

Development of National Water Resources Policy and Implementation Plans for the Kiribati Adaptation Program

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The Pacific small island nation of Kiribati has water resource problems amongst the most challenging in the world: rapidly growing population; urbanisation; high infant death rates due to water borne-diseases; limited freshwater supplies; restricted resources and capacity; vulnerability to climate change and variability; seawater intrusion; unclear management and regulatory roles; and limited information on the quantity and quality of water resources. This paper describes the research and the processes involved in the development of the country's first National Water Resources Policy and Implementation Plan. It is argued here that simple translocations of developed-world policy frameworks and "toolkits" to small island nations are unlikely to succeed as they ignore the local biophysical, socio-cultural, governance and resource context. Instead, analysis of past ministerial declarations, government decisions and community consultations as well as the water resource priorities provides a basis for developing policy. Many of the pressing national problems can be addressed through seven key policy objectives: improve understanding and monitoring of water resources and their use; increase access to safe and reliable water supplies and appropriate sanitation; achieve financially, socially and environmentally sustainable water resource management; increase community participation in water management and conservation; improve governance in water and sanitation sectors; provide training opportunities for and mentoring of staff in the sector; and decrease unaccounted for water losses and improve cost recovery.

1. INTRODUCTION

The 1994 Barbados Conference on the Sustainable Development of Small Island States focussed international attention on their fragility and vulnerability which result from their remoteness, small land areas, rapid population growth, restricted capacity, limited resources and sensitivity to climate variability and change, especially sea level rise (Talu *et al*, 1979). Low Gross Domestic Product, limited trading opportunities and increasing urbanisation are straining traditional support mechanisms (Ward, 1999) and customary approaches to hazard reduction in Small Island States.

Many small islands in the Pacific are less than three kilometers wide. The soils of these very small islands are highly permeable so that surface water resources are rare. Groundwater is often the main source of freshwater and usually is found in shallow, thin lenses of freshwater floating over seawater (Underwood *et al*, 1992). Urban and peri-urban low coral atoll communities face water problems that are amongst the most critical in the world (Carpenter *et al*, 2002). Expanding human settlements, increasing demand, agriculture, waste disposal, frequent droughts, extreme climate variability, seawater inundation during storms and sea level rise as well as conflicts between traditional subsistence values and resource rights and the demands of urbanised societies are some of the difficulties faced (White *et al*, 1999, Falkland, 2002). Urban atoll communities rapidly pollute shallow groundwater with human and animal wastes so that water-borne diseases are often endemic and infant death rates due to these diseases are tragically large. To compound problems, only a few Pacific Island Countries have national water policies or water resource plans, so that there are no clear priorities and direction for government ministries and agencies, non-government organisations, aid donors or indeed the community at large. In this paper, we describe the development and adoption of national water resources policy and implementation plans for the Republic of Kiribati.

1.1. Water Resources in the Republic of Kiribati

The low lying 32 atolls (less than 6 m above mean sea level) and one raised island of Kiribati are spread over three million square kilometres of the central Pacific (see **Error! Reference source not found.**). Over 43 percent of its population of 100,000 is crowded into one urban centre, South Tarawa (area 15.8 km²), with population densities over 12,000 people per square kilometre. The remainder of the population is scattered over 167 villages in 22 atolls and islands. Fresh groundwater, the principal source of drinking water in the country, exists as shallow, vulnerable thin veneers of freshwater floating over seawater (Underwood *et al.*, 1992).

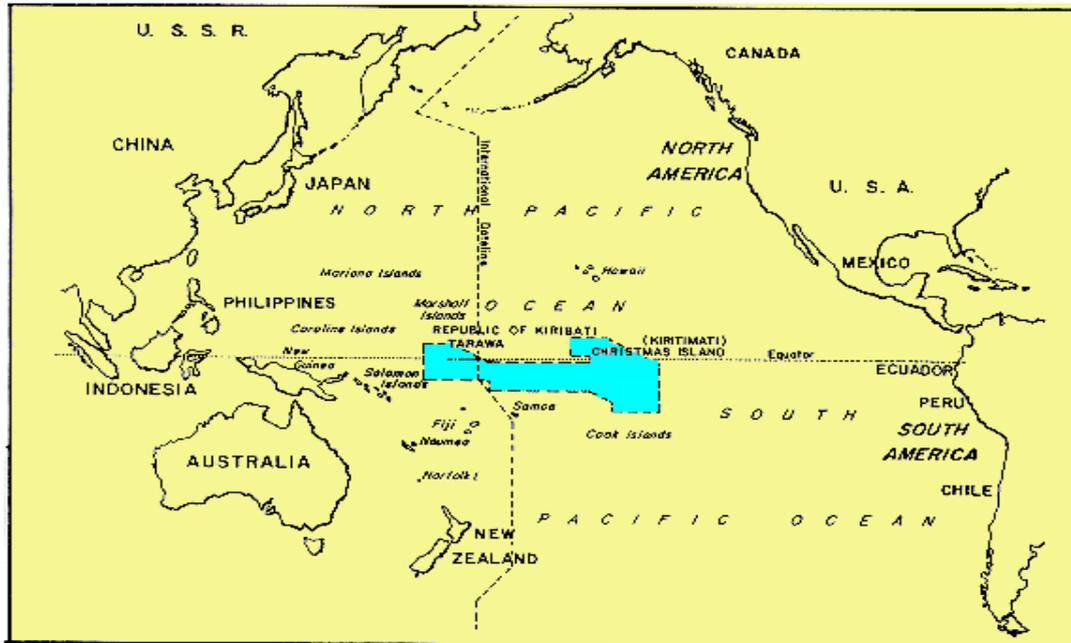


Figure 1 Location of the Republic of Kiribati in the central western Pacific

Kiribati is in the top 10% of most environmentally vulnerable nations in the world (Kaly *et al.*, 2003). The incidences of illnesses and deaths from water-borne diseases are amongst the highest in the Pacific (WHO, 2005) and urban areas have disproportionately higher rates than rural and outer island locations. Mean annual rainfall varies from over 3,100 mm in the Northern Gilberts in western Kiribati, with a coefficient of variation (CV) of only 0.29, to less than 680 mm in the eastern Line Islands, with a CV of 0.91. Rainfalls in low coral atolls in the central Pacific are strongly correlated to variations in central and eastern Pacific sea surface temperatures (SST) (Falkland, 1983, Evans *et al.*, 1998) and El Niño-Southern Oscillation (ENSO) events. Because of this, annual rainfalls have characteristically large coefficients of variation (Falkland & Brunel, 1993; Falkland, 2002). The strong correlation between annual rainfall in the capital, South Tarawa (Figure 1) and the Niño 3.4 region SST anomaly is evident in Figure 2.

