Lionfish and Sea Cucumber Workshop

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Havana, Cuba

Sea cucumber fisheries and management

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SERIAL EXPLOITATION

GLOBAL TRENDS IN SEA CUCUMBER FISHERIES

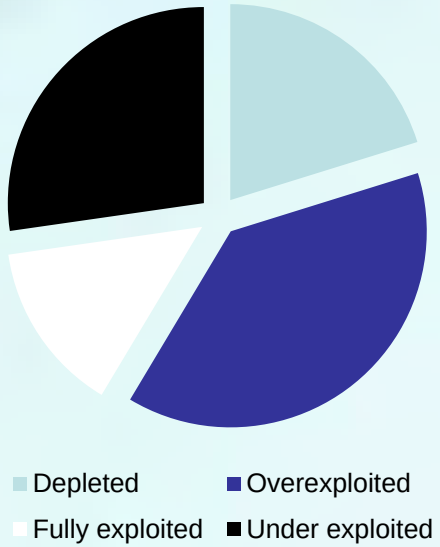
Globalisation of sea cucumber trade

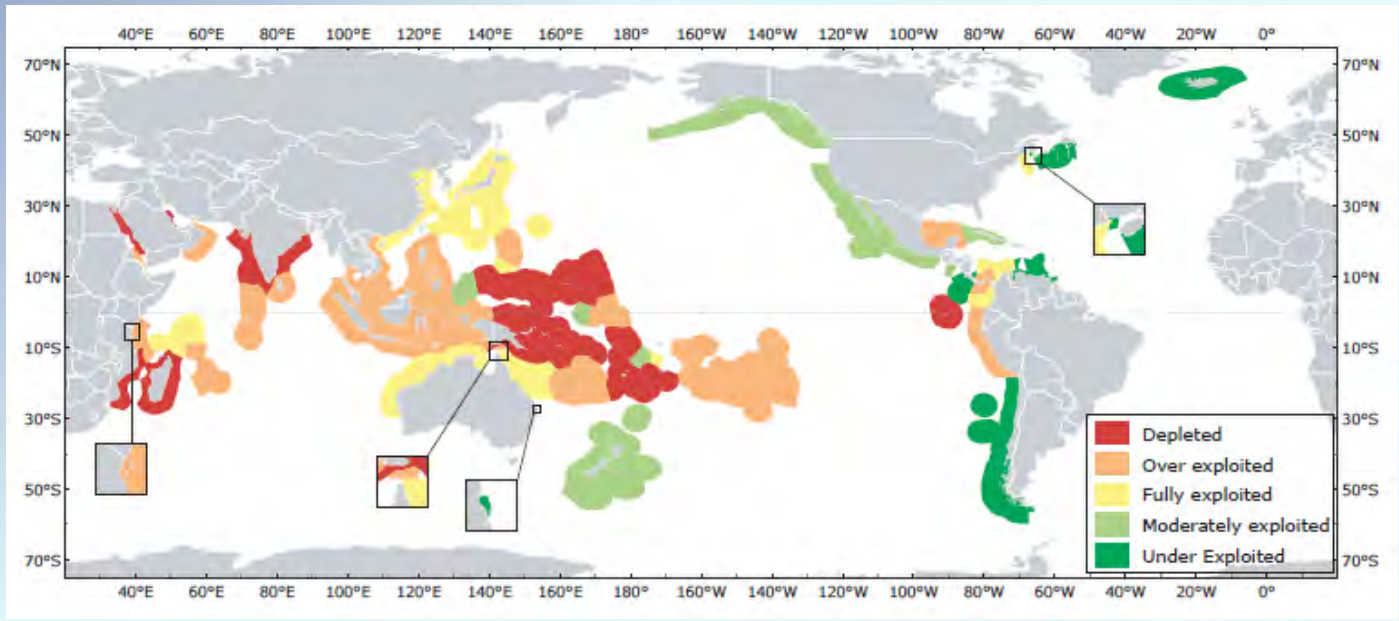
Strong demand from Asian markets leading to search for regions to exploit and new species to target as an adaptive strategy to serial over-exploitation in traditional Indo-Pacific fisheries

Global sea cucumber catch exported to Hong Kong. Source: Anderson et al. (2010)

