



# Understanding and advancing climate adaptation in a third sector sustainability organisation

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## 1. Problem statement

- ▶ As climate change escalates, so does the need for individual and collective action.
- ▶ Third-sector sustainability organisations (TSSOs) play an important role in enhancing understanding and motivating community action in response to climate change.
- ▶ Better understanding of how local TSSOs, organised around sustainability, link scientific understanding of climate change and local adaptive actions to address local consequences of climate change.

## Aim, research questions and case study

- ▶ Aim: to investigate how a TSSO understands climate change and advances climate adaptation
- ▶ Research questions:
  - ▶ RQ1: What is the understanding of climate change and adaptation within the TSSO in this case study?
  - ▶ RQ2: What is the nature of the group's social identity?
  - ▶ RQ3: What is the relationship among understanding of climate change and adaptation, social identity and social action?



Case study:

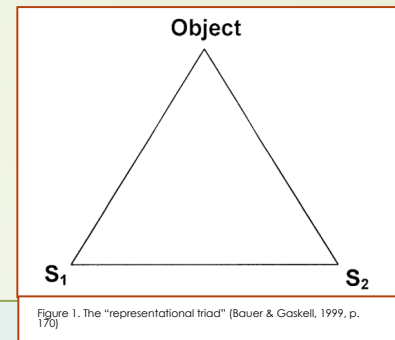
The UNESCO Noosa Biosphere Reserve Board of Directors (NBR Board)

## Literature review: climate change and adaptation

- Climate change science and policy knowledge from the reified universes of scientists and policy-makers is often transferred to social groups through the media, at times transforming or limiting key concepts and meaning (Trumbo, 1996)
  - Intergovernmental Panel on Climate Change (IPCC) (1989)
  - United Nations Framework Convention on Climate Change (UNFCCC) (1992)
  - CSIRO State of the Climate Reports (BoM/CSIRO 2012, 2014, 2016)
  - Garnaut climate change review (Garnaut, 2011)
- Climate change adaptation
  - Adaptive actions are increasing due to growing acknowledgement of climate change's inevitability and irreversibility, (e.g. IPCC, 2014b; O'Brien & Selboe, 2015; Burton, 2009, 2004)
  - Greater social and financial resources are required to elevate the level of adaptation required (e.g. Moser & Pike, 2015; Moser, 2014)

# Theoretical perspectives

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- RQ1: *Social representations theory (SRT)* to consider social representations.
  - Key concepts (Moscovici, 1961):
    - *Reified knowledge* - scientific research acknowledged within a fixed set of scientific rules, allowing the knowledge that emerges from its findings to be analysed, challenged or discussed among their peers
    - *Consensual knowledge* – the collective understanding, which may combine lay knowledge and/or reified knowledge of the social group.
    - *Social representation* – A group's understanding of a new emerging scientific phenomenon, that may or may not align with reified knowledge; the social object is discussed and debated within the social group to make sense of the reified information, which then may emerge as a social representation.
- RQ2: *Identity process theory (IPT)* to explore social identity of the NBR Board. Key concepts include continuity, distinctiveness, efficacy, and self-esteem (Breakwell, 1986, 1993)
- RQ3: *Cognition, affect and behaviour concepts* (adapted from research by Lorenzoni, Nicholson-Cole and Whitmarsh (2007) to explore social adaptive actions

## 4. Social representations theory: key concepts

- ▶ *Antinomies* are contradiction or opposition between two beliefs or principles. They appear as antagonistic representations and can assist with sense making and communication by providing structure as social knowledge is developing (Moloney, Williams & Blair, 2012; Markova, 2000, 2003)
- ▶ *Anchoring* is a process by which unfamiliar concepts or social objects are understood by a lay group through its relationship with existing social representations (Moscovici, 1961)
- ▶ *Objectification* uses symbolic coping to make abstract ideas become associated with more tangible or concrete ideas (Wagner, Kronberger, & Seifert, 2002; Wagner & Kronberger, 2001)
- ▶ *Hegemonic, emancipated and polemic representations* (Moscovici, 1961; Wagner, 2012)

