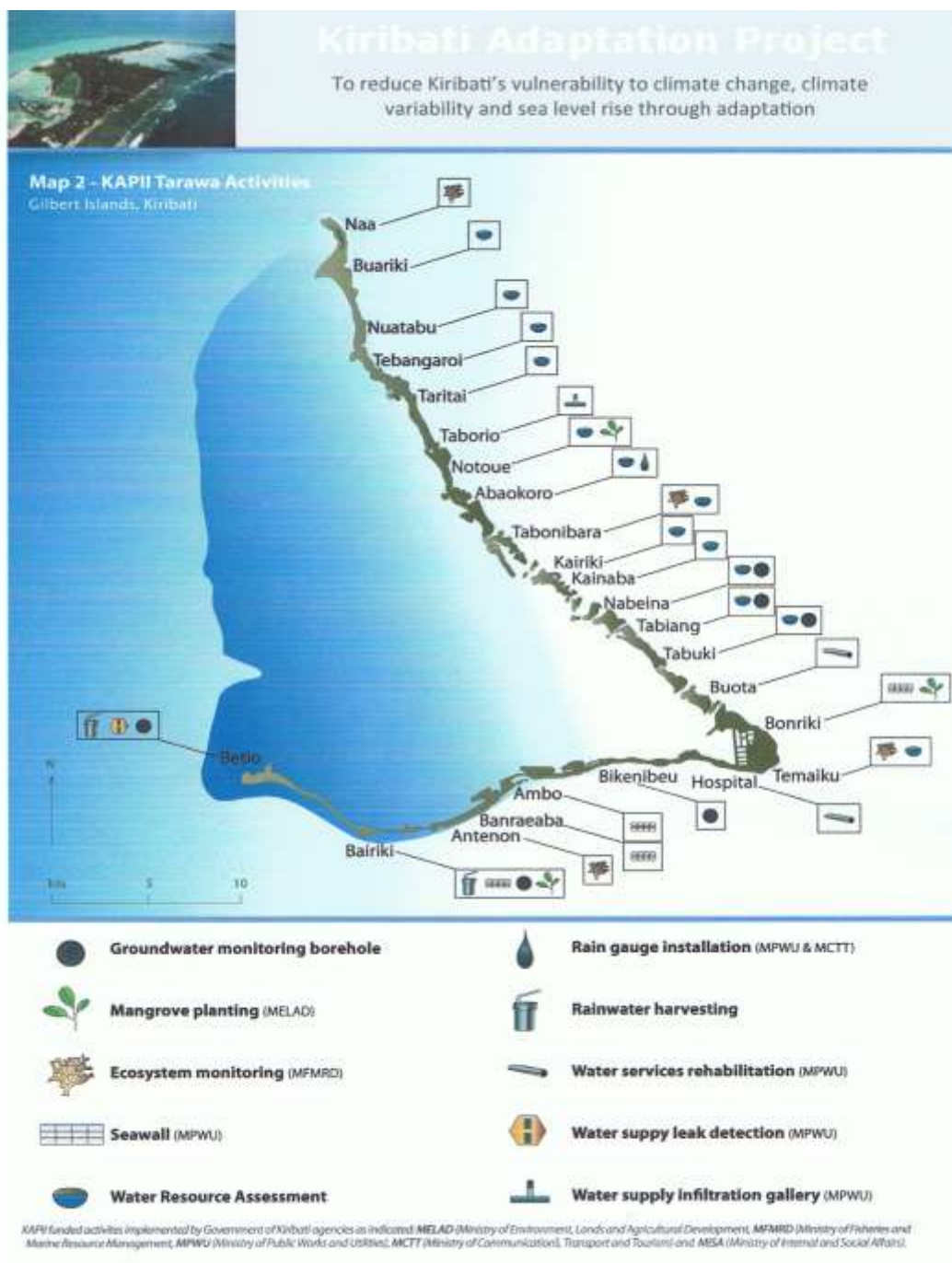


REPUBLIC OF KIRIBATI

OFFICE OF THE PRESIDENT

KIRIBATI ADAPTATION PROGRAMME – PHASE III

ENVIRONMENTAL MANAGEMENT PLAN



February 2011

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KIRIBATI ADAPTATION PROGRAMME – PHASE III

I. EXECUTIVE SUMMARY

1. The proposed Kiribati Adaptation Programme – Phase III (KAP III) will build on KAP II best practices in designing and implementing climate change adaptation measures in water and civil works by implementing physical investments and capacity building; emphasizing community consultation/participation whilst pursuing climate change resilient investments.
2. This EMP report is primarily focused on two components of the KAP III proposal. These include: (i) **improvements to water resource use and management** with primary sub components of groundwater abstraction system; water reticulation including leakage detection; up-gradation of water supply at Tungaru Central Hospital; community awareness about water conservation; and, feasibility of developing treated water resources in South Tarawa; (ii) **enhancement in coastal resilience** with primary emphasis on continuation of shoreline protection works in South Tarawa; and advisory support and asset management of coastal infrastructure.
3. This Environmental Management Plan was developed in accordance with the World Bank’s Environmental Management Plan (EMP) guideline and is considered to be equivalent with the Basic Environmental Impact Assessment; a requirement of the Kiribati Government’s Environment Act, 2007, An Act to Amend the Environment Act 1999. However the EMP shall be reviewed and updated after the completion of the final design of the project. According to the Act, KAP III will need to comply with environmental requirements as detailed in the EMP and lodge an application on relevant sub-components of KAP III to secure Environment License from the Ministry of Environment, Lands, and Agricultural Development (MELAD) before the Contractors can commence construction.
4. A preliminary environmental assessment of the proposed KAP III adaptation measures in water and civil works project concluded that no specific risks are foreseen with the Project activities aside from possible minor land acquisition, and disturbance to the adjoining areas. The construction impacts will be minor, reversible and manageable if the mitigation measures as given in the EMP are properly implemented. The EMP (Table 2) is based on the type, extent and duration of the identified environmental impacts. The EMP has been prepared by close reference to best practices and in line with the *World Bank’s Safeguard Policies*. The effective implementation of the EMP will be audited as part of the Grant conditions. In this regard, the KAP Office (the Implementing Agency) will guide the design and supervision engineers and contractors in the implementation of the EMP.
5. Prior to implementation of the Project, and upon completion of the detailed design, the EMP will be reviewed and updated by the KAP Office to ensure that it complies with the proposed design and any additional changes made at the design stage (e.g. location, scale,

source of materials, safety, etc.) and which have impacts on the environment are reflected in the EMP.

6. With the implementation of the project, economic development of the area (South Tarawa) will be induced. Public health and social well being of residents will be improved to encourage the entrepreneurship of people. Public assets will be well protected from adverse climate change impacts thus raising the resilience of the population to adverse climate changes and variability.
7. Without the implementation of the project, the reticulated freshwater system will remain very bad and continue to deteriorate as more of the water system infrastructures become damaged from coastal erosion and lack of maintenance. Without the coastal protection of the public infrastructures (including the whole water lens of the island) the social welfare and livelihoods of the people of South Tarawa will be seriously put at risk.
8. The public consultations and information disclosure that was carried out on 11 February 2011 was attended by a large number of stakeholders. The consultation focused on identifying fully the environmental issues and objectives of the EMP and ensuring that the mitigation measures described sufficiently cover the identified environment and socioeconomic issues. The consultation approved the EMP as presented at Table 2 and recommended that the protection of traditional medicinal plants must be included as an important environmental issue and objective to be considered in the EMP design/pre-construction and construction phases. Unfortunately, there are no registered traditional medicinal plants in Tarawa. However, almost all plants and trees have traditional 'medicinal' use and fortunately they are in sustainable abundance throughout Kiribati, except in South Tarawa and Betio the main urban areas. In these areas, most of the traditional medicinal plants have been destroyed. In the project areas, KAP III will identify the medicinal plants with the assistance of the communities and in consultation with the communities will take appropriate measures to protect the plants if they are impacted by the construction.
9. The other important outcome of the consultation was that stakeholders were interested to know the impacts if any of a new coastal protection design of KAP II that included a landing ramp for boats and canoes in the seawall construction. The construction design is environmentally sound now with the predominant prevailing north easterly winds. For the past decades, Kiribati worst weather conditions came during the predominant westerly winds and so the new design has not been tested fully. The recommendation of the consultation was for KAP III to use the new seawall design only in coastal areas that are least influenced by changes in weather patterns. The project will examine the sea wall and ramp designs in KAP III and incorporate the community suggestions where feasible.
10. The project assessment concludes that with appropriate mitigation strategies described in the EMP, and the positive social, economic and environmental benefits which will flow from the Project, the construction related environmental impacts, which are minor, can be managed within

acceptable levels. There are no significant environmental impacts needing in-depth assessment. All potential and associated impacts can be addressed through proper implementation of the mitigation measures as proposed in the EMP. Provisions will be made in the Project Budget to cover the environmental mitigation and monitoring costs.

II. POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK

11. Kiribati's statutory framework requiring compliance to the Environmental Impact Assessment (EIA) System for all projects is embodied in the **Environment Act 1999 (No. 9 of 1999)** as amended 2007, an ***“Act to Provide for the Protection Improvement and Conservation of the Environment of the Republic of Kiribati and for Connected Purposes”***.
12. Environmental impact assessment of all public or private development projects is a legal requirement under Part IV of the Environment Act 1999(as amended 2007) relating to Environment licences (through Environment License Application), Environmental Impact Assessment, Review and Monitoring. Prescribed development projects/Environment Significant activities as listed in the Schedule in Section 14 require an Environmental Assessment Report (a Basic Environmental Impact Assessment or a Comprehensive Environmental Impact Assessment, in accordance with Section 32 of the Environment Act 1999) and submission of an Environment Licence Application which is processed and reviewed by the Environment and Conservation Division (ECD). Annex A presents excerpts of the relevant sections on Environmental impact Assessment System and the Schedule of the Prescribed Developments covered under the Act.
13. The proposed Project is not expected to have any significant and irreversible adverse impacts on human health and/or the natural environment. Modest and temporary negative environmental impacts may be caused during implementation of the civil works and during operation and maintenance of the resulting infrastructure. However these impacts are expected to be temporary and mitigable. In accordance with World Bank policy for Environmental Assessment (OP/BP/GP 4.01), this project has been assigned Category “B” and an Environmental Management Plan (EMP) has been prepared by the Office of the Beretitenti (OB) who is the Project Executing Agency. The EMP will be integrated into the technical design, and included in all bid documents and contracts for all civil works.

III. DESCRIPTION OF THE PROJECT

A. Introduction

14. Kiribati is one of the most vulnerable countries in the world to the effects of climate change. To address the rising risks the Government of

Kiribati has undertaken an adaptation programme that is now entering its third phase in 2011, supported by the World Bank, the Global Environmental Facility, AusAID, NZAID, UNDP, and a parallel project by the EU.

15. The Kiribati Adaptation Programme – Phase III is comprised of a number of component activities. This EMP will address the following two physical interventions of the KAP III:

- i. **Increase Coastal Resilience**

This activity is aimed at reducing the vulnerability of the coastline through encouraging the implementation of proactive management techniques and a range of risk management solutions.

- ii. **Improve Water Resource Use and Management**

This activity is aimed at increasing the production of safe drinking water to the increasing population of South Tarawa by expanding the groundwater abstraction galleries and contains the provisions for detecting leakages in the reticulated system and, expansion of roof rainwater harvesting in South Tarawa.

B. The Executing Agency

16. The Kiribati Adaptation Project III will reside in the Office of the Beretitenti (OB). It will be managed, on behalf of the OB, by the Kiribati Adaptation Programme III Project Management Unit (KAP III PMU). During the project implementation, engineers and technicians of the Civil Engineering Division of Ministry of Public Works and Utilities (MPWU) and Public Utilities Board (PUB) will work with the approved and final detailed design and supervision consultants of KAP III on day to day basis and shall observe and comply with relevant legislations including the Environment Act 1999 (as ammended 2007)

C. Project Rationale

17. Coastal hazards in Kiribati comprise coastal erosion and flooding. Flooding of land occurs when the sea levels rise above the land levels (Kiribati highest land level is approx 3 meters above sea level), often made worse by waves overtopping the coastline. The wearing away of land by the action of natural forces such as wind and waves is made worse during hightides accompanied by strong winds, creating intense wave action that causes severe erosion and overtopping of the affected coastline.
18. Coastal erosion is quite evident in South Tarawa in comparison to Outer islands. Most village settlements and public infrastructure interventions such as, houses, roads, utility lines, etc., are established along the coastline. The coastal zone of South Tarawa is a precious public asset that has largely been eroded and degraded by public infrastructural developments and the increasing encroachment of the population into coastal areas for settlement. The new settlement areas and the coastal zones therefore need to improve their resilience to climate change and climate variability by improving the protection of public assets.

19. The existing water resource use system as operated by Public Utilities Board (PUB) for people living on South Tarawa is in poor condition as evident with the acute shortage of reticulated water supply for some 50,000 people on South Tarawa. An estimated “safe” water demand for South Tarawa is 3,500 – 4,000 m³/day whereas PUB is currently extracting 1,900 m³ per day from its Bonriki gallery. Buota gallery normally produces 350 m³/day but currently awaits major renovations.
20. The water resource issue of shortage of clean water of 1,500 - 2,000 m³ per day is compounded with the rapid increase in population on South Tarawa and the numerous water leakages in the reticulated system. Thus the critical need is to improve water resource use and management. There is also the need to explore fully the potential of rainwater harvesting to provide alternate source of drinking water and thereby eliminating the use of well water that is often of poor quality and becomes a health hazard.

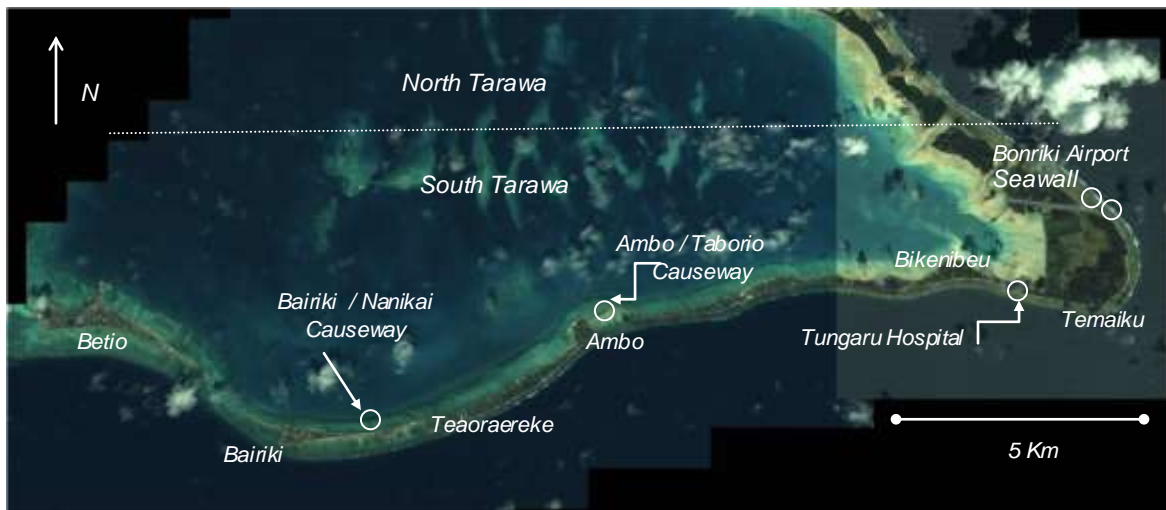
D. KAP II Project – Lessons Learned

21. In comparison to other Pacific islands that are just starting to address climate change adaptation and disaster risk management, Kiribati has an advanced level of awareness of the impact of climate change and climate-related hazards. The Government has embarked in the process of mainstreaming climate change adaptation (CCA) and disaster risk reduction (DRR) in its development processes through a series of initiatives: the launch of the Kiribati Adaptation Program (KAP) in 2003, the adoption of a Climate Change Adaptation Policy Note and a Climate Change Adaptation Strategy in 2005, the consultation process and consequent adoption of a National Adaptation Program of Action (NAPA) in 2007 and the ongoing implementation phase of KAP. In addition, the Kiribati Sustainable Development Plan (KSDP) which covers the period 2008-2011 recognizes the potentially high cost and effects of climate change on economic growth and social development. The recently adopted National Water Resource Policy (2008) defines the priorities in the water sector taking into account climate change adaptation. With KAP support MPWU and MELAD have implemented since September 2009 two major pilot investment projects in enhanced coastal resilience and improved sustainability and supply from groundwater and rainwater.
22. The details of activities of KAP II Project are given in Annex A. Public consultations carried out as part of the shoreline protection works in KAP II has resulted in inclusion of slipway in the design of the shoreline protection works (for boat access) and the hiring of local labour on the construction team. For the first time, construction was carried out successfully using Force Account procedure with MPWU plant and resources using hired labour and private sector plant where appropriate. Pilot implementation of leakage detection protocol has resulted in trained teams capable of carrying forward the leak detection program under KAP III. The pilot has provided a better understanding of the mechanisms of water losses. In all cases, there is a much better understanding of the mechanism of Environment Licence Applications and approvals which would be useful in KAP III.

