



Adapting to climate change through the strengthening of asset management practices in Kiribati: Examples from the water sector

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ABSTRACT

Kiribati is representative of a Pacific Island nation, which is both a Small Island Developing State and Least Developing Country with very real climate change challenges and weaknesses in asset management. Climate change adaptation and infrastructure development in this nation are already intricately linked. Despite this, Kiribati is still heavily hampered with the build neglect paradigm which impacts on both development and adaptation efforts. Furthermore, the parallels between climate change adaptation programmes or projects and infrastructure development has become increasingly hazy and given rise to a growing dependency on external funding. This paper aims to understand the role of asset management in this ongoing paradigm. Consideration is given on how asset management practices could be strengthened for effective adaptation to climate change in Kiribati, with specific examples from the water sector. Further understanding of how asset management works in this context is important including more support for its ongoing implementation and sustainable funding. The methodology employed for this research include, literature review, document analysis and interview with the Government of Kiribati Ministry staff.

Keywords: *climate change adaptation, asset management in small islands, infrastructure development, sustainability of funding, dependency on external funding.*

INTRODUCTION

As a low-lying atoll nation, Kiribati is also confronted with the build neglect rebuild paradigm (BNR) which constrains progress on core development, aid effectiveness and climate change adaptation (CCA). Climate change compounds and complicates the BNR challenge, in view of “assessment, response, disaggregated knowledge and the uncertain and dynamic nature of responsibility” (Schenk et al. 2016). Since the perils of climate change are unavoidable, adaptation to these impacts has become the focus of infrastructure planning strategies, including infrastructure asset management

with emphasis on infrastructure availability during an extreme climate event and on effects from prolonged exposure to long-term climate changes (Bhamidipati, Van der Lei, and Herder 2016). Integration of infrastructure management with CCA requires sophisticated decision-making, given the uncertainty of future climate effects at the regional and national levels.

CCA interventions are already intricately linked with infrastructure development projects, in Kiribati. However, there is still a need to strengthen asset management (AM) practices to support CCA. Current discourse on the implementation of AM alongside CCA in the context of Small Island Developing States (SIDS) and Least Developing Countries (LDC) is limited. There is also a shortage of literature on AM and a lack of clarity on how AM can be applied in atoll nations like Kiribati.

To meet the goal of this paper the following objectives are established:

- 1) Overview of climate change adaptation in Kiribati,
- 2) Understanding the linkages between infrastructure development and climate change adaptation, and
- 3) Considerations for strengthening AM practices to support CCA in Kiribati.

The outline of the paper includes introduction, methodology, results & discussion and conclusion.

METHODS

Qualitative methods (literature review, document analysis and coding Nvivo software) were used for this paper. The policy documents were analysed in accordance with the objectives established and then coded using NVivo software. A qualitative survey was also conducted on 30 interviewees across 10 Ministries pertaining to their view on the importance of AM for CCA.

Literature Review

Climate change adaptation (infrastructure) programmes in Kiribati

Adaptation includes both preventive measures, i.e. investment in infrastructure, and remedial measures, i.e. post-disaster relief and reconstruction (Catalano, Forni, and Pezzolla 2020). In Kiribati, CCA is referred to as “making changes to reduce the vulnerability of a community, society or system to the adverse effects of climate change or make the most of potential positive effects” (Taloiburi et al. 2019). Regarding CCA strategies, the previous administration of the Government of Kiribati (2004-2015) had focused on ‘migration with dignity’. Under this policy, adaptation programmes include, inter alia, seasonal worker programmes, upgrading of local institutions like the Kiribati Institute of Technology to deliver Australian recognized qualifications in trades such as plumbing, purchasing land in Fiji and, international advocacy on the plight of the Kiribati people due to climate change (Office of Te Beretitenti 2018). In contrast, the current administration is focused on achieving sustainable development alongside CCA as evidenced by the “wealthier, healthier and peaceful country” slogan of the Kiribati Vision 20 (Government of Kiribati 2018). Part of this programme include improving connectivity and accessibility to infrastructure through development projects that are funded or co-funded through adaptation funds. These include:

- Reconstruction of South Tarawa’s main road and some feeder and urban roads, funded by the World Bank, Australia and the Asian Development Bank (ADB), with an estimated cost of A\$68 million.