Limited land areas in small islands also restrict freshwater quantities and storage options, which are especially vulnerable during frequent severe ENSO-related droughts when stored rainwater is quickly exhausted. In severe droughts, groundwater in narrow atolls can become too saline for consumption or use in crop production, and, in the past, has forced evacuation of islands.

Demand for freshwater in Kiribati is increasing due to population growth and to urbanisation. The predicted demand in urban South Tarawa to 2030 greatly exceeds the sustainable yield of current groundwater sources (Figure 3). Both population expansion and urbanisation impact on water quality because of the limited land area for development. Water use for traditional crops such as coconuts, pandanus and taro often competes with water supplies for communities and fertilisation of crops and raising domestic animals, particularly pigs, contribute to groundwater pollution. Human and financial resources are very limited, with estimated per capita GDP around \$US1,200. The problem of treating equitably both urban and small, numerous and widely spread rural settlements is complex and difficult, particularly because the quantity and quality of groundwater available throughout the islands of Kiribati and sustainable yields are not known except in parts of Tarawa and Kiritimati atolls.

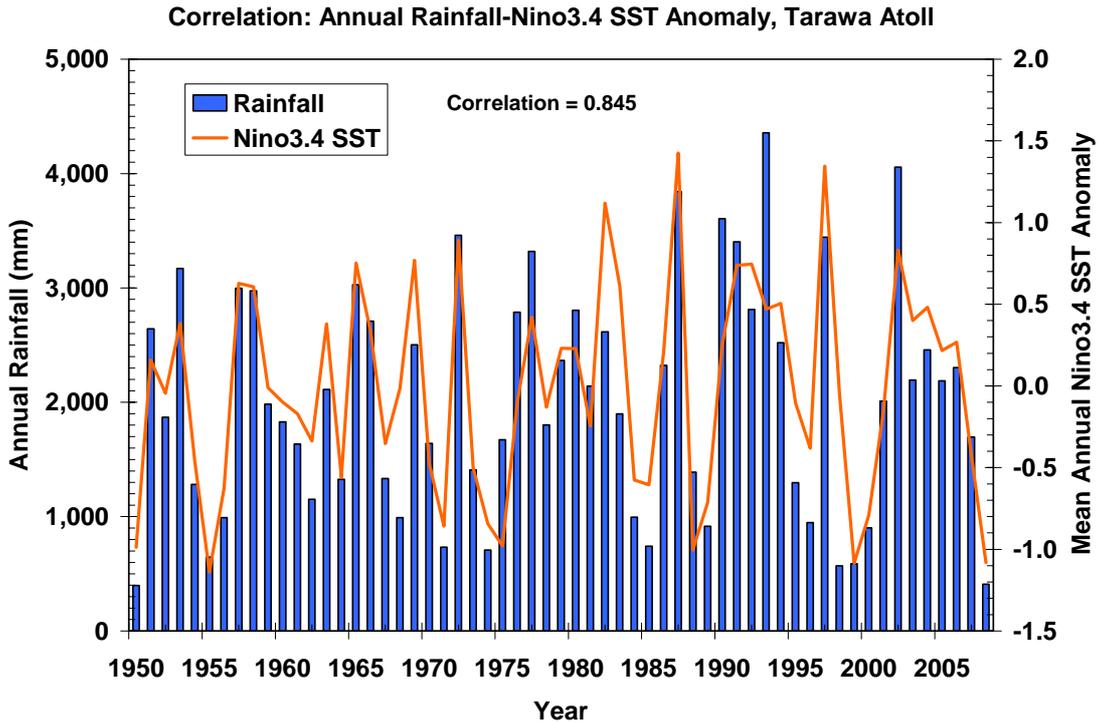


Figure 2 The strong correlation between annual rainfall in Tarawa atoll and the mean annual Niño Region 3.4 SST anomaly (White and Falkland, 2009).

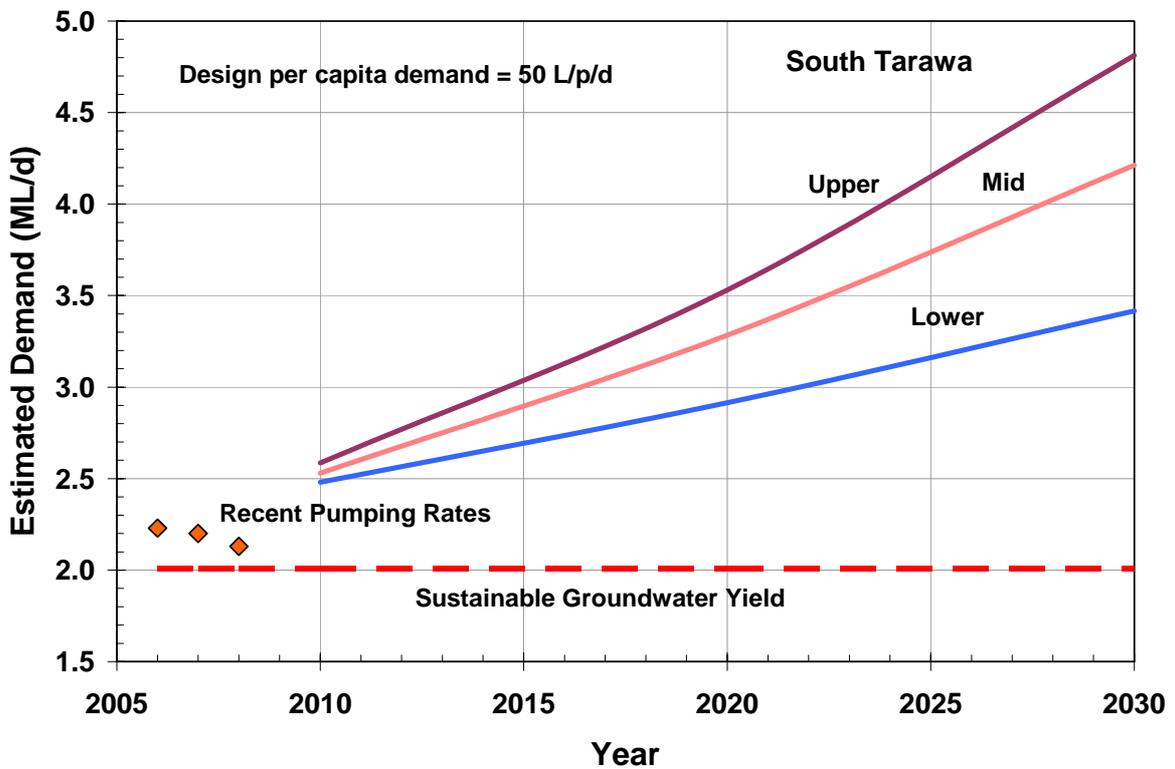


Figure 3 Estimated future demand for freshwater in urban South Tarawa, compared with recent pumping rates and the estimated sustainable yield of current groundwater sources. Three projections of expected population growth have been used together with a design demand of 50 L/person/day.

