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# Social vulnerability of coastal communities to climate change: a Southern hemisphere focus



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GULLS

Global Understanding and Learning for Local Solutions: **Reducing vulnerability of marine-dependent coastal communities**



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# What is GULLS?



- Southern hemisphere interdisciplinary Belmont forum coastal vulnerability theme project
- Forms part of Global Marine Hotspots Network
- **Aim:** - *“...characterizing, assessing and predicting the future of coastal-marine food resources through the provision and sharing of knowledge across regional "hotspots", defined here as fast-warming marine areas and areas experiencing social tensions as a result of change”.*

# Who is GULLS?



University  
of Southampton



National Oceanography  
Centre, Southampton  
UNIVERSITY OF SOUTHAMPTON AND  
NATURAL ENVIRONMENT RESEARCH COUNCIL



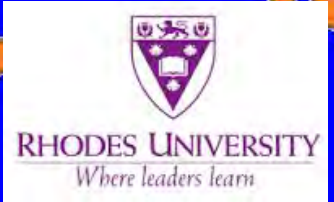
University  
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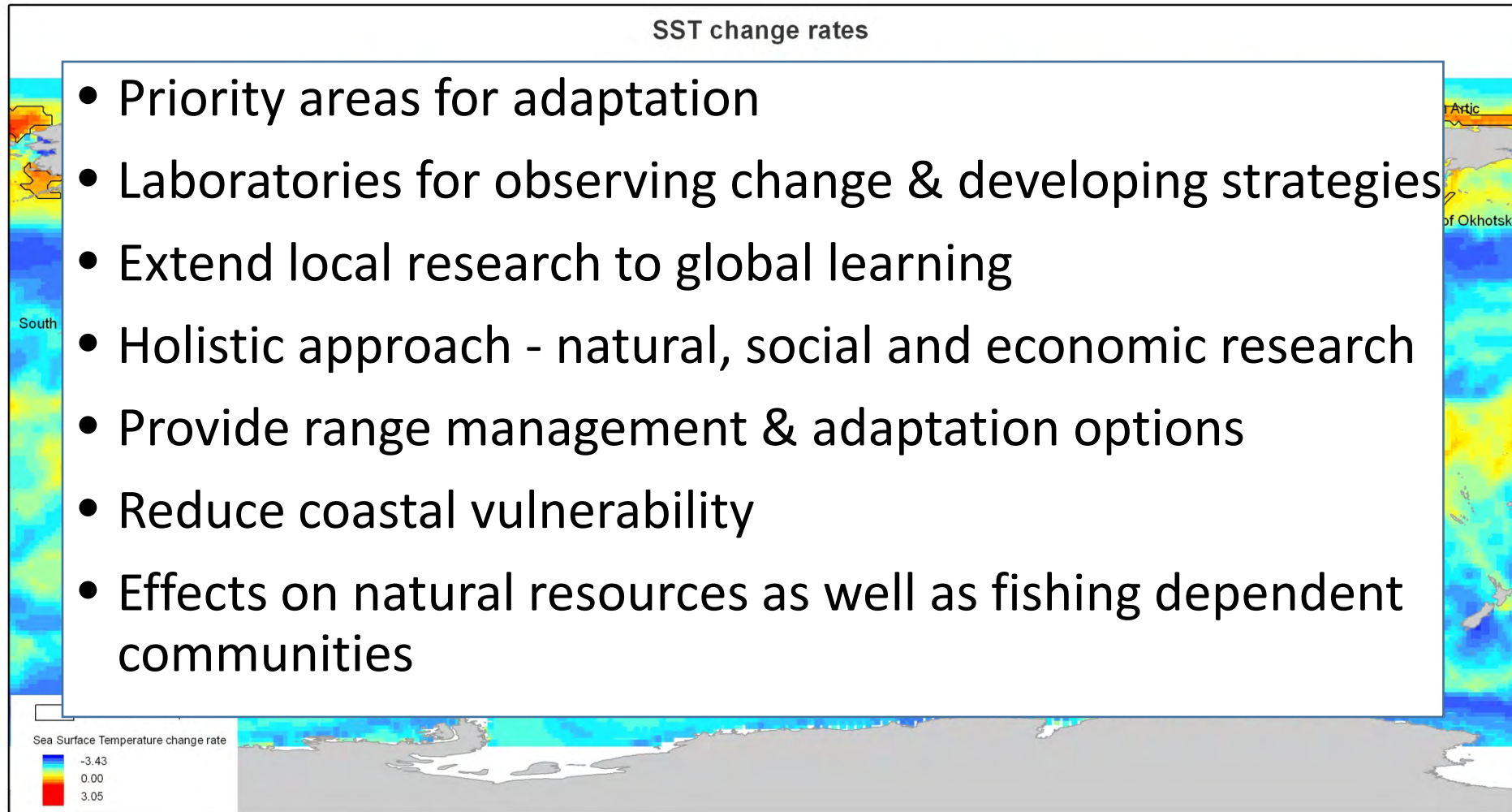
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# Evidence of hotspots

RESEARCH PAPER

2013

\* Why study these hotspots?



