



Impacts and Achievements of the MTSRF

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Marine and Tropical Sciences Research Facility (MTSRF)
http://www.rrrc.org.au/news/2010_conference.html

Showcasing the Australian Government's investment
in the MTSRF for improved sustainability of the
North Queensland region, and Australia

18-20 May 2010
Pullman Reef Hotel & Casino
Cairns, North Queensland



Abstract

[MTSRF Project Number 4.9.7a](#)

A cautionary tale of social indicators: Social resilience in the Great Barrier Reef Region

Timothy Lynam, Samantha Stone-Jovicich and Erin Bohensky
CSIRO Social and Economic Science Program, Townsville, QLD 4814

In this paper we present our results and conclusions following three years of research on indicators of social resilience in the Great Barrier Reef (GBR) region. Indicators are designed to inform stakeholders as to the state or trend of the social systems they are concerned with. Based on the observations on the indicator, stakeholders judge whether or not the state or trend are acceptable or require the system to be modified or just monitored further. With a relatively large data set to draw from, our analyses suggest several important concerns. Firstly, indicators of social states or processes, such as resilience, are unlikely to yield unambiguous information on state or trend in the social elements of concern. Secondly, our results indicate that we may need to know a good deal about the broader social, economic and biophysical context in order to gain full benefit from a given set of indicator information. Thirdly, indicators based on small samples may yield highly misleading results. Based on these results we suggest that use of social indicators at these large regional scales will require users to be highly tolerant of ambiguity and uncertainty and especially so when indicators are based on small samples of the underlying social processes. We conclude the paper with concrete suggestions for developing improved indicators of complex social states and for effectively using such indicators.



Australian Government

Department of the Environment, Water, Heritage and the Arts



Marine and Tropical Sciences Research Facility

A cautionary tale of social indicators

Social resilience in the Great Barrier Reef region

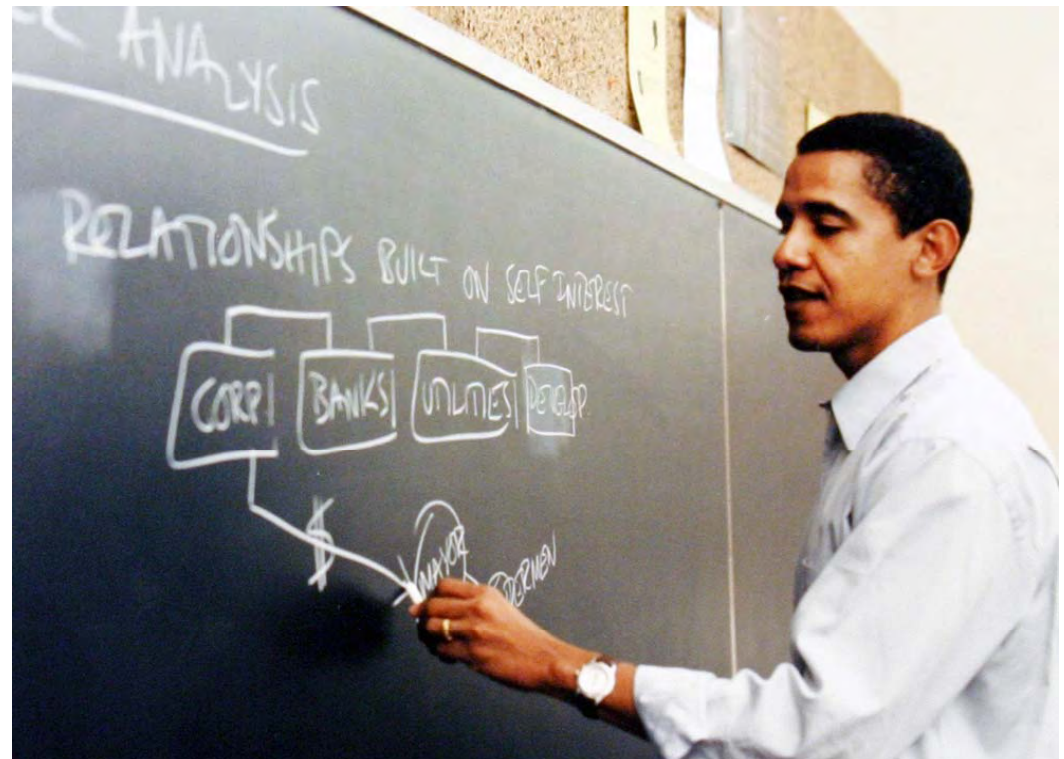
Tim Lynam, Erin Bohensky and Samantha Stone-Jovicich