1.2. Climate Change and Variability

Predicting the impacts of climate change on future water resources across Kiribati is complex. This is because simulations using ocean-atmosphere general circulation models (GCMs) are not presently carried out at sufficiently fine horizontal scale resolution. Their ability to generate climate change scenarios for Small Island States are therefore limited (Ali *et al.* 2001). GCMs used to predict the impacts of greenhouse gas emission scenarios on future climates are not good at simulating changes to the hydrological cycle and are notoriously bad for rainfall predictions, especially in the tropics. There are two basic reasons for this: (i) GCM's generally do not simulate tropical convection very well, and (ii) they cannot reproduce the major modes of current climate variability, including ENSO. (W. Steffen, private communication, 23 February 2009).

Across the Pacific, the increase in average annual temperature has been less than 0.5°C since 1900 and records for 1900 to 1995 reveal no clear general trend in rainfall (Ali *et al.* 2001). The records do, however, show decadal fluctuations of mean annual rainfall linked to fluctuations in ENSO indicators or sea surface temperatures (as in Figure 2). The surrounding oceans, none-the-less, have a strong influence on the climate of Pacific islands. The Pacific Ocean is predicted to warm in the future by 1 to 2°C with a doubling of atmospheric carbon dioxide (CO₂) concentration and mean rainfall intensity in small islands there may increase by about 20-30% across the tropical oceans (Ali *et al.* 2001). This increase, however, may be offset by increases in evapotranspiration, despite an increase in cloudiness. Increased CO₂ levels also increase plant productivity and therefore evapotranspiration. Since GCMs at present can say little about impacts on ENSO events which are key determinants of extreme events in Tarawa (Fairbanks *et al.*, 1997), the impacts of climate change on the climate drivers of groundwater recharge in small Pacific islands are uncertain (Ali *et al.*, 2001).

The impacts on fresh groundwater lenses from projected mean sea level rises and possible changes in recharge have been studied in Tarawa atoll using groundwater models (see e.g. Alam and Falkland, 1997). It was found that sea level rises of up to 1 m would have little impact on freshwater lenses provided that land was not lost at the edges of the island. For Bonriki water reserve, the main groundwater lens supplying South Tarawa, modelling predicted the freshwater zone would increase slightly in thickness and volume as more of the freshwater lens will be within the upper, lower-permeability, Holocene sediments. If, however, land area is lost at the edges of an island as sea levels rise, the island area is reduced (see **Error! Reference source not found.**), decreasing the volumes of freshwater lenses. A World Bank (2000) study found that the combined effect of sea level rise, changes in rainfall, and changes in evapotranspiration due to higher temperatures could result in a 19-38% decline in the thickness of the groundwater lens at Bonriki by 2050. Measurements of groundwater lens salinity profiles during the frequent, ENSO-related severe droughts reveal a 50% (as used above) decrease in thickness of the lens together with increases in the salinity of abstracted water (White and Falkland, 2009).

1.3. Social and Cultural Constraints

There are significant cultural constraints to effective water management in Kiribati. The main social group in Kiribati, before European colonisation, was the *kaianga*, a group of extended families sharing a piece of land. This social organisation remains even today fundamentally important, particularly in rural areas (Talu *et al.*, 1979). The frequency of droughts and the scarcity of freshwater meant that water, traditionally the responsibility of the *kaianga*, was used with care. The notion of village or government-controlled water supply systems is foreign.

Land in all islands except the growth centre of Kiritimati in the east (Figure 1), is privately-owned and the government leases land, particularly water reserves over groundwater source areas. I-Kiribati cannot be considered poor because almost everyone owns or has access to land. Land is the principal form of wealth and carries with it subsistence rights and social, political and legal significance. Land ownership is accompanied by traditional resource rights essential for survival, even in urban areas, including customary ownership of groundwater. Demand management through water pricing for government reticulated water pumped from privately-owned land is counter to traditional practice and is an anathema to almost all I-Kiribati. Water ownership is a highly contentious issue and could explain why draft national water resource legislation, drafted in 1994, which identified the Government of Kiribati (GoK) as the resource owner, has never been tabled or debated in parliament.

Other cultural influences have a direct bearing on water management. At their heart, is the conflict between the demands of a growing, highly urbanised society and the long-established traditions and practices of subsistence communities (Jones, 1997; White *et al.*, 1999).

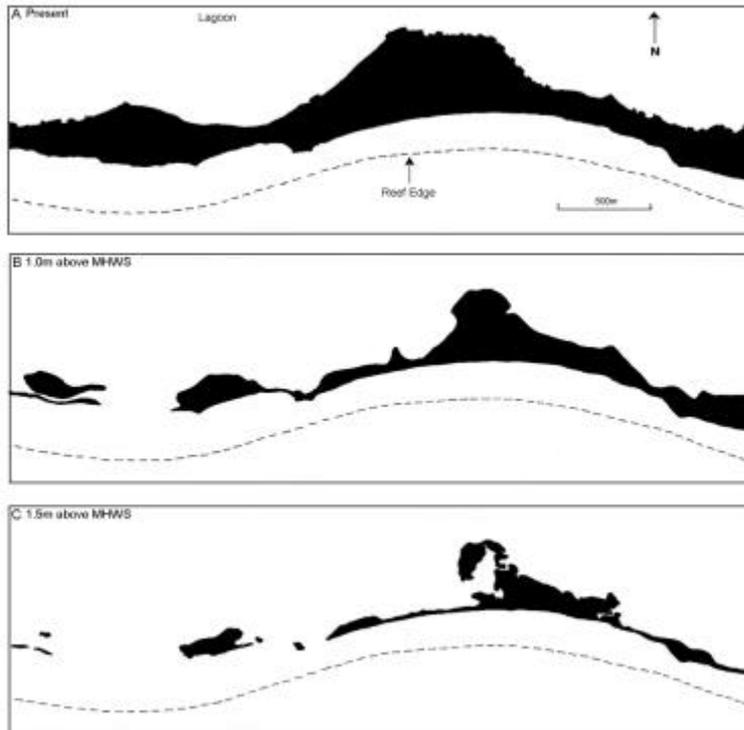


Figure 4 Projected inundation of Bikenibeu island, South Tarawa, under the Worst-Case Emissions Scenario. A: Present status, B: Residual island under a worst case scenario, 2100; C: Residual island under worst case scenario and storm surge, 2100 (World Bank, 2000).