# Social vulnerability focus

- **Part 1: Vulnerability assessments:** 3-5 coastal communities in each hotspot
- **Part 2: Develop adaptation pathways and options:**  
Participatory methods with communities
- **Part 3: Model indicator relationships - link with ecological vulnerability research**  
- e.g. MICE models in development for each hotspot
- **Part 4 – Summary and comparative analyses**

# 5 hotspots - 1 common methodology

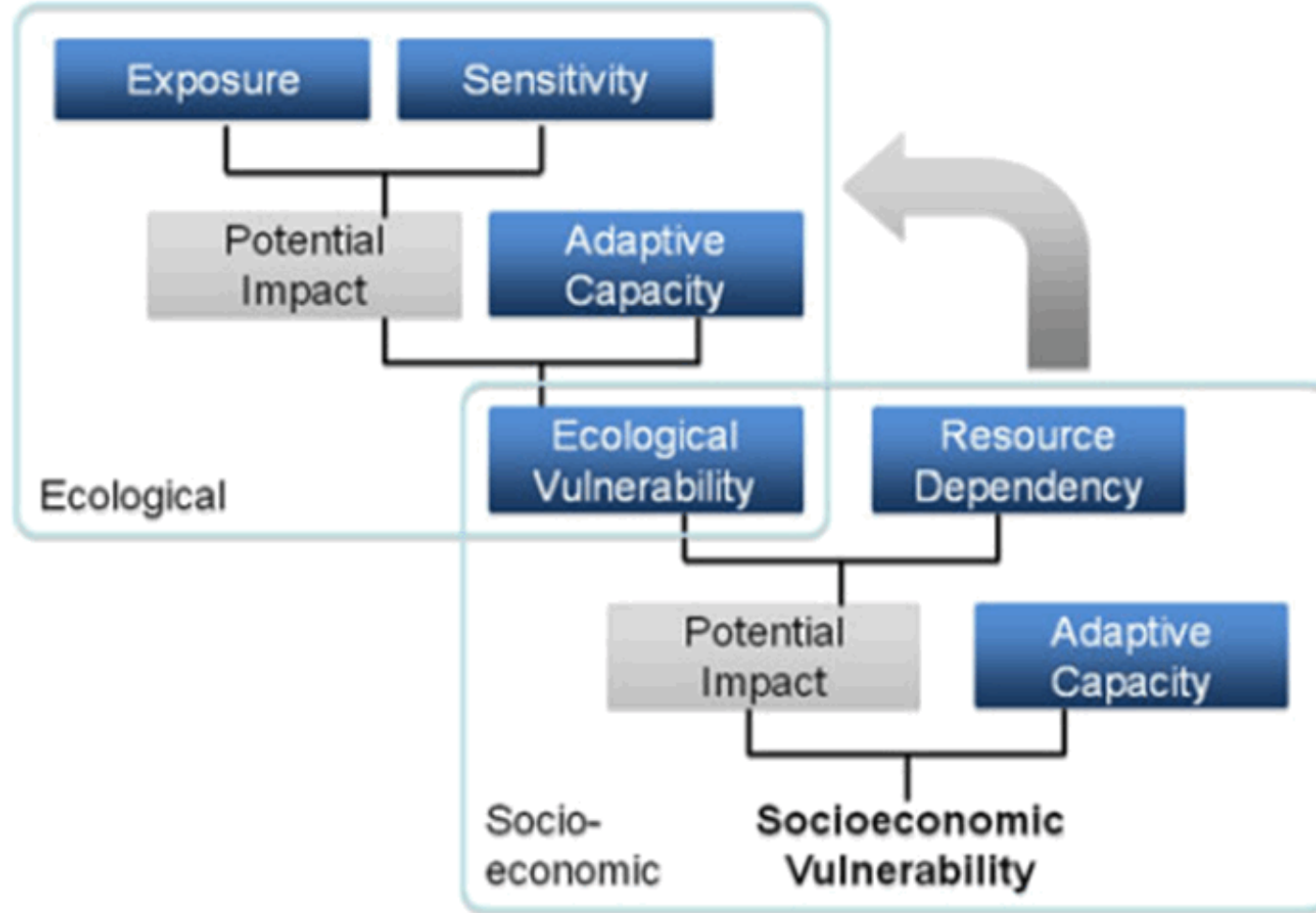
- Challenges
  - Communication both with communities and also with the GULLS team (social team and wider group)
  - Remote working across hotspots
  - Funding differences among hotspots
  - Timing of actions and stages of research
  - Different strengths in different hotspots – at different stages of engagement with the topic

