Introduction to The Fishery Performance Indicators

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Food is the indispensable cornerstone of human well-being

Human Health, Nutrition & Food Security
Terrestrial Food Systems
Aquatic Food Systems
Rationale of Developing Fishery Performance Indicators (FPIs)

- Many certification programs are expensive and emphasize biological and ecosystem indicators.
- Need to address an essential objective of managing commercial fisheries—**to create sustainable income and contribute to resilient communities.**
- Need for **comparability** between fisheries management systems in industrialized and artisanal fisheries.
The Blue Ribbon Panel

Chair: Ove Hoegh-Guldberg, Director of Global Change Institute, University of Queensland
Transform Aqorau Deputy DG/Director, Forum Fisheries Agency/Parties of Nauru Agreement
Ragnar Arnason Professor, University of Iceland
Thiraphong Chansiri President, Thai Union Foods
Nelson Del Rio Chairman, Emergent Intelligence Solutions
Henry Demone President and CEO, High Liner Foods Inc., Canada
Sylvia Earle Founder Mission, Blue/Sylvia Earle Alliance
Missy H. Feeley Chief Geoscientist, ExxonMobil Corporation
Dimitri Gutierrez Director of Oceanographic Investigation, Institute of Sea of Peru
Ray Hilborn Professor of Aquatic and Fisheries Science, University of Washington
Naoko Ishii CEO and Chairperson, Global Environment Facility
Chris Lischewski President and CEO, Bumble Bee Foods
Jane Lubchenco, Former Admin of NOAA; Professor Oregon State University
Kim Anh Nguyen, Director, NOMA-FAME Program, University of Nha Trang, Vietnam
David Obura Director, CORDIO East Africa, Kenya
Rolph Payet FRGS Minister for Environment and Energy, Pro-Chancellor University of Seychelles
Neroni Slade Secretary General, Pacific Islands Forum
John Tanzer Director, Global Marine Programme WWF International
Johan H. Williams Specialist Director, Ministry of Fisheries Ministry of Fisheries and Coastal Affairs
Dawn Wright Chief Scientist, Esri GIS Mapping Software
Jintao Xu Professor of Natural Resource Economics, Peking University

Study Co-Directors
James L. Anderson, World Bank
Claudia Mengelt, US National Research Council
“...we must recognize that the well-being of communities, viability of economies, and sustainability of ecosystems are intricately linked.”

“...solutions must be multidimensional and integrate all aspects of the socio-ecological system.”
BRP on Measurement and Capacity

“A multidimensional indicator system ... needs to be designed as an integral part of the measurement process.”

Establish “global networks of expertise and research”
Improving Fisheries Systems - Do we know what really works? Where should we invest?

- Better infrastructure?
- More data and stock assessment?
- More stakeholder meetings?
- Community management?
- Secure fishing rights?
- Education?
- More enforcement?
Comparable

Indonesia – Bajau Sea Gypsy - Snapper/Grouper Boat
Rhode Island – Groundfish Trawler

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What Are the FPIs?

• A rapid assessment instrument for measuring economic, community and ecological outcomes in fishery management systems.

• Are designed to evaluate and compare the world’s fisheries management systems – both in developed and developing; data-rich and data-poor regions.

• Are designed to evaluate the effectiveness of investment, reforms and interventions in fishery management systems.
The **Triple Bottom Line**

- **Ecological Sustainability**
- **Economic Sustainability**
- **Community Sustainability**

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[UF University of Florida]
New tool – Fishery Performance Indicators

Features 1: Multi-Dimensions

Features 2: Easy to Measure

Feature 3: Output Results & Input Factors

Fish Stock and Ecology
Harvest Efficiency
Harvest & Post-harvest Assets
Risk
Value added & Market
Management returns
Labor Returns
Community Services
Labor Conditions

Macro Factors
Rights
Co-Management
Management Practices
Markets & Market Institutions
Infrastructure
Fishery Performance Indicators

With Test Cases:
Alaska Salmon, New England Groundfish, and Kenya Artisanal Fisheries

Version 1.3

James L. Anderson¹, Christopher M. Anderson², Jingjie Chu³ & Jennifer Meredith⁴

Revised
July 18, 2016

http://ifs.institute.sfn.ufl.edu/projects/new-metrics/fpi-manual

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³Senior Resource Economist, Africa Region, World Bank, Washington, DC
⁴Assistant Professor of Economics, Seattle Pacific University, Seattle, WA
The Fishery Performance Indicators: A Management Tool for Triple Bottom Line Outcomes