Global indications of over-exploitation

Population declines from overfishing	81 %
Decrease in average body size harvested	35 %
Move from near shore to off-shore fishing grounds	51 %
Shift from high to low value species	76 %
Lack of fisheries management regulations	38 %
Illegal, unregulated and unreported catches	50 %





Source: Anderson et al. (2010); Purcell et al. 2013

Recent trends in the development of sea cucumber fisheries

- Fisheries have undergone boom & bust cycles since 1950's
- Catches have increased 13-16 fold in the past 3 decades
- New fisheries have expanded 5-6 times faster than previously
- Decimation of stocks in short time frames (2-4 years)
- Export-driven exploitation has caused collapse of sea cucumber fisheries in last decade
- Moratoria imposed in 14 countries (39 % of global fisheries)
- Local extinction of some tropical species

Recent development has been unsustainable and too rapid for effective management response

Conservation status

- 377 sea cucumbers species assessed for extinction risk
- 16 species placed on IUCN Red List
- 9 are “Vulnerable” and 7 are “Endangered”
- Likelihood of listing on CITES Appendix II
- All species were previously common and widely distributed
- Extinction risk driven by high market value
- Risk compounded by accessibility & familiarity in market
- Majority of Caribbean species categorized as “Least concern” due to lack of information or evidence that they are fished

Importance of sea cucumbers

- **Ecological importance**
  - Bioturbation is an important ecological function
  - Key role in nutrient cycling increasing primary production
  - Potential to buffer reefs from ocean acidification
- **Socio-economic**
  - Source of income for ~ 3 million fishers in > 70 countries
  - Sea cucumber fisheries are significant to poverty reduction as benefits flow directly to the village level
  - Flow of benefits to all actors along the value chain
  - Source of export earnings for low-income countries

LOSS OF SEA CUCUMBERS FROM OVERFISHING POSSES A THREAT TO BIODIVERSITY, ECOSYSTEM SERVICES & LIVELIHOODS

Biological challenges to management

- **Insufficient data on biological parameters**
  - Lack of data on life history characteristics e.g. growth, mortality, longevity, dispersal & recruitment hampers conservation, management & aquaculture development

- **Ecological vulnerability**
  - Sedentary and unable to escape from exploitation
  - Susceptible to opportunistic exploitation
  - 'K strategists': low recruitment, slow growth and high longevity makes recovery rates slow and stocks vulnerable to collapse
  - Reproductive success relies on sufficient densities for effective spawning & fertilisation of gametes

