Reducing Illegal Fishing Using Behavior Change Interventions
A case study in the Upper Gulf of California

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THE PROBLEM OF ILLEGAL FISHING

- Illegal fishing: **intentional disregard of fishing regulations**
- Threat to fisheries sustainability
  - Adds to over-harvesting, pollution, and other anthropogenic impacts
- Fisheries management objective: “ensure the continued productivity of the resources and the accomplishment of other fisheries objectives” (FAO, 2002).

“Reducing fish stocks to biologically and ecologically harmful levels will result in a loss of potential benefits as food, income, employment and others, both immediately and in the long term” (FAO, 1997)

- Evidence suggests prevalence varies greatly across geographies
  - High-governance vs. **Low-governance contexts**
• Top–down, command and control regulations
• “Deterrence Theory” (Becker, 1968)

\[ EU_j = p_j U_j(Y_j - f_j) + (1 - p_j)U_j(Y_j) \]

where:
- \( Y_j \): income from offense (monetary and psychic)
- \( U_j \): utility function
- \( p_j \): probability of apprehension and conviction
- \( f_j \): monetary equivalent of the punishment if convicted

**Home–Economicus:**
- PROSPECT THEORY
- SOCIAL DIMENSION
- BOUNDED RATIONALITY
Illegal fishing is a complex issue where an array of economic, institutional and social factors interacts to determine its form and level of occurrence (Le Gallic and Cox, 2005)

- Low level of fines and penalties
- Limited Gov funding and capacity
- Organized crime
- High cost of optimal enforcement
- Corruption
- Poverty and limited Eco Altern
Using Behavioral Interventions to Address the Drivers of Illegal Fishing

Theoretical Models

Lab and Artefactual Field Exp

Fisheries Management
8 Step Process for Designing and Implementing Behavioral Interventions to Reduce Illegal Fishing

1. Gain an in-depth understanding of the community
2. Identify different types of high impact illegal fishing, and relevant stakeholders directly and indirectly associated with each type of behavior.
3. Identify the social, cognitive, psychological, and contextual factors driving each type of actor
4. Design hypothetical interventions to disrupt these drivers
5. Experimentally test those hypotheses
6. Pilot interventions
7. Scale-up tested interventions
8. Implement monitoring and evaluation systems
CASE STUDY

THE GULF CURVINA FISHERY IN GOLFO DE SANTA CLARA IN THE UPPER GULF OF CALIFORNIA
The Gulf Curvina (Cynoscion othonopterus) fishery is one of the most important in the region due to its catch volumes and social impact.

- **2007** Fishery’s management plan
- **2011** TAC published for the first time
- **2012** Curvina specific permits are issued
- **2013** IVQ is established

<table>
<thead>
<tr>
<th>Community</th>
<th>No. of permits</th>
<th>% of permits</th>
<th>No. of fishermen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golfo de Santa Clara, Sonora</td>
<td>435</td>
<td>60%</td>
<td>1,305</td>
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<tr>
<td>Cucapá</td>
<td>109</td>
<td>15%</td>
<td>327</td>
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<tr>
<td>Bajo Río, Baja California</td>
<td>48</td>
<td>7%</td>
<td>144</td>
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<tr>
<td>San Felipe, Baja California</td>
<td>129</td>
<td>18%</td>
<td>387</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>721</strong></td>
<td><strong>100%</strong></td>
<td><strong>2,612</strong></td>
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</table>
2. **IDENTIFY TYPES OF ILLEGAL FISHING AND RELEVANT STAKEHOLDERS**
3. UNDERSTANDING ILLEGAL FISHING BEHAVIORS AND DRIVERS
4. Designing Interventions

The Pope
Social disapproval
Venting
Sustainable fishing group
5. Test Experiments

- Decisions on how many fish to catch
- Baseline / Treatment

<table>
<thead>
<tr>
<th>Fish extracted by the other four members of my group</th>
<th>My extraction level</th>
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<tbody>
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<td>1</td>
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<tr>
<td>4</td>
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5.1. Running Experiments

- Direct measurement of behavior change in actual stakeholders in actual context
- Different combinations of interventions
- Surveys at the end of game
**Next Steps**

6. Pilot Intervention

7. **Scale-up** tested intervention

8. Implement **monitoring and evaluation systems**
TO RECAP...

• Illegal fishing is a pervasive threat to fisheries around the world
• Corruption, lenient penalties, and other problems constrain the efficacy of enforcement systems.
• Beyond monetary incentives behavioral factors are driving illegal fishing activities
• Effective interventions to deter and/or change illegal behaviors can be developed and implemented guided by the systematic process proposed in this presentation
• Behavioral interventions may be particularly useful in low-governance fisheries that lack resources for high levels of surveillance and enforcement
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