Climate change and coastal people: what we know and how social science could help us learn more

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Fisheries and aquaculture policy

Climate adaptation and mitigation policy

Over 400 million of the world’s poorest depend on fish for food. How will they adapt to climate change?

Oceans Day at Copenhagen
The Importance of Oceans, Coasts, and Small Island Developing States in the Climate Regime
December 14, 2009
8:00 to 22:00
Venue: European Environment Agency, Copenhagen
Featuring H.S.H. Prince Albert II of Monaco
Indonesian Minister Dr. Fadel Muhammad
Grenada’s UN Ambassador Dr. Dessima Williams
US NOAA Administrator Dr. Jane Lubchenco and other World Leaders

Find out what’s at stake

Don’t let fish slip through the climate change net
Outline

• What do we know about ocean-related climate change and its impacts on coastal people?
• What can the social sciences offer to further our understanding and support effective societal responses?
• How can ‘human dimensions’ be incorporated in ICES/PICES research and policy advisory work?
The consequences of policy (in)action: future climate change relative to 1986 to 2005 average

(US National Academy of Sciences, citing IPCC_AR5)
Extreme events:
Globally, hurricanes are getting stronger but not more frequent – but regional patterns differ. Same for droughts and floods

Maue (2011) *Geophys. Res. Lett.* (data updated 31/12/12)

IPCC_AR5 WG II Table 5.1 “likely decrease or no change in frequency TCs, likely increase in the most intense TCs
101 Idiosyncratic pathways, #37 – a change in the prevailing wind and its impact on seaweed farms

Seaweed farm, Tabiteuea Atoll, Kiribati

Source: Pickering et al 2011
Pickering et al. (2011) Vulnerability of aquaculture in the tropical Pacific to climate change, In Bell et al. SPC.

More frequent and severe ENSO events

ENSO-associated shifts in prevailing wind in S Pacific

Coastal aquaculture more exposed to storm damage

Pickering et al. (2011) Vulnerability of aquaculture in the tropical Pacific to climate change, In Bell et al. SPC.
How IPCC decides what we know about climate change

<table>
<thead>
<tr>
<th>Agreement</th>
<th>Evidence (type, amount, quality, consistency)</th>
<th>Confidence Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>High agreement</td>
<td>High agreement Limited evidence</td>
<td></td>
</tr>
<tr>
<td>Limited evidence</td>
<td>High agreement Medium evidence</td>
<td></td>
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<tr>
<td>Medium agreement</td>
<td>Medium agreement Limited evidence</td>
<td></td>
</tr>
<tr>
<td>Limited evidence</td>
<td>Medium agreement Medium evidence</td>
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<tr>
<td>Low agreement</td>
<td>Low agreement Limited evidence</td>
<td></td>
</tr>
<tr>
<td>Limited evidence</td>
<td>Low agreement Medium evidence</td>
<td></td>
</tr>
<tr>
<td>Low agreement</td>
<td>Low agreement Robust evidence</td>
<td></td>
</tr>
<tr>
<td>Limited evidence</td>
<td>Robust evidence</td>
<td></td>
</tr>
</tbody>
</table>
Increased atmospheric CO$_2$ and the oceans:

The further we get from the distal driver of change, the less confident we become in quantifying impacts

Source:
IPCC_AR5 WGII, Fig 19-3
Observed impacts of climate change on human and managed systems are based of a small number of case-studies.
What we know about climate change and marine & coastal systems

Degree of confidence in detection of trends in climate change-sensitive elements

Degree of confidence in attribution to climate change

1. Evidence of changes in species and ecosystems
   - Increase in coral bleaching
   - Shift in range limits of species distribution
   - Decline in the extent of salt marshes and mangroves
   - Decline in the extent of seagrasses

2. Impacts on coastal processes
   - Decreased calcification
   - Increased beach erosion
   - Increased saltwater intrusion

3. Impacts on human systems
   - Increased flood damage
   - Decreased harbor operations

Source: IPCC_AR5 WG II Fig 5.5 (2014)
How can social science help increase what we know?

Five fundamental questions for societally relevant trans-disciplinary research
(modified from Flyvberg, 2001 Making Social Science Matter)

1. Where are we going?
2. Is this desirable?
3. Who benefits and who is losing out?
4. Which mechanisms of power make us stay on course?
5. What should be done if we are on the wrong track?
Social science in climate change analysis and prediction
(IPCC 5th Assessment WGII, 2014)

Scenarios developed from social, political and economic analysis

Demographic, economic and social analysis of populations

Dependency on ecosystem services

Scenarios developed from social, political and economic analysis
Climate change could cost the world 5% to 20% of GDP a year

Shifting the world onto a low-carbon path could benefit the economy by $2.5 trillion a year

By 2050, markets for low-carbon technologies could be worth at least $500 bn
Economics is not the only social science.
What is a coastal community?
Community of place, occupation or interest
Social divisions lead to vulnerability differentials
The Hurricane Katrina experience, New Orleans, August 2005
Longer-term consequences of differential vulnerability on coastal communities – the legacy of Hurricane Katrina in New Orleans

Population of New Orleans in mid-2005 and mid-2006, (in numbers) and by race


2014 update: 380,000 people in 2013
100,000 fewer AA in 2013 than 2000, increase in Latino and Asian populations
Gender and climate change
Some stereotypes and then some social analysis

• Women as environmentally vulnerable...
Women as environmentally virtuous...