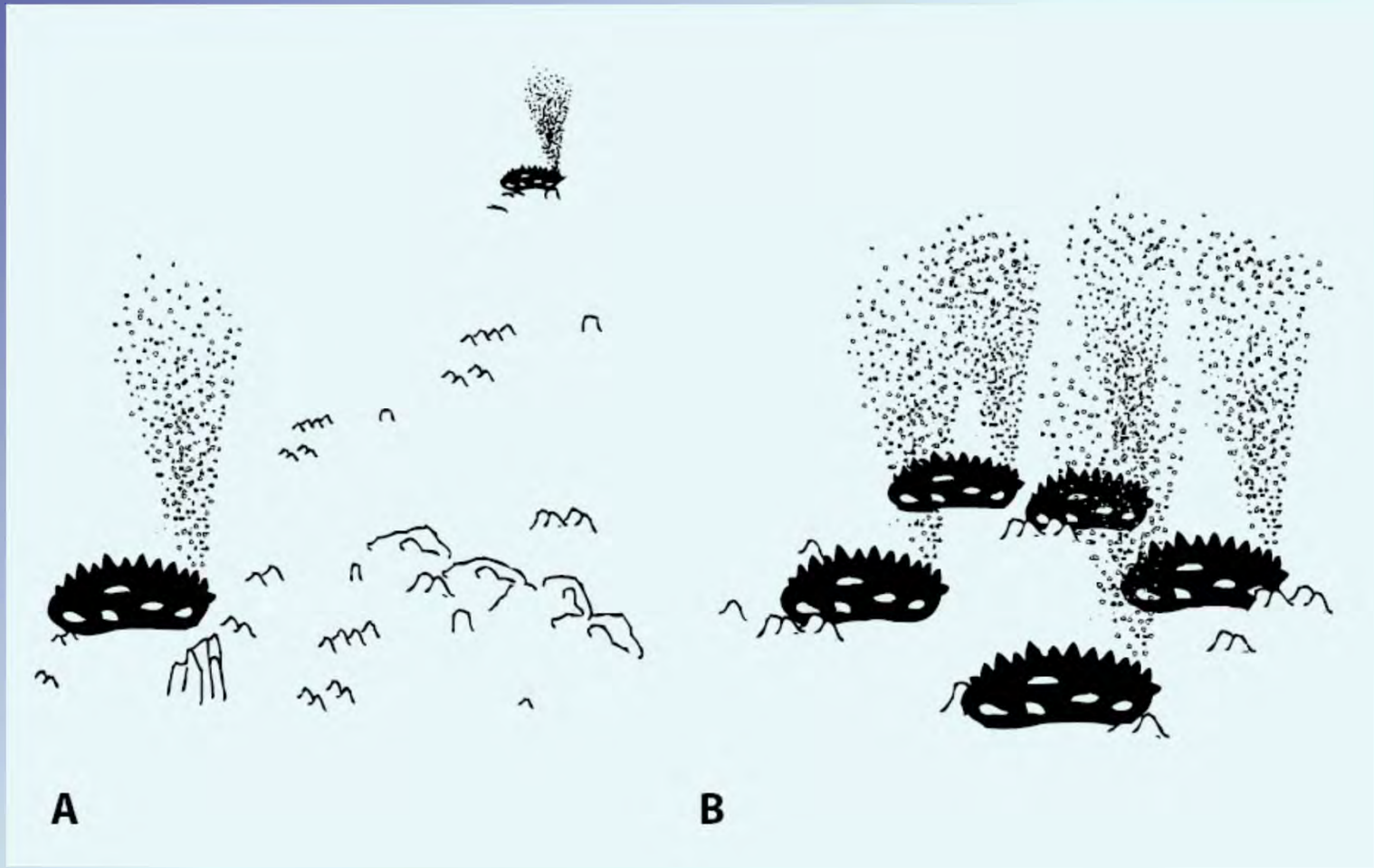
S-fisheries

- **S**mall-**s**cale
- **S**patially-**s**tructured
- Targeting **S**edentary **S**tocks

Classical approaches to fisheries management based on Maximum Sustainable Yields (MSY) are not applicable

Information on species abundance and densities is critical to sustainable management

Objective of management: get from A to B



Create multiple groups of adults at sufficient densities to reproduce effectively and supply recruits to the fishery. (Source Friedman *et al*. 2008)

Current status in the Caribbean

- Global review of trade and fisheries did not identify any known fisheries, except Cuba and Mexico (FAO, 2008)
- **Lack of information** on status of fisheries in the Caribbean
- Evidence that fisheries are **developing rapidly** in the region
- Caribbean may be the **last** tropical region in the world with an **opportunity** to implement sustainable management
- Request for WECAF to **increase attention** to sea cucumber fisheries management at the 15th Session held in March 2014
- Urgent **need** to develop management plans for existing fisheries
- Diagnostic tools & technical guidelines specific to sea cucumber fisheries exist for **best-practice management**
- Workshop aims to raise awareness of the issues and act as a **catalyst** for future interventions in the region

ECOSYTEM APPROACH

SEA CUCUMBER FISHERIES MANAGEMENT

Ecosystem Approach

- Ecosystem Approach to Fisheries (EAF) should be applied whereby the objectives are to preserve ecosystem integrity and biodiversity and address the value and use of resource by a range of stakeholders

- Lack of quantitative information on the status of sea cucumber stocks should not be used as a reason to delay the implementation of management

- In the absence of insufficient data a pre-cautionary approach should be applied

Road Map for Management

1) Categorize fishery

-scale of fishing activities

-status of stocks (indicators or survey)

