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PARTICIPATORY FUTURES METHODS: TOWARDS ADAPTABILITY AND RESILIENCE IN CLIMATE-VULNERABLE COMMUNITIES

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Abstract

This paper points to the value of broadening the palette of approaches to climate change futures beyond the dominant methods of empiricist predictive trends and expert scenarios. The first half of the paper contextualises the climate change discourse within the field of futures studies and explores potential points of dialogue between a number of futures approaches and the most prominent of the climate protection work. The second half of the paper introduces a case study of community based participatory approaches involving community scenario writing and community visioning, which enacts a collaborative engagement between futures researchers and climate-vulnerable communities. However, any participatory futures method chosen to facilitate climate change adaptation must be context-aware in both its design and implementation if it is to facilitate adaptability and resilience in climate-vulnerable communities.

Keywords: Participatory Futures, Futures Methods, Social Learning, Climate Adaptation, Climate-vulnerable Communities

Introduction

The purpose to this paper is to discuss the application of participatory futures methods to climate change adaptation research. We begin by discussing the climate change context, with particular reference to a move from passive adaptation to active co-evolution. We then develop a typology to illustrate the range of "futures methods" that may be applicable to climate change adaptation research, and go on to specifically discuss how participatory futures approaches may aid in facilitating active co-evolutionary adaptation. Lastly, we discuss the application of a participatory futures approach in a rural area of Australia in order to draw reflections on its utility for building resilience and climate change adaptation.

Climate Change Adaptation: Towards Co-evolution

The complex issue of anthropogenic climate change endangers our entire planet as it tracks a path to radical, rapid, and potentially irreversible, changes in the global ecosystem in the relatively near-term future—within a century. The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) (2007) stated that "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level" (p.1).

Of the two main strands being undertaken in the broad area of climate futures, climate *mitigation* and climate *adaptation*, this paper is concerned with the latter. In contrast to mitigation, which must be tackled on a cooperative global scale, because of the global nature of anthropogenic climate change, adaptation involves responses to the local effects of this global challenge. Indeed, even if greenhouse gas (GHG) emissions were stabilised today, the accumulated GHGs in the atmosphere and associated climate change events would still require significant adaptation. The kinds of foresight and preparation that are imperative in these circumstances have been referred to as "adaptive capacity". Adaptive capacity is a complex and dynamic set of capabilities and, although generally assisted by the strength of a society's productive assets, even societies with "high adaptive capacity remain vulnerable to climate change, variability and extremes" (IPCC, 2007, p. 14). Climate change activists, Minu Hemmati and Ulrike Röhr, highlight the importance of wide public involvement in the development of adaptive capacity:

> Adaptation, which must be context-specific and participatory, requires that all members of the affected communities be part of a climate change planning and governance process. If women [for example] are not fully involved in planning and decision-making… the quality of adaptive measures will be limited and successful implementation will be doubtful. (Hemmati and Röhr, 2007, p. 7)

From *passive* adaptation to *active* co-evolution

Collins and Ison (2009) in the introduction to this special issue argue that two possible interpretations can be made from the etymology of the term "to adapt." These are "to fit" or to "make suitable." The first interpretation, which is also the most commonly used one, is to see adaptation as a passive "fitting into" predetermined conditions. For example if climate change projections suggest that "x" is highly likely to happen, then the communities affected by "x" will need to adapt or "fit into" this outcome. As Ison *et al* (2007) suggest, this approach is deterministic and allows for little human agency on the part of the community concerned. It is based on a formal, positivist scientific worldview based on mechanistic metaphors and simple linear causal relationships. It is exemplified below in both the predictive-empirical approach in futures studies and the trend-modelling approach in climate change science.

The second interpretation of "to adapt" - to "make suitable" - enables a more active two-way interaction that provides space for an alternative post-normal, postpositivist scientific worldview to come into play (Funtowicz and Ravetz, 1991). In the latter, arising from the new biological sciences of chaos and complexity, organic metaphors enable causation to be viewed as complex, non-linear (including feedback loops), emergent and self-regulating (Jantsch, 1980; Maturana and Varela, 1980/1991; Thompson, 1991; Masani, 1995; Deacon, 2003; Morin, 2005; Ceruti and Pievani, 2005; Goodenough and Deacon, 2006; Alhadeff-Jones, 2008). An interesting

metaphoric example has been used by environmental scientists Kai Lee (1993) to express the shift from formal to postformal thinking: the shift from the compass to the gyroscope. This perspective has the potential to transform *passive* adaptation—or fitting into—into *active* co-evolution—or co-creation. As Collins and Ison indicate in the editorial introduction to this special issue, the notion of co-evolution moves beyond the idea of a "separate environment" in favour of "processes of mutual interaction which in human social systems can be seen as processes of learning and development." In this approach adaptive capacity becomes intimately linked to the concept of social learning. This active co-creating adaptive capacity is aligned to concepts such as the "double- and triple-loop learning" of Chris Argyris and Donald Schön (Schön, 1973) and the "learning organisations" and "learning societies" of Peter Senge and Otto Scharmer (Senge *et al.*, 2005). Links between these approaches and the adaptive management and resilience Approach to managing long-term socio-ecological change (Gunderson, 1999) could also be fruitfully explored.

Understanding Futures Studies: A Typology of Approaches

Given the significance of the climate crisis, one might expect the academic discipline of futures studies, which has been evolving over several decades, to have something to contribute. Futures studies is a transdisciplinary, transnational and multi-sectorial field which includes thousands of academics and practitioners, many of whom operate globally.

There are many possible ways to frame the recent history of futures studies and, within these, the development of various futures epistemologies or traditions may be observed. While acknowledging that futures thinking has a much longer tradition than the late twentieth century, a typology[1] of five traditions of futures studies have been identified since the 1960s (Inayatullah, 1990; Ramos, 2003; Slaughter, 2003, Gidley, 2004) (see Table 1). These include:

- *The predictive-empirical tradition* originated in the USA. It arose initially from US defense intelligence but was supported as a methodology with broader purposes by the formation of the World Future Society in the 1960s. This research refers to a one and only future that empirical trends suggest, and is often referred to as the (singular) 'probable *future*.' This approach still dominates the literature base. A strength of this approach is its perceived objectivity and values neutrality. Its weaknesses may include narrowness in focus and lack of contextual awareness. It also implies that that trends are inevitable and this can be disempowering if the trends are negative.
- *The critical-postmodern tradition* originated in Europe and grew out of a critical social theory tradition which sought to balance what it perceived as the overly empiricist approach of many futurists in the USA. This led to the foundation of the World Futures Studies Federation in the early 1970s, which continues to this day to support a critical approach to futures (Dator, 2002; Ramos, 2003). This approach is normative and is often referred to plurally as 'preferred *futures*.' A strength of this approach is that it makes explicit the—often tacit—contextual and values dimensions and thus leads to a questioning of 'business as usual'. A weakness is its perceived subjectivity which can sometimes lead to excessive relativism.
- *The cultural-interpretive tradition* arose in large measure from the work of those futures researchers who sought to include non-Western cultures and to invoke a deeper

[1] Note that other typologies have also been developed but it is beyond the scope of this paper to explore them further.

consideration of civilizational futures (Sardar, 1994; Inayatullah, 1995, 2000; Nandy, 2000;). This approach opens up the possibilities of alternative, particularly non-Western futures, and is a crucial part of the dimension that may be referred to as 'possible, or alternative, futures'. Strengths of this approach include its creativity and engagement of multiple perspectives. A weakness is that proposed alternatives may lack feasibility.