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Plos One, 2015

http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0122809)
Fishery Performance Indicators - Outputs

68 simple metrics covering 14 dimensions, 3 components

Ecological Sustainability
- Fish Stock Health & Environmental Performance

Harvest Sector
- Harvest Performance
- Harvest Asset Performance
- Economic Risk Exposure
- Owners, Permit Holders & Captains
- Crew

Post-Harvest Sector
- Market Performance
- Processing & Support Industry Performance
- Post-harvest Asset Performance
- Processing Owners & Managers
- Processing Workers

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FPI Outputs

• **14 Dimensions**

• **68 metrics**

• **Two ways of Grouping:**
  – Triple-Bottom Line
  – Along the value Chain

• **Metrics**
  – Metrics are scored 1-5, with the bins generally chosen to reflect the quintiles of performance on the metric globally

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**FPI Outputs**

- **14 Dimensions**
- **68 metrics**
- **Two ways of Grouping:**
  - Triple-Bottom Line
  - Along the value Chain

**Metrics**

- Metrics are scored 1-5, with the bins generally chosen to reflect the quintiles of performance on the metric globally.

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## FPI Inputs

- **15 Dimensions**
- **54 metrics**

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<th>Dimension</th>
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Macro Indicators

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<td>Heritage Foundation/Wall Street Journal</td>
<td>• Business Freedom&lt;br&gt;• Trade Freedom&lt;br&gt;• Fiscal Freedom&lt;br&gt;• Government Size&lt;br&gt;• Monetary Freedom&lt;br&gt;• Investment Freedom&lt;br&gt;• Financial Freedom&lt;br&gt;• Property Rights&lt;br&gt;• Freedom from Corruption&lt;br&gt;• Labor Freedom</td>
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Gross Domestic Product (GDP) Per Capita

Data – Take advantage of existing databases
Sample Metric 1:

**Annual Landings Volatility:** Ratio of the standard deviation of the first differences of annual total landings sold to the mean landings over the past 10 years

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<th>Score</th>
<th>Description</th>
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<td>5</td>
<td>0.14 or less</td>
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<tr>
<td>4</td>
<td>0.15 ~ 0.21</td>
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<tr>
<td>3</td>
<td>0.22 ~ 0.39</td>
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<tr>
<td>2</td>
<td>0.40 ~ 0.99</td>
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<tr>
<td>1</td>
<td>1 or greater</td>
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*Note:* Pilot study boundaries were established by calculating the score for each country-fish category (finfish, shellfish, and crustaceans only) in FishStat (FAO), then determining the quintile values.
Sample Metric 2:

Social Standing of Captains

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<td>Among the most respected in the community, comparable with civic and religious leaders or educated professionals</td>
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<tr>
<td>4</td>
<td>Comparable to business managers and white collar jobs</td>
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<tr>
<td>3</td>
<td>Comparable to skilled labor jobs</td>
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<tr>
<td>2</td>
<td>Comparable to unskilled labor or service jobs</td>
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<tr>
<td>1</td>
<td>Among the least respected, such as illegal labor, slaves or indentured servants</td>
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</table>
Quality of the Scores

- **A**: Highly Confident
- **B**: Reasonably confident
- **C**: Not sure, just a guess
FPI Database 2017
N=121
32 countries
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FPI Database 2017
N=121
32 countries
FPI Case Studies

Scale
- Artisanal: 36%
- Industrial: 64%

Location
- Inland: 7%
- Offshore: 29%
- Nearshore: 64%

No. of Species
- Single species: 43%
- Multi-species: 57%

Fish Type
- Bivalve: 4%
- Other: 7%
- Crustacean: 21%
- Finfish: 68%
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<tr>
<th>Species/Strain</th>
<th>Country/Region</th>
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<th>Ecology</th>
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</tbody>
</table>
Thank You

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Insights from the Fishery Performance Indicators

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Sr. Resource Economist, The World Bank Group