-capacity of management agency

2) Develop set of regulatory measures

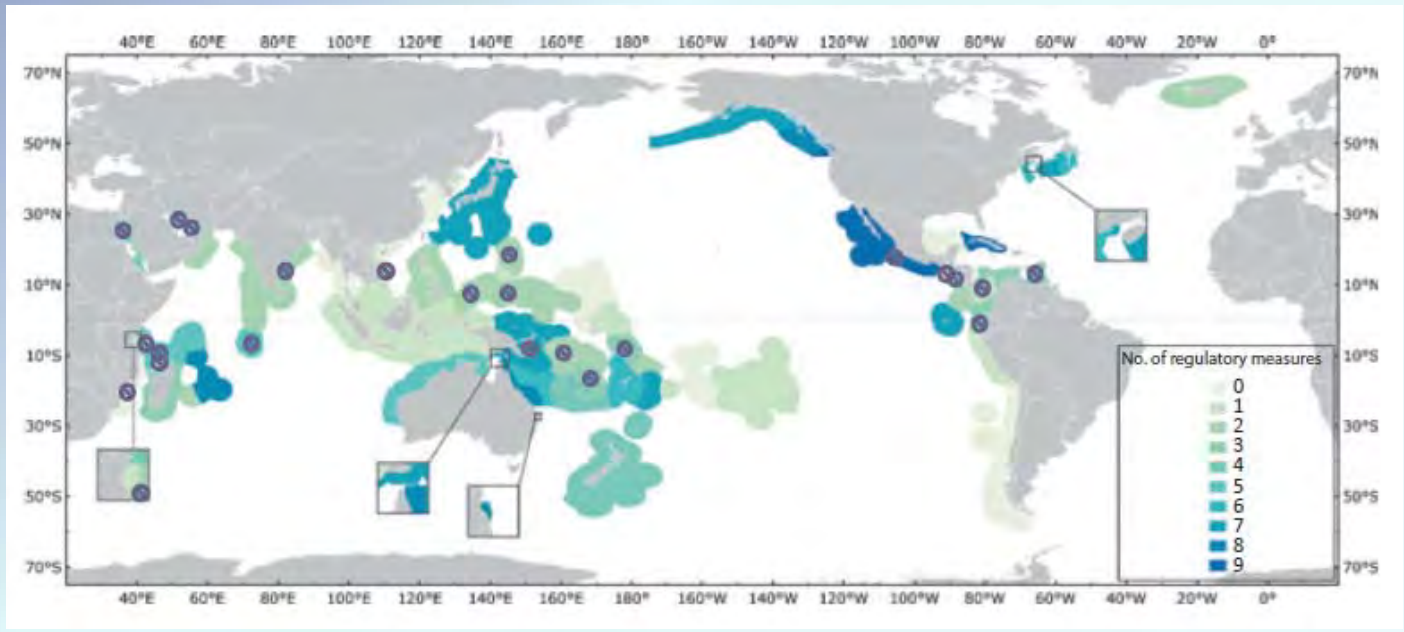
3) Develop set of actions for implementation

Minimum regulatory measures (small-scale fisheries)

	Under exploited		Fully exploited		Depleted	
	Advised	Min.	Advised	Min.	Advised	Min.
Size limits	✓	✓	✓	✓		
Gear limitation and development	✓		✓	✓		
Effort and capacity control	✓		✓			
Catch quotas	✓		✓			
Market chain licensing and reporting	✓	✓	✓	✓	✓	✓
Seasonal and short-term closures	✓		✓			
Bans or moratoria					✓	✓
Marine protected areas and no-take reserves	✓	✓	✓	✓		
Rotational harvest closures	✓		✓			
Territorial user rights in fisheries	✓	✓	✓	✓		

Boom – Bust - Ban

- Central and South American countries imposed fewer regulatory measures on sea cucumber fisheries (1-2)
- Fisheries closed in Panama, Venezuela, Costa Rica, Ecuador
- Moratoria underscore <u>weakness of management</u>
- Fishery in Cuba is well regulated (size limits, closed season)



Source: Purcell *et al*. (2013)

Actions for implementing management (small-scale fisheries)

	Under exploited		Fully exploited		Depleted	
	Advised	Min.	Advised	Min.	Advised	Min.
Overview of the harvested species	✓	✓				
Fishery-independent stock surveys	✓	✓	✓	✓	✓	✓
Fishery-dependent stock surveys	✓	✓	✓	✓		
Socio-economic surveys	✓	✓	✓	✓	✓	✓
Price monitoring	✓		✓			
Support institutional arrangements for local-scale management	✓		✓	✓		
Establish management advisory committees	✓		✓	✓	✓	
Legislation of management regulations	✓		✓	✓		
Assign accountability	✓		✓		✓	
Enforcement	✓		✓			
Education and communication with stakeholders	✓	✓	✓		✓	✓
Improve quality of processing through training	✓	✓	✓	✓	✓	✓
Restocking					✓	

