



Climate adaptation and resilience in coastal zones

A review of coastal research funded by the Climate Change and Water Programme of Canada's International Development Research Centre

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Executive Summary

- This report was commissioned by the Climate Change and Water Program (CCW) of Canada's International Development Research Centre (IDRC) as an evaluation of its portfolio of climate change adaptation projects in coastal zones. The review is concerned with identifying and understanding the contributions of this portfolio to the scientific literature and to CCW's program-level outcomes, to identifying key research findings, and identifying recommendations for future funding directions.
- Analysis was based on a purposeful sample of 13 projects, selected by IDRC staff according to clear and transparent criteria. The evaluation team first clustered projects by thematic cluster and performance against outcome indicators, and then qualitatively evaluated the contributions of projects to 2 thematic clusters and 3 outcome indicators. The evaluation team supplemented information from project documentation with 9 interviews conducted with Principal Investigators and CCW staff.
- Of the 13 projects considered in this review, 8 were still active. The projects were funded under a diversity of modalities, and included legacy projects from 2 closed programs, projects funded under the African Adaptation Research Centres Initiative, and projects funded through a specific call for proposals on coastal vulnerabilities. The projects were almost evenly distributed across Africa, the Middle East, Asia and Latin America, and were dominated by recipients in universities and research centres. The projects worked at a range of different scales, from single communities to whole nations, which is significant given the importance of physical scale in coastal change and adaptation.
- Two key, non-exclusive thematic clusters of research were identified in the project sample. The first concentrated on issues related to disaster risk reduction and socio-ecological resilience (DRR/SER), and the second cluster focussed on projects related to adaptation to slow-onset climate change. Projects in the DRR/SER cluster were more likely to have been funded through CCW's initial call for proposals on coastal vulnerabilities. Projects in the second cluster on climate adaptation were more likely to have been funded through older modalities, including the former Climate Change Adaptation in Africa Program.
- Projects in the DRR/SER cluster focus on reducing risk from, and increasing resilience to, extreme events and climate variability. All are grounded in fieldwork and have specific policy implications, welcome in a field that more usually produces normative ideas. These projects offer interesting and innovative insights into climate change impacts on livelihoods, and state- and community-led initiatives to reduce vulnerability and exposure. A key set of findings emerging from multiple projects is that climate vulnerability is mediated through institutional arrangements for, e.g. natural resource management, land tenure and social protection, as well as by local climatological conditions. Most projects in this cluster have yet to complete, and there are interesting lines of research that should result in strong publications.
- Projects in the Adaptation cluster focus on adaptation to slow onset change, including sea level rise (SLR) and salinization of groundwater. Several of these projects were among the first in Africa to offer fine-resolution downscaled projections of

inundation due to SLR, including for the Nile Delta, which is considered a global hotspot. These projects offer nuance to concerns about climate risks, demonstrating that, e.g., demographics, urbanisation, and unsustainable aquifer use are likely to be more immediate and more significant drivers of vulnerability than projected SLR and climate change. Most projects in this cluster have completed. Although some impactful scientific publications have arisen they were largely produced by just two projects and there are significant areas yet to be exploited.

- Some projects used climate change as a major structuring factor of their research, while others used it as an entry point to examining multiple stresses and sources of vulnerability acting on poor people. Understanding the differences between the 13 projects reviewed was complicated by a lack of clarity in conceptual and methodological frameworks. The evaluation team suggests that more clarity in conceptual frameworks would help researchers and CCW staff articulate the anticipated contributions of projects to the literature and to development outcomes. The evaluation team also suggests that CCW emphasise ‘decision-first’, rather than ‘science-first’, approaches in future funding calls and rounds to better manage uncertainty and enhance the uptake of results by end-users.
- The review of contribution towards CCW’s program level outcomes focused on Outcome Area 1, which has 8 indicators around risk reduction and strengthening of adaptive capacity. The coastal thematic focus meant that alignment of the projects with indicators of risk reduction, vulnerability assessment, testing adaptation strategies, and strengthening adaptive capacity was high. However, alignment with indicators for integrated water management and water quality was low despite the potential significance of climate change on water resources in coastal areas. The evaluation team suggests that CCW emphasise this topic area in the future.
- Key recommendations arising from this review are to i) emphasise clarity in conceptual frameworks, ii) emphasise decision-first approaches to climate adaptation research, iii) emphasise issues of water resources management, water quality, and water supply, sanitation and hygiene in coastal zones under conditions of climate change, iv) consider developing synthesis of research arising from different projects, v) reduce the number of indicators for Outcome Area 1, review indicators for specificity, measurability and relevance, and reword indicator 1.6 to encompass institutional and organisational dimensions.
- The findings of this report are limited by its timing and sample size. 8 of the 13 projects reviewed are still active, and are likely to generate more results and contributions to outcomes. More recent coastal adaptation projects funded by CCW may have been framed differently or adopt other methodologies, and this evaluation report can only reflect on the project sample reviewed not the broader portfolio of CCW’s work.

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1. Introduction

1.1 Background

IDRC's Climate Change and Water program (CCW) aims to support research improving adaptation to the water-related impacts of climate change at the policy level and in practice. The CCW prospectus acknowledges that populations living in coastal areas, especially in large coastal cities, are particularly vulnerable to the current and expected impacts of climate change, including storm surges and flooding, coastal erosion, groundwater salinization, and sea level rise. Among the program's broad portfolio, 23 research projects focus to some extent on the theme of coastal vulnerability. Overall, projects addressing coastal vulnerability represent 12% or \$8.2M of CCW's portfolio.

In 2013, halfway through its 2010-2015 programme, CCW commissioned the Overseas Development Institute to evaluate how the research findings of these projects contribute to the literature on adaptation in coastal areas. CCW also wished the evaluation to assess progress toward program-level research outcomes, and to inform future programming decisions (see Annex 1 for bibliographies of the review team, and Annex 2 for the Terms of Reference).

The evaluation was intended to address the following questions:

1. What are key results and challenges emerging from CCW-funded research on coastal vulnerability? What are the enabling and inhibiting factors associated?
2. How do the results of CCW-funded research on coastal vulnerability contribute to the literature on adaptation in coastal zones (including understanding of the water-related impacts of climate change, vulnerability and adaptive capacity in coastal zones)?
3. To what extent does CCW-supported research contribute to the improvement of the quality and availability of water for vulnerable communities, reduce risk and build adaptive capacity, as outlined under Outcome Area 1? Outcomes captured could include those that are expected, those not realized and emergent outcomes.

1.2 Methods

The evaluation exercise considered a purposeful sample of 13 projects supported by CCW (see Annex 3 for the list of projects). IDRC staff selected these 13 projects from CCW's 23 coastal projects according to four criteria: projects should have i) been approved for funding by April 2012, ii) a strong coastal thematic focus indicated in the program dashboard (>30% coastal focus), iii) a funding value of C\$300 000 or more, and iv) not be the subject of another evaluation exercise.

The evaluation team initially screened the 13 projects to extract key descriptive information. This included project tombstone data; project contributions toward Outcome Area 1 (OA1); project contributions to the scientific literature and to other, non-scientific outputs; and project research questions, objectives, methods, outcomes and research findings. This information was extracted from Project Approval Documents (PADs), proposals, Interim and Final Technical Reports (ITRs and FTRs), Project Completion Reports (PCRs), and Project Monitoring Reports (PMRs). This information was tabulated and used to cluster projects by research themes and development outcomes for more focused analysis¹.

¹ See Annex 3 for results from this initial screening

Wherever possible, information was sourced from project documents in a consistent manner. For closed projects, for example, data on scientific outputs was always taken from ‘Question 1 – Research Outputs’ in the PCR. However, for active projects, data was acquired opportunistically from available ITRs or PMRs.

To supplement the information available from documentation of active projects, interviews were conducted with four CCW staff and with five project leaders (see Annex 4 for a list of interviewees, and Annex 5 for the interview protocol). Information was also extracted from documentation arising from a workshop on coastal adaptation research convened in Belem, Brazil by CCW in October 2013. Wherever possible, information for active projects was included from documentary sources or interviews that indicated the strong potential for achieving outcomes or finding results in particular areas. However, in the analysis the team was careful to distinguish between observed and reported results, and those which were anticipated.

1.3 Constraints & limitations

Eight of the 13 projects were active at the time of this exercise. For active and closed projects, the information available was both quantitatively and qualitatively different.

Closed projects are accompanied by FTRs, which have more detailed and final information than ITRs, and PCRs that give IDRC staff opportunities to reflect on outcomes achieved, research findings, and document outputs. There is also an inevitable tendency for scientific outputs and lessons to accrue towards the end of a project’s lifecycle.

By contrast the documentation of active projects, in general, lacked discussion of outputs, outcomes or research findings. Both evolutions in methodologies and achieved or potential contributions to OAI were often also unclear. The review team therefore relied on information in PADs, proposals, ITRs and PMRs, and interviews with CCW staff and project leaders where possible. Consequently, the findings of this exercise may be outdated as active projects mature and reach completion.

1.4 The project sample

Geographically, the projects were distributed across sub-Saharan Africa (five projects), Latin America and the Caribbean (three), Asia (two), and the Middle East and North Africa (three) (Table 1.1).

The projects worked at scales ranging from a single community to whole nations, with eight projects working in multiple communities. In addressing coastal vulnerabilities, projects working at large scale are particularly noteworthy because of the landscape and spatial planning issues involved in flood and sea level rise protection. Seven of the 13 projects worked at the scale of cities or subnational regions.

The seven African projects² included the sample’s five closed projects. Of these five, four were legacies of the former Climate Change Adaptation in Africa Programme (CCAA), and one was co-funded by CCAA and the former Urban Poverty and Environment Programme (UPE). The two remaining projects in Africa were both funded under the African Adaptation Research Centres Initiative (AARC) from a closed call for proposals. Five of the projects in Latin America, Asia and the Middle East were funded under an open call on coastal vulnerabilities to climate change, while the sixth was funded as an unsolicited proposal.

Seven project recipients were universities, one was an NGO, one was an independent think tank, one was an intergovernmental organisation, and three were government affiliated

² 5 from sub-Saharan Africa and 2 from North Africa.

research institutes. Eight were previous recipients of IDRC funding, while five were new awardees. Of the five new recipients, three were funded under CCAA and two under CCW's call for proposals on coastal vulnerabilities. The two AARC projects funded were both former recipients of grants from CCAA.

Table 1.1. Projects in the review sample

Short name	Full name
105515 <i>Nile Delta</i>	Adaptation to the impacts of sea-level rise in the Nile Delta coastal zone, Egypt
105674 <i>Cape Town</i>	The power of collaborative governance: Managing the risks associated with flooding and sea-level rise in the city of Cape Town
105814 <i>Climate Change and Health</i>	Climate change and human health in Accra, Ghana
105838 <i>CapaSIDS</i>	Capacity building and knowledge on sustainable responses to climate change in small island states
105868 <i>Five-City Network</i>	Sub-Saharan African cities: a five-city network to pioneer climate adaptation through participatory research and local action
106548 <i>CCARCD</i>	Climate change adaptation research and capacity development in Ghana
106551 <i>ARCA</i>	Establishing the Alexandria Research Centre for Adaptation to Climate Change
106597 <i>River Plata</i>	Impacts of climate variability in the coastal areas of Argentina and Uruguay in the River Plata Estuary
106703 <i>Chilika Lagoon</i>	Strengthening livelihood security and adapting to climate uncertainty in Chilika Lagoon, India
106706 <i>Groundwater in Lebanon</i>	Climate change and saltwater intrusion along the Eastern Mediterranean: socio-economic vulnerability and adaptation
106707 <i>Risk Communication in Vietnam</i>	Communicating climate change risks for adaptation in coastal and delta communities in Vietnam
106711 <i>Amazon Extreme Events</i>	Socio-cultural adaptations of Caboclos communities to extreme tidal events in the Amazon estuary of Brazil
106714 <i>Tumbes Mangroves</i>	Impacts of climate variability and CC on the mangrove ecosystem in Tumbes, Peru

1.5 Summary

The 13 projects in the sample cover a wide range of geographies, scales, and themes, providing strong potential for developing a useful synthesis of findings. Differences in modalities, original programmes and initiatives, and orientation of original objectives might account for some of the portfolio's variation analysed in later sections.

Addressing the evaluation questions posed by the Terms of Reference, the main part of this evaluation report focuses on evaluating research findings and development outcomes. Section 2 considers three clusters of development outcomes: testing adaptation strategies, reducing risk, and building adaptive capacity. Section 3 then considers two clusters of research findings on disaster risk reduction and socio-ecological resilience, and adaptation to climate change. Finally, Section 4 considers the report's findings in light of the evaluation questions, and provides conclusions and recommendations.

2. Research findings

This section of the report first briefly considers the methods and approaches used across the project sample. It then presents an in-depth analysis of two thematic clusters: risk reduction and socio-ecological resilience, and adaptation to slow onset climate change. The report then briefly discusses the performance of the project sample in producing scientific publications. Finally, a summary highlights conclusions regarding the research contributions from the project sample.

2.1 Conceptual approaches and methods

The 13 projects are complex, each drawing on multiple disciplines, methods, and techniques, and attempting to answer multiple research questions. Although not required by the TORs or evaluation questions, the evaluation team wanted to develop a broad sense of the methods and conceptual approaches adopted by researchers. In particular we wanted to know how climate change was framed in the research, as climate adaptation remains a relatively recent subject for many researchers. There are also challenges around making a long-term issue like climate change - which usually is considered over 50- or 100-year timescales - immediately relevant to policymakers, communities, and other development stakeholders.

We judged five of the 13 projects as focusing primarily on long-term climate change, while three focused on more immediate climate variability or extreme events, and four considered both sets of issues. Projects such as 105515 *Nile Delta* considered the long-term implications of sea level rise over the time span of 100 years, while projects such as 106597 *River Plata* were more concerned with vulnerability to episodic flooding events in the near term. Projects such as 105674 *Cape Town* and 105838 *CapaSIDS* considered both long-term and short-term issues. Of the five projects focussing on long term climate change, four were funded under the older modalities and just one under the call for proposals on coastal vulnerability. By contrast, all three projects on extreme events were funded through the call for proposals on coastal vulnerabilities, as were two of the four projects working on both perspectives.

We also asked if climate issues – either climate change or climate variability/extremes – were central structural features of the research, or whether they were entry points to discussing other issues. We judged that six projects had climate change as their main focus, five projects used climate as an entry point to working on other issues, and for two projects it was unclear. Projects such as 105674 *Cape Town* focused clearly on the impacts of both long-term SLR and climate extremes on the city’s population, and generated adaptation recommendations for city planning. By contrast, 106706 *Groundwater in Lebanon* focused on the more general question of managing saltwater intrusion in aquifers, and including sea level rise as a factor alongside more immediate challenges such as over-abstraction. All five projects using climate as an entry point were funded under the call on coastal vulnerabilities, while all six projects clearly focusing on climate adaptation were funded under older modalities. Neither approach is superior, but the evaluation team expected a more even distribution, with a balance of projects focussing specifically on climate adaptation and other projects integrating climate amongst other stressors acting on poor and vulnerable people. We also note that projects in the second category have opportunities to assess whether climate risks trump other drivers of vulnerability, which is a particularly relevant question in the context of water resources.

The evaluation team did not find it easy to classify projects in terms of their approaches and methods. The key obstacle was a lack of clarity in conceptual frameworks, which made it difficult to assess what research questions projects would address and how. For example, in the literature there is a distinction between projects that use social vulnerability analysis to

explore different impact pathways for climate change, and those that develop biophysical impact scenarios to identify vulnerable groups. In practice, however, several projects used both approaches in parallel and were, more often than not, unclear about the linkages between them. The mixtures of methods and approaches were not always clearly understandable, and the evaluation team found most projects would have benefited from a clearer articulation of a framework connecting research questions, conceptual approaches, and methods for data collection and analysis.

As an example of the contrary, the project 106707 *Risk Communication in Vietnam* has an elegant design framed by a limited number of easily evaluable research questions. Some other projects lacked clarity about their epistemological or methodological underpinnings, and appeared overly complex and driven by project objectives and activities rather than research questions. Three project proposals appeared to lack research questions altogether. For these complex projects, means of integration across disciplines, methods and sectoral silos were not always clear in the proposals, or subsequent project reports and research deliverables.

More clarity in conceptual frameworks would increase confidence that research teams have identified the potential contributions of their research to the literature and/or policy. Clarity would also provide a useful means of assessing whether projects have achieved their research goals, and contribute towards assessments of their development impact. Research is also more likely to generate high quality publications in high impact factor journals if oriented by clear conceptual and theoretical underpinnings.

To an extent the lack of clarity may be a reflection of the innovative aspects of the research, with teams struggling to integrate new issues (e.g. climate change) and research approaches (e.g. social sciences) into their work. During one interview, a project leader remarked that they would like to see leadership from IDRC and CCW on the most effective conceptual frameworks and methodological approaches to deploy in developing climate and climate adaptation research projects.

