



# Barriers to reducing climate enhanced disaster risks in Least Developed Country-Small Islands through anticipatory adaptation

Natasha Kuruppu<sup>a,\*</sup>, Reenate Willie<sup>b</sup>

<sup>a</sup> Institute for Sustainable Futures, University of Technology Sydney, PO Box 123, Broadway, NSW 2007, Australia

<sup>b</sup> Kiribati Ministry of Public Works and Utilities, PO Box 498, Betio, Tarawa, Kiribati

## ARTICLE INFO

### Article history:

Received 26 December 2013

Received in revised form

2 June 2014

Accepted 17 June 2014

### Keywords:

Small Island

Climate adaptation

Disaster risk

Vulnerability

Least Developed Country

Systematic review

## ABSTRACT

Small Island Developing States (SIDS) classified as Least Developed Countries (LDCs) are particularly vulnerable to the projected impacts of climate change. Given their particular vulnerabilities, climate adaptation investments are being made through both national and international efforts to build the capacity of various sectors and communities to reduce climate risks and associated disasters. Despite these efforts, reducing climate risks is not free of various challenges and barriers. This paper aims to synthesise a set of critical socio-economic barriers present at various spatial scales that are specific to Least Developed Country SIDS. It also aims to identify the processes that give rise to these barriers. Drawing on theories from natural hazards, a systematic literature review method was adopted to identify and organise the set of barriers by focussing on both academic papers and grey literature. The data revealed a notable lack of studies on adaptation within African and Caribbean LDC-SIDS. In general, there was a paucity of academic as well as grey literature being produced by authors from LDC-SIDS to challenge existing discourses related to adaptation barriers. The most common barriers identified included those related to governance, technical, cognitive and cultural. Three key findings can be drawn from this study in relation to formal adaptation initiatives. Firstly, the lack of focus on the adaptive capacity needs of Local Government or Island Councils and communities was a key barrier to ensure success of adaptation interventions. Secondly, international adaptation funding modalities did little to address root causes of vulnerability or support system transformations. These funds were geared at supporting sectoral level adaptation initiatives for vulnerable natural resource sectors such as water, biodiversity and coastal zones. Thirdly, there is a need to recognise the significance of cultural knowledge and practices in shaping adaptive choices of communities in SIDS.

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## 1. Introduction

There is unequivocal evidence of anthropogenic climatic change and of its effects on natural and human systems in various regions of the world (IPCC, 2013). The Intergovernmental Panel on Climate Change (IPCC) asserts that climate change will result in an increase in mean and extreme air and ocean temperatures, rising sea levels and changes in average rainfall over most land areas, timing of seasons and in the frequency and intensity of extreme events such as floods, tropical cyclones and droughts in different regions (IPCC, 2013). Small Island Developing States (SIDS) classified as Least Developed Countries (LDCs) because of low income and other development indicators are particularly vulnerable to climatic risks due to their special characteristics such as physical size, proneness to natural disasters, the extreme openness of their

economies and low adaptive capacity (Mimura et al., 2007). Despite having contributed the least to global greenhouse gas emissions, the impacts of climate change are already visible in these contexts (Kuruppu and Liverman, 2011). Consequently, they place additional strain on people's livelihoods (economic security, health, infrastructure etc.) and threaten the cultural survival and wellbeing of island communities (Nunn, 2013; Farbotko and Lazrus, 2012; Smith and McNamara, 2014). In response, many SIDS have initiated anticipatory adaptation actions through national adaptation programmes funded through the United Nations Framework Convention on Climate Change (UNFCCC). For example, the atoll nation of Kiribati was one of the first LDCs to initiate a development and climate change programme – the Kiribati Adaptation Programme (KAP) administered by the World Bank and funded through the UNFCCC. Climate adaptation refers to “any adjustment by natural or human systems in response to actual or expected impacts of climate change [and variability], aimed at moderating harm or exploiting beneficial opportunities” (Eriksen et al., 2007, p. 10). Recent scholarship has argued that

\* Corresponding author. Tel.: +61 2 9514 4961; fax: +61 2 9514 4941.

E-mail address: [natasha.kuruppu@uts.edu.au](mailto:natasha.kuruppu@uts.edu.au) (N. Kuruppu).

adaptation must go beyond making adjustments and consider system transformations (e.g., restructuring political economies at various scales) that address deep-rooted structures driving social vulnerability (Bassett and Fogelman, 2013; Pelling, 2011a).

As early adaptors, SIDS provide a valuable context to study the initial bottlenecks and opportunities associated with formal adaptation planning and implementation. Willie (2013) reports on the need for international funded projects to be flexible when applied to the national contexts. For example in Kiribati, phase two of KAP project aimed to install three community water systems on one island, but due to ongoing land ownership issues between government and communities, only one community water system was installed. Moreover, since donor funds had to be spent within a certain timeframe, implementation of specific project activities was expedited without due consideration of the real needs of communities. In an effort to anticipate and act on such challenges in a timely manner as part of future adaptation or policy efforts, an increasing body of literature has focussed on identifying various socio-economic barriers or constraints to adaptation. However, many of these studies have focussed largely on developed country contexts with a paucity of literature on the most vulnerable low income countries such as LDC-SIDS (Biesbroek et al., 2013; Ford et al., 2011; Measham et al., 2011). Additionally, Biesbroek et al. (2013) argue that current literature on barriers is largely context or sector specific, based on a small sample size and thus, difficult to fully understand their nature. Moreover, limited studies have undertaken a comparative analysis across various contexts to identify common constraints. This study aims to contribute to filling this knowledge gap by exposing and synthesising a key set of common barriers identified across LDC-SIDS through a systematic review methodology. Given that adaptation investments are currently underway in many SIDS, it is envisaged that the study will provide a useful baseline for measuring progress and success of adaptation efforts whilst highlighting policy areas that need further investments.

Moser and Ekstrom (2010, p. 2) define barriers as “impediments, that can stop, delay or divert the adaptation process, or that might prevent the community from using its resources in the most advantageous way to respond to climate change impacts”. Barriers are interconnected and likely to occur at various spatial scales as well as distinct stages of the adaptation process, including planning, implementation and monitoring and evaluation (Moser and Ekstrom, 2010). Given these scalar dependencies, locating spaces and processes through which barriers arise can also provide opportunities to rework the path dependent institutional structures, organisational cultures and policy making procedures that constrain other development goals in SIDS (Burch, 2010; Moser and Boykoff, 2013). Certainly, barriers can be overcome through various creative processes of thinking and resource use and non-traditional partnerships (Biesbroek et al., 2013; Taylor et al., 2013). This study specifically addresses the following objectives in relation to LDC-SIDS:

- (1) To synthesise a set of key barriers/constraints to reducing climate risks through anticipatory adaptation and to identify their associated underlying causes.
- (2) Identify the extent of the barriers that are addressed in formal National Adaptation Programmes of Action (NAPAs).

This paper is structured as follows. Section 2 provides an introduction to the LDC-SIDS context whilst Section 3 presents a theoretical framework for diagnosing and categorising barriers. A description of the systematic review methodology adopted in the study is provided in Section 4. Section 5 presents and discusses the results. This is followed by a set of concluding remarks in Section 6.

