

Annex 1



Climate Risk Profile for Kiribati

Report Prepared by

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Summary

The likelihood (i.e. probability) components of climate-related risks in Kiribati are evaluated for both present day and future conditions. Changes over time reflect the influence of global warming.

The risks evaluated are extreme rainfall events (both hourly and daily), drought, high sea levels, extreme winds and extreme high air and water temperatures.

Projections of future climate-related risk are based on the output of global climate models, for given emission scenarios. All the likelihood components of the climate-related risks show increases as a result of global warming, though for some the increases are small relative to the uncertainties.

Best estimates of long term, systematic changes in the average climate for Kiribati indicate that by 2050 sea level is likely to have increased by 37 cm, rainfall by over 20%, extreme wind gusts by 7% and maximum temperatures by almost 1.0 C.

The observed long term trend in relative sea level for Betio is 5 mm/yr, a rate far in excess of the observed local and global trends in mean sea level. For Betio an hourly sea level of 3.1 m above mean sea level is currently a 500-year event. It will likely be at least a ten-year event by 2025.

No significant long term trends are evident in the observed daily, monthly, annual or maximum daily rainfall. Currently a daily rainfall of at least 180 mm is a relatively rare event at Betio, with a return period of 16 yr. There is large uncertainty in the rainfall projections, with one model suggesting substantial increases in rainfall, two models suggesting only small increases, and one model indicating a small decrease in rainfall into the future. An extreme daily rainfall of 200 mm is currently a 30-year event. It will likely be a ten-year event by 2050. An extreme hourly rainfall of 80 mm is currently a 100-year event. It will likely become a 30-year event by around 2050.

A monthly rainfall below the ten percentile is used as an indicator of drought. Drought frequency is strongly linked to the occurrence of La Niña events. Six global climate models that were best out of 19 at simulating present day ENSO conditions show no significant changes toward El Niño-like conditions in the latter part of the current century. Therefore it is not yet possible to make consistent predictions about the future nature of La Niña and El Niño events and the implications for the frequency, duration and intensity of droughts in Kiribati.

Currently an extreme wind gust of 35 m sec⁻¹ at Betio has a return period of 50 years. This will reduce to approximately 30 years by 2050.

There is relatively high confidence in projections of maximum air temperature. A maximum air temperature of 36 C is currently in excess of a 200-year event. By 2050 it will likely have a return period of 20 years. Open ocean water temperatures in excess of 32 C currently have a return period of 80 years.

Introduction

Formally, risk considers not only the potential level of harm arising from an event or condition, but also the likelihood that such harm will occur.

While the level of harm component of a climate-related risk will be site or sector specific, in general the likelihood component of a climate-related risk will be applicable over a larger

geographical area, and to many sectors. This is due to the spatial scale and pervasive nature of weather and climate. As a result, the likelihood of, say, an extreme climate event or anomaly, is often evaluated for a country, state, small island or similar geographical unit. While the likelihood may well vary within a given geographical unit, there is often insufficient information to assess this spatial variability, or the variations are judged a priori to be of low practical significance.

This climate risk profile (CRP) is based on observed data for Betio, South Tarawa (Latitude 1 21 N; Longitude 172 56 E). The cooperation and assistance of the staff of the Kiribati Meteorological Service and of the National Tidal Centre, Australian Bureau of Meteorology is acknowledged with gratitude. While data for South Tarawa clearly cannot characterize the climate conditions for all of Kiribati, they do provide a general indication of current climate risks facing the country. The CRP can be extended by analysing data from other locations in Kiribati.

Future changes in climate are based on the output of GCMs, and are for a 3.75 by 3.75 degree (approximately) grid square centered on Betio. The climate projections are therefore more reflective of changes for a larger area than just South Tarawa.

The following hazards are considered to be among the potential sources of climate-related risk:

- extreme high rainfall events;
- drought;
- high sea levels;
- damaging winds;
- extreme high water temperatures; and
- extreme high air temperatures.

Methods

Preparation of a CRP for a given geographical unit involves an evaluation of current likelihoods of all relevant climate-related risks, based on observed and other pertinent data.

Future changes in risk are estimated using the outputs of selected GCMs¹ run for a range of greenhouse gas emission scenarios (Figure 1). Table 1 lists the combination of models and emission scenarios on which the CRP is based.

Differences in the climate projections give rise to uncertainties in the estimated values of future climate risks. There are numerous sources of uncertainty in projections of the likelihood components of climate-related risks. These include uncertainties in greenhouse gas emissions as well as in modelling the complex interactions and responses of the atmospheric and ocean systems. Policy and decision makers need to be cognizant of uncertainties in projections of the likelihood components of extreme events.

Best estimates of future risk levels are based on an average of the estimates using a multi model and emission scenario ensemble. The range in uncertainty is determined using a model and emission scenario combination that produces, in turn, the maximum and minimum rate of change in future risk levels. Estimates of future changes in the frequency of drought use the daily data generated by the Canadian Climate Centre GCM (CGCM).

¹ Hadley Centre (United Kingdom) , Australian Commonwealth Scientific and Industrial Research Organisation (CSIRO), Japan's National Institute for Environmental Science (NIES), the Canadian Climate Centre GCM (CGCM) and the Goddard Fluid Dynamics Laboratory (GFDL).