Table 2. Types of social representations (Adapted from Moscovici, 1961; Wagner, 2012)

<i>Type of representation</i>	<i>Knowledge foundation</i>	<i>Group role</i>
Hegemonic	Consensual within group	Most prevalent
Emancipated	Specialised expert knowledge to complement hegemonic representation	Supplemental
Polemic	Direct challenge to hegemonic representation	Usually brought from outside of group

## 4. Social identity: Key concepts

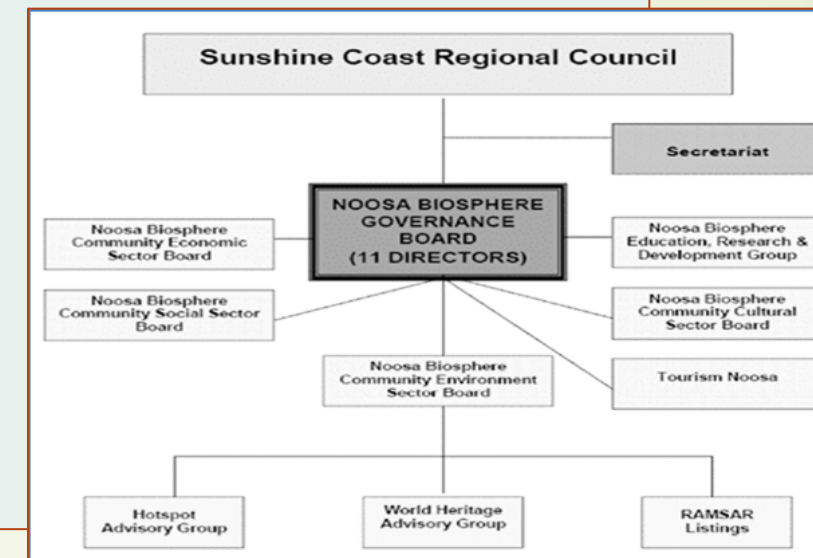
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- ▶ *Social identity in Identity Process Theory (Breakwell, 1986, 1993):*
  - ▶ *Continuity:* Relates past and present identity, seeking sameness, but can accommodate growth and change over time
  - ▶ *Distinctiveness:* Relates to development of some unique elements of identity
  - ▶ *Efficacy:* Characterised by control and competence, as opposed to feelings of futility or alienation
  - ▶ *Self-esteem:* Partially achieved through the other principles, contributes to the selective perception of information processing and value formation.
- ▶ *Social identity in social representations theory (Moscovici, 1961):*
  - ▶ Product of group dynamics; developed to serve group interests; and built around a group's identification; reveals differing processes, depending on differing levels of the group's cohesion and strength among the group's members, generating varying levels of resistance to new concepts through:
    - ▶ *Propaganda:* individuals' identity firmly rooted to the practices and values of their group. rejected new science concepts that conflict with social identity
    - ▶ *Propagation:* individuals' identity firmly rooted to the practices and values of their group; generated varying levels of resistance to the new concepts, used propagation to develop their attitudes of the acceptable components of the science
    - ▶ *Diffusion:* a low resistance mode of communication showing a tenuous identity with their group and used to share opinions



# Method

- Single-case study design – previously undocumented and worthy of study and critical analysis in-depth (Yin, 2009) of complex and relatively new phenomena (Baxter & Jack, 2008)
- The benefits of using the Noosa Biosphere Reserve (NBR) Board as the case study TSSO flow from the wider applicability of research outcomes to biosphere reserves (BR) worldwide and to other areas particularly vulnerable to climate change and its consequences (IPCC, 2007b)
- The aim of UNESCO Biosphere Reserves (BRs) is to advance sustainability (UNESCO, 1995, 1996). As of 2015, 669 globally-designated UNESCO BRs operated across 120 countries (UNESCO, 2015). This extensive MAB network has the potential to reach to key stakeholders, such scientists, policy-makers and local community activists. Currently, the knowledge-sharing from its activities and their potential community benefits is limited (Reed, 2016)
- Personal connection to the study: served on the NBR Board prior to study
- To avoid bias, the participants were solicited through the NBR secretariat via two NBR Board email invitations and through verbal invitations during Sector Board meetings via the Sector Board chairs
- Of the 65 NBR Board members serving during the 2012-2013 term, 23 participants volunteered for semi-structured interviews