## 2. A sea of islands under a changing climate

Small Island Developing States (SIDS) are a unique group of developing countries that were recognised through the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, Brazil. They share a set of common characteristics and challenges such as remoteness, rapidly expanding populations, excessive dependence on international trade, high transportation and communication costs, low availability of resources and susceptibility to natural disasters (Sem, 2007). Despite these commonalities, the heterogeneity amongst the islands (e.g., through social structures, cultural practices, language etc.) shapes the use and management of resources, connections to global networks as well as their capacity to adapt to various stressors, including climate change (Barnett and Campbell, 2010; Hau'ofa, 1994). Certainly, societies across the SIDS have developed various traditional strategies to deal with natural hazards and ensure resiliency to future stresses. For example, in Samoa when communities plant food crops, a patch is often reserved for use during the hurricane season. Within SIDS, those classified as Least Developed Countries possess the lowest Human Development Index ratings of all countries in the world and reflect the lowest indicators of socioeconomic development. These include Kiribati, Tuvalu, Samoa, Solomon Islands, Timor-Leste, Vanuatu, Haiti, Guinea-Bissau, Comoros and São Tomé and Príncipe. Samoa is expected to graduate out of the LDC category in January 2014. Characteristics of these islands alongside their vulnerability to climate change index are presented in Table 1. It must be highlighted that Haiti has a very different political setting to other Caribbean SIDS and thus, unlikely to be representative of the adaptation barriers in other Caribbean SIDS (Bishop and Payne, 2012). A greater percentage of the populations across the islands live in rural areas (e.g., 80% in Vanuatu) in which a semi-subsistence lifestyle (e.g., fisheries, copra) prevails. A MIRAB economy (largely shaped by the combined impacts of Migration, Remittances, Aid and Bureaucracy) characterises many SIDS too small to attract normal investments in productive activities.

Given their unique vulnerabilities, various mechanisms at the international level aim to support SIDS adapt to climate change. Most SIDS are members of the Alliance of Small Island States (AOSIS): a coalition of 42 SIDS and represents one-fifth of the total membership of the United Nations and the single largest unified voting block. Early lobbying from the Alliance ensured that adaptation was an integral part of the UNFCCC since its adoption

**Table 1**

Characteristics of the study Islands classified as LDC-SIDS (Global Adaptation Institute, 2011; UNDP, 2012).

Country	Population	Human Development Index (UNDP ranking)	Vulnerability Index (GAI ranking)
<b>Pacific Islands</b>			
Samoa	187,820	0.702 (96)	0.428 (127)
Solomon Islands	561,000	0.530 (143)	0.514 (164)
Timor-Leste	1,066,409	0.576 (134)	0.517 (165)
Tuvalu	11,232	Unavailable	Unavailable
Vanuatu	264,652	0.626 (124)	0.429 (128)
Kiribati	106,461	0.629 (121)	Unavailable
<b>African Islands</b>			
Comoros	724,300	0.429 (169)	0.433 (129)
Guinea-Bissau	1,704,000	0.364 (176)	0.510 (161)
São Tomé and Príncipe	187,356	0.525 (144)	0.480 (143)
<b>Caribbean Islands</b>			
Haiti	10,413,211	0.456 (161)	0.512 (162)

in 1992. The Barbados Programme of Action and interlinked Mauritius Strategy aim to progress adaptation efforts in SIDS, for example through building and enhancing their scientific technological capabilities (Ronneberg et al., 2013). To support adaptation commitments, the UNFCCC has established four funds, specifically for access by developing countries. These include the Least Developed Countries Fund (LDCF), the Special Climate Change Fund (SCCF), the Strategic Priority on Adaptation (SPA) and the Adaptation Fund (AF). Conference of the Parties to the Convention (i.e., COP-7) established the National Adaptation Programme of Action (NAPA) for LDCs which identifies urgent and immediate adaptation projects for financing through a multi-stakeholder, bottom-up process. All LDC-SIDS have developed NAPAs but are at various stages of their implementation due several reasons including the low availability of donor funding (Agrawal, 2009). The Green Climate Fund to be established in 2014 through the UNFCCC will also provide funding through both private and public sources to support adaptation and mitigation efforts in Least Developed Countries and SIDS. Various regional initiatives are also active. For example, the development of a Strategy for the Disaster and Climate Resilient Development in the Pacific (SRDP) which aims to integrate disaster risk management and adaptation into a single strategic framework.

### 3. Theoretical framework: overcoming adaptation barriers

Adaptation is recognised as a process that moderates climatic risks and supports system transformation through an understanding of both the likely impacts on the system as well as the attributes (both natural and social) of the exposed system that drives vulnerability (Smit and Pilifosova, 2003; Schoon et al., 2011). Brooks et al. (2005, p. 152) define vulnerability as “the degree to which a system is susceptible to injury, damage and harm”. Many studies – influenced by the critical political economy approach to hazards – have demonstrated that vulnerability is constructed socially and are rooted in the socio-political processes that allocate resources in a society (Hewitt, 1997; Liverman, 2001). The Pressure and Release model (PAR) developed by Blaikie et al. (1994) provides a useful method for conceptualising the progression of vulnerability through space and time whilst situating it in the context of climate related disasters (Fig. 1). Moreover, it questions deeper sources that may generate barriers to adaptation and thus increase vulnerability of a given system. In the PAR model, vulnerability is generated through various root or underlying causes which shape a series of dynamic pressures and in turn gives rise to unsafe conditions (i.e., increased susceptibility to disasters). Here, *root causes* are deeply entrenched in socio-economic systems and affect how resources are allocated

and distributed amongst various actors (e.g., power inequalities). Thus, identifying root causes giving rise to barriers to adaptation is likely to be valuable to understanding their interactions with *dynamic pressures* (i.e., processes and activities) that transform the effects of the root causes into particular types of unsafe conditions. *Unsafe conditions* are the specific forms in which the vulnerability of a population is expressed in time and space in conjunction with the hazard (e.g., lack of disaster planning or engaging in dangerous livelihoods) (Wisner et al., 2004).

Existing scholarship on understanding barriers or constraints to adaptation provide valuable insights to the various causal factors that hinder the planning and implementation of adaptation in various contexts. Mukheibir et al. (2013) examined cross-scale challenges to adaptation planning within Local Government in Australia. Barriers identified in this study related predominantly to governance and resource limitations (i.e., human, technical and financial) which included competing priorities due to limited operational resourcing, poor communication and coordination between various tiers of government and poor understanding of climate risks due to challenges in understanding what information was required, where to find it, and how to effectively use it. Burch (2010) in their study of barriers to adaptation planning within three Canadian Councils concluded that effective use of existing resources rather than increased financial resources can facilitate adaptation. In examining barriers to mainstreaming adaptation into development assistance in Mozambique, Sietz et al. (2011) report the following as key challenges: data availability and management; institutional continuity; mandate and financial resources posed a challenge. Moser and Ekstrom (2010), in exposing a set of barriers found at different phases of adaptation, highlighted the challenges posed by deeply held values and beliefs in shaping how people perceive, interpret and think about climatic risks. Similarly, Jones and Boyd (2011) emphasised the barriers related to culture and perceptions of climate risks in shaping the adaptive choices made in Nepalese communities. Here, perceptions, values and ethics played a key role in determining whether adaptation was sought or not whilst cultural reluctance to accept external assistance by members of a particular caste impeded the adaptation implementation process.

The above studies suggest the range of dynamic social barriers that may be encountered when planning and operationalising adaptation. For classification purposes they relate to governance, technical and financial resources, cognitive and cultural barriers. However, Biesbroek et al. (2014) cautions that rather than identifying which barriers have emerged, it is pertinent to question “how and why” barriers may have emerged and how they may be overcome. In doing so, the PAR model provides an explanatory tool in diagnosing barriers and their underlying causes that drive vulnerability of a given system.