One clear signal from our brief consideration of methods was the increase in use of economics methods by projects in later modalities. In total, eight out of 13 projects used some form of economics methods, including assessments of adaptation costs and the costs of climate impacts, valuation of ecosystem services, and economic aspects of livelihoods. Five of these projects were from the call on coastal vulnerabilities, reflecting the emphasis on economics in that call.

2.2 Research publications

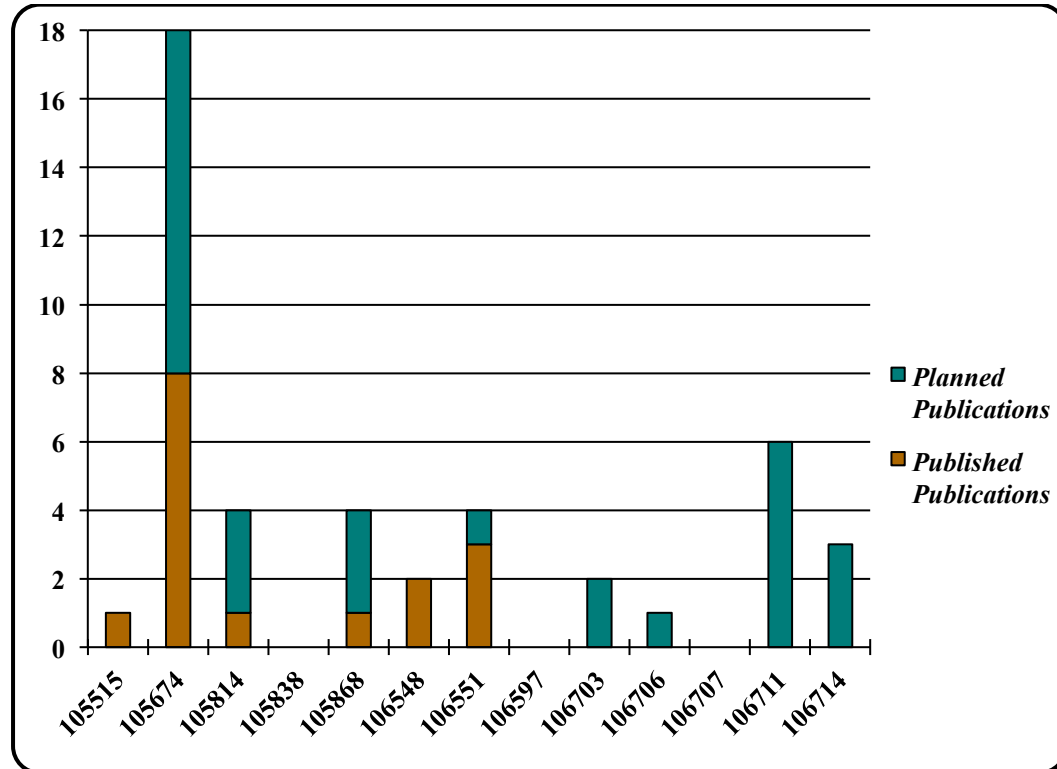
Contributions to the scientific literature, defined in terms of journal articles, books, book chapters and formal conference proceedings, have been uneven and limited to date. In total the 13 projects have published 16 scientific contributions, eight of which originate from 105674 *Cape Town* (Figure 2.1; see Annex 6 for a summary of publications, and Annex 7 for a complete list). However, with eight projects still active and the tendency for scientific publications to accrue later the project lifecycle, this number can be expected to increase.

Publications are fairly evenly distributed among methodological, theoretical, empirical and descriptive contributions, with a concentration of publications on political and economic analysis. Of the seven projects with at least one published scientific contribution, five had a university as the lead grantee. However, the evaluation team is reluctant to draw conclusions from this observation given the staffing complexities of many projects, and the small sample size.

Of the 16 published contributions to date, seven have citations tracked in Google Scholar. However, because four of these seven come from chapters of the same book, only three of the 12 unique publications have been cited. As of February 2014, a journal paper from 105674 *Cape Town* had been cited seven times, the book from the same project had been cited six

times, and a journal paper from 106551 *ARCA* had been cited once. Although citations can grow with time, the immediate impact of publications can often be judged by examining citations within three or four years. The evaluation team suggest that CCW consider evaluations of citations at appropriate intervals to gauge their impact.

Figure 2.1. Numbers of published and planned publications per project



Six of the 16 contributions to date have been journal articles, published in six different journals. Four of these journals have publically available data on their two-year impact factors, which were 0.842, 1.71, 1.57, and 2.11³. These compare favourably to a journal such as *Climate and Development*, which has a two-year impact factor of 0.81.

In total, at least 29 additional publications are planned, either already submitted to journals or described elsewhere in project documentation, of which ten are planned from 105674 *Cape Town*. This number may also increase, as several projects noted that they are planning publications but do not disclose the number or type anticipated⁴.

Although not part of the TORs or evaluation questions, the evaluation team were interested in the comparative weight of scientific publications versus non-scientific outputs arising from projects. The number of non-scientific outputs greatly exceeded the number of scientific contributions, and varied widely in format and significance. An initial attempt to quantify outputs was abandoned, as it was impossible to obtain a clear picture from the documentation of some projects.

The range and variety of these outputs included workshop summaries, reports, student theses, surveys, conference papers, presentations, websites, blogs and social media pages, economic appraisals, newsletters, brochures, scientific models and tools, GIS databases and maps, training courses, institutional MOUs, video recordings, management plans, media materials,

³ All data 2012, source <http://www.scimagojr.com/>

⁴ In these cases the evaluation team did not include any estimates for the number of expected publications

policy briefings, and political declarations. Many of these were generated in the English language, but relevant local languages included Portuguese, Spanish, French, Arabic, Oriya, and Vietnamese. The quality and usefulness of these outputs varied, with remarks to this effect by project leaders and CCW staff in project documentation. Two particularly noteworthy outputs from closed projects were the mayoral declarations generated by 105868 *Five-City Network* and the new ‘Climate Change Think Tank’ generated by 105674 *Cape Town*.

Assessing the impact of these materials was beyond the scope of this evaluation, but it was the opinion of the evaluation team that – in terms of policy influence and supporting development practice – these outputs were likely to be of greater significance than the arising scientific publications.

2.3 Thematic clusters of research

Contributions to Research

During the screening exercise, a classification and clustering exercise was used to explore the thematic relationships between different projects based on a review of project documentation.

Initially this exercise identified three clusters: disaster risk reduction and socio-ecological resilience; urban and spatial planning as adaptation to slow-onset sea level rise; and groundwater resources and ecosystem services. However, during the process of deeper analysis it became apparent that a more logical and useful division was between projects conducting research on disaster risk reduction and socio-ecological resilience, and those focusing on adaptation to slow-onset climate change. In consultation with CCW the clusters were consequently reformed as:

1. Disaster risk reduction and socio-ecological resilience (DRR/SER cluster), and
2. Adaptation to slow onset climate change (Adaptation cluster).

A strong correlation was observed between thematic focus and funding modalities for these projects. Four of the six projects in Cluster 1 (DRR/SER) were funded under the call on coastal vulnerabilities. By contrast, of the eight projects in Cluster 2 (Adaptation), seven were funded by the older modalities, and just one project supported under the CCW call on coastal vulnerabilities.

Each of these clusters is assessed in terms of identifying key findings, in particular identifying areas in which findings are emerging from multiple projects, highlighting significant publications and areas with potential for further exploitation, and finally assessing opportunities for future research investments.

2.3.1 Disaster risk reduction and socio-ecological resilience (DRR/SER)

The six projects in this cluster were 105868 *Five-City Network*, 106597 *River Plata*, 106703 *Chilika Lagoon*, 106707 *Risk Communication in Vietnam*, 106711 *Amazon Extreme Events*, and 106714 *Tumbes Mangroves*.

Key research findings in this area, and why they are significant

The projects with a focus on building socio-ecological resilience are all about halfway through and therefore have not produced published results. However, initial findings are beginning to emerge in all of them that potentially offer interesting and new insights into climate change manifestations and impacts on particular livelihood activities, as well as state-led and community actions that are helping to reduce vulnerability and exposure to climate extremes. In some of the projects, autonomous adaptations by communities are also being uncovered that have not been well understood in these locations or even internationally. Many of the projects study ecosystems and social aspects of resilience in parallel, looking at the impact of climate extremes on both types of systems, and bring the two together by examining the interplay between them.

The 106714 *Tumbes Mangroves* project, for example, has developed a useful framework for understanding the inter-relationships between the mangrove ecosystem, socio-economic activities and climate. Initial findings point to changes in the geology of the mangrove and the biological population brought about by El Niño. This is important because of the high demand on fisheries in the country and this is the first time anyone has looked at this issue in Peru. High levels of precipitation, soil erosion and changes in certain nutrients are having an impact on the population of the conch, making it harder for local fishermen to find, so understanding this relationship is very important.

The 106703 *Chilika Lagoon* project has evolved from its initial design, which analysed ecosystem process and social vulnerability separately, to looking at convergence and linkages between the datasets. This convergence has allowed researchers to analyse trends across larger scales – for example, thinking about how household-scale adaptations could scale up to a larger area, defined by ecosystem dynamics. This has also generated an interest in understanding the institutional context and trying to influence this by sharing results from the socio-ecological analysis with DRR officials.

The social science aspects of the research are less innovative in some of the projects, in terms of methodology or research questions, but nevertheless are important fields of study. The social science research in the 106714 *Tumbes Mangroves* project examines social organisation, income from conch and crab fishing activities and potential new sources of income from eco-tourism.

The 106597 *River Plata* project looks at present and future vulnerability to flooding across settlements in two countries with a natural border. The natural science is innovative in looking at wind regimes and comparing increases in the height of the river caused by rainfall versus wind and how this differentially affects these communities. On the social science side, the research on adaptive capacity is not particularly innovative but participatory methods are being used to generate CCA plans with communities and local government and therefore this research should have important policy implications. The maps show that what was once exceptional in terms of flooding, will become more commonplace in the future.

The 106711 *Amazon Extreme Events* project uses innovative econometric models to understand the structure of household incomes, investment strategies and adaptive capacity. Incomes are partly derived from federal transfers, which are not only being used as safety nets to get families through hard times, but are also allowing families to invest in acai production. The researchers are using these findings to generate models of how cash transfers can help to build adaptive capacity.

The 106707 *Risk Communication in Vietnam* project is more oriented towards social science research than the other projects in this cluster. It analyses the link between communication of climate projections and collective action taken to reduce disaster risk – for example through early warning systems – as well as how better communication can improve DRR and adaptation planning to reduce vulnerability over the long term. It asks whether uncertainties around climate projections should be communicated or not by comparing two communication approaches: communicating climate uncertainty versus communicating what neighbours have done to adapt. This is innovative in the climate change literature, although studies of communicating uncertainty and probabilities are more common in natural hazards literature and lessons from these methods and findings could be drawn on to a) strengthen the project and b) situate findings within the broader literature and compare effectiveness of communication techniques for different types of hazards, temporal and spatial scales.

The connection between livelihood activities and the ability to cope with and adapt to changes in climate – and in particular, climate extremes – was not always well articulated. The 106714 *Tumbes Mangroves* project, for example, does not refer explicitly to this link, but there is an implication that sustainable management of mangrove resources will ensure that communities whose livelihoods depend on these ecosystems are more resilient to El Niño events. Other extreme events related to climate change are not discussed directly.

The 106711 *Amazon Extreme Events* project has found that federal government funds allocated to communities to improve housing and productive activities have been used as more than just a safety net – they have led to improvements in adaptive capacity. The mechanism via which this increase in income generates adaptive capacity is still being explored. Similarly, the production of acai is thought to be contributing to a reduction in vulnerability to sea level rise and drought as demand for acai is high in local markets, so farmers can save from their income, and this palm is particularly resilient to reduction in levels of precipitation. An additional finding is that the production of this fruit is not extractive and so increased production does not produce negative externalities for the environment.

Areas where similar evidence is emerging from multiple projects

Findings from several projects illustrate that vulnerability to climate change is mediated through local climatological conditions as well as institutional arrangements. In the 106714 *Tumbes Mangroves*, Peru, productive resources are most affected by the El Niño phenomenon and in particular through the uncertainty this creates around sustainable extraction of conch and prawns. Climate change may have an impact on El Niño but it is not the primary cause of changes in ecosystems. Nonetheless, the over-exploitation of natural resources also undermines people's resilience and capacity to cope with extreme events and longer-term impacts of climate change.

Adaptation in this context will require a better understanding of how these resources are affected by climate extremes and slow-onset events, although the project does not look directly at these manifestations of climate change. It does however look at the local informal institutions governing resource extraction and wider supply chain management, both of which are key components of resilience to a range of external shocks and stresses. A combination of strategies is therefore needed to improve adaptive capacity in this context, and at different scales of governance. Similarly, the 106597 *River Plata* and 105868 *Five-City Network* projects identify land-use practices and other formal and informal urban development processes that contribute to increasing exposure to climate extremes.

Notable publications arising, and why they are significant

The 106711 *Amazon Extreme Events* project is about halfway through and a poster of findings at this stage was presented at the American Geophysical Union (AGU) Meeting in 2013: *Linking ethnographic and hydro-climate analyses to identify flood regime changes, their drivers and socio-cultural responses across the Amazon Estuary*. At the next Annual Meeting of the AGU, a paper will be presented on *Government benefits and the resilience of household livelihood strategies in the Amazon estuary region, Brazil*. This study explores connections between government cash transfers and household strategies as it relates to climate change adaptation and social-ecological conditions. In addition, 15+ masters' theses and a doctoral research project are underway on topics related to the project.

The 106597 *River Plata* project has generated a number of publications in Spanish that present the flood maps that have been developed and synthesise the project. In addition, papers will be submitted to *Environment and Urbanization* on topics of climate information, adaptation funds and institutional development, but it is still too early to say whether these will be a significant contribution on this topic outside these countries.

The 105868 *Five-City Network* project has generated a number of publications, some of which are significant and innovative within the DRM and socio-ecological resilience literature. They focus on the role of local governance in building resilience in urban areas, rather than rural communities, which is more common in this field. Other non-journal publications that are relevant to the DRM literature include five baseline studies on the projected impacts of climatic variables on four government sectors – water and sanitation, energy, transport and health – as well as a series of Climate Resilience Handbooks. While these outputs may not be innovative as such, they have been developed in a participatory way and so are expected to be more useful for local decision-makers, demonstrating practical adaptation measures and tools.

Research findings that remain unexploited

There are some interesting lines of research in all of the projects that have not yet been published, but generally there are plans to do so towards the end of each project. However, most of the projects have several lines of research and there is a danger that some of the findings will not be fully exploited. For example, in the 106714 *Tumbes Mangroves* project, questions around how sustainable existing practices of extracting resources (conch and crab) really are and how this relates to the type of social organisation (loose associations developed through family ties), are important. The project should publish findings from these research themes – e.g. what is the maximum number of associations and members for this type of extraction to be efficient? Also, how much can be extracted from the mangrove in a sustainable manner? Answering these questions would offer an important contribution to the literature on collective action and sustainable development. One recommendation for the portfolio of projects as a whole is to undertake a review of each of the projects' key findings in the final year and identify suitable publications channels for each.

Similarly, the 106707 *Risk Communication in Vietnam* project has posed a lot of interesting questions, including around the influence that framing of climate change messages has on immediate comprehension, longer-term recall and behaviour change. Research findings should be published, as this is an important and understudied issue in the field of socio-ecological resilience.

How IDRC can build on these results in the future projects

IDRC has supported a number of interesting research projects on topics of DRR and disaster resilience, all with important and very specific policy implications, which makes a welcome change from what are sometimes very general normative ideas produced in this field. The natural science components are particularly strong and original in all the projects reviewed. However, the social science elements are sometimes less innovative methodologically and could pose more challenging research questions of relevance to the broader theoretical literature on disaster vulnerability, DRR and resilience. Specifically, research that looks at how governance systems and communities have coped with and learned from experiences of dealing with extreme events would make a vital contribution to this literature. Further studies on different methods for communicating risk, uncertainty, probabilities and scenarios are also needed in the climate change field, particularly as these relate to local contexts and knowledge. Research could usefully encourage more trans-disciplinary approaches with scientists with different disciplinary backgrounds working more collectively to define the research problem and questions, alongside other stakeholders with non-scientific backgrounds.

2.3.2 Adaptation to climate change

The eight projects in this cluster were 105515 Nile Delta, 105674 Cape Town, 105814 Climate Change and Health, 105838 CapaSIDS, 105868 5 City Network, 106548 CCARCD, 106551 ARCA, and 106706 Groundwater in Lebanon.