- The study employs the sequential qualitative research design (Morse, 2010) to further explore this previously unanticipated area revealed through the topic guide process
- Research questions 2 and 3 were added as new themes emerged from the data analysis
- Thematic analysis was used to develop themes to analyse the interview data

<i>Research question (RQ)</i>	<i>Intention to know</i>	<i>Data collection method</i>	<i>Analytical tool</i>
RQ1	Subconscious understanding of and emotional connection to the term “climate change”	Semi-structured interviews, which included free associations	Free association technique
RQ1	Social representation of climate change	Semi-structured interviews	Thematic analysis
RQ1	Social representation of climate change adaptation	Semi-structured interviews	Thematic analysis
RQ2	Social identity of the NBR Board	Semi-structured interviews	Thematic analysis
RQ3	Relationship between social representations, social identity and social action	Semi-structured interviews	Thematic analysis

## Findings on SRs around climate change

*Word associations with climate change themes of cause, impacts and response*

<b>Word associations with climate change</b>						
<b>Theme</b>	<b>First-order*</b>		<b>Subsequent-order*</b>		<b>Total*</b>	
<b>Cause of climate change</b>	7	(32%)	9	(18%)	16	(22%)
<b>Impacts of climate change</b>	6	(27%)	28	(56%)	34	(47%)
<b>Response to climate change</b>	6	(27%)	13	(26%)	19	(27%)
<b>Other</b>	3	(14%)	0	(0%)	3	(4%)
<b>Total</b>	22	(100%)	50	(100%)	72	(100%)

\*Note: Percentages in parentheses indicate proportion of word associations generated within category and are for reflective purposes; they are not meant to be indicative of statistics.

*A posteriori themes with antinomies from knowledge associations with climate change*

<b>Word association theme</b>	<b>Antinomies from knowledge associations</b>	
Cause of climate change	Anthropogenic (12)	Natural (4)
Impacts of climate change	Local (25)	Distant (9)
Response to climate change	Environmental (10)	Socio-political (9)

- Free associations of knowledge were analysed to develop themes presented as antinomies or oppositional dyads, for further analysis of the SRs of climate change
- Knowledge associations show a wide range of initial impressions across causality, effects and responses
- The antagonistic components within each category (e.g. the anthropogenic/natural causality, the local/distant biophysical impacts and the environmental/socio-political aspects of the responses) add to the diffused nature of the social representation among the NBR Board participants

## 6. Climate change SRs

<i>Emotive associations</i>			
<i>Affect</i>	<i>First-order</i>	<i>Subsequent-order</i>	<i>Total</i>
<i>Negative</i>	20	9	28
<i>Mixed</i>	2	0	2
<i>Positive</i>	0	5	6
<i>Total</i>	22	14	36

<i>Emotive associations categorised by type, affect and emotion</i>		
<i>Type of emotion</i>	<i>Positive affect</i>	<i>Negative affect</i>
Phenomenon or event-related	Excitement Positive feelings	Anger
		Blame (2)
		Concern (6)
		Disappointment
		Frustration (4)
		Pessimism (2)
Future Appraisal	Hope (2)	Sadness (5)
		Worry (2)
		Fear (2)
Related to object or phenomenon's properties	Compassion	Cynical
		Futility
		Resignation (2)

- Free associations show unconscious emotions relating to climate change highlight an initial negative affect. The emotive associations primarily relate to the scientific phenomenon itself
- The free associations of the NBR Board participants indicate a high degree of thinking and emotional connection to climate change on an unconscious level as revealed by analysis of the antinomies: 1) anthropogenic/natural; 2) local/distant; and 3) environmental/socio-political