In order to protect fresh groundwater sources for urban water supplies, the Government has declared privately-owned lands overlying groundwater sources to be Water Reserves. This prohibits settlement and allows eviction of existing dwellers from the Reserves, after payment of compensation or land lease rents. Declarations of Water Reserves are highly contentious. Land and water ownership remains a sensitive issue. Affected communities sometimes vandalise water infrastructure such as pumps and pipelines. With the inexorable population growth, encroachment on Reserves continues and has caused abandonment of some Water Reserves in South Tarawa.

Sanitation poses significant problems. In many atolls there is insufficient freshwater for freshwater-flushed sewage systems. The alternatives, pit latrines and septic systems have very high potential to pollute shallow domestic water wells on which communities depend.

Composting toilets are shunned by most I-Kiribati as being culturally inappropriate. Many prefer the traditional method of using the beach, where tides remove waste, or the bush. While adequate for low density rural populations, this increases health risks in higher density urban areas.

Problems in the water and sanitation sector span the responsibilities of many Ministries who, however, tend to operate as independent 'silos', with conflicts over roles and responsibilities, very limited collaboration and minimal sharing of information. In essence, Ministries operate in a manner similar to *kaianga*.

1.4. Critical Water Resource Issues

A review of many past reports revealed a number of critical water resource issues including (White, 2007a):

- The high rate of preventable deaths and illnesses due to water-borne diseases.
- Fragmented control, management and protection of freshwater resources.
- Financially unsustainable water supply systems.
- Groundwater abstraction rates in the urban centres South Tarawa and Kiritimati higher than sustainable yields.
- Growing and sometimes conflicting demands for safe freshwater.
- Contamination of fresh groundwater supplies by settlements and sanitation systems.
- Impacts of climate variability and change on availability and salinity of freshwater.
- Inadequate knowledge and monitoring of the nation's freshwater resources.
- Decrease in the number of trained water and sanitation specialists and technicians.
- Limited use of rainwater harvesting and storage especially on outer islands.
- Constraints on development due to limited water supplies.
- Limited community participation in freshwater management, protection and conservation.

- Limited community understanding of responsible water use and protection.
- Limited water education in schools.
- Difficulties over the declaration of government water reserves on private land.
- Difficulties in providing services to small villages that are highly dispersed across the 22 inhabited islands.
- Inequities in the provision of services to urban and rural communities.
- Lack of clear, unified national policy direction, underpinning legislation and plans.

Most of these issues have long been recognised but attempts to address them have been piecemeal and lacked a coordinating policy framework. Impaired governance has been claimed to be the main obstacle to better and more equitable water sharing and improved water supply and services in many water-stressed countries (Solanes and Jouravlev, 2006). A fundamental assumption in this work is that public policy is an authoritative response by government to public issues or problems that provides leadership, direction, coordination and resources (Bridgman and Davies, 2005).

2. THE EVOLUTION OF NATIONAL POLICY

2.1. Early Attempts at a Whole-of-Government Approach

Following the cholera outbreak in the 1977, the then British Gilbert Islands Administration recognised the need for better coordination of water and sanitation sector. The Public Utilities Board (PUB) was established in July 1977 under the then Ministry of Works and Energy (MWE) to coordinate and manage water supply and sewage disposal in the capital South Tarawa. About the same time, an inter-departmental committee was set up mainly to review the then Australian Development Assistance Bureau's (ADAB) funded Tarawa Sewerage Project which ran from 1978 to 1982 in the densely populated areas of Bikenibeu, Bairiki and Betio. After independence in 1979, an improved reticulated freshwater system was installed in South Tarawa between 1983 and 1987 and upgraded in 1989 that abstracted water from fresh groundwater lenses in the then sparsely populated islands of Bonriki and Buota.

Continuing health, water supply and waste disposal issues in South Tarawa, outer island needs and the recognition of further need for better coordination led the GoK to formalise in 1985 the *Kiribati Water Supply and Sanitation Coordinating Committee* (KWSSCC). It was chaired by the then Ministry of Health, Family Planning and Social Welfare (MHFPSW) with deputy chair from the MWE and secretarial support from MHFPSW. The Committee was to address the critical water and sanitation issues facing the country.

The planned role of the Committee was to monitor water quality in the country, to review and consider future water and sanitation projects before presentation to Cabinet, and to act as an advisory body to Government Ministries and non-Government organisations on water and sanitation related matters. The Committee members were to be senior officers in MHFPSW, the PUB, the Public Works Department of the MWE, the Ministry of Home Affairs and Rural Development, Ministry of Finance and Economic Planning, and a representative of the non-government organisation (NGO) Karikirakean Maaun te I-Kiribati (formerly - Save the Children Federation). In late 1989, the committee prepared a project proposal for the improvement of sanitation in South Tarawa

Unfortunately, KWSSCC soon became defunct. Some of the issues cited for its demise were loss of initial enthusiasm after project initiation; disputes over which Government Ministry should be the lead Ministry, a traditional reluctance to share knowledge, and a lack of clear definitions of responsibilities and terms of reference. Instead project-specific steering committees for water and sanitation aid projects have been formed, but these lack continuity and strategic direction and are driven by the goals of the project rather than national priorities. Government Ministries remained as independent "silos" and major barriers to inter-Departmental collaboration and information sharing persisted.

In 1992, a *Draft National Water Plan* (Shalev, 1992), was developed with assistance from the United Nations Department of Technical Cooperation for Development (UNDTCD, now United Nations Department of Economic and Social Affairs, UNDESA). The Draft Plan was updated, again in draft form in 2000, by the Water Engineering Unit (WEU) of the MWE in collaboration with the PUB. It identified some of the urgent national issues in water management that needed to be addressed. The most important were the need for national policy guidelines in order to develop priorities and to coordinate the water sector. It also pointed out that, in 1992, authority for overall water resources

management had not had been vested in any Government authority and that competence for water resources management and conservation was not identified in any of the then directions assigning Ministerial responsibilities. The draft plan identified critical issues but, in the absence of over-arching policy, did not provide a set of prioritised actions to address them. It remained a draft and was never endorsed by GoK. In 1994, *The Water Resources Management Act of Kiribati* was drafted with UN assistance to complement the draft plan. It has been with the Attorney General's Office since 1994 and has never been tabled or debated in parliament, partly because it vests ownership of water resources with the government.