# 5 hotspots - 1 common methodology

- Benefits of GULLS

- High interaction of researchers from students to senior academics
- Cross cultural comparisons
- Are there commonalities across hotspots?
- Development of a methodology and framework that is flexible and useful in other contexts and studies – potential for future use
- Capacity building of researchers and communities
- Improvement in interdisciplinary research

# IPCC vulnerability model

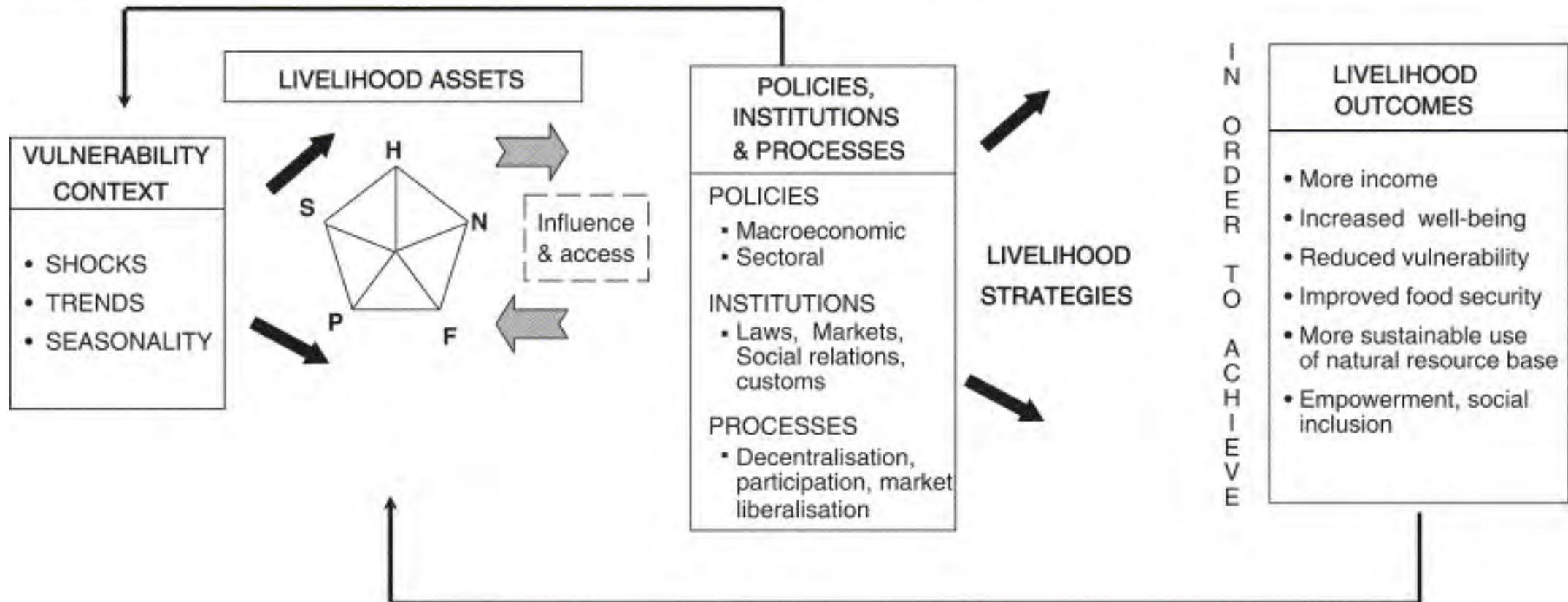




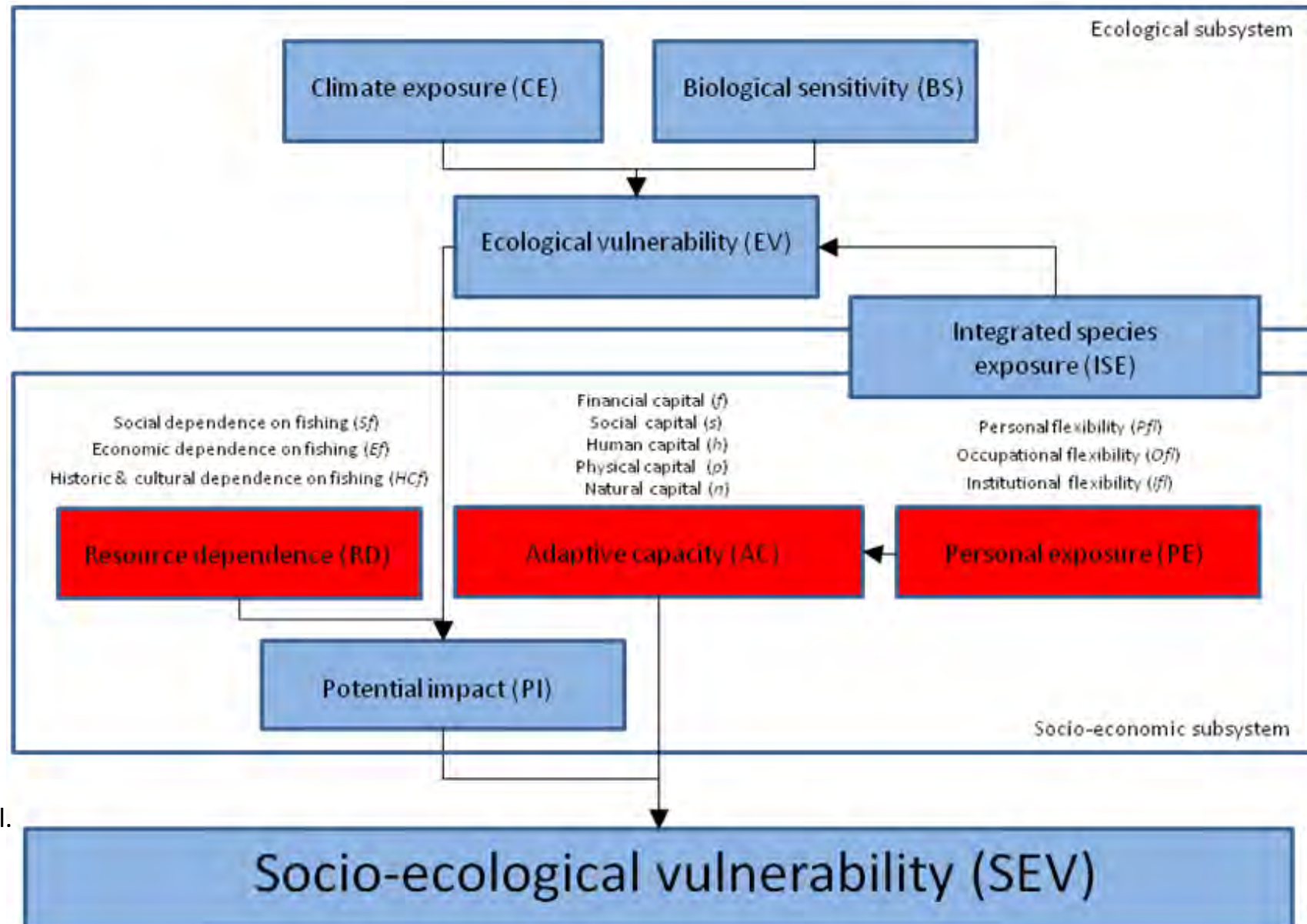
# Livelihood analysis

Rural livelihoods framework used to understand natural resource management systems

Legend : H: human; N: natural; F: financial; P: physical; S: social ...Capital



# Linked model of socio-ecological vulnerability



Modified from Marshall et al. (2013) and Metcalf et al. (in review)