E. The Proposed Project

23. The proposed Kiribati Adaptation Project III (KAP III) will build on KAP II best practices in designing and implementing adaptation measures in water and civil works. The Project will implement physical investments and capacity building; emphasize community consultation/participation; and leverage other donor activities in pursuing climate resilient investments. It is expected that the project will move quickly to the implementation of investments on the basis of experience gained and the extensive technical and analytical work already carried out during the preparation and implementation phase of KAP II.
24. More works investments were identified under KAP II than it (KAP II) was able to implement. The proposed Project activities represent both climate change adaptation and natural hazard disaster reduction measures. In particular, potential expansion of the ground water reserves into North Tarawa is crucial to managing severe droughts which impose severe public health risks and require national emergency response. The proposed shoreline protection projects mitigate the effects of erosion of assets in the coastal zone, e.g. roads, and retain the width of water reserves to sustain freshwater lenses.
25. The proposed KAP III will include: (i) **improvements to water resource use and management** with primary sub components of groundwater abstraction system; water reticulation including leakage detection; up-gradation of water supply at Tungaru Hospital; community awareness about water conservation; feasibility of developing treated water resources in South Tarawa; water legislations, etc. (ii) **enhancement in costal resilience** with primary emphasis on continuation of shoreline protection works in South Tarawa; and advisory support and asset management of coastal infrastructure; (iii) **institutional strengthening**; and (iv) **project management**.
26. This EMP will primarily discuss the proposed physical interventions associated with (i) improvements to water resource use and management, and (ii) enhancement in coastal resilience.
27. KAP III will focus primarily on South Tarawa and if additional financing is available, either through savings or donations, then the project may be expanded to include other sites.

Figure 1: The KAP III Project area



IKONOS Satellite image of Tarawa Atoll

IV DESCRIPTION OF THE ENVIRONMENT

A. Physical Environment

1. Location and Geography

28. Kiribati is composed of small islands located between Longitude 170 degrees East and 150 degrees West in the Central Pacific Ocean, on either side of the Equator at the intersection of the International Dateline and the Equator. See Figures 1 and 2 for the general location of the proposed Project and map of Kiribati. The three groups of islands namely the Gilberts, the Line and the Phoenix is either coral atolls or an elevated limestone island. Of the 33 islands comprising the Republic of Kiribati only 18 are inhabited.

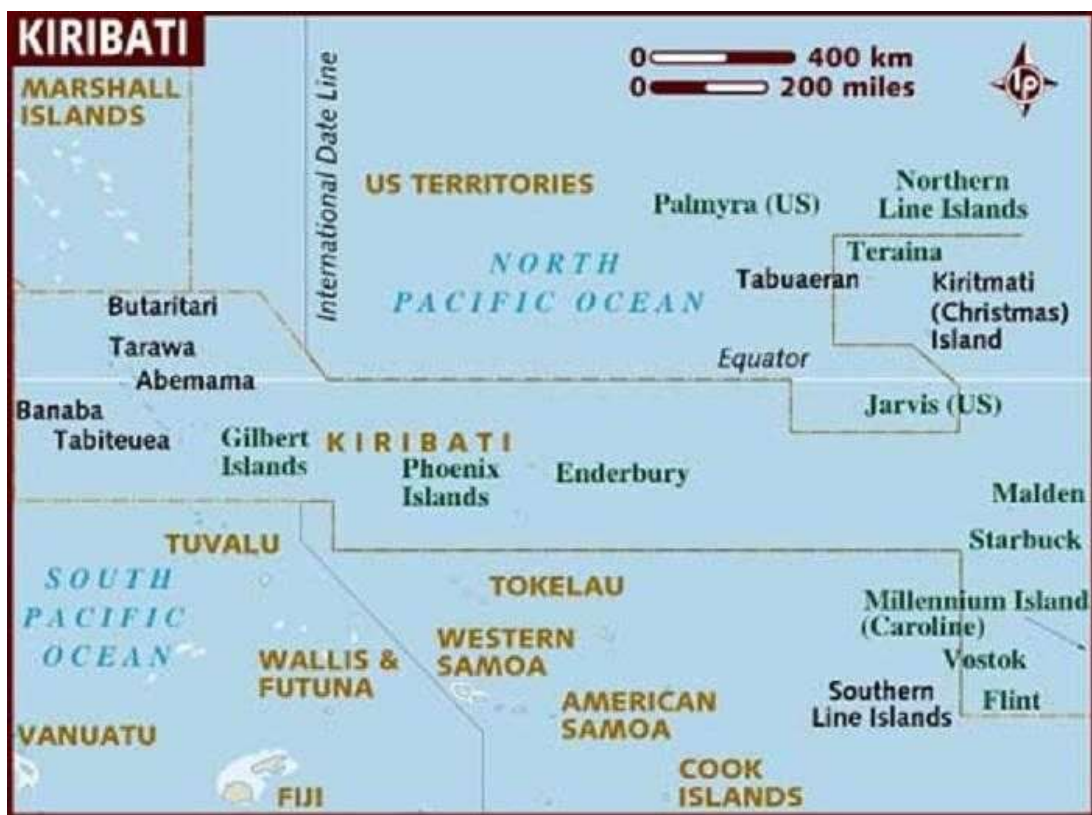


Figure 2: Map of Kiribati

29. The Gilbert Group which is comprised of 17 islands has a total land area of 286 square kilometres. Tarawa, an atoll in this group, is home of the Kiribati government, the port of entry, and the international airport. Eight islands and atolls constitute the Phoenix Group. The Line Islands consists of a total of 8 islands and atolls covering an area of 497 square kilometers, including Kiritimati with a land area of 384.5 square kilometers, which is the largest atoll in the world. Whilst Banaba (Ocean Island) rises some 78 meters above sea level, the rest of the islands are no more than 3 meters above sea level. The national capital Bairiki is located on the Tarawa atoll. Betio is the port of entry while Bonriki is the international airport.

2. Climate

30. Due to its geographical location, Kiribati has a predominantly hot dry equatorial climatic conditions with prevailing South Easterly winds most of the year. Temperature varies between 25C and 33oC with maximum possible annual sunshine of 4134 hours. The wet season extends from December to May and rainfall variation is high on most of the islands. A gentle breeze from the easterly quarter is predominant. Table 1 below displays average monthly climate indicators in Tarawa, based on 8 years of historical weather readings.

**Table 1: Average Monthly Temperature (degrees C), Tarawa Island
1° 35''S, 172° 93'' E, 4m asl**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Average Temperature	27	26	27	27	27	27	27	27	28	27	27	27
Average Maximum Temperature	27	27	27	27	27	28	28	28	29	28	28	28
Average Minimum Temperature	26	26	26	26	26	26	26	26	26	26	26	26

31. Rainfall differs from year to year and from island to island. The drier Southern islands have an average yearly rainfall of 1000 mm while that of the Northern part (includes Tarawa) is 3,000 mm. Low temperatures are experienced during heavy downpours accompanied by strong winds over long periods. Prolonged drought periods were encountered in 1988 to early 1989 followed by another in 1998 extending into mid 1999 and resulting in the loss of many valuable food crops including coconuts (*Cocos nucifera*) and breadfruits (*Artocarpus sp.*). Refer to Section 5. Fresh Water Resources – Climate Change and Drought Frequency for more rainfall information.

3. Soils

32. Like other coral atolls and islands, the nature of the soil is derived from limestone which has been formed as a result of coral formation over thousands of years. There is no andesitic rock formation in South Tarawa that can be used as quarry sources for construction. The soil is alkaline and therefore it does not support the growth of certain plants and trees. The poor and infertile nature of the soil is due to its alkalinity, porosity and lack of essential elements which makes it unable to support plant life. Consequently, the island is incapable of supporting intensive agricultural activities.
33. The topsoil which is composed of decaying or composted organic matter mainly decaying leaves and plant materials is thinly spread over most of the area with plant cover and other areas covered with wild bushes. Due to their ability to withstand the harsh atoll conditions the predominant plants species that survives are coconuts (*Cocos nucifera*), pandanus or screw pine (*Pandanus tectorius*), salt bush (*Scaevola sericea*), and other tolerant indigenous plants and trees.

4. Water Resources

34. Freshwater resources exist underground as water lenses floating on seawater as shown at figure 3. These are derived from the infiltration of rainwater into the water table below the ground. The lens resembles the appearance of a convex lens which is thickest at the centre and thinnest on the sides facing the ocean or lagoon throughout the length of the atoll or island. The lens is formed where the width of the island is sufficiently wide so as to reduce the outward flow of the accumulated underground lens. The freshwater lenses in low coral atoll and islands are extremely vulnerable to occasional environmental influences. Groundwater is the principal source of fresh water in Kiribati. Urban or South Tarawa water supply originates from water wells located in water reserve areas with restricted use and access in the villages of Bonriki and Buota. Well water is pumped from wells and conveyed through a system of pipes to consumers. Chlorination without preliminary treatment of urban water supply is carried out at the source. The proposed KAP III project will include provision to expand the groundwater system and protect underground water lens and supply systems from sea overtopping and coastal erosion by constructing protection works where appropriate to safeguard these resources.

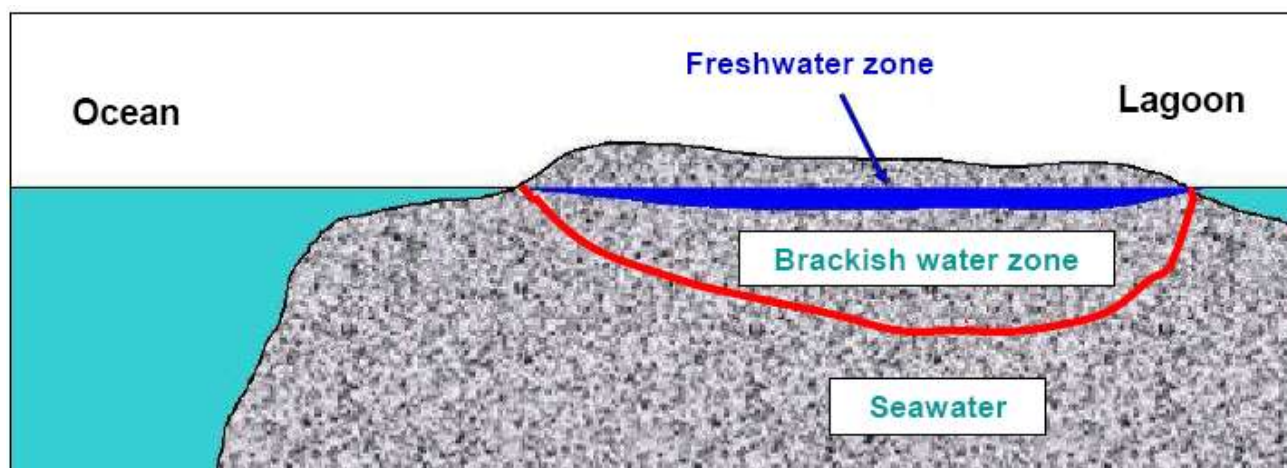


Figure 3: Typical cross section through a coral atoll showing the thin freshwater lens floating over a brackish transition zone between the lens and underlying seawater in the limestone aquifer

5. Fresh Water Resources – Climate Change and Drought Frequency

35. Climatic conditions have a major influence on fresh water resources in Kiribati. For example, underground freshwater lenses are recharged by rainfall and households frequently use rainwater catchments to supplement other water sources. Thus for many reasons, prolonged periods of low or zero rainfall (i.e. droughts) have serious implications for human well-being.
36. Figure 4 highlights the high variability in rainfall at Betio, South Tarawa and also indicates a trend towards fewer high rainfall months. Figure 5

shows the number of months in each year (1947 to 2005) for which the observed precipitation was below or equal to the ten percentile for that month. A monthly rainfall below or equal to the ten percentile is used here as an indicator of drought. There is considerable inter-annual variability in this indicator of drought, with no obvious long term trend.

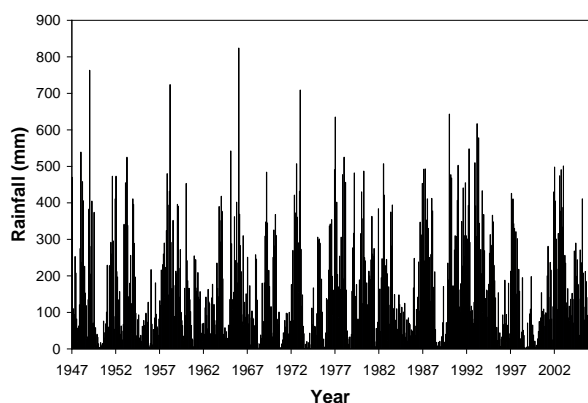


Figure 4. Monthly rainfall totals for Betio, South Tarawa. Source: Kiribati Meteorological Service.

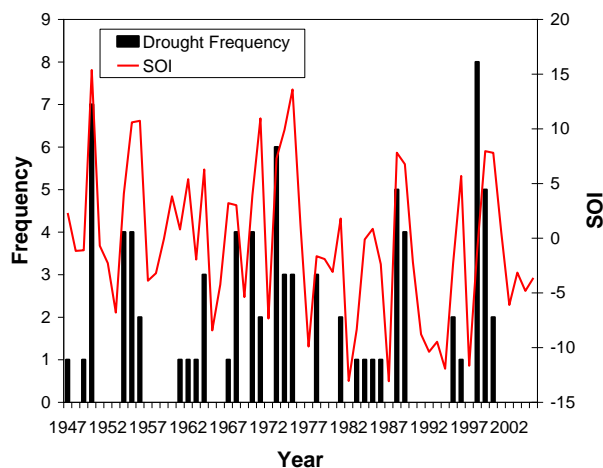


Figure 5. Annual drought frequency for Beitio, South Tarawa and Southern Oscillation Index. Sources: Kiribati Meteorological Service and Australian Bureau of Meteorology.

37. However, the droughts associated with well developed La Niña conditions are clearly evident. During La Niña the Intertropical Convergence Zone moves away from the equator, reducing rainfall in most parts of Kiribati.

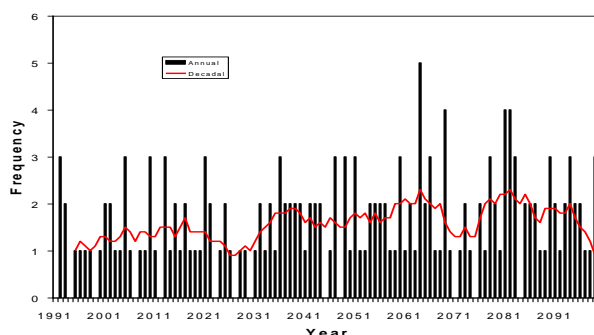


Figure 6. Annual and decadal frequencies of drought for a grid square centred on Tarawa, as estimated by the Canadian Global Climate Model using the A2 greenhouse gas emissions scenario. Source: IPCC Data Distribution Centre.

38. Global climate models provide projections of future rainfall. An analysis of future rainfall conditions, as estimated by the Canadian Global Climate Model using the A2 greenhouse gas emissions scenario, suggests that the frequency of drought will be higher in the second half of this century relative to the first half. However, it is important to note that the model did not capture the high frequency of drought associated

with the La Niña in the late 1990s. Recent global climate modeling studies indicate that, in a warmer world, the pattern of tropical Pacific sea surface temperatures becomes more El Niño-like, with an associated eastward migration in the tropical Pacific rainfall pattern. But for the six (out of 19 studied) models that were best at simulating present day ENSO conditions, no significant changes toward El Niño-like conditions were indicated for the latter part of the current century. Therefore it is not yet possible to make consistent predictions about the future nature of La Niña events, or of the opposite warm event, the El Niño.

B. South Tarawa Coastal Processes

39. The coastal process regime (waves, tides, currents, sediment transport) of South Tarawa varies considerably between different island shorelines and between the ocean and lagoon. It is important to recognise such differences in the assessment of coastal change (erosion and accretion) and flooding. Furthermore, consideration of differences in processes between sites is critical in the design of asset protection measures at the shoreline.
40. Circulation in coral reef systems is typically driven by a combination of tidal flow, wind-driven flow, and flow induced by the breaking of wind-waves at the reef edge. In large part the relative role of each of these mechanisms is controlled by reef morphology. Coral reef oceanography studies need to examine the broad scale circulation and the interaction of waves with coral reefs.