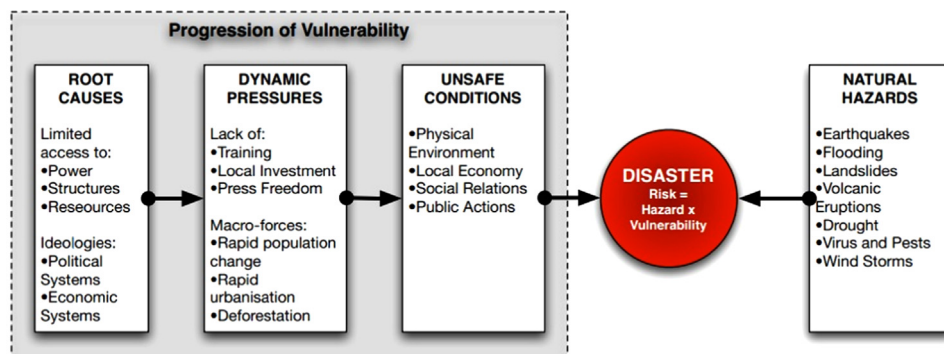


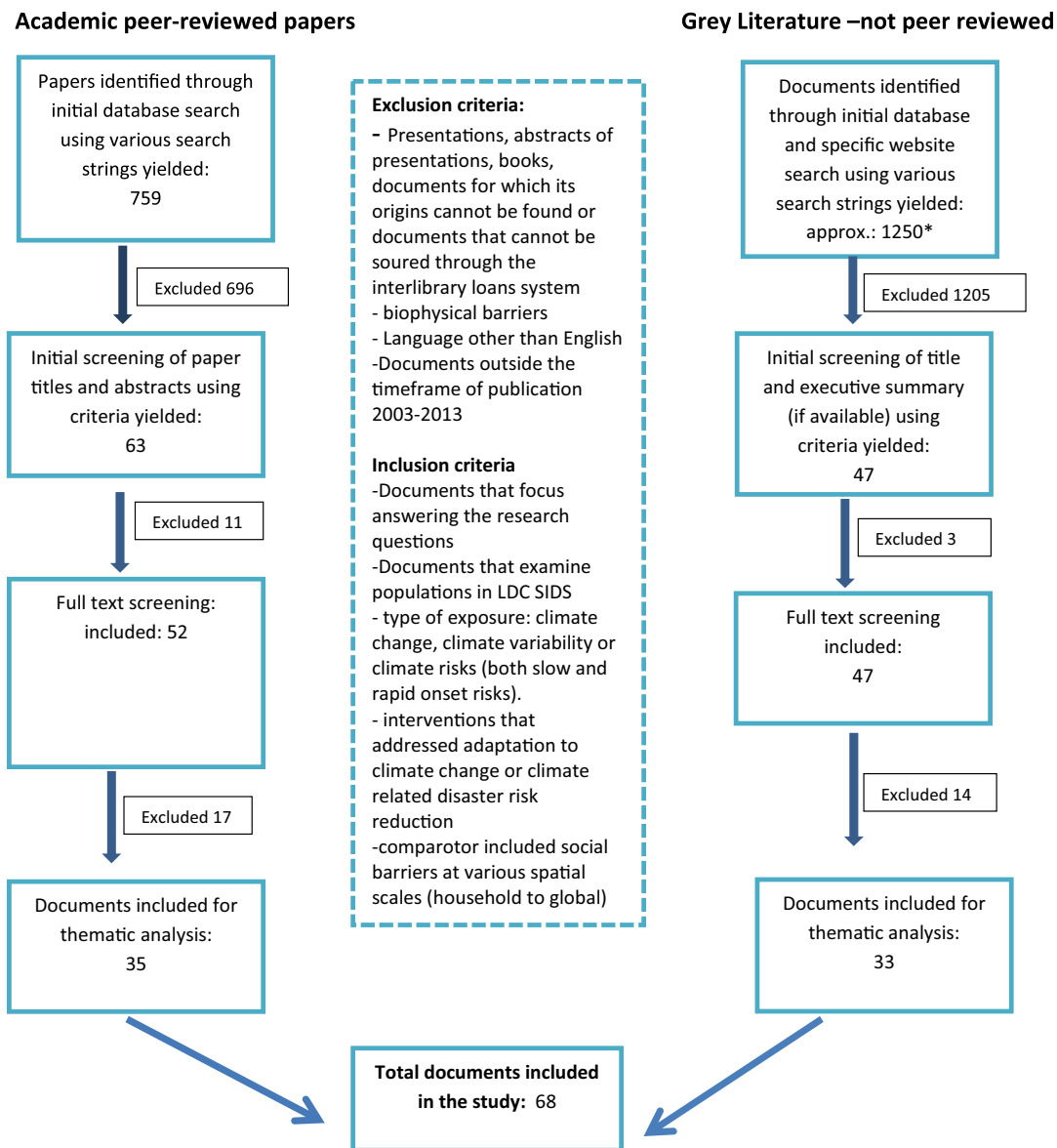
Fig. 1. Pressure and Release model (Wisner et al., 2004, p. 51).

#### 4. A systematic review methodology

Biesbroek et al. (2013) argue that traditional literature reviews can lack rigour and transparency; introducing bias in the selection, interpretation and organisation of content. Systematic review methods are often adopted in the health sciences to “examine existing or new technologies efficiently and practices and consider the totality of evidence to inform practice” (Green, 2005, p. 270). However, systematic reviews have gained acceptance and application in areas outside of health sciences such as environmental science, international development and engineering sciences (Ford et al., 2011; Howe et al., 2013; Snilstveit et al., 2012). Its utility is striving to comprehensively synthesise the results and conclusions of a number of distinct articles in a given research area through applying clearly formulated research questions, a comprehensive search strategy that includes published and unpublished studies, explicit criteria for the inclusion and exclusion of articles, a comprehensive list of studies included

and excluded and a systemic analysis of the eligible studies using statistical synthesise of data (i.e., meta-analysis) where appropriate (Green, 2005).

The systematic review process adopted in this study commenced with the establishment of a set of inclusion and exclusion criteria (Fig. 2) for screening both peer-reviewed “academic” and non-peer reviewed “grey literature” publications to be included in the study (Noyes and Lewin, 2011; Hagen-zanker and Mallett, 2013). Inclusion criteria related to the exposure unit (e.g., climate change impacts), population (e.g., LDC-SIDS), intervention (e.g., adaptation), comparator (household versus community spatial scale) and outcome (e.g., social barrier or constraint to adaptation). Exclusion criteria related to the language of the articles, biophysical barriers (e.g., coastal erosion), time frame of publications (i.e., 2003–2013) and type of publication (e.g., document's origins cannot be found). A set of possible search strings were piloted initially over a one week period using both the ISI Web of Knowledge (WOK) database for academic literature as well as Google Scholar for grey literature.



\*It was found that only documents appearing in the first two-three pages of the search results in Google or Google Scholar were relevant to the research study and thus downloaded where appropriate.

Fig. 2. Systematic review process adopted in the study.