- The Kiribati Aviation Investment Project provide upgrades to the runways and airport facilities on Tarawa and Kiritimati islands and reform airport management, funded by the World Bank, New Zealand and Taiwan.
- The South Tarawa Water Project for the installation of desalination plants to complement the existing water supply network, with an approximate total funding of A\$68 million, around 37% of funds sourced from the Green Climate Funds (GHD 2017).

• Documents analysed	Acronym	Year(s)	Type of document
Kiribati Vision for 20 years	KV20	2016-2036	National Policy
Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management	KJIP	2014-2034	National Policy
Climate Change Policy	CCP	2018	National Policy
National Disaster Risk Management Plan	NDRMP	2012	National Policy
Kiribati Development Cooperation Policy	KDCP	2015	Sector Policy
National Water Resources Policy and Implementation Plan	NWRP	2008	Sector Policy
Kiribati Climate Change and Disaster Risk Finance Assessment Draft Report		2019	National report
Kiribati Development Plan	KDP	2016-2019	National Development Plan
Kiribati Voluntary National Review and Kiribati Development Plan Mid-Term Review		2018	National Report
Ministry Strategic Plan for the Ministry of Infrastructure and Sustainable Energy [MISE]	MSP	2016-2019	Ministry Strategy
Kiribati Government Budget – Investing in Inclusive Development		2019	National Budget

Table 1: List of documents analysed

Developing infrastructure has been part of early and ongoing adaptation efforts in Kiribati as evidenced from the examples above. Most of the above projects have already commenced under the previous administration, some of them as continuity or expansion from earlier projects. Another observation from these examples is that Kiribati, is heavily reliant on its development partners' support in order to adapt to climate change, particularly in relation to the development of critical infrastructures such as transport, water, power, and coastal protection (Taloiburi et al. 2019; Government of Kiribati 2018b). This means that adaptation efforts have fit within the mainstreamed development that it is not easy to distinguish between adaptation-specific activities and “normal” development (Wuebbles 2013). For example, during the period 2011-2018, Kiribati accessed about US\$54.9 million from multi-lateral

climate finds for Climate Change Disaster Risk Management Activities. The top beneficiary sectors are water and sanitation (40%), energy (19%) and transport infrastructure (12%) (Taloiburi et al. 2019). Thus, it can be argued that the advent of climate change not only compounded on the ongoing BNR problem (Alejandrino-Yap et al. 2013) but also create aid dependency at the same time. This 'AIDdiction' disguised as 'climate adaptation' produced a powerful climate-development-finance nexus (Mallin 2018), where, in Kiribati, most of the climate donor financed adaptation projects are focused on the critical infrastructures.

Document analysis

Understanding the relationship between infrastructure development and climate change adaptation in Kiribati

Document analysis was conducted as outlined in Table 1. CCA, disaster risk management (DRM) and resilient infrastructure are recurring themes throughout the documents reviewed (Government of Kiribati, 2018a; 2018b; 2014; 2012; 2004). Most of the proposed activities considered as CCA and DRM listed are related to infrastructure development, particularly the critical infrastructures. For example, the Kiribati Vision for 20 years (KV20), emphasises robust coastal seawall and cost savings from photovoltaic systems as a strategy to decrease reliance on imported fuel, whereas the Kiribati Climate Change Policy and National Disaster Risk Management Plan both mention innovative energy technologies, protection of coastal areas and efficient rainwater harvesting systems as contributing to overall climate change and DRM for resilient infrastructure. (Government of Kiribati 2018b; 2012). In addition, coastal protection and/or improvement of coastal infrastructure construction and maintenance, implementation of Energy Roadmaps and expansion of renewable energy including the promotion of groundwater and rainwater harvesting systems, generally fall under CCA activities in any climate change-related policies (Ministry of Infrastructure and Sustainable Energy 2017; Government of Kiribati 2016). These observations suggest that Kiribati recognizes the disruptive effect of climate change on economic development, and similarly understood that resilient infrastructure is an essential fabric of CCA and DRM.