Key research findings in this area, and why they are they significant

Most projects in this cluster have contributed locally important findings, with research framed in terms of local knowledge gaps and policy problems rather than global research questions. However, some findings have wider resonance. For example CCW-supported projects have generated important assessments for the Nile Delta, which is a global hotspot for vulnerability to SLR. Results from 105838 *CapaSIDS* are important because little similar research has been conducted in lusophone Africa or African small island states.

A key result from project 105515 *Nile Delta* was the development of more accurate downscaled vulnerability assessment for SLR in the eastern Nile Delta than had been previously available. By using higher resolution digital elevation models (30m grid) and including existing infrastructure including coastal defensive works, raised road networks, and canals in the analysis, the team localised projections of SLR impacts. Results forecast a loss of 1-3% of the study zone by 2100 under 1m SLR scenarios. These figures are significantly less than proposed for the Nile Delta by other studies, typically 10-30% under similar SLR

scenarios (e.g. Dasgupta et al., 2009; Nahry & Doluschitz, 2010). The project also identified the SLR impacts on groundwater levels and soil drainage as likely to have more significant impacts on coastal communities than direct inundation. Overall the findings highlight the importance of demographic change and urbanization as drivers of vulnerability, and suggest that managed retreat and radical transformation in the use of coastal space is likely to be a more cost effective investment than the construction of sea walls and hard defences.

106551 *ARCA* has built on the work begun in 105515 *Nile Delta*, outscaling the vulnerability assessments to the whole Delta with a simpler methodology and updated SLR projections. Findings so far indicate that SLR scenarios in the order of 1m would inundate 22.5% to 29.2% of the Delta assuming no adaptation. However, much of that impact would fall on undeveloped lands and wetlands, with less than 5% of impacted land being urban space. Similar to 105515 *Nile Delta*, inclusion of existing infrastructure in the analysis resulted in far less loss of coastal area. The project has also built on agricultural impacts work from 105515 *Nile Delta*, developing projected economic costs from increased water logging of soils, and will continue to contribute to economic assessments of SLR impacts and adaptation costs.

105838 *CapaSIDS* considered the impacts of both SLR and increased flooding from precipitation events, and identified vulnerable areas. These results were novel in a national context, being the first climate change or SLR project in either Cape Verde or Sao Tome & Principe, and the project was also innovative for lusophone African countries. The project also developed some socioeconomic studies of local importance and usefulness. Particularly in combination with storm water studies, these findings would be useful inputs for urban planning, although the project's difficulty in engaging with government authorities does raise the question of how results might be taken up and applied.

105674 *Cape Town*, benefitting from a team with strong modelling capacity, focused on fine-scale risk mapping and explored institutional aspects of risk management in Cape Town. The project demonstrated that as a result of coastal development, SLR, and increased frequency and intensity of storm surges, Cape Town will be at greater risk of coastal flooding. Findings indicated that, due to the high costs of hard approaches to coastal protection, building control, coastal zone management and set-back areas could be more efficient adaptations. Similarly, research on reducing risk to inland flooding, which has disproportionately impacted on informal housing areas, focused on governance approaches and understanding how institutional dimensions contribute to vulnerability. The project's focus on institutional aspects of flood risk management included assessments of collaborative governance in flood risk reduction. These suggest that the success of such initiatives is conditioned as much by the socio-political structures and relationships they operate within, as they are by the degree of risk posed or protection afforded.

106706 *Groundwater in Lebanon* is researching the impact of climate change on groundwater, particularly on saltwater intrusion into coastal aquifers. The initial project framing was in terms of greater seaward pressures on aquifers resulting from SLR generating more saltwater intrusion. To date, evidence from the project has been that salinity is instead highly correlated with population density and therefore driven by inland abstraction and recharge rather than climate change.

Findings from 105868 *Five-City Network* were mainly related to processes for building stakeholder engagement, and the project appears to have focused on the delivery of practical information, tools and other support to urban planners. This focus recognises that adaptation is a process of social and institutional change embedded within a political economy rather than a series of strategies or technical planning (e.g. Pahl-Wostl, 2009). Rigorous critical investigations of this perspective would make strong contributions to the literature, in the future. One research finding was that city planners and politicians were more interested in risk assessments addressing upstream and downstream aspects of food, water, energy and master supply chains, not just in terms of direct physical impacts and spatial planning. This perspective of urban systems as an economic nexus vulnerable to climate change bears further investigation in the future.

105814 *Climate Change and Health* is something of an outlier in the project sample, focusing on urban health. The project stressed investigation of community perceptions and mental models regarding climate change rather than vulnerability assessments or identification of adaptation options. The project's work on processes of building engagement between communities and urban authorities parallels work in 105868 *Five-City Network*. It is particularly interesting in the case of developing community action on unblocking sanitation and drainage lines following the identification of flood risk. This could make a contribution as a policy brief or 'how to' toolkit, but would be difficult to exploit as a contribution to the literature.

Results from 106548 *CCARCD* cover a range of topics including relationships between climate variables and malaria prevalence. Some small grant-supported research has explored issues relevant specifically to coastal environments. One line of research has correlated small relative SLR changes with groundwater salinization and linked this with impacts on agriculture and as a possible driver of migration. Future work will focus on geospatial assessments of household exposure to flooding and SLR-driven inundation, and relationships between climate change and food security mediated through artisanal fisheries.

Areas where similar evidence is emerging from multiple projects

This cluster has made contributions in three key areas: advancing understanding of vulnerabilities to physical climate impacts, identifying and assessing policy responses, and developing participatory approaches to urban and spatial planning.

In terms of physical risk, four of the projects addressed vulnerability to sea level rise or coastal flood risk: 105515 *Nile Delta*, 105674 *Cape Town*, 105838 *CapaSIDS*, and 106551 *ARCA*. These were among the first projects in Africa to offer fine-resolution downscaled projections of inundation due to SLR. In general, their findings provide more nuance to concerns about vulnerabilities to SLR, highlighting the key drivers of vulnerability as demographic growth and urbanization of coastal space. These are comparable to the findings of 106706 *Groundwater in Lebanon* that demographics are more immediate and more significant drivers of vulnerability than projected SLR. While SLR may exacerbate risk over the course of a century, the greater risk is generated by concentrating assets and people in flood-prone areas, or by over-exploiting coastal aquifers for irrigation.

In Egypt, both projects (105515 *Nile Delta* and 106551 *ARCA*) found that land losses to SLR in the Nile Delta would be considerably less compared to projections from previous studies. The difference between these projections is largely due to higher resolution base maps providing more detail in the extent of inundation, and also due to inclusion of key infrastructure such as defensive works and the international coastal road. Similarly, downscaled flood risk maps⁵ for 105674 *Cape Town* and 105838 *CapaSIDS* developed more nuanced understandings of SLR and storm surge impacts in their respective local areas.

These projects also considered other factors of physical risk, in particular flood risk. In line with research findings from elsewhere, a number of projects identified flood risk in unplanned and informal urban areas as highly significant (105868 *Five-City Network*, 105674 *Cape Town*, 105838 *CapaSIDS*). 105674 *Cape Town*, for example, identified storm surge hotspots and areas at risk from downstream flooding, and highlighted cases in which existing infrastructure was a source of vulnerability due to inappropriate design. Aside from flood risk, 105515 *Nile Delta* concluded that SLR effects on groundwater levels will have more significant consequences than direct inundation, including impacts of groundwater salinization on urban and sanitation infrastructure.

An unsurprising but general finding reported by several projects (105868 *Five-City Network*, 105674 *Cape Town*, 105838 *CapaSIDS*) was that policymakers are less concerned by slow onset SLR than by flood-risk in the near term. An interesting finding from 105868 *Five-City*

⁵ e.g. Bundrit & Cartwright, 2012. Understanding the risks to Cape Town of inundation from the sea. Chapter 3 in Climate change at the city scale: impacts, mitigation and adaptation in Cape Town. Routledge.

Network was that policymakers were concerned less by direct physical risk than by climate change disrupting upstream and downstream supply chains.

In terms of policy responses, 105515 *Nile Delta*, 106551 *ARCA* and 105674 *Cape Town* projects examined approaches to coastal defences. They concluded that while infrastructure dominates thinking, there are significant opportunities in governance and soft, or ecosystem, options. 105515 *Nile Delta* concluded that while hard defences remain cost effective in areas of concentrated infrastructure, they do not protect against groundwater and water table impacts, and are poor value for money in rural areas. 105674 *Cape Town* identified set-back areas and building control as the most effective options to reducing flood risk. Both 105515 *Nile Delta* and 105674 *Cape Town* found that although coastal ecosystems such as wetlands and dune systems have historically been economically undervalued and affected by degradation, with some rehabilitation they could form important and cost-effective components of a coastal defence strategy.

The third set of findings relates to the importance of involving communities in coastal planning and adaptation, and the potential for participatory approaches to catalyse new forms of governance. The use of participatory approaches may be particularly appropriate in spatial and/or urban planning, although relatively untested in the context of climate adaptation (e.g. McCall, 2003; Fairhurst, Rowswell & Chihumbiri, 2012). 105515 *Nile Delta* and 105838 *CapaSIDS* both demonstrate that in these contexts, PAR approaches depend on support from key authorities if they are to achieve impact, particularly in cases requiring large-scale interventions such as landscape management or large infrastructure investments. By contrast, 105674 *Cape Town* and 105868 *Five-City Network* demonstrate the potential for these approaches to negotiate between multiple stakeholders in spatial planning and adaptation, and to affect policy and practice when the key actors are engaged. 105868 *Five-City Network* concluded that adaptation is dependent on a process of social and institutional change more than a series of strategies and plans, and that participatory approaches can catalyse and facilitate that change. 105674 *Cape Town* also highlighted that the mobilization of participation in planning and governance has to be understood within the wider socio-political and institutional contexts in which it is attempted.

The majority of these projects are framed in terms of generating knowledge to meet immediate development challenges (see Outcome Indicator 1.3) rather than theoretical or methodological contributions to the literature. However, this local perspective generates value. These investigations of climate change impacts and adaptations on the ground provide evidence as to how climate change generates specific challenges for development policy, but that these challenges are not insurmountable. A common finding is that climate change will exacerbate development challenges in many coastal areas, but that key drivers of vulnerability are demographic change and urbanization and that strengthened governance and planning can do much to reduce vulnerability.

Notable publications arising, and why they are significant

The large number of scientific contributions from 105674 *Cape Town* includes publications on flood risk; inundation vulnerability; empirical, theoretical and methodological aspects of risk management; and institutional and governance approaches to flood risk management. Notably, many of these publications have a focus on institutional and socio-political dimensions, which is distinct to the normal focus in this field on projecting impacts and modelling the costs and benefits of different engineering options.

Two peer-reviewed publications from 106551 *ARCA* detail downscaled projections of SLR impacts in the Nile Delta using GIS techniques, one for the area of Kafr el Sheikh and the other for the whole Delta.⁶ These publications are significant in that they provide updated and ground-truthed assessments for a global hotspot, and highlight the value of wetlands and existing infrastructure in protecting the majority of vulnerable areas.

⁶ The publication on Kafr el Sheikh is partly based on work conducted under 105515 *Nile Delta*

Research findings that remain unexploited

The majority of projects in this cluster are closed, and the three active projects are likely to generate a number of publications yet.

In terms of the closed projects, results of 105515 *Nile Delta* remain largely unexploited, aside from some conference papers and a self-published book available only in Egypt. The project has failed to capitalise on the results they have, and interviews suggest that this is largely due to constraints in time and human resources in the CORI team to prepare publications.

For active projects, 106551 *ARCA* has findings on agricultural and health vulnerabilities to climate change that are likely to be of value. 106706 *Groundwater in Lebanon* will contribute to the characterization of groundwater and coastal aquifers in Lebanon, especially in terms of the physical and socio-economic impacts of saltwater intrusion on urban and agricultural water users.

There is a cluster of work including 105515 *Nile Delta*, 106706 *Groundwater in Lebanon*, and 106548 *CCARCD* on groundwater issues that is as yet unexploited. Given the relevance of this to CCW's water resources focus and Outcome Area 1, CCW might wish to explore the potential of producing a synthetic publication.

How IDRC can build on these results in the future projects

A well-understood challenge of policy-oriented research on climate change impacts such as SLR is that, to policy-makers, problems appear to be distant, surrounded by considerable uncertainty, and less significant than more immediate development needs. 'Science first' approaches that begin by modelling and projecting impacts of SLR, coastal flooding and inundation, and then attempt to identify and assess feasible adaptation options can find managing these concerns difficult. By contrast, 105674 *Cape Town* demonstrates the potential of an alternative approach, which begins by understanding the institutional, governance, and political economy contexts within which decisions will be made, and identifying what the feasible action space for adaptation is. This alternate approach resonates calls by experts at the interface of research and policy for a shift in adaptation research to address issues of deep uncertainty in decision making (e.g. Hallegatte, 2012; Ranger, 2013). This 'development-first', 'policy first', or 'decision-centric' approach plays to the traditional strengths of IDRC and its partners in developing countries, as social science approaches require less intensive resource inputs than physical modelling. Continued investments in capacity building for economic methods and assessments will strengthen this area. Further, initial investments by IDRC into identifying feasible actions spaces for adaptation could be extremely valuable in guiding and directing larger investments into physical modelling by others.

These ideas are partly driven by the realization that coastal adaptation is generally concerned with populations, assets, infrastructure, landscapes, and investments at large scales. Appropriate strategies and measures to adapt to changing coastal landscapes are more likely to be driven by government policy and less likely result from autonomous adaptation at the individual or community scale. As such, government policy is more likely to be driven by economic and political factors than technical assessments. While research on technical options can provide evidence for investment decisions, they are rarely conclusive or even key aspects of decision making.

The evaluation team recommends that CCW continue to support research into non-infrastructure adaptation and risk reduction, including soft/ecosystem coastal defences and governance measures such as building control, to reduce vulnerabilities arising from demographic pressures and coastal urbanization. Action research on stakeholder participation in coastal and urban governance and planning to prepare for a changing climate still has yet to make a significant impact in Africa. Experience from projects such as 105838 *CapaSIDS* demonstrate the difficulties in effecting change in the absence of buy-in from authorities, while 105674 *Cape Town*, 105868 *Five-City Network*, and 104329 *Moroccan Coastal Adaptation*⁷ demonstrate the potential gains unlocked by political support. Another important

⁷ CCAA project not evaluated as part of this exercise

approach is to conduct research on feasible livelihood adaptations and the investments required to generate enabling environments for them, in cases where infrastructure options are unfeasible. This might include research on transformations from agriculture to aquaculture, new building practices, and so on.

Relatively few projects in this sample have focused on issues of water resources or water supply and sanitation. These are both issues that will be highly significant as coastal zones become more highly populated, with greater water demand, and impacted by SLR, flooding, and other climate-related impacts. Both 106706 *Groundwater in Lebanon* and 105515 *Nile Delta* have shown how these issues conflate in coastal space with degradation of the coastal aquifer and reduced drainage. They suggest that, especially with adaptation investments in coastal defences, many communities will be more directly impacted by changes in groundwater than by direct inundation. These impacts will affect the performance of sanitation, drainage, and water treatment infrastructure, and constitute major challenges for governments and communities. Future research could consider issues of water supply and alternative sources of water, including desalination, particularly in densely populated areas. This is related to the need for research to consider climate impacts on coastal areas, and particularly coastal cities, as more than just direct physical impacts in particular spaces. It is also important to understand climate risks to, and strengthen the resilience of, upstream and downstream systems and supply chains that serve urban spaces and their populations.

2.4 Summary

The 13 projects can be separated into two broad clusters on risk reduction and climate change adaptation. Findings from the DRR/SER cluster have explored linkages between local climatological conditions, institutional arrangements and vulnerability. They have also explored linkages between ecosystem degradation and over-exploitation of natural resources and vulnerability to climate change and disasters. These projects were more likely to be funded under the CCW call on Coastal Vulnerabilities, more likely to use climate change as an entry point to other issues, and more likely to include economics methods.

Projects in the second cluster focused on adaptation to climate change, and were more likely to be funded by older modalities. These projects advanced understanding of vulnerabilities to physical climate impacts, identified and assessed policy responses, and explored participatory action research (PAR) approaches to urban and spatial planning.

All projects used a mixture of methods and approaches in their work, although some had stronger bio-physical bases (e.g. 106714 *Tumbes Mangroves*, 106703 *Chilika Lagoon*, 105515 *Nile Delta*) and others had a stronger focus on social sciences (e.g. 105814 *Climate Change and Health*, 105868 *Five-City Network*). However, in general the conceptual frameworks linking these different methods, and linking research questions with methods and activities, were not as strong as they could have been. For example, although several projects contributed to institutional development and adaptive capacity (see Section 3.4), few were able to connect this with theoretical or conceptual perspectives on adaptation as a process of social and institutional change. Other projects used parallel entry points to assessing vulnerability without reconciling, or exploiting interlinkages between, them. The evaluation team recommends that CCW work with recipients to strengthen conceptual frameworks in future projects, especially given the importance of good research design to achieving sound results, strong publications, and strengthened evidence-based decision-making.