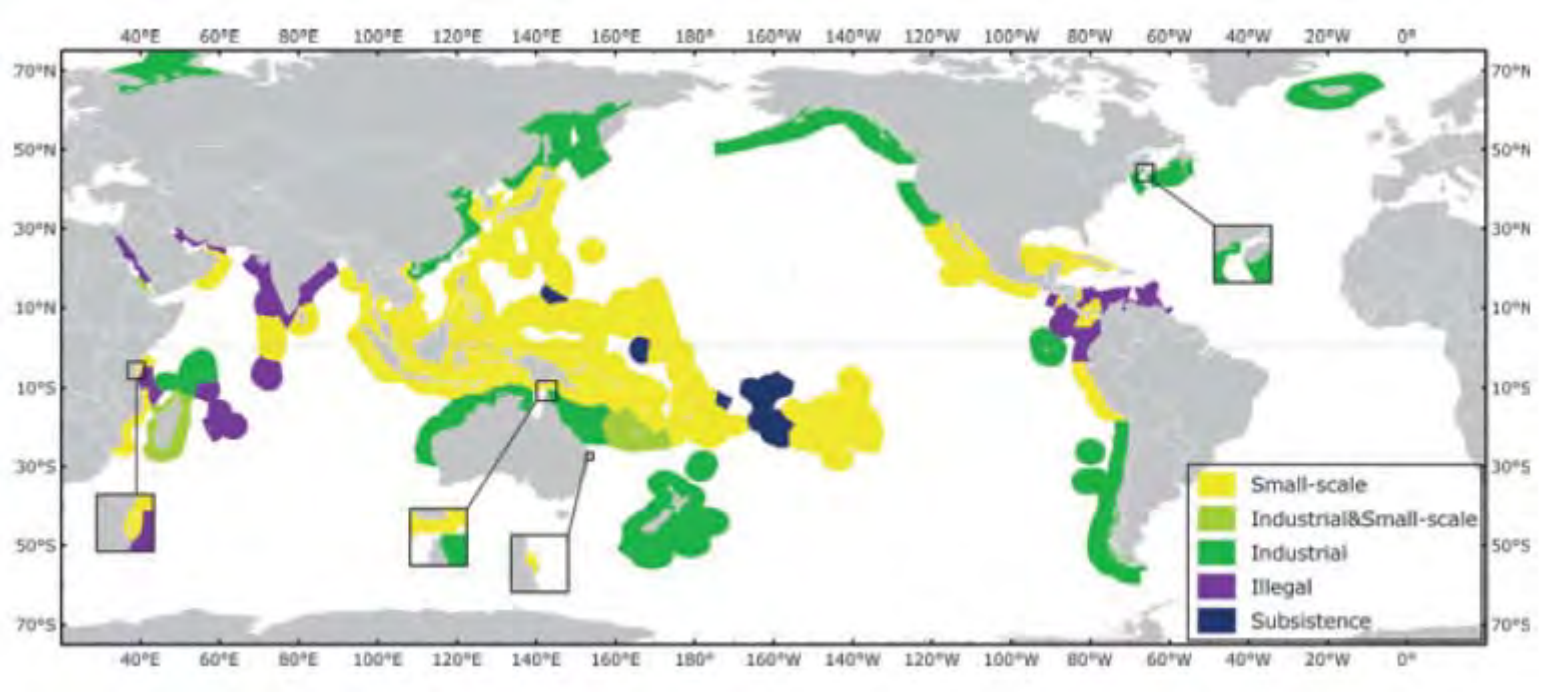
Re-stocking

"Translocation of adults or the release of hatchery-reared juveniles to create of increase densities of protected adults that breed and enhance recruitment of new sea cucumbers in the fishery"

- Hatchery technology for sea cucumbers originally developed to **re-stock** over-exploited wild populations
- Re-stocking of wild fisheries with hatchery-reared juveniles is only management action that can **restore** depleted fisheries
- Re-stocking should only be implemented where agencies have the **technical capacity** to conduct responsible programs

