Does gender matter?
The case of sandfish (*Holuthuria scabra*) sea ranching in Pandaraonan, Guimaras, Philippines

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What is sandfish (*Holothuria scabra*)?

Family: **Holothuriidae**

Commercial name: “**trepang**”, “**beche-de-mer**”

Description: **grey/black with dark transverse wrinkles. Dorsal area is grey or white**

Habitat & ecology: **Intertidal area; sea grass beds, fringing reefs**

Status: **Endangered** (IUCN; ver. 3.1, 2013)

Threat: **Commercial harvest**

Sources: Jaeger, 1833; Hamel, et al., 2013
## Sandfish population

### Wholesale prices of trepang in Puerto Princesa City from 1998 to 2002

<table>
<thead>
<tr>
<th>Species</th>
<th>Size/Number of specimens/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(mean dried weight of specimen)</td>
</tr>
<tr>
<td></td>
<td>1998</td>
</tr>
<tr>
<td><em>H. scabra</em></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>15</td>
</tr>
<tr>
<td>M</td>
<td>20</td>
</tr>
<tr>
<td>Mt</td>
<td>40</td>
</tr>
<tr>
<td>S</td>
<td>60</td>
</tr>
<tr>
<td>XS</td>
<td>80</td>
</tr>
<tr>
<td><em>H. fascogilla</em></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>3-7</td>
</tr>
<tr>
<td>M</td>
<td>5-6</td>
</tr>
<tr>
<td>Mt</td>
<td>7-8</td>
</tr>
<tr>
<td>S</td>
<td>8-10</td>
</tr>
<tr>
<td>XS</td>
<td>11-15</td>
</tr>
<tr>
<td><em>S. horrens</em></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>&gt;7.0</td>
</tr>
<tr>
<td>M</td>
<td>6.4-7.8</td>
</tr>
<tr>
<td>S</td>
<td>5.1-6.4</td>
</tr>
<tr>
<td>XS</td>
<td>&lt;5.1</td>
</tr>
<tr>
<td><em>A. japonica</em></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>&gt;7.6</td>
</tr>
<tr>
<td>M</td>
<td>6.4-6.8 cm</td>
</tr>
<tr>
<td>S</td>
<td>5.1-6.4 cm</td>
</tr>
<tr>
<td>XS</td>
<td>&lt;5.1 cm</td>
</tr>
</tbody>
</table>

### Market demand
- High price

### Lacking or weakly implemented policies

### Population decline
Sandfish sea ranching project

Marine Science Institute
University of the Philippines (UP-MSI)

Aquaculture Department
Southeast Asian Fisheries Development Center (SEAFDEC/AQD)

Guiuan Dev’t Foundation, Inc.
Eastern Samar (GDFI)

Institute of Fisheries R&D
Mindanao State University (MSU-Naawan)

Australian Government
Australian Centre for International Agricultural Research
OBJECTIVES

1. Identify the areas utilized by men and women

2. Determine gender differences in socio-demographic characteristics and perceptions on socio-political conditions in the community

3. Determine factors that influence the respondents’ willingness to participate in the sandfish sea ranching project
METHODOLOGY

Focus group discussions
March 2015 - February 2016

Mapping workshops

Survey
April 2016
RESOURCE UTILIZATION

Legend:
- Red  – Gleaning
- Blue – Fishing
- Green – Charcoal source/s
- Orange – Farming area/s