CCW should also strengthen the social science aspects of future projects, particularly in using locally-grounded perspectives to critique the theoretical literature on DRR/SER. The high cost of infrastructure and engineering approaches to coastal adaptation, and the high uncertainties resulting from 'science first' or modeling approaches to vulnerability and impact assessment make these less suitable areas for future investments. Instead, IDRC can gain more added value by continuing to strengthen economic assessment and political economy approaches that can be used to identify feasible interventions for others to develop technical assessments and specifications. These would be particularly powerful when joined with social

science research on institutional and governance regimes and how these shape vulnerability in different biophysical contexts as well as potential livelihood adaptations to coastal change. The evaluation team also recommends that CCW, while keeping a niche for ‘science-first’ research, emphasises conceptual approaches and research designs that focus on decision-making under conditions of deep uncertainty (e.g. Hallegatte, 2012; Ranger, 2013). These approaches are likely to better serve local decision-makers, and better reflect the strengths of IDRC and its traditional partners.

Scientific publications from projects were fairly evenly distributed among methodological, theoretical, empirical and descriptive contributions, with a concentration of publications on political and economic analysis. However, publication rates were not high, and not even across projects – 105674 *Cape Town* accounted for half the publications to date. The most significant publications arising within this project sample came from academic institutions with high capacity (University of Cape Town) or that had been recipients of multiple rounds of IDRC funding (ARCA). However, the evaluation team notes that other strong academic organisations and institutions with multiple rounds of funding had not produced significant publications at the time of the evaluation.

Significant areas remain for scientific publications to arise out of these projects, and CCW could consider developing publications synthesising results from multiple projects. Specifically, a synthesis of research on institutional development and learning processes in governance systems and communities in relation to extreme events and long term planning would make a vital contribution to the literature. Another area for a synthesis publication could be for those projects which have examined the impacts of SLR on groundwater (105515 *Nile Delta*, 106706 *Groundwater in Lebanon*, and 106548 *CCARCD*).

The findings of these projects are of general interest to the literature on climate adaptation and resilience, with papers on similar subjects arising in journals such as *Climatic Change*, *Nature Climate Change*, *Global Environmental Change*, and *Climate and Development*. These journals are interested in - and supportive of - empirical interdisciplinary research that looks at how social and ecological systems interact and adapt and that also make important contributions to resilience and adaptation theory. Governance, social learning and adaptive management are also important themes in these journals. Coastal journals such as *Coastal Management* and the *Journal of Ocean & Coastal Management* tend to be focused on specific debates such as marine protected areas or property rights regimes, and while they have occasional papers on climate change it is not a core focus for them. For water journals, the online *Journal of Water and Climate Change* leans towards modelling studies, while the *Journal of Water Resources Development* and *Water Alternatives* are both more focused on debates of policy, institutions and social science perspectives. *Environmental Hazards*, the *International Journal of Disaster Risk Reduction and Disasters*, would also be suitable outlets for articles arising from some of the research on disaster risk reduction and resilience to climate extremes. These journals encourage innovative and mixed methods approaches to research on vulnerability and individual and collective responses to disaster risk.

3. Contributions to development outcomes

3.1 Contributions to Outcome Area 1

CCW's Monitoring and Evaluation (M&E) Framework⁸ identifies three outcome areas, of which the first, Outcome Area 1 (OA1), relates to research outcomes. OA1 is expressed as:

“Fund relevant research to improve the quality and availability of water for vulnerable communities, reduce risk, and build adaptive capacity”

OA1 is further described in terms of a baseline assessment, and a progressive series of statements outlining minimal, medium and high level outcomes the programme aspires towards (see Annex 8).

In order to assess performance of the project sample against OA1, the evaluation team made use of a set of eight indicators developed by CCW staff (Table 3.1). These indicators are not official components of the CCW M&E Framework, but are used by programme management to track project and portfolio performance. The eight indicators relate to the minimal, medium and high level outcomes of OA1.

Table 3.1. Indicators used to assess Outcome Area 1

Minimal level indicators	1.1 Assessing vulnerability: How have researchers improved understanding of the vulnerability and adaptive capacity of targeted beneficiaries? Of key sectors (e.g. agriculture, fisheries, tourism, etc.)?
	1.2 Barriers: Has research identified barriers to the uptake of existing technologies and strategies for improving water resources management? How has it increased understanding of these barriers and strategies to overcome them?
	1.3 Testing adaptation strategies: How has the project tested and/or increased understanding of strategies to adapt to climate change.
	1.4 Water quality/availability: How has the project helped improve the quality and/or availability of water for the poor?
	1.5 Risk: How has the project helped reduce risks associated with climate change (e.g. flooding, drought, sea-level rise, storms, etc.)? How has the project improved awareness of these risks
Medium level indicators	1.6 Increased adaptive capacity – communities/institutions: How has the adaptive capacity of communities and/or institutions been increased as a result of the research? How are they applying findings of the research (e.g. adaptation options tested during the project)?
	1.7 Funding: Has the partner secured other sources of funding for adaptation research?
High level indicator	1.8 Increased adaptive capacity – multi-scale: How have improvements in adaptive capacity been demonstrated at the regional or national level? How have adaptive strategies been ‘scaled up’?

⁸ Climate Change and Water Program, Monitoring Framework and Tools, Final draft May 27, 2010/Revised March 2012

During the initial screening exercise, the evaluation team assessed each project’s contribution to the eight OA1 indicators as a “Yes” or “No”, based on a review of available documentation. To ensure accuracy and consistency, these judgements were made at the end of the project screening process, after collecting and assessing all other project data. For the purpose of this exercise, active projects were assessed in terms of outcomes anticipated in project documentation rather than outcomes reported on. For indicator OA1.7 *Funding*, a ‘No’ was automatically recorded for all active projects that did not explicitly report funding already achieved.

The sample of CCW projects aligned well with four of CCW’s indicators (OA1.1 *Assessing Vulnerability*, OA1.3 *Testing Adaptation Strategies*, OA1.5 *Risk Reduction* and OA1.6 *Increased Adaptive Capacity*). These are appropriate areas for climate adaptation projects to occupy, although there is the potential for some overlap and, effectively, double counting especially between OA1.3 *Testing Adaptation Strategies* and OA1.5 *Risk Reduction*. The sample aligns moderately well with indicator 1.7 *Funding*, although this may be flattering as two projects led to further funding from IDRC, two reported small levels of resource mobilisation in terms of additional funding for students and workshops, and just one project reported winning UK£ 200 000 in funding from another donor.

There was limited evidence of alignment with two indicators (OA1.2 *Barriers* and OA1.4 *Water Quality/Availability*), and no evidence for the eighth (OA1.8 *Increased Adaptive Capacity – Multi-scale*) (Figure 3.1). OA1.8 *Increased Adaptive Capacity – Multi-scale* is a highly ambitious indicator, and it is unsurprising that no projects report against it. The low alignment of the project sample with indicators on water resource management barriers and water quality and availability is noteworthy given the centrality of these issues to CCW’s mandate and the challenges relating to these issues in coastal environments. Most projects aligned with between 4 and 6 indicators (Figure 3.2).

Figure 3.1. Numbers of projects contributing to each indicator of OA1

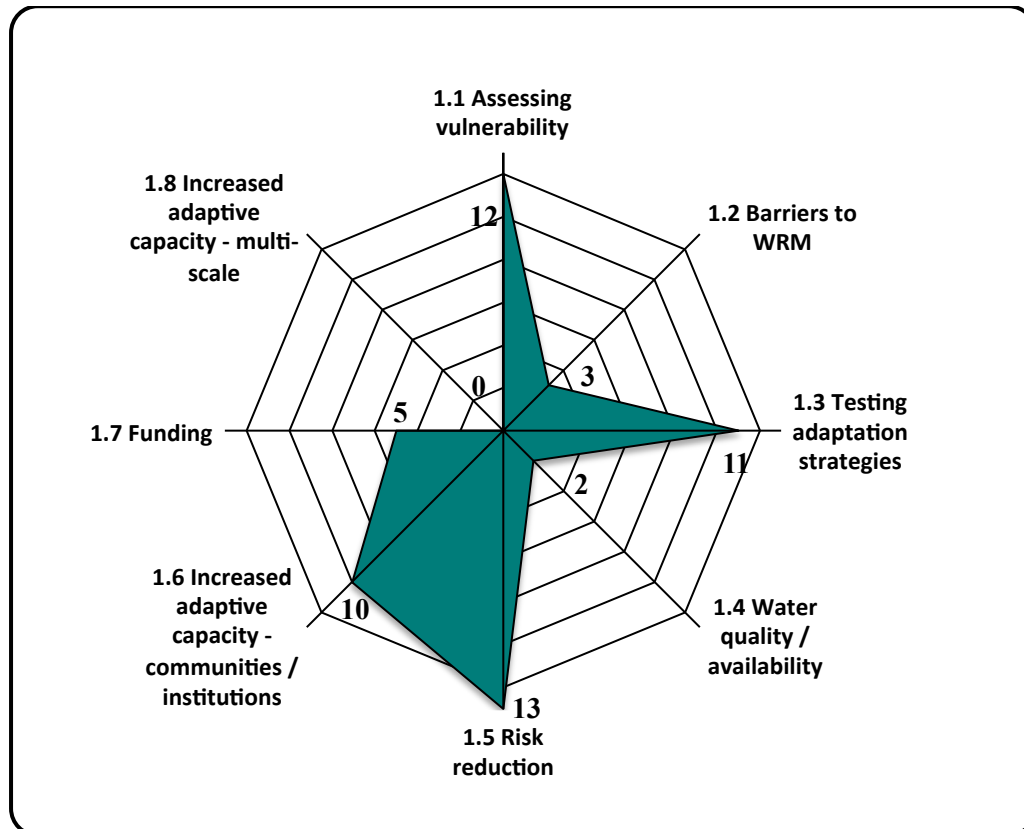
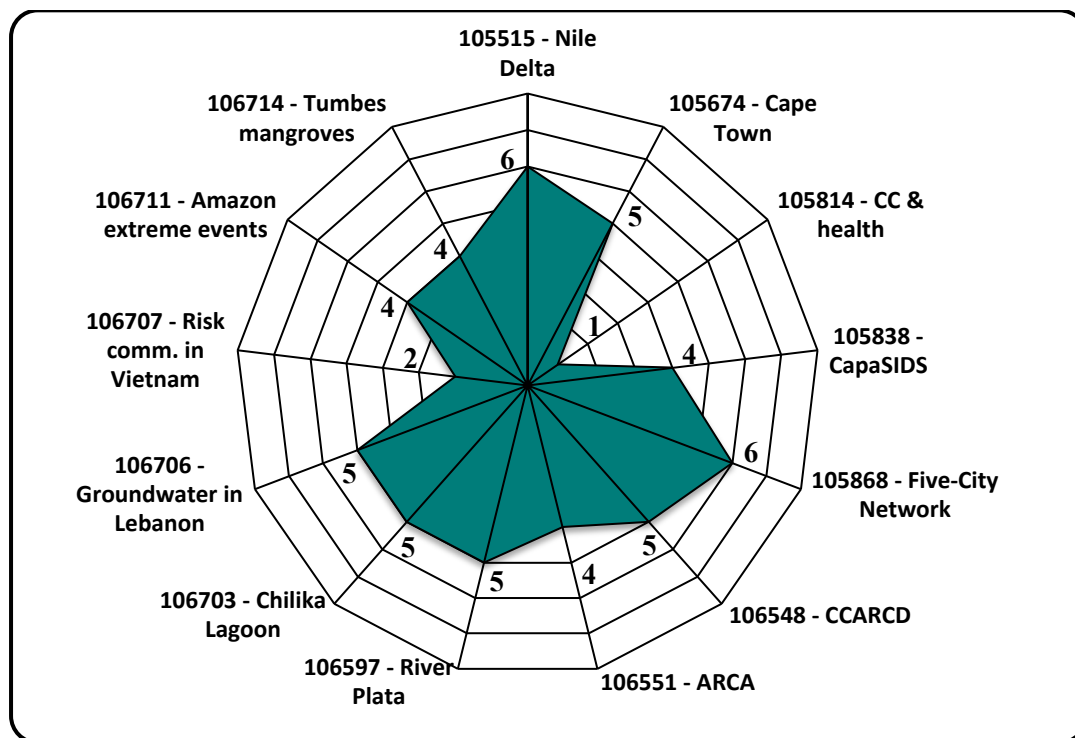


Figure 3.2. Number of indicators towards which each project contributes

In consultation with CCW, 3 indicators were then chosen for in-depth review focused on identifying significant outcomes, and areas in which multiple projects were making similar contributions. The indicator-clusters chosen were two with the largest number of contributing projects (OA1.3 *Testing Adaptation Strategies*; OA1.5 *Risk Reduction*) and the most ambitious indicator with contributing projects (OA1.6 *Increased Adaptive Capacity*). One highly populated indicator-cluster (OA1.1 *Vulnerability Assessment*) was dropped as consultations between CCW and the evaluation team agreed that this was a comparatively well-trodden area with few new findings likely.

3.2 Indicator OA1.3: *Testing Adaptation Strategies*

Indicator OA1.3 *Testing Adaptation Strategies* is phrased as follows: ‘How has the project tested and/or increased understanding of strategies to adapt to climate change?’

We scored 11 of the 13 CCW projects as contributing to this indicator, with only 105814 *Climate Change and Health* and 106707 *Risk Communication in Vietnam* not doing so. These two projects did not test or increase understanding of strategies to adapt to climate change as they mainly focused on understanding and communicating risk⁹.

Project contributions towards OA1.3 *Testing Adaptation Strategies*

The project contributions to date have focused mainly on the second clause of the indicator question: discussing adaptation *planning* via participatory research, rather than on the *empirical testing* of adaptation interventions in the field. Given the collaborative nature of many of these plans and tests, we consider both those led by the project team and those led by the recipients (as a result of the project) here. All 11 projects are contributing to adaptation planning / awareness raising, usually involving multi-stakeholder discussions after the

⁹ While 106707 *Risk Communication in Vietnam* was testing the impact of communicating risk in awareness raising, the project did not frame awareness raising or communication as an adaptation strategy. It is, rather, a vehicle for disseminating knowledge about adaptation strategies, and is therefore considered an element of adaptive capacity rather than an adaptation strategy in itself.

completion of earlier vulnerability assessments, either to develop an adaptation management plan or to rank/score specific adaptation options.

Only three projects to date have resulted in physical testing or upgrading occurring, which was always led by newly-inspired boundary partners, rather than the project team itself. These three are: 105674 *Cape Town*, for some physical slum upgrading; 105868 *Five-City Network*, for various city-led field interventions, such as home retrofitting in Cape Town and building flood defences in Walvis Bay; and 106548 *CCARCD* for some changes to community solid waste management activity. Two other active projects may also result in physical testing: 106703 *Chilika Lagoon*, which aims to pilot test sustainable livelihood interventions, such as the climate-resilient management of the lagoon fishery and the development risk transfer mechanisms like life insurance, and 106706 *Groundwater in Lebanon*, which aims to pilot test groundwater management adaptations in Tripoli City, such as desalinating groundwater at the city/household scale and decreasing water loss from irrigation canals in order to reduce over-extraction from wells.

In addition, five projects are *theoretically* testing adaptation strategies, via economic appraisal methodologies. These five are: 105515 *Nile Delta*, which performed sensitivity analyses and cost-effectiveness analyses on various adaptation options; 106548 *CCARCD*, which performed a cost-benefit analysis (CBA) of the top-ranked adaptation options emerging from participatory adaptation planning; 106551 *ARCA*, which is performing a full economic analysis of adaptation in the Nile Delta, using, among others, CBA, hedonic pricing and contingent valuation; 106703 *Chilika Lagoon*, which is performing a CBA of different wetland management options; and 106706 *Groundwater in Lebanon*, which is performing a CBA of saltwater intrusion adaptation options.

Commonalities between projects

The contributions can be clustered into three different types: 1) participatory adaptation planning, 2) physical testing of adaptation options, and 3) economic appraisal of adaptation options. There is limited discussion of the achievements of these activities in the active projects, but, in the closed projects, they appear to be variable and with mixed success. In 105674 *Cape Town*, for example, the capacity development and vulnerability assessment outcomes were emphasised more heavily than the participatory adaptation planning. This apparently motivated some community members but demotivated others who realized that the community issues they were grappling with were much more complex than they had imagined. 105838 *CapaSIDS* struggled at the political level, with tensions around the use of 'adaptation' in policies and development plans resulting in these project outputs being rejected by national government. 105515 *Nile Delta* had clearer success, with its economic appraisals of adaptation feeding into a draft national strategy on climate adaptation, and with one of the PIs becoming appointed as lead author on the IPCC AR5 WG2 chapter on adaptation. For 105868 *Five-City Network*, its collaborative adaptation planning resulted in a variety of policy changes and physical interventions by the five cities, as well as three adaptation tools and two significant mayoral declarations on adaptation.