1. Tides

41. Tidal flow is an important mechanism of water exchange between the open ocean and lagoon where there are large (wide and deep) passages in the reef rim or where the lagoon is relatively small in area. The direct influence of tides is limited where there are no passages connecting the lagoon and ocean and/or where the tides have low amplitude.
42. The tidal characteristics of Tarawa lagoon are semi-diurnal (2 high tides every 24 hour period) with the tidal range (difference in tidal elevation between low and high tide) ranging from 2.4 m under spring tide conditions to 0.5 m under neap tide conditions. Notably there is considerable difference in the height of successive high tides.
43. A modeling study of circulation in Tarawa atoll lagoon indicated that the lagoon shoreline of South Tarawa is subject to reversing tidal flows, which are controlled by the rising (incoming) and falling (outgoing) tides. Current meters deployed close to the south Tarawa Lagoon shoreline, used to validate the model, measured peak currents on the order of 0.15 to 0.2 m/s. In general such currents are insufficient to entrain sediments

but are capable of transporting sediment once it has been mobilised by wave energy.

44. Changes in tidal elevation also play a major role in modulating the magnitude of wave energy that propagates onto reef surfaces and can access the reef island shorelines. This will be discussed in greater detail below.

2. Wind

45. The wind regime is important in forcing surface currents in atolls and can force surface and return currents in atoll lagoons (Munk and Sargent, 1948). Wind also plays a major role in the generation of waves that can affect shorelines (Kench et al., 2006). Wind-generated wave energy can be divided into two types. First, incident ocean swell at the ocean reef edge is generated by wind systems in the Pacific Ocean. These waves are the largest (1-3 m) to impact the atoll on the ocean reef and have a long period (10-14 seconds). Second the interaction with wind with the lagoon surface generates local wave energy. Wave height is related to the wind speed and distance of lagoon across which wind blows. These waves are typically lower than ocean waves, have shorter period and propagate in the direction of wind flow. In Tarawa the wind regime is dominated by winds from the easterly quarter. Consequently, wind-generated wave energy increases westward across the lagoon. However, reversals in this energy gradient can be expected under less frequent north westerly events.

3. Waves

46. The interaction of waves with coral reefs is known to control reef flat wave and current processes, ecological and geological processes in coral reef systems (Hamner and Wolanski, 1988; Nakamori et al., 1992; Roberts et al., 1992; Abelson and Denny, 1997; Hearn et al., 2001). Incident waves and their interaction with coral reef platforms are also acknowledged as the main mechanism controlling the formation, erosion and change of coral reef islands (Gourlay, 1988).
47. Coral reefs act to filter incident waves and control the energy that leaks on to reef platform surfaces. The physical processes of wave breaking at the reef edge have been well documented. Numerous studies have documented large reductions in wave energy of up to 97% as incident swell is transformed and breaks at the reef edge. However, there has been comparatively little emphasis placed on examining the character and importance of wave processes on reef flats for the formation, change and stability of reef sedimentary landforms such as beaches, sand aprons and reef islands (KAP II FS6 – Improving the Protection of Public Assets).
48. Despite dramatic energy losses at the reef edge, residual wave energy still leaks onto reef flat surfaces. Transmission of this energy onto reef surfaces and toward shorelines is strongly influenced by tidal stage. Transfer of wave energy across reef flats to shorelines is greatest at higher tidal stages (Brander et al., 2004) and in situations where the

wave height is small compared with water depth (Kench and Brander, 2006).

49. Once on reef flats, energy travels toward island shorelines. Studies have shown that the maximum size of waves on reef flats is controlled by water depth, with the maximum wave height approximately 0.6 times the water depth (Gourlay, 1994; Brander et al., 2004; Kench and Brander, 2006; Kench et al., 2009). Consequently, as water depth decreases toward shore wave height also diminishes. In addition waves can lose their energy through interaction with the reef surface. Consequently, this frictional loss in energy is dependent on the width of the reef flat surface. In general, reduction in energy increases with reef flat width (Kench and Brander, 2006).

4. Summary Coastal Processes Regime: South Tarawa

50. The physical condition of each section of coast results from the interaction of waves and currents with the existing coastline and the available supply of sand and gravel. The coastal process regime in South Tarawa represents a synthesis of the wind, wave and current processes that are able to influence the coastline transport sand and gravel, causing coastal erosion or coastal accretion (land building).
51. On coral reef systems the exposure of coastlines to energy (waves and currents) is controlled by:
 - The direction and magnitude of ocean swell that is delivered to the coral reef. In general prevailing swell propagates from the east around Tarawa.
 - The elevation and width of the reef which act to reduce incident ocean swell energy reaching shorelines. Coral reef platforms cause ocean swell to transform and break, releasing wave energy at the reef edge. In general, higher reef platforms are more efficient at promoting wave breaking. The reef platform at Tarawa is considered to be elevated and is exposed at lower tidal stages and is efficient at breaking incident wave energy.
52. Wave energy that is not released at the reef edge travels onto the reef platform where it can form secondary waves. In this instance wave breaking can occur at island shorelines. However, as waves travel across a reef platform interaction with the reef surface causes waves to lose their energy. Therefore, wider reef flats are more efficient at extracting energy from waves.
53. In summary wave energy is greatest on prevailing windward locations and where the distance from island shoreline to reef edge (the reef flat) is narrow. In contrast, wave energy is generally lowest at leeward locations and where the reef width is large.

C. Biological Environment

1. Coastal Resources

54. The coastal areas of Kiribati are characterized by white sandy beaches, reef flats, reef patches, lagoons, mangrove forests, extensive reef mud flats and sea grass beds. These areas contain a variety of habitats, numerous eco systems and marine organisms. The coastal areas support fishing, recreation, trade and communication. With constant mining of beach sand, gravel and other aggregates for construction

purposes the coastal areas are greatly threatened. The European Union (EU) is currently funding a project on Environmentally Safe Aggregates for Tarawa (ESAT) Project, implemented by SOPAC. The ESAT project aims to protect the vulnerable beaches of South Tarawa from damage caused by aggregate mining and provide an alternative supply of material through environmentally safe lagoon dredging. However the earliest implementation of the ESAT Project is expected to be sometime in 2012.

55. Ministry of Fisheries and Marine Resources is responsible for the management of marine resources including production of aggregates and sand from the coastal areas. Preventing the destruction of marine resources including coral reefs is necessary. Therefore, the KAP III Project will ensure that material to be used for shoreline protection works and expansion of water galleries will not cause significant adverse environmental impact on the coastal and marine environment. The proposed Project will use the sand and aggregate from the Government designated mining sites. This is important as a minimal impact option that does not harm the coastal / marine environment of Tarawa. The project will also take necessary precautions and measures to ensure that the construction activities will not pollute the lagoon environment.

2. Forest Resources

56. Except for a few uninhabited islands in the Northern Line Islands and the Phoenix Group, where - te buka (*Pisonia grandis*) and other wild trees grow, there are no natural forest of major significance in terms of size, age and biological diversity. Forests in the Lines and Phoenix are resting and nesting places for long distance flying migratory birds all the year round. Mangrove forests also exist on muddy shores and coastal beaches where water is calm and in areas that are protected from waves and strong currents. Mangrove rehabilitation is undertaken by the Government under the World Bank funded project, Kiribati Adaptation Project II (KAP II). It includes planting of mangrove in selected areas prone to coastal erosion and in areas to protect causeways. Several types of the mangroves are found in Kiribati namely the white mangroves (*Sonneratio alba*), the tongo buangui (*Bruguiera gymnorhiza*), te aitoa (*Lumnitzera littorea*), and the red mangrove (*Rhizophora stylosa*).
57. The expanded areas of groundwater galleries will normally be within private lands or private agricultural lands of coconut, breadfruit, bwabwai (swamp taro) and pandanus trees. Coastal protection measures would normally displace coastal shrubs like the saltbush, te ren (Tree heliotrope) *Tournefortia samoensis*, te uri (Guerttarda) *Guettarda speciosa*, and te kiaiai (Beach hibiscus) *Hibiscus tiliaceus*. These coastal shrubs are not endangered and have grown widely over the islands.

D. Socio-Economic Environment

1. Population

58. The population of Kiribati, as enumerated on 7 November 2005 consisted of 45,612 males and 46,921 females or a total of 92,533 people. This is an increase of 8,039 persons in 5 years compared to the 2000 census (84,494) with an annual rate of growth of 1.8%. Kiribati's population has

steadily increased since the 1930s when the first census was conducted (Figure 4). With a population of just under 30,000 people in 1931, 56,000 people in 1978, and over 90,000 in the year 2005, the Kiribati population more than tripled in size during the last 74 years.

59. Population growth varied extensively by Island and Island Groups. While the overall growth rate of Kiribati was 1.8% per annum, the Gilbert Group of Islands grew only at a rate of 1.4% while the Line and Phoenix Group of Islands grew at a very rapid rate of 6.7% per annum. Islands that experienced significant population increase include: South Tarawa (3,594); Kiritimati (1,684); Tabuaeran (782); Makin (694); Abemama (262); and North Tabiteuea (235).

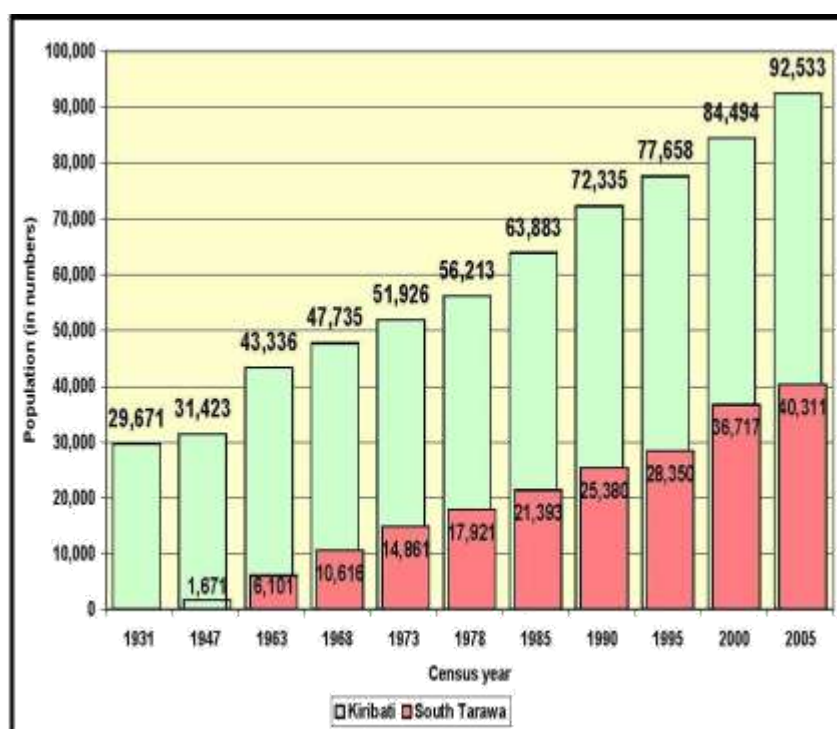


Figure 4: Population Size Kiribati and South Tarawa 1931-2005

60. Almost 44% of the population of Kiribati lived in South Tarawa in 2005. Its population increased from 25,380 in 1990 to 36,717 in 2000, to 40,311 in 2005. The census counted 13,999 private households with 88,644 household members, which is 6.3 persons per household on average. In South Tarawa 7.5 persons share a household on the average. Almost a third (26,798) of all persons that live in private households live in households with 10 persons or more, and 7,191 persons live in households with 15 persons or more. The long term trend of rural to urban (South Tarawa) migration has eased. The 2005 census data show a net flow of people from the Gilbert Group Islands towards the Line Islands during the inter-census period 2000-2005.

2. Economy

61. The country's economy is predominantly subsistence, with copra,

seaweed and fisheries as the main source of foreign exchange earnings. Kiribati's per capita GDP of US\$ 700, is one of the lowest in the world. Only 16% of the workforce participates in the formal wage economy and over 60% of all formal jobs are in South Tarawa. The monetary economy of Kiribati is dominated by the services sector, representing a GDP share of over 73%, and the public sector which provides 80% of monetary remuneration. Tourism is one of the largest domestic activities. Between 3,000 and 4,000 visitors per year provide \$5-\$10 million in revenue. Attractions include World War II battle sites, game fishing, ecotourism, and the Millennium Islands, situated just inside the International Date Line and the first place on earth to celebrate every New Year.

62. Most islanders engage in subsistence activities ranging from fishing to the growing of food crops like bananas, breadfruit, and papaya. The leading export is copra, which accounts for about two-thirds of export revenue. Other exports include pet fish, shark fins, and seaweed.
63. Kiribati Fish Limited is a recent Kiribati Government major investment to commence operations in late 2011 that will significantly increase the local fishing economy and also generate export income.

3. Infrastructure, Public Services and Utilities

64. The infrastructure of Kiribati is generally rudimentary. Whenever practicable, roads are built on all atolls, and connecting causeways between islets are also being built as funds and labour permit. The Public Utilities Board has an extensive reticulated system for water and sewerage for South Tarawa and electricity for the whole of Tarawa. The Public Services and Utilities now urgently require refurbishment and expansion to cater for the increase in population demand. A program to construct causeways between North and South Tarawa was completed in the mid-1990s. In 2008 the roads in Betio and Bairiki were improved with Japanese aid. Kiribati has about 640 kilometers (398 miles) of roads that are suitable for motor vehicles. All-weather roads exist in Tarawa and Kiritimati
65. In early 1998, work began on a major project to rehabilitate the port terminal and facilities at Betio. Financing for the project was provided by a grant from Japan of US\$22 million. There is a small network of canals, totalling 5 kilometers (3.1 miles), in Line Islands as well as ports and harbours such as Banaba, Betio, English Harbour, and Kanton. There are 21 airports, 4 of them with paved runways. Only Tarawa and Christmas Island are served by international flights.

V. ANTICIPATED ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

66. Safeguard measures have been incorporated in the Project as follows: (i) **Design-Preconstruction Phase**, the period before the actual construction starts and designs are being prepared (Section A). This allows the designers to incorporate the environmental management plan (EMP) in the project design, technical specifications and contract documentations; (ii) **Construction Phase**, the period from the time that

the — Notice to Proceed is given to the Contractor until the issuing of the — Certificate of Completion (Section B). The Contractor would construct the Project as per the design and technical specifications and implement the EMP; and (iii) **Operation and Maintenance Phase**, the period starting with the issuing of the — Certificate of Completion issued by the DOW until the end of the 20 year lifetime of the project (Section C).

A. Design/Pre-Construction Phase

1. Protection of Sensitive, Traditional Medicinal Plants and Ecologically Important Areas

67. The proposed KAP III Project development will improve and protect the environmentally sensitive areas (including traditional medicinal plants), and adverse impacts are not anticipated. However, during the preparation of the detailed design for the coastal protection and expansion of the groundwater galleries project, attention will be given to protect potential environmental sensitive areas and to minimize negative impacts on sensitive ecosystems, or the natural environment. Suggested measures to achieve this objective are:

- Identify environmentally sensitive or ecologically fragile areas (if any);
- Ensure construction personnel are aware of locations and importance of the sensitive areas and avoid disturbing them;
- If the proposed construction is located close to these areas, take necessary measures to avoid/minimize disturbance.

2. Environmentally Sound Design and Build Maintenance

68. Coastal protection works and construction of groundwater galleries and water systems may induce some soil and coastal erosion, but this will be minimized and avoided through proper design. This measures include:

- Choice of the location that gives the best economy in terms of excavation and fill.
- Choice of proper structural design for coastal protection works that is environment-friendly to the coastline and requires less maintenance
- Consider possible alternatives for construction materials (aggregates) to be sourced from environmentally safe sources within Kiribati or imported.
- Preservation of vegetation or revegetation of disturbed areas with plants that help bind sediments.
- Proper alignment of the walls along the coastline to reach the adjacent structure or headland.
- Proper handling and discharge of cross water flows from landside areas including roads and causeways.
- For the construction of the ground water galleries, consider

appropriate location that would not interfere with local communities livelihood.

3. Cultural Heritage

69. Historical sites from the World War II consisting large canons and bunkers are located along the beach in Betio area. However, these sites are located outside the project area. Except for burial grounds on the ocean-side of Bikenibeu village, no specific cultural / archaeological sites have been identified along the coastal areas of South Tarawa. However, in case cultural / historical heritage sites and including traditional medicinal plants are identified during the construction of KAP III Projects, the Contractor will be asked to stop work immediately and notify the KAP supervision consultant who in turn will notify the relevant Government agencies. Construction work will not commence until the KAP Office receives written permission to resume the work from the responsible Government agency.