- *The prospective-action research* approach seeks to facilitate empowerment and transformation through engagement and participation. It was initially developed by French and later Swedish futurists and has been emphasised in Australia (Berger, 1964; Bjerstedt, 1982; Boulding, 1988; Hutchinson, 1992; Wildman and Inayatullah, 1996; Gidley, 1998). This could be referred to as 'prospective' or 'participatory futures', depending on context. The most obvious strength of this approach is that it engages participants in research projects, empowering them to question and act on alternatives to 'business as usual'. A weakness is that if it does not also take account of relevant empirical research, it may lack legitimacy in positivist scientific circles.
- *The integrative-holistic* futures approach is a relatively new and somewhat contested territory. It is potentially the broadest and deepest possible approach to futures as it can integrate aspects of all the other approaches (Voros, 2001; Slaughter, 2003; Gidley and Hampson, 2008; Gidley, forthcoming). Because of its grounding in complex, integrative and transversal epistemologies it maximises potential for facilitating and enabling normative 'planetary futures.' The strength of this approach is its breadth of scope which may enable the integration of different methods as appropriate to different contexts. However, too much breadth may also be perceived as a weakness in that it may sometimes lead to a lack of depth.

These are not mutually exclusive approaches, nor should this conceptualisation imply a linear developmental model. These are all suitable pathways to futures research depending on the context. Well-informed futures researchers may utilise any or all of these traditions depending on their operational context. Each approach represents different epistemological underpinnings, which, to some degree, parallel similar developments in other knowledge spheres. As indicated above each of these approaches has strengths and limitations as does futures studies as a field. Being transdisciplinary, the insights and methods of futures studies can be applied within many fields and across multiple issues. However, its contributions are yet to be widely adopted. At a time when the pace of change is accelerating, and environmental issues such as anthropogenic climate change are upon us, both the natural sciences and social sciences could benefit from a greater understanding of how to think about the future. The ontological, epistemological and methodological contributions of futures studies have been overlooked and too much research mirrors the short-termism of much government policy-making. Futures studies is not without its drawbacks, however. Unfortunately its reputation as a serious academic field has been tainted by the uptake and over-use of well-known futures methods such as scenarios in non-scientific ways by business consultants. Futures studies often focuses on very complex themes and, consequently, not all relationships can be fully teased out and conclusions have to be recognised as reflecting a degree of uncertainty. Futures studies are also not 'values-free' as deliberations are influenced by the cultural and individual values of participants, stakeholders, researchers and any organisational frameworks involved (Paulsen, 2005).

Table 1: Towards Planetary Futures: A Typology of Futures Approaches

Key Terms	Futures Studies Approaches	Underlying Theories and/or Paradigms	Goals
'probable futures'	Predictive/ Empirical	Positivism Empiricism	Analysis Prediction
'preferred futures'	Critical/ Postmodern	Critical Theory Deconstruction	Normativity Emancipation
'possible or alternative futures'	Cultural/ Interpretive	Constructivism Hermeneutics	Alternatives "Other" futures
'prospective or participatory futures'	Prospective/ Participatory	Action Research Hope Theories	Empowerment Transformation
'planetary or integral futures'	Integrative/ Holistic	Integral Theories Planetisation Theories	Global justice Planetary Era

Source: Gidley, 1998; Gidley, Bateman, & Smith, 2004; Inayatullah, 1990; Inayatullah, 2004; Slaughter, 2008

These issues are addressed in discussions of validity and trustworthiness in the futures studies literature (eg see Inayatullah, 2003). Taking these issues into account, policy and planning initiatives for climate change adaptation based upon futures approaches do need to be implemented within the cautionary frameworks of adaptive management.

Futures Studies and Climate Change: Towards A Dialogue of Approaches

In the light of this overview of key futures research approaches, it may be useful to consider which—if any—of these approaches are being utilised by climate change researchers investigating dimensions of climate futures. A scan of the literature followed by a request to members of the World Futures Studies Federation[2] via their electronic discussion board supports the proposition that only a limited range of futures approaches are currently being utilised by climate researchers. Two of the most commonly used are trend analysis/modelling and scenario mapping based on the trends/models projected. The former methods are heavily weighted towards the empirical/predictive approach in futures studies while those scenarios that offer alternatives to 'business as usual' lean more towards the critical and interpretive approaches. Although the futures studies field has developed and diversified its theories and methods considerably over the past four decades, and has developed a substantial knowledge base

[2] The World Futures Studies Federation, founded in Paris in 1967, is the foremost scholarly association for futures studies researchers worldwide. The first author has a long association with the organisation and is its current President (2009-2013).

(Slaughter and Inayatullah, 2000), very little of this knowledge base has as yet influenced climate change research. This claim has been further substantiated by a recent study of the extent to which the substantial literature used in the IPCC reports includes futures references. Nordlund (2008) surveyed the reports from IPCC Working Groups II, III and IV and found that only six of the 13,000 references were from known futures journals (five from *Futures*, and one from *Futuribles*). In addition, seven 'known (by the author of the study) futures scientists' were referred to in the reports. The IPCC reports - like most climate change research - focuses on 1) the physical science basis, 2) adaptation and 3) mitigation. Nordlund notes that although it is not surprising that futures research is not highly referenced in the first of these, it has much to contribute to the other two areas. The present paper takes up this challenge by introducing a dialogue between futures studies and adaptation - in particular active adaptation, which we also refer to as co-evolution - and which may in turn influence mitigation in local ways.

Although limited interaction seems to have occurred between the two fields to date, it may be useful to explore whether any parallels can be found between the above futures typology and current approaches to climate change. Epistemological parallels between the fields can open up possibilities for conceptual bridges to be constructed. Upon such conceptual bridges, the potential knowledge transfer between those futures studies and climate change approaches that are epistemologically aligned can be created (See Table 2). The scope of this paper does not allow a full explication of how such knowledge transfer would be enacted across all these epistemological approaches. However, the following discussion offers some initial steps in the development of an innovative theoretical proposition to be further explored in subsequent research.