In 1993, following major diarrhoea outbreaks in children in South Tarawa, GoK requested Australian assistance in upgrading sanitation and water supply systems. The then AIDAB's Pacific Regional Team conducted a field appraisal (AIDAB, 1993) and concluded that the problem in South Tarawa was critical and, for sustainable development, should be addressed comprehensively. It recommended a multi-disciplinary, coordinated, long-term (at least 10 year duration) program with multiple components in community health, education, water supply, sanitation, appropriate technology, institutional strengthening and management all conducted in parallel, rather than individually, with the GoK to develop suitable strategies and policies for addressing the issues. It was estimated that the program would need annual budgets of several million (1990) dollars. This recommendation, acknowledging the necessity of long-term, integrated engagement, was ignored by aid agencies.

2.2. Previous Policy Statements and Directions

The broad definition of policy adopted here is "the collection of government decisions that direct public resources in one direction but not another" (Bridgman and Davis, 2004). There was no clearly enunciated coherent statement or set of statements in Kiribati of national policy on water and sanitation. Instead, there were a collection of National Development Strategies and Plans, presidential and ministerial statements, declarations and Cabinet decisions together with the outcomes of national consultations.

In a statement to the Maneaba ni Maungatabu (Kiribati Parliament), on the opening of its fifth session on October 31, 1994, Te Beretitenti (The President) of the Republic, presented an outline of GoK policy on all areas of its responsibility. Those policies that had direct or indirect implications for the water sector of Kiribati were:

- Strong emphasis is placed on the improvement of living standard of all I-Kiribati.
- Resources and efforts will be directed towards developing subsistence and employment opportunities, and improving living conditions.
- Efforts to reduce population growth will continue.
- The resettlement programme will continue to be developed, new sources of livelihood explored, and basic essential services ensured and expanded.
- Efforts to promote Kiritimati Island as a focus of development will continue.

The Kiribati National Consultation on Sustainable Water Management, conducted as a lead up to the Pacific Regional Consultation on Water in Small Island Countries in 2002, identified the continuing need for adequate supplies of safe drinking water and for better coordination of the water sector. The Regional Consultation culminated in the Sigatoka 2003 Ministerial Declaration of the *Pacific Action Plan on Sustainable Water Management*, endorsed by all Pacific Island Nations Heads of State during the Pacific Island Leaders meeting in Auckland in 2003, and presented at the third World Water Forum. This *Action Plan* (SOPAC and ADB, 2003) called for the development of national instruments including broadly-based national visions, policies, plans, legislation and capable organisations and empowerment of communities appropriate to each island country. It recognised that both behavioural change and long-term collaboration were essential for improvement. Since Kiribati was a signatory of the *Action Plan* this was an important first step in developing national policy and plans.

The conflicting roles of Ministries in the water sector were addressed in *Directions Assigning Ministerial Responsibility* (5 August 2003), which includes "Ministerial Coordination" and "Cabinet Taskforces Chairmanship" in the responsibilities of Office Te Beretitenti (Office of the President, OB). They also specify particular line Ministry responsibilities in water:

- Ministry for Public Works and Utilities (MPWU) – water management; sewerage systems.
- Ministry for Health and Medical Services (MHMS) – health inspectorate services and environmental health.
- Ministry for the Environment, Lands and Agricultural Development (MELAD) – environment and conservation; waste and pollution management.

The Directions clearly identified MPWU as the lead national water resource agency. Despite these Directions, other Ministries still have direct responsibilities in water resources and water supply.

The Kiribati National Development Strategy 2003-2007 included goals relevant to the water sector:

- Raise the quality of life by improving supply and quality of water.
- Ensure sustainable use of water resources.
- Promote community participation for better use of water resources.
- Provide sound infrastructure and services at reasonable costs.
- Rehabilitate and expand existing water supply systems.
- Improve collection, storage, treatment and distribution of water.
- Rehabilitate the sewerage and sanitation system and improve its operation and management.
- Improve maintenance standards for government assets.
- Ensure that all future construction projects comply with the Environment Act.

The Asian Development Bank (ADB) funded Technical Assistance Project, *Promotion of Effective Water Management Policies and Practices* in 2003-2004 which excluded South Tarawa because of the then ongoing ADB funded Sanitation, Public Health and Environment (SAPHE) project, developed a 20-year Kiribati Water Sector Road Map that set out strategies and a long-term action program. Strategies were identified under four key areas: water resource assessment and monitoring; community assessment, consultation and participation; institutional arrangements and policy framework, water and sanitation development and arrangement. The strategies were arranged under eight projects within these areas. A central, high priority initial 12-month task proposed was the development of national policies and procedures for the improvement of operation of the water sector. It unfortunately was not implemented at the time.

Finally, the GoK Cabinet decision in 2004 to make outer island water supply systems sustainable provides a clear policy direction but one that posed enormous difficulties for line Ministries since it implied charging for water supply in Outer Islands where *Kaianga* customarily manage water.

The above outline shows underlying water policy intent and water policy needs. However, major disconnections between policy proclamation and its implementation, and between project plans and action are apparent, since problems identified in the early 1990s persist. The various policies, statements and decisions needed to be embedded in a broader national water policy framework and mechanisms and incentives to encourage implementation and review were required.

2.3. The Kiribati Adaptation Program (KAP)

Kiribati and Colombia were the first countries in the world to be selected under the Global Environmental Facility (GEF) Strategic Priority on Adaptation (to climate change). In 2003, the GoK, with support from the World Bank (WB), started the Kiribati Adaptation Program (KAP) under the Ministry of Finance and Economic Development, with the key goal of reducing Kiribati's vulnerability to climate change, climate variability and sea level rise. The program was planned to have 3 phases. Phase I, Preparation (which ran from 2003-2005) aimed to incorporate adaptation into national economic planning, to prepare a National Adaptation Program of Action (NAPA) under MELAD and to design an intermediate pilot implementation phase, KAP-Phase II to run from 2007-2009.

All of these activities were based upon an extensive community consultation process throughout the Gilbert Island group, as well as several technical studies in key affected sectors. During that consultation processes, communities were asked for suggestions on adaptation strategies. Much to the surprise of the consultants, the top strategies had little to do with the threat of sea level rise. Seven out of the top ten strategies were concerned with access to freshwater, water quality and the protection of freshwater sources. KAPI prioritised adaptation options under the following categories: Awareness; Water Resources; Inundation/Coastal Erosion; Agriculture; Health; Family Planning; Overcrowding/Migration; Fisheries and Waste Management.

The second phase of the program, KAPII, Pilot Implementation, (2007-2009), jointly funded by GEF, AusAID and NZAid, and managed through the WB, aimed to develop and demonstrate the systematic diagnosis of climate-related problems and the design of cost effective adaptation measures, while continuing the integration of awareness and responsiveness into economic and operational planning. This was planned to be achieved through continued consultation and awareness raising; consolidation of the mainstreaming of adaptation into national economic planning; and implementation of pilot adaptation measures to address pressing adaptation issues while building capacity in key government

ministries, local government and communities. Finally, KAPIII, Expansion (planned for 2009-2015), is designed to gradually scale up the investments piloted under KAPII to cover all major islands and vulnerable sectors of Kiribati.