## 6. Findings on SR around climate change

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	<i>The NBR Board participants</i>	<i>Moscovici's Parisian Catholics</i>
<i>Societal segmentation</i>	2012-2013 UNESCO NBR Board	1950s Parisian Catholics
<i>Strength of group identity</i>	Strong	Strong
<i>Process of communication (communicative modalities)</i>	Propagation	Propagation
<i>Social-psychological function</i>	Attitude	Attitude
<i>Contents of communication (anchoring or objectification)</i>	SRs are anchored in images of human-induced pollution; biophysical impacts (e.g. sea-level rise, flooding, ice melting) and holistic, sustainable responses addressing not only carbon pollution but also to more broadly protect the environment through sustainable practices	SRs are anchored in the traditions and roles of the confessional in the religious practices of Catholics
<i>Level of rejection/resistance or reception/acceptance of new scientific concepts</i>	Partial and controlled reception of climate change focused on sustainability over specific mitigation and adaptation practices	Partial and controlled reception of psychoanalysis

- SR of climate change incorporates a *hegemonic representation* emphasising attribution to anthropogenic causes; current and projected consequences from physical impacts, primarily local in nature but also including distant impact of "ice"; and collective, primarily socio-political responses
- *Anchoring* with the SR includes negative imagery of human-induced pollution (e.g. pollution spewing smokestacks and fossil-fuel burning) and physical impacts (e.g. polar bears on floating ice blocks). *Anchoring* climate change to sustainability principles and sustainable practices connects this cohort's connection with sustainability to the phenomenon in a way that provides meaning and a communication mechanism

## Findings on adaptation

- ▶ No discernible cohesive SR around adaptation emerged from the data because of the wide range of views on adaptation responses, from general to specific
- ▶ The data reveals a limited understanding and connection with adaptation
- ▶ Few adaptive actions related solely to individual responsibility, and all emerged from personal experiences of farming or rural property management, indicating that personal experiences with climatic impacts can play a role in understanding effective adaptive actions

## Individual/social adaptation responses

Individual	Social	
	Socio-political	Socio-economic
3.A2/Adapt family farming practices to address drought 4.A1/Individual and social adaptation to address lifestyle and consumption 16.A4/Adapt farming practices to address temperature and precipitation changes 20.A14/Undertake due diligence on property to address flooding; bore to use flood water 20.A18/Take individual responsibility 20.A20/Become self-sufficient in applying adaptation to personal property 21.A18/Individual preparedness	3.A1/Remove government maladaptation that hinders action 4.A1/Individual and social adaptation to address lifestyle and consumption 16.A8/Assist in job-creation that addresses climate change impacts 19.A3/Create government buyback of flood prone land 20.A21/Promote sustainable, holistic adaptation by changing values to protect biodiversity 20.A22/Reverse maladaptive government policies promoting biodiversity loss 21.A3/Encourage political action on adaptation 21.A13/Promote adaptation and mitigation by new Noosa Council leadership 21.A17/Advance holistic community activism 22.A13/Reverse maladaptation in local government planning scheme 23.A5/Create dual approach of mitigation and adaptation 23.A14/Advance collective action against risks from impacts	23.A16/Promote economic benefits of adaptation  23.A17/Encourage sustainable, buy-local approach to adaptation  23.A18/Promote ecological tourism  23.A19/Provide local incentives to meet customer demand



- ▶ Responses indicating adaptive actions suggested government-imposed actions, often of a general nature, deferring responsibility for adaptation to 'the other' or acknowledging collective actions are required to tackle climate change
- ▶ The socio-political adaptive actions indicated concern about climate change but limited knowledge of how to respond to the need to change the economic model currently in existence