Table 2: Futures and Climate Change: A Dialogue of Approaches[3]

Futures Studies Key Terms	Futures Studies Approaches	Climate Change Approaches	Climate Change Key Terms
'probable futures'	Predictive/ Empirical	Climate Trends "Top-down Scenarios"	Trend is destiny Mitigation Adaptation
'preferred futures'	Critical/ Postmodern	Global Protocols Emissions Targets	2% Warmer Stabilisation
'possible or alternative futures'	Cultural/ Interpretive	Gender and Climate Climate Alliance	Alternatives "Other" futures
'prospective' or 'participatory futures'	Prospective/ Action Research	Climate Activism "Bottom-up" Scenarios	Co-evolution Social learning Co-creation
'planetary or integral futures'	Integrative/ Holistic	UN protocols Global collaboration	Justice futures Global futures

[3] Table 2: Futures and Climate Change: A Dialogue of Approaches © Gidley, 2009

Clearly the *predictive/empirical* approach to climate change using trend analysis and modelling is epistemologically aligned to the predictive/empirical approach to futures studies. Empirical data based on past trends forms the basis of the type of scenarios that are often used to present climate change data. While these may be intended to evoke mitigatory change, in effect, they may elicit little engagement or motivation from local communities who have limited ownership of such a process. There may be some value in furthering discursive collaboration between climate scientists and empirically oriented futures researchers. Such collaboration would focus on the notion of the "probable climate future." Although this scientific research base is crucial in establishing the likely parameters of climate change, its assumption with regard to climate adaptation is that "trend is destiny" which is a passive approach to adaptation (relating to the first definition above "to fit into"). Such predictive methods bring too much closure to the situation leaving communities feeling disempowered and helpless to make appropriate changes. There is a lot of literature on the helplessness and disempowerment of young people about the negative future scenarios presented to them almost as fact (Eckersley *et al*., 2007; Gidley, 2001).

The *critical* futures tradition questions the empiricist notion of "trend as destiny" and unpacks the narrowly and negatively constructed "probable future", thus opening up such questions as "Whose future is being predicted?" "Whose science is being used to measure the trends?" and "Who decides what is preferred?" This normative approach to envisaging preferred futures appears to have its parallels in United Nations climate protection initiatives such as the United Nations Framework Convention on Climate Change (UNFCCC) agreement (1992), the Kyoto Protocol (1995) and the annual Conference of Parties (COPs), all of which provide means both for critiquing existing climate insensitive activities associated with hyper-development and collaboratively designing targets for reduction of GHG emission in order to enable "preferred climate futures". The IPCC reports are an example of long-term futures thinking which critiques the status quo and proposes normative preferred futures, e.g. of carbon emissions. It has been referred to as a climate change approach which futures researchers could learn from (Tonn, 2007).

If climate change researchers took a lead from the *cultural/interpretive* futures tradition, they would go beyond mere critique of the empiricist approach and question the very basis of the categories of knowledge on which the Western worldview rests. Such an approach would critique the Western development model at its heart in line with postcolonial and postindustrial discourses, arguing that the hyper-development catalysed by neoliberal globalisation is not the only way for all societies to "develop". The cultural/interpretive futures literature could evoke alternative "possible climate futures" through questions such as: "What might climate futures look like if more voices were heard from the "cultural *Other"* such as indigenous elders, women, future generations or non human sentient beings?" A good example of climate protection aligned to "possible or alternative futures" is the Climate Alliance of European Cities with the Indigenous Rainforest Peoples.[4] Another cultural/interpretive alternative to the dominant futures discourse is the perspective from women involved in working for a broadening of climate change policy (Hemmati and Röhr, 2007).

[4] The *Climate Alliance of European Cities with the Indigenous Rainforest Peoples* is based in Brussels. It is Europe's largest city network for climate protection and aims for the preservation of the global climate. This involves reducing greenhouse gas emissions in the industrialised countries of the North, and conserving the rainforests in the South of the planet. http://www.klimabuendnis.org/home.html

The *prospective/participatory* futures approach involves both informed forward thinking and active participation/engagement, to enable its empowering and transformative potential. While climate change activism is clearly both participatory and action-oriented, it needs to be also well informed about the complexity of climate issues in order to claim wider legitimacy. An emergent climate change methodology, which is utilising the prospective/participatory futures approach, involves community based scenario building. This approach is exemplified in the case study reported in this paper. Such an approach could be much more widely used in climate-vulnerable communities worldwide to increase both the empowerment of threatened communities and to enable the kind of social learning that would assist with active, co-evolutionary adaptation (rather than passive adaptation to the 'future-as-given'). It has been suggested that there are "fields of tension" when engaging in participatory research arising between the struggle to legitimate the research process, and the desire to focus on reducing climate impact through the goal of "sustainabilityand possibilities for actual change" (Gunnarsson-Östling and Larsen, 2008). If this tension can be overcome by the integration of sufficient scientific data into participatory community scenario-building processes, it may even facilitate increased motivation towards those small household actions that could mitigate climate change if they reached a critical mass—enabling "participatory futures."

What then might the *integrative/holistic* futures approach have to offer in the climate futures arena? Anthropogenic climate change is a planetary issue of meta-proportions and meta-complexity. It will require both global/planetary collaboration and holistic/integral/transversal epistemologies and strategies if we as a species are to turn around the current alarming trends. It appears that most nations continue to behave nationalistically—putting concerns for their economic competitiveness ahead of their commitment to meeting the global targets recommended by the IPCCC protocols. In this light, and until the 'global imaginary' (Steger, 2008) has become more established, increasing the visibility of international collaborative work on climate change is vital if the health and well-being of the planet is to be valued, ahead of nationalistic interests. It would seem that at this point in time, notions such as "integral futures" and "planetary futures" are not yet sufficiently embedded in either the futures field or the climate change field. However, the epistemological and methodological approaches to be found in the emergent integral futures approach clearly have something to offer to climate futures. Recent research from the integral studies field has begun to address this issue from a more integral perspective (Esbjörn-Hargens, 2009) including an upcoming special issue on climate change of the *Journal of Integral Theory and Practice*.

While it is beyond the scope of this paper to expand on the potential all of the above futures approaches if applied to climate change research, the case study below exemplifies how the authors of this paper have begun to explore such knowledge transfer in one of these five approaches. The following study is an attempt to apply what we refer to above as the *prospective/participatory* futures approach in a participatory research project with a climate vulnerable community.

Participatory Futures Facilitating *Active* Co-Evolutionary Adaptation

This section presents a community-based case study that enacts participatory futures approaches to climate change adaptation. The case study actively involves a diversity of participation from the local communities in the re-visioning of their region in the face of potentially rapid climate change. In this regard the researchers enact a movement beyond merely

assisting their communities to *passively* adapt to climate change. By engaging and empowering the members of these communities to be active collaborators in re-visioning and developing scenarios about their communities, the study provides tentative steps towards facilitating co-evolutionary adaptation to climate change.