The document searches were conducted using various search strings over a three week period utilising academic databases such as WOK, Elsevier, EBSCO and Wiley whilst grey literature utilised Google Scholar, Google, ProQuest and specific websites related to LDC-SIDS. A full set of search strings and results associated with the academic searches are provided in [Supplementary Data S1](#) whilst a list of specific websites accessed to search grey literatures is provided in [Supplementary Data S2](#). A similar set of search strings as the academic database search were adopted as part of the grey literature search. The initial search retrieved 759 academic papers and over 1000 grey literature documents. All articles were screened according to the pre-determined exclusion and inclusion criteria through reading the title, keywords and abstract or executive summary and saved in the reference database Mendeley, which enabled duplicated to be identified ([Fig. 2](#)). Final screening yielded 35 academic papers and 33 grey literature documents (i.e., totalling 68 articles) to be included in the in-depth analysis ([Supplementary Data S3](#)).

The research undertook a narrative based, qualitative thematic analysis of the final 68 selected articles. This was guided by a typology of barriers to adaptation which was informed by the study's theoretical framework. The typology included cultural, cognitive, governance, technical, financial and other barriers. Each article was read and the

text manually coded according to these themes. The coded sections of text were organised into tables according to the typology themes in which each theme was coded and analysed further to draw out key thematic patterns emerging from the literature. A statistical based meta-analysis of the final articles was considered unsuitable given the qualitative nature of the research questions in which barriers are likely to be contextually shaped, requiring an understanding of the processes that give rise to such barriers. Instead, the results in the section that follows, discuss and report on the frequency of the typology of themes found in the analysed documents. Finally, five individual country NAPAs were analysed to ascertain the extent the barriers identified through the systematic review were being addressed through various interventions.

This systematic review has various biases associated with the data collection phase. Due to time and resource constraints the search for articles was conducted over a short-time frame (three weeks). This precluded the searching of individual journals that may not appear in the included set of academic databases; for example open access journals or including additional organisational websites in attempting to retrieve grey literature. Additionally, the academic search was limited to published peer-reviewed papers and did not extend to books, conference papers, book chapters or Doctoral theses. It was noted during the Google

**Table 2**  
Synthesis of key barriers across LDC-SIDS.

Financial	Technical	Cognitive	Cultural	Governance	Other
( <i>n</i> =4) <sup>a</sup> International adaptation funding for LDCs; inadequate, unpredictable, complex to administer and inequitable.	( <i>n</i> =11) Paucity of baseline data related to climate and natural resources as well as limited in-country capacity to generate and manage this data.	( <i>n</i> =7) Vulnerability assessments and adaptation planning have given limited attention to community perceptions of climate risks and the influence of beliefs and values in shaping adaptation decisions.	( <i>n</i> =6) Traditional knowledge, rituals and cultural meanings play a key role in understanding how communities deal with environmental change; these are often not considered in formal adaptation planning efforts.	( <i>n</i> =15) Limited engagement with communities and Local Councils' implies that their needs for building self-sufficiency are often overlooked in national adaptation initiatives which tend to focus on top-down sectoral (e.g., water, health, agriculture) adaptation interventions.	( <i>n</i> =11) Root causes of vulnerability are not being addressed through current formal adaptation efforts. The need for actively navigated transformative adaptation through deep structural changes to address long standing issues of gender inequality, corruption, declining markets etc., has been overlooked.
( <i>n</i> =2) Lack of in-country capacity to access international adaptation funds and mobilise funds effectively particularly in rural areas or outer islands.	( <i>n</i> =4) Limited understanding on the impacts of climate change on health systems and associated demand on the health workforce including facilities, drugs and skills.	( <i>n</i> =5) International discourses on climate refugees and climate migrants from LDC-SIDS threaten how SIDS perceive their future by silencing alternative identities, reasserting power imbalances and curtailing peoples' agency.	( <i>n</i> =4) Erosion of social cohesion and collective practices in communities has the potential to constrain adaptive capacity.	( <i>n</i> =4) Gaps in policy enabling environments at regional and national levels constrain adaptation planning and implementation within SIDS.	
( <i>n</i> =2) International adaptation funding does little to address root causes of vulnerability through cross-sector initiatives and support programmes that allow communities to help themselves.		( <i>n</i> =2) Limited understanding by the private sector on the risks of climate change on industry.	( <i>n</i> =3) Adaptation related to education/info and other outputs are often not produced in local dialect (s) and thus impedes community ownership of adaptation efforts.	( <i>n</i> =3) National policies and strategies related to climate change overlook issues of urbanisation, in-country migration and population growth whilst concurrently various sectoral policies addressing these issues fail to recognise climate change.	( <i>n</i> =2) LDC-SIDS often lack sufficient capacity to actively engage in climate diplomacy at the international level, and consequently have had limited influence in shaping negotiations at this level.

<sup>a</sup> (*n*=4) Represents the frequency the barrier is discussed in the literature analysed.

searches for grey literature that many of the relevant articles could be retrieved from the first two to three resultant web pages; consequently initial screening was limited to these pages. However, articles pertinent to this study may have been located outside this range and thus overlooked. Additionally, the inclusion criteria were contained to the publication period between 2003 and 2013 to provide an indication of barriers to anticipatory adaptation within LDC-SIDS. Articles that fell outside this range may have been relevant but excluded from the study.

## 5. Results and discussion

This section presents and discusses the results associated with the 68 articles that met the study's inclusion criteria. A majority of the articles analysed related to the Pacific Islands ( $n=44$ ), followed by SIDS in general ( $n=12$ ), African islands ( $n=4$ ), Caribbean islands ( $n=4$ ) and LDCs ( $n=3$ ).

There was a notable lack of adaptation literature and data related to Africa and Caribbean (i.e., Haiti) LDC-SIDS; this is a concern given their inherent biophysical and social vulnerabilities. Moreover, it limits the comparison of barriers across contexts to ascertain whether a particular barrier is dominant in a specific region. The majority of the articles analysed adopted qualitative methods of data collection; key informant interviews, case studies, and focus groups. Most of the grey literature seemed to be produced by international agencies (e.g. UNDP), universities (e.g., USP) or regional bodies (e.g., SPREP). No research based articles were produced through Government agencies in LDC-SIDS whilst authorship of academic research articles by LDC-SIDS was rare.

The analysis revealed a snapshot of barriers as related to the typology of themes and these are presented in Table 2 alongside their frequency of occurrence in the literature. The most common barrier reported related to governance followed in descending order by, technical, cognitive, cultural, financial and "other" barriers. The "other" barrier related to the lack of focus amongst adaptation planning efforts on addressing the root causes driving social vulnerability. It must be stressed that the typology of themes provided a useful mechanism for the key barriers to be categorised and synthesised across the contexts. However, as mentioned previously, most barriers do not exist in isolation but are produced through inter-related processes and are likely to require interventions across scales to alleviate such processes. The discussion that follows, presents each of the common barriers associated with anticipatory adaptation.

### 5.1. A synthesis of barriers and their associated causes

#### 5.1.1. Governance

Governance refers to "the set of decisions, actors, processes, institutional structures and mechanisms, including the division of authority and underlying norms, involved in determining a course of action" (Moser, 2009, p. 31). In the multi-governance context in which adaptation takes place, governance related barriers were identified at various spatial scales, from the local to the international. Social interactions within these spaces created and mediated inequalities in power. The most common governance barrier reported, related to the limited engagement between formal national adaptation efforts and communities or Local Government, was often created through weak linkages and poor coordination between the tiers of government. Consequently, this gave rise to poor communication between communities and government, which often led to local or community needs being overlooked in adaptation efforts (World Bank, 2009). Lack of community ownership was reported in cases where efforts had been made to engage communities in adaptation interventions,

which had largely been externally driven; brokered by regional agencies with external donors on behalf of national governments. For example in Kiribati, national adaptation efforts funded through the UNFCCC failed to improve community wellbeing and daily realities of households in rural islands; most of the funding targeted urban areas through structural interventions such as constructing seawalls or spent on consultant fees (Gaillard, 2012; Kuruppu, 2009). Similarly in Vanuatu and Solomon Islands, weak linkages between rural and central governance meant that the adaptation needs of rural communities, comprising between 80% and 90% of the total population, were given limited attention (Wickham et al., 2009). In Haiti, the most successful disaster risk reduction programmes exploited pre-existing partnerships between communities and other agencies with buy-in from Local Government (Pelling, 2011b).