# Vulnerability assessment analysis

- Balanced weighted average approach

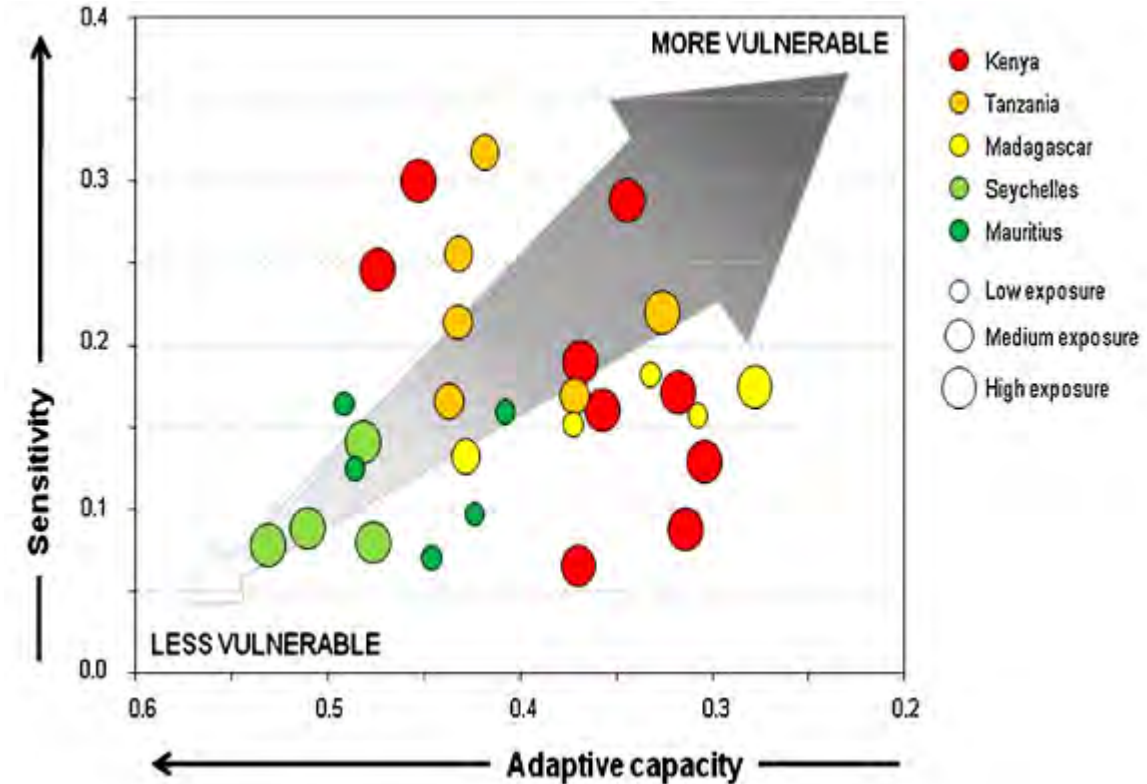
$$\text{Exp} + \text{Sens} - \text{Adapt Cap} = \text{Vuln}$$

(Morzaria Luna et al., 2014)