Success and inhibition factors

Few adaptation projects engaged in physical testing, with more projects conducting economic feasibility assessments. More risk reduction projects focused on communicating risk rather than trialling physical risk reduction interventions. This is likely due to the scale and cost of adaptations and resilience building measures in coastal environments, particularly where they concern physical infrastructure. This contrasts with community based adaptation projects in agriculture, for example.

The four closed projects generated relevant insights on success and inhibiting factors to adaptation planning, testing and appraisal, particularly relating to political incentives and individual relationships. 105674 *Cape Town* found that ward councillors and local leaders were effective intermediaries on flooding issues between the city government and citizens, as they would usually report the floods to the City and distribute any aid. However, physical settlement upgrading and private investment in adaptation were constrained by the highly

politicized and hostile relationship between the City and its informal residents in general. City officials feared for their safety when engaging with residents and were concerned that residents would use flood dialogues as opportunities to demand other infrastructure services. Residents were also reluctant to engage, as these voluntary efforts had lower priority than their basic livelihood needs and other local priorities, such as violence (e.g. a local shooting marred the plans for one of the project events).

105838 *CapaSIDS* struggled unsuccessfully to formally involve municipal governments in its adaptation scenario building work. This was due to democracy in the countries being relatively young and a resulting suspicion of participatory policy making. Instead, the team found that informally involving particular individuals from these organisations circumvented much of the political tension and allowed more productive dialogue. This at least allowed the project's vulnerability analyses to be taken seriously, though adaptation dialogues focused mainly on general urban risk reduction.

For 105515 *Nile Delta*, much of its success was likely due to its well-networked PIs, who leveraged their relationships to effectively insert their adaptation recommendations into policy and to effectively insert themselves into adaptation roles with the IPCC. The main insight from 105868 *Five-City Network* was that stimulating the interest of a city/municipality in adaptation was possible through a flexible approach that 'continuously redefines itself in view of the reaction of target groups to the project activities and outputs'. The project also found that identifying local 'champions' within a relevant department of the city partners (e.g. environment office) promoted more interest and engagement on their part. These champions were integral to organising the project's multi-stakeholder platforms on adaptation in their cities, maintaining momentum on project activities, and ensuring that adaptation options were locally appropriate.

Knowledge contributions from this cluster

Given the paucity of scientific contributions to date by the 11 projects in this cluster, the contributions focusing specifically on adaptation are scarce. Here we focus narrowly on contributions discussing adaptation itself, rather than resilience more generally. Of the 30 publications for which we have details, approximately six take a major focus on adaptation, though two of these are books that also focus on climate impacts, vulnerability and mitigation (Cartwright et al. 2013 from 105674 *Cape Town*, and Elshinnawy et al. 2012 from 105515 *Nile Delta*). From the remaining four, two are from 105674 *Cape Town* and discuss adaptation to flooding and sea-level rise in Cape Town's informal settlements (Drivdal forthcoming and Brundrit et al. 2011). The other two are from 105868 *Five-City Network*, with one discussing adaptation theoretically from the concept of climate risk (Cartwright 2012) and the other discussing it practically via 'participatory action adaptation' at the municipal level (Fairhurst et al 2011). All six focused on adaptation at the local/regional level, indicating little scientific contribution to date on adaptation knowledge for national and global contexts.

The non-scientific outputs from the 11 projects include several relevant to adaptation as well. This includes the adaptation management plans and economic appraisal reports being generated, as well as adaptation policy declarations, tools and other relevant reports, student theses and conference papers. The five economic appraisals will contribute to knowledge needs at the community (106548 *CCARCD*), city/regional (105515 *Nile Delta*, 106551 *ARCA*, 106703 *Chilika Lagoon*, 106706 *Groundwater in Lebanon*), and national (106548) scales, while the two mayoral policy declarations and three adaptation tools from 105868 *Five-City Network* had a continental, if not global, perspective. To date, there is also one student thesis on barriers to flood risk adaptation in an informal community in Cape Town (Orangio 2012 for 105674 *Cape Town*) and three reports reviewing sea-level rise adaptation options (CoRI 2010 and 2011a, b for 105515 *Nile Delta*). None of the active projects have yet generated any other relevant contributions, though it is expected that they will do so.

Was OA1.3 Testing Adaptation Strategies set at a realistic level?

This depends on the extent to which CCW is interested in focusing specifically on infrastructural spinoffs from the projects, versus adaptation in general. The ‘and/or’ phrasing of the current indicator question does not discriminate between projects with any focus on adaptation at all (11 in this sample), projects that actually empirically tested strategies (3, possibly 5), and projects which used economic assessments (5). A future indicator could subdivide these three types of contribution, such as:

‘Has the project increased awareness of adaptation and undertaken adaptation planning?
Has the project resulted in the physical testing of adaptation options? Has the project undertaken economic appraisal of adaptation options?’

In the opinion of the evaluation team, one problematic issue with this indicator is the small but important difference of emphasis from the Outcome Statement. The relevant part of the Outcome Statement reads: “...Strategies to build adaptive capacity to such change are tested and understood”, and is clearly a question about testing strategies for building adaptive capacity. However, the wording of OA1.3 *Testing Adaptation Strategies* instead focuses on testing adaptation strategies, which is a different proposition. In this evaluation exercise we have focused on the working of the indicator, and the confusion in wording may be a source of some of the redundancy noted with indicator OA1.5 *Risk Reduction*.

3.3 Indicator OA1.5: Risk Reduction

Indicator 1.5 *Risk* is phrased as: ‘*How has the project helped reduce risks associated with climate change (e.g. flooding, drought, sea-level rise, storms, etc.)? How has the project improved awareness of these risks?*’

We scored 13 of the 13 CCW coastal projects as potentially contributing to this indicator.

Project contributions towards OA1.5 Risk Reduction

The project contributions to date have focused more on the second indicator question than the first: increasing *awareness* of climate risks, rather than making substantive contributions to reducing risks themselves. All 13 projects are contributing to improving risk awareness, usually via scientific and social vulnerability assessments to climate variability and change, followed by multi-stakeholder outreach and targeted risk communications. The 106707 *Risk Communication in Vietnam* project is a strong example, analysing the value and methods of risk communication for various audiences in its three focal cities.

Only five projects to date have made substantive contributions to reducing risks, which were infrastructural and/or policy-oriented. Three of these include the same physical interventions as were mentioned in Section 3.2 on the testing of adaptation options, as the evaluation team judged them able to both reduce climate risk and adapt to climate impacts. The five projects are: 105515 *Nile Delta*, for inserting its work on sea-level rise risk into Egypt’s draft national strategy on adaptation and DRR; 105674 *Cape Town*, both for some physical slum upgrading and for policy and institutional progress in the City of Cape Town, including new coastal setback policy; 105814 *Climate Change and Health*, for some storm drainage improvements to reduce flood risk; 105868 *Five-City Network*, for various city-led field interventions, policy changes and the two mayoral declarations; and 106548 *CCARCD* for some changes to community solid waste management activity.

Six other active projects could yet make substantive contributions to risk reduction, three via infrastructure and possibly three via policy (though this is more difficult to judge). These are: 106703 *Chilika Lagoon*, which aims to pilot test sustainable livelihood interventions and community disaster risk management plans; 106706 *Groundwater in Lebanon*, which aims to pilot test groundwater management adaptations in Tripoli City; 106711 *Amazon Extreme Events*, which aims to construct an early warning system against extreme tidal events; 106551 *ARCA*, which aims for ARCA to become a technical support unit to the climate change directorate of the Egyptian Environmental Affairs Agency; 106597 *River Plata*, which aims to strengthen long-term transboundary climate risk management in the estuary; and 106707

Risk Communication in Vietnam, which aims to study risk communication and integrate risk reduction into national policy, via the influence of its lead partner (NISTPASS) as a policy think tank within the national government.

Commonalities between projects

The contributions can be clustered into two different types: 1) raising risk awareness and 2) substantive contributions to risk reduction. There is limited discussion of the achievements of these activities in the active projects, but, in the closed projects, they appear to be variable and with mixed success, similar to the adaptation strategies discussed in Section 3.2. 105515 *Nile Delta*, for example, saw success in terms of getting results included in national policy. 105868 *Five-City Network* saw similar success with its city-level policy changes and field interventions related to risk reduction, which are also now influencing other cities beyond the original five. For 105674 *Cape Town*, its policy influence at the city government level saw success, but, as discussed in Section 3.2, its community engagements faced greater challenge, though did result in minor slum upgrading. For 105814 *Climate Change and Human Health* and 106548 *CCARCD*, both of these projects did stimulate some infrastructural risk reduction, but it was at a local scale, with essentially no spinoff impact elsewhere.

Success and inhibition factors

Five of these projects have generated relevant insights on success and inhibiting factors to climate risk communication and reduction interventions. 106707 *Risk Communication in Vietnam* has been determining the various challenges to climate risk communication, highlighting the challenge of targeting messages to different audiences with varying levels of existing knowledge, using appropriate media channels at an appropriate time. It has found that awareness is high, particularly around disasters, but that understanding is low, with a need to communicate how climate change will affect the nature and extent of disasters. 105838 *CapaSIDS* struggled at the policy level, as discussed in Section 3.2, but also found that while stakeholders were aware of climate risks they were not used as parameters for decision-making. This seemed to relate to the language of ‘climate change’ being politically unsavoury, as policy engagement was more successful when discussing the same risk reduction measures in terms of general resilience. 105868 *Five-City Network* found that a city-led risk assessment needs to think more systematically about integrating development and adaptation, encompassing its various urban supply chains. In terms of risk communication, it also found that stakeholders more easily grasp the concept of climate risk if perceived and projected impacts are in agreement. 105674 *Cape Town* found that citizens viewed climate risk from flooding as a problem for the city government to handle, but also found that the city could only do so much, and needed residents to assume some local responsibility as well. For 105515 *Nile Delta*, its findings are the same as in Section 3.2: that well-networked PIs can have a major impact on the success of risk communication and reduction efforts.

Knowledge contributions from this cluster

Given the limited number of scientific contributions from the 13 projects to date, the contributions focusing specifically on risk awareness and reduction are scarce. Of the 31 publications for which we have details, approximately 11 take a major focus on risk awareness and reduction, though two of these are books that also focus on climate impacts, mitigation and adaptation (Cartwright et al. 2013 from 105674 *Cape Town*, and Elshinnawy et al. 2012 from 105515 *Nile Delta*). From the remaining nine, seven are from 105674 *Cape Town* and are iterations on two themes: coastal risk management in Cape Town (Brundrit and Cartwright 2012; Colenbrander et al 2012; Colenbrander et al forthcoming; and Ziervogel et al forthcoming) and GIS-based flood risk analysis (Musungu et al 2012a, b; 2011). The other two publications discuss climate risk theoretically in the context of adaptation (Cartwright 2012 from 105868 *Five-City Network*) and GIS-based sea-level rise risk analysis (Hasaan 2013 from 106551 *ARCA*). Ten of the 11 focus on risk at the local/regional level, while one discusses GIS methods in general, indicating little scientific contribution to date on risk reduction knowledge for national and global contexts.

The non-scientific outputs from the 13 projects include several relevant to risk awareness, assessment and reduction as well. 105674 *Cape Town* generated GIS-based risk assessments and six relevant student theses for Cape Town: Waddell (2014) on collaborative flood risk governance; Desportes (2013) on flood risk resilience; Musungu (2012) on GIS-based flood risk assessment; Orangio (2012) on barriers to flood risk adaptation; Mfupi (2013) on flood risk response; and Solomon (2011) on flood early warning systems for informal settlements. 105868 *Five-City Network* generated climate resilient handbooks for each city, along with its two mayoral declarations. 106597 *River Plata* will generate a spatial assessment tool to evaluate and select critical areas of risk in the River Plata, along with a risk perception report. 106707 *Risk Communication in Vietnam* will generate a variety of risk communication models and tools. 106711 *Amazon Extreme Events* will generate the aforementioned early warning system for extreme tidal events. Again, though, these outputs focus at the local/regional level and do not significantly contribute to knowledge needs at the national and global levels.

Was OA1.5 Risk reduction set at a realistic level?

This depends on the extent to which CCW is interested in focusing specifically on substantive contributions to risk reduction from the projects, versus risk activity in general. The dual question phrasing of the current indicator includes all projects with any focus on climate risk equally (13), though this obscures projects that actually implemented substantive measures toward risk reduction (5, possibly 11). A future indicator could more explicitly separate these into two sub-indicators, such as:

‘Has the project improved awareness of the risks associated with climate change? Has the project implemented tangible interventions toward reducing risks associated with climate change?’

In the opinion of the evaluation team, one problematic issue with this indicator is the question of how significant the criteria are for a project to score a success. Achieving a genuine reduction in risk for vulnerable communities would be no small feat. However, although 13 projects in the sample have scored against this indicator, many have done so by raising awareness of risks. This is a considerably more nebulous achievement, particularly in the absence of criteria or guidelines that establish what success looks like.

3.4 Indicator OA1.6: *Increased Adaptive Capacity*

Indicator OA1.6 *Increased Adaptive Capacity* is phrased as:

‘How has the adaptive capacity of communities and/or institutions been increased as a result of the research? How are they applying findings of the research (e.g. adaptation options tested during the project)?’

The evaluation team scored 10 of the 13 CCW coastal projects as contributing to this indicator, with 105814 *Climate Change and Health*, 106707 *Risk Communication in Vietnam*, and 106714 *Tumbes Mangroves* not doing so.

Key to evaluating performance against this indicator is defining adaptive capacity. The CCW definition of adaptive capacity is¹⁰:

“The ability of a system to adjust (to climate change). Building adaptive capacity implies that we are improving the ability of people (through access to resources, such as financial, human, social and natural capital) to modify practices to cope with and manage the adverse impacts of climate change.”

¹⁰ Source: Climate Change and Water Program Monitoring Framework and Tools, Revised March 2012.

While agreeing with the first sentence, the evaluation team suggests that the definition of building adaptive capacity, focused narrowly on issues of resources and assets, does not capture dimensions of adaptive capacity that are crucial to CCW projects. A view of adaptive capacity focused on assets is common to perspectives that regard adaptation in terms of technical solutions and strategies. As we shall argue below, CCW-supported projects instead tend to align with perspectives that regard adaptation as a process of social and institutional change embedded in a political economy. These perspectives regard adaptive capacity as the ability to alter processes and, if necessary, change structurally in response to experienced or expected change (e.g. Pelling et al., 2008; Pahl-Wostl, 2009). Jones et al (2010), similarly, identify five characteristics of adaptive capacity that includes asset bases, but also institutions and entitlements, knowledge and information, the capacity to innovate, and the ability to respond to anticipated future change. These perspectives are therefore concerned with institutional development, including the development of organisational relationships and processes of learning and evaluation, and these are areas in which several CCW have contributed. While these might be regarded as assets, it is more useful and appropriate to think of them as systems and processes.

For the purpose of this exercise the evaluation team has therefore defined adaptive capacity as individual, institutional and organisational resources and processes that facilitate adaptation of systems in response to experienced or anticipated change.

Project contributions towards OA1.6 Increased Adaptive Capacity

Project contributions to date focus on both of the indicator questions. All 10 projects are increasing the adaptive capacity of communities and/or institutions, including via activities related to institutional development and stakeholder workshops and via the adaptation testing and risk reduction activities discussed in Sections 3.2 and 3.3. These latter activities also address the second indicator. We focus here on the first question, as the large number of projects still active makes it difficult to make judgements about adaptation options being taken up and sustainably applied by communities.

Approximately seven projects have a focus on institutional adaptive capacity and five on community adaptive capacity. 105674 *Cape Town* and 106551 *ARCA*, for example, both developed entirely new climate change institutions (the Climate Change Think Tank and the ARCA), which contributes to the broader institutional framework and capacity of their environment. Other institutional examples include: 105674 *Cape Town*, stimulating institutional development in the City of Cape Town, with its Flood & Storms Task Team evaluating their own work to reduce future risk; 105838 *CapaSIDS*, focused on developing the capacities of government and civil society staff on climate adaptation, via training courses and workshops; 105868 *Five-City Network*, focused on developing the ability of its five cities to address climate change by developing participatory processes to city planning; 106597 *River Plata*, focusing on developing the capacities of the local governments involved in the transboundary management of the estuary through providing them with, and strengthening their capacity to use, risk maps generated from digital elevation models; and 106703 *Chilika Lagoon*, focusing on developing the capacity of the Chilika Development Authority to manage the wetland, engage in project research, and strengthen participatory processes with communities.