Engaging an inland Victoria farming community in climate change adaptation work[5]

The setting and aims of the project

The Hamilton region in Victoria, Australia, is a rural farming community consisting of several small towns and the regional centre of Hamilton. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) and Bureau of Meteorology (2007) predict a warming, drying climate with a consequent reduction in groundwater volumes and increased frequency and severity of droughts. Water supply is already a critical issue, with the region experiencing a '… supply deficiency of 1000ML per annum based on the last 10 years water yield from the Catchment' (Wannon Water, 2007 p1). This has necessitated ongoing water restrictions and forced changes to household and farming practices. The challenges the community face have led to a high local interest in understanding and responding to climate change.

Climate change has been a focus of discussion in the Community Reference Group associated with the 'Local Global Project' conducted by researchers at RMIT University since 2006. A public forum with a range of 'expert' guest speakers on climate change was held in April 2007 to aid understanding of climate change issues in the community. The researchers were then asked by community members to find ways to assist them with addressing climate change in the region. It was decided that a scenario thinking workshop on the impacts of climate change and the future of the region would be a useful next step.

The researchers did not expect the community members to develop 'scientifically or technically sound answers' on how the community should adapt to climate change. The scenario thinking workshop was undertaken as a process to find out what community members currently thought about climate change adaptation issues, to engage them in dialogue on the complexity of the issues involved, to gather their adaptation ideas and to build their awareness that many different possible futures may unfold based on actions they do or do not take as well as changes that occur to the climate.

Through undertaking this process it was hoped that those who participated would continue the discussions outside of the workshop, leading to ongoing planning and action on climate change adaptation within the region. The scenario stories once written up would be a tool for furthering these discussions with those that hadn't participated in the workshop. The scenario stories would also be useful for government educators and policy makers who could use them to identify any misunderstandings or gaps in awareness of climate change issues within the community. Targeted information and capacity building programs to address such gaps could then be developed.

[5] Text adapted from Smith, Mulligan and Nadarajah (2009 forthcoming).

Futures study approach/steps

The Hamilton scenario thinking workshop was held on 4-5 February 2008 using a prospective / participatory futures approach. Forty-one people participated (18 female, 23 male) including several farmers, a retired school principal, a church minister, Aboriginal community leader, a publican (ie hotel operator), local shire councillors, a Country Fire Authority representative, artists, business personnel, and two new migrants to the area. Prior to the workshop participants were sent some pre-reading, which included the scientific predictions of climate change for the region and the current Council Strategic Plan 2005-2009. Participants were also asked to complete a small survey to determine their current understanding of climate change in the region and to describe their preferred vision for the future of the region.

At the workshop participants were split into four small groups and taken through a process for identifying and discussing the many factors likely to affect their community's development in the future. They explored and voted upon what they felt were the most critical factors facing their community - those which would have a high level of impact and where the outcome of that impact was highly uncertain. Each group was then allocated one of the top four critical factors to use as the starting point for generating their inductive scenarios. Throughout the two days a number of plenary sessions were held where each small group reported back on their developing scenario and received input from the other participants. This ensured differentiation between the scenarios.

The scenarios produced did not focus on disputes about what level of climate change would occur nor on the effectiveness of different adaptation strategies. They focussed on the adaptation challenges facing the region and the likely impact of these. By lunch time on day two four broad scenarios were mapped out. In plenary each group told their scenario then a discussion was held about the implications of that scenario for the future of the region. After hearing all four scenarios a list of possible strategies and desired next steps was generated.

Workshop findings

As a result of creating the scenarios, participants in the workshop could see a range of implications that they as a community needed to consider and plan for. They saw a need to find ways to influence individuals to take action to reduce their carbon emissions and adapt their homes and lifestyles sooner rather than later. They saw the opportunity to learn from other cultures and those who have already taken action. They recognised that their current mental health and community welfare services were not sufficient to cope with the increased demand predicted in many of the scenarios. They identified a need for preventative programs and early intervention programs for farmers and families at risk. The idea of creating a National Centre for Farmer Health was raised. Nutrition and healthy lifestyle education programs were also suggested as a way to prevent health problems. Diversifying sources of farm income by moving away from monocultures to a range of different crops and other sources of income were seen as ways to minimise vulnerability of farmers to climate change.

The participants saw a need to undertake activities to build community cohesion and support each other through tough times. They saw a need to develop disaster response plans to cater for a possible influx of climate refugees from southern Asia and the Pacific and they also wanted to start cultural exchange initiatives and awareness raising initiatives now so that it would not be such a shock to the current population if an influx of migrants did occur. Participants also highlighted a need to consider ways to attract people and businesses to the region. Expanding

educational and employment opportunities were seen as key in this regard. This was also seen as a strategy to help stop the trend of youth leaving the region. The participants saw an opportunity for their educational organisations to specialise in environmental education and teach Aboriginal and Asian perspectives of environmental management.

The participants also identified a range of desired further research. This included research into ways to farm effectively under drought conditions and ways to minimise water use and ensure water security. It also included research on the implications of a future shortage of oil and oil-based products on farming practices, transport of produce and the functioning of other aspects of community life. Research into the implications of 'corporate farms' run by large multinational companies and increased mechanisation of farming practices on employment levels in the region was also recommended.

Towards the end of the workshop participants were asked what they would like to see as the next steps of this project. The participants identified a range of strategies including generating a report on the scenarios that could be widely distributed throughout the community; having secondary school students comment on the scenario stories, possibly to make movies about them; and have the scenarios told on Radio National. Of course, a starting point would be for participants to share insights they had gained at the workshop with family and friends in order to inject more urgency into community discussions about future lifestyles in the region, which, in turn, might encourage people to think more urgently about what they can do now to reduce greenhouse gas emissions. Some participants raised the difficulties involved in getting local organisations and agencies to work together and so an emphasis was placed on a need to build more effective partnerships. There was enthusiasm for completing the local future stories so that the challenges they raise could be discussed widely across the community. It was noted that the shire council and other government organisations needed to review their strategic plans for the future.

Since the workshop and next steps

After the workshop the four broad scenarios and all the associated workshop materials were given to two local writers who were allocated the task of turning them into more detailed scenario stories. The writers worked in consultation with a range of workshop participants and the researchers to develop four plausible stories set well into the future. Three of the scenarios are set in 2030 while the fourth is set in 2050.

Drafts of the stories were presented at a one day community workshop 21 June 2008 and feedback sought. The community writers continued to develop the stories based on the feedback. The resultant scenario stories have been published in a report titled 'Unexpected sources of hope: climate change, community and the future' available in hardcopy and online (see Nadarajah *et al.,* 2009)[6].

A public event to launch the report occurred in Hamilton on 3 June 2009 with an associated article appearing in the local newspaper, the Hamilton Spectator, on 9 June 2009. Locals have been asked to read the stories and provide feedback to the researchers. Copies of the report have been distributed widely to local schools, community groups, government and business organisations. The researchers have met with local government representatives and others to discuss potential next steps. The researchers intend to initiate follow up projects with community members as a part of their ongoing Local-Global Research Program in Hamilton.