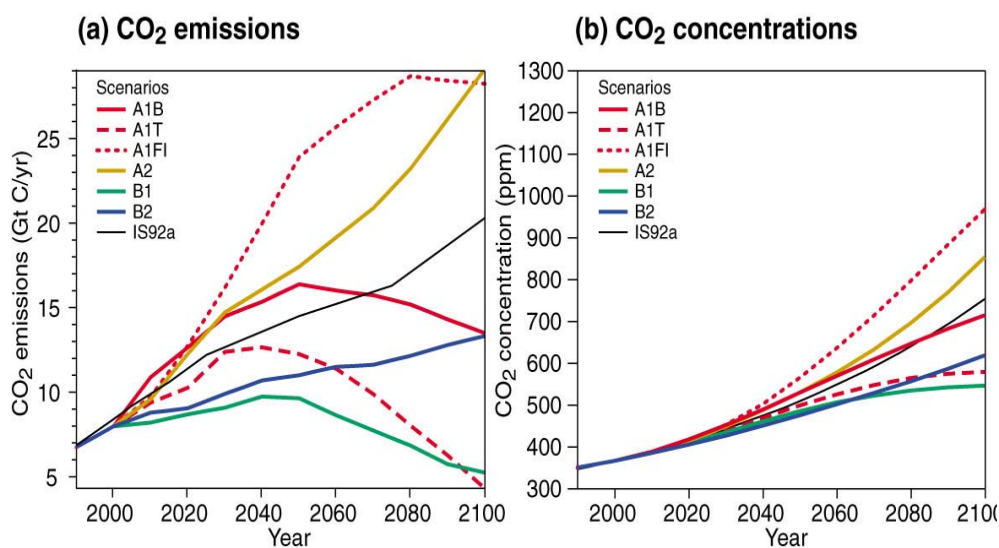


Figure 1 Scenarios of CO₂ gas emissions and consequential atmospheric concentrations of CO₂ (from IPCC, 2001).

Table 1

Available Combinations of Global Climate Models and Emission Scenarios¹

	CGCM ²	CSIRO	Hadley	NIES	GFDL	See Text
A1B	T, P, S	T, P, S	T, P, S	T, P	S	W
A1F	T, P, S	T, P, S	T, P, S	T, P	S	W
A1T	T, P, S	T, P, S	T, P, S	T, P	S	W
A2	T, P, S	T, P, S	T, P, S	T, P	S	W
B1	T, P, S	T, P, S	T, P, S	T, P	S	W
B2	T, P, S	T, P, S	T, P, S	T, P	S	W

¹ T = temperature, P = precipitation, S = sea level, W = wind

² In addition to monthly data, daily data are available for this model, but for the A2 and B2 emissions scenarios only.

Data Specifications and Terminology

The *return period* (sometimes referred to as the *recurrence interval*) is used as a measure of the likelihood of an extreme event. The *return period* is a statistical estimate of how often an extreme event of a given magnitude is likely to be equalled or exceeded. Thus the "hundred-year event" is one which will, on average, be equalled or exceeded once in any hundred-year period. Importantly, it does not mean that that the event occurs every hundred years. In fact, in every year there is a 1 percent chance that an event with a 100 year return period will occur.

Sea Level

a) Current Risks Levels

Figure 2 shows daily mean values of sea level for Betio, relative to mean sea level. There are large interannual variability and extremes (both high and low) in sea level, the major anomalies being associated with El Niño events. A long term trend of increasing sea level is

also evident. The observed long term trend in sea level for Betio is 5 mm/yr. This is greater than the estimated range of global sea-level rise over the past century, namely 1 to 2 mm/yr. The National Tidal Centre, Australian Bureau of Meteorology also reports a 5 mm/yr increase in relative sea level at Betio for the period of record, in this case after vertical movements in the observing platform and the inverted barometric pressure effect have been taken into account.

Figure 3 shows satellite-observed and five day averaged sea level anomalies for a grid square centred on South Tarawa. Data are for 1992 to 2002. The large anomalies are again associated with El Niño events. An increasing trend in sea level is evident, but it is very small relative to the interannual variability.

Even more extreme high sea levels are evident in the mean hourly sea level data. Figure 4 presents the maximum mean hourly sea level, by year, for Betio. Such exceptionally high sea levels are associated with flooding, accelerated coastal erosion and salt water intrusion into groundwater. Extreme high sea levels associated with El Niño events are clearly evident. The long term trend in the extreme hourly sea levels is 2 mm/yr. This is not as great as the trend for the daily mean sea level.

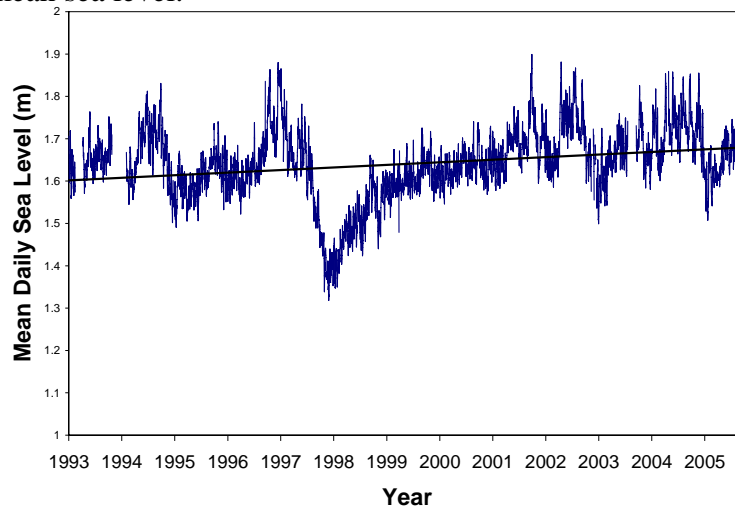


Figure 2 Daily sea level for Betio (1993 to 2005), relative to mean sea level. Also shown is the linear trend in sea level over the same period (5 mm/yr).