For the five community-focused projects, their activities involved participatory outreach, multi-stakeholder workshops and direct engagement of community members in the research. These include: 105674 *Cape Town*, working with informal settlement communities; 106548 *CCARCD*, working with one study community in Accra; 106597 *River Plata*, working with the various estuary communities in two countries; 106706 *Groundwater in Lebanon*, working with communities in three field sites; and 106711 *Amazon Extreme Events*, working with *caboclos* communities in the Amazon estuary.

Commonalities between projects

The contributions can be clustered into two different types: 1) institutional or community-level capacity development, and 2) institutional or community-level vulnerability/risk

reduction activities and/or adaptation activities. Here we focus on the first cluster here, since Sections 3.2 and 3.3 discussed the achievements of the second type. 105674 *Cape Town*, for example, saw success with its development of the Climate Change Think Tank, which is now an independent entity within the University of Cape Town, as well as with its influence on the city government, with a self-evaluation by the Flood and Storms Task Team indicating their capacity to look at flooding issues more holistically. As discussed in Section 3.2, the project struggled in a difficult political climate to engage informal communities on adaptation. However, its stakeholder processes did motivate many of the attending residents to collaborate on new activities (e.g. local saving groups) and to engage more in local politics and advocacy.

106551 *ARCA* has created a new centre for climate adaptation capacity and research. ARCA has developed MOUs and relationships with a number of local and national institutions, including universities, the governorate of Alexandria, and the Egyptian Environmental Affairs Agency. 106703 *Chilika Lagoon* is also seeing particular success so far. According to interviews, the implementing partner (Wetlands International) and the Chilika Development Authority have developed a very close relationship. This is allowing them to engage effectively with the community and at the policy level.

For 106548 *CCARCD*, its government and community capacity development are resulting in visible behaviour changes and an interest by the Accra Metropolitan Assembly for their staff to be trained on adaptation by the project team. 106597 *River Plata* is also already confident that the project activities have ‘definitely’ contributed to capacity development of the communities and municipalities on risk and adaptation, with officials in both countries interested and participating in the project. 105838 *CapaSIDS*, meanwhile, also aimed to develop the capacity of these groups, but many of these efforts were rejected at the policy level, discussed further below.

Success and inhibition factors

Five of these projects have generated relevant insights on success and inhibiting factors to community / institutional adaptive capacity via capacity development. 105674 *Cape Town* found that the City’s current structure made cross-departmental work challenging, recommending outcome-based funding and an integrated budget instead of department-based funding. It also found that departments were understaffed and lacking staff with facilitation and community engagement skills, making community engagement on adaptation difficult.

105838 *CapaSIDS* found that, given the local institutional dynamics in Sao Tome and Cape Verde, participatory action research as the method of adaptive capacity development was not effective. They may have benefitted from the approach taken by 105868, which saw success in their city-level engagements on capacity development and risk reduction / adaptation testing interventions via the use of a more flexible approach, continuously redefining itself in view of the reaction of target groups to project activities and outputs. For 106597 *River Plata*, its ongoing, transboundary activities are strengthened by their research team consisting of both Argentinian and Uruguayan organisations, making them better able to engage communities and policymakers in both countries for capacity development. For 106703 *Chilika Lagoon*, one of the founders of the Chilika Development Authority previously worked for Wetlands International. Having these pre-existing links between the two organisations has helped the latter more effectively develop the institutional capacity of the former.

Knowledge contributions from this cluster

Given the paucity of scientific contributions by the 10 projects to date, the contributions focusing specifically on adaptive capacity are scarce. Here we focus again only on publications related to strengthening community and institutional adaptive capacity, as we detailed the relevant publications on adaptation testing and risk reduction in Sections 3.2 and 3.3. Of the 29 publications for which we have details, approximately five focus on this topic. Three of these are from 105674 *Cape Town* and analyse capacity development from the city

government and informal settlement perspectives (Cartwright et al 2012; Ziervogel et al forthcoming; Drivdal forthcoming).

The remaining two are from 105868 *Five-City Network* and discuss capacity development for the five cities via the lenses of climate resilience and participatory action adaptation tools (Laros 2012; Fairhurst et al 2011). All five focused on capacity development for adaptive capacity at the local/city level, and only Fairhurst et al (2011) can be said to have detailed any real mechanisms for capacity development implementation, while the others placed capacity development within broader contextual analyses. This thus indicates little scientific contribution to date on capacity development knowledge for regional/national/global contexts, though this makes sense since Indicator 1.6 is focusing at the community/institutional level.

The non-scientific outputs from the 10 projects include several relevant to community and institutional capacity development for adaptive capacity as well. The various training courses and stakeholder workshops from all 10 projects are directly relevant, as are the three capacity development tools produced by 105868. Two student theses from 105674 *Cape Town* also discuss the topic by analysing multi-stakeholder collaboration dynamics in two of Cape Town's informal settlements (Desportes 2013; Orangio 2012). Two Portuguese-language reports from 105838 *CapaSIDS* also assess the multi-stakeholder group dynamics toward adaptive capacity in the project (Da Cruz, 2011; Costa and Alves 2011). These outputs again focus mainly at the local/city level.

Was OA1.6 Increased Adaptive Capacity set at a realistic level? What would be needed to reach OA1.8 Increased Adaptive Capacity - Multi-scale?

The evaluation team would recommend that CCW reword OA1.6 *Increased Adaptive Capacity* to encompass dimensions of institutional and organisational processes, as this is an area to which many CCW projects will contribute. Otherwise, the level of ambition is judged to be reasonable. However, for the indicator's second question, it is difficult in practice to disaggregate project-led application of adaptation options from recipient-led testing of options, particularly during the lifespan of a project. We discussed them together in Section 3.2, though acknowledge their differences in terms of the former's status as a 'minimum outcome' and the latter's status as a 'medium outcome'. The evaluation team would therefore suggest much more stringent criteria for a second question around sustainable uptake and application of adaptation options, criteria that might include the dedication of resources such as budget lines, or establishment of committees, or formalisation of agreements that indicate future sustainability. However, CCW should consider whether this might constitute a high-level outcome.

OA1.6 *Increased Adaptive Capacity* also links intrinsically with the 'high outcome' OA1.8 *Increased Adaptive Capacity - Multi-scale*, which asks 'How have improvements in adaptive capacity been demonstrated at the regional or national level? How have adaptive strategies been 'scaled up'?'. In the initial project screening, none of the 13 projects were scored as contributing to this indicator. However projects such as 106551 *ARCA* or 106597 *River Plata* could still achieve it, particularly at the regional scale in larger countries, or the national scale in smaller countries. Although we only discussed the community and institutional capacity development for adaptive capacity interventions of OA1.6 *Increased Adaptive Capacity* projects above, our scoring of these 10 projects also relied on their other successful adaptation testing and risk reduction interventions.

Although a few projects engaged at the regional/national level (105515 *Nile Delta*, 105838 *CapaSIDS*, 106551 *ARCA*, 106597 *River Plata*), we did not score them as contributing to OA1.8 *Increased Adaptive Capacity - Multi-scale*. They were either unsuccessful in this engagement (105515 *Nile Delta*, due to the Egyptian revolution; 105838 *CapaSIDS*) or were mainly impacting at lower scales, even if their overall scope was regional (106551 *ARCA* & 106597 *River Plata* – both doing mainly community/city-level research within their regional framing). That said, we assess OA1.8 *Increased Adaptive Capacity - Multi-scale* as logically

sound and valuable as a top-level indicator: inherently difficult to achieve but indicative of strong success if it occurs, for certain types of projects.

3.5 Analysis

While assessing performance against the eight indicators, the evaluation team considered three key questions: whether the number and types of indicators are appropriate; whether CCW coastal programming is balanced under these indicators; and whether there are gaps that CCW should focus on in its next phase.

Figure 3.1 illustrated how the project sample aligns with the eight indicators of OA1. It shows strong alignment between projects and OA1.1 *Assessing Vulnerability*, OA1.3 *Testing Adaptation Strategies*, OA1.5 *Risk Reduction*, and OA1.6 *Increased Adaptive Capacity*. Alignment between projects and OA1.2 *Barriers and* OA1.4 *Water Quality/Availability* was much weaker. Our analysis so far suggests that 1) the eight indicators are not sufficiently different to justify their number; 2) that this project sample is imbalanced against these indicators, and that 3) this project sample has a gap on water and is biased towards climate change as the main entry point.

On the first question, our analyses of OA1.3 *Testing Adaptation Strategies*, OA1.5 *Risk Reduction*, and OA1.6 *Increased Adaptive Capacity* in Sections 3.2 to 3.4 show a significant degree of overlap in the projects and activities discussed. This also applies to OA1.1 *Assessing Vulnerability*, and would probably also apply to OA1.8 *Increased Adaptive Capacity – Multi-scale* if any projects had achieved it. While there are some minor differences, the majority of CCW’s ‘climate-focused’ projects meet all four indicators, and their activities are often difficult to disaggregate into ‘vulnerability assessment’, ‘adaptation testing’, ‘risk reduction’ and ‘adaptive capacity’ components. The main question for CCW to consider is what value it gains from having these four (five, with OA1.8 *Increased Adaptive Capacity – Multi-scale*) different ways of assessing climate-focused projects, when it is clear that most – at least in coastal areas – contain elements that will meet all four? We suggest that these four (five) could be reduced to two or three (e.g. one on vulnerability and risk, another on adaptation options and adaptive capacity across scales) without any significant loss of M&E granularity.

Any effort to rework the indicators should also attempt to make them more directly measurable and attainable, as illustrated in particular by OA1.3 *Testing Adaptation Strategies*, OA1.6 *Increased Adaptive Capacity*, and OA1.8 *Increased Adaptive Capacity – Multi-scale* and as discussed earlier. Likewise, our findings on project success factors appear to consistently reinforce the importance of politically savvy project leaders, who are able to build networks of influence with key stakeholders and leverage relationships between their project and ongoing policy initiatives. We would suggest that CCW consider how that might be addressed in evaluation criteria for selecting fundable projects.

On the second and third questions, we argue that – at least for its coastal programming – CCW has favoured projects with climate change as the main entry point, with a corresponding lack of ‘water-focused’ projects.¹¹ This is evidenced both in the dominance of climate-focused indicators (five of the eight) and in the dominance of climate-focused projects (arguably all 13 are climate-focused). Research at ODI indicates that a key driver of vulnerability of water sector services to future climate impacts is their ‘development deficit’ and vulnerability to existing climate variability (e.g. Calow et al 2011; Oates et al 2014). Projects to support better management of water services under existing climate variability can thus be equally valuable to projects that promote adaptation and resilience to future impacts.

¹¹ We use the terms ‘water’ and ‘water sector’ here to refer both to water, sanitation and hygiene (WASH) initiatives and to initiatives on the broader management of water resources, including water for agriculture, energy and environment (WRM). From a coastal perspective, ‘water-focused’ programming could also distinguish between fresh and marine waters.

CCW could balance its portfolio by commissioning this type of research on best management in coastal WASH and WRM, and by developing additional indicators to measure the success of these projects.

3.6 Summary

The 13 projects align well with indicators around vulnerability assessment, climate change adaptation, risk reduction, and strengthening the adaptive capacity of institutions and organisations. They align less well with indicators of water resources management and water security, reflecting a general concern in these projects on managing risks from extreme events and slow onset SLR.

The focus in these projects on flooding issues – both downstream, and from SLR and storm surges – fits the mandate of CCW. However, other water issues are also in play in coastal areas under conditions of climate change. These include groundwater degradation, access to reliable quality and quantities of potable water, and the maintenance and continued functioning of irrigation and water supply and sanitation. These all represent areas for CCW to strengthen its water themed research, and to address the development needs of vulnerable communities in a more focused manner.

The majority of projects contributing to indicators on testing of adaptation options did not engage in empirical testing or substantive implementation in ways that lend themselves to quantifiable impact. Similarly, most risk reduction projects focused on communicating risk rather than trialling physical risk reduction interventions. In both cases this is likely to be largely due to the scale and cost of adaptations and resilience building measures to SLR and extreme events, particularly where they concern physical infrastructure, which are generally not amenable to community-based investments.

The three indicators used in this assessment should be reviewed for specificity, measurability, and relevance. In particular, performance against these indicators was hard to assess due to ambiguities in indicators OA1.3 *Testing Adaptation Strategies* and OA1.5 *Risk Reduction*, and the costs of investing in or trialling physical adaptation options. The evaluation team also noted that OA1.3 *Testing Adaptation Strategies* is focused on testing adaptation strategies rather than testing strategies for building adaptive capacity. We also recommend that OA1.6 *Building Adaptive Capacity* and CCW's definition of adaptive capacity be reconsidered to reflect institutional and process aspects that, in the view of the evaluation team, better reflect the interventions of CCW-supported research.

4. Key Findings & Conclusions

This section considers the three evaluation questions in turn, and highlights some suggestions for future funding directions by CCW. Rather than reproduce the arguments, evidence, and conclusions from previous sections in their entirety, this section instead highlights the most salient findings of the evaluation. Annex 10 summarises the main conclusions and recommendations

4.1 Contribution towards programme outcomes

The 13 projects considered cover a wide range of geographies, scales, themes, and methodological approaches, and to an extent some of these differences are expressions of the different funding modalities and sources through which they have been supported.

Most projects in this sample start from the perspective that coastal communities are made vulnerable to water excess in terms of both shocks and long-term stresses. The majority of the 13 projects therefore contribute to outcome indicators addressing climate change: OA1.1 *Assessing Vulnerability*, OA1.3 *Testing Adaptation Strategies*, OA1.5 *Risk Reduction*, and OA1.6 *Building Adaptive Capacity*. By contrast, fewer address issues of water resources management, water and sanitation, or waste water treatment, and consequently there is less alignment with outcome indicators OA1.2 *Barriers to WRM* or OA1.4 *Water Quality and Quantity*.

In terms of contribution to climate-relevant indicators for development outcomes, the 13 projects have made significant contributions to vulnerability assessments and the strengthening of institutional capacities for adaptation. Projects have generally focused on theoretical or feasibility testing of adaptation and risk reduction strategies rather than empirical testing. This is most likely due to the scale of interventions in coastal areas, which adaptation and risk reduction often resulting from the construction of large scale infrastructure or from changes in municipal planning regulations. Few projects are able to affect such changes, particularly during their life-cycle, and so instead focus on feasibility assessments and identifying opportunities for decision-makers and others to invest. The evaluation team also notes that CCW can more effectively capture the contributions of these and similar projects to OA1.6 *Building Adaptive Capacity* by reconceptualising adaptive capacity to include process and systems aspects as well as resources and assets.

The focus in this sample of projects on climate issues lends itself to issues of flooding, both from extreme events and long term SLR inundation. However, there are water issues that are particularly relevant to coastal areas under a changing climate. These include issues of groundwater, sanitation and water supply systems, and water quality. Research from ODI and others suggests that development deficits in water services are key drivers of vulnerability, and that the resilience of coastal communities to climate change and extreme events can be strengthened through improvements in water services (e.g. Calow et al 2011; Oates et al 2014). Research investments on these subjects could help CCW more effectively balance the water and climate aspects of its mandate, and to ensure research is focused on the needs of vulnerable communities.

4.2 Contribution to the scientific literature

Scientific publication rates across the project sample were not high and were not evenly distributed between projects, with 8 of 16 publications to date arising from one project. However, several scientific articles have been published in journals with fair impact factors, and several have been cited by other papers.

Publications included methodological, theoretical, empirical and descriptive contributions, with a concentration of publications on political and economic analysis. One cluster of planned and extant publications relates to downscaled assessments of impacts and vulnerability to SLR and extreme events. These are of more specific value, providing more nuanced and ground-truthed perspectives on these issues to the literature for hotspots such as the Nile Delta and the city of Cape Town. Another set of scientific outputs deals with governance and institutional issues related to resilience, adaptation, and risk reduction, including the role of local government, climate information and institutional development, improvements in planning regulations and zoning, and the impact of state interventions such as cash transfer schemes and safety nets. Several of these publications provide novel findings to the literature, and there are opportunities for CCW to further exploit these perspectives both from the 13 projects sampled and in future work.

In general, the publication potential of these projects is underexploited. In particular the work on strengthening governance and institutional dimensions of adaptation and socioecological resilience could be the basis of a CCW synthetical publication, as could work on groundwater vulnerabilities in coastal areas.

4.3 Key results emerging from the research

The evaluation team identified two broad clusters of research in the portfolio, the first focused on disaster risk reduction and socio-ecological resilience, and the second addressing climate change adaptation. Within these broad headings there was considerable diversity in subjects, approaches, research questions, and findings.

Findings from the first cluster explored linkages between local climatological conditions, institutional arrangements and vulnerability, and between ecosystem degradation and vulnerability to climate change and disasters. These projects demonstrate that adaptation requires knowledge of how ecosystems, natural resources, and livelihood systems are affected by climate extremes and slow-onset events. For example, extreme events and climate variability can create uncertainties and stresses for institutions governing natural resources, and the supply chains reliant on them.