4. Social or Community Concerns (Pre-Construction)

70. KAP III project is concentrating on protecting the coastline and adjacent important public assets. A separate project, Kiribati Road Rehabilitation Project (KRRP), financed by the World Bank and other Donors will rehabilitate the main highway in South Tarawa. Where there is commonality in construction, the two projects will seek to coordinate the implementation of the mitigation measures to maximize the synergy from the Projects. Coastal protection and water system improvements are generally aimed at bringing benefits to surrounding communities through improved utility services and prevention of land degradation from high tide overtopping and inundation. The coastal protection structures would also have a people friendly and safe design, e.g. by providing better access way or ramp to the reef through the wall structure. Coastal protection structures and rehabilitated water systems can lead to changes in the community or social environment around the build environment, influencing various aspects of lifestyles, public health patterns, social and economic activities.
71. No displacement of people will be required for the proposed Project. The proposed rehabilitation of water works will be carried out along the existing structures and already agreed upon gallery areas by the landowners. The only potential impacts are from the proposed coastal constructions to protect public assets.
72. Measures to minimize the social impact of any necessary land acquisition and compensation of loss of crops include:
- Identification of land acquisition needed, and trees and plants or other miscellaneous items which may be affected by gallery and water works reconstruction and rehabilitation, and compensation requirements;
 - Prior discussion of project impacts and proposed measures with the affected community; local government officers and

nongovernmental organizations.

- Conduct surveys before activities commence to identify all members of the affected population.
- Consult affected communities identified in the survey to seek their views and concerns on the project.
- Identification of other land-based natural resources, infrastructure, and services that may be impacted or lost to the affected community.
- Preparation of resettlement plan to address the land acquisition, trees/plants losses, and other social impacts.
- Public announcement through media to inform the general public particularly landowners

B. Construction Phase

1. Social / Community Concerns (Construction)

73. The objective is to minimize social disturbance and maximize community benefits from the Project. Measures to achieve this objective are:
- Inform the local community of the project plans in advance of the construction, and seek their views through public consultations. .
 - Avoid or minimize disturbances near living areas. Control run-off and manage sediments near farms / garden areas. Arrange employment and training for local people. Include women and other community groups in project activities.
74. The projected disturbances in the communities are minor and temporary, and the Contractor will implement appropriate mitigation measures and make suitable arrangements during the construction period. The general practice is that Contractors employ workers from the communities. The clan leaders will be consulted when recruiting workers for the Contractors.

2. Soil Erosion

75. Apply proper mitigation measures to ensure that impacts of surface erosion are temporary and minimized to acceptable levels. Measures to achieve these objectives are:
- Minimize work areas.
 - Keep vegetation clearing to a minimum.
 - Keep vehicles on defined tracks.
 - Construct the necessary temporary/permanent control structures.
76. Encourage re-vegetation as soon as the construction activities finish, or plan to immediately rehabilitate the disturbed sites after use.

3. Controlling Coastal Erosion

77. Coastal erosion from coastal construction activities can be mitigated to reduce and or improve their potential impacts. The more common amelioration strategies include:
- i. Minimise reef reclamations to encourage free flow supply of sediment to and along the coast.
 - ii. Restrict clearing of vegetation during construction and revegetate immediately after completion of construction, with plants that help to bind sediment.
 - iii. Restrict construction of seawalls, revetments, groynes which change the coastal processes, to within the beachfront and beachrock.
 - iv. Ensure coastal constructions are appropriately aligned to the coastline, securely connected to the adjacent headland, and at recommended height to prevent overtopping by high tides.
 - v. Ensure to obtain infill materials (reef mud) from approved designated existing pits.
 - vi. Minimise coastal mining and ensure to maximize the utilization of aggregates sourced from environmentally safe sources within Kiribati or imported.

4. Controlling Storm Water

78. Implementation of proper mitigation measures will ensure that the impacts are temporary and minimized to acceptable levels. The proposed mitigation measures are:
- Installing silt traps or other control structures at the outset of the construction.
 - Preparing all disturbed areas for re-vegetation or for natural revegetation.
 - Phasing and limiting ground disturbance to areas of a workable size.
 - Scheduling construction to limit disturbance of large areas of soil during wet seasons.
 - Avoid discharging of contaminated water to the lagoon.
 - Pass storm water run-off from construction areas through rocks or silt traps to remove soil and petroleum-based organic pollutants before disposal.

5. Management of Stockpiles and Spoil-heaps

79. To minimize dust and sediment run-off from material stockpiles and spoil heaps (if any) require proper management. Recommended measures are:
- Identify and agree on dumping locations with the government officials and local landowners including plans for future use of the spoil materials.

- Include all drainage provisions suggested for construction sites in the site plans.
- Choose the locations of waste spoil piles to avoid blocking surface run-off or drainage ditches.
- Cover all spoil heaps or stockpiles during rainy season to prevent erosion and sediment run-off.

6. Dust Control

80. Dust nuisance created by construction of KAP III projects will be minimal because the coastal construction works will mainly use sand and reef mud that does not emit dust. However, to control unnecessary dust from the construction water works, the Contractor will:
- Spray water on exposed surfaces during dry periods especially near schools, hospitals, rural communities, etc.
 - Cover all dust generating loads carried in open trucks

7. Noise Control

81. Noise mainly affects urban areas, villages, hospitals, schools, etc. located near construction sites. To control noise during water works and coastal construction the recommended measures are:
- Use modern and well-maintained equipment with mufflers.
 - Use temporary noise screens or mounds near residential areas, when appropriate.
 - Carry out noisy construction activities during normal working hours.
 - Advise schools, hospitals, churches, etc. when there will be unusual or unavoidable noise during construction.

8. Aggregate Management

82. Aggregates for the KAP III Project will be sourced from strategically designated coastal areas. The aggregate will be mostly sand and reef mud from adjacent build up coastline areas. Measures to address potential environmental impacts are:
- Avoid overloading trucks and cover trucks to minimize dust and loss of load from trucks during transportation;
 - Maintain mixing plants in good working condition so as to reduce emission from the plant.
 - Implement safety procedures to reduce the potential for road accidents in village or urban areas
 - Minimise coastal mining and ensure to maximize the utilization of aggregates sourced from environmentally safe sources within Kiribati or imported.
 - Ensure to source aggregates from approved designated mining sites; if required

83. Ensure that the Contractors have obtained the requisite permits and clearances from the Environment and Conservation Division (ECD) of the Ministry of Environment, Land and Agricultural Development (MELAD). The Environmental Licence will be one of the conditions required prior to starting the construction work.

9. Offsite and Waste Management

84. To manage waste the objective is to avoid contamination from solid waste and sewerage. Suggested measures to achieve this objective are:
- Contain all stored wastes within the construction sites.
 - Undertake solid waste sorting to separate organics and non-organics.
 - Properly dispose of all used fuel and lubricant oils in environmentally sound manner, either by recycling or for other use such as fuel for hot mix plant, etc.
 - Crush, burn and bury all inorganic solid waste in an approved solid waste disposal area.
 - Remove all disabled machinery from the project area.
 - Use above-water table pit latrines or composting toilets at construction sites or utilize adjacent village toilets.
 - Compost all green or organic wastes or use as animal food.

10. Safety and Health

85. Occupational health and safety risks of construction works can be limited by clearly defining procedures for handling construction materials and operating heavy equipment, etc. Specific equipment and training may be needed to:
- Ensure all occupational health and safety requirements are in place on construction sites and in work camps;
 - Train construction workers and management personnel in the proper use of personal protection equipment (PPE) and record keeping.
 - Install proper safety / cautionary signs when construction is encroaching onto roads, through villages, near markets, schools and other community facilities.
 - Ensure that safety and inspection procedures for safe handling of toxic materials and other hazardous substances are in place before construction commences.
86. General Health and Safety Awareness for construction workers will include:
- Introduce and train Contractor's personnel with health and safety issues in construction sites and basic hygienic practices to minimize spread of diseases;
 - Increase awareness by providing information on methods of

transmission and protection measures for HIV/AIDS and STD.

- Prohibit drugs and alcohol on construction sites; and
- Make available medical assistance in emergency or non-emergency situations and information on other health related assistance.

11. Site De-commissioning / Rehabilitation

87. To minimise ongoing impacts after construction is completed, the Contractor will be responsible for proper decommissioning and rehabilitation of the temporary construction camp sites. Recommended measures to achieve this objective are:

- Rake or loosen all compacted ground surfaces.
- Implement revegetation/rehabilitation of the sites involving, where possible, local women's/community groups.
- Undertake public consultation to get the feedback of local communities on the project.

C. Operational Phase

1. Public Safety

88. Public assets safety features will be included as an essential element in the design for water works and coastal construction projects, particularly where the build assets are within village areas or urban settlements.

89. Community requirements for the build assets' safety measures will be discussed with the affected communities during the initial awareness and community consultations program, and their inputs will be integrated into the design phase. Issues which will be incorporated into detailed design for specific projects in more densely settled areas include:

- Measures to avoid accidental falls and slippage for recreational uses of seawalls.
- Prevention of unauthorised access (especially children) to current and future water galleries / reservoirs to prevent accidental drowning of children and water pollution.

2. Rehabilitation and Maintenance Practices

90. Routine maintenance refers to activities such as grading, grass cutting, drain clearing, and detecting leakages in water systems and repairing wear and tear in coastal constructions. Routine maintenance is performed at regular intervals. Periodic maintenance activities are typically scheduled over periods of several years and may include resurfacing and repairs. Other maintenance activities considered to be periodic include seasonal maintenance, such as surface water flood repairs, emergency maintenance to reinstate damaged coastal defence structures, and the regular upkeep of safety features and the water system. The government will ensure that there is sufficient funding

available to carry out routine and periodic maintenance of the KAP III Projects.

VI. ANALYSIS OF ALTERNATIVES

91. Enhancing the only water resource harvesting system and protecting that system from climate change and climate variability is the only feasible option to ensuring that the system meets the basic water quantity and quality needs of the community. So there is no immediate alternative.
92. With the implementation of the project, economic development of South Tarawa may be enhanced. South Tarawa population would become better-off in terms of water supply and their welfare considerably improved as the basic necessity of life—water—becomes more readily available. The productivity of the individual and communities will be significantly induced and would in turn, spur economic development as contented people go about their own entrepreneurial ways.
93. Health risks such as the occurrence of diarrhoea and other water borne diseases will be reduced since there will be better quality drinking water available for all communities. The Project will provide sufficient safe drinking water so that well water, often contaminated, is no longer used for drinking.
94. Without the implementation of the project, the conditions of the water reticulated system will remain inadequate and inefficient and will deteriorate because of significant breakages/leakages in the system that makes the reticulated system inefficient and in turn encourage vandalism due to frustration with the system. The economic development of the area will remain stagnate as people will not be content with utility services. Large part of South Tarawa communities will still use well water for drinking and thus will be at constant risk of water borne diseases. Hence, the implementation of the KAP III Project on the improvements to water resource use and management, and enhancement in coastal resilience to protect public assets is a necessity.
95. The main alternatives considered with regard to coastal protection design options were the locations of the walls and, importantly, material selection. Cement concrete, rocks and sand supply are important considerations. The Project will utilise the World Bank and GOT approved KAP II FS6-Shoreline Protection Design Guidelines to determine the appropriate locations and design to use at the given locations. This will help the Contractors to minimise the potential negative impact of the Project. The construction materials –sand and coral mud – will be procured from Government approved sources.

VII. INFORMATION DISCLOSURE, CONSULTATION, AND PARTICIPATION

96. As required by the World Bank Safeguards Policies, public consultations were undertaken during the preparation of EMP. Preliminary

consultations were undertaken on November 2010 during the field visit to Tarawa.

97. A public consultations workshop and information disclosure was carried out on February 11, 2011 and the workshop records are attached as Annex C. The workshop participants included village representatives of South Tarawa, women groups, church representatives, KANGO, council representatives, and government agencies.
98. The KAP III EMP was well accepted by the participants partly because of preceding presentation of KAP II experiences which explained also that the similar project interventions will be implemented in KAP III and similar environmental management and monitoring measures will be applied as discussed in the EMP.
99. The workshop however made a specific recommendation for change in the EMP. This being the addition / inclusion of traditional medicinal plants to the protection of (sensitive) natural areas as an environmental issue to be considered in the Design and Pre-Construction Phase of the Project.
100. Another important issue raised during the EMP workshop was on the appropriateness and effectiveness of the seawall design with a boat ramp. Although the KAP II design is currently providing safe and workable infrastructure, the workshop cautioned that the current design is best protection for the predominant easterly wind climate patterns that South Tarawa now enjoys. Adverse weather patterns are associated with predominantly westerly winds and if and when the westerlies return then the seawall ramp design may become inappropriate as it is specifically designed for protection against the easterly winds.
101. The EMP will be disclosed to the Public and will be available locally to the communities at the KAP III PMU, MPWU, Community Centres and Teinainano Urban Council and Betio Town Council offices.

VIII. GRIEVANCE REDRESS MECHANISM

102. As with KAP II the KAP III PMU will receive and document issues and concerns that the local populace and stakeholders will have relative to the project and its implementation. Resolution of these issues and concerns will be undertaken expeditiously so as to minimize any impacts that may affect the project implementation. Through implementation of KAP II pilot projects, the KAP PMU has gained considerable experience in dealing with project grievances.
103. The following process will be followed to address the issues and concerns that stakeholders and Affected People may have on the proposed development:
 - The first step towards resolution of issues and concerns relevant to project is the filing of a formal notice/complaint by the Affected Person/People (AP) with the KAP office. For minor complaints such as excessive dust, noise, safety violation, the person

assigned to supervise environment and social aspects by the Supervising Engineer will respond within 24 hours of lodging the complaint and a resolution will be conveyed to the AP within 48 hours. For more substantial complaints about land occupation, damage by contractor's equipment, drainage issues, etc. the Supervision Engineer will respond within 24 hours and set up further discussion/meetings with the complainant to reach a satisfactory resolution acceptable to all parties within seven days. For land issues, the timeframe may be longer.

- The KAP office will maintain a register where all complaints are logged by: date, name and contact address and details of the complaint. A duplicate copy of the register entry will be given to the AP for their record. The AP may, if so desired, discuss the complaint directly with the Director of KAP or its representative at a mutually convenient time and location. If the complaint of the AP is dismissed the AP will be informed of his/her rights in taking the complaint to the next step. However, every effort will be made to resolve the issue to the mutual satisfaction of both the parties.
- Should the AP be not satisfied with the decision of the KAP, the AP may file a written complaint with the Environment and Conservation Division (ECD) of the Ministry of Environment, Land and Agricultural Development (MELAD) only if the complain concerns environmental issues. The time horizon for the investigation and resolution of the complaint will vary depending on the nature of complaint and the investigating officer of the ECD.
- Should the AP still be not satisfied with the decision of the ECD-MELAD, the AP may then take the grievance to the Kiribati Judicial System. This will be at the AP's cost but if the court shows that KAP have been negligent in making their determination the AP may seek costs.
- Additionally, the KAP Land Acquisition and Resettlement Framework (LARF) details specific measures relating to grievances.

IX. ENVIRONMENTAL MANAGEMENT PLAN

A. Overview

104. The proposed KAP III Project will build on KAP II best practices in designing and implementing adaptation measures in water and civil works, and no specific risks are foreseen with the Project activities aside from possible land acquisition, and disturbance to the adjoining areas. Possible impacts are detailed above and will be mitigated during the design/pre-construction, construction, and operation Phases, as summarized in the Environmental Management Plan.

105. This Environmental Management Plan was developed in accordance with

the World Bank's Environmental Management Plan (EMP) guideline and is considered to be equivalent with the Basic Environmental Impact Assessment; a requirement of the Kiribati Government's Environment Act, 2007, An Act to Amend the Environment Act 1999. However the EMP shall be reviewed and updated after the completion of the final design of the project. According to the Act, KAP will need to comply with environmental requirements as detailed in the EMP and lodge an application on relevant sub-components of KAP III to secure Environment License from the Ministry of Environment, Lands, and Agricultural Development (MELAD) before the Contractors can commence construction

An environmental assessment of the proposed KAP III adaptation measures in water and civil works project concluded that the construction impacts will be minor, reversible and manageable if the mitigation measures as given in the EMP are properly implemented. The EMP (Table 2) is based on the type, extent and duration of the identified environmental impacts. The EMP has been prepared by close reference to best practices and in line with the *World Bank's Safeguard Policies*. The effective implementation of the EMP will be audited as part of the Grant conditions. In this regard, the KAP III PMU (the Implementing Agency) will guide the design and supervision engineers and contractors on the implementation of the EMP.