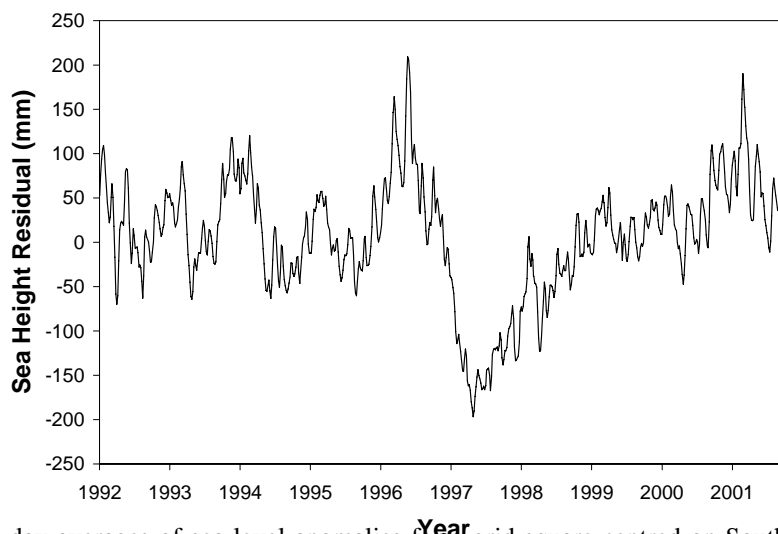


Figure 3 Five day averages of sea level anomalies for a grid square centred on South Tarawa, as observed by satellite.

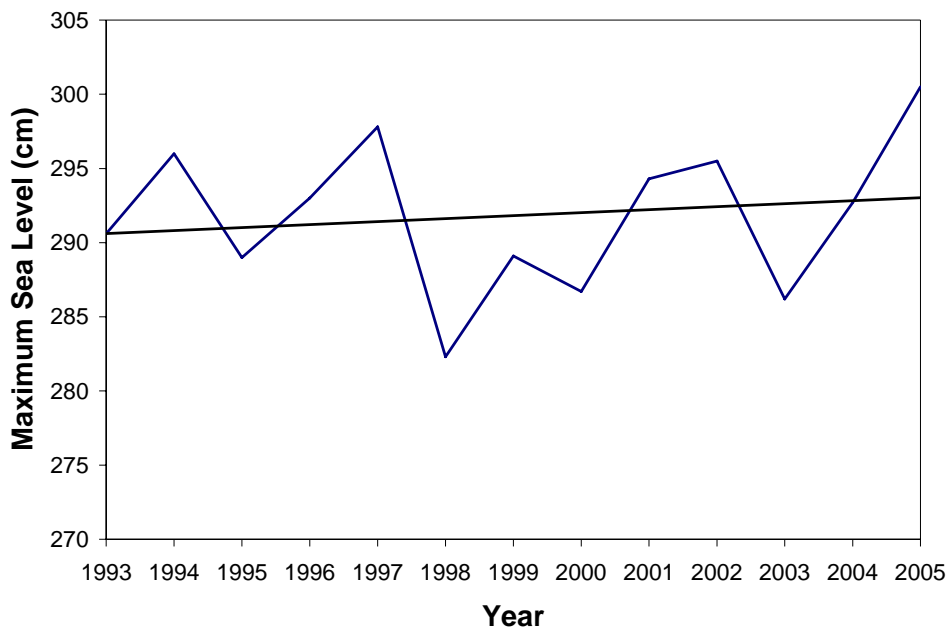


Figure 4 Maximum hourly sea level, by year, for Betio (1993 to 2005). Also shown is the linear trend in sea level over the same period (2 mm/yr).

An hourly sea level of 3 m above mean sea level is a relatively rare event for Betio, with a return period of approximately 9 yr (Figure 5 and Table 2).

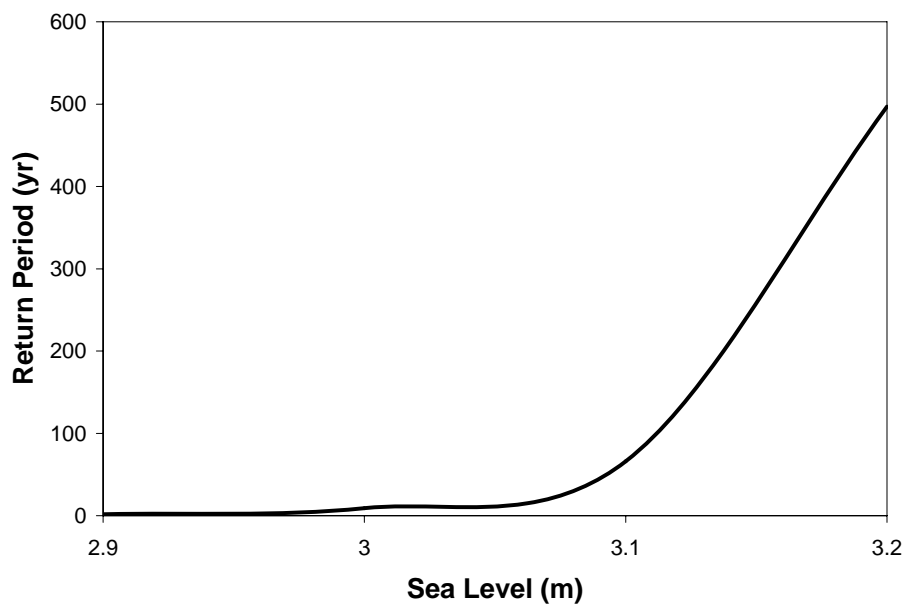


Figure 5 Relationship between hourly sea level and return period for Betio, based on observed hourly sea level for 1993 to 2005.