Challenges to management

- Illegal, unreported and unregulated fishing - small-scale and industrial fisheries in Caribbean and Latin America
- Poaching – industrial 'factory' boats from neighbouring countries fishing in the EEZ of Caribbean countries



Source: Purcell *et al*. (2013)

Minimum regulations

1. A small list of permissible species for exploitation
2. Fleet controls – especially on the size of boats in the fishery
3. Limited entry controls to restrict the number of fishers
4. Licensing and reporting requirements

Potential for TURFs in Caribbean

Territorial User Rights in Fisheries (TURFs)

"The provision to certain users e.g. ***fishers*** *or* ***co-operatives*** *of the exclusive privilege to exploit certain resources and/or access certain areas of seabed"*

1. Rights to specified **portions of the catch** e.g. Individual Transferable Quotas (ITQs)
2. Exclusive **access to fishing grounds**

- Can be at local, national, regional or international level
- Bestows accountability and ownership over stocks
- Avoids the "race to fish" and the "tragedy of the commons" typical to open-access fisheries

Importance of enforcement

- Enforcement capacity is the most important driver for fisheries sustainability
- Without enforcement the best management plans will fail!
- Participation of stakeholders in the development of management plans is essential
- Community-based or co-management approaches are better suited to small-scale fisheries
- Illegal trade needs regional level enforcement
- Licensing and reporting requirements at each level of the value chain are essential for monitoring, control and surveillance
- Vessel Monitoring Systems can assist with IIU fishing

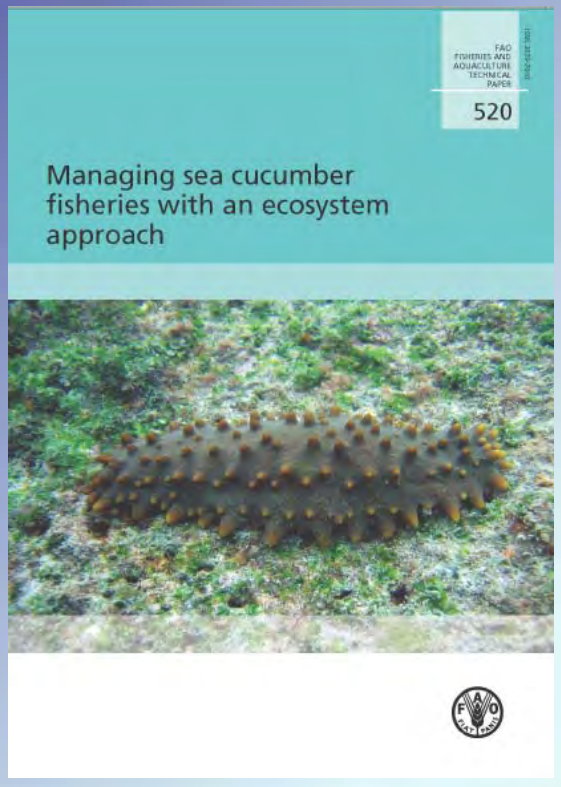
Recommendations

- Conduct fundamental **biological research** on life-history characteristics and reproductive biology of exploited species
- Train fishery officers in survey techniques to conduct **fishery-independent surveys** of sea cucumber populations
- Develop regional guides for **identification** of live and processed local species
- Collect standardised **data** at the national level on prices and quantities of catches, processing and exports
- Provide technical assistance on post-harvest handling, **processing** and quality assurance to ensure that the maximum value is realized from the resource
- Organise a participatory **workshop** on Sea Cucumber Fisheries: an Ecosystem Approach to Management (SCEAM) workshop for the **Caribbean** region

Further information

RESOURCES

Sea cucumber fisheries management



http://www.fao.org/docrep/012/i1384e/i1384e00.htm

http://aciar.gov.au/publication/mn135

http://www.fao.org/docrep/013/i1780e/i1780e00.htm

Sea cucumber fisheries: an ecosystem approach to management (SCEAM) FAO workshop reports

SCEAM Pacific (2011)

http://www.fao.org/docrep/015/i2658e/i2658e00.htm

SCEAM Indian Ocean (2013)

http://www.fao.org/docrep/018/i3223e/i3223e00.htm