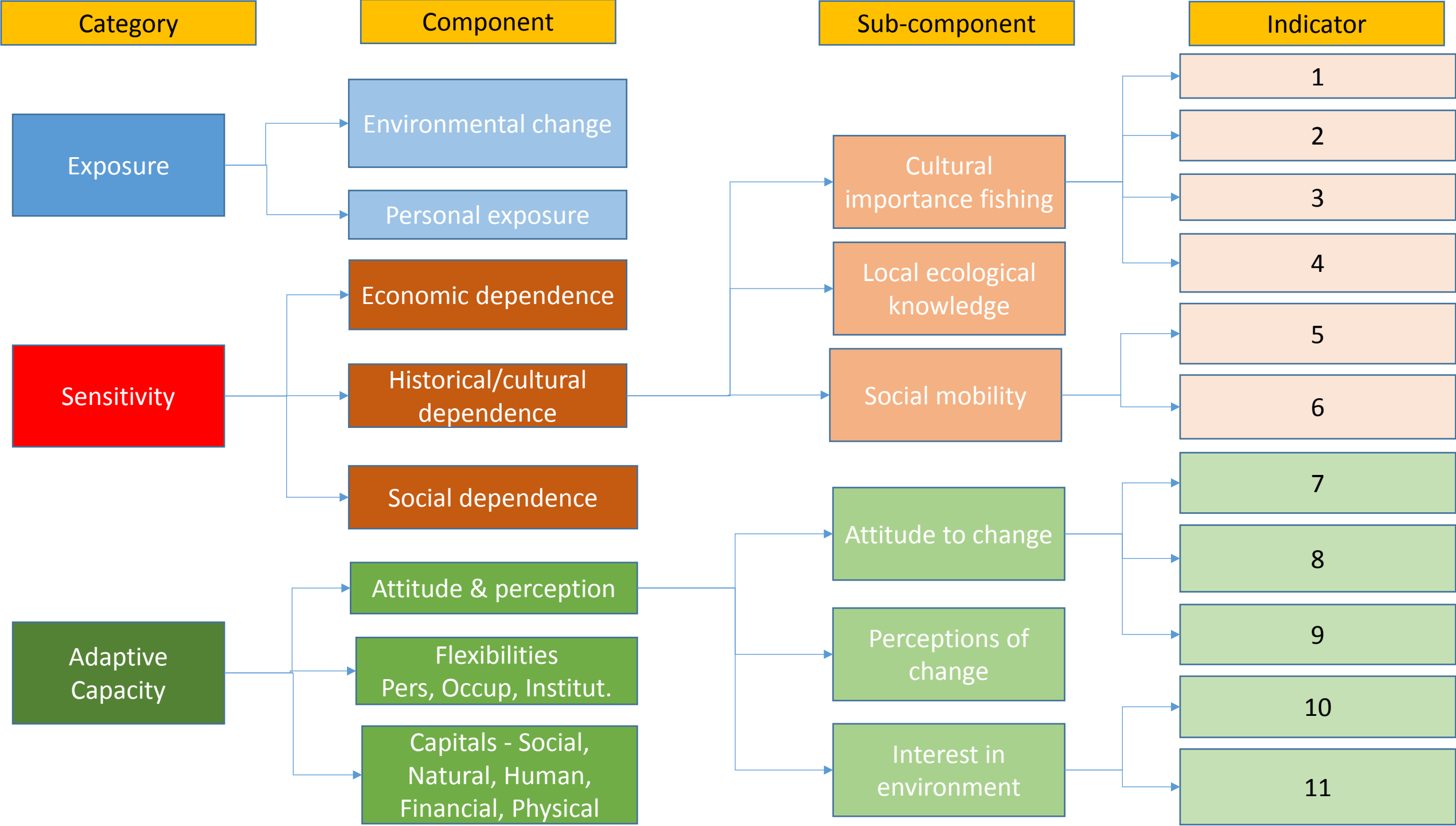
Unit of analysis is the household