Table 2

Return Periods (yr), for Hourly Sea Level (m) at Betio

Sea Level (m) of at Least	Observed	2025	2050	2075	2100
2.9	1.7	1.0	1.0	1.0	1.0
3.0	9.2	1.0	1.0	1.0	1.0
3.1	66	1.8	1.0	1.0	1.0
3.2	497	10	1.0	1.0	1.0
3.3	>3000	72	27	1.0	1.0
3.4		>500	17	1.0	1.0
3.5			126	2.0	1.0
3.6			>900	19	1.0

b) Projected Risk Levels

Best estimates of future sea-level rise are based on an average of the estimates using a multi model and emission scenario ensemble (see Table 1). Figure 6 shows the best estimate of mean sea level out to 2100, as well as the band of extreme uncertainty. The latter is estimated using the highest and lowest estimates of sea-level rise for all model and emission scenario combinations.

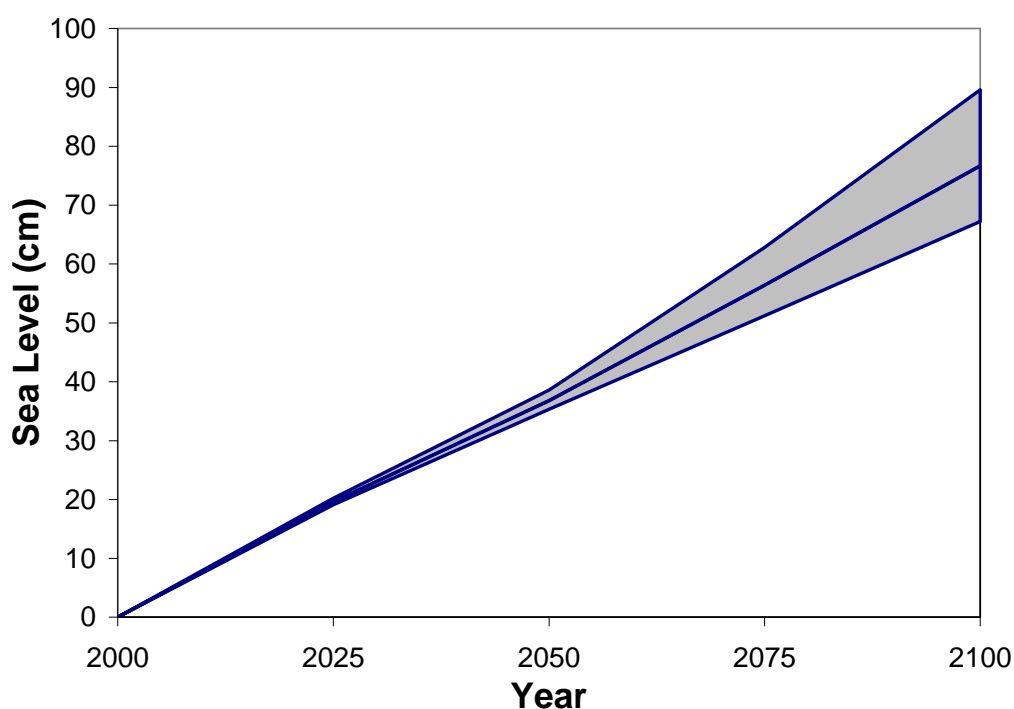


Figure 6 Best estimate of projected increase in mean sea level for Betio, along with the uncertainty envelope as given by the maximum and minimum estimates using all possible combinations of the available global climate models and emission scenarios.

As indicated in Figure 7 and Table 2, global warming will also have a significant impact on the return periods of extreme high sea levels that persist for at least an hour. For example a sea level 175 cm is currently a 100-year event. It will likely be a 4-year event by 2025. Figure 6 also shows the low level of uncertainty in future projections of sea level extremes.

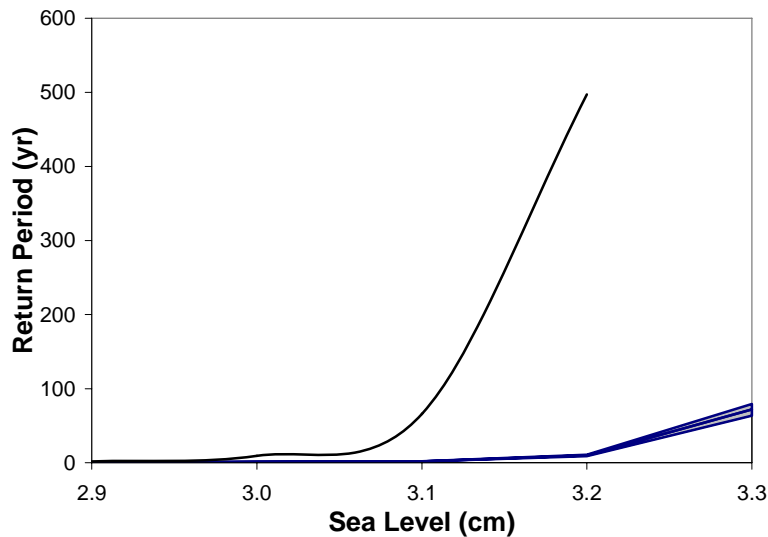


Figure 7 Relationship between hourly sea level and return period for Betio, for present day (black line) and 2025 (blue lines). The uncertainty envelope shows the maximum and minimum estimates of return periods for 2025, based on all possible combinations of the available global climate models and emission scenarios.

Daily Rainfall

a) Current Risks Levels

Figure 8 shows daily rainfall for Betio. High variability, including extremes, is readily apparent. This is also the case for the longer term monthly and annual rainfall data (Figures 9 and 10, respectively). No significant long term trends are evident in any of the three time series.