The *National Adaptation Steering Committee* (NASC) was formed in 2004 to oversee KAPII and report to the OB. This Committee has members from all key government agencies as well as community members from the National Council of Churches, the Chamber of Commerce and from the Women's Committee (AMAK). A range of pilot water resources projects were designed under the key Freshwater Component of KAPII (Falkland, 2005). The lead projects were to assist the GoK in the development of:

- (i) A national water resources policy.
- (ii) A 10-year national water resources implementation plan to put that policy into practice.
- (iii) A 10-20 year Water Master Plan for Tarawa.

2.4. The Pacific Program for Water Governance

While KAPI was being implemented, the European Union (EU) established a Program for Water Governance (PfWG), for three regions, Africa, the Caribbean and the Pacific. A Pacific region submission in 2002 by the South Pacific Applied Geoscience Commission (SOPAC) proposed three pilot studies in Fiji, Kiribati, and the Solomon Islands for water governance at different scales: national, major utility and local village, island or catchment based. The overall goal of the EU Water Governance project was: *"to mainstream the principles of good water governance into day to day applications and pilot projects so as to assist in achieving sustainable water resource management and provision of water services"*. The EU-SOPAC Pacific component goal was *"to promote the application of effective water governance within institutions, systems, structures and processes in three countries in the Pacific selected on the basis of their level of development in water governance"*.

An implicit assumption underpinning the EU PfWG is that the plethora of water policy frameworks and policy and planning "tool kits" available in developed world countries (see e.g. Global Water Partnership, 2003) would be relevant and directly transferable to developing countries. In essence, the PfWG, was an opportunity to showcase developed world water governance reforms in developing countries. There are, however, no easy prescriptions for the rapid translocation of these relatively recent water governance reforms and water management frameworks from developed countries to small island developing countries. For example, in developed countries there are frequently hundreds of people engaged in the planning, management and use of water. For them, some of the major challenges are addressing the environmental impacts of water supply and water effluent treatment systems and accommodating the predicted impacts of climate change.

In many small island countries in the Pacific region there are often only one or two water professionals whose tasks may range from replacing washers in domestic taps, replacing groundwater pumps, unblocking clogged sewers to advising on national water policy and representing the country at international climate change meetings. The major daily challenges in water governance they face are maintaining supplies of adequate quantities of safe freshwater to growing populations in dispersed and isolated communities with very limited resources, no economies of scale, as well as coping with the complex cultural and institutional changes necessary in the transition from subsistence to urban communities.

Experience has shown that quick, developed-world formulaic solutions that take no account of island priorities, traditions and practices, which developed over millennia, are often politely ignored (Dray *et al*, 2007). Transformation of the water sector in the Pacific involves behavioural change (SOPAC and ADB, 2002), generally a long-term process, which requires appreciation of the different nature of freshwater in small island countries and the prevailing culture and traditions.

The initial pilot EU PfWG project for Kiribati was planned as a 10 month project, far too short for significant behavioural change. The identified projects were therefore focussed on structural improvements achievable in the short-term but requiring continued effort to have lasting impact (White, 2007b). It was assumed that policy and its implementation are an essential over-arching components of integrated water resource management which encompasses health, environmental, economic, social, cultural, infrastructural and technical issues. Because of this, it is essential that all Ministries, agencies, community organisations and businesses with broad interests in freshwater participate in deliberations on policy and plans. The re-establishment of a whole-of-government and community National Water and Sanitation Coordination Committee (NWSCC) directly under OB and reporting to Cabinet was identified as a key task. A simplified model of the policy process was adopted, in which

the NWSCC played a key driving role (Figure 5) and the EU Pfwg started in May 2006 and was completed in March 2007.

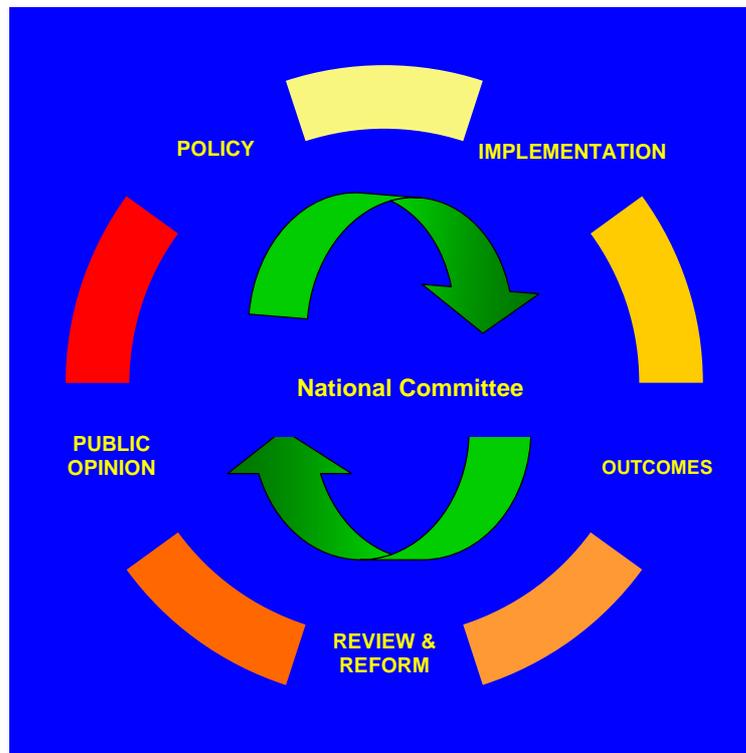


Figure 5 Simplified model of the policy cycle showing the central role of the NWSCC in implementing, reviewing and recommending revisions to policy

At the inaugural meeting of the NWSCC on 22nd February 2007 to discuss draft terms of reference, it was decided that the NWSCC would be chaired by the lead water agency MPWU, not OB as originally designed and that non-government organisations (NGO) would not be invited to participate as “*water is government business*”. Other tasks undertaken in the EU Pfwg included the preparation of draft national water policy and the extensive revision of the 2000 version of the draft National Water Plan as a precursor to the KAPII water component projects. These drafts were presented to the NWSCC and circulated to all members of the NWSCC as well as NGO and community organisations for comment (White, 2007b).

