Capture fisheries in the South China Sea

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SUB-REGION
a shallow shelf
Capture fisheries – a history of expansion of effort & capacity

• **Post 1945 expansion**
  – due to lack of fishing during the war period

• **1970’s intensification**
  – expansion of the small trawl fishery
  – massive increase in the tuna fisheries
  – small scale fishing motorization, cheap gear

• **1990’s technology & markets**
  – satellite based fishing zone prediction
  – small boats installing fish finders and GPS
  – can get further offshore
  – access arrangements
  – canning, freezing and export
  – globalized markets/transport infrastructure
Types of fishing

**Passive gears**
- traps, pots
- gillnets
- longlines

**Active/mechanized gears**
- **Pushnetting**
  - Nearshore, typically ~10 metres depth
- **Trawling**
  - Otter board trawling
  - Pair trawling, midwater trawling
  - Upto 70 metres depth
- **Purse seine**
  - Light attraction
  - Brings up demersal species in shallow water
General trend in South China Sea capture fisheries

- South China Sea 13% of global total marine catch
  Total SCS production
  - ~10.3 million tonnes (of 78.3 million tonnes)
- Overall consistent increase in capture fishery production
- Southern China
  - rapid rise 1950-1960s
  - in decline since 1990 as overfishing has impacted even fast recruiting spp.
- Southeast Asia ↑29% past decade
  - consistent slight annual increases of 2 to 4%
How is rising production achieved in the SCS?

• Several effects

• Fishing vessel capacity increasing
  – Both power & numbers
  – Expanding fishing area sustains production level

• increase in biomass by fishing down effects
  – removing larger longer lived species
  – higher biomass of short-lived small fast recruiting species
Status of fisheries

• Ecosystem level effects
  – Majority of impact between 1975 and 1985
  – Large composition shifts of previous decades
  – Loss of higher value larger species
  – Settled down to favour an ecosystem dominated by small species

• Lower value species utilized variously
  – surimi, canned fish, fishmeal, aquaculture feeds

• Catch per Unit Effort is low (and declining)
  – working harder for lower value catch
Targeting of small pelagics, neritic tunas

• Expansion of purse seine and pair trawl fisheries
  – chasing small pelagics further offshore
  – Purse seine use of lights - even demersal species caught

• Large pelagic species
  – fully fished in Viet Nam
  – overfished in Gulf of Thailand
  – moderately/underfished eastern side of the South China Sea

• Small pelagic species
  – overfished/fully fished: China, Viet Nam, Gulf of Thailand, northern Philippines
  – underfished/moderately fished: south & southeastern South China Sea
Loss of demersal (bottom living) species

- Nearshore fishing (esp. Trawling) targets bottom dwelling species
- High value, highly appreciated locally
- Rapid loss of sharks/rays (bycatch)
- High value snappers, groupers, croakers
- Small demersals, trevallies,
- Lowest value/smaller sizes: threadfins, bigeyes, ponyfish (processing for surimi)
Production of surimi species

• Dramatic increase in production over the past decade
  – >754,000 tonnes in the South China Sea in 2007 (probably more now)

• Several drivers
  – improved processing techniques
  – demand for frozen standardized cheap seafood
  – increasing use of species previously regarded low value trash fish category
  – lack of quality fish for direct sale
Low value/trash fish production

- ~1.7 million tonnes
- **Consistently >20 %** of total catch across the region
- Mainly from trawl fisheries
  - ~40 to 60 % of catch
  - For fish meal or for direct feeding
  - Aquaculture & livestock feeds
- **Nearly 65%** reduction in past 2-4 years
  - increased preservation/utilization for human food (surimi)
Aquaculture development & demand for feeds

- Aquaculture now produces 2.2 million tonnes of food fish in the SE Asian region.
- Aquaculture has a direct linkage to marine capture fisheries:
  - Demand for fresh fish and fishmeal as feeds
  - Capture fishery fish direct feeding to aquaculture
- Aquaculture production demands almost all of the region’s fishmeal (>80%):
  - This demand drives overfishing
FISHERY MANAGEMENT?
General failure of centralized fisheries management measures

• Fishing operations are highly mobile
  – expansion into new areas
  – transhipment of fish between fishing areas
  – IUU catches

• Limited enforcement/compliance
  – perceived as inflexible, not relevant to local context
  – local government may override national measures
  – political “interference” in decision making
  – well connected industrial sector (=money)
  – large numbers of the artisanal sector (=votes)
Huge numbers, complex governance

- Enormous numbers of vessels in the South China Sea region
  - Over 1.74 million fishing vessels recorded
  - 86% small-scale, ~12 metres
- Over-capacity in fisheries
  - particular medium scale trawlers, pair trawlers, pushnetters, purse seine
- Complicated by contested territorial and border claims
  - fisheries seen as possible precedent, so no dialogue
Can we say our fisheries are managed?