Many of the adaptation efforts reported at the national level across the countries were sector driven by reducing vulnerability on water, health, agriculture or biodiversity rather than building the adaptive capacity of Local Government or strengthening community leadership. This is pertinent to many SIDS in which traditional governance remains strong and rooted in everyday cultural practices of resource management and livelihood activities. It appears that support for sectoral driven interventions is catalysed by donor preferences for adaptation funding in addressing top-down policy development targeting central government rather than empowering community level decision makers. Several studies reported that weakened local institutions and local leadership in rural areas had constrained the management of natural resources, which had in turn reduced the adaptive capacity of traditional governance structures (Bayliss-Smith et al., 2010; Albert et al., 2012). Colonisation, monetisation, corruption and self-interested village leaders were attributed to driving these barriers. However, the results emphasised that adaptation initiatives need to focus on empowering local leaders (both young and old) through participatory processes so that they can inform their communities about appropriate adaptation strategies that are culturally appropriate and effective (Ronneberg et al., 2013). Certainly, limited buy-in from communities for national adaptation initiatives will persist in the absence of commitment to build capacity within local governance structures, particularly in rural areas where a subsistence economy prevails.

An additional barrier to adaptation is present, related to the mismatch in policy enabling environments between regional (e.g., Pacific, Caribbean) and national levels. The results acknowledge that causal drivers are found at both these levels, yet it suggest that dominant power structures at the regional and international levels have greater influence over this mismatch. For example, in Tuvalu and Kiribati, regional donors had contributed to weakening capacity and poor coordination between various government agencies within each country by focussing on their own agendas rather than those that reflected local or in-country realities (Urbano et al., 2010). Such power struggles and inequalities between the two levels placed additional burden on government agencies that were often resource constrained. For example, the multitude of regional donor organisations, each implementing various regional adaptation and disaster management initiatives in the Pacific had produced a confusing landscape of overlapping roles and responsibilities and constrained the process of integrating the two initiatives within national programmes (Gero et al., 2010). Moreover, despite the push for improved donor coordination (e.g., through Paris Declaration), the results indicate a lack of initiative by regional donors in changing their own institutional infrastructure to meet the needs of in-country policy and legislative frameworks. A one size fits all approach to regional adaptation planning must be replaced with the recognition of the distinct institutional and cultural architecture in which national

stakeholders operate. Concurrently, at the national level, SIDS need to focus on developing their own governance arrangement to strengthen coordination between agencies responsible for climate change adaptation and disaster management (SPREP, 2013).

The remaining two governance related barriers were associated with firstly, the lack of integration of dynamic pressures such as climate risk induced migration, rapid urbanisation and population growth into national adaptation policies/strategies; and secondly, the limited capacity of government officials in LDC-SIDS to engage in climate diplomacy at the international level. The lack of resources, technical expertise or negotiation skills prevents many SIDS from actively engaging in climate diplomacy and thus influencing international diplomatic agendas and other non-UNFCCC forums such as OECD (Sura et al., 2013). One suggested strategy of overcoming this barrier is the creation of forums across government and international alliances (e.g., AOSIS) to exchange knowledge and to pool diplomatic intelligence (e.g., the Durban Platform for Enhanced Action) (Sura et al., 2013). As mentioned previously, the focus on sectoral adaptation strategies prevented opportunities to address broader pressures that gave rise to vulnerability. For instance, in São Tomé and Príncipe, the NAPA fails to acknowledge population pressures by addressing issues of reproductive health/family planning or the frequent migration of coastal populations from floods and coastal erosion (Mutunga and Hardee, 2010). It appears from the results that a greater need persists for integrated adaptation programmes that address the broader drivers of vulnerability across sectors whilst concurrently mainstreaming adaptation into sectoral policies and strategies.

### 5.1.2. Cognitive

Cognitive barriers refer to the subjective dimension of adaptation and encompass people's perceptions of risks, values and beliefs, shaped by external factors such as the media or internal factors that include cultural practices. The key cognitive barriers that emerged from the results included the limited attention given to the subjective dimension of adaptation by community based-vulnerability assessments undertaken as part of national adaptation planning efforts. For example in Tuvalu in Kiribati, people's perceptions of climate change were greatly influenced by the church, which in turn stood to curtail their adaptive capacity (Kuruppu and Liverman, 2011). For many Tuvaluans climate change was not an issue requiring anticipatory adaptation due to their perception that they shared a special relationship with God and the promise made by God to Noah in the bible in protecting their islands from being submerged (Mortreux and Barnett, 2009). In the Solomon Islands, communities perceived threats to the vulnerability of their fisheries as emanating from multiple sources, such as breakdown of traditional communal support systems or the shift from a subsistence lifestyle to a cash economy, rather than the impacts of climate change alone. However, proposed interventions to reduce vulnerability on this resource base had largely focussed on a sectoral approach rather than an inter-sectoral approach that introduced alternative livelihoods or improved access to health services. If adaptation interventions are to gain buy-in from communities, then the findings suggest the pertinence of understanding beliefs, perceptions and values to adaptation decision-making.

Interlinked with the previous cognitive barrier was the lack of understanding by the private sector in SIDS about the impacts of climate change on business and industry. In general, there was a paucity of data related to our understanding of the adaptation needs of the private sector in SIDS and the role they can play building the adaptive capacity of communities. For example, it was reported that in Samoa the limited understanding of climate risks in the tourism sector was a barrier to adaptation planning (Klint

et al., 2012). This was furthered by the weak relationship between the private sector and government agencies.

An additional cognitive barrier, related to international discourses on climate refugees/climate migrants from SIDS, which threatened how SIDS perceived their own security. Such discourses stood to silence alternative identities of the resourcefulness of SIDS whilst curtailing people's agency to lead a life that they valued. For example, in many SIDS, migration between islands is a traditional coping mechanism in dealing with environmental change such as long-term drought (Lazrus, 2012). In Tuvalu, results indicated that communities did not perceive the impacts of climate change as a priority and consequently migration was not considered an option. For them, adaptation was perceived as a strategy that must aim to sustain their population and way of life so that their cultural rights were not undermined (Mortreux and Barnett, 2009). However, they believed that international discourses on migration and climate refugees were being used as tool for inaction at the international level on curbing greenhouse gas emissions whilst denying SIDS the voice of an equal citizen within the global community (McNamara and Gibson, 2009; Farbotko and Lazrus, 2012). In overcoming such barriers, the results call for the international media to reframe discourses in terms of collective rights, cultural identity and the right to self-govern which has the potential to be lost. Revised methods for the production of knowledge which combines island based and scientific knowledge are required to ensure that SIDS retain control of how island-based knowledge is incorporated into broader adaptation planning and policy at various spatial scales (Lazrus, 2012).