106. Prior to implementation of the Project, and upon completion of the detailed design, the EMP will be reviewed and updated by the KAP III PMU to ensure that it complies with the proposed design and any additional changes made at the design stage (e.g. location, scale, source of materials, safety, etc.) and which have impacts on the environment are reflected in the EMP

B. Environmental Management Plan

107. The findings and proposed mitigation measures have been compiled into an Environmental Management Plan (EMP). It summarizes the major anticipated environmental impacts and their associated mitigation measures during the design, construction and operational phases. It makes reference to the relevant law and contract documents, approximate location, timeframe, mitigation costs (in US Dollars), and the responsibility for its implementation and supervision.
108. The recommendations and proposed mitigation measures will be attached to the Project Bidding Documents and subsequently included in the construction contracts. It is anticipated that the total costs for environmental mitigation would be minimal based on the KAP II experience and because, many of the mitigation measures will be incorporated as part of the standard design and construction practices and as such their costs will be included in the construction cost.

1. Design/Pre-Construction Phase

109. Experience shows that inadequate application of the EMP by the contractor may occur due to weak linkages of the EMP with the contract documents. The EMP is a part of the work program and as such it must be addressed by the contractor and carried out as required.
110. In the Bid and Contract section — “Special Conditions of Contract”, the Project Supervision Consultant (PSC) of the KAP III PMU will, prior to the tender being called, revise and update the EMP taking into account the requirement of the Environment act and also based on detailed design, for inclusion in the Bid and Contract documents. The contractor will use this document to cost his compliance with the EMP.
111. Bid evaluation and selection of contractor: The contractor will be required to provide a short statement that confirms that:
- the EMP conditions have been included in the bid price,
 - the contractor has experience of working with an EMP,
 - the contractor has a qualified and experienced person on the contractor’s team who will be responsible for the environmental compliance requirements of the EMP.
 - The contractor is aware of requirements of the Environment Act 1999 (as amended 2007) and willing to comply with.
112. Land acquisition and compensation is not anticipated to be an issue but will be discussed with the affected communities, including identification of potential land to be acquired, trees and plant or other affected by water and coastal construction works, and compensation requirements. KAP III PMU will discuss measures with the affected community and work with the local government officers to implement land acquisition and provide compensation as described in the Socioeconomic Study and Livelihood Restoration Analysis of KAP III and in accordance with the national Land Acquisition and Resettlement Policy Framework.

2. Construction Phase

113. During the construction the contractor will work according to the requirements of the Contractor’s Environmental Plan (CEP) based on the EMP. The CEP will be prepared by the contractor and approved by the Project Supervising Engineer (PE). Supervision and monitoring of the CEP activities will be undertaken as follows;
- The Contractor has the initial responsibility for preparing and implementing the CEP as per the works contract.
 - The Project Supervising Engineer (PE) will direct the contractor with regard to compliance with the CEP.
 - The Project Supervising Consultant (PSC) of KAP will carry out independent monitoring of the work and can issue Defect Notices to the PE who will transmit these to the contractor.
 - The Contractor will have his own representative on site – the Site

Engineer (SE) who will be responsible for implementing the contract and complying with the CEP.

114. Contractor prepares CEP: following the award of the contract and before commencing the work the contractor will prepare the Contractor's Environmental Plan (CEP) that addresses the conditions of the construction in the EMP that has been attached to the Bid and Contract Documents. The CEP will amplify how the contractor will address the activities in the construction section of the EMP. The contractor will submit the CEP to the PSC of KAP III PMU for approval.
115. Induction of contractor to site: Following the selection of the contractor and the approval of the CEP, the contractor together with the person on the contractor's staff who will be responsible for supervising the CEP (Environment Officer) will meet on-site. If the plan is appropriate and implementable, the Environment Officer will advise the PE that the contractor can now commence work.
116. Preparation of site and establishment of contractor's facilities: This applies to all of the contractor's facilities, storage areas, workshops, labour camps (when needed), and concrete mixing areas, etc. The location and development of the contractors' facilities will be approved by the PE. The sites will be selected so that:
 - They do not interfere with the environment and social well being of the surrounding communities re noise, dust, traffic, vibration, etc.,
 - The size of contractor 's facilities are limited to absolute minimum to reduce unnecessary clearing of vegetation, sanitary waste and grey waters are treated before release into surface water systems,
 - The sites are properly drained. Paved areas, including vehicle parking areas, workshops and fuel storage areas will drain to an oil and water separator, and
 - Fuel storage areas are not located within 10m of a water course. The contractor's facilities are to be contained within an adequate security fence.
117. Clearing of sites and removal and disposal of vegetation:
 - Wherever possible limit areas to be cleared and avoid excessive machine disturbance of the topsoil.
 - Wherever practical 10m wide buffer zones are to be established at sites abutting to the lagoon.
 - Cleared material is to be piled into manageable sized heaps according to disposal or re-use requirements.
118. Prevention of soil erosion on construction site: The contractor will be responsible for ensuring that the erosion is contained by appropriate soil conservation protection methods. This is particularly important since the work locations are close to the lagoon. The contractor will:
 - Limit the extent of excavation to reduce soil erosion potential.
 - Apply soil conservation protection methodology to susceptible areas to prevent / minimize storm water runoff carrying eroded

materials offsite.

- Avoid excavation and operating machinery in wet ground conditions.
- Upon completion of works, the contractor will ensure that all excavated areas are properly stabilized. This includes the rehabilitation of all disturbed areas by the most appropriate and effective method.

119. Storage and handling of construction materials, fuel and lubricants: Construction materials will include aggregates, gravel and cement for concrete manufacture, reinforcing rods and steel mesh, wood and other construction materials, fuel and lubricants, etc. Fuel and oil will be stored in dedicated areas at least 10m away from the lagoon areas. Where fuel in excess of 5000 litres is stored on site, it will be stored in sealed tanks on a concrete base that is bunded to hold 110% of the tank capacity. All workshops would be provided with oil and water separators. Vehicles and machinery will not to be refuelled within 10m of the lagoon. The contractor must have trained personnel who are competent in fuel handling procedures and for cleaning up accidental spills. Any major spill in the vicinity of the lagoon will be reported to MELAD. All waste oil, oil and fuel filters will be collected and disposed off in secure landfill areas. At the closure of the site, all contaminated soil will be excavated, removed and replaced with fresh topsoil from the stockpile of cleared topsoil.
120. Noise and Vibration: this applies to all machinery, vehicles and construction sites where noise and vibration may affect susceptible receptors. Whilst Kiribati does not have noise and vibration standards, the contractor should abide with WHO standards and will be responsible for ensuring that noise and vibration does not affect the adjacent communities. While it is unlikely that noise and vibration will be an issue due to the large distances between the activities and the communities the contractor will confine all work to daylight hours (0700hrs - 1900hrs) should the community find that any night time operations become a nuisance.
121. Dust management: this applies to all of the construction sites. During construction when dust may be generated the contractor will monitor the worksite conditions and apply dust control measures which includes reducing construction traffic movements and spraying well-water on exposed areas. In dry season, availability of water may be a problem.
122. Community safety from increased vehicle movements: this applies to all vehicles and particularly to haul trucks that pass through villages. The contractor will ensure that all vehicles which pass through villages are operated safely without endangering these communities. The contractor will ensure that:
- all trucks and equipment are maintained in a safe operating condition,
 - all drivers and machinery operators are properly trained and act responsibly,

- all loads are secured and all loads with potential dust generating materials (e.g. excavated soil and sand) will be covered with tarpaulins,
 - the contractor will immediately remove any drivers that ignore any of the community safety requirements.
123. Safety and Hazard: Before commencing work, the contractor will be required to identify potential hazards and where appropriate, prepare an emergency response plan to address serious accidents and nominate a person who will be immediately contacted should an accident occur. The emergency response plan will be submitted to the PSC for approval one week prior to starting work.
124. The contractor will be required to keep the site free of drugs and alcohol.
125. The contractor will be required to provide a safe work environment and provide safety measures and protective equipment to all workers including; hand, head, eye and ear protection and safety footwear.
126. The contractor will provide first aid facilities on-site and employ a trained first aid person.
127. The contractor will provide supplies of potable water, toilets and wash water to the workers.
128. Disposal of waste materials: All construction waste materials including empty drums, lumber, sand and gravel, cement bags etc are to be suitably disposed of. If these cannot be recovered for scrap value these materials should be taken to an approved landfill sites for safe disposal.
129. Clearance and rehabilitation of construction sites and removal of contractor's facilities: It is the contractor's responsibility to address site cleanup. This includes the removal of all waste materials, machinery and any contaminated soil. All construction sites and work areas will be rehabilitated so that these can be returned as close as possible to their previous uses. This includes the stabilization and landscaping of all of the construction sites. No waste will be left on site after the work is completed. Should the contractor fail to remove the waste, as stipulated in the contract agreement, the KAP is entitled to withhold payment and arrange the clean up and deduct the cost of the clean up and appropriate administrative charges from the final payment.

3. Operational Phase

130. People Safety: During operation, the Project safety features will include (i) fencing of water gallery reservoirs to prevent unauthorised access by children and others and to prevent accidental drowning, (ii) seawalls will have safety access ramps for launching boats and canoes, and (iii) sufficient supply of safe drinking water
131. Water Works and Coastal Protection Structures Maintenance: Routine maintenance (grading, grass cutting, drain clearing, leakage and damage repairs) will be undertaken on regular basis. Seasonal maintenance such as seawall repairs after a storm, emergency maintenance to ruptured pipes, and the regular upkeep of safety features and road signs will be

undertaken as necessary.

C. Environmental Monitoring Plan

132. A monitoring plan for the proposed Project (Table 3) has been prepared. The main components of the monitoring plans include:

- Environmental issue to be monitored and the means of verification,
- Specific areas, locations and parameters to be monitored;
- Applicable standards and criteria to be used;
- Duration and frequency and estimated monitoring costs; and
- Institutional responsibilities for monitoring and supervision.

133. The cost of implementing the monitoring plan during the construction phase will be around \$20,000. This estimated cost will be reviewed and revised once site specific and detailed design has been completed.

134. A field monitoring checklist has been prepared based on the EMP and monitoring plan at Annex D. The field monitoring checklist will be used by the supervising field engineers. The signed checklists will be provided to the KAP III PMU / MPWU who will be responsible for the appropriate follow-up and compliance reporting.

135. The KAP III PMU will maintain a Complaints Database, which will contain all the information on complaints received from the communities or other stakeholders and the response to the complaints. This should include: the date and time of complaint received, type of complaint, location, actions taken to address these complaints (where, when, how, by whom), and the final outcome.

D. Institutional Implementation and Reporting Arrangements

1. Project Implementation

136. KAP III PMU will be responsible for the implementation and compliance with the EMP and Monitoring Plan. Day-to-day implementation and compliance will be the task of PSC of Kiribati Adaptation Project. The PSC will ensure that the Contractor's Project Engineer (PE) and Environment Engineer (EE) complete their own Contractor's Environment Plan (CEP) in accordance with the EMP design recommendations, and submit the Plan to the PSC for approval before implementation. PWD of the Ministry of Works and Public Utilities would provide technical assistance and assist with contract labour to the Project Contractor as necessary.

2. Reporting Arrangements

137. The findings of the regular monitoring activities, as specified in the Monitoring Plan (Table 3) will be included in the quarterly PSC progress reports. The Environment Engineer (EE) assigned for environmental and social affairs of the Project will be responsible on behalf of the Contractor, for the preparation of Environmental Safeguard sections of the quarterly progress reports to the PSC of KAP III PMU. The reports will include an overview of the status of the implementation of the EMP's and compliance to the national environmental regulations. The PSC progress reports will be submitted for information to the Office of the President, ECD-MELAD, and the World Bank.

TABLE 2: ENVIRONMENTAL MANAGEMENT PLAN

ENVIRONMENTAL ISSUE AND OBJECTIVE	MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ESTIMATED MITIGATION COSTS ⁱ	IMPLEMENTATION	SUPERVISION
DESIGN / PRE-CONSTRUCTION PHASE						
<p>Protection of (sensitive) Natural areas and Traditional Medicinal Plants</p> <p>To minimise negative impacts on sensitive ecosystems, traditional medicinal plants or the natural environment</p>	<ul style="list-style-type: none"> Identify potential environmentally sensitive/natural areas/medicinal plants Locate optional construction sites /activities away from them Ensure construction personnel are aware of locations to avoid them If the proposed construction passes close to these areas, include temporary fences to restrict machines and activities from encroaching the area. 	Some sections of the water and coastal construction areas	During project preparation and design	Minimal (part of standard design practices)	KAP/PSC	ECD and World Bank
<p>Environmentally Sound design</p> <p>To avoid erosion and damage to the water and coastal constructions</p>	<ul style="list-style-type: none"> Use only approved aggregate and sand in secured and bermed storage sites. Only approved disposal sites shall be used Identify sections of construction works that will require revegetation immediately after rehabilitation Temporary and permanent drainage systems shall be designed to minimise erosion and impacts on adjacent coastal areas Choice of proper structural design for coastal protection works that is environment friendly to the coastline and requires less maintenance. Consider possible alternatives for construction materials (aggregates) to be sourced from environmentally safe sources within Kiribati or imported. Choice of the location that gives the best economy in terms of excavation and filling. Proper alignment of the walls along the 	Entire constructions of water and coastal protection works	During project preparation and design	Minimal (part of standard design practices)	KAP/PSC	ECD & World Bank

ENVIRONMENTAL ISSUE AND OBJECTIVE	MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ESTIMATED MITIGATION COSTS ⁱ	IMPLEMENTATION	SUPERVISION
	<p>coastline to reach the adjacent structure or head land.</p> <ul style="list-style-type: none"> • Proper handling and discharge of cross water flows from land side areas including road and causeways. • For the construction of the ground water galleries, consider appropriate location that will not interfere with local communities livelihoods. coastline to reach the adjacent 					
<p>Project Safety</p> <p>To avoid accidents during and after construction of water and coastal projects</p>	<ul style="list-style-type: none"> • Construction campsites, construction storage sites, waste disposal sites, and cement mixing sites are identified to minimize impacts on the environment and human beings • include occupational health and safety requirements are in place on construction sites. • Include safety instructions for the construction activities in the contract document. 	Entire constructions of water and coastal protection works	During project preparation and design	Minimal (part of standard design practices)	KAP/PSC	ECD & World Bank
<p>Cultural Heritage</p> <p>To avoid any serious damage to cultural heritage sites (i.e. ceremonial and burial sites)</p>	<ul style="list-style-type: none"> • In case a cultural heritage site is identified during the construction, the Contractor will cease to work immediately and notify the PSC 	All potential cultural sites	During project preparation and design	Minimal (part of standard design practices)	KAP/PSC	ECD & World Bank
<p>Social or Community Concerns</p> <p>To minimise social impact of an relocation or resettlement of people</p>	<ul style="list-style-type: none"> • Plan activities to avoid/minimise displacement of residents • Discuss the projected impacts and negotiate proposed measures in advance with the affected community; work with local government officials and NGOs • Conduct surveys before activities commence to identify all members of affected populations • Identify other land based natural resources, infrastructure and services which may be lost to the affected 	All along the alignment of water and coastal protection works	During project preparation and design	To be determined	KAP/PSC	ECD & World Bank

ENVIRONMENTAL ISSUE AND OBJECTIVE	MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ESTIMATED MITIGATION COSTS ⁱ	IMPLEMENTATION	SUPERVISION
	<p>community</p> <ul style="list-style-type: none"> Identify suitable land (if possible, land having the same clan ownership) for resettlement. Make public announcement through media to inform the general public particularly land owners. 					
To minimise damage to personal and community property	<ul style="list-style-type: none"> Ensure works will be restricted to the minimum requirements to avoid encroaching on other land properties. Ensure projected impacts and proposed measures have been discussed in advance with the affected community and other stakeholders Conduct surveys before activities commence to identify all members of affected populations. 	All properties close to all KAP III water and coastal protection works	During project preparation and design	To be determined	KAP/PSC	ECD & World Bank
CONSTRUCTION PHASE						
<p>Social or Community Concerns</p> <p>To avoid any serious damage to cultural heritage sites (i.e. ceremonial and burial sites)</p>	<ul style="list-style-type: none"> Advise the local community of project plans in advance of construction, and involve them in planning as necessary. Avoid or minimise disturbances near living areas, schools, health centres, etc. Control runoff and manage sediments near plantations/cultivated areas Arrange employment and training for local people Include women and other community groups in project activities. 	All along the alignment of water and coastal protection works	During mobilisation and commencement of construction activities in the communities	Minimal (part of standard design practices)	Contractor	KAP/PSC
<p>Soil instability and Erosion</p> <p>To minimise the amount of sediment/soil lost from the construction site</p>	<ul style="list-style-type: none"> Keep vegetation clearing to a minimum Construct necessary temporary/permanent control structures Reduce the time surfaces remain bare Encourage re-vegetation immediately after construction activities finish. 	All areas where clearing is required	Continuous	Minimal (part of standard design practices)	Contractor	KAP/PSC