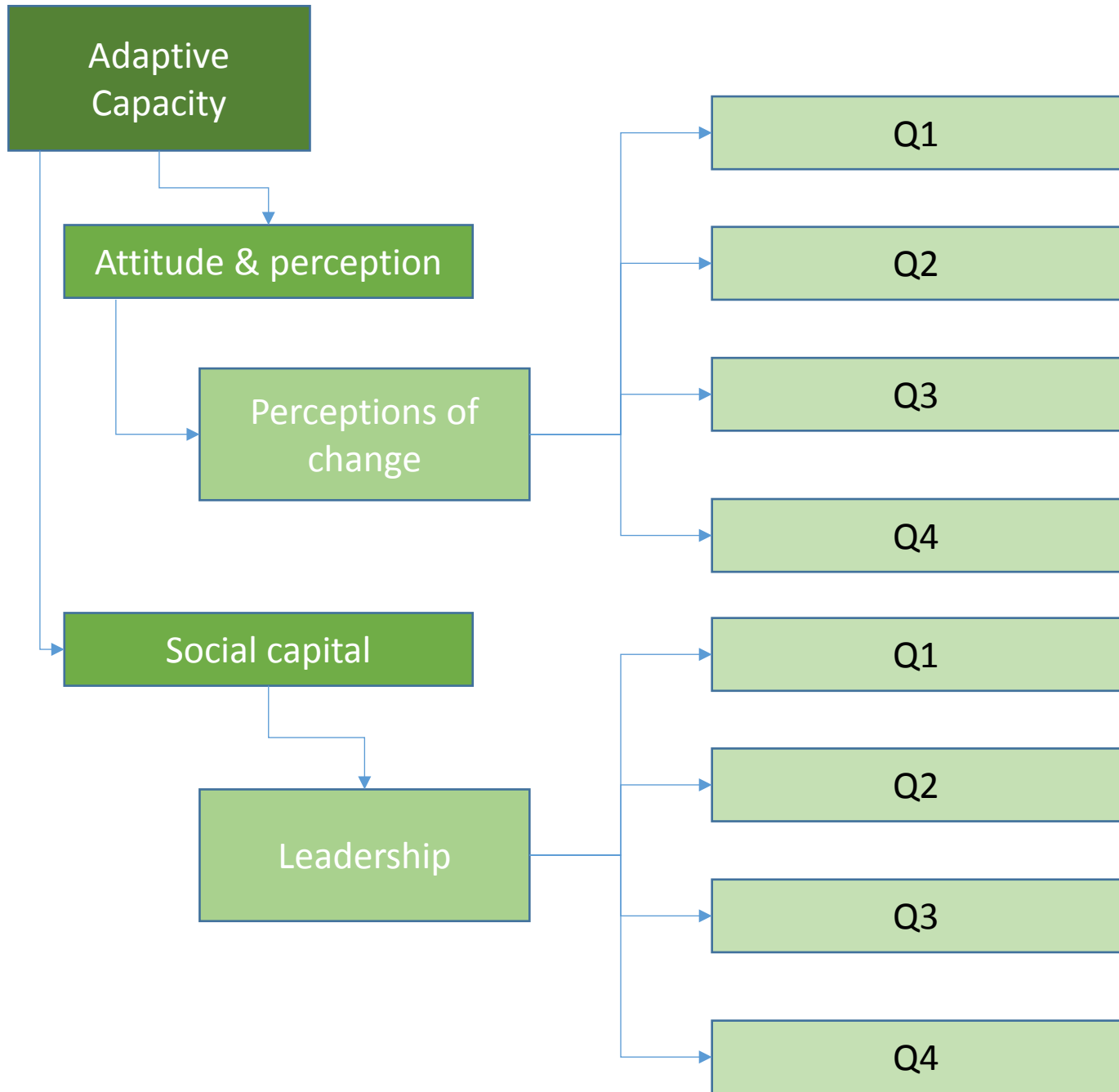
Scores for different scales: Household, community and hotspot