Group 1

Group 2

Group 3
RESOURCE UTILIZATION
## DEMOGRAPHIC PROFILE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Men</th>
<th>Women</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% Mean ±SD (n=30)</td>
<td>% Mean ±SD (n=30)</td>
<td>% Mean ±SD (n=60)</td>
</tr>
<tr>
<td>Age</td>
<td>50 ±13</td>
<td>48 ±13</td>
<td>49 ±13</td>
</tr>
<tr>
<td>Years of education</td>
<td>8 ±3</td>
<td>7 ±3</td>
<td>7 ±3</td>
</tr>
<tr>
<td>Occupation diversity</td>
<td>1.7 ±0.5</td>
<td>1.7 ±0.8</td>
<td>1.7 ±0.6</td>
</tr>
<tr>
<td>Occupation multiplicity</td>
<td>1.8 ±0.4</td>
<td>1.8 ±0.8</td>
<td>1.8 ±0.6</td>
</tr>
<tr>
<td>Years spent in fishing</td>
<td>33 ±14</td>
<td>26 ±17</td>
<td>30 ±16</td>
</tr>
<tr>
<td>Fishing hours (hours)*</td>
<td>5 ±3</td>
<td>3 ±2</td>
<td>4 ±3</td>
</tr>
<tr>
<td>Organizational membership*</td>
<td>90%</td>
<td>57%</td>
<td>73%</td>
</tr>
<tr>
<td>Membership duration*</td>
<td>5.3 ±8</td>
<td>1.1 ±2</td>
<td>3.2 ±6</td>
</tr>
</tbody>
</table>

Note: *Significant at 0.05 level
DEMOGRAPHIC PROFILE

**Primary income source/s**

- **Men**: 100% Fishing
- **Women**: 27% Non-fishing, 73% Fishing

**Secondary income sources**

- **Men**: 86% Casual labor, 39% Business, 5% Fishing
- **Women**: 39% Casual labor, 9% Business, 22% Fishing

*Monthly income*

- **Men**: PhP5332 (USD 115.20)
- **Women**: PhP3392 (USD 73.29)

Note: *Significant at 0.05 level

USD 1 = Philippine Peso 46.29, the exchange rate in April 2016
AWARENESS AND PERCEPTIONS

Governance and project management perceptions

<table>
<thead>
<tr>
<th>Category</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empowerment</td>
<td>7.52</td>
<td>8.12</td>
</tr>
<tr>
<td>Institutional trust*</td>
<td>7</td>
<td>4.73</td>
</tr>
<tr>
<td>Fisheries management</td>
<td>4.8</td>
<td>6.23</td>
</tr>
<tr>
<td>Governance</td>
<td>7.04</td>
<td>7.09</td>
</tr>
</tbody>
</table>

Notes: *Significant at 0.05 level; assessed using a 10-point Likert scale
AWARENESS AND PERCEPTIONS

Notes: SC = sea cucumber (H. scabra)  *Significant at 0.05 level
AWARENESS AND PERCEPTIONS

Project involvement

Willing to participate: 57% Men, 70% Women
Attend meetings: 60% Men, 63% Women
Volunteer: 47% Men, 27% Women
Work with pay*: 40% Men, 10% Women
Assume responsibility: 23% Men, 7% Women

Note: *Significant at 0.05 level
FACTORS INFLUENCING PARTICIPATION

Logistic regression analysis

**DV:** “Willingness to participate in the project”

**IV:** Monthly income
Household income
Income diversity
Income multiplicity
Gender
Age
Years in school
Organizational membership
Project awareness
Governance
FACTORS INFLUENCING PARTICIPATION