ENVIRONMENTAL ISSUE AND OBJECTIVE	MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ESTIMATED MITIGATION COSTS ⁱ	IMPLEMENTATION	SUPERVISION
<p>Controlling Coastal erosion</p> <p>To minimise the amount of beach sediment lost from the coastal protection works</p>	<ul style="list-style-type: none"> • Avoid dredging of aggregate materials from adjacent reef flat , rather, use sand build up areas for coastal protection works • Ensure the coastal wall structure is correctly aligned with coastline to limit changes in sediment transport, wave and current conditions • Ensure coastal wall structures have their ends connect to adjacent headlands to prevent overtopping by waves causing erosion • Re-vegetate around coastal construction areas using vegetation that helped to bind sediment • Restrict human activities e.g. sand mining, around the construction site. • Ensure to obtain infill materials (reef mud) from approved designated existing pits. • Minimise coastal mining and ensure to maximise the use of aggregates sourced from environmentally safe sources within Kiribati or imported. 	<p>All areas where coastal construction is required</p>	<p>Continuous</p>	<p>Minimal (part of standard design practices)</p>	<p>Contractor</p>	<p>KAP/PSC</p>
<p>Controlling Storm water</p> <p>To minimise the impact of contaminated runoff water</p>	<ul style="list-style-type: none"> • Divert runoff from non-construction areas to segregate non contaminated drainage from construction runoff • Pass storm water runoff from construction areas through silt traps before discharging into the sea • Store oil etc., in a container located away from drainage ditches. 	<p>All areas where clearing is required</p>	<p>Continuous</p>	<p>Minimal (part of standard design practices)</p>	<p>Contractor</p>	<p>KAP/PSC</p>

ENVIRONMENTAL ISSUE AND OBJECTIVE	MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ESTIMATED MITIGATION COSTS ⁱ	IMPLEMENTATION	SUPERVISION
Management of Stockpiles and Spoil-heaps To minimise dust and runoff	<ul style="list-style-type: none"> • Discuss dumping locations with local landowners • Ensure stockpile or spoil-heap locations do not block surface runoff or drainage lines • Cover or re-vegetate spoil-heap or stockpiles if prolonged exposure is expected, to minimise erosion and sediment runoff • discuss reuse of spoil materials with local landowners or community groups • Where possible spoil should be used to level low lying areas or waste disposal pits before revegetation. 	Dumping areas	Continuous	Minimal (part of standard design practices)	Contractor	KAP/PSC
Dust Control To minimise health risk or inconvenience due to dust production	<ul style="list-style-type: none"> • Spray water on exposed surface during dry periods, especially near schools, hospitals and community areas • Ensure trucks are not overloaded and are covered when transporting friable materials. 	Cleared areas, material transport	During dry periods	Minimal (part of standard design practices)	Contractor	KAP/PSC
Noise Control To minimise nuisance from noise	<ul style="list-style-type: none"> • Use modern and well maintained equipment with mufflers • Use noise screens or mounts near residential areas • Carry out noisy construction activities during normal working hours • Advise local people, schools, hospitals, etc. when there will be unavoidable noise activities. 	All construction areas, access routes	Continuous	Minimal (part of standard design practices)	Contractor	KAP/PSC
Material Management To minimise impacts of materials delivery and waste disposal	<ul style="list-style-type: none"> • Develop materials delivery and waste disposal handling plans • Develop site sediment control plan • Develop safety measures to avoid loss of load (e.g. reef mud) from trucks • Implement methods to reduce dust emission from the loads • Put into practise safety methods to reduce potential road accidents in villages or urban areas. Restrict peak traffic delivery 	All materials management areas	Continuous	Minimal (part of standard design practices)	Contractor	KAP/PSC

ENVIRONMENTAL ISSUE AND OBJECTIVE	MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ESTIMATED MITIGATION COSTS ⁱ	IMPLEMENTATION	SUPERVISION
	<ul style="list-style-type: none"> Develop safety measures which ensure stability of exposed faces or waste material stockpiles. 					
Offsite and Waste Management To prevent/minimise contamination from solid wastes and sewerage	<ul style="list-style-type: none"> Contain all solid waste within construction sites During site clean-up collect all spilled fuel oils Crush, and bury all inorganic solid waste in an approved disposal area Remove all disabled machinery from the project area Use above-water table pit latrines or portable toilets at construction sites or borrow adjacent village toilet facilities Compost or use as animal food all green or organic wastes. Undertake solid waste sorting to separate the organics and non-organics. 	All off sites storage and disposal sites	Continuous	Minimal (part of standard design practices)	Contractor	KAP/PSC
Safety and Health To ensure maximum safety of construction personnel and local residents	<ul style="list-style-type: none"> Ensure all occupational health and safety requirements are in place on construction sites and in work camps Install cautionary signs in hazardous areas Schedule construction activities to limit exposure to dust, noise, etc. Enhance safety and inspection procedures Use Personal Protection Equipment (PPE) 	All construction sites	Continuous	Minimal (part of standard design practices)	Contractor	KAP/PSC
General Health and Safety Awareness for Construction Workers	<ul style="list-style-type: none"> Train and familiarise workers about health and safety issues on construction sites including main areas of risk to workers and others Education on basic hygiene practices to minimise spread of tropical diseases Increase workers' HIV/AIDS and STD awareness, including information on methods of transmission and 	Construction camps	Continuous	Minimal (part of standard design practices)	Contractor	KAP/PSC

ENVIRONMENTAL ISSUE AND OBJECTIVE	MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ESTIMATED MITIGATION COSTS ⁱ	IMPLEMENTATION	SUPERVISION
	protection measures <ul style="list-style-type: none"> • Prohibit usage of drugs and alcohol on construction sites • Post notices about seeking medical assistance in emergency or non-emergency situations and procedures for seeking other health related assistance. 					
Site de-commissioning To minimise ongoing impacts after construction is complete	<ul style="list-style-type: none"> • Rake or loosen all compacted ground surfaces • Establish a site re-vegetation plan. Where possible involve local women's groups and community groups to provide materials to implement re-vegetation. • Undertake public consultation to the communities to get the feedback on the project 	All construction and camp sites	After completion of construction	Minimal (part of standard design practices)	Contractor	KAP/PSC
OPERATIONAL PHASE						
Peoples Safety To enhance safety and welfare following increase in availability of safe drinking water	<ul style="list-style-type: none"> • Securely seclude the water galleries from encroachment of squatters to prevent possible contamination of the galleries. • Fence off all water holes to prevent access by children and accidental drowning • Display public notices to warn nearby residents to avoid damages to the completed/repared water and coastal protection structures • Advertise widely, the availability of safe drinking water from PUB and to avoid drinking well water 	All project sections	As required	part of standard design practices	KAP	KAP/OB
Rehabilitation and Maintenance of Practices To avoid damage and	<ul style="list-style-type: none"> • Conduct regular monitoring and inventory of risks for erosion on coastal protection works and flow problems of the rehabilitated water system. • Conduct routine maintenance works like leakage detecting, grass cutting, 	Entire project section	As required	part of standard design practices	KAP	KAP/OB

ENVIRONMENTAL ISSUE AND OBJECTIVE	MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ESTIMATED MITIGATION COSTS ⁱ	IMPLEMENTAT ION	SUPERVISION
erosion problems to the completed water and coastal protection works	and replacing and patching damaged and eroded coastal structures .					

TABLE 3: ENVIRONMENTAL MONITORING PLAN

ENVIRONMENTAL ISSUE AND OBJECTIVE	WAYS FOR VERIFICATION	LOCATION	STANDARDS/CRITERIA	DURATION/FREQUENCY AND ESTIMATED COSTS	IMPLEMENTATION	SUPERVISION
CONSTRUCTION PHASE						
Protection of traditional medicinal plants Identification and protecting traditional medicinal plants	Visual check with communities on identifying medicinal plants	All areas where clearing is required	Removed medicinal plants must have replacement planting near project area.	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the KAP Engineer and the Contractor	EE and KAP Engineer with Community Rep.
Social or Community Concerns Minimising of social disturbance and maximising community benefits	Verbal or formal complaints Project progress reports	Along the entire water and coastal construction works	Lands Acquisition and Resettlement Policy Framework	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the KAP Engineer and the Contractor	EE and KAP Engineer
Soil instability and Erosion Minimisation of the amount of sediment lost from the construction sites	Visual check for sediment load and waste management procedures Verbal or formal complaints	All areas where clearing is required	Construction and waste materials should be controlled Waste can only be disposed off at approved sites	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the KAP Engineer and the Contractor	EE and KAP Engineer
Controlling Coastal Erosion Minimisation of beach sediment lost from the coastal protection works	Check that procedures in Shoreline Protection Design Guidelines are followed throughout construction Verbal or formal complaints	All areas where coastal protection works are carried out	Erosion should be controlled	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the KAP Engineer and the Contractor	EE and KAP Engineer
Controlling Storm water Minimising contaminated runoff water	Visual check for water and drainage management Verbal or formal	All areas where clearing is required and construction sites	No increase of drainage problems or water logged areas Waste can only be disposed	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the KAP Engineer and the Contractor	EE and KAP Engineer

	complaints		off approved sites			
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ENVIRONMENTAL ISSUE AND OBJECTIVE	WAYS FOR VERIFICATION	LOCATION	STANDARDS/CRITERIA	DURATION/FREQUENCY AND ESTIMATED COSTS	IMPLEMENTATION	SUPERVISION
Management of Stock-piles and Spoil-heaps Manage to minimise dust and runoff	Visual field checks Verbal or formal complaints	Dumping areas	Construction and waste materials should be controlled Waste can only be disposed off at approved sites	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the KAP Engineer and the Contractor	EE and KAP Engineer
Air Quality and Dust Control Ensure there is no health risk or inconvenience due to dust production	Visual field checks Verbal or formal complaints	Cleared areas and concrete mixing areas	??	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the KAP Engineer and the Contractor	EE and KAP Engineer
Noise Control Ensure nuisance from noise is minimised	Visual field checks Verbal or formal complaints	All construction areas	??	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the KAP Engineer and the Contractor	EE and KAP Engineer
Safety and Health Ensure maximum safety of construction personnel and local residents	Visual field checks Verbal complaints by workers	All construction sites	??	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the KAP Engineer and the Contractor	EE and KAP Engineer
Avoid disturbance by the construction workers	Verbal and formal complaints by the local communities	All construction sites	As listed in EMP	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the KAP Engineer and the Contractor	EE and KAP Engineer
Health and Safety Awareness for construction workers	Verbal and formal complaints by communities and workers	All construction sites	As listed in EMP	Continuous (minimal costs, included in standard supervision)	Joint monitoring by the KAP Engineer and the Contractor	EE and KAP Engineer
Site de-commissioning Minimise ongoing impacts after construction is completed Wherever possible replant medicinal plants at construction campsites	Counting of replanting Agreement with communities	All construction sites	no increase in soil and coastal erosion	After completion of construction (minimal costs, included in standard supervision)	Joint monitoring by the KAP Engineer and the Contractor	EE and KAP Engineer

ENVIRONMENTAL ISSUE AND OBJECTIVE	WAYS FOR VERIFICATION	LOCATION	STANDARDS/CRITERIA	DURATION/FREQUENCY AND ESTIMATED COSTS	IMPLEMENTATION	SUPERVISION
OPERATIONAL PHASE						
Peoples Safety Mitigate increased use of water and coastal protection structures	Visual checks Verbal and formal complaints by communities	Water galleries, seawalls, beach nourishment and sensitive areas	Routine and periodic maintenance of water systems and coastal protection structures	Annually after construction (USD\$3,000 per year)	PUB Engineer Environment Officer	MWPU HQ KAP Office World Bank
Rehabilitation and Maintenance of Water and Coastal Defence Systems Practices Avoid systems failures and reduced visibility	Verbal and formal complaints	Entire water groundwater system	Routine and periodic maintenance	Annually after construction (USD\$3,000 per year)	PUB Engineer	MWPU HQ KAP Office World Bank

X. CONCLUSION AND RECOMMENDATION

138. The project will introduce short-term negative environmental disturbances associated with the construction activities. This will be mitigated by operational procedures during construction, within the framework of a contractor's approved Environmental Management Plan to be supervised by the PSC and monitored by KAP III PMU.
139. Positive effects to the local economy will accrue through better social welfare amenities and improved health conditions, new income earning opportunities generated by demand for labour during construction and through the creation of new small business opportunities in the surrounding areas.
140. The EMP concludes that in the context of appropriate mitigation strategies described above, and the positive environmental benefits which would flow from the Project, environmental impacts can be managed within acceptable levels. There are no significant environmental impacts needing further detailed study or comprehensive EIA. All potential and associated impacts can be addressed through the implementation of the mitigation measures as proposed in the EMP. Provisions will be made in the Project Budget to cover the environmental mitigation and monitoring costs in the overall Project design costs.

ANNEX A: KIRIBATI ADAPTATION PROJECT (KAP II)

KAP II Project Briefing – Lesson Learned

Overview

Compared to other Pacific islands that are just starting to address climate change adaptation and disaster risk management, **Kiribati has an advanced level of awareness of the impact of climate change and climate-related hazards**. The Government has embarked in the process of mainstreaming climate change adaptation (CCA) and disaster risk reduction (DRR) in its development processes through a series of initiatives: the launch of the **Kiribati Adaptation Program (KAP)** in 2003, the adoption of a **Climate Change Adaptation Policy Note** and a **Climate Change Adaptation Strategy** in 2005, the consultation process and consequent adoption of a **National Adaptation Program of Action (NAPA)** in 2007 and the **ongoing implementation phase of KAP**. In addition, the **Kiribati Sustainable Development Plan (KSDP)** which covers the period 2008-2011 recognizes the potentially high cost and effects of climate change on economic growth and social development. The recently adopted **National Water Resource Policy (2008)** defines the priorities in the water sector taking into account climate change adaptation. With KAP support MPWU and MELAD have implemented since September 2009 two **major pilot investment projects** in enhanced coastal resilience and improved sustainability and supply from groundwater and rainwater.

General Background

Kiribati is one of the most vulnerable countries in the world to the effects of climate change and sea level rise. Most of the land in urban Tarawa is less than 3 meters above sea level; the island has an average width of only 450 meters, rendering retreat adaptation options untenable. This situation is typical of most islands in the country. The islands are exposed to periodic storm surges and droughts, particularly during La Niña years, although they lie outside the cyclone path. Already, Kiribati is becoming increasingly vulnerable to climate events due to its high population concentration, accelerated coastal development, shoreline erosion, and rising environmental degradation.

By 2050, if no adaptation measures are undertaken, Kiribati could face economic damages due to climate change and sea level rise of US\$8-\$16 million a year, equivalent to 17-34 percent of its 1998 GDP.

To address these rising risks, the Government of Kiribati is undertaking an Adaptation Program, supported by the World Bank, the Global Environmental Facility, AusAID and NZAID, the Japan PHRD Climate Change Fund, UNDP, and a parallel project by the EU. The key goal is to reduce Kiribati's vulnerability to climate change, climate variability and sea level rise.

The Kiribati Adaptation Program (KAP) is being implemented in three phases:

Phase I: Preparation (2003-2005, completed). This phase began the process of mainstreaming adaptation into national economic planning and identified priority pilot investments for Phase II. It also involved an extensive process of national consultation and was closely linked with the preparation of the 2004-07 National Development Strategy and Ministry Operational Plans, and the compilation of the NAPA which was completed in early 2007.

Phase II: Pilot Implementation (2006-2010). The objective of this current phase is to develop and demonstrate the systematic diagnosis of climate-related problems and the design and implementation of cost-effective adaptation measures, while continuing the integration of climate risk awareness and responsiveness into economic and operational planning.

Phase III: Expansion (2010-2015). Many lessons are being learnt in the current Phase II and these are informing the design and preparation of an expanded programme for CCA which will incorporate Disaster Risk Reduction (DDR) measures which, in Kiribati in particular, are closely linked to CCA initiatives.

Implementation Arrangements

The World Bank is the implementing agency for KAP II. Specific components are being implemented by key line ministries, in particular the Ministry of Environment, Lands and Agriculture Development (MELAD), the Ministry of Public Works and Public Utilities (MPWU), the Ministry of Internal and Social Affairs (MISA), the Ministry of Fisheries and Marine Resources Development (MFMRD), and the Ministry of Communications, Transport and Tourism Development (MCTTD).

Kiribati is in the forefront of tackling practical CCA issues – some early lessons.

As a pioneer in the practical implementation of CCA initiatives, Kiribati had little actual experience upon which to draw from elsewhere, either in the Pacific region or globally.

Funding

KAPII is co-financed by Global Environment Facility (GEF), NZAID and AusAID and is operating under a Trust Fund the details of which are appended below.