### 5.1.3. Cultural

Cultural barriers refer to processes impeding the totality people's way of life, including the distinctive spiritual, material, intellectual and emotional features through which life continues. In many SIDS, culture conditions how resources are interpreted and utilised in pursuit of various coping or adaptation strategies (Kuruppu, 2009). The main cultural barriers identified through the data relate to the limited consideration given in adaptation planning to the role traditional knowledge, rituals and cultural meanings play in communities when dealing with environmental change. For example, in Vanuatu and Samoa adaptive capacity of communities to disaster risks and climate change can be enhanced by building on existing traditional practices of openly sharing crop varieties and maintaining genetic material in reservoirs in farmers' fields (McGregor et al., 2011). Supporting such adaptation interventions can safeguard livelihoods as well as maintain food and nutritional security in each country. Several studies reported that the trend in declining traditional knowledge is a barrier to adaptive capacity of communities. In the Solomon Islands, erosion of traditional knowledge surrounding gardens and bushfoods precluded families passing this knowledge to the younger generations (Albert et al., 2012). Consequently, increase in pests and disease of food crops was reported, which had led to the reliance on imported, processed foods. In Guinea Bissau, understanding the role of rituals to adaptation was demonstrated through the loss of Diola male identity as a result of declining rains and the inability to rely on traditional knowledge to read the weather patterns (Davidson, 2012). Thus, Diola men could not showcase their cultivation skills through the production of rice. Paradoxically, traditional male initiation practices which were previously practiced implicitly due to condemnation by the Christian church were now being reasserted in the hope of bringing more rain to the paddy fields.

An additional cultural barrier related to the erosion of traditional social systems that support principles of intra-community



solidarity, reciprocity and collective support. For example in the Solomon Islands, processes driving this change were reported to include those that support individualism, for example, the monetisation of inter-household interactions and principles of modernity and democracy. Community based adaptation initiatives which are being piloted through many of the NAPAs are likely to be undermined if they fail to recognise and alleviate those processes shaping vulnerability through the erosion of the collective nature of traditional social systems in SIDS.

Finally, a key cultural barrier concerned the paucity of education material and other communication outputs related to climate change adaptation and disaster management in local dialect(s). This had led to the mistrust of climate change information as well as poor ownership of national adaptation initiatives. [Albert et al. \(2012\)](#) highlight that the diversity of languages present in both Vanuatu and Solomon Islands often poses a barrier to communicating climate change issues. Often the uptake of new ideas through changed behaviour is dependent on the acceptance of new knowledge. However, when climate adaptation is not in the dialect familiar to communities, particularly in rural areas, it is often rejected by local decision makers/leaders. One suggested way of overcoming this form of barrier involves the targeting of education and information at younger or educated decision makers in communities through face-to-face dialogue, visual material in local dialects and radio broadcasts ([Warrick et al., 2011; Nunn, 2013](#)).

#### 5.1.4. Financial

Two of the three funding barriers related to the mechanism underpinning the allocation of international adaptation financing whilst the other concerned the lack of in-country capacity to access and manage funds in rural areas. A common theme that ran through these barriers was the inequalities in power relations between LDC-SIDS and donor countries. Several studies asserted that international adaptation funding for LDC-SIDS was inadequate, unpredictable, complex to administer and inequitable. It was reported that LDC-SIDS such as Tuvalu found it difficult to compete with larger LDC countries such as Bangladesh in accessing Global Environmental Facility (GEF) funding to operationalise their NAPAs. Additionally, the application procedures are complex which precludes access to these funds; capacity building efforts are needed to address this persistent barrier.

An additional barrier highlighted by the results included the in-country capacity limitations associated with developing project proposals to attract and manage funding through the GEF. Various factors contributed to this barrier which included the absence of context specific climate data that demonstrated impacts on various sectors or livelihoods, complicated nature of funding criteria, poor track record in project managing donor initiatives and in certain instances, the absence of a National Climate Change policy to guide sectoral level adaptation implementation. It appears that when proposals were successful, limited capacity existed within Local Government or other government agencies located in rural areas to administer the funds that were directed specifically at these areas. For example, in Vanuatu there were no dedicated adaptation officers stationed on some of the outer islands to implement and manage agricultural based adaptation for communities. Further, without a dedicated officer it was difficult to build trust and a long-term relationship with the community for adaptation initiatives to be sustained over the long-term. It was suggested that in the absence of dedicated officers, the mobilisation of traditional leadership, for example through the church or village network leaders may be an option for overcoming the barrier ([Warrick et al., 2011](#)).

Lastly, the results highlight how adaptation funding at the international and regional levels is not directed towards reducing

root causes of vulnerability and support programmes that allow communities to help themselves. For example in the capital Funafuti, Tuvalu, funding for health was prioritised for addressing HIV, smoking and mental health rather than mitigating other pressing cross-sector processes driving vulnerability, such as poor health problems from rural migration to the urban centre, water shortage and waste disposal ([Simpson et al., 2012](#)). The results suggest that through pilot projects, adaptation finance had generated dependence amongst communities for donor knowledge and funding whilst undermining adaptive capacity ([Nunn, 2013; Warrick, 2011](#)).

#### 5.1.5. Technical

The two most commonly identified technical barriers related to the limited data are available on climate and other biophysical resources (e.g., biodiversity, water resources) as well as the capacity to generate and manage this data within SIDS. Certainly, the paucity of data is a notable fact for many SIDS. However, the persistence of this barrier undermines the extent to which government agencies in SIDS can make timely policy related adaptation decisions and advice communities and sectors on appropriate interventions ([Ekström et al., 2013](#)). For example, in East Timor, groundwater monitoring data sets were incomplete to inform groundwater management under a changing climate whilst in the Comoros and São Tomé and Príncipe the absence of monitoring infrastructure (e.g., weather stations) precluded the collection of data related to surface and groundwater supplies for water planning purposes. Strategies suggested for overcoming such barriers included the development of guidelines that support informed monitoring and the development of national policies and programmes to address climate and water knowledge gaps that foster best practice management. In the Solomon Islands there seemed to be a considerable amount of historical climate data. However, it was scattered amongst agencies with limited formal processes for organising, archiving and sharing of the data. Results from Haiti suggest that additional resources must be channelled into universities in SIDS to provide training on data collection and management as well as building the capacity to apply data for undertaking integrated vulnerability assessments.

The second technical barrier is related to the limitations in current understanding of climate change impacts on health systems and associated demand on the health workforce, including facilities, drugs and skills. The results emphasise that the key processes underlying this barrier in the Pacific SIDS was the absence of well-developed public health surveillance systems to monitor impacts; a majority of SIDS relied on syndromic surveillance rather than laboratory based surveillance systems ([Hanna et al., 2011; Gero et al., 2013](#)).

