Frankenfood or Farm Fresh?
U.S. Consumer’s Perceptions of Aquaculture Practices and Products

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Where does high quality seafood come from? (n=224) U.S. sample
Why is Maine (home of the lobster) interested in aquaculture?

*Is aquaculture competition, or a source of help?*

Wild Harvest Seafood: $600 million industry

2014: $7 million bond for marine businesses

Marine Aquaculture: $140 million (and growing) industry
What do U.S. people (think they) know about aquaculture?

The Good
- Industry diversity for coastal communities
- Decrease our seafood import debt
- Increase seafood access (decrease price, different species)
- Reduced pressure on wild fisheries

The Bad, and The Ugly
- Highly publicized environmental risks (biofouling, wild species 'contamination') and conflicts with existing use (wild-harvest, recreation)
- Public discourse in the ‘novel food technology’ frame (with GM)
- Uncertainty about regulation
- ‘Wasting fish to grow fish’
- Human health implications (same amount of omega-3, use of dyes on fin fish)
What do U.S. people really know?
Data and Methods

- Online Survey (via GfK), Winter 2018
- 1,200 representative U.S. sample

What did we ask?

- Seafood Consumption and Information Seeking Behavior
  - Product Origin Knowledge
- Knowledge/Awareness of Aquaculture (& myths)
- Aquaculture in the News
- Media Information Experiment
  - Gain v. Loss, Spatially Distant vs. Close
What do U.S. people really know about aquaculture?

• “When you think of aquaculture, what comes to mind?”
  • 17% percent of answers indicate that participants had no knowledge of AQ
  • 25% - it was clear they didn’t really know (“anything to do with water”)
• 48.5% looking for information about seafood products; of these
  • 70.2% are looking for country/area of origin
  • 47.3% are looking for how the product is produced
• 69% NOT looking for information on aquaculture (news, etc.)
What do people know about AQ?

- Current level of AQ knowledge
(0=know nothing, 100=know everything); \(m=16.2\)

- Perceived needed knowledge
(0=know nothing, 100=know everything); \(m=42.8\)
Do they know if they are eating aquaculture seafood?

- 47.3% were *unsure* if they had consumed AQ products....
- 41.14% *definitely have*
How are people evaluating aquaculture?

The Theory Context

Citizens Perspective: Aquaculture as a novel food technology (& therefore, risky?)
- Frewer et al., 2011
- D’Anna & Murray, 2015
- Hall & Amberg, 2013
- Mazur & Curtis, 2006
- Citizens may think differently than consumers re: environment
  - Nyborg, 2000
  - Faber, Petersen & Schiller, 2002

Aquaculture product consumption
- Verbeke et al., 2007
- Brayden, Noblet, Evans & Rickard, 2018
- Altintzoglou et al., 2010
- Claret et al., 2016
- Li, Kecinski & Messer, 2017
What factors impact aquaculture support: differ across citizen or consumer?

• Support aquaculture policies (α = .86)
  - Support Policies that fund research on aquaculture
  - Support policies that expand aquaculture operations in the U.S.
  - Support policies that expand aquaculture operations outside the U.S.

• Buy aquaculture products (α=.73)
  - Look for aquaculture products when I purchase seafood
  - Buy aquaculture products
  - Farm-raised seafood is safer to eat than wild-caught seafood
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequent Seafood Consumer</td>
<td>1 if more than once a month; 0 otherwise</td>
</tr>
<tr>
<td>Perceived knowledge regarding AQ</td>
<td>Self-reported AQ knowledge, 0=know nothing, 100=know everything</td>
</tr>
<tr>
<td>Awareness of negative news</td>
<td>1 if heard/read negative news about AQ in past 10 years; 0 otherwise (23% of sample =1)</td>
</tr>
<tr>
<td>Environmental/social benefits</td>
<td>Composite variable ($\alpha = .81$)</td>
</tr>
<tr>
<td>Concerns</td>
<td>Composite variable ($\alpha = .81$)</td>
</tr>
<tr>
<td>Benefits of AQ outweigh risks</td>
<td>1 (7)=Risks (benefits) strongly outweigh benefits (risks)</td>
</tr>
<tr>
<td>Trustworthy source of information</td>
<td>1=Can be trusted, 6=Can not be trusted</td>
</tr>
<tr>
<td>Media Experiment Condition</td>
<td>4 treatment conditions, control group</td>
</tr>
<tr>
<td>Usual demographic suspects</td>
<td>(age, income, gender, education)</td>
</tr>
</tbody>
</table>
More on composite, trust and media variables

Social/environmental benefits ($\alpha = .81$)
- Healthy food source
- Affordable product
- Local jobs
- Relieve pressure on wild

Concerns ($\alpha = .71$)
- AQ is unnatural
- Aesthetics, smell
- Recreation conflicts
- AQ is unethical

Trust & Credibility
- Government
- University
- AQ Industry

Media Experiment Condition
- Gain-U.S.
- Gain-China
- Loss-U.S.
- Loss-China
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<th>Variable</th>
<th>Support for Policy</th>
<th>Buy aquaculture products</th>
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<tr>
<td>Frequent Seafood Consumer</td>
<td>.108***</td>
<td>.161***</td>
</tr>
<tr>
<td>Perceived knowledge regarding AQ</td>
<td>.004*</td>
<td>.003*</td>
</tr>
<tr>
<td>Awareness of negative news</td>
<td>.125</td>
<td>-.210***</td>
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<tr>
<td>Environmental/social benefits</td>
<td>.633***</td>
<td>.687***</td>
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<tr>
<td>Concerns</td>
<td>-.034</td>
<td>-.012</td>
</tr>
<tr>
<td>Benefits of AQ outweigh risks</td>
<td>.177***</td>
<td>.146***</td>
</tr>
<tr>
<td>Trustworthy source of information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-University scientists</td>
<td>.130***</td>
<td>.0004</td>
</tr>
<tr>
<td>-Aquaculture industry</td>
<td>.133***</td>
<td>.144</td>
</tr>
<tr>
<td>Media experiment</td>
<td>+condition 3 &amp; 4</td>
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<td>Usual demographic suspects</td>
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<tr>
<td>(age, income, gender, education)</td>
<td></td>
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</tr>
<tr>
<td>Male: -114*</td>
<td></td>
<td>Income: -.001**</td>
</tr>
<tr>
<td>Ed: .152**</td>
<td></td>
<td></td>
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<tr>
<td>n=712, R²=0.39</td>
<td></td>
<td>*p&lt;.10, **p&lt;.05, ***p&lt;.01</td>
</tr>
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Concluding thoughts & Next Steps

- Factors driving public support for aquaculture production/policies appear aligned, but may differ from consumer choices in source of information
  - *Action item:* Survey of Maine coastal citizens regarding support for aquaculture development in coastal waters

- Support and consumption decisions may be influenced by loss messaging – could it be impacted by positive framing?
  - *Action item:* Monday session on Stated preference – K. Evans presenting on information treatment and consumers
Thank you

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Photos courtesy of State of Maine Fall Photo contest http://www.maine.gov
Figure 10: Feelings towards aquaculture information sources; categories ranked on a Likert scale from 1 (less agreement) to 6 (more agreement) (averages reported).
References