Moreover, it is emphasised that the Government of Kiribati (GoK) consider it prudent that CCA and DRM are addressed in a systematic and integrated manner (Taloiburi et al. 2019: Government of Kiribati 2004, 2012, 2014, 2018a, 2018b; Ministry of Finance and Economic Development 2019). This is done through ensuring the inclusion into such plans, CC and DRM elements vital for the survival of the Kiribati people. Activities outlined in all the three policy documents above, (KJIP, NDRMP, and KCCP) are integrated into the annual strategic, business and budget planning processes at organisational and individual-officer level (Government of Kiribati 2012), including strategies that govern the management of infrastructure. Figure 1 shows the linkages of policies for CCA and DRM to national frameworks.

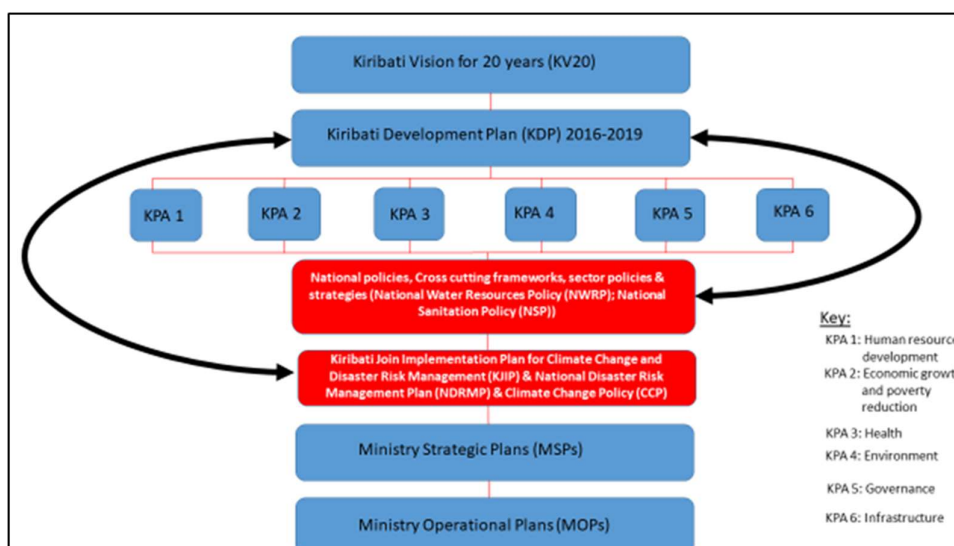


Figure 1: Linkages of the KJIP & NDRMP to national frameworks (Adapted from Government of Kiribati:2016; 2015; 2014)

Funding and implementation of activities outlined in the policies are ensured if these are linked to the Kiribati Development Plans (KDP), down to Ministry Strategic Plans (MSP) and Ministry Operational Plans (MOP). However, due to obvious financial limitations, not all the activities in the policies can be implemented, and some require longer term financial commitments. The KDP, MSP and MOP are typically four-year plans, so funding is only assured for that period. Unfunded activities are carried out for the next four-year funding cycle or promoted for aid funding. There is limited progress in connecting policy and planning to resource distribution because budgets are structured along administrative lines and not programmatic lines (Taloiburi et al. 2019).

Interviews for considerations for more support for AM practices

Can asset management become an effective adaptation strategy?