#### 5.1.6. Other

The barrier which was classified under the “other” category related to the lack of focus from national adaptation programmes on addressing the root causes driving vulnerability. Attention to transformational adaptation in addressing deep structural constraints and inequities was also absent. From the discussion above, it emerges that many of the barriers are deeply entrenched in history and context in which adaptation is taking place. For example, the governance barrier, which was associated with the mismatch between regional and national adaptation policy environment is not endemic to climate adaptation specifically but encountered when dealing with other regional based initiatives such as biodiversity conservation. Similarly, the barrier associated with the inequitable transfer of adaptation funding to LDC-SIDS through the UNFCCC reflects the historical transfer of aid to SIDS in which limited improvements have been made to the livelihoods of the most vulnerable whilst leaving many small island economies with a large



burden of debt (Barnett and Campbell, 2010). Given that many of the conditions generating these barriers and driving vulnerability are dynamic and cross-scale in nature, it begs the question as to why limited focus has been placed on these through the adaptation investments currently underway in SIDS. Certainly at times, it seems that adaptation initiatives continue to perpetuate existing power inequalities and social inequities. For example, results from the Pacific Island studies suggest that transformational adaptation required to overcome the deep-seated structures driving vulnerability are often beyond the scope of single adaptation projects. It seems that most of the national adaptation initiatives have been sector focussed. Additionally, it seems that top-down UNFCCC funding modalities mediate and support such processes. For example, results from Tuvalu and Haiti confirm that donor funded adaptation and disaster risk reduction initiative are too narrow and do little to tackle these root causes (Pelling, 2011b; Fujita et al., 2013). They stress the need for formal adaptation initiatives to understand the multiple sources of hazards and address a wider range of issues such as the inequities between urban and rural communities, strengthening access to livelihood assets, declining terms of trade, inequalities in gender, corruption, urban governance and land use and rights. Concurrently, this study failed to identify literature that demonstrated how mechanisms at the international scale or at the donor level are changing in response to overcoming some of the barriers identified above. Rightly, the focus must remain on the most vulnerable communities and sectors in SIDS. However, the failure to address barriers at the macro-policy level will ensure that many of the barriers identified through this study will remain unchallenged.

## 5.2. Addressing barriers through national adaptation programmes of action

The study reviewed five randomly selected National Adaptation Programme of Actions (NAPAs) to identify the extent to which adaptation barriers discussed in Section 5.1 had been addressed in formal national adaptation efforts. NAPAs' from Samoa, Kiribati, Guinea-Bissau, Comoros and São Tomé and Príncipe were selected. This study acknowledges that there are likely to be other national adaptation initiatives active within each country that complements the NAPAs. Additionally not all barriers identified in Table 2 can be addressed through a NAPA, for example those being driven at regional and international levels.

Across the five NAPAs', the analysis revealed that the common barriers revolved around the vulnerability of the major natural resources on which livelihoods were dependent, such as on water, agriculture, biodiversity, fisheries and coastal zones. The NAPAs' recognised that the vulnerability of these natural resources is likely to be exacerbated by non-climatic drivers that constrain development pathways such as rapid population growth and urbanisation. Analysis of the NAPAs confirmed that many of the proposed adaptation strategies focussed mainly on these vulnerable resource sectors with limited discussion on their interrelations. All five NAPAs' highlighted a set of barriers to implementing NAPA actions. Many of these were related to the limited knowledge of climate change amongst communities and government agencies, institutional weaknesses (such as policy gaps), NAPA's being subsumed by other national adaptation initiatives (e.g., the Kiribati Adaptation Project) and limited financial resources and constraints to accessing these resources.

In examining the priority list of adaptation actions for each country's NAPA, the results indicated that all five NAPAs had adopted actions that addressed the key technical barrier related to the lack of climate and natural resource related baseline data. For example, the Guinea-Bissau NAPA includes a priority action on developing a tool for mangrove monitoring as well as for coastal erosion. Such initiatives aim to support decision making related to

the management of these natural assets under uncertainty (GoG, 2006). Across the NAPAs, there was a notable absence of actions to overcome the cognitive, cultural and governance barriers identified in Section 5.1. This is a concern, given that many of the impacts of climate change will be experienced at the local level: impacting communities, Local Government and other agencies responsible for servicing rural areas in which most communities reside. In most NAPAs the adaptive capacity needs of formal local agencies were overlooked. There was an absence of activities related to understanding community perceptions of climate change and articulating the types of interventions required to challenge or support those perceptions; for example through education material in local language. Despite the presence of community adaptation projects related to the key natural resource sectors, limited attention was directed at activities that specifically addressed the building of community cohesion, community leadership of youth or strengthening linkages between Local Government and communities. Moreover, given that the use and management of natural resource based assets in SIDS are inextricably linked to cultural practices, the absence of activities that support and enhance those practices is likely to constrain the adaptation process within communities.

NAPA activities addressing root causes of vulnerability or undertaking system wide transformations were scarce. There was limited mention of activities to redress social inequalities such as gender, corruption, in-country migration, urban-rural disparities, land tenure, youth unemployment etc. The Samoan NAPA was the sole NAPA that acknowledged the influence of urbanisation on climate change impacts and subsequently incorporated climate adaptation activities into urban policies as well as implementing zoning and strategic management planning (GoS, 2005). Although all five NAPAs identified vulnerable communities, there was an absence of activities demonstrating how inequalities in opportunity and outcome structures will be overcome for the most vulnerable. Again, this may be due to the sectoral driven vulnerability assessment methodologies adopted in the NAPAs. However, sectoral strategies will be comprised by overlooking the structural drivers that marginalise the most vulnerable; for example having lack of access to education/skills or political decision making processes.

## 6. Implications for policy and practice

The results suggest several implications for both policy and practice. Indeed these suggested policy and practice interventions are necessary across all the LDC SIDS. However, a greater focus and investment is particularly necessitated in both the African and Caribbean SIDS.

First, issues of governance and their associated institutions play a critical role in shaping adaptation efforts in SIDS and thus the cross-scale linkages between various tiers of government (from regional to local) need strengthening to facilitate coordination, social learning and overcome power inequities if adaptation is to deliver cross-sectorial benefits. Moreover, regional and international adaptation policy frameworks need to acknowledge and reflect the local policy environments of SIDS. This calls for regional and international donors and implementing partners to reflect on their own policies and practices and question the fundamental changes required to occur internally if they are to meet the distinct cultural and institutional architecture present in SIDS. Greater exploration and documentation is required of the types of practices and mechanisms of regional and international organisations that have or are changing to support new governance arrangements and the conditions that enable(d) such transitions. There is a specific need to strengthen the linkages between national adaptation efforts and Local Government, which offer niches for experimenting innovative community based adaptation strategies.

Moreover, limited knowledge exists in understanding the particular capacity needs of Local Government. Particularly, those supporting national adaptation efforts or targeting community adaptation as well as the role Local Government can play in strengthening traditional governance structures in rural areas (e.g., building leadership of rural youth or empowering community level decision makers). Additionally, for many government agencies in SIDS, adaptation is one of a suite of programmes that they may be implementing in a resource constrained environment. The requirement for adopting new and innovative mechanisms through which adaptation can be implemented at the community level becomes vital for donors and other implementing partners. For example, by placing greater trust in communities to develop their own strategies for reducing local vulnerabilities and providing funding directly to those communities for their delivery will foster adaptive capacity building and strengthen local leadership. Currently, when communities are engaged in donor led adaptation activities and are motivated in developing innovative solutions to overcome their own local vulnerabilities, the opportunity for communities to operationalise these initiatives is often denied due to the lack of integration of such activities in original project funds. Such examples are widely observed in ongoing water and agricultural projects at the community level in Kiribati (Willie, 2013).

Second, the significance of traditional knowledge and cultural practices in SIDS in shaping actors' perceptions of climate risks and their agency in undertaking adaptation must be considered in policies and strategies related to adaptation in all sectors, including the private sector which has been overlooked in many SIDS. Currently, the limited focus and investments in understanding and integrating traditional knowledge into adaptation efforts in SIDS is a concern. Inextricably linked to this is the limited investment or effort being made by donor communities such as the Least Developed Countries Fund and other funding bodies to firstly engage with local researchers or experts in SIDS rather than utilising the skills of international fly-in and -out consultants to generate adaptation related knowledge to support donor investments. Secondly, to build local research and leadership capacity to produce such knowledge. Here, adaptation must be seen as an inherent opportunity to challenge existing development practices and tap into the skills sets of local experts and practitioners who are likely to have a deeper understanding of the every-day cultural realities shaping social vulnerability. It is these deeper structural processes that remain overlooked in national adaptation policies and practices, but are pertinent if adaptation is to challenge unhelpful discourses (e.g., climate refugees) and transform communities and societies across SIDS. Moreover, it will provide improved policy guidance related to the types of investments required by communities (besides mangrove plantations, rain-water tanks etc.), particularly in rural areas and the mechanisms through which adaptation financing should be channelled so it genuinely opens up the choice sets for the most vulnerable.