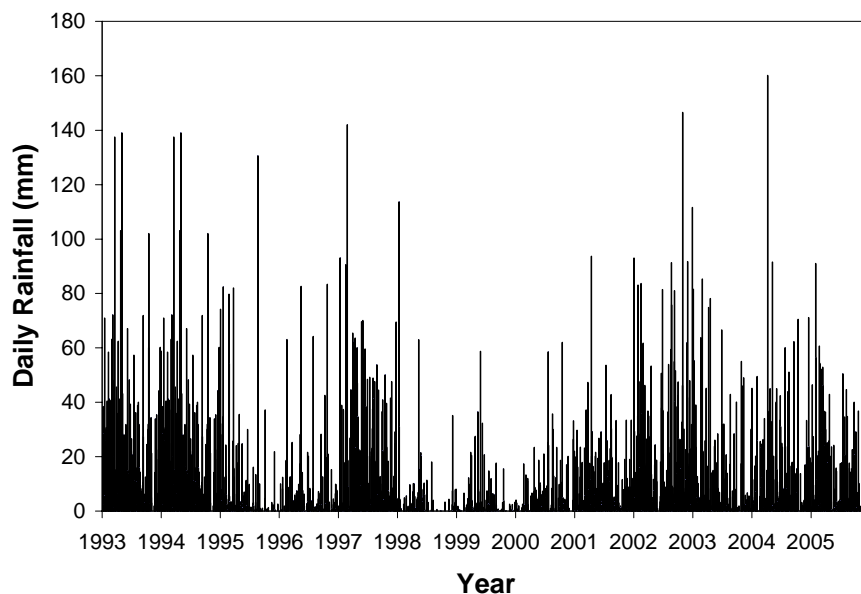


Figure 8 Daily rainfall for Betio (1993 to 2005).

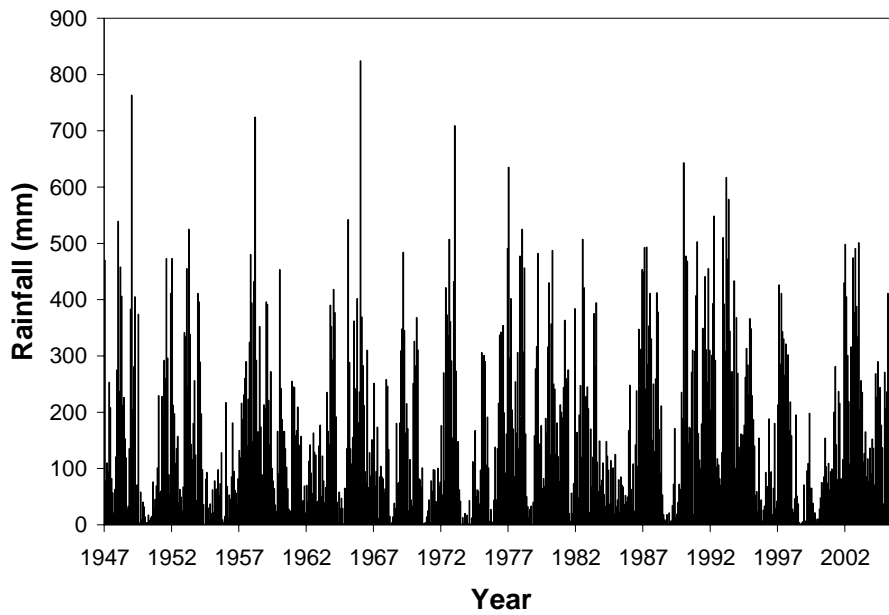


Figure 9 Total monthly rainfall for Betio (1947 to 2005).

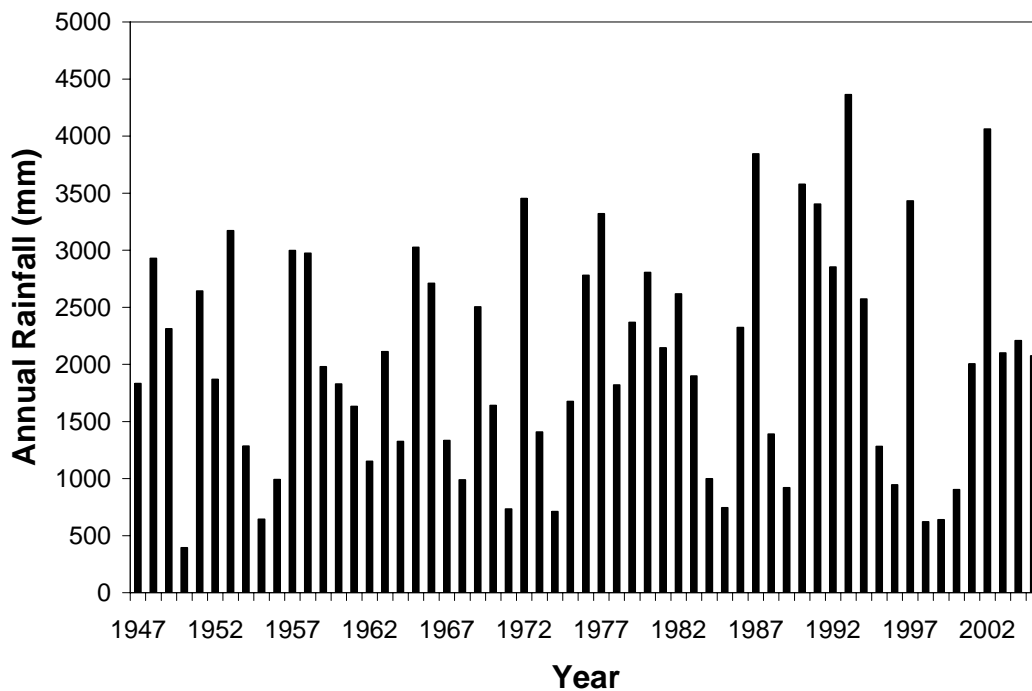


Figure 10 Total annual rainfall for Betio (1947 to 2005).