[6] Report available online at http://www.rmit.edu.au/browse;ID=90esk0wyyj33

It is hoped that the workshop participants and non-participants who read the stories will be motivated to initiate actions to address climate change adaptation issues without researcher involvement. One example of this is actions undertaken by Rosie Rowe, a workshop participant, who went back into the Western District Regional Health Service after the workshop and produced a policy for how health services might respond to a wide range of climate change related health challenges. This report has been circulated across Victoria (Rowe and Thomas 2008).

Methodological reflections

The participatively produced scenario stories place scientific predictions of climate change into a format that readers can relate to more clearly. For example the CSIRO (2004 p5) predict that in the Glenelg Hopkins Region of which Hamilton is a part there will be 'annual precipitation decreases likely (annual changes of +3 to -10% by 2030 and +10 to -25% by 2070)'. In the Hamilton scenario stories the above statement is translated into different possible future climates and examples of what the Hamilton region would look like living under those climate conditions, the challenges community members would be facing and how they may be responding. It provides a rich context that readers can use to interpret the meaning of the scientific data. The local community members can create powerful images in their stories referring to changes to specific streets, community facilities, buildings and farms. Such depth of local detail could not be produced by the scientific experts who do not live in the area. The participatively produced scenario stories are a useful complement to the scientific predictions. Both are necessary.

Mayer (2006 p2) explains the power of stories:

> ... [T]here is good reason for the ubiquity of stories: narrative is the fundamental human device for enabling collective action. First, narratives play an important role in constituting mind: enabling memory, structuring cognition, making meaning, and establishing identity. Second, because we are creatures constituted by narrative, we can be called by stories: engrossed by them, moved emotionally by them, persuaded by them, and ultimately motivated to act by them. Third, because narratives are shared, they can operate at both the individual and the collective level, constructing common desires, enlisting participation in a common drama, and scripting collective acts of meaning. Narratives are particularly important tools for empowering communities of resistance, which face significant obstacles to collective action and which, therefore, operate at considerable disadvantage in the political arena. It should be no surprise then that narrative politics is particularly prevalent in social movements.

The Hamilton scenario stories summarise a set of possible and plausible futures as developed by the sub-set of community members participating in the workshop. Different participants are likely to lead to different scenarios. This is expected. The scenarios produced are not "set in stone", but expected to be modified as they are distributed and discussed more widely within the community. They are a starting point for discussions: a catalyst for social learning about climate change and the desired future for the region.

The scenario stories are a tool that can be utilised by community members (residents, farmers, business personnel, government agencies, etc) to identify what are desirable and undesirable possibilities in the future. They can then plan and take actions that will facilitate desired changes,

minimise undesired changes, and make the best of undesired changes that can not be prevented. Some of these changes will relate to adaptation to climate change, some will not. The scenario thinking process highlights the complex and interconnected nature of adapting to climate change, regional / town planning and community development. It highlights the need for ongoing discussions, planning and actions to influence the future that unfolds. The scenario thinking workshop and scenario stories that were created are small steps in the journey.

The case study shows one approach to using scenario thinking – a prospective/participatory futures approach - to climate change adaptation. Scenario thinking is also being incorporated into another participatory futures methods to build resilience to climate change within "sea change" regions (ie. coastal regions experiencing rapid population growth). However, because of the highly transient and heterogeneous composition of sea change communities (Smith and Doherty, 2006; Smith and Thomsen, 2008; Smith *et al*., 2008), which compounds the inherent complexity, uncertainty, and high decision stakes associated with climate change (Smith, in press), some alternative methods are also proposed to be incorporated.

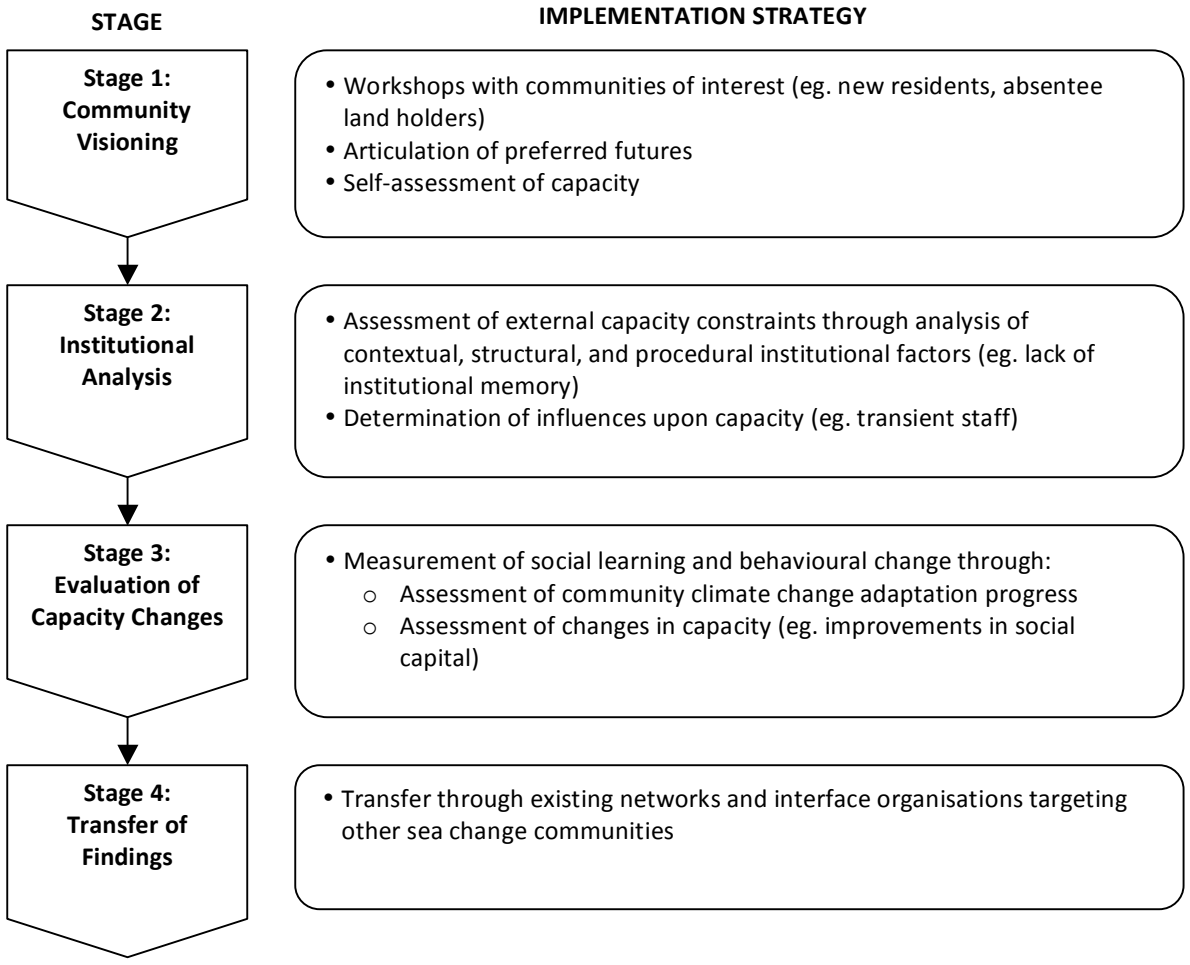

Figure 1: Flow chart of the community visioning method adapted from Smith *et al*., 2008