Impacted entity	Responsive entity	Type of adaptation response
Individuals	Individuals	3.A2/Adapt family farming practices to address drought 16.A4/Adapt farming practices to address temperature and precipitation changes 20.A14/Undertake due diligence on property to address flooding; bore to use flood water 20.A18/Take individual responsibility 20.A20/Become self-sufficient in applying adaptation to personal property 21.A18/Individual preparedness
Individuals	Social and/or private sector	16.A8/Assist in job-creation that addresses climate change impacts
Individuals and private sector	Social (government) and private sector	23.A16/Promote economic benefits of adaptation 23.A17/Encourage sustainable, buy-local approach to adaptation 23.A18/Promote ecological tourism 23.A19/Provide local incentives to meet customer demand
Individuals, private sector, environment	Social (government)	19.A3/Create government buyback of flood prone land 22.A13/Reverse maladaptation in local government planning scheme
Environment	Social (government)	20.A22/Reverse maladaptive government policies promoting biodiversity loss
Non-specific	Social (government)	21.A3/Encourage political action on adaptation 21.A13/Promote adaptation and mitigation by new Noosa Council leadership
Non-specific	Social	21.A17/Advance holistic community activism 23.A14/Advance collective action against risks from impacts
Non-specific	Social (government)	3.A1/Remove government maladaptation that hinders action
Individuals	Individual and social	4.A1/Individual and social adaptation to address lifestyle and consumption
Environment	Individual and social	20.A21/Promote sustainable, holistic adaptation by changing values to protect biodiversity
Non-specific	Individual and social	21.A18/Encourage individual and community action on mitigation and adaptation
Non-specific	Non-specific	23.A5/Create dual approach of mitigation and adaptation

## Findings on social identity

- Sustainability was a key theme that emerged from the data, yet not a question in the topic guide
- The sustainability data was categorised around subthemes relating to the participants early experiences with sustainability, its reinforcing principles, and the application of sustainability to their personal and professional lives
- The findings reveal the NBR Board holds a social identity with sustainability and the NBR Board participants held personal identities with sustainability

Formative sustainability experiences through individual actions and personal philosophy:

*"You define it in your own home or you define it in the social issues of your area that you're living in, or you define it in the governance... personally, I live by a very soft footprint...I'm careful with recycling, I don't waste things, I don't buy excessively. I'm not a fan of consumerism" [3.S1].*

Formative sustainability experiences through personal values and positive affect with sustainability:

*"When I lectured at university in the late 90s, I wondered where the activists had gone...If you are interested in sustainability, you carry that with you. Or you naturally gravitate towards things with that framework within which you see yourself...It was that long-term thinking – that's sustainability" [1.S1].*

Reinforcing sustainability principles through tertiary study:

*"I completed the [TAFE] diploma in sustainability ...certainly opened my eyes far, far better than what I had previously known about climate change...Yep, so I'm a sustainability champion..." [2.S2].*

Applying sustainability principles through career choices:

*"...I was working with the Living Smart program with...it's about coaching. So you all get together, say you choose to do it in your street for six weeks... you say, "Hey, let's all get sustainable." There might be people interested in bikes and other people interested in compost, so you just tailor it to that group. Then every week you meet and tell everyone what you've been doing to be sustainable and you go on excursions and do learning things, and there's all this support material so you can gather from that. And it's that sort of coaching thing, because a lot of people are really new to it and they found that really, really successful" [3.S5].*

- ▶ Research demonstrates that effective climate change engagement, defined as a “personal state of connection with the issue of climate change” (Lorenzoni, Nicholson-Cole and Whitmarsh, 2007, p. 446), consists of concurrent elements:
  - ▶ *cognition*, pertaining to knowledge
  - ▶ *affect*, denoting concern about and motivation, and
  - ▶ *behaviour*, requiring specific action.
- ▶ Community awareness of climate change’s causality and impacts may have increased in the past decade, as noted in survey research from the US (Leiserowitz, Kates, & Parris, 2006), UK (Lorenzoni et al., 2007) to Australia (Leviston et al., 2011)
- ▶ Barriers to local action and engagement continue to exist, partially due to limited government focus (Lorenzoni et al., 2007).