Various authors stressed the importance of mainstreaming adaptation into existing infrastructure policy domains and associated institutions, to facilitate interactions across institutional divides, as opposed to infrastructure and climate policies existing in silos (Schenk et al. 2016; Gibbs 2015). However, the uncertainties of climate change make it more challenging for asset managers to make investment plans, to determine optimal adaptation strategies on civil infrastructures (Mondoro, Frangopol, and Liu 2018; Bhamidipati 2015) and to incorporate climate change into infrastructure planning and decision-making (Schenk et al. 2016). The limitations in effectively integrating climate change into infrastructure planning and decision-making results from uncertainty in climate models, and a lack of technical understanding around best adaptation strategies (Schenk et al. 2016). This creates potentially costly inconsistencies, sends mixed signals to investors, and heightens the risk of short-sighted infrastructure decisions (Gallego-Lopez and Essex 2016).

On the other hand, adopting preventive maintenance would better enhance CCA efforts. According to Gibbs (2015), early preventive actions will be the most effective adaptation strategy in the long run and asset managers should be at the forefront of business continuity planning and disaster management process to ensure climate-related disasters on public assets are minimised (Warren 2010).

Furthermore, as part of another research, 30 participants across different Ministries in Kiribati were asked on the importance of asset management to CCA. Most of the participants agree that asset management plays an important role in CCA or is an important CCA strategy. The examples below are taken from 4 participants which can be named participant 1,2,3 & 4). One of the important messages from this collective response is that the sustainability of ongoing operations of critical assets particularly during an emergency or climate change-related scenarios e.g. flooding or droughts is a significant factor in ensuring the success of adaptation efforts. For example, according to Participant 1, “prioritization of critical galleries on the main water reserve...and better efficient maintenance strategies to counter the impact of climate change...” are the way in which asset management could improve climate adaptation responses. In fact, according to Gibbs (2015), the assessment of assets and infrastructure in light of climate change should include prioritisation of adaptation actions according to the risk of service levels of appropriate scale, as opposed to vulnerability or consequence of climate change to individual assets in isolation.

Other notable statements from the interviews include:

- Asset management should be a critical part of managing the water infrastructure so that the integrity of the system is continuous, even during an emergency. Asset management plays an important role – it makes our infrastructure withstand the effect of climate change.
- Climate Change component is an integral part of major infrastructure projects. And vice versa, maintenance that is done in a timely manner contributes to better CCA.
- Extreme weather events are becoming frequent e.g. in the period of 2018 -2019 especially during the months of Jan-March, we experience a lot of climate change-related requests to repair public, community and private infrastructure. Asset management is extremely important to adaptation. For example, the road will need to be climate resilient given that climate outlook is more rainfall so the design should consider good drainage, which is not really what we see now.

Sustainable financing

The policy documents analysed show that the principal donors for CCA and DRM in Kiribati include ADB, World Bank, EU, New Zealand, Australia, UNDP, Japan, United States and Germany. Other donors include the Taiwan Government which allocated AUS\$1 million of its bilateral assistance for disaster response on an annual basis; most of it is used for coastal protection (Office of Te Beretitenti 2018). Development partners including Australia, New Zealand, Japan, ADB, World Bank contributed significant funds for infrastructure since Kiribati could not possibly fund all its development needs from domestic revenue sources (Government of Kiribati 2018b). In 2017, Government allocated over AUD\$4m to the Ministry of Infrastructure and Sustainable Energy, which manages infrastructure in Kiribati while development partners contributed more than AUD\$138m to support infrastructure (Ministry of Finance and Economic Development, 2017a; 2017b). This trend is similar for subsequent years highlighting that commitment from Government for infrastructure development often fall short of what is required/committed by development partners. These observations also emphasise that it is politically easy to depend on donor funds for new infrastructure, where compared to the construction of new assets, maintenance has weak political support (Giglio, Friar, and Crittenden 2018).