CSIRO



Key lessons in relation to thinking about and measuring adaptation





SMART - Simple Measurable Accessible Relevant Timely

User

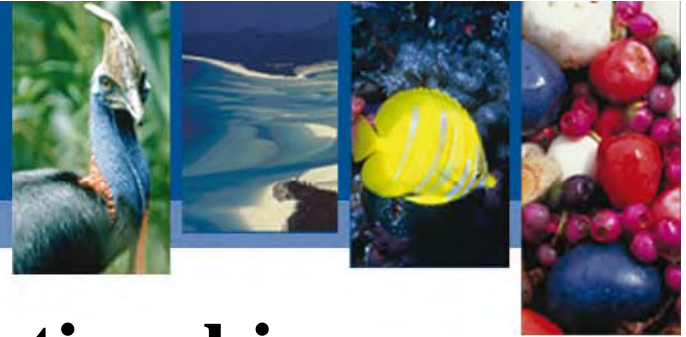
Indicator

System



**Indicators – convey information to the user
about the system**





Relies on known and stable relationship between indicator and system

User

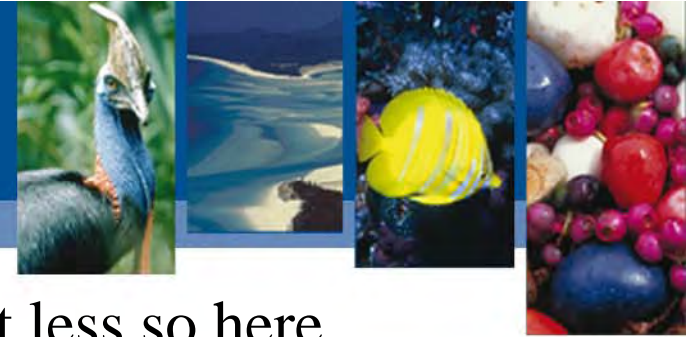


Indicator

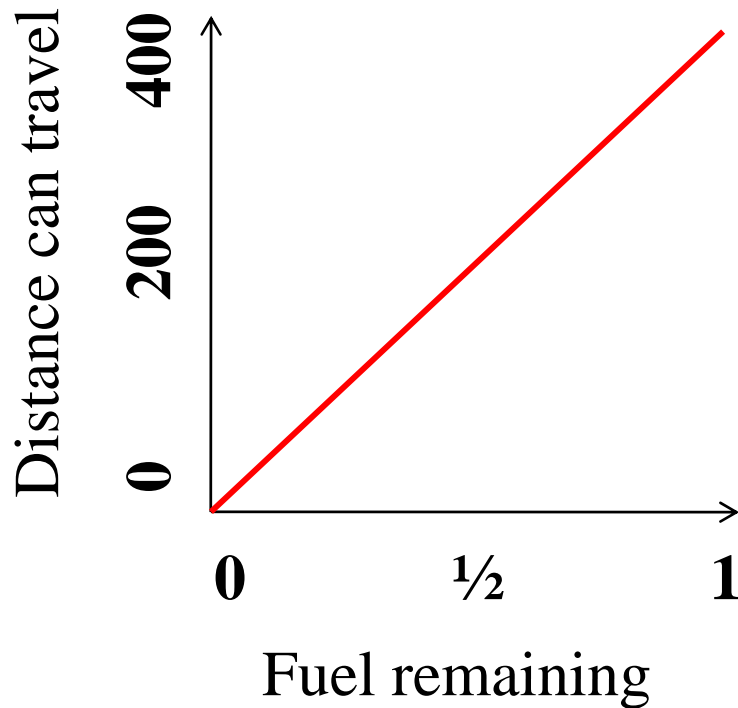


System

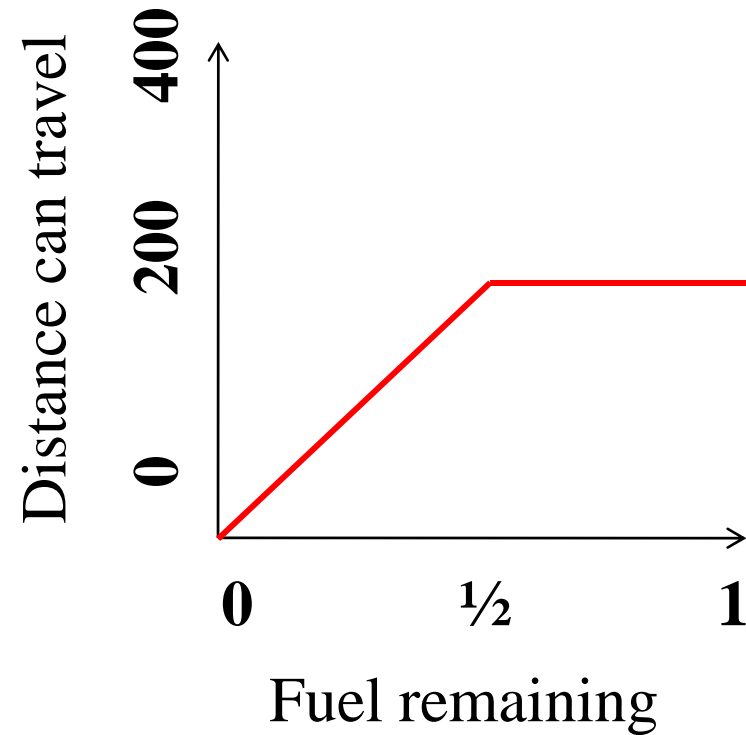




The indicator is useful here...

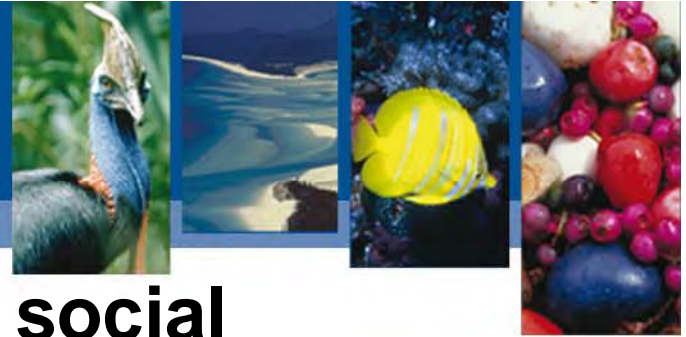


But less so here....



The user's understanding of the relationships between indicators and the system is critical!

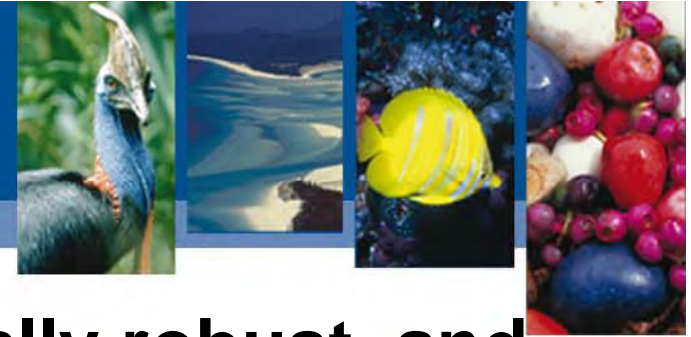




Prediction of outcomes in human social systems is notoriously difficult:

- Simple cause – effect relationships may not hold
- And the context or setting may be the dominant effect





We set out to provide theoretically robust, and user acceptable indicators of social resilience

We asked stakeholders what resilience meant to them and what gave rise to social resilience (n = 20)

We reviewed historical cases of undesirable change (n = 10)