Figure 11 presents the annual maximum daily rainfall for Betio. Again, considerable interannual variability in extreme rainfall occurrences is evident. A daily rainfall of at least 140 mm is a relatively rare event at Betio, with a return period of approximately 5 yr (Figure 11 and Table 3).

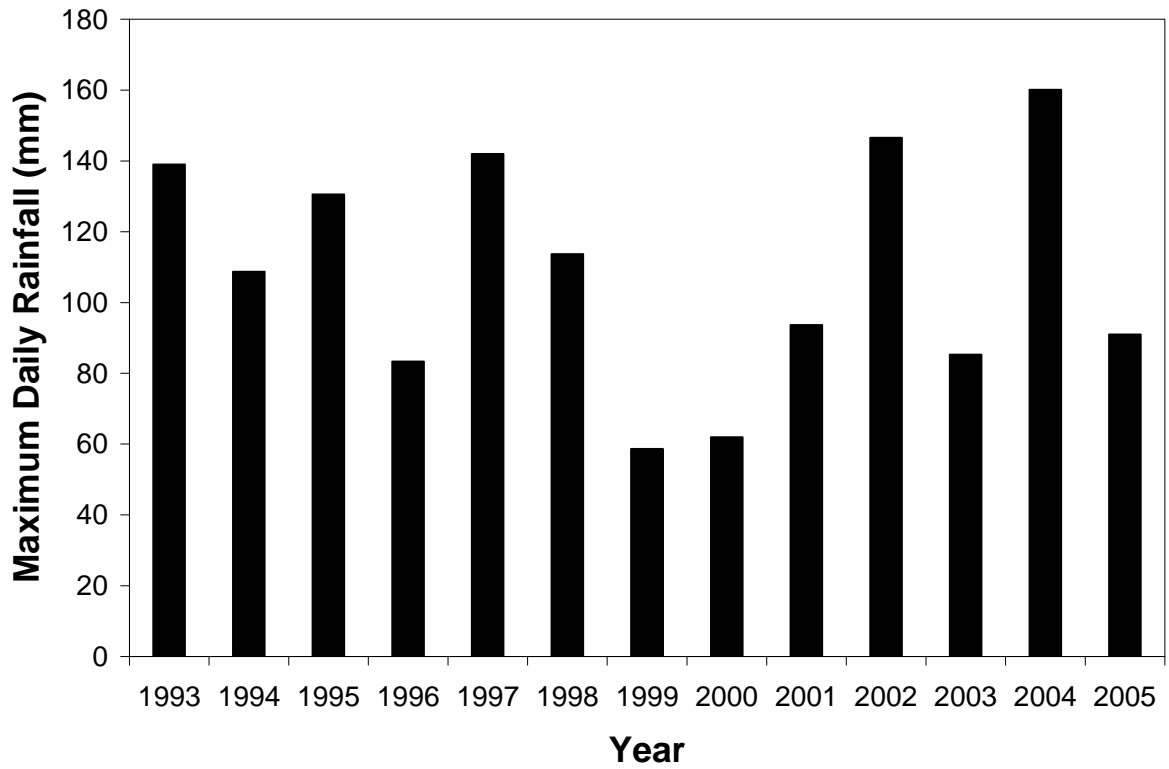


Figure 11 Maximum daily rainfall, by year, for Betio (1993 to 2005).

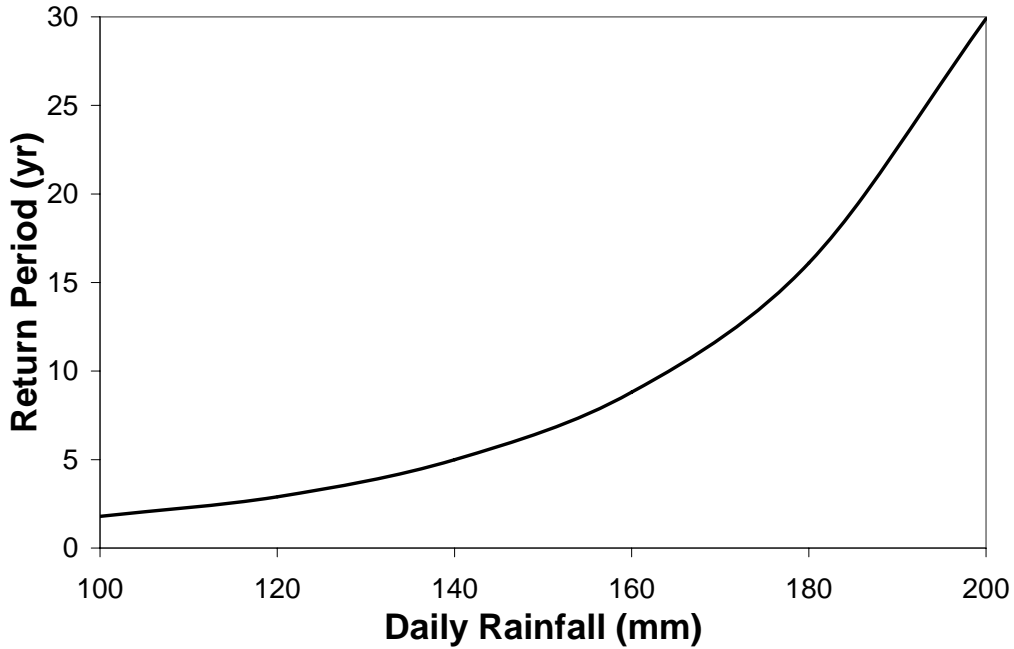


Figure 12 Relationship between daily rainfall and return period for Betio, based on observed daily rainfall for 1993 to 2005.