NBR Board's social action with sustainability and climate change

Element of social action	Action with sustainability	Action with climate change and adaptation
<b>Cognition</b> (Lay knowledge, values, ideas)	<p>The NBR Board participants have significant knowledge of:</p> <p>sustainability principles and effective measures to promote sustainability</p>	<p>The NBR Board participants have significant knowledge of causality of climate change and local and global impacts from climate change</p> <p>The NBR Board participants have limited knowledge of effective mitigation actions to address causality and adaptation measures to address local impacts</p>
<b>Affect</b> (identity, concern and motivation)	<p>The cohort of NBR Board participants:</p> <p>Holds a social identity with sustainability and its advocates hold mostly positive feelings towards sustainability</p> <p>Identifies with sustainability which builds self-esteem, self-efficacy, and positive distinctiveness</p> <p>Provides motivation to continue relationship with sustainability</p>	<p>The cohort of NBR Board participants:</p> <p>Holds no personal or social identity with climate change and its advocates hold mostly negative feelings about climate change</p> <p>Mostly lacks self-efficacy over effective responses and displays no indication of relationship to self-esteem or positive distinctiveness</p> <p>Shows no evidence of significant personal motivation to establish relationship with climate change or responsibility for personal solutions</p>
<b>Behaviour</b> (personal and collective action)	<p>The NBR Board participants incorporate sustainability measures into personal lifestyle and through educational and professional pursuits</p> <p>The Board's main purpose is to initiate and develop social actions to promote sustainability across community</p>	<p>The NBR Board participants have:</p> <p>Limited experience with mitigation and adaptation actions and some conflate responses to address causality with actions to alleviate local impacts</p> <p>Show limited personal experience with climate change adaptation to local impacts</p> <p>The NBR Board, through its practices, demonstrates an interest in but little social action promoting adaptation and no indication of promoting mitigation actions across community</p> <p>The NBR Board, through its social identity with sustainability, plays a role focusing on broader sustainability solutions to addressing climate change and adaptation, fulfilling a group's main objective of social action on sustainability but not directly promoting climate change solutions</p>

- ▶ After considering the TSSO's understanding of climate change, adaptation and sustainability, the findings reveal the NBR Board:
  - ▶ Engages to a limited extent with climate change and adaptation
  - ▶ Grounds its social identity in sustainability
  - ▶ Holds climate change SRs primarily around causes and consequences
  - ▶ Does not hold a cohesive SR around adaptation
  - ▶ Does not fully align its lay thinking with the views of those in the reified communities, especially around effective adaptive responses
- ▶ Recommendations to address cognitive, affective and behavioural gaps in adaptive action:
  - ▶ Augment the TSSO's current understanding of adaptive actions appropriate to address local impacts and build adaptive capacity across the NBR, and
  - ▶ Leverage its social identity with sustainability by linking sustainable adaptive practices with specific local climatic risks at both an individual and collective scale