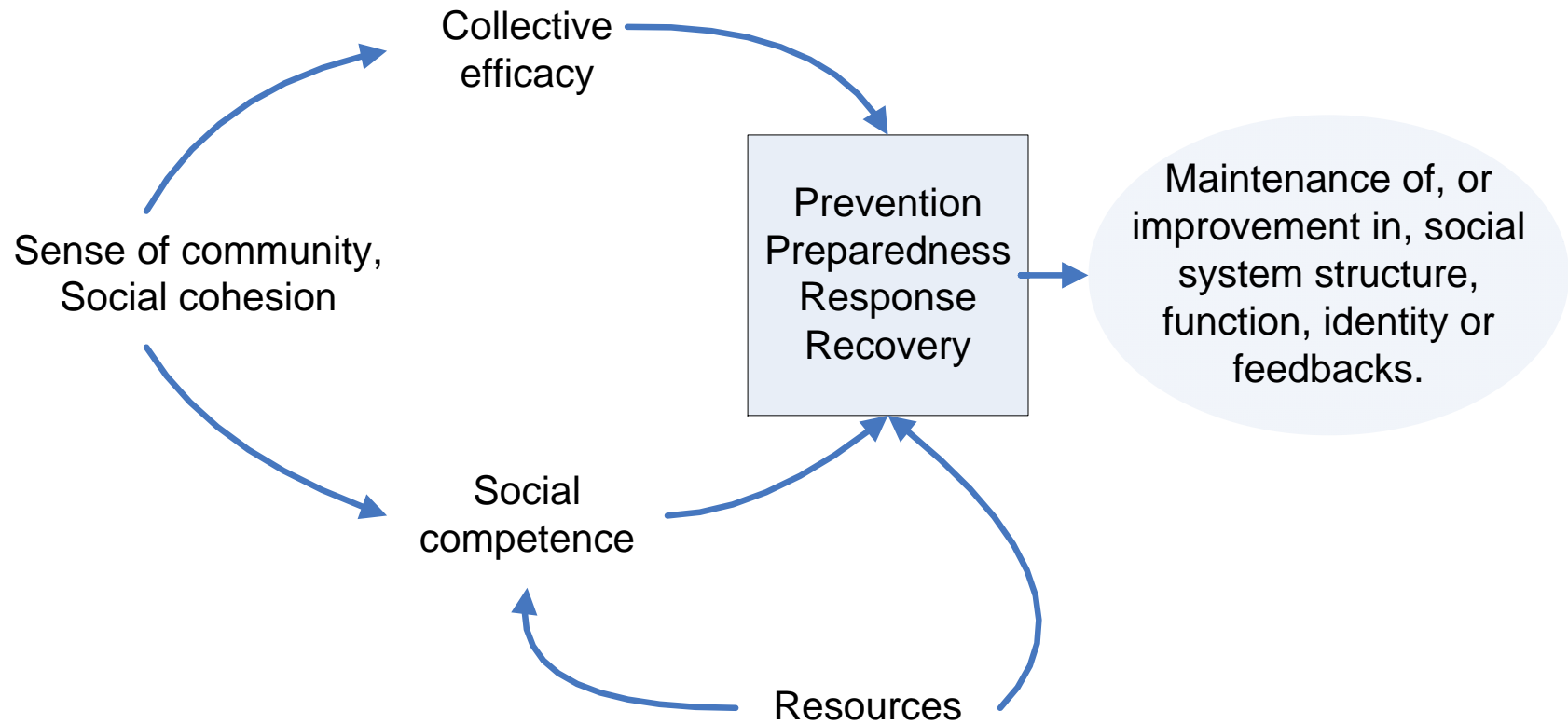
We interviewed representatives of groups that had been through change (n = 20)

We built, tested, refined and validated a model of social adaptation.





Conceptual model



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Collective efficacy: “sense of collective competence shared among individuals when allocating, coordinating and integrating their resources in a successful concerted response to specific situational demands” (Zaccaro et al., 1995)

Sense of community or social cohesion: “membership, influence, integration and shared emotional connection of the community” (Lochner et al., 1999)

Collective competence: “the problem solving ability of a community that arises through collective effort” (Lochner et al., 1999)

PPRR: The extent to which the social system takes preventative, preparatory, response and recovery actions