As Smith and Thomsen (2008) highlight, "The issue for sea change communities is the rate of change in low population areas, where the effects of high percentages of growth on relatively small communities may not be as easily absorbed as in the cities" and may adversely affect societal response to sustainability challenges and natural disasters (eg. sea level rise, storm surge, and flooding). The coupling of two significant drivers of change (ie. climate change and the sea change phenomenon) present challenges for the development of effective climate change adaptation strategies. As a result, the approach suggested in the case study will be adapted to include community action planning coupled with: (i) an assessment of changes in perceptions of adaptive capacity; and (ii) institutional analysis to determine procedural and structural barriers and opportunities for adaptation. The proposed method is expected to have particular utility for sea change regions and other regions experiencing rapid demographic change as it facilitates learning on behalf of residents as well as institutions and therefore learnings are less likely to be lost due to demographic shifts as the transience of knowledge is diminished through the institutionalisation of that knowledge. Furthermore, the sharing of capacity changes enables new residents to learn from the past experiences of other residents. Figure 1 presents a summary of the community visioning method proposed for sea change regions with suggestions for how the method may be applied in practice.

While the proposed method designed for use in sea change or other transitional communities has yet to be validated through application, a review of the outcomes of the approaches on which the method is based indicates the following likely outcomes for each stage (Figure 2).

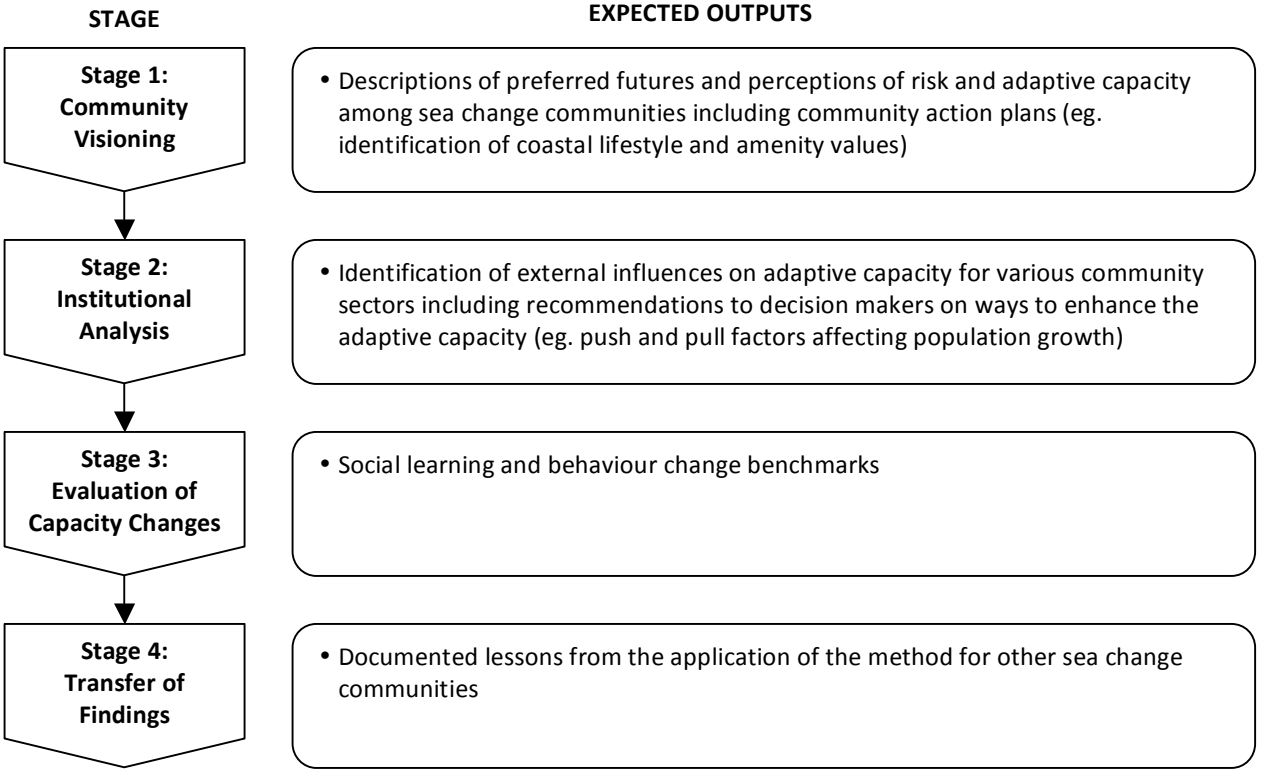

Figure 2: Flow chart of the community visioning outputs adapted from Smith *et al*., 2008

For example, community action plans that are developed collectively based on a shared preferred future are likely to engender widespread commitment and implementation; similarly, social learning and behaviour change benchmarks may: (i) provide a source of motivation and empowerment based on progress made each time these are revisited; and (ii) help to improve the knowledge and capacity of new residents to respond to climate change within the local context.

Reflections

Climate change adaptation is a social process. It is planned, implemented and managed under particular social conditions and to serve particular social ends. Indeed, even where the ends appear to focus on the protection, conservation or management of particular natural assets, these are always servant to the heritage, economic or political wishes of communities and it is here that it is fundamentally important to understand various practices of power and governance in decision-making. As a result, the use of futures methods must be context-responsive. For example, within sea change communities, climate change adaptation impacts are further compounded by other social processes (eg. population growth and changing demographic composition). Beginning the dialogue on these dynamic socio-ecological processes inherent in sea change communities is a critical first step in building resilience through understanding probable, and preferred possible futures. Thus the method proposed for the sea change regions may help participants articulate their preferred futures and perceptions of adaptive capacity to achieve them. It will also allow for the identification of external influences on adaptive capacity, together with monitoring and evaluation of capacity changes over time—through a process of social learning. Enabling participants to create a preferred future, rather than accepting a probable future, is at the heart of this community visioning method.

Conclusions

This paper takes a novel approach to working with climate-vulnerable communities. Beginning the process of bringing together two discourses that have not previously been integrated—futures studies theories and methods and climate change adaptation approaches—the paper potentially enriches both discourses. The authors deepen the understanding of the notion of adaptation by distinguishing between *passive* adaptation to a taken-for-granted "probable climate change future" and the notion of *active*, co-evolutionary adaptation. Secondly, several approaches to research in the futures studies field are briefly introduced and subsequently brought into conversation with the main approaches to climate change. It was noted that much of the futures-oriented research being undertaken with regard to climate change is influenced by the dominant methods of empiricist predictive trends and expert scenarios. It was further noted that the futures studies field has developed over several decades beyond the methodological positivism of the *predictive/empirical* approach to include post-positivist futures approaches such as *critical, cultural/interpretive*, *participatory*, and *integrative/holistic*.