Women have lower carbon footprints than men, and are more interested in nurturing natural resources while men prefer to plunder them..etc.
Gender and climate change

• Climate change and disasters expose and exacerbate existing gender inequities

• Adaptation and mitigation policies that are ‘gender-blind’ are likely to be less effective

• Labeling women as either victims or virtuous is simplistic and damaging - as is blaming men for climate change

References:

How can coastal communities adapt to climate change?
Adaptation and mitigation decisions under uncertainty
e.g. Shrimp or rice in low-lying coastal Asia?

Global climate trends and projections

Local climate trends and projections

Impacts on biophysical systems

Responses of social-ecological systems

Daw et al (2008) for FAO

Photos: Mike Lusmore, WorldFish
What do people think about climate change? What actions are they taking to address their concerns?
Percent of US citizens who believe global warming has already begun

McCright & Dunlap (2011) *The Sociological Quarterly* 52

65% Democrat
53% Independent
42% Republican

Chinese public’s perception of the causes of climate change

Chinese public’s concern for climate change impacts


$n = 509$
What do the public know about climate change?
Gallup poll trends on % of US public support for questions about global warming
Coastal climate change concerns in context

European study of public awareness, concerns and priorities about anthropogenic change \((n = 10,106)\)

Climate change in broader risk context: Solomon Islands

A.-M. Schwarz et al./Global Environmental Change 21 (2011) 1128–1140

Future threats (N=145)

- Climate-related changes + natural disasters
- Malthusian scenario
- Social cohesion erosion
- Land dispute and inter-community conflict over resources
- Local economic crisis
- Household-level issues
- No answer/don't know
- Fisheries-related issues

Proportion of total responses

Fig. 4. Future threats, identified by the respondents during the vulnerability analysis.
What impacts do people associate with climate change on the coasts and seas in the UK?

(UK sample, $n=1001$; Chilvers et al 2014 GEC 29)

<table>
<thead>
<tr>
<th>Impact</th>
<th>% of responses</th>
<th>Affect (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEA LEVEL RISE</td>
<td>32.1</td>
<td>(-0.90, 0.29)</td>
</tr>
<tr>
<td>COASTAL EROSION</td>
<td>27.4</td>
<td>(-0.91, 0.28)</td>
</tr>
<tr>
<td>OTHERS</td>
<td>9.2</td>
<td>(n/a)</td>
</tr>
<tr>
<td>FLOODING</td>
<td>8.1</td>
<td>(-0.99, 0.09)</td>
</tr>
<tr>
<td>NOTHING</td>
<td>5.4</td>
<td>(0, 0.35)</td>
</tr>
<tr>
<td>MELTING ICE CAPS</td>
<td>3.7</td>
<td>(-0.98, 0.14)</td>
</tr>
<tr>
<td>SEA TEMPERATURE RISE</td>
<td>3.7</td>
<td>(-0.65, 0.70)</td>
</tr>
<tr>
<td>WILDLIFE</td>
<td>3.0</td>
<td>(-0.84, 0.47)</td>
</tr>
<tr>
<td>DON'T KNOW</td>
<td>2.3</td>
<td>(-0.94, 0.30)</td>
</tr>
<tr>
<td>WEATHER</td>
<td>2.2</td>
<td>(-0.57, 0.57)</td>
</tr>
<tr>
<td>POLLUTION</td>
<td>1.7</td>
<td>(-1, 0)</td>
</tr>
<tr>
<td>FISH STOCKS</td>
<td>1.0</td>
<td>(-0.91, 0.29)</td>
</tr>
</tbody>
</table>
Engaging citizens in climate action:
“Fear won’t do it”
“non-threatening images that relate to every-day emotions and concerns tend to be the most engaging”
Opportunities: New technologies and new social movements

New technologies

New social movements
## Synthesis: Some potential social science contributions

<table>
<thead>
<tr>
<th>Social enquiry in order to:</th>
<th>Which can help to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understand people’s perceptions about climate change</td>
<td>Develop strategies to influence support for policies addressing emissions; design effective adaptation measures</td>
</tr>
<tr>
<td>Understand people’s emotional responses to climate variability and change</td>
<td>Influence behaviour; communicate climate science more effectively</td>
</tr>
<tr>
<td>Identify technological, political, economic, and social trends and forces influencing the climate system</td>
<td>Identify the best opportunities and processes for transformational change</td>
</tr>
<tr>
<td>Understand how adaptation plans and action decisions are made</td>
<td>Improve governance, planning and resource allocation</td>
</tr>
<tr>
<td>Social difference and its links to climate vulnerability</td>
<td>Target adaptation support; helping to give a voice to marginalized people</td>
</tr>
<tr>
<td>Reveal vested interests, networks of influence and the exercise of power</td>
<td>Challenge power, support climate justice and get to agreement on emissions controls?</td>
</tr>
</tbody>
</table>
Pathways to a future on a resilient planet
(IPCC_AR5 WGII)
Thanks!

Manuel Barange
Gorka Merino

Cassandra de Young
Doris Soto

Hannah Bassett