These results relate to research findings from the second project cluster, which focused on adaptation to climate change. These projects have made significant contributions in terms of mapping vulnerabilities to physical climate impacts. They have also highlighted the importance of interlinkages between institutions and physical systems in strengthening resilience and adapting to climate change. In particular these projects have confirmed the importance to flood risk reduction of planning regulations and construction control in flood plains and lowlying areas. They have also explored participatory approaches to urban and spatial planning, and noted the potential importance of up- and down- stream supply chains for the sustainability of urban economies under a changing climate.

4.4 Future funding directions

The evaluation team identified a number of strengths in the project sample upon which to build, as well as some gaps that CCW can address. The team also used the opportunity to reflect on the project sample as a whole and consider how it related to emerging issues in the

literature. These observations are offered for discussion by the team and as potential inputs to future framing discussions around CCW's next programming cycle.

In terms of strengths to build on, the evaluation team noted the social sciences perspectives of the project sample. While physical impact modeling is an important part of scientific enquiry related to climate change, it is relatively expensive and also, in a context of climate change, raises issues of uncertainty that are not amenable to resolution in developing countries where data, and knowledge about system dynamics and parameters, is often weak. The evaluation team is not arguing against geospatial assessments and scenario approaches, which they consider to be potentially appropriate and relatively inexpensive. However, we do suggest that social sciences, including institutional and political economy analysis, can provide more useful entry points to work on adaptation, adaptive capacity and resilience that also addresses underlying drivers of vulnerability. In particular they can play a valuable role in generating locally-grounded perspectives to critique the theoretical literature on disaster risk reduction and climate adaptation. Specifically, research examining thresholds and coping capacities of communities as well as learning within governance systems (after extreme events) would make a vital contribution to this literature.

We suggest that CCW consider framing this in terms of an emphasis on “decision-centric”¹² approaches to climate adaptation and resilience rather than “science first” approaches (e.g. Ranger 2013). This framing provides several advantages for research partners in developing countries. In particular it helps development research by helping to address immediate development needs in ways that are climate resilient and reduce risk, and provides a methodological approach to managing deep uncertainty that is more appropriate for making development decisions. These would be particularly powerful when joined with social science research on institutional and governance regimes and how these shape vulnerability in different biophysical contexts as well as potential livelihood adaptations to coastal change.

Despite emphasising here the importance of social sciences, the evaluation team is not implying in any way that natural sciences should be excluded from CCW support. We also endorse CCW's support for multi-disciplinary approaches, which intend to bring together experts and approaches to address real world problems in an integrated fashion. However, researchers find designing, managing and conducting multi-disciplinary work problematic for a number of reasons (see, e.g., Jobbins, 2011, p.5). These challenges may be one cause for the observed weakness in conceptual frameworks in these projects. The evaluation team recommends that CCW consider how to strengthen capacity for multi- and inter-disciplinary research.

A related strength that CCW can build on is in action research approaches that build adaptive capacity in institutions and governance processes for adaptation at the city level or in spatial planning. Projects such as 105515 *Nile Delta* and 105674 *Cape Town* have the potential to make significant advances in specific contexts, and to make important contributions to local and national debates on coastal adaptation as well as produce publications relevant to the literature.

In terms of gaps to address, the evaluation team have noted elsewhere the opportunity for CCW to strengthen its portfolio of work on water issues in coastal areas under a changing climate. Water security can be used as a broad framework under which to organise, but key issues are likely to include access to reliable quality and quantities of water for drinking and

¹² Many IDRC projects begin by consulting with end-users and client groups to identify knowledge needs. However, a “decision-first” approach implies moving beyond this type of consulting to making the decision-maker's perspective the entry point for analysis. For example, in addressing client knowledge needs for maximizing water productivity, a ‘science-first’ project might begin by asking questions about water demand of different crops, how they might be affected by climate change, and then move towards the identification of crops, technologies and techniques which it then encourages farmers to adopt. A ‘decision-first’ approach might start by considering the constraints and tradeoffs small farmers have in managing and using irrigation, what bottlenecks are simplest to resolve, and then move towards identifying adaptation options that are feasible. Many projects may run these processes together and in parallel, but conceptual approaches are usually framed as ‘science first’ as this is a more traditional academic approach.

supplementary irrigation, impacts on groundwater in particular, the climate resilient design and maintenance of irrigation and WASH infrastructure, and research to enhance delivery of both informal and formal WASH services.

The evaluation team also noted a number of emerging issues that CCW is well positioned to address in future research. One area is to build on work done by 106707 *Risk Communication in Vietnam* and others in research on communicating risk, uncertainty and probabilities and how this affects knowledge creation and collective action to reduce risk. Another area is research on how acceptable levels of risk vary between communities and across livelihood activities, and how external/scientific assessments of risk and local ‘indigenous’ perceptions can be brought closer together. A third area is investigation of different livelihood activities that undermine resilience to some hazards and increase resilience to others, to produce a more nuanced understanding of how risk varies in relation to different climate extremes. Finally, rural communities in coastal areas are often highly dependent on marine natural resources, and more research is need to consider the potential for sustainable use of natural resources to buffer the impacts of extreme events and climate change. This line of research would examine different kinds of social and economic organisation and how these balance the trade-offs between extraction and protection.

A final observation, related more to research impact than substance, comes from the evaluation team’s own personal experience, as well as being reflected in interviews conducted during this exercise. This observation is that whether projects are able to achieve development outcomes and influence policy from evidence appears to depend more than anything else on having politically savvy project leaders who are able to build networks of influence with key stakeholders, and leverage relationships between their project and ongoing policy initiatives. The evaluation team would suggest that CCW consider how that might be addressed in evaluation criteria for selecting future projects in ways that go beyond written research-to-policy strategies in project proposals.

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Annexes

Annex 1. Evaluation team biographies

Guy Jobbins is a Research Fellow in the Overseas Development Institute's Water Policy Programme. Guy has fifteen years experience working with governments, NGOs, and researchers in the Arab region and Africa in research, project management, and technical assistance. He has undertaken consultancy and evaluations for major international clients including IFAD, GIZ, and AusAID, and was a Senior Program Officer in IDRC's Climate Change Adaptation in Africa program between 2006 and 2012. His principal research areas are institutional aspects of natural resources in coastal and drylands environments. Guy has a PhD in Public Policy from the University of Birmingham.

Julian Doczi is a Research Officer in the Overseas Development Institute's Water Policy Programme. He is an expert on the links between climate adaptation and water, including both water supply, sanitation and hygiene (WASH) services and water resources management (WRM), and is focused on policy research, project implementation, capacity development, and monitoring, evaluation and learning. He is particularly interested in building resilient WASH services in urban areas in Asia. He holds a M.Sc. in Climate Change and International Development from the University of East Anglia and a B.Sc. in Environmental Sciences from Royal Roads University.

Emily Wilkinson is a Research Fellow in the Overseas Development Institute's Climate and Environment Programme. She attained an MA in Development Studies from the Institute of Social Studies in 2003 and a PhD in Human Geography from UCL in 2011. She is an honorary researcher at the Aon Benfield UCL Hazard Centre and worked as a project researcher at the Colegio de Mexico from 2004-2006, coordinating two evaluations of the national disaster reconstruction fund. Emily's research focuses on institutional and policy dimensions of environmental hazards, in particular local governance, learning, and innovation in disaster risk reduction.

Annex 2. Terms of Reference

Terms of Reference for Evaluating and Synthesizing Research on Adaptation in Coastal Zones

Request for Expressions of Interest

Program Title:	Climate Change and Water (CCW) at the International Development Research Centre (IDRC), Canada
Position	Evaluation Consultants (team of up to 3)
Location	Most work can be done remotely, may include travel, including to Brazil and Ottawa
Timeframe	Part-time for up to 8 months ; Approximate total of 50 days (including travel)
Expected Start Date	August 26, 2013
Application Deadline	August 16, 2013

Background

IDRC's Climate Change and Water program (www.idrc.ca/ccw) aims to support research that improves adaptation to the water-related impacts of climate change at the policy level and in practice. The CCW prospectus acknowledges that populations living in coastal areas, especially in large coastal cities, are particularly vulnerable to the current and expected impacts of climate change, including storm surges and flooding, coastal erosion, groundwater salinization, sea level rise, etc. Among the program's broad portfolio, 23 research projects focus to some extent on the theme of coastal vulnerability. Overall, projects addressing coastal vulnerability represent 12% or \$8.2M of CCW's portfolio.

In year three of its five-year span (2010-2015), CCW is seeking to synthesize the results of research funded on adaptation in coastal zones and to consider how the research findings contribute to the literature on adaptation in coastal areas. CCW also wishes to assess progress toward its program-level outcomes (see Annex 1 for a summary of CCW outcome areas). The Terms of Reference (TOR) for this evaluation will focus on the first outcome: funding relevant research to improve the quality and availability of water for vulnerable communities, reduce risk, and build adaptive capacity.

Purpose and scope of work

Purpose: The primary intended user group of this evaluation is the CCW program team. Consolidating the interim results of research and the extent to which CCW funding has contributed toward improving the quality and availability of water for vulnerable coastal communities, reduced risk, and built adaptive capacity will assist the CCW program in its efforts to assess progress to date and inform future programming decisions.

Scope: The evaluation will consider a purposeful sample of projects supported by CCW during the current programming period. While the projects all address the theme of coastal vulnerability, they were funded through diverse modalities, are geographically distributed across all regions where CCW programs (sub-Saharan Africa, Latin America and the Caribbean, Asia, Middle East and North Africa) and take different approaches to their research.

Although the evaluator(s) will ultimately decide how many projects to sample, a list of 13 relevant projects has been identified for this evaluation using the following criteria:

- Coastal vulnerability theme (at least 30% of the focus of the project)
- Mature project - approved by April 2012
- Significant project value - at least \$300,000
- Not yet the focus of another evaluation

The evaluation will help to answer the following questions:

1. What are key results and challenges emerging from CCW-funded research on coastal vulnerability? What are the enabling and inhibiting factors associated?
2. How do the results of CCW-funded research on coastal vulnerability contribute to the literature on adaptation in coastal zones (including understanding of the water-related impacts of climate change, vulnerability and adaptive capacity in coastal zones)?
3. To what extent does CCW-supported research contribute to the improvement of the quality and availability of water for vulnerable communities, reduce risk and build adaptive capacity,

as outlined under outcome area 1? Outcomes captured could include those that are expected, those not realized and emergent outcomes (see Annex 1).

Funding scope and duration

The evaluation work is expected to be carried out over an eight-month period (August 2013 to March 2014). The study has a budget ceiling of CAD\$45,000 to cover professional fees (including taxes), travel and accommodation expenses, and associated operational expenses (e.g. communications, translation, etc.) during the execution of the evaluation work.

Consultancy roles and responsibilities

Working as a team, the evaluators will:

- Prepare an evaluation workplan for IDRC approval;
- Develop an evaluation design document including detailed methodology, assessment frameworks and data collection instruments for in consultation with CCW and IDRC evaluation staff;
- Gather data from project documents and key informant interviews (with grantees and CCW team members) about research results; progress, challenges and short-comings toward outcome area 1, and other unanticipated research outcomes;
- Use relevant tools to analyze data;
- Provide a synthesis of key results of CCW supported-research on adaptation in coastal zones and assess how the research findings speak to the literature on adaptation in coastal areas;
- Assess the significance and relevance of achievements (expected and unexpected) and challenges related to outcome area 1;
- Present preliminary findings and a draft outline of the report for IDRC feedback;
- Prepare a full draft of the evaluation report for IDRC feedback;
- Submit the completed evaluation report, maximum 30 pages, that responds to the questions outlined in the terms of reference, incorporates feedback obtained on the draft report and includes appendices with details on the methodology, informants, etc.;
- Prepare a maximum 10-pages synthesis highlighting key research findings emerging from projects under review (as opposed to evaluation findings).

Support IDRC will provide to the consultants:

As the primary intended user of the evaluation study findings, assigned CCW staff will:

- Interact closely with the team of evaluation consultants;
- Provide inputs to inform the development of the work plan;
- Provide relevant program-level documents, project documentation, and other documentation to the consultants as need;
- Facilitate contact with relevant grantees, IDRC staff, other donors, and other relevant stakeholders.

See Annex 2 for Terms and Conditions of the contract.

Consultant competencies:

IDRC is seeking the following required and desired competencies for a team of up to three consultants (i.e. the individuals in the team are expected to have complementary skills and expertise):

Required: Experience evaluating research for development projects with grant recipients based in low and middle income countries; Knowledge about basic research processes and experience measuring research outcomes; Understanding of climate change adaptation and adaptation research in low and middle income countries and familiarity with the relevant literature; Knowledge about coastal areas and related environment and development issues; Ability to work with a strong cross-cultural sensibility and awareness; Strong oral and written communicator; Ability to read, write and speak in English, ability to read and understand French and Spanish; Ability to travel (to Brazil, to Ottawa).

CCW requires a credible and independent evaluation. Note that the team members must have no conflict of interest with the evaluation (i.e., have not received funding from the program for the past

two years and have no prospect of receiving funding in the next year; have no stake in the outcome of the evaluation). Evaluators are responsible for declaring any potential conflicts of interest.

Desired: Ability to read, write and speak in English, French, and Spanish; Experience working on, or evaluating an adaptation project in a low or middle income country; Field experience in one or more low or middle income countries; Experience working in a team.

How to apply:

- 1) If you are interested in submitting an expression of interest, please send the below indicated documents (in English or French) by 23:59 EST on August 16, 2013 to the email address: ccw@idrc.ca. Curriculum Vitae of all applicants – maximum 3 people (maximum 3 pages for each CV).
- 2) A letter of interest that outlines a) how the skills, experiences and expertise of the consultant/team will contribute to this evaluation assignment; b) initial ideas on a proposed evaluation approach (to be adapted in discussion with IDRC); c) a statement on potential conflict of interest for each team member (maximum 5 pages).
- 3) Proposed daily fees for the evaluation. Please note that daily fees should include administrative expenses and that the budget will be paid in Canadian dollars.
- 4) Writing sample from a comparable assignment (maximum 5 pages).
- 5) List of references (minimum 3; maximum 5).

Incomplete applications will not be considered.

Please send questions to ccw@idrc.ca by July 26, 2013. Should you be interested in receiving a document that records all inquiries and responses, send an email to the same address. This will be sent out to those who inquired on July 31, 2013.

Method of selection:

IDRC will use the following criteria to select an evaluation consultant/team with whom it will begin to negotiate

the final scope of work for the evaluation:

- a) Project team's skill set matching required and desired skill set (Based on CVs, expression of interest, references, quality of writing sample) (60%)
- b) Preliminary proposed evaluation approach (20%)
- c) Appropriateness of fees relative to budget for study (20%)

Annex 3. Project screening results

	105515	105674	105814	105838	105868	106548	106551	106597	106703	106706	106707	106711	106714
Funding source	CCAA	CCAA /UPE	CCAA	CCAA	CCAA	AARC	AARC	CCW	CCW	CCW	CCW	CCW	CCW
Lead institution	GRI	Uni	Uni	Uni	IGO	Uni	Uni	Think tank	NGO	Uni	GRI	Uni	GRI
Articles ¹³	1	18	4	0	4	2	4	0	2	1	0	6	3
Status	Closed	Closed	Closed	Closed	Closed	Active	Active	Active	Active	Active	Active	Active	Active
Former IDRC grantee?	New	Repeat	Repeat	New	New	Repeat	Repeat	Repeat	Repeat	Repeat	New	New	Repeat
The 8 indicators:													
OA1.1	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.2	Y	N	N	N	Y	N	N	N	Y	N	N	N	N
1.3	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
1.4	N	N	N	N	Y	N	N	N	N	Y	N	N	N
1.5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1.6	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	N	Y	N
1.7	Y	Y	N	N	N	Y	N	Y	N	N	N	N	Y
1.8	N	N	N	N	N	N	N	N	N	N	N	N	N
Clusters:													
DRR-SER	N	N	N	N	Y	N	N	Y	Y	N	Y	Y	Y
CCA	Y	Y	Y	Y	Y	Y	Y	N	N	Y	N	N	N

CCAA = Climate Change Adaptation in Africa Programme

UPE = Urban Poverty and Environment Programme

AARC = African Adaptation Research Centres Initiative

CCW = Climate Change and Water Programme

GRI = Government Research Institute

IGO = Intergovernmental Organisation

Uni = University

¹³ Includes both planned & published

Annex 4. Interviews conducted

Name	Role	Project
IDRC staff		
Mark Redwood	Team Leader & Program Officer	105515 Nile Delta & 106551 ARCA
Charlotte MacAlister	Program Officer	106703 Chilika Lagoon, 106706 Lebanese Groundwater, & 106707 Risk Communication in Vietnam
Marco Rondon	Program Officer	106714 Tumbes Mangroves
Walter Ubal	Program Officer	106597 River Plata, 106711 Amazon Extreme Events
Recipients		
Sergio Rivera	Principal Investigator	106714 Tumbes Mangroves
Sinh Bach Tran	Principal Investigator	106707 Risk Communication in Vietnam
Ritesh Kumar	Principal Investigator	106703 Chilika Lagoon
Mutasem el Fadel*	Principal Investigator	106706 Lebanese Groundwater
Forencia Almansi	Principal Investigator	106597 River Plata

*Written submission

Annex 5. Interview Protocol

Introductory Email

To: Project leader

CC: Heidi Braun, responsible PO

Dear [name],

I am part of a team at the Overseas Development Institute conducting an evaluation of the Climate Change and Water Program (CCW) of Canada's International Development Research Centre. In particular we are looking at IDRC supported research on coastal adaptation to climate change. Your project [project name] [project number] is one of 13 projects included in this analysis. Heidi Braun of the CCW team (copied here) has already notified you about this exercise.