Third, strengthening of policies that explicitly promote the building of long-term technical expertise and scientific capacities in SIDS to generate the data and information needed to support adaptation decision making. The inequities of climate change places a greater imperative for in-country technical capacity building to shift from piecemeal donor efforts to a structured approach that provides the necessary funding to meet the long-term scientific needs of SIDS. This will require developed country scientists working alongside counterparts in SIDS through longterm engagement processes, co-producing knowledge and transferring the necessary skills over timeframes that exceed traditional short-term consultancies or Technical Assistance. Moreover, it will require funding that moves beyond capacity building workshops and instead provide sustained financing of both the soft and hard infrastructure required to support in-country data generation, management and

dissemination, particularly in local languages. There is also a need for south-south climate adaptation collaboration networks between SIDS themselves as well as between SIDS and other developing countries through which capacity can be strengthened where it is weak, lessons from various aspects of the adaptation processes can be shared and in-country expertise developed.

Finally, there is an ethical or moral dimension to how adaptation policies and practices are applied in the context of SIDS (Kuruppu, 2009). This calls for all actors from the local to the international to be reflexive and realistically question and critique the methods, tools, processes and other mechanisms through which adaptation is delivered. Drawing on the seminal work of Robert Chambers, the question of "whose reality counts" in which the priorities of the most vulnerable are placed first, is equally pertinent to the adaptation context in SIDS (Chambers, 1995). It requires policies that enable communities and decision makers in SIDS to question the processes by which they can hold donors and other funding bodies accountable and ensure that adaptation efforts deliver outcomes that SIDS value. In doing so, policies and their instruments must challenge the power structures that mediate and continue to lubricate inequalities in the delivery of adaptation interventions. It is pertinent to question whose interests these delivery mechanisms serve and who they are desirable for. Certainly, it requires SIDS themselves as well as the international community at large, to shift from perceiving communities in SIDS as objects of vulnerability to active agents and recognise the agency inherent in local culture. For example, it will have implications for how monitoring and evaluation of adaptation efforts are undertaken. How the "success" of adaptation efforts is defined and measured will be contextually sensitive and thus, must be led by SIDS and project beneficiaries. This prompts one to question the processes by which evaluation is conducted in SIDS and thus, necessitating the use of experts and practitioners from SIDS themselves who have a strong understanding of culture and local context to lead the process rather than the reliance on fly-in and -out international consultants. It will only be through investments in such adaptive learning mechanisms that internal capacity be built and continuously improved upon to enhance equitable mechanisms for delivering adaptation interventions.

## 7. Conclusions

Anticipatory adaptation activities are vital for LDC-SIDS if they are to meet the broad challenges that climate change poses on their development goals. Similar to other development challenges, the process of adaptation can become stifled with various socio-economic barriers or constraints that drive vulnerability of a given system. The findings of the systematic review provide a snapshot of key barriers to adaptation within LDC-SIDS. The data revealed a notable lack of studies on adaptation within African and Caribbean LDC-SIDS. In general, there was a paucity of academic as well as grey literature being produced by authors from LDC-SIDS to challenge existing discourses related to adaptation barriers. This supports the need for adaptation funding to be channelled into research or other in-country institutions that builds agency and enable researchers, practitioners and government officials to generate their own knowledge that can meet the adaptation needs of SIDS. This is particularly pertinent given the various international adaptation funding that is earmarked for LDC-SIDS. The most common barriers identified included those related to governance followed in descending order by, technical, cognitive, cultural, financial and "other" barriers. The "other" barrier related to the lack of focus amongst adaptation planning efforts on addressing the

root causes driving social vulnerability such as power inequalities between donors and national governments or issues of rural–urban migration. An analysis of five NAPA documents revealed the lack of attention directed at overcoming cultural, cognitive and governance barriers related to Local Government. Additionally, the NAPAs did little to address root causes of vulnerability due to their sectoral focus.

Three key findings can be drawn from this study. Firstly, the lack of focus on the adaptive capacity needs of Local Government or Island Councils and communities in formal adaptation efforts was a key barrier to ensuring success of adaptation interventions. Weak linkages and poor coordination between various tiers of government often gave rise to poor communication between communities and government; this led to local or community needs being overlooked in adaptation efforts. In turn, there remained limited capacity within Local Government and other rural government agencies to access or manage adaptation programmes and funding initiated through national or regional efforts. Secondly, the lack of focus on Local Government and community level was exacerbated by international adaptation funding modalities (i.e., through the UNFCCC), which did little to address root causes that drive vulnerability or support system transformations. These funds were geared at supporting sectoral level adaptation initiatives for vulnerable natural resource sectors such as water, biodiversity and coastal zones. Within these programmes, limited focus remained on cross-sectoral linkages to identify processes driving vulnerability of communities. Impacts driven by vulnerability assessments as part of national adaptation efforts seemed to have contributed to the sectoral focus. Thirdly, there is a need to recognise the significance of cultural knowledge and practices in shaping adaptive choices of communities. This is particularly salient given that many communities in SIDS live in rural areas and are dependent on subsistence livelihoods. Current formal adaptation efforts failed to demonstrate how traditional practices had been incorporated into adaptation initiatives or how they strengthened cultural practices such as village governance arrangements related to natural resources.

Given the long term nature of adaptation programmes, Ellerman (2006) warns that over time adaptation funding may become a form of unhelpful aid if it continues to be promoted as a reward for staying in a state of helplessness. This may recreate a clientelistic dependency that undermines self-help, particularly in SIDS whose economies are highly dependent on foreign aid. In overcoming barriers to adaptation, the key question that must be asked is how can donors help in a way that: fosters; respects; and sustains the autonomy of recipients, to act on their own motivation? Such a shift in focus requires adaptation to be considered first as an issue of equity and justice in which “adaptation funding” enables vulnerable communities to maintain their basic human rights and cultural dignity. To do so requires funding that addresses the root causes of vulnerability; supports research and leadership capacity building within SIDS rather than the use of short-term fly-in and out international consultants; and refocus on capacity building of Local Government and communities whilst integrating the traditional knowledge and practices of communities. Moreover, it calls for an equitable partnership between those administering adaptation funds and recipient governments so that donors do not promote these funds as a “good will” handout for the helplessness of SIDS in dealing with the challenges of climate change.

## Acknowledgements

The authors would like to thank the International Geosphere Biosphere Programme and Asia Pacific Network (grant no.

ARCP2012-06CMY-IGBP) for providing financial support to conduct this study. Sincere thanks are also due to University of Technology, Sydney students' Ana Shah Hosseini and Toni Patsias who assisted with the data collection phase. The guidance of A/Prof. Pauline Dube and three anonymous reviewers are also acknowledged.

## Appendix A. Supplementary information

Supplementary data associated with this article can be found in the online version at <http://dx.doi.org/10.1016/j.wace.2014.06.001>.

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