Key question: What makes some communities more vulnerable than others to future environmental change?



(Cinner et al., 2011)

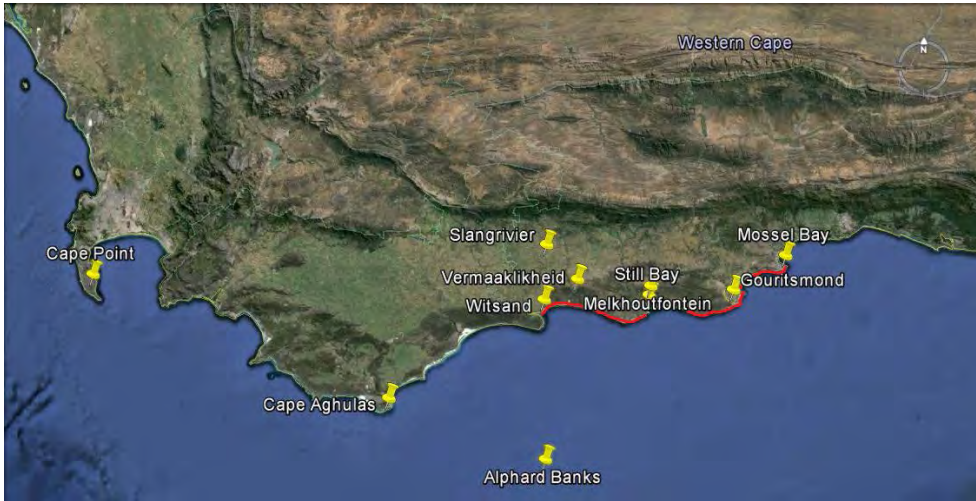




Aus	Brazil	India	SA	WIO
Y	Y	Y	Y	Y
Y	Y	Y	Y	Y
Y	Y	N	Y	N
Y	N	Y	N	Y
Y	Y	Y	Y	Y
Y	N	N	N	N
Y	N	Y	N	N
Y	Y	Y	Y	Y

# Coastal community hotspots

South Africa – Southern Cape



Brazil – South Brazilian Bight



Australia  
SE Australia & Tasmania



India – Kerala & Tamil Nadu



Madagascar – SW region



# 5 hotspots – 1 common methodology

Country	Researchers	Survey format	Pre-testing	No. in field team	Training received	Lang. survey	Translators used?	Average Survey length
Australia	3	Web	Yes	0	N/A	English	No	15 mins
Brazil	2	Field	Yes	1	N/A	Portuguese	No	1.5 – 2+ hrs
India	3	Field	Yes	30	Yes	Malayalam	No	1 hour
South Africa	3	Field	Yes	1 (2)	Yes	Afrikaans	Yes	1.5 – 2+ hrs
WIO	2	NGO?	Y/N	2 (4)	Yes	Malagasy	Yes	TBC

## Questions asked over a wide range of components and topics

Examples include:

- fishing activity and consumption,
- fish catch and over-harvesting,
- perceptions of long and short term change in the local marine environment and fish populations



# Major issues - SA

- Reduction in fish abundance locally
- Unpredictability of weather and sea conditions
- Local fish market dynamics
- Governance and management changes, non-clarity & complexity
- Impact of other competing sectors – fisheries/ tourism