We would like to stress that this is not an evaluation of your project. Rather, the purpose of the exercise is to consider CCW's portfolio of coastal projects collectively, to understand where the program has made valuable contributions, and how it can build on achievements to date. This exercise will not make judgments about your project, and will have no impact on the funding or continuation of your project.

In connection with this exercise, I would appreciate the chance to discuss with you via telephone or Skype the research being conducted by your project team at [time] on [day]. As your project is still active and final reports have not been written, it would be helpful for us to understand your expectations for the project's future. In particular we would like to ask:

- What research findings you anticipate;
- What the broader significance of the research is;
- What development outcomes you anticipate; and
- How you would like to build on this work in the future

The telephone or Skype interview should last for one hour, and will not be recorded. Information or notes from the interview will be used to inform conclusions about the total group of 13 projects rather than to report specifically on your project.

Please confirm your availability at [time] on [day] or suggest an alternative. Please also indicate your preference for Skype or telephone, and send me your contact details.

Many thanks in advance for your time, and I look forward to speaking with you.

Yours sincerely,

[Interviewer name]

Interview Session

Opening Statement

Dear [name], my name is [interviewer name], many thanks indeed for agreeing to speak with me today. As you know, I am part of a team at the Overseas Development Institute conducting an evaluation of coastal adaptation research projects supported by IDRC's Climate Change and Water Program (CCW) Programme. Your project [project name] [project number] is one of 13 projects included in this analysis.

I'd like to stress that we are not evaluating your project. Instead, we are considering the portfolio of 13 projects together, to understand where the program has made valuable contributions, and how it can build on achievements to date. This exercise will not make judgments about your project, and will have no impact on the funding or continuation of your project.

- Do you have any questions about what I've just said?

- I have timetabled one hour for this interview – is that acceptable to you? Is there a time that you need to finish by?
- This conversation will not be recorded, and we will not cite you by name without your express permission.
- Are you happy to proceed?

This interview is designed as a semi-structured conversation, so there are a number of subjects I need to cover in the time we have, but we can have an open discussion. These subjects are:

- What research findings you anticipate;
- What the broader significance of the research is;
- What development outcomes you anticipate; and
- How you would like to build on this work in the future.

So now I will begin by asking:

Interview Questions

1. What research results do you expect from this project?
 - a. Probe: what early results have you already seen?
2. What tangible development outcomes do you expect to see resulting from this project?
 - a. Probe: what challenges have already been overcome towards achieving these outcomes?
3. What do you think have been the success factors in this project?
4. As a result of your experience in this project, what do you think should be future research priorities
 - a. For your team
 - b. For the Climate Change and Water Programme
5. What added value have IDRC brought to your research?
 - a. What can they do to help you more?
6. Do you have any final comments or feedback that you would like to share?

Annex 6. Overview of publications from the project sample

Publication types	Books: 2 Book chapters: 7 Journal articles: 21 Conference proceedings: 1
Contribution type	Methodological: 5 Theoretical: 8 Empirical: 8 Descriptive: 6
Main themes	Sea-level rise / coastal risk analyses (non-political/economic): 5 Flood risk analyses (non-political/economic): 4 Climate change and health: 2 Groundwater quality: 1 General climate risk/resilience: 6 Political-economic analyses (any topic – mainly floods or SLR): 10

Note: Totals in the table do not correspond to the totals in the text, as several of the planned publications were not fully described in the project documentation

Annex 7. Scientific publications

List accurate as of February 2014

Publication name	Form	Type	Themes	Actually Published	Cites
105674					
Cartwright, A., Parnell, S., Oelofse, G. and Ward, S. (eds) (2013) <i>Climate Change at the City Scale: Impacts, Mitigation and Adaptation in Cape Town</i> . London: Earthscan.	Book			Y	6
Brundrit, G. and Cartwright, A. (2012) Understanding the risks to Cape Town of inundation from the sea. In Cartwright et al. (eds) <i>Climate Change at the City Scale: Impacts, Mitigation and Adaptation in Cape Town</i> . London: Earthscan.	Book chapter	Empirical	Sea-level rise / coastal inundation for Cape Town	Y	0
Brundrit, G., Cartwright, A., Dekker, G., Fairhurst, L. and Oelofse, G. (2011) Sea level rise for Cape Town: impacts and adaptation. <i>SAEON</i> . Johannesburg: Jacana.	Book chapter			N	
Cartwright, A., Cohen, B. and Liddel, D. (2012) Supporting city-scale decisions in the context of climate change. In Cartwright et al. (eds) <i>Climate Change at the City Scale: Impacts, Mitigation and Adaptation in Cape Town</i> . London: Earthscan..	Book chapter	Methodological	Methods & recommendations for resilient city-level decisions	Y	0
Colenbrander, D., Sutherland, C, Oelofse, G., Gold, H., Tsosobe, S. and Cartwright, A. (2012) Reducing the pathology of risk: developing an integrated municipal coastal protection zone for the City of Cape Town. In Cartwright et al. (eds) <i>Climate Change at the City Scale: Impacts, Mitigation and Adaptation in Cape Town</i> . London: Earthscan.	Book chapter	Descriptive	Case studies on coastal risk mgmt & sea-level rise	Y	0
Tadross, M., Taylor, A. and Johnston, P. (2012) Understanding Cape Town's climate. In Cartwright et al. (eds) <i>Climate change at the City Scale: Impacts, mitigation and adaptation in Cape Town</i> . London: Earthscan.	Book chapter	Descriptive	Overview of Cape Town climate & future CC	Y	0
Colenbrander, D., Cartwright, A., and Taylor, A. (2013) Drawing a line in the sand: managing coastal flooding risks in the City of Cape Town. Submitted to <i>South African Geographical Journal</i> .	Journal article	Descriptive	Cape Town coastal set-back line case study	N	
Drivdal, L. Practises of civic organization in a fragmented institutional context: a case study of the formation and demise of a civic organization in Philippi, Cape Town. In Brown-Luthango (ed) <i>Local development in poor, marginalised areas in cities of the South – A comment on state-society synergy in Philippi, Cape Town</i> . Forthcoming.	Book chapter	Theoretical	Civic organisational practices & social capital case study	N	

Drivdal, L., Burie, C., Kinnes, I., and Timm, S. Urban agency and the presentation of self: insight from comparative ethnographies in Cape Town. <i>Writing Field Notes in the Streets: Ethnographic Reflections on Conducting Fieldwork in Contemporary Urban Africa</i> . Forthcoming	Book chapter	Theoretical	Urban agency & comparative ethnography	N	
Ziervogel, G., Waddell, J., Smit, W. and Taylor, A. Governing flood risk in Cape Town, South Africa: barriers and opportunities for collaborative urban risk management. Submitted to <i>South African Geographical Journal</i> .	Journal article	Theoretical	Flood risk mgmt & governance, collaborative governance in the City of Cape Town	N	
Smit, W. and Ziervogel, G. Exploring theoretical lenses for understanding urban flooding. Submitted to <i>Natural Hazards</i> .	Journal article	Theoretical	Conceptual framework for urban flooding, applied to Cape Town	N	
Musungu, K., Motala, S. and Smit, J. (2012): Using multi-criteria evaluation and GIS for flood risk analysis in informal settlements of Cape Town: the case of Graveyard Pond, <i>South African Journal of Geomatics</i> , Volume 1, Number 1, pp 77-91.	Journal article	Methodological / Empirical	Develops & applies MCE & GIS for flood risk analysis in slums in Cape Town	Y	7
Musungu, K., Motala, S. and Smit, J. (2012): GIS data collection for flood risk management, <i>PositionIT</i> , April/May 2012, pp 66-72.	Journal article	Methodological / Empirical	Develops & applies GIS for flood risk analysis in slums in Cape Town	Y	0
Musungu, K., Smit, J. and Drivdal, L.: Collecting flooding and vulnerability information in informal settlements: the governance of knowledge production. Submitted to <i>South African Geographical Journal</i> .	Journal article	Theoretical	Nodal governance assessment for flood-prone slums in Cape Town	N	
Drivdal, L. Flooding in Cape Town's informal settlements: Collaborative capacity and the conditions for settlements to move towards adaptation. To be submitted to <i>South African Geographical Journal</i> .	Journal article	Empirical	Compares the micro-political dynamics of 3 flood-prone slums in Cape Town	N	
Drivdal, L. and Lawhon, M. Plural regulation in spheres of informality: shebeens in Cape Town. Submitted to <i>South African Geographical Journal</i> .	Journal article	Empirical / theoretical	Assesses shebeens & alcohol via a plural perspective & via slum case study	N	
Machiridza, R. and Smit, W. The impact of flooding of informal settlements on child health: a case study from Cape Town. To be submitted to a suitable academic journal.	Journal article	Empirical	Survey of flood impacts on child health in 1 slum case study	N	

Musungu, K., Motala, S. and Smit, J. (2011): A participatory approach to data collection for GIS for flood risk management in informal settlements of Cape Town, <i>Proceedings of AfricaGEO 2011, Cape Town, South Africa, 31 May – 02 June 2011</i> , ISBN: 978-0-620-48428-2 (Peer reviewed paper).	Journal article	Methodological / Empirical	Develops & applies GIS for flood risk analysis in slums in Cape Town	Y	0
105515					
Elshinnawy, I.A., Abdrabo, M.A. and Farouk, A. (eds) Abu-Zeid, A.B.I. et al., 2012. <i>Sea level rise in the Nile Delta: impacts, vulnerability and adaptation: case studies and lessons learned from Ras el Bar - Gamasa areas</i> . Coastal Research Institute / Institute of Graduate Studies and Research / Center for Development Services, Cairo and Alexandria.	Book	Descriptive, empirical, methodological	SLR in the Nile Delta	Y	0
105814					
Perception, experience and indigenous knowledge of CC and variability: the case of Accra, a sub-Saharan African city. <i>Regional Environmental Change</i> . Codjoe, S.N.A., Owusu, G., and Burkett, V. 2013.	Journal article	Descriptive	Summary of project results, focusing on local perceptions & experiences	Y	0
105868					
Cartwright, A. (2012). <i>Climate Change Adaptation: The Concept of Climate Risk</i> . (Annex 36)	Journal article	Theoretical	Climate risk	N	
Tadross, M. And P Johnston. (2012). <i>Using Climate Projections for Assessing Impacts at the City Scale</i>	Journal article	Empirical	GCM downscaling with Cape Town weather data at city scale	N	
Laros, M. (2012). <i>Planning for Climate Resilience at the local level: A Tale of 5 African Cities</i> (Annex 42)	Journal article	Descriptive	Lessons learned on PAR / resilience from the project	N	
Fairhurst, L., Rowswell, P. and Chihumbiri, F. <i>Resilient Cities 2011. Participatory Action Adaptation: Tools for increasing climate change capacity and preparedness at the local government level. Resilient Cities 2: Cities and Adaptation to Climate Change – Proceedings of the Global Forum 2011, Vol 2. Springer. (Annex 50)</i>	Conference Proceedings			Y	0
106551					
M.A. Hasaan & M. A. Abdrabo - <i>Vulnerability of the Nile Delta coastal areas to inundation by SLR - Environmental Monitoring & Assessment journal</i>	Journal article	Empirical	Coastal vulnerability to SLR	Y	1
Economic valuation of impacts of SLR on agricultural sector: Damietta governorate coastal area, Egypt ; M.A. Abdrabo and M.A. Hasaan	Journal article	Empirical	Economics of SLR on agriculture	N	

Climate change and epidemiology of human parasitosis in Egypt - Journal of Advanced Research http://www.sciencedirect.com/science/article/pii/S209012321300088X , Wael M. Lotfy	Journal article	Theoretical	CC & health (parasitology)	Y	0
GIS-based risk assessment for the Nile Delta Coastal Zone under different SLR scenarios case study: Kafr el Sheikh governorate, Egypt; M.A. Hasaan; Journal of Coastal Conservation: Planning & Management, http://link.springer.com/article/10.1007%2Fs11852-013-0273-0	Journal article	Empirical	Modelling SLR and its inundation implications	Y	0
106706					
GIS-based assessment for the development of a groundwater quality index towards sustainable aquifer management - Journal of Environmental Management	Journal article	Methodological	Groundwater quality index development	N	
106711					
Resilience through local management systems in the Amazon floodplain and estuary: local agency and the role of the state. F. de Castro and O. Almeida.	Journal article	Theoretical	Local agency / political interactions with estuary resilience	N	
Mosaic production landscapes in the Amazon estuary: smallholder land use, market flexibility and forest transition from WWII to present. N.D. Vogt, M. Pinedo-Vasquez, E.S. Brondizio, O. Almeida, S. Riveiro. (ITR1 - 'will be submitted to a journal soon', but a copy was not included in the ITR)	Journal article			N	

Annex 8. CCW Outcome Area 1

Outcome area	Baseline ¹⁴	Minimum outcomes	Medium outcomes	High outcomes
<p>1. Research</p> <p>Fund relevant research to improve the quality and availability of water for vulnerable communities, reduce risk, and build adaptive capacity</p>	<p>Research on climate change and water is disparate and largely driven by institutions in the North. Some good work in the South is starting to emerge particularly in Asia. Much research does not positively impact communities.</p>	<p>A group of research projects supported by CCW are able to improve the quality and availability of water for the poor, reduce risk and/or affect change in policy in the face of climate change. Strategies to build adaptive capacity to such change are tested and understood. Bottlenecks to the uptake of existing technical and managerial options are identified.</p>	<p>Partners are able to secure other sources of funding for their research. Research projects are growing in prominence and more people are positively affected by the applied work. A measurable change in adaptive capacity is noted in several communities or institutions.</p>	<p>Improvements in adaptive capacity to climate change and a reduction in vulnerability to water stress at multiple scales, from small communities to larger sub-regions affecting a large population, are documented.</p>

¹⁴ As assessed in February 2010 when the CCW program prospectus was developed for approval by the IDRC Board of Governors.

Annex 9. Evaluation recommendations

This list has been compiled from recommendations and suggestions for CCW found in the report text. It is not exclusive, and is not a substitute for the broader evaluation findings, which remain an important context for these recommendations.

The evaluation team recommends that CCW:

Research Focus

- develop more work in the water thematic, and particularly research aimed at reducing vulnerabilities to climate risks through improving water security and access to water and WASH services;
- continue to support research into non-infrastructure adaptation and risk reduction, including soft/ecosystem coastal defences and governance measures such as building control, to reduce vulnerabilities arising from demographic pressures and coastal urbanization;

Project selection and design

- work with recipients to strengthen conceptual frameworks in future projects.
- emphasise conceptual approaches and research designs that focus on decision-making under conditions of deep uncertainty;
- strengthen the social science aspects of future projects, particularly in using locally-grounded perspectives to critique the theoretical literature on disaster risk reduction and socio-ecological resilience;
- continue to strengthen economic assessment and political economy approaches that can be used to identify feasible adaptations and development interventions for others to invest in;
- consider how the political leadership and social entrepreneurship skills of project leaders might be assessed in project selection criteria;

Support for publications

- undertake a review of each of the projects' key findings in the final year and identify suitable publications channels for each;
- consider developing publications synthesising results from multiple projects;
- specifically, from the sampled projects, a synthesis of research on institutional development in relation to extreme events and long term planning, and the impacts of SLR on groundwater would both be useful contributions;

Monitoring and evaluation

- consider evaluations of project publication citations at appropriate intervals to gauge their impact. For example, an annual exercise tracking citations of project publications from the last five years;
- reduce the number of indicators for Outcome Area 1 oriented to climate change aspects. We suggest that these five could be reduced to two or three (e.g. one on vulnerability and risk, another on adaptation options and adaptive capacity across scales) without any significant loss of M&E granularity;
- review the three indicators analysed in this exercise (OA1.3, OA1.5, & OA1.6) for specificity, measurability, and relevance;
- reword OA1.6 *Increased Adaptive Capacity* to encompass dimensions of institutional and organisational processes, as this is an area to which many CCW projects will contribute.