3. FORMULATING POLICY AND IMPLEMENTATION PLANS UNDER KAPII

The task of overseeing the formulation of Policy and Plans under KAPII was the joint responsibility of both the NWSCC, as designed, and the NASC, because of its overall coordinating role. The national policy and planning projects of the freshwater component of KAPII specified a series of required actions for developing policy and plans:

- (i) Review the draft national water policy developed under EU-SOPAC Pfwg to ensure that it is consistent with regional initiatives, previous policy statements, documents and plans and with the goals of KAPII.
- (ii) Review the revised EU-SOPAC Pfwg draft national water plan to ensure that it is consistent with the draft national policy, previous policy directions, statements and draft plans, and addresses the aims of KAPII.
- (iii) Assist the NWSCC to discuss, review and modify the draft policy and plan for submission to Cabinet for consideration.
- (iv) Provide succinct summaries of the policy intent and goals and the implementation plan to OB and the Cabinet.
- (v) Provide procedures for the NWSCC to monitor and report to the Government on the

implementation of policy and plans and for their revision.

- (vi) Provide procedures for the incorporation of National Water Plan objectives within Ministry Operational Plans.
- (vii) Ensure that the Water Master Plan for Tarawa is consistent with draft National Policy and Plans.

The extensive reviews undertaken are summarised in sections 1 and 2 above. The critical issues identified in Section 1.4 above together with the widespread concerns expressed during the extensive KAPI community consultation process provide the basis for a policy response.

The lack of feedback from Ministries to the written draft policy and revised plans developed under the EU-SPOAC PFWG appear to stem from three issues: written communication in Kiribati is less effective than verbal discussion; a general lack of familiarity with policy and plans and their relevance; and ever-present, more immediate pressing problems. This meant that the process of developing policy would require explanation of the policy and planning processes, more face-to-face meetings, more discussion, and more time. In order to foster an appreciation of the strengths of the policy process, potential outcomes of effectively implemented national water policy in Kiribati were outlined:

- (i) Improved public health due to a decrease in water-borne diseases.
- (ii) Equitable access to safe freshwater.
- (iii) Improved water supplies for schools, hospitals and clinics.
- (iv) Decreased losses from reticulated water supplies.
- (v) Efficient allocation of water to various users.
- (vi) Increased community participation in the protection, conservation and management of freshwater sources.
- (vii) Improved public awareness of water resource issues.
- (viii) Enhanced water and sanitation educational programs.
- (ix) Increased conjunctive use of rainwater and groundwater.
- (x) Clear identification of roles and responsibilities in the water sector.
- (xi) More effective governance, monitoring and assessment of water resources.
- (xii) Strengthened institutional and human capacity and the provision of appropriate training in the water sector.
- (xiii) Better knowledge of the quantity and quality of freshwater resources and their use.
- (xiv) Financially and environmentally sustainable water supply systems with improved levels of cost recovery and lower water losses.
- (xv) Improved protection of freshwater resources from adverse impacts of human activities.
- (xvi) Improved risk assessment and management for the water sector.
- (xvii) Enhanced resilience to extreme events, climate variability and climate change and increased ability to respond quickly to water crises.
- (xviii) Enhanced access to aid donor and loan schemes and coordination of donor agencies in the water and sanitation sector.

Figure 6 summarises the process of development and refinement of the policy and implementation plans. Besides separate workshops with NASC and NWSCC, extensive consultations were undertaken with lead government ministers and agencies, local governments, non-government organisations, businesses, the accommodation industry, foreign diplomats and aid donors.

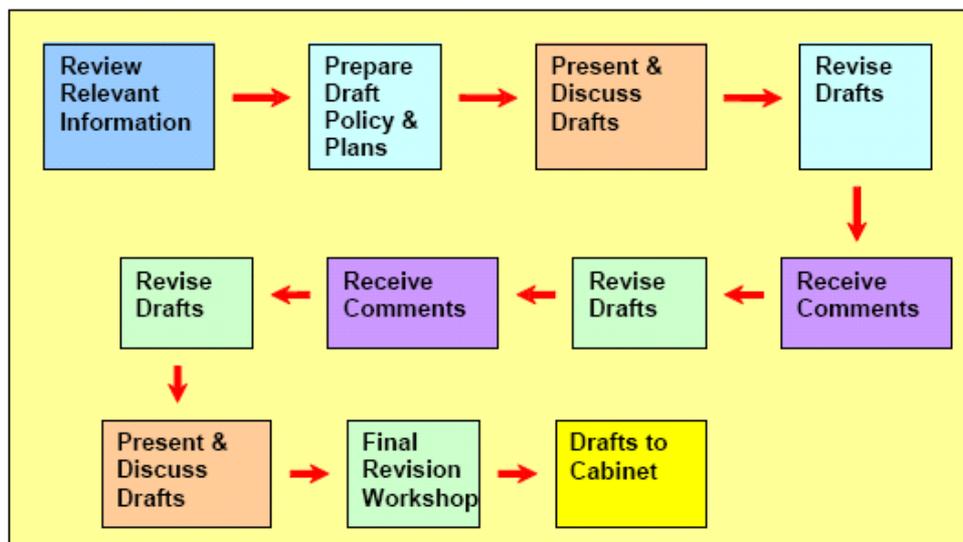


Figure 6 Process of development and refinement of the National Water Resources Policy and Implementation Plans

The KAPII part of the process commenced in September 2007 and was completed in January 2009. Including the preliminary PFWG work, the complete process took 31 months, a relatively short time in the Pacific. One advantage was that some members of the drafting team involved had up to 30 years experience in water resource and sanitation issues in Kiribati with both an appreciation of the context and the opportunity to build relationships.

After the discussion and revision process with the NWSCC and NASC, three over-arching policy goals were identified together with an associated set of seven policy objectives to address the highest priority issues (Table 1) and these were included in the draft policy. The policy intent is that: firstly, as a matter of highest priority, safe freshwater will be supplied sustainably to satisfy basic human needs, then those of the environment and finally those required for development; secondly, there is a strong commitment to protect and conserve freshwater resources; and thirdly there is a determination that services are delivered well. These policy intents differ from those of some developed world nations where the highest priority is to satisfy the needs of the environment first. This change in priorities is a direct result of the current and predicted significant water shortages in urban areas in Kiribati (see Figure 3).

Table 1 Three Policy goals and seven objectives of the draft National Water Resources Policy

Policy Goal 1. Provide safe, socially equitable, financially and environmentally sustainable water supplies to enhance the welfare and livelihood of I-Kiribati
1. <i>Increase access to safe and reliable water supplies</i>
2. <i>Achieve sustainable water resource management</i>
Policy Goal 2. Protect and conserve freshwater sources for public water supplies
3. <i>Improve understanding and monitoring of water resources and their use</i>
4. <i>Improve protection of public water source areas</i>
5. <i>Increase community participation in water management and conservation</i>
Policy Goal 3. Deliver freshwater efficiently and effectively.
6. <i>Improve governance in the water and sanitation sector</i>
7. <i>Decrease unaccounted for water losses and improve cost recovery</i>

The draft policy expresses the vision of the Government and people of Kiribati for the future of water resources and water supply in the country. It specified planned policy outcomes and provided short to medium-term (up to 3 years) and medium to long-term (3 to 10 years) strategies for achieving the policy objectives. Organisational, institutional, resource, financing and legislative implications of the

policy were discussed and mechanisms for its implementation and review were outlined.

