Comparing Strategies for Fisheries Management

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Roadmap for this talk

- Key challenges for fishery management
- Successful approaches
- Prospects: Food, livelihoods, conservation
- New challenges & opportunities
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Key challenges for fishery management

- Many objectives of fishery management
  - Food security
  - Livelihoods and economic efficiency
  - Ecosystem sustainability

- Input vs. output controls?
  - Closed seasons, gear restrictions, size limits, closed areas
  - Well-monitored total allowable catches
  - Combination of them?

- Stock assessment
  - Data “rich”
  - Data “poor”

- Mixed-stock fisheries
  - Does overfishing increase production?
  - Designing institutions for management
Question: How to design fishery management to embrace these goals and challenges?
One approach: Rights-based management (RBM): Increasingly adopted around the world

- Set overall TAC, allocate as “shares” to:
  - Areas
  - Fishing ports
  - Individuals
RBM and fishery collapse

Theory: RBM alter incentives for stewardship
Panel Data: 11,000 fisheries worldwide x 50 years
Compare collapse rates with/without RBM

Question: How to prevent fisheries from collapsing?
RBM and fishery collapse

“Can catch shares prevent fishery collapse?”
(Costello et al., 2008. Science.)
Other RBM solutions in the developing world

- Fishery cooperatives
  - Give some monitoring and management authority to fishing groups
- Spatial rights – TURFs
  - Allocate spatial rights to communities

“Partial enclosure of the commons”
(Costello et al., 2015. *J. Public Econ.*)
Example from the field: Fish Forever

FISH FOREVER: THE ELEMENTS OF SUCCESS

- Community Support
- Fishery Management
- Links to Markets
- Fisheries Policy
- Exclusive AccessPrivileges
- Exclusive Access Area
- Fish Recovery Zones
- Monitoring & Evaluation
- Local Enforcement System

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Data-poor ecosystems in worst shape

- 95% of fisheries *lack formal assessment*
- How to design/prioritize reforms without data?
- Develop new methods for global data-poor assessment
Models that combine ecology, economics, fisheries science can inform management design
A model of *global* fishery management reform

- Stock-by-stock analysis (4,713 fisheries worldwide)
- Economics data, ecological data, dynamic models
- Current status & projections
  - BAU, Fmsy, Rights-based fishery management
- Triple-bottom-line outcomes
  - Food, Profits, Conservation
Global snapshot of fishery status & trends

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Global snapshot, highlighting China

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Forecasting effects of RBM

- Tradeoffs across objectives, across countries
- Timing of recovery
- Alternative management scenarios

"Global fishery prospects under contrasting management regimes" (Costello et al., 2016. *PNAS*)
Country-level effects: RBFM vs. BAU

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Global effects: Today

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- Policy applied to stocks of conservation concern
- Policy applied to all stocks

Biomass (MMT) vs. Annual Profit ($ Billions)
Global effects: Conservation Concern stocks

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Policy applied to stocks of conservation concern
Policy applied to all stocks

Annual Profit ($ Billions) vs Biomass (MMT)
New challenges and opportunities

- Multi-species fisheries and food webs
  - Fishing predatory fish lets prey flourish
  - May increase overall production, but
  - May increase risk

- Aquaculture, enhancement, and wild fisheries
  - Spatial planning
  - Market interactions
  - Ecological interactions

- Climate change
  - Productivity changes, range shifts, dispersal, regime shifts
  - Climate-proofing fishery institutions
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Conclusions and main messages

- Global: Fisheries “diverging” in performance
  - If devote science and best management practices:
    - Fisheries will recover
    - Can produce many benefits: food, economy, ecosystem

- China context is special:
  - Mixed-stock fisheries
  - Ocean enhancement, artificial reefs
  - Combination of input and output controls
  - Excellent scientific capacity
  - Many social objectives

- A way forward?
  - Draw on lessons-learned from around the world
  - But unique context may call for new approaches, and combinations of tools

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Thank You
Questions?

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