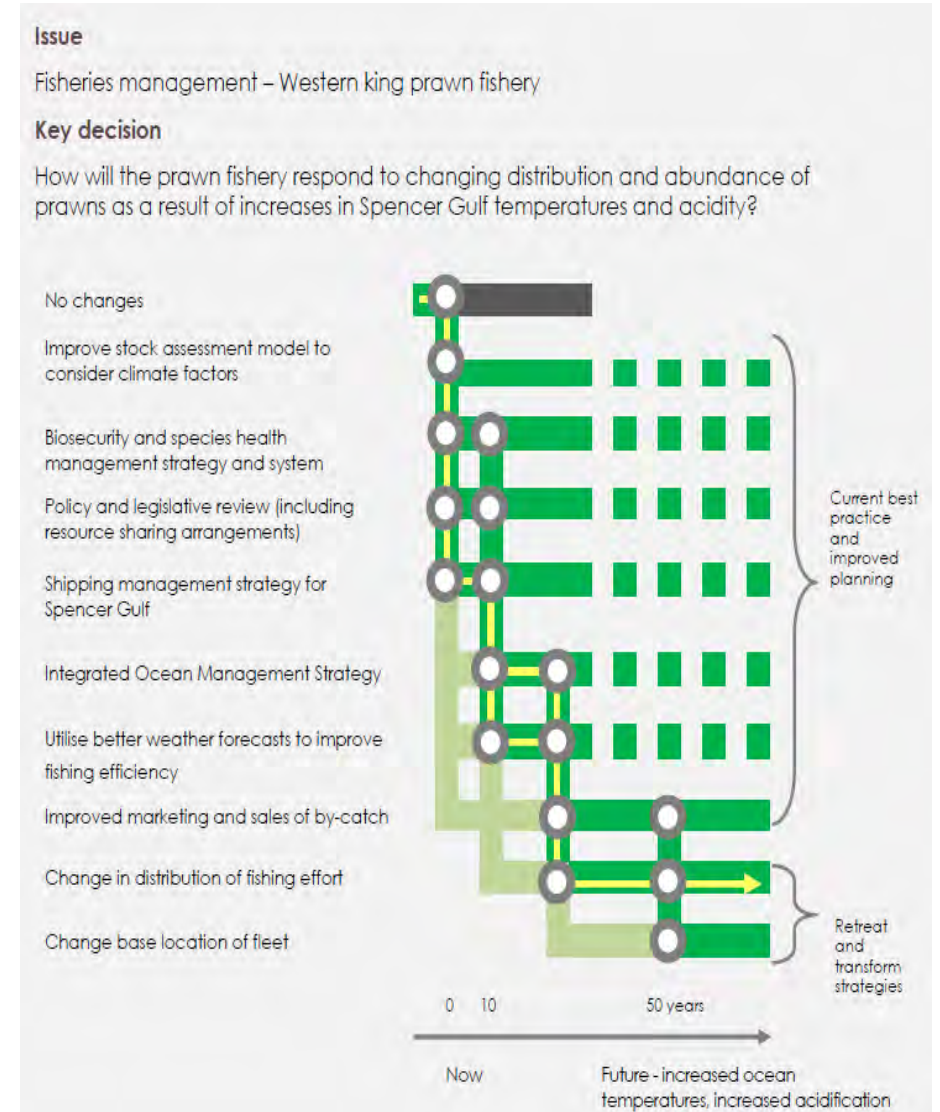
Environmental change is a MAJOR factor AND may compound other stressors

However, communities also have more immediate pressing concerns

# Immediate stages

- Complete VA survey across hotspots
- Complete analysis to answer key questions
- Use participatory group methods to develop adaptation pathways:  
bottom-up community-driven approach

e.g. Open Space Technology (Owen, 1993)



# Future work

- Bayesian modelling of survey data output
- Integration of central and local governance mapping
- Integration with global (FAO) and national (census) datasets (agricultural yield, health, aquaculture potential)
- Feedback and linkage into ecosystem and MICE models
- Partnerships and collaborations from several institutions within and outside of the “hotspots”
- Seek local champions and bridging organisations to take the outcomes of the research to the practical stage.



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Department:  
Agriculture, Forestry and Fisheries  
REPUBLIC OF SOUTH AFRICA

# Thank you



## GULLS Social Vulnerability Team

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[www.marinehotspots.org/index.php/featured-projects/gulls](http://www.marinehotspots.org/index.php/featured-projects/gulls)