This proposition was then supported by a case study that is primarily aligned to the prospective-action research futures approach. The case study reflects a critical distance from the "trend is destiny" assumption of predictive methods, and enacts a participatory method. The key learning from the case study emphasises that climate change adaptation is a social process that takes place amidst the complex and interconnected nature of a region and community. Participatory visioning and scenario activities therefore need to be seen as long-term

commitments by their sponsors in order for strong community partnerships for adaptation to be forged. The recognition of uncertainty in the results of such activities also highlights the need for ongoing discussions, planning and actions to influence the future that unfolds. While the application of participatory methods in the case study was widely accepted in that particular context, alternative and/or supplementary methods may be required in other contexts (eg. sea change regions).

It is proposed that such participatory approaches, which are designed with the appropriate context in mind, can facilitate deep social learning. Such social learning can be regarded as an example of *active*, co-evolutionary adaptation—as facilitated through participatory approaches to community scenario building. This is a contrast to the type of passive adaptation called for by predictive trend modelling of a "probable climate change future". This co-evolutionary approach is not only adaptive but also potentially empowering and resilience-building for vulnerable communities struggling to come to terms with the threats to their livelihoods and lifestyles of climate change.

References

Alhadeff-Jones M. 2008. Three generations of complexity theories: Nuances and ambiguities. *Educational Philosophy and Theory* **40**1: 66-82.

Ames S. 1998. *A Guide to Community Visioning*. Oregon Visions Project: Portland.

Australian Bureau of Statistics. 2001. *Population Projections (ASGC 2001), 2002-2022*. Commonwealth Department of Health and Ageing: Canberra.

Australian Bureau of Statistics. 2004a. *Australian Social Trends: Population Seachange – New Coastal Residents*. Commonwealth of Australia: Canberra.

Australian Bureau of Statistics. 2004b. How Many People Live in Australia's Coastal Areas? In *Year Book Australia 2004* (Cat. No. 1301.0). Commonwealth of Australia: Canberra.

Bellamy J, Smith T, Taylor B, McDonald G, Walker M, Jones J, Pero L. 2005. *Criteria and Methods for Monitoring and Evaluating Healthy Regional Planning Arrangements*. Tropical Savannas Management CRC : Darwin.

Berger G. 1964. *Phénoménologie du Temps et Prospective 1re éd*. Presses Universitaires de France: Paris.

Bjerstedt A. 1982. *Future Consciousness and the School* Vol. 62. School of Education University of Lund, Sweden: Malmo.

Brangwyn B, Hopkins R. 2007. *Transition Initiatives Prime.* Transition Network: UK and Ireland.

Boulding E. 1988. Image and action in peace building. *Journal of Social Issues* **442:** 17-37.

Burnley IH, Murphy PA. 2004 *Sea Change: Movement from Metropolitan to Arcadian Australia*. University of New South Wales Press: Sydney.

Ceruti M, Pievani T. 2005. The incompleteness of each tradition: toward an ethic of complexity. *World Futures: The Journal of General Evolution* **61**(4): 291-306.

Ison R, & Collins K. 2009. Editorial to this Special Issue.

CSIRO. 2004. *Climate Change in the Glenelg Hopkins Region*. Produced by the CSIRO on behalf of the State of Victoria, Department of Sustainability and Environment.

CSIRO and Bureau of Meteorology. 2007. *Climate Change in Australia*. Technical Report.

Dator J. 2002. *Advancing Futures: Futures Studies in Higher Education*. Praeger: Westport Connecticut.

Daffara P. 2005. Maroochy 2025 community visioning – a partnership towards a preferred future. 6th International Cities Town Centres and Communities Conference, Australia, 1-3 June.

Daffara P. 2007. Maroochy 2025 Community visioning. 1st International Conference and Workshop on City Foresight in Asia Pacific. Chiang Mai University, Thailand, 5-7 September.

Deacon TW. 2003. The hierarchic logic of emergence: Untangling the interdependence of evolution and self-organisation. In *Evolution and Learning: The Baldwin Effect Reconsidered*, Weber B, Depew D (eds). MIT Press: Cambridge MA; pp273-308.

Eckersley R, Cahill H, Wierenga A, Wyn J. (eds.). 2007. *Generations in Dialogue about the Future: The Hopes and Fears of Young Australians*. Australian Youth Research Centre and Australia: Melbourne, VIC.

Esbjörn-Hargens S. 2009. *An Integral Approach to Climate Change: Why Truth Is Not Enough (Resource Paper No. 3)*. Integral Institute: Denver, CO.

Funtowicz SO, Ravetz JR. 1991. A new scientific methodology for global environmental issues. In *Ecological Economics: The Science and Management of Sustainability*, Costanza R. (ed.). Columbia University Press: New York; pp137-152.

Gidley J. 1998. Prospective youth visions through imaginative education. *Futures: the journal of policy planning and futures studies* **30 (**5): 395-408.

Gidley J. 2001. An Intervention Targeting Hopelessness in Adolescents by Promoting Positive Future Images. *Australian Journal of Guidance and Counselling* 11(1): 51-64.

Gidley J. forthcoming. An other view of integral futures: De/reconstructing the IF brand. *Futures: the journal of policy planning and futures studies*.

Gidley J, Hampson G. 2008. Integral perspectives on school educational futures. In *Alternative Educational Futures: Pedagogies for Emergent Worlds*, Inayatullah S, Bussey M, Milojevic I (eds). Sense Publishers: Rotterdam Netherlands.

Goodenough U, Deacon TW. 2006. The sacred emergence of nature. In *Oxford Handbook of Science and Religion,* Clayton P. (ed.). Oxford University Press: Oxford; pp853-871.

Gunderson L. 1999. Resilience, flexibility and adaptive management - antidotes for spurious certitude? *Conservation Ecology* **3**(1): 7. Online at URL: http://www.consecol.org/vol3/iss1/art7/ [accessed 2 June, 2009].

Gunnarsson-Östling U, Larsen K. 2008. Climate change scenarios and behavioural change: Navigating between heuristics of deliberative planning processes and astroturfing. Paper presented at the UK-Ireland Planning research conference 2008, Sustainability, space and social justice, Queens University, Belfast, Ireland.

Gurran N, Squires C, Blakely E. 2005. *Meeting the Sea Change Challenge: Sea Change Communities in Coastal Australia*. National Sea Change Taskforce: Neutral Bay, Sydney.

Hemmati M, Röhr U. 2007. A huge challenge and a narrow discourse: Ain't no space for gender in climate change policy? *Women & Environments.* Spring/Summer: 5-9.