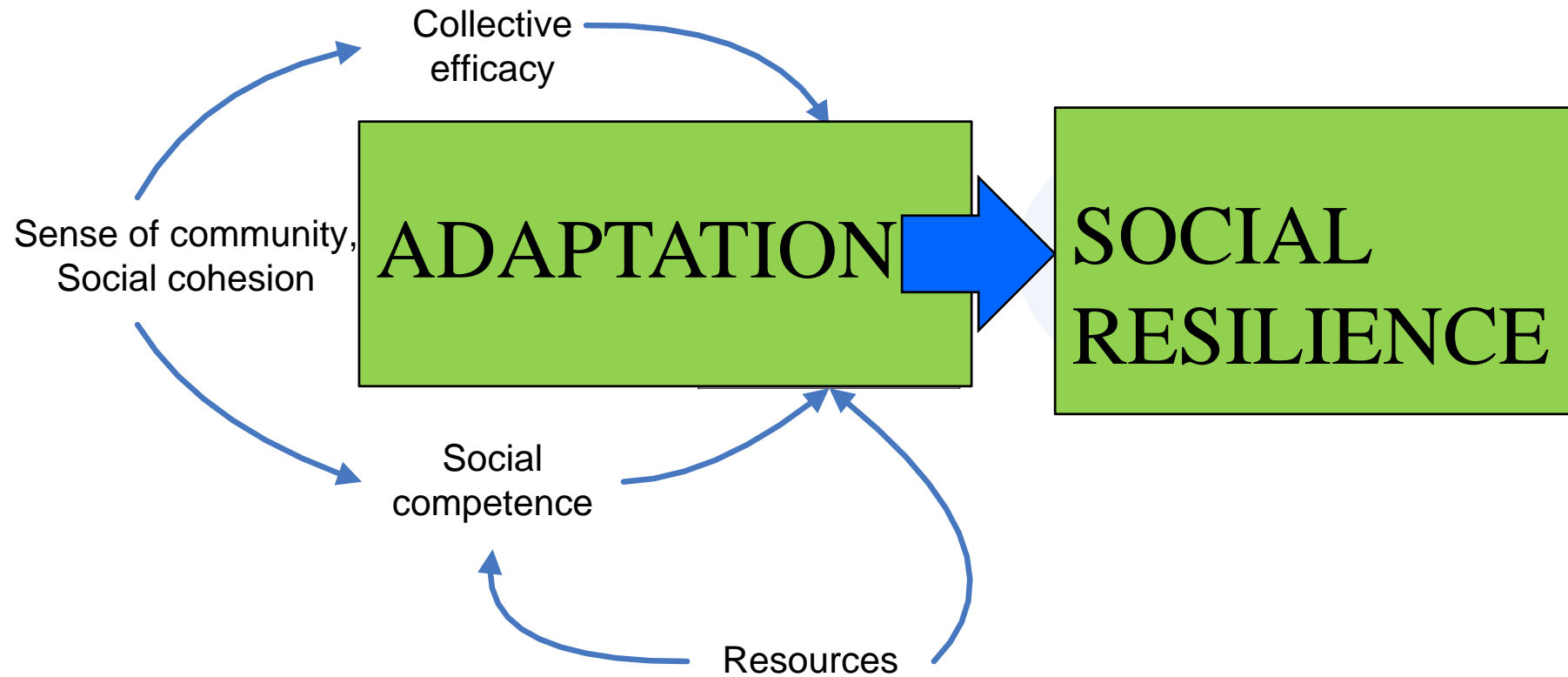
Maintenance of, or improvement in, social system structure, function, identity or feedbacks.

Resources: Endogenous or exogenous financial, physical or environmental resources