- Across the whole region
- Management of **individual stocks is rare**
  - Mixed gear fisheries
  - range of vessel size & type
  - Many species targeted, all utilized
  - Some resources have specific measures applied
  - But weak enforcement
Fishery overcapacity

• Leaving it to the market to determine optimal capacity isn’t working

• Why are vessels not leaving the fishery?
  – Often uneconomic
  – fishery over-exploited in most cases

• Cannot sustain increasing production forever
  – reached the limit in almost all fisheries
Perverse policies undermining sustainability

• Rising costs, lower catch value
  – labour costs
  – Fuel costs
  – other inputs
  – declining catches

• Perverse incentive structures
  – subsidies and other distorting factors

• Governments may “help out” fisheries
  – policies for increasing production for oceans
  – foreign labour
  – fuel subsidies
  – turning a “blind eye” to IUU fishing
Spatial measures most common management approach

- Size limits (e.g. fish length) and quotas are not used, or poorly enforced
- Difficult to control numerous vessels
- All countries have some zoning of their EEZ
  - two or more zones, some have up to four zones
  - closed areas and closed seasons common in the near shore zone
  - Gear restriction and licensing,
- But...limited VMS/patrolling to ensure compliance
Closed areas & MPAs

• Come in many forms
• (MPAs) are the most common
  – established with tourism or conservation objectives
  – typically Ministry of Environment and rarely in consultation with fisheries
  – almost never actually protect fishery resources
  – source of dissatisfaction to disenfranchised fishers
• Need a more holistic understanding of how area protection benefits fisheries
  – Critical habitats
  – Spawning of nursery areas
  – Seasonal/area
  – Social benefits/impacts
Artificial reefs

• Major programmes in some countries
• Popular intervention in shallow waters
  – less (ir)relevant to pelagic resources?
• Considered to have multiple functions
  – Obstructions to trawl fishing?
  – Increase catches of small scale fisheries?
  – Increase tourism value?
• Fish aggregators or increasing biomass?
  – Limited, objective evaluation of impacts of artificial reef programmes
• Need more science-based establishment & monitoring of artificial reefs
IMPROVING MANAGEMENT & REHABILITATING FISHERIES

Some thoughts for the meeting
Consistent policy with long term vision

• **Recognize**
  – need for management
  – overcapacity in onshore processing infrastructure

• **Take on industrial /commercial fisheries**
  – Avoid short term “easy fixes”
  – Build-in sustainability
  – Recognize that processing and aquaculture demand for fish as drivers
  – They are beginning to listen as they see their investments are not performing
Future of the South China Sea fisheries determined by political will

- Invest in fishery management
  - build local government skills to manage fisheries
  - reduce fishing effort
  - control access, allocate rights
- Integrate ecosystem services into fishery management
  - Innovative, science-based use of spatial measures
- Link subsidies to commitments
  - improvements in management or
  - more compliant fishing behaviour
- Combat IUU fishing
  - related movements and trade
  - Vessels and crew
Reduce impacts on habitats & diversity

• Reducing trawl impacts
  – recovery of benthic life is relatively quick in areas where trawling ceases
  – but in heavily trawled areas may take decades

• Conservation areas
  – e.g. MPA, coastal fishery exclusion zones may be effective
  – must be of meaningful scale and have a degree of connectivity

• Complex of coastal environments seems to be the most important
  – delta, mudflats, mangroves fringes, seagrass
  – shallow substrates in the nearshore

• Aim for less impacting gears in the nearshore areas
  – protect spawning and nursery grounds, reduce catch of juveniles
Habitat recovery and manipulation

• Resting fisheries (closures)
  – generally quick recovery (< 5 years)
  – except long lived species shark/turtle etc.

• Zoning and habitat closures maybe effective
  – Especially for demersal, nearshore resources
  – link to mosaic of habitats

• Marine parks and protected areas
  – rarely have an explicit fishery objective
  – Typically fail to provide fishery benefits

• Artificial reefs
  – fishery potential is over-played
  – benefits mostly lie in the social impacts
What to do in deeper water?

• Primarily pelagic fisheries
  – can be variable, and are mobile
  – environmental factors, climate

• Respond to
  – limitation of effort of capacity
  – protection of spawning or juvenile stocks

• Spatial measures provide many of these benefits
  – closed areas
  – especially if linked to gear measures and seasonal closures

• Difficult to enforce without surveillance
  – e.g. vessel monitoring and sea patrols
Would decommissioned rigs contribute to enhanced fisheries resources?

- When in operation the exclusion area around a rig is a form of reserve
  - the exclusion zone around a series of rigs can be substantial
  - three dimensional structures attract considerable marine diversity
  - too far offshore for artisanal fishery benefits
- After decommissioning would the exclusion area be maintained?
  - industry no longer in interested
- If no exclusion zone
  - little fishery benefit beyond acting as a large aggregating device
  - could be trawled around
  - Fish highly susceptible to light attracting purse seine vessels
Would decommissioned rigs contribute to biodiversity?

- Probably
- Depends upon
  - extent of the exclusion area
  - sunk or fixed legs?
  - three dimensional “volume” created
- As aggregators will certainly attract...
  - larger fauna - whaleshark, shark, turtle, etc.
  - ...and fishing vessels!
- If non-selective fishing is going on around this structure
  - these species may actually become more susceptible to capture
Thank you