Table 3

Return Periods (yr), for Daily Rainfall (mm) at Betio

Daily Rainfall (mm) of at Least	1993-2005	2025	2050	2075	2100
100	1.8	1.5	1.3	1.2	1.1
120	2.9	2.2	1.7	1.5	1.3
140	5.0	3.4	2.5	1.9	1.7
160	8.8	5.6	3.8	2.7	2.3
180	16.1	9.6	6.0	4.0	3.2
200	29.9	16.5	9.6	6.1	4.6

b) Projected Risk Levels

Best estimates of changes in daily rainfall are based on an average of the estimates using a multi model and emission scenario ensemble (see Table 1). Figure 13 shows the best estimate of mean annual rainfall out to 2100, as well as the band of extreme uncertainty. The latter is estimated using the highest and lowest estimates of daily rainfall, for all model and emission scenario combinations. It is clear that there is large uncertainty in the rainfall projections, with one model suggesting substantial increases in rainfall, two models suggesting only small increases, and one model indicating a small decrease in rainfall into the future.

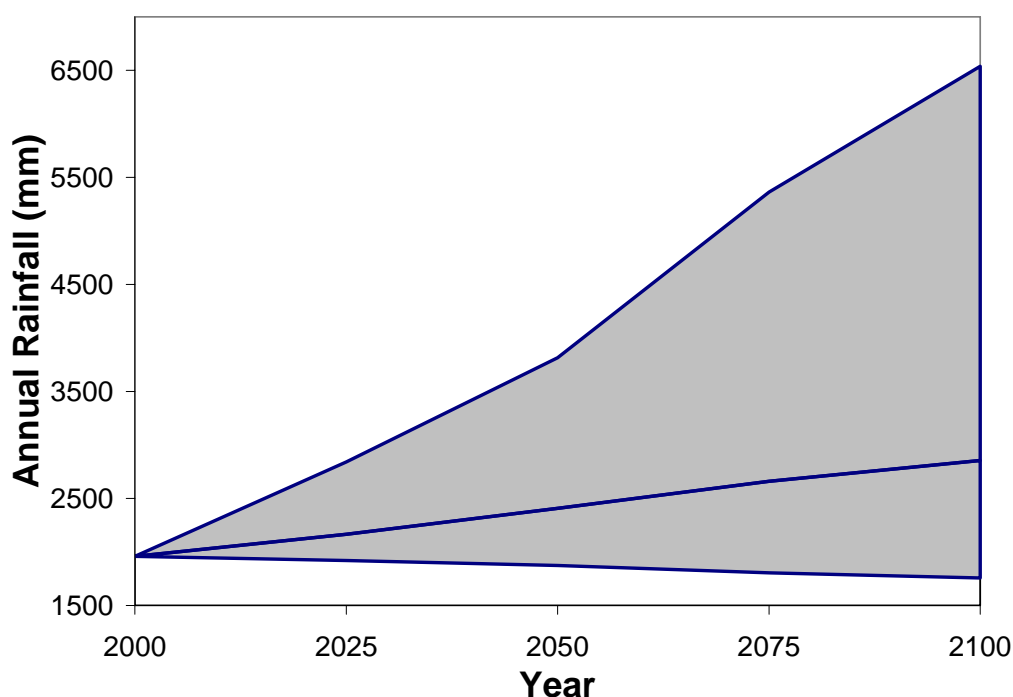


Figure 13 Best estimate of projected change in mean annual rainfall for Betio, along with the uncertainty envelope as given by the maximum and minimum estimates using all possible combinations of the available global climate models and emission scenarios.

As indicated in Table 3 and Figure 14, global warming will likely reduce the return periods of extreme daily rainfall events. But Figure 14 also shows that again there is large uncertainty.

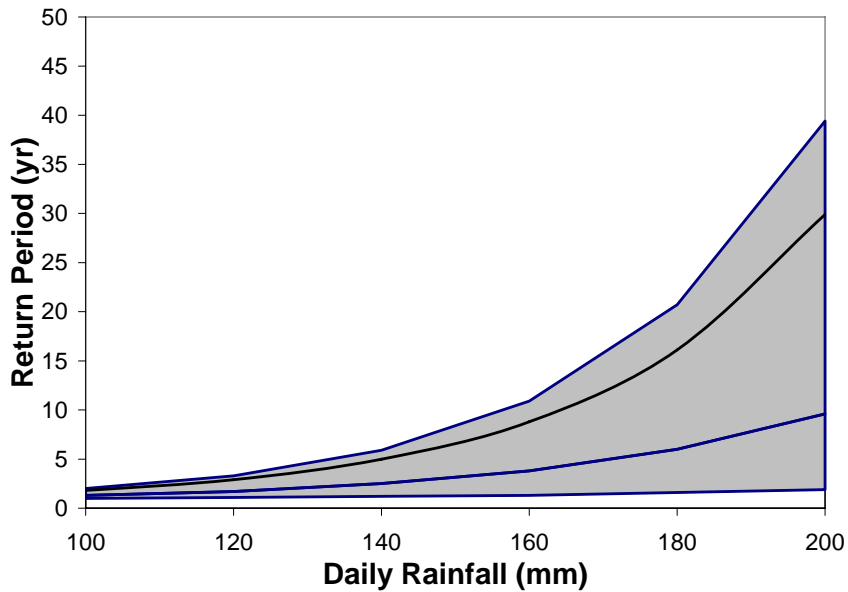


Figure 14 Relationship between daily rainfall and return period for Betio, for present day (black line) and 2050 (blue lines). The uncertainty envelope shows the maximum and minimum estimates of return periods for 2050, based on all possible combinations of the available global climate models and emission scenarios.