Conceptual model

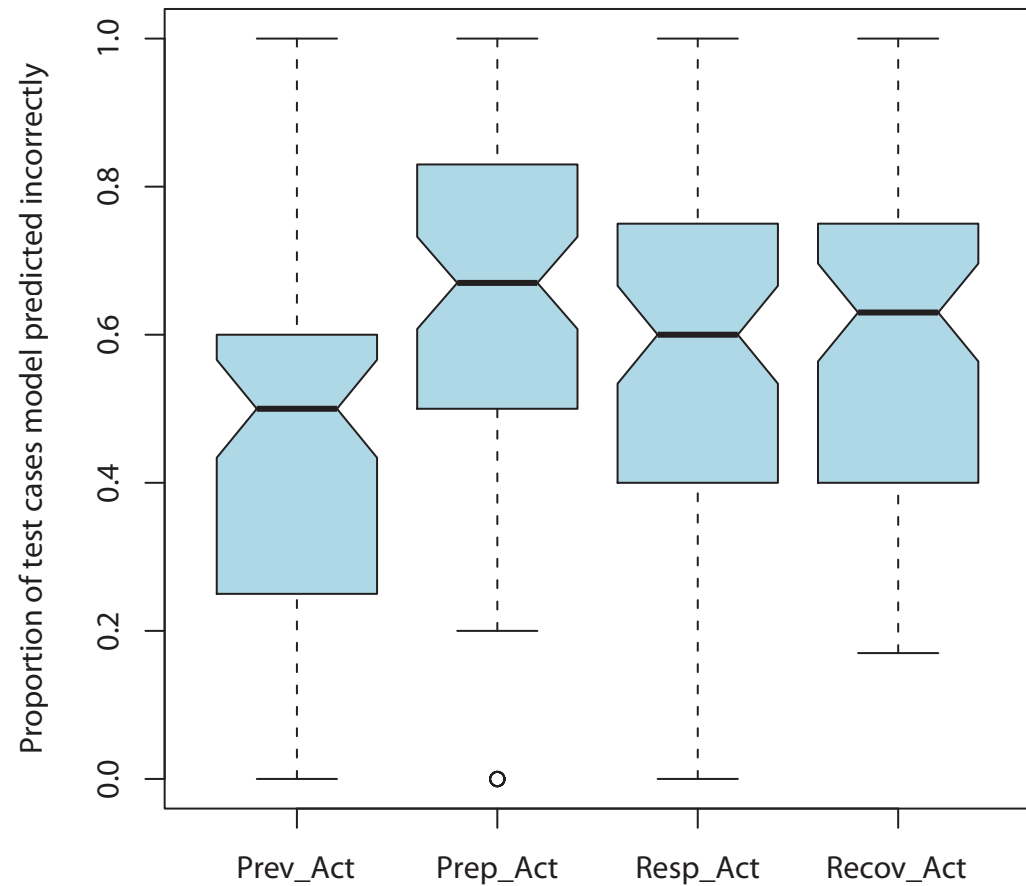


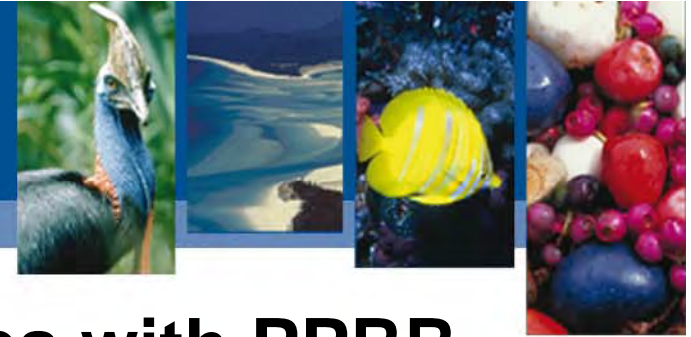


From conceptual to statistical model

Trained a Bayesian Belief Network model using 30 cases.

Model correctly predicts the likelihood of adaptation in about 40 to 50% of cases.