Our analysis of previous policy declarations in Kiribati revealed a disconnect between pronouncement of policy and implementation. Because of this, implementation was detailed in the accompanying draft 10-year National Water Resources Implementation Plan, developed in parallel with the policy. The Plan described the opportunities, issues, constraints and the possible future of water resource management and use. It used the goals and objectives of the draft National Water Policy as the framework for action and specifies activities, measurable indicators or outputs and strategies to address priorities in the freshwater resources sector under each policy objective. All together, 38 activities and 72 indicators or outputs were identified under the 7 policy objects in Table 1. An example of the activities and indicators or outputs under policy objective 1 is given in Table 2.

The draft implementation plan also specified the Ministries responsible for each activity, provided a list of highest priority activities and a schedule for completion of activities. It noted that plans and policy documents are living documents in need of regular review and revision. In addition to the draft Plan, activities were also entered into Ministerial Operations Plans, through which Ministry performance is judged, and procedures were developed for the NWSCC to monitor and report to the Government on the implementation of the policy and plans and for their revision. Finally, two page Cabinet briefing notes were prepared on both the revised draft policy and plan which were then all submitted to the GoK Cabinet by the MPWU (Figure 6).

The National Water Resources Policy and National Water Resources Implementation Plan for Kiribati were approved by GoK Cabinet on 14th January 2009.

Table 2 An example from the draft National Water Resources Implementation Plan of the activities and indicators or outputs under Policy Objective 1.

Policy Goal 1. Provide safe, socially equitable, financially and environmentally sustainable water supplies to enhance the welfare and livelihood of I- Kiribati	
Policy Objective 1. Increase access to safe and reliable water supplies	
1.1 Identify priority villages and islands for urgent attention.	
1.1.1	<i>A set of criteria for identifying villages and islands with urgent water resource needs</i>
1.1.2	<i>A prioritised list of villages and islands for water supply improvements</i>
1.2 Decrease the incidence of water-borne diseases by improving the safety of freshwater supplied from groundwater and rainwater systems.	
1.2.1	<i>A 30% decrease from 2005 levels of the number of diarrhoeal and dysentery cases by 2013 and a 50% decrease by 2018.</i>
1.2.2	<i>A 10% increase over 2005 levels in the percentage of the population with access to safe water sources by 2013 and a 20% increase by 2018</i>
1.3 Improve schools, hospitals, clinics, and outer island and rural water supplies.	
1.3.1	<i>A 20% Increase in the number of outer islanders with safe water supplies from protected water sources by 2013 and a 40% increase by 2018.</i>
1.3.2	<i>A 50% increase in improved water supplies to schools, hospitals and clinics by 2013 with a 100% improvement by 2018</i>
1.4 Increase the use of improved rainwater harvesting.	
1.4.1	<i>Review and enacting of building codes or regulations requiring the installation of rainwater catchments in new buildings with suitable roofs.</i>
1.4.2	<i>Strategy developed to enforce building code for installation of rainwater tanks.</i>
1.4.3	<i>Financing scheme established for purchasing domestic rainwater catchments for outer islands.</i>
1.4.4	<i>Trial of improved rainwater harvesting and storage systems with first-flush devices.</i>
1.4.5	<i>A 15% increase in the number of households and public buildings with rain catchments by 2013 and a 30% increase by 2018.</i>
1.5 Increase access to safe, basic sanitation removed from water source areas.	
1.5.1	<i>A 10% increase over 2005 levels in the percentage of the population with access to safe sanitation by 2010 and a 20% increase by 2015.</i>
1.5.2	<i>Improved recommendations on the positioning of sanitation systems relative to wells and water sources</i>

4. CONCLUDING REMARKS

The developed world view of low, small island countries is that climate change and particularly sea level rise are the greatest threats they face. We have attempted to show here that there are more immediate, day-to-day threats which are of far greater concern to island communities than sea level rise. In Kiribati, this is particularly so about water resources. There, we have argued, the combination of geography, hydrogeology, population growth, climate variability, resource limitations, social and cultural traditions, governance issues and the difficult transition from subsistence to urbanised living make water resource management amongst the most challenging in the world. Many previous studies have argued that the absence of a whole-of-government approach and comprehensive national water resource policy and plans to implement policy greatly compound that challenge.

We have also argued that simple translocation of developed-world policy frameworks and “toolkits” to small island nations is problematic as they ignore the local biophysical, socio-cultural and resource context. Instead we have analysed water resource issues, ministerial declarations, government decisions and community consultations to provide pointers for policy development. For example, our review of previous policy statements revealed a disconnect between policy pronouncement and implementation which needed to be recognised and explicitly addressed. It also revealed that Ministries with responsibilities in water acted as independent *kaianga*, impeding the development of a whole-of-government approach ***suggest that previous sentence is cut into two at the “***see note”. To address these needs, an accompanying policy implementation plan was developed in parallel with draft policy and a whole-of-government National Water and Sanitation Coordination Committee was re-established to oversee the policy process.

The review of previous policy, decisions and declarations and public consultations in Kiribati revealed the widespread concern of the community and the genuine desire of the GoK to improve access to safe, reliable and adequate water resources. These were used as the basis for policy and plan development in an iterative process involving the whole-of-government NASC and NWSCC. In that process, feedback was improved when it was recognised that verbal rather than written communication was the preferred method of operation.

One significant problem in policy development, implementation and review in small island states is the very limited number of water resource/supply/sanitation specialists, usually two or three people. They are normally inundated with the daily problems of managing dispersed water supply and sewerage systems with little time to focus on longer-term, strategic issues. Regional organisations such as SOPAC have played an important role in pooling regional expertise to address strategic policy and planning issues. Kiribati’s endorsement of the 2003 *Pacific Action Plan on Sustainable Water Management*, in which SOPAC played a key role, provided the basis for the development of national policy and plans. This was built upon through the EU-SOPAC Pacific Water Governance Program and completed under Phase II of the Kiribati Adaptation Program. Aid donors and lenders prefer bi-lateral arrangements but with Pacific Island nations there is a significant advantage in including a regional organisation in water aid programs.

The planned outcomes of the now GoK-endorsed national policy and implementation plan are dependent on the general realisation that water is ultimately everyone’s business and that improvements require behavioural change, itself a long-term process.

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