Element	NBR Board participants' personal and collective actions regarding sustainability, climate change and adaptation	Recommendations to address cognitive, affective or behavioural gaps in adaptive action
Cognition	<p>The Board's sustainability advocates had:</p> <p>Significant knowledge of sustainability principles and effective measures to promote sustainability in areas of natural resource use and biodiversity conservation</p> <p>Some knowledge of key role of sustainability in addressing climate change, with limited understanding of specific local adaptive responses</p> <p>Significant knowledge of causality of climate change and local and global impacts from climate change</p> <p>Limited knowledge of effective mitigation actions to address causality and adaptation measures to address local impacts</p>	<p>To address cognitive gaps to enhance adaptive action, provide opportunities to strengthen cognitive understanding by:</p> <ol style="list-style-type: none"> <li>1) Building upon the group's knowledge of sustainability by highlighting the linkage between climate change and non-sustainable human activities</li> <li>2) Highlighting relevance of local impacts to individuals, family and neighbourhood, as well as community-wide and regional impacts.</li> <li>3) Offering occasions for the group to learn about specific aspects of climate change that relate to their personal and family life, and community needs by providing usable knowledge about: <ol style="list-style-type: none"> <li>a) Present, local and personal risks, and</li> <li>b) Specific adaptation measures to address locally identified climatic impacts.</li> </ol> </li> </ol>
Affect	<p>The Board's sustainability advocates:</p> <p>Identified with sustainability builds self-esteem, self-efficacy, and positive distinctiveness but mostly lacks self-efficacy over effective climate change responses and displays no indication of relationship between self-esteem or positive distinctiveness and climate change</p> <p>Provided motivation to continue relationship with sustainability but shows no evidence of significant personal motivation to establish relationship with climate change or responsibility for personal solutions</p> <p>Had limited experience with mitigation and adaptation actions and some conflate responses to address causality with an interest in but little social action promoting adaptation</p> <p>Held a personal and social identity with sustainability, but no identity with climate change</p> <p>Held positive feelings of sustainability but mostly negative feelings about climate change.</p>	<p>To address affective gaps to enhance collective adaptive actions, provide opportunities to strengthen affective connections by:</p> <ol style="list-style-type: none"> <li>1) Building self-esteem and self-efficacy among group members and enhance social identity with adaptation by linking group's knowledge of and identity with sustainability and its ability to successfully implement specific achievable adaptive actions that provide immediate visible results and community those efforts to the greater community through existing outreach efforts such as local media events and the annual Noosa Biosphere Festival.</li> <li>2) Tapping the NBR Board's motivation obtained from the positive associations with sustainability and developing direct linkages between sustainability principles and sustainable aspects of adaptive actions through Biosphere projects by highlighting local relevance of impacts with local adaptive actions by the group</li> <li>3) Orchestrating personal experiences with climatic impacts through a lived event or through simulation, relating to extreme weather events, such as flooding or heatwaves, to increase affective linkages that build awareness and acceptance of risks</li> <li>4) Promoting positive affect with climate change by emphasising the "gains" from adaptation to their community, rather than the "losses" from climate change.</li> </ol>
Behaviour	<p>The Board's advocates incorporated sustainability measures into personal lifestyle and through educational and professional pursuits but show little personal experience with climate change adaptation to local impacts</p> <p>The Board's main objective was to initiate and develop social actions to promote sustainability across their community</p> <p>The Board's social identity with sustainability played a role focusing on broader sustainability solutions even when directly focusing on</p>	<p>To address behavioural gaps to enhance adaptive actions, provide opportunities to encourage adaptation planning and actions by:</p> <ol style="list-style-type: none"> <li>1) Leveraging NBR Board social group norms and promoting collective efficacy by describing and providing examples of how other pro-sustainability groups advance sustainable approaches to adaptation thus reinforcing norms</li> <li>2) Integrating adaptation into the range of existing community-wide sustainability projects thus addressing climate change while supporting societal and ecological outcomes concurrently</li> <li>3) Orchestrating a NBR Board goal of evaluating and revising the existing Noosa Climate Action Plan, initiating a</li> </ol>



<b>Study's component</b>	<b>Contribution to knowledge</b>
<i>Theory</i>	The study analyses cognitive, affective and behavioural components of climate change and adaptation within a UNESCO BR TSSO. It extends SRT and IPT to explore this globally-affiliated TSSO , the NBR Board, operating in a particularly vulnerable ecosystem.
<i>Methods</i>	The study expands the range of methods of analysis applicable to SRT for revealing a TSSO's shared social identity and social representations of climate change, applying thematic analysis and free association techniques to analyse the data generated from semi-structured interviews
<i>Practice</i>	<p>The study analyses and recommends proposals to improve climate change adaptation practice through consideration of a TSSO's cognitive, affective and behavioural aspects around sustainability, climate change and adaptive actions. The single case study design:</p> <ul style="list-style-type: none"> <li>• Offers in-depth analysis of a specific TSSO and practical implications for community organisers, policy-makers and other decision-makers, providing an outcome that will improve practice</li> <li>• Can be applied broadly to TSSOs in communities across the globe. The UNESCO Man and the Biosphere Programme alone has over 550 formal governing bodies worldwide; each biosphere reserve charged with promoting sustainability and educating the public about climate change and adaptive actions to address its consequences</li> </ul>



## Study's limitations and further research

<i>Study's limitations</i>	<i>Further research</i>
Single case study in the UNESCO Noosa Biosphere Reserve	Comparative studies with other UNESCO biosphere reserves in developed and developing countries
Semi-structured interviews were focused solely on climate change and adaptation	Extended interview queries to include sustainability
Semi-structured interviews only	Build in second phase to include focus groups, which could be added in conjunction with a comparative study
Limited time horizon	Comparison of NBR Board's past and current knowledge and practices, which would inform about new lay thinking in the intervening years since the initial data collection in 2012-2013

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## Understanding and advancing climate adaptation in a third sector sustainability organisation

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