All respondents

Men

Women

All fishers
## FACTORS INFLUENCING PARTICIPATION

**Hosmer and Lemeshow test (GoF)**

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Factor</th>
<th>Coefficient</th>
<th>S.E.</th>
<th>z-value</th>
<th>p-value</th>
<th>OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>All respondents</td>
<td>Gender (Women)</td>
<td>1.566</td>
<td>0.778</td>
<td>4.056</td>
<td>0.044</td>
<td>4.79</td>
</tr>
<tr>
<td></td>
<td>Years in school</td>
<td>0.291</td>
<td>0.149</td>
<td>3.798</td>
<td>0.051</td>
<td>1.34</td>
</tr>
<tr>
<td></td>
<td>Project awareness</td>
<td>2.903</td>
<td>0.803</td>
<td>13.069</td>
<td>0.000</td>
<td>18.22</td>
</tr>
<tr>
<td>Men</td>
<td>Years in school</td>
<td>0.793</td>
<td>0.347</td>
<td>5.224</td>
<td>0.022</td>
<td>2.21</td>
</tr>
<tr>
<td></td>
<td>Project awareness</td>
<td>5.034</td>
<td>2.042</td>
<td>6.075</td>
<td>0.014</td>
<td>153.55</td>
</tr>
<tr>
<td>Women</td>
<td>Project awareness</td>
<td>2.416</td>
<td>0.952</td>
<td>6.447</td>
<td>0.011</td>
<td>11.20</td>
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<tr>
<td></td>
<td>Years in school</td>
<td>0.425</td>
<td>0.187</td>
<td>5.141</td>
<td>0.023</td>
<td>1.53</td>
</tr>
<tr>
<td>Fishers</td>
<td>Project awareness</td>
<td>2.101</td>
<td>1.134</td>
<td>3.433</td>
<td>0.064</td>
<td>8.18</td>
</tr>
<tr>
<td></td>
<td>Perceived benefits</td>
<td>2.340</td>
<td>1.084</td>
<td>4.657</td>
<td>0.031</td>
<td>10.38</td>
</tr>
</tbody>
</table>

**Model Summary**

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Step</th>
<th>-2 Log likelihood</th>
<th>Cox &amp; Snell $R^2$</th>
<th>Nagelkerke $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>All respondents</td>
<td>9</td>
<td>56.443$^b$</td>
<td>0.312</td>
<td>0.426</td>
</tr>
<tr>
<td>Males</td>
<td>9</td>
<td>21.741$^d$</td>
<td>0.475</td>
<td>0.637</td>
</tr>
<tr>
<td>Females</td>
<td>8</td>
<td>28.283$^c$</td>
<td>0.243</td>
<td>0.345</td>
</tr>
<tr>
<td>Fishers</td>
<td>8</td>
<td>38.156$^c$</td>
<td>0.440</td>
<td>0.601</td>
</tr>
</tbody>
</table>

**Note:** Significance level: 0.05 and 0.10
Does gender matter?

1. Inequality in income and organizational membership

2. Women have lower trust on local organizations
Does gender matter?

3. Sandfish collection and trade were female-dominated.

4. Women were less willing to be hired as laborers for the project.
Does gender matter?

5. Gender is a factor of participation

6. Participation is incentive-driven
Does gender matter?

7. Knowledge building is essential in increasing men and women’s interest to participate in the project.

8. The type of information required by men and women differ. Women may respond to IEC’s while the men may want technical knowledge.
Thank you!
Acknowledgements

- SEAFDEC/AQD for travel assistance (5815-T-AF)
- Professor Vicente Balinas of the University of the Philippines Visayas for assistance with statistical analysis
- Michael Orquejo for assistance in GIS mapping
- Local government officials of Pandaraonan
- Pandaraonan Unified Association
Sandfish life cycle and production flow

0 day: fertilized egg
1-2 d: gastrula
2-4 d: auricularia
8-10 d: doliolaria
3-8 d: mature adult
6-8 mo: juvenile
14-21 d: pentaculla

Pelagic phase

Benthic phase

Epi-benthic
SEAFDEC/AQD
Sea Cucumber Hatchery
(constructed: 2010)
Sandfish spats (30-40 d)

1-2 mo (3-6 g)
Parameters

Seagrass

Chl a

Water depth

Penetrability

Pheophytin

Canopy height
Assessment

1. Bio-physical suitability assessment
2. Community orientation & public consultation (IEC)
3. Presentation to LGU & securing legal permits (use rights)
4. Planning workshop & partnership agreement (capability building)
5. Site delineation & development
**ZONE A: CORE ZONE**
(50 x 50 m)
No entry, Release & monitoring only

**ZONE B: NURSERY**
(100 x 100 m), 1 ha
Restricted entry,
No fishing

**ZONE C: BUFFER**
(250 x 250 m), ~5 ha
Entry allowed,
Restricted fishing
High mortality for stocks <3g ($p < 0.05$); survival stabilizes once stocks reach 3g
Problems in sea ranch sites
Intertidal area, Pandaraonan, Guimaras, Philippines, 2016