Hutchinson F. 1992. *Futures consciousness and the school: Explorations of broad and narrow literacies for the twenty-first century with particular reference to Australian young people.* Unpublished PhD University of New England: Armidale NSW.

Intergovernmental Panel on Climate Change (IPCC). 2007. *Summary for Policymakers of the Synthesis Report of the IPCC Fourth Assessment Report*. World Meteorological Organization (WMO) & United Nations Environment Programme (UNEP): Valencia Spain.

Inayatullah S. 1990. Deconstructing and reconstructing the future: Predictive cultural and critical epistemologies. *Futures: the journal of policy planning and futures studies*. **22(**2):115-141.
Inayatullah S. 1995. Futures visions for South-east Asia: Some early warning signals. *Futures: the journal of policy planning and futures studies*. **27(**6): 681-688.
Inayatullah S. 2000. *Alternative Futures: Methodology Society Macrohistory and the Long-Term Future*. Tamkang University Press: Taipai.
Inayatullah S. 2002. Questioning the Future - Futures Studies Action learning and Organisational Transformation. Tamkang University Press: Taipai.
Inayatullah S. 2003. Causal layered analysis: Unveiling and transforming the future. In: *Futures Research Methodology*, Glenn J (ed.) . The American Council for the United Nations University: Washington .
Ison R, Röling N, Watson D. 2007. Challenges to science and society in the sustainable management and use of water: Investigating the role of social learning. *Environmental Science and Policy, 10*(6), 499-511.
Jantsch E. 1980. *The Self-Organising Universe: Scientific and Human Implications of the Emerging Paradigm of Evolution.* Pergamon Press: New York.
Lee K. 1993. *Compass and Gyroscope: Integrating Science and Politics for the Environment*. Island Press: Washington DC.
Masani PR. 1995. The ecology of the noosphere: Where the ecological movement falls short. *Kybernetes: The International Journal of Systems and Cybernetics* **249**:13-34.
Maturana H, Varela F. 1980/1991. *Autopoiesis and Cognition: The Realization of the Living*. Springer: New York.
Mayer F, 2006. 'Narrative and Collective Action: The Power of Public Stories', presented at the annual meeting of the American Political Science Association, Marriott, Loews Philadelphia, and the Pennsylvania Convention Center, Philadelphia, PA, 31 August, p. 2
Morin E. 2005. Restricted complexity, general complexity. Paper presented at the Intelligence de la Complexite : Epistemologie et Pragmatique Conference, Cerisy-La-Salle France, 26 June.
Nandy A. 2000. Recovery of Indigenous Knowledge and Dissenting Futures of Universities. In *The University in Transformation: Global Perspectives on the Futures of the University,* Inayatullah S, Gidley J. (eds). Bergin and Garvey: Westport Connecticut, p270.
Nadarajah Y, Mulligan M, Smith J, le Nay L, Hindhaugh C. 2009, Unexpected sources of hope: climate change, community and the future. Globalism Research Centre and Global Cities Institute, RMIT University. Available online at http://www.rmit.edu.au/browse;ID=90esk0wyyj33
Nordlund G. 2008. Futures research and the IPCC assessment study on the effects of climate change. *Futures: The journal of policy, planning and futures studies,* **40**(10), 873-876.
Paulsen C. 2005. Essay on methods in futures studies and a selective bibliography. Online at URL http://hdl.handle.net/1800/2314. [Accessed 2 June 2009].
Queensland Department of Infrastructure and Planning (QDIP). 2008. Sunshine Coast population and housing fact sheet. Queensland Department of Infrastructure and Planning: Brisbane. February 2008.
Ramos JM. 2003. *From Critique to Cultural Recovery: Critical Futures Studies and Causal Layered Analysis*. Australian Foresight Institute: Melbourne.
Rowe R, Thomas A. 2008. *Climate Change Adaptation: A Framework for Local Action; Southern Grampians Primary Care Partnership*. Policy Signpost #3. The McCaughey

Centre: University of Melbourne
Sardar Z. 1994. Conquests, Chaos and Complexity: The Other in modern and postmodern science. *Futures: the journal of policy planning and futures studies*. **26(**6): 665-682.
Schön DA. 1973. *Beyond the Stable State: Public and Private Learning in a Changing Society*. Penguin: Harmondsworth.
Senge P, Scharmer CO, Jaworski J.,Flowers BS. 2005. *Presence: An Exploration of Profound Change in People Organizations and Society*. Broadway Books: New York.
Slaughter R. 2003. *Integral Futures - a New Model for Futures Enquiry and Practice.* Australian Foresight Institute: Melbourne.
Slaughter R, Inayatullah S. 2000. *The Knowledge Base of Futures Studies* CD-ROM Vols. 1-4. Foresight International: Brisbane.
Smith JM, Mulligan M, Nadarajah Y. 2009 (forthcoming). Scenarios for engaging a rural Australian community in climate change adaptation work. In: *Climate Change Adaptation in Developed Nations*, Ford JD and Ford LB (eds). Springer: Dordrecht.
Smith TF. in press. A neo-research approach to enhance climate change adaptation. In *Climate Change Responses across Regional Australia: Social Learning and Adaptation,* Martin J (ed.). VURRN Press: Bendigo.
Smith TF, Brooke C, Preston B, Gorddard R, Abbs D, Mcinnes K, Withycombe G. 2007. Managing for climate variability in the Sydney region. *Journal of Coastal Research*. Special Issue **50**: 109-113.
Smith TF, Doherty M. 2006. The suburbanisation of coastal Australia. In *Australian State of the Environment Report 2006* (cross cutting commentaries). Australian Government Publishing Service: Canberra.
Smith TF, Thomsen DC. 2008. Understanding vulnerabilities in transitional coastal communities. In *Proceedings of Solutions to Coastal Disasters 2008*, Wallendorf L, Ewing L, Jones C, Jaffe B. (eds). American Society of Civil Engineers: Hawaii; pp980-989.
Steger MB. 2008. *The Rise of the Global Imaginary: Political ideologies from the French Revolution to the Global War on Terror*. Oxford University Press: Oxford.
Thompson WI. (ed.). 1991. *Gaia 2: Emergence the New Science of Becoming*. Lindesfarne Press: New York.
Tonn B. 2007). The Intergovernmental Panel on Climate Change: A global scale transformative initiative. *Futures: The journal of policy, planning and futures studies* **39**(5), 614-618.
Voros J. 2001. Reframing environmental scanning: an integral approach. *Foresight: the journal of future studies, strategic thinking and policy.* **36** (6): 533-552.
Wannon Water. 2007. Fact sheet: Wannon Water tackles climate change with 50 year plan Hamilton system and Glenthompson supply. Wannon Water Victoria.
Wildman P, Inayatullah S. 1996. Ways of knowing culture communication and the pedagogies of the future. *Futures: The journal of policy, planning and futures studies* **28(**8): 723-740.