NAAFE
La Paz, Mexico
March 22, 2017
<table>
<thead>
<tr>
<th>Fishery</th>
<th>Country</th>
<th>Year</th>
<th>Ecology</th>
<th>Economic</th>
<th>Community</th>
<th>Harvest Sector</th>
<th>Post-Harvest Sector Performance</th>
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<td>2.40</td>
<td>2.23</td>
<td>1.78</td>
</tr>
</tbody>
</table>
Fishery Performance

Outputs

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Fishery Performance

**Outputs**

- Stock Health
- Harvest Performance
- Harvest Asset Performance
- Risk
- Trade
- Product Form
- Post-Harvest Assets
- Managerial Returns
- Labor Returns
- Health & Sanitation
- Community Services
- Local Ownership
- Local Labor
- Career

**Inputs**

- National Environment
- Environmental Risk
- National Governance
- National Economics
- Access Rights
- Harvest Rights
- Collective Action
- Participation & Support
- Management Capacity
- Gender Leadership & Cohesion
- Data
- Management Methods
- Markets & Market...
- Infrastructure

Legend:
- Green: Top 10%
- Black: Average
- Red: Bottom 10%

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Performance by Region

- Northern Europe
- Australia
- North America
- Asia
- Africa
- South America

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University of Florida
Global FPI Preliminary Insights: Access & Harvest Rights

- Access and Harvest Rights are positively related to performance

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Global FPI Preliminary Insights: Enforcement & Rights

Ecological benefits of rights rely on strong enforcement.
Global FPI Preliminary Insights: Access & Harvest Rights

Exclusivity of rights is important for ecological benefits.
Global FPI Preliminary Insights: Triple Bottom Line – Trade offs

- Improved ecology is positively related to improved economics
- Improved economics is positively related to improved community
Global FPI Preliminary Insights: Data Collection & Analysis

Proportion of fishery systems

Ecological Performance

- Good
- Moderate
- Poor

Data and Analysis
- >4
- 3-4
- <3

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University of Florida
Global FPI Preliminary Insights: MPAs

Proportion of fishery systems

Ecological Performance

- Good
- Moderate
- Poor

MPAs
- >4
- 3-4
- <3

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Poor national governance can undermine fisheries management.
Fishers have little influence on business and marketing.

Photo credit: Maskur Tamanyira
Preliminary Insights: Relevance of input variables

**Ecology**

- **Fishery Management** $p < 0.001$
  - $\leq 2.75$
  - $> 2.75$

- **Governance** $p = 0.021$
  - $\leq 3.5$
  - $> 3.5$

Node 2 (n = 68)
- [Boxplot]

Node 4 (n = 8)
- [Boxplot]

Node 5 (n = 45)
- [Boxplot]

*Boxplots represent median, 25th and 75th percentiles.*
Preliminary Insights: Relevance of input variables

**Infrastructure**

- Node 2 (n = 70)
- Node 4 (n = 34)
- Node 5 (n = 17)

**HarvestRights**

- Node 4 (n = 34)
- Node 5 (n = 17)

*Boxplots represents median, 25th and 75th percentiles.*
Preliminary Insights: Relevance of input variables

Community

Infrastructure
p < 0.001
1
4.5
Infrastructure
p = 0.032
2
2.833
Node 3 (n = 40)
2.5
3
3.5
4
4.5
Node 4 (n = 48)
2.5
3
3.5
4
4.5
Node 6 (n = 15)
2.5
3
3.5
4
4.5
Node 7 (n = 18)
2.5
3
3.5
4
4.5
Node 5 (Leadership)
p < 0.001
5
4
Infrastructure
≤ 4.5
≤ 2.833
≤ 4
Leadership > 4.5
> 2.833
> 4

Community

Institute for Sustainable Food Systems
## Comparison within Species Groups

<table>
<thead>
<tr>
<th>Shrimp Fisheries</th>
<th>Ecology</th>
<th>Economic</th>
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<td>Suruga Pink Shrimp</td>
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<th>Community</th>
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<td>AK Crab</td>
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<td>Lobster (Nephrops)</td>
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<td>FL Stone Crab</td>
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<td>FL Blue Crab</td>
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</table>
FPI work – What’s Next

**Database:** > 121 fisheries systems today
**Researchers:** > 30 from around the world
**Users:** World Bank and others

**THE FPI COLLABORATIVE**
Scale up – Long term
Manage Data and Data Integrity
Coordinate Effort
Thank You

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