Furthermore, the discussion with interviewees, regarding the sustainability of funding for infrastructure programmes give some of the following notable issues:

- Funding or financing is a critical factor. During normal times, maintenance funds are enough but during emergency, they are depleted quickly.
- Scheduled maintenance is a must, but it is always constrained with a limited budget.
- Maintenance fund is not based on studied criteria creating a very reactive situation. Longer-term financial Planning for infrastructure is problematic.
- More understanding and clarity of the financial system and its impacts on how infrastructure programmes operate; there is an observation that these two operate in silos.
- Budget allocations are transferrable – Leadership can determine that budgets originally intended for maintenance and operations for infrastructure programmes can be used elsewhere.

The above observations mostly agree with issues outlined in the policy documents analysed. For example, severe infrastructure deficits for utilities, transport and communications remain and the high cost of service delivery (especially in the outer islands), creates additional challenges that are not easily addressed (Taloiburi et al. 2019). There are also sizeable financing gaps in social infrastructure (water and sanitation), especially as the existing infrastructure comes under increasing pressure from the impacts of climate change. In addition, most of the aspirations outlined in the KV20 are yet to have a funding source identified. This is particularly true for major infrastructure needs which even if provided at only basic levels would exceed national GDP many times over (Government of Kiribati 2018b). These issues are also related to the lack of sustainability of funding for infrastructure programmes and high dependence on development partners for new infrastructure projects.

RESULTS AND DISCUSSION

Measures and efforts to address climate change and disaster risks seem to be well integrated into critical sectors, but they need maintaining and upscaling to improve the resilience of the Kiribati people (Government of Kiribati 2014). Further thematic coding of the policy documents using NVivo show the top coding five nodes as: CCA and DRM, Funding, Resilience and Water Infrastructure. The prominent emphasis on these thematic areas as broad themes of the policies analysed highlights and implies their intricate relationship.

Conversely, while there are significant overlaps in the climate change-related goals of the planning documents at the higher level, there is also significant fragmentation at the indicator level (Government of Kiribati 2018b), when it comes to CCA and implementation. This disparity supports the notion that CCA and DRM are yet to be fully integrated into national, sectoral or thematic strategies and associated government systems and processes (Taloiburi et al. 2019; Government of Kiribati 2018b). Better alignment and linkage are required between policy objectives and funding required to deliver services in support of objectives across all the national policies, strategies and objectives.

Moreover, the absence of an infrastructure policy has constrained infrastructure management in various ways. It is stressed that “any future strategy for the sustainability of Kiribati must involve the mainstreaming of climate change agendas into meeting economic development needs” (Storey and Hunter 2010). At the same time, CC makes it imperative that infrastructure policy formulation be coordinated with CC mitigation and adaptation strategies in support of water infrastructure resilience and sustainability (Gay and Sinha 2015).

Finally, progressive AM implementation should be adopted. In this context, acquisitions or capital works involving constructing new systems and upgrading existing assets to increase the level of service (Public Utilities Board 2017). Accordingly, donors are relied upon for the creation of any major asset; these normally follow on from the Road Maps, National policies and strategic plans, which are in turn integrated within the KDP. Only smaller projects can be possible without funding from donors. This existing 'modus operandi' implies two things. First, the reliance on donors for the creation or upgrading of new assets highlights the importance of the external environment that may influence the current way asset management is done. Second, the integration of AM requires strategic support and more coordination (in this case from those who control decision-making) i.e. Ministers, Secretaries, Chief Executive Officers and Heads of Divisions, apart from Development partners.

CONCLUSIONS

Asset management has an important role in climate change adaptation. The paper discussed the parallels between infrastructure development and climate change adaptation in Kiribati, and the necessity of sustaining funding for infrastructure programmes. Better alignment between climate change adaptation policies with Ministerial Operational plans is needed, particularly in terms of indicators which could be useful for better incorporation of asset management, nationally. Further, the Covid-19 pandemic highlighted the importance of maintaining sustainable infrastructure that can assist with responding to the wider health impacts of pandemics at the local level e.g. water infrastructure for handwashing facilities. While the consensus is that asset management is important for climate change adaptation, its practise is currently ad-hoc, further understanding on how it works in this context and Government financial support towards its sustainable implementation, is required.

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