Trust Fund Grant Number	Date Signed	Closing Date	Amount \$A million
GEF TF056267	June 2006	30 June 2009	2.368
NZAID TF056594	August 2006	30 April 2009	1.315
AusAID TF056115	June 2006	30 April 2009	2.842
		TOTAL	6.525

Launched in late 2006 with a total of \$A6.525 million of funding from GEF, AusAid and NZAid, KAP II suffered initial implementation delays, largely due to an **overambitious design (too many activities with too wide a scope in sub sectors and geographic spread) and inadequate management resources.**

The GOK with its donor partners recognized these shortcomings and agreed in late 2008 to **a) a more focused approach** and **b) an extension of the project timelines** initially scheduled for completion in mid 2009 to end 2010.

A further key lesson has been the recognition at the highest level of government that both **CCA and increasingly also DRR are cross sectoral in their focus** and central to the country's long-term security and development.

The **Office of the President (OB)** has therefore taken the leadership for **CCA/DRR** policies, management and coordination whilst **implementation of CCA/DRR programs rests with the Ministries.**

Mainstreaming CCA and DRR still remains a relatively new concept which is implemented on a project-basis rather than on an issue-basis. Moreover, the level of awareness at government level does not translate in changed behavior at individual or community level, often because of lack of alternatives (as is the case with beach mining, over-fishing and beach toileting that remain widespread in most coastal communities).

Achievements with KAP.

In spite of these “teething problems” (KAP is sometimes described as “the first born of a new generation of [practical CCA] projects”), **GoK Ministries – with KAP support** have gained some significant achievements and these include:-

1. The **KAP First National Consultation 2007** (on CCA) and the **KAP Baseline Survey 2008** on public awareness of and attitudes towards climate change issues and challenges on South Tarawa and a number of the Outer Islands have been completed.
2. Further **consultations, participatory risk assessments and awareness raising programmes** on Climate Change (CC) & Sea Level Rise (SLR) have been carried out on over 12 Outer Islands and this has enabled MISA to make progress in the completion of the **Outer Island profiles** which provide succinct and detailed island specific data on socio-economic and physical issues including vulnerabilities to CC & SLR.
3. The development of a **bilingual glossary of CC & SLR and adaptation terms in I-Kiribati & English** which is helping to raise understanding and a consistency of approach and messages to communities. MELAD is taking responsibility for the promotion & dissemination of this “live” resource.
4. **Media actions** including radio programmes and quizzes on CC & SLR are being broadcast regularly but MELAD is seeking to develop an overall Communications Strategy.
5. A **National Water Resources Policy document as well as the National Water Resources Implementation Plan for Kiribati** has been developed with the support of the multi agency National Water and Sanitation Steering Committee (NSWCC) and after detailed technical verification was submitted by MWPU and approved by GOK Cabinet in March 2009.
6. The National Institute of Water and Atmospheric Research Ltd, NZ has prepared **predictor tables and a calculator on rainfall levels and intensity and drought intensity** and a separate set of tables and **calculator on sea level rise and likelihood of storm surges** based on historical data for the islands of Kiribati and internationally recognized CC scenarios and working with the Kiribati Met Service. **(See Appendix B).** The use of the calculators has proved popular and NIWA is being contracted to provide further training to a wider audience across the country in 2009.
7. Proposals for **an integrated approach to coastal zone hazard risk assessment and protection (ICZH management)** have been extensively discussed and facilitated by KAP consultant Dr. Robert Kay. After several iterations, sound and practical approaches involving the strengthening of the existing Foreshore Management Committee have emerged. Furthermore through **an inter-ministerial working group** MFMRD, MELAD, & MISA which brought together data held in a number of different GoK agencies, it has been possible to produce predictions for climate related changes over time for sections of South Tarawa ((Bikenibeu and Temaiku) based on various climate change scenarios. **(See Appendix C).** The process has demonstrated the **tangible benefits of inter agency cooperation** and can now be replicated to other sites throughout Kiribati. It has achieved capacity building within a range of agencies and should ensure sustainability. Further work under KAP is envisaged for 2009, linked to the practical outworking of the pilot investment “Improving Protection of Public Assets ”being implemented by MPWU.
8. At the core of the restructured KAP II are two major contracts namely

1. **Risk Analysis and Design Capacity for Coastal Hazard Management**–renamed **“Improving Protection of Public Assets”(\$A1.0 m)** which covers coastal zone assessments and enhanced coastal zone management and pilot investments at up to four sites
 2. **Kiribati Improving the Supply and Sustainability of Freshwater (KISSF)(\$A1.6m)** which deals with groundwater assessments and improved rainwater harvesting and pilot investments in up to 30 sites.
9. Proposals to undertake this work, submitted by seven international companies in the region and from Europe were evaluated by GoK representatives mainly from the MPWU & MELAD under World Bank Procurement Guidelines, with contract awarded in August and mobilisation in September 2009.

The contract ‘KAPII FS6 - Improving the Protection of Public Assets’ was awarded to a New Zealand based firm Beca International Consultants while the contract ‘KAPII FS7 – Kiribati Improving the Sustainability and Supply of Freshwater’ was awarded to a UK based firm GWP Consultants Ltd.

Both projects have been implemented since September 2009 and currently in works construction phase and are planned to be completed by the end of 2010.

The Future Beyond 2010- Proposed Project

In recent discussions with the World Bank (GEF) & AusAid taking into account the existing strategies, policies and action plans, various assessments and on-going initiatives on Climate Change Adaptation (CCA) and Disaster Risks Reduction (DRR) and financing available consensus emerged in Government that a new project should focus on **two priority areas: water resource management and coastal resilience**. These are the two top priorities identified in the NAPA as well as the focus of ongoing pilot programs with MPWU, MELAD and other government agencies that need to be scaled-up to be fully effective. The proposed project, tentatively titled *Increasing Resilience to Climate Variability and Hazards* would support the government overarching goal of mainstreaming adaptation to climate change and disaster risk reduction into core aspects of Kiribati economic and social development. The specific development objective would be to strengthen the resilience of Kiribati to the impact of climate variability and climate change as well as climate-related hazards. The project would aim at reducing the impact of droughts, storm surges and coastal erosion on the quality and availability of freshwater resources and the livelihoods of coastal communities.

The design of the follow on project is in progress and is anticipated to be completed by mid 2011. The design process includes wide consultation with key stakeholders both in Government and NGOs.

The project will be implemented by the World Bank and the Office of Te Beretitenti will have an overall over-sighting role of the project.

ANNEX B: ENVIRONMENT LICENCE APPLICATION

**ENVIRONMENT ACT 1999
(No. 9 of 1999) Amended 2007**

AN ACT TO PROVIDE FOR THE PROTECTION IMPROVEMENT AND CONSERVATION OF THE ENVIRONMENT OF THE REPUBLIC OF KIRIBATI AND FOR CONNECTED PURPOSES

PART IV—ENVIRONMENT LICENCES

31. Application for an environment licence

A person may apply to the Principal Environment Officer for an environment licence in relation to a proposed activity by

- (a) using the form approved by the Principal Environment Officer from time to time, and attaching any information required by that form; and
- (b) paying such fee as may be prescribed by regulation.

32. Consideration of application

- (1) After receiving an application for an environment licence, the Principal Environment Officer must, in writing to the applicant
 - (a) grant an environment licence;
 - (b) require the applicant to submit an environmental impact assessment report to the Principal Environment Officer;
 - (c) refuse to grant an environment licence.
- (2) The Principal Environment Officer may only grant an environment licence under subsection (1) if
 - (a) the possible environmental impacts of the proposed activity are well known, are not significant, and will not significantly affect an area of environmental significance; or
 - (b) the activity is an unforeseen activity requiring immediate action in the public interest, and the need for such action outweighs the need for an environmental assessment.
- (3) The regulations may prescribe additional requirements in making a decision under subsection (1).

33. Requirements of environmental impact assessment report

- (1) An environmental impact assessment report must include
 - (a) a description of the impacts of the proposed activity;
 - (b) the possible alternatives to the proposed activity, including the alternative of not undertaking the proposed activity;
 - (c) mitigation measures that can be applied to minimise or prevent harm to the environment; and

- (d) any details that may be prescribed by regulation.
- (2) The Principal Environment Officer may, by notice in writing to an applicant, exempt the applicant from including information required by subsection (1) if the Principal Environment Officer considers the information is not necessary or appropriate for the purposes of evaluating the proposed activity.
- (3) In preparing an environmental impact assessment report, the applicant must attempt to consult with
 - (a) any nearby or adjacent landowners; and
 - (b) any other person who would have an immediate interest in the activity.
- (4) The costs of preparing an environmental impact assessment report must be borne by the applicant for the environment licence.

34. Requesting additional information and seeking advice and information

- (1) At any point after an application for an environment licence has been made, and before determining the application, the Principal Environment Officer may, in writing—
 - (a) request additional information from the applicant; or
 - (b) seek advice or information from any person or committee, to gain a better understanding of the proposed activity.
- (2) If the Principal Environment Officer has made a request under subsection (1)(a), the Principal Environment Officer is not required to make any further decisions in relation the application for the environment licence until the information is provided.

35. Suggesting amendments to proposed activities

- (1) The Principal Environment Officer may, by notice in writing to an applicant, suggest amendments to a proposed activity.
- (2) The applicant, in response to a suggestion made under subsection (1), may by notice in writing to the Principal Environment Officer, modify the proposed activity.

36. Publication of environmental impact assessment report

- (1) If the Principal Environment Officer is satisfied that an environmental impact assessment report meets the requirements of this Act, the Principal Environment Officer must give notice in writing to the applicant setting out a procedure for publication adequate to bring the report to the attention of interested persons.
- (2) Without limiting the generality of subsection (1) the Principal Environment Officer may require
 - (a) publication of notices in newspapers and radio;
 - (b) the holding of public hearings;
 - (c) submission of copies to public authorities or specified persons that may be interested in the proposed activity; and
 - (d) that comments be submitted to the Principal Environment Officer by a particular date.
- (3) The Principal Environment Officer may exclude information from publication to

- (a) protect the environment; or
 - (b) protect commercially sensitive information.
- (4) The Principal Environment Officer must allow the applicant to inspect and copy any comments received by the Principal Environment Officer under this section.
 - (5) The Principal Environment Officer may require that the costs of publication in relation to this section be borne by the applicant.
 - (6) The Principal Environment Officer is not required to make any further decisions in relation to an application unless the applicant has published the environmental impact assessment report as required by subsection (1).

37. Consideration of environmental impact assessment report and comments

- (1) At the conclusion of any period allowed for comment under section 36 the Principal Environment Officer may, in writing to the applicant
 - (a) grant an environment licence for the proposed activity if the Principal Environment Officer believes that the benefits of the proposed activity outweigh its possible environmental impacts; or
 - (b) refuse to grant an environment licence.
- (2) In making a decision under subsection (1), the Principal Environment Officer must act in accordance with any requirements that may be prescribed.

38. Conditions on environment licences

An environment licence may be subject to reasonable conditions, including conditions

- (a) specifying the duration of the licence;
- (b) specifying the location of any particular activities;
- (c) specifying the method of undertaking any activities;
- (d) modifying the proposed activity;
- (e) requiring the monitoring of any environmental impacts;
- (f) requiring the reporting of environmental impacts;
- (g) specifying maximum quantities of emissions of substances;
- (h) requiring the implementation of a plan to manage any environmental impacts;
- (i) requiring the lodgement of bonds;
- (j) specifying fees that must be paid;
- (k) specifying any procedures for cessation and rehabilitation; and
- (l) specifying individuals who may carry out activities under the licence.

39. Transfer of environment licences

An environment licence may only be transferred after written approval from the Principal Environment Officer.

ENVIRONMENT ACT 1999
(No. 9 of 1999)

**AN ACT TO PROVIDE FOR THE PROTECTION IMPROVEMENT AND CONSERVATION OF
THE ENVIRONMENT OF THE REPUBLIC OF KIRIBATI AND FOR CONNECTED
PURPOSES**

SCHEDULE
(Section 14)

PRESCRIBED DEVELOPMENTS

1. FOOD INDUSTRIES including;

- (a) Fruit processing, bottling and canning
- (b) Brewing, making and distillery works
- (c) Abattoirs
- (d) Other food processing requiring packaging

2. IRON AND STEEL INDUSTRIES

3. NON-METALLIC INDUSTRIES including:

- (a) Lime production
- (b) Brick and tile manufacture
- (c) Extraction of minerals and mining
- (d) Extraction of aggregates stones or shingles, sand and reef mud, beach rock
- (e) Radioactive related industries
- (f) Manufacture of cement
- (g) Plastic manufacturing and moulding

4. LEATHER, PAPER, TEXTILE AND WOOD INDUSTRIES including:

- (a) Leather tanning and processing
- (b) Textile industry with dyeing facilities
- (c) Carpet industry with chemical dyeing
- (d) Manufacture of paper, pulp and other wood products

5. FISHING AND MARINE INDUSTRY PRODUCT

- (a) Fish processing
- (b) Seaweed farming
- (c) Land or marine foods processing or farming
- (d) Pet fishing licensing
- (e) Fishing ponds industries
- (f) Fishing activities in Kiribati waters
- (g) Introduction to Kiribati non-native (alien) species.

6. CHEMICAL INDUSTRY including:

- (a) Pesticide production and use
- (b) Pharmaceutical production
- (c) Fertiliser manufacture and use
- (d) Oil refineries

7. TOURISM INDUSTRY including:

- (a) Hotels
- (b) Golf courses
- (c) Recreational parks
- (d) Tourism resorts or estates

8. AGRICULTURE INDUSTRY including:

- (a) Livestock development
- (b) Agricultural development schemes
- (c) Irrigation and water supply schemes
- (d) Logging operations
- (e) Saw milling, all forms of timber milling and treatment, copra processing

9. PUBLIC WORKS SECTOR including:

- (a) Landfills
- (b) Infrastructure developments
- (c) Major waste disposal plants including recycling and collection systems
- (d) Soil erosion, beach erosion and siltation control
- (e) Hydropower schemes, desalination plants
- (f) Reservoir development
- (g) Airport developments
- (h) Causeways, drainage and disposal systems
- (i) Dredging
- (j) Watershed management
- (k) Ports and harbours
- (l) Seawalls/land reclamation
- (m) Boat channels
- (n) Port and harbours

10. GENETICALLY ENGINEERED ORGANISMS (GEOs)

11. OTHER

- (a) Industrial estates
- (b) Housing multiple units
- (c) Settlement and resettlement schemes
- (d) Petroleum product storage and processing works.

ANNEX C: PUBLIC CONSULTATION MEETINGS

Public Consultations on Environmental Management Plan For the Kiribati Adaptation Programme Phase III

Location and Date:

1. The consultation was held at the boardroom of the Betio Town Council on Betio Islet on 11 February 2011 from 0900 – 1400 hours.

Context and Observations:

2. All stakeholders were invited to the KAP III EMP consultations. Invitation letters from the Office of the President was sent to 25 stakeholder representatives (see distribution list). 20 participants attended the workshop.

3. The EMP Consultation workshop was opened by the Secretary, Office of the President who chaired the meeting that has initially adopted its agenda (attached) to focus on the briefings of the KAP II and III Projects, and discussions of the KAP III EMP report.

4. The consultation format is of open discussion of all issues raised by the presentations made or by any participant at any time and facilitated by the chair.

Summary of information presented and issues raised:

5. The Project Manager of KAP II presented his review of KAP II and brief of KAP III projects. Copy of slide presentations is attached but the following were fully discussed: KAP II: Pilot Implementation, Phase III: Expansion, Implementation Arrangements, Funding, Institutional Arrangements, and achievements with KAP. The emphasis was made on that all construction activities of KAP II will be continued in KAP III projects.

6. The presentation of KAP II was well received. The main concern raised was that KAP III should expand into outer islands as several participants have voiced the need for similar coastal defense structures for all village communities. It was explained at the workshop that currently the KAP III project area is South Tarawa and that the expansion of the investments may be considered when additional funds become available.

7. An observation was made that some rainwater catchment tanks were installed in church maneabas during KAP II. Currently, non-church members residing close by are prohibited access to the water supply tanks. It was explained that all KAP II installations are for the use of the general public.

8. A church representative raised the need for climate change adaptation awareness material and information to use in her outer islands awareness training programme with the church youth groups. When KAP III project is launched, KAP III PMU will provide the appropriate materials

9. The KAP III EMP was presented by the OB Consultant. Presentations made explained (i) the scope and various components of the Project, and (ii) the main environmental issues based on the Environmental Management Plan report. A slide presentation (attached) was used as a base guideline for general discussion on all issues. The main discussion was centered on handouts of Table 1: Environmental Management Plan, and Table 2: Environmental Mitigation Plan. The workshop focused

on reviewing the environmental and social issues identified to ensure all issues are covered and adequately addressed in the EMP report.

10. The workshop participants quickly went through the list of environment and social issues and their management and mitigation measures recommended and readily agreed that the actions to be taken through the EMP appears appropriate and adequate. The workshop process of going through the environmental management and mitigation tables brought an interesting comment from a senior government official that the tables have provided a better understanding of the actual objective of the EMP wherein the various elements of environmental and social issues are recorded with their corresponding treatments clearly shown. This comment adds to the outcome of the workshop that the participants have gone through and approved the EMP for KAP III.