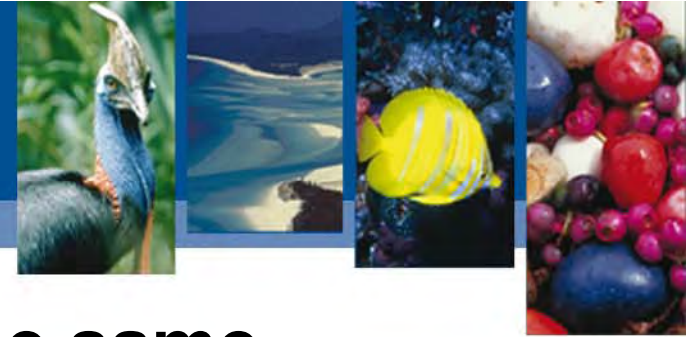




Indicators and their relationships with PPRR

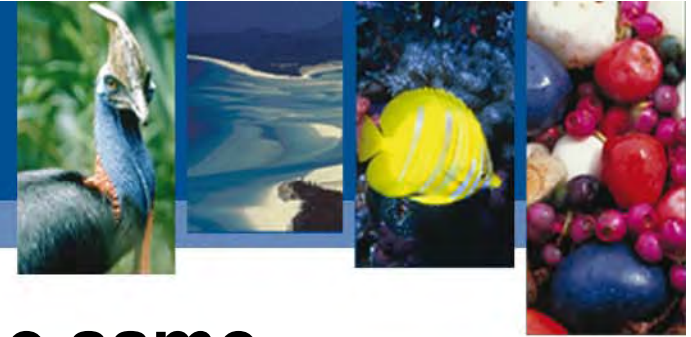
Indicator	Preventative Actions	Preparatory Actions	Response Actions	Recovery Actions
Debate	Positive	No	Negative	Negative
Empowered	No	No	Positive	No
Expt_space	No	Positive	Positive	No
Healthy environment	Positive	No	No	Negative
Kno_Bio	Negative	No	No	Positive
Long term decisions	No	Positive	Negative	No
Org_coord	No	Positive	Positive	No
Positive_Sol	No	No	Positive	No
Resource_congruence	Positive	No	No	Negative





Variables do not always have the same directional effect

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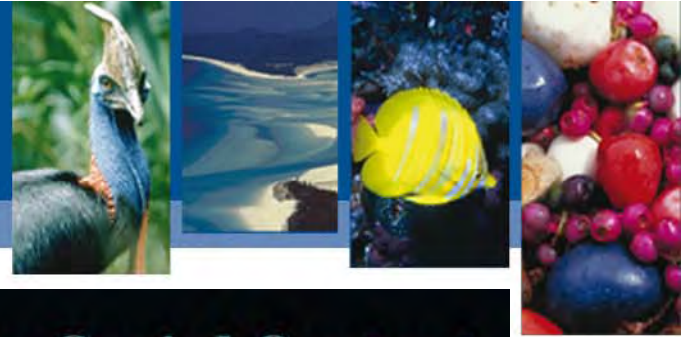




Key lessons - 1

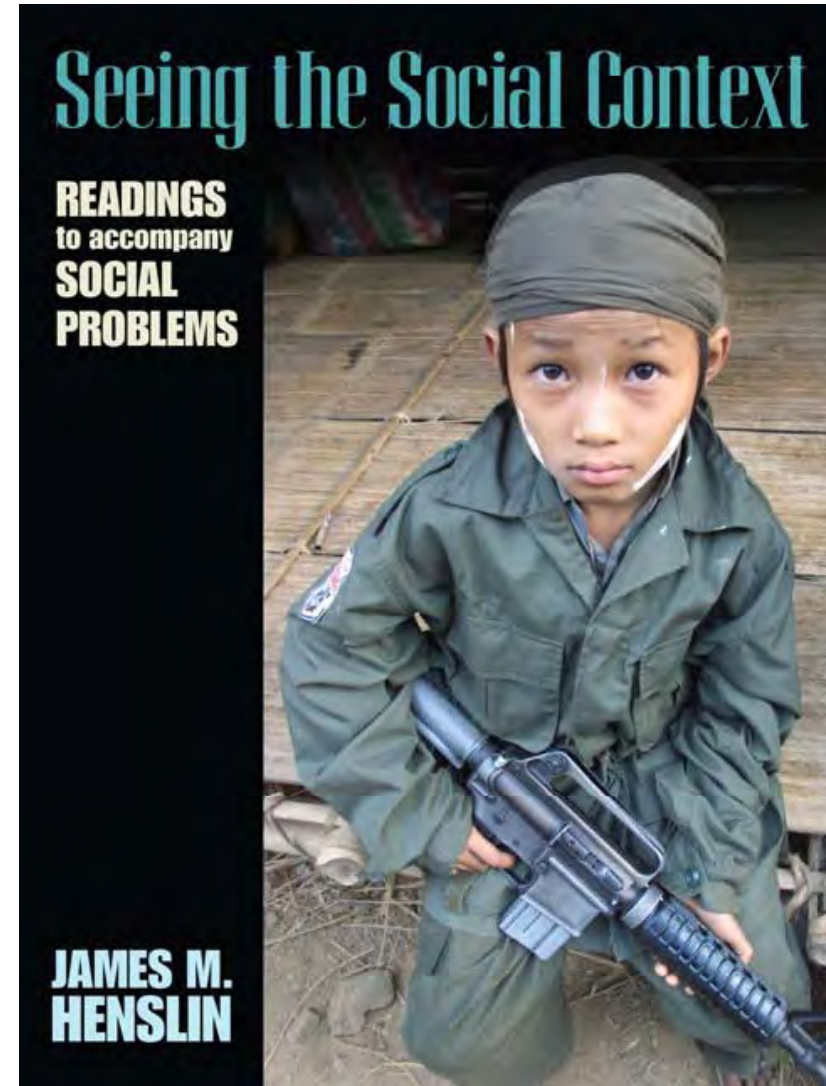
...social states are inherently unpredictable. As a consequence indicators are unlikely to yield unambiguous information on likely outcomes.