11. The workshop however made a specific request for change in the EMP. This being the addition / inclusion of traditional medicinal plants to the protection of (sensitive) natural areas as an environmental issue to be considered in the Design and Pre-Construction Phase of the Project. To the extent that these medicinal plants are in the project area and may be impacted by the project, they will be protected in consultation with the communities. The corresponding change has been made in the EMP.

12. An important question was raised by the engineers from Ministry of Public Works and Utilities (MPWU) on the appropriateness and effectiveness of the seawall design with a boat ramp. The participants agreed that the design is good for the adjacent village community and the KAP II Project Manager confirmed that the feedback from people has been positive. The OB consultant explained that the seawall ramp design is appropriate to the current weather patterns where the easterly winds are predominant. As Kiribati adverse weather patterns are associated with predominant westerly winds and if and when the westerlies do come back then the seawall ramp design will be truly tested as it is currently designed for the easterly winds. For new seawall construction, the KAP III design will review the orientation of ramps at new seawall locations.



GOVERNMENT OF KIRIBATI

OFFICE OF TE BERETITENTI

P.O. Box 68, Bairiki, Tarawa, Republic of Kiribati

Tel: +686 21183 Fax: +686 21902

File Ref:

Date: 4 Feb. 2011

Kiribati Adaptation Program Phase III: Environmental Management Plan Workshop

Dear Stakeholder,

This is to inform you that a workshop on the Environmental Management Plan for the next phase of the Kiribati Adaptation Program will be convened at the Betio Town Council boardroom on Friday 11 Feb 2011 from 0900.

The workshop will discuss, with key stakeholders, the various activities and lessons learned that have been undertaken through the Kiribati Adaptation Program to date and will go over those that are anticipated to be undertaken in the next phase of the program. A tentative agenda for the workshop is attached for your information.

It is to this end that I have the pleasure of inviting you to this half day workshop.

It would be appreciated if you, or your designated representative could communicate your availability on or before Wednesday 9 February 2011 to either Mr Mike Foon or Andrew Teem at 21183 or 22650.

Kam raba,

A handwritten signature in black ink, appearing to be 'A. Teem', written over a horizontal line.

Tangitang Kaureata
Secretary
Office of Te Beretitenti

**Public Consultations on
Environmental Management Plan
for the Kiribati Adaptation Programme Phase III
Friday 11 February 2011
Board Room, Betio Town Council***

Draft Agenda

09:00 Welcome (Chair: Mr. Tangitang Kaureata*, Permanent Secretary, Office of the Beretitenti

09:05 Purpose of Dialogue, Agenda, Dialogue Process (Komeri Onorio, OB Consultant)

09:30 Refreshments

09:50 Kiribati Adaptation Project (KAP II) Briefing – Lesson Learned (Mr. Kautuna Kaitara)*
Kiribati Adaptation Project (KAP III)

10:15 Discussion on lessons learned (Chair: Mr. Tangitang Kaureata)*

10:30 The Kiribati Adaptation Project Phase III (KAP III) (Mr. Kaiarake Taburuea)*

11.05 Key Findings of the Environmental Management Plan for KAP III (Dr. Komeri Onorio, OB
Consultant)

11:20 Discussion, and Validation of Findings (Chair: Mr. Tangitang Kaureata)*

12:00 Close of Public consultation

13:00 Refreshments

* To be confirmed

Distribution List KAP III EMP Consultations:

1. Secretary, Ministry of Finance and Economic Planning
2. Secretary, Ministry of Public Works and Utilities
3. Secretary, Ministry of Education
4. Secretary, Ministry of Environment, Lands and Agricultural Development
5. Secretary, Ministry of Health and Medical Services
6. Secretary, Ministry of Internal and Social Affairs
7. Secretary, Ministry of Communications, Transport and Tourism Development
8. Secretary, Ministry of Fisheries and Marine Resource Development
9. Secretary, Ministry of Foreign Affairs and Immigration
10. Director, Lands Management Division, MELAD
11. Director, Kiribati Meteorological Office, MELAD
12. Director, Rural Planning Office, MISA
13. Director, Environment and Conservation Division, MELAD
14. Director, Engineering Section, Public Works Division, MPWU
15. Chief Executive Officer, Public Utilities Board
16. Clerk, Teinainano Urban Council
17. Clerk, Betio Town Council
18. Senior Women Development Officer, Womens Development Unit, MISA
19. President, Aia Maea Ainen Kiribati (AMAK)
20. President, Kiribati National Council of Churches
21. Representative, Catholic Church
22. Representative, Kiribati Protestant Church
23. Representative, Seventh Day Adventist Church
24. Representative, Church of Latter Day Saints
25. Representative, Bahai Faith

EMP WORKSHOP

11 February 2011

FULL NAME	ORGANISATION	
1. Maleta Tenten	KPC	<i>[Signature]</i>
2. Jobwebwe Jentaka	SDA	<i>[Signature]</i>
3. Nenenteit Teanti-Ruata	ECD MELAD	<i>[Signature]</i>
4. Taakiro Obaia	Bahai.	<i>[Signature]</i>
5. Tiaou Bauntari	KANGO	<i>[Signature]</i>
6. Bwebwe Tuare	RPD - MISA	<i>[Signature]</i>
7. Utunia Amuh	MISA.	<i>[Signature]</i>
8. Eveste Kekau	MAWU.	<i>[Signature]</i>
9. Renate Willie	MAWU	<i>[Signature]</i>
10. Moia Tetoa	AMAIC	<i>[Signature]</i>
11. Riibeta Abeta	ECD - MELAD	<i>[Signature]</i>
12. Kaiaraki Tabuwa	KAP II	<i>[Signature]</i>
13. Tekiman Uthanza	BTC	<i>[Signature]</i>
14. Mike Soun	OB	<i>[Signature]</i>
15. Andy Teem	OB	<i>[Signature]</i>
16. Elisa Tokataake	BTC	
17. Romano Reo	BTC	
18. Tokia Greig	TUC	
19. Tangitang Kaurota	OB	
20. Teata Teruber	MISA	

Signatures above indicate Participant has received his/her workshop costs.

KAP III EMP PRESENTATION

KAP II PRESENTATION

KAPII - Kiribati Adaptation Project Phase II

To reduce Kiribati's vulnerability to climate change, enhance the resilience of the population

Major project achievements

KAPII - Kiribati Adaptation Project Phase II

Coastal management and protection

- Construction of seawalls.
- New Shoreline Protection Guidelines
- New coastal calculator

KAPII - Kiribati Adaptation Project Phase II

KAPII funding

Funding agency	Amount (millions)
GEF - Global Environment Facility	AUSD 2,308
NCAD	AUSD 1,315
AsfAD	AUSD 2,842

Mangrove planting

- KAP funded mangrove planting activities have been implemented by MELAD
- To increase shoreline resilience and the health of coastal waters

KAPII - Kiribati Adaptation Project Phase II

Freshwater supply & sustainability

- Tarawa Water Master plan developed.
- National Water Resources Policy and implementation plan developed.
- Monitoring boreholes.
- Hydrogeological surveys.
- Planned rainwater harvesting and infiltration galleries.

Awareness

- Bilingual keyways in Kiribati & English languages.
- Radio and newspaper based awareness raising.
- COP 15 DVD.

KAPII - Kiribati Adaptation Project Phase II

Water system leak detection

- Leak detection pilot project in Betio.
- Training of local PUB staff and new equipment.

Climate monitoring

- Predictions and calculator for future rainfall levels, drought intensity and storm surges.
- Rain gauges at all outer islands of Gilbert group by MCTTO.
- Coastline monitoring by MFMRO.

KAPII - Kiribati Adaptation Project Phase II

Consultations & community training

- First National Baseline Survey on public awareness towards CCA.
- Risk assessment based consultations held on 6 Outer Islands.
- Training in North Tarawa villages to accompany new infrastructure.

KAPII - Kiribati Adaptation Project Phase II

End of Presentation

THANK YOU
VERY MUCH

KAPII - Kiribati Adaptation Project Phase II

KAP III EMP PRESENTATION



WHY Do EMP?

Environment Act 1999, Environment (Amendment) Act 2007

- Act to Provide for the Protection Improvement and Conservation of the Environment of Kiribati and for Connected Purposes

World Bank: EMP = Basic EIA + MELAD

EMP REPORT & OUTCOME OF PUBLIC CONSULTATIONS TO INFLUENCE FINAL DESIGN PLAN FOR IMPLEMENTATION OF KAP III PROJECTS

The KAP III Project Area

C1 – Improve water resource use and management
 C1.1 – Groundwater abstraction systems
 C1.2 – Water reticulation program & leakage detection

C2 – Increase in coastal resilience
 C2.1 – Shoreline protection works
 – Protection of public assets

Location Map – 2004 (NOVOS) Satellite image of Tarawa Atoll

Some locations considered

Environmental Impacts C1 & C2

Design/Pre-construction Phase

- Protection of sensitive natural areas
- Environmentally Sound design
- Project safety
- Cultural heritage
- Personal, social or community concerns

See Handouts of Table 3 & 4

Environmental Impacts C1 & C2

Construction Phase

- Social or community concerns
- Soil erosion and instability
- Coastal erosion
- Storm water
- Stockpiles and spoil-heaps
- Dust nuisance
- Noise
- Materials storage and disposal
- Offsite contamination
- Safety and health
- General health & safety awareness for construction workers
- S&E-decommissioning

Environmental Impacts C1 & C2

Operational Phase

- Peoples' safety
- Rehabilitation and maintenance of practices

Conclusions & Recommendation

- Project causes short-term negative disturbances during construction. Mitigated by operational procedures during construction.
- Positive effects to local economy through better social welfare amenities and improved health, new income from labour & small business opportunities.
- The EMP concludes: in the context of the appropriate mitigation strategies, and the positive environmental benefits from the project, environmental impacts can be managed within acceptable levels.

ANNEX D: FIELD MONITORING CHECKLIST

ENVIRONMENTAL ISSUE AND OBJECTIVE	MITIGATION MEASURES	LOCATIONS	TIMEFRAME	ACHIEVED YES/NO	REMARKS
<p>Social or Community Concerns</p> <p>To minimize social disturbance and maximize community benefits from the subproject:</p> <p>To minimise loss of traditional medicinal plants</p>	<ul style="list-style-type: none"> • Advise the local community of project plans in advance of construction, and where possible involve them in planning and identifying medicinal plants • Avoid disturbances near living areas when possible • Control runoff and manage sediments near garden areas • Arrange for local people to be employed and trained • Include women's and other community groups in project activities • Negotiate with community about disposal areas, stockpiles 	<p>Potential seawall alignments and water systems constructions</p>	<p>During mobilisation and start of construction activities in the communities</p>		
<p>Soil Instability and Erosion</p> <p>To minimise the amount of sediment lost from the construction site</p>	<ul style="list-style-type: none"> • Reduce the time surfaces remain bare • Keep vegetation clearing to a minimum • Avoid clearing of traditional medicinal plants • Construct necessary temporary/permanent control structures • Encourage revegetation (including replacement of removed traditional medicinal plants) after construction activity finishes 	<p>All areas where clearing is required</p>	<p>Continuous</p>		
<p>Controlling Coastal erosion</p> <p>To minimise the amount of beach sediment lost from the coastal protection works</p>	<ul style="list-style-type: none"> • Avoid dredging of aggregate materials from adjacent reef flat, rather, use sand build up areas for coastal protection works • Ensure the coastal wall structure is correctly aligned with coastline to limit changes in sediment transport, wave and current conditions • Ensure coastal wall structures have their ends connect to adjacent headlands to prevent 	<p>All areas where coastal construction is required</p>	<p>Continuous</p>		

	<p>overtopping by waves causing erosion</p> <ul style="list-style-type: none"> • Re-vegetate around coastal construction areas using vegetation that helped to bind sediment <p>Restrict human activities e.g. sand mining, around the construction site</p>				
<p>Controlling Storm water</p> <p>To minimise the impact of contaminated runoff water</p>	<ul style="list-style-type: none"> • Divert runoff from non-construction areas to segregate non contaminated drainage from construction runoff • Pass storm water runoff from construction areas through silt traps before discharging into the sea • Store oil etc., in a container located away from drainage ditches. 	All areas where clearing is required	Continuous		
<p>Management of Stockpiles and Spoil-heaps</p> <p>To minimise dust and runoff</p>	<ul style="list-style-type: none"> • Discuss dumping locations with local landowners • Ensure stockpile or spoil-heap locations do not block surface runoff or drainage lines • Cover or re-vegetate spoil-heap or stockpiles if prolonged exposure is expected, to minimise erosion and sediment runoff • discuss reuse of spoil materials with local landowners or community groups • Where possible spoil should be used to level low lying areas or waste disposal pits before revegetation. 	Dumping areas	Continuous		
<p>Dust Control</p> <p>To minimise health risk or inconvenience due to dust production</p>	<ul style="list-style-type: none"> • Spray water on exposed surface during dry periods, especially near schools, hospitals and community areas • Ensure trucks are not overloaded and are covered when transporting friable materials. 	Cleared areas, material transport	During dry periods		
<p>Noise Control</p> <p>To minimise nuisance from noise</p>	<ul style="list-style-type: none"> • Use modern and well maintained equipment with mufflers • Use noise screens or mounts near residential areas • Carry out noisy construction activities during normal working hours • Advise local people, schools, hospitals, etc. when there will be unavoidable noise activities. 	All construction areas	Continuous		
<p>Material Management</p> <p>To minimise</p>	<ul style="list-style-type: none"> • Develop materials delivery and waste disposal handling plans • Develop site sediment 	All materials management			

impacts of materials delivery and waste disposal	<p>control plan</p> <ul style="list-style-type: none"> • Develop safety measures to avoid loss of load (e.g. reef mud) from trucks • Implement methods to reduce dust emission from the loads • Put into practise safety methods to reduce potential road accidents in villages or urban areas. Restrict peak traffic delivery • Develop safety measures which ensure stability of exposed faces or waste material stockpiles. 	areas	Continuous		
<p>Offsite and Waste Management</p> <p>To prevent/minimise contamination from solid wastes and sewerage</p>	<ul style="list-style-type: none"> • Contain all solid waste within construction sites • During site clean-up collect all spilled fuel oils • Crush, and bury all inorganic solid waste in an approved disposal area • Remove all disabled machinery from the project area • Use above-water table pit latrines or portable toilets at construction sites or borrow adjacent village toilet facilities • Compost or use as animal food all green or organic wastes. 	All off sites storage and disposal sites	Continuous		
<p>Safety and Health</p> <p>To ensure maximum safety of construction personnel and local residents</p>	<ul style="list-style-type: none"> • Ensure all occupational health and safety requirements are in place on construction sites and in work camps • Install cautionary signs in hazardous areas • Schedule construction activities to limit exposure to dust, noise, etc. • Enhance safety and inspection procedures • Use Personal Protection Equipment (PPE) 	All construction sites	Continuous		
<p>General Health and Safety Awareness for Construction Workers</p>	<ul style="list-style-type: none"> • Train and familiarise workers about health and safety issues on construction sites including main areas of risk to workers and others • Education on basic hygiene practices to minimise spread of tropical diseases • Increase workers' HIV/AIDS and STD awareness, including information on methods of transmission and protection measures • Prohibit usage of drugs and alcohol on construction sites • Post notices about 	Construction camps and construction sites	Continuous		

	<p>seeking medical assistance in emergency or non-emergency situations and procedures for seeking other health related assistance.</p>				
<p>Site de-commissioning</p> <p>To minimise ongoing impacts after construction is complete</p>	<ul style="list-style-type: none"> • Rake or loosen all compacted ground surfaces • Establish a site re-vegetation plan. Where possible involve local women's groups and community groups to provide materials to implement re-vegetation 	All construction and camp sites	After completion of construction		
<p>Peoples Safety</p> <p>To enhance safety and welfare following increase in availability of safe drinking water</p>	<ul style="list-style-type: none"> • Securely seclude the water galleries from encroachment of squatters to prevent possible contamination of the galleries. • Fence off all water holes to prevent access by children and accidental drowning • Display public notices to warn nearby residents to avoid damages to the completed/repared water and coastal protection structures • Advertise widely, the availability of safe drinking water from PUB and to avoid drinking well water 	All project sections	As required		
<p>Rehabilitation and Maintenance of Practices</p> <p>To avoid damage and erosion problems to the completed water and coastal protection works</p>	<ul style="list-style-type: none"> • Conduct regular monitoring and inventory of risks for erosion on coastal protection works and flow problems of the rehabilitated water system. • Conduct routine maintenance works like leakage detecting, grass cutting, and replacing and patching damaged and eroded coastal structures . 	Entire project section	As required		