Key lessons - 2

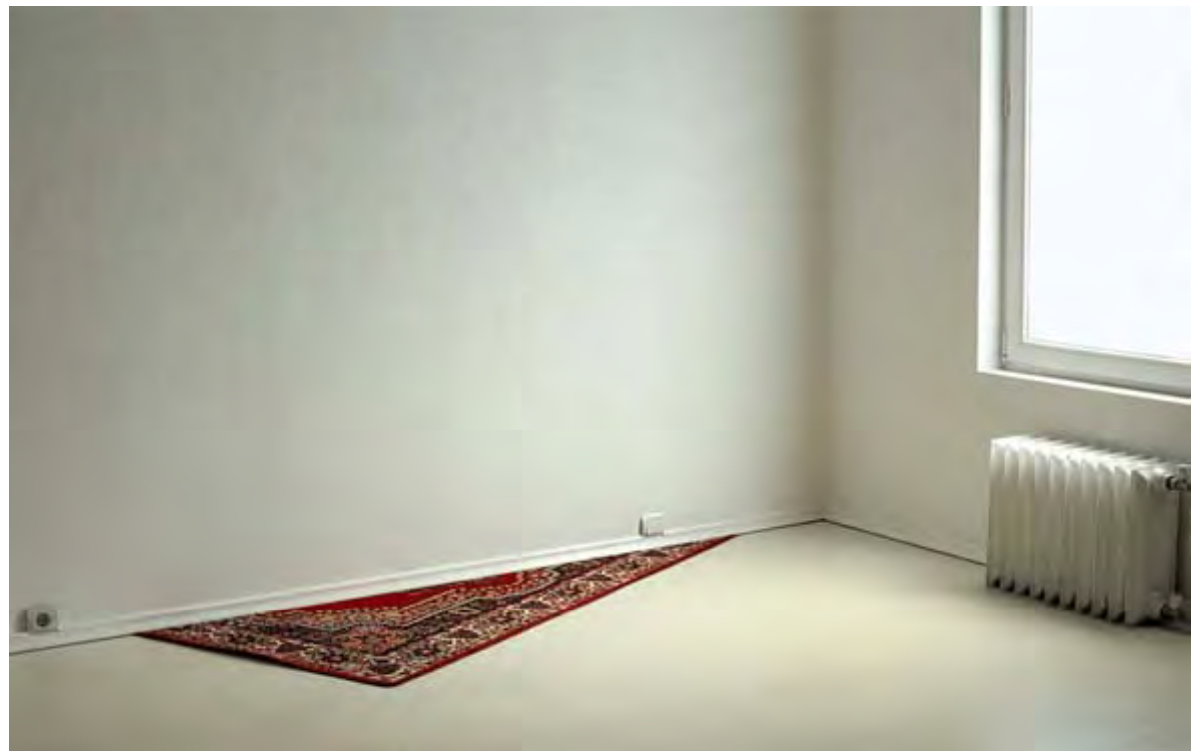
we may need to know a good deal about the broader social, economic and biophysical context in order to gain full benefit from a given set of indicator information.





Key lessons - 3

...indicators based on small samples may yield highly misleading results!





Key lessons - 4

...clever people using SMART indicators may still get it wrong!

Why Economists Failed to Predict the Financial Crisis:

"It's not just that they missed it, they positively denied that it would happen."

Franklin Allen





Key lessons - 5

...in the realms of adaptation and resilience, simple, aggregated indicators are simply good enough!



The miracle of 1994

The tragedy of 2010





Key lessons - 6

User



Indicator



System



The user and their knowledge are part of the system



We have ready for use:

- *A tested and validated set of indicators of adaptation likelihood;*
- *An analytical system that can be used for monitoring or prediction;*
- *A data collection instrument that can be delivered through the internet or in face to face interviews.*





Thank you

For further information contact:

Tim Lynam

CSIRO, Davies Laboratory, Townsville