Hourly Rainfall

a) Current Risks Levels

Figure 15 presents the annual maximum hourly rainfall for Betio. The data covers the period 1998 to 2005, which is a very short record on which to base risk estimates. Substantial interannual variability in extreme hourly rainfall occurrences is evident. An hourly rainfall of at least 50 mm is a relatively rare event at Betio, with a return period of approximately 9 yr (Figure 16 and Table 4).

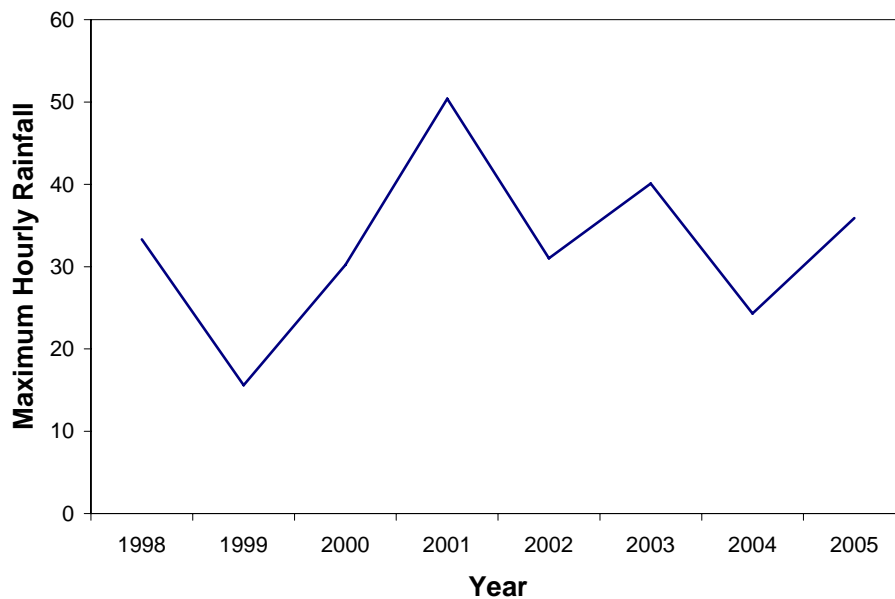


Figure 15 Maximum hourly rainfall, by year, for Betio (1998 to 2005).

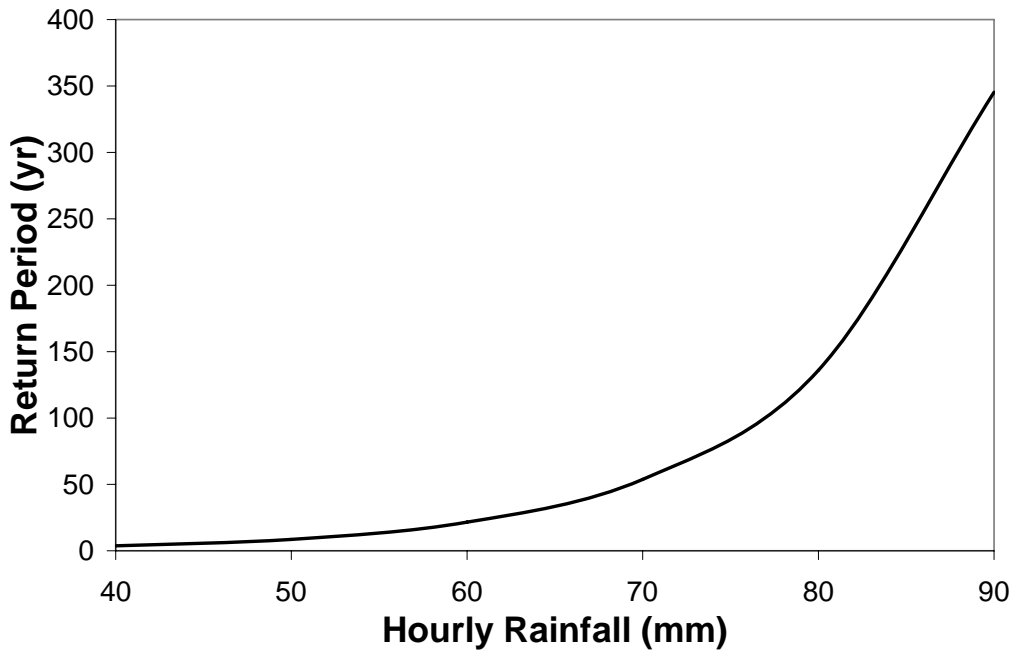


Figure 16 Relationship between hourly rainfall and return period for Betio, based on observed six-hourly rainfall for 1998 2005.

Table 4

Return Periods (yr), for Hourly Rainfall (mm) at Betio

Hourly Rainfall (mm) of at Least	1998 to 2005	2025	2050	2075	2100
40	3.8	2.8	2.2	1.8	1.6
50	8.7	5.8	4.0	2.9	2.4
60	22	13	7.9	5.3	4.1
70	54	29	16	10	7.3
80	136	67	34	19	14
90	345	154	73	38	25

b) Projected Risk Levels

Best estimates of changes in hourly rainfall extremes are based on an average of the estimates using a multi model and emission scenario ensemble (see Table 1). As indicated in Table 4 and Figure 17, global warming will likely reduce the return periods of extreme hourly rainfall events, although Figure 17 also shows there is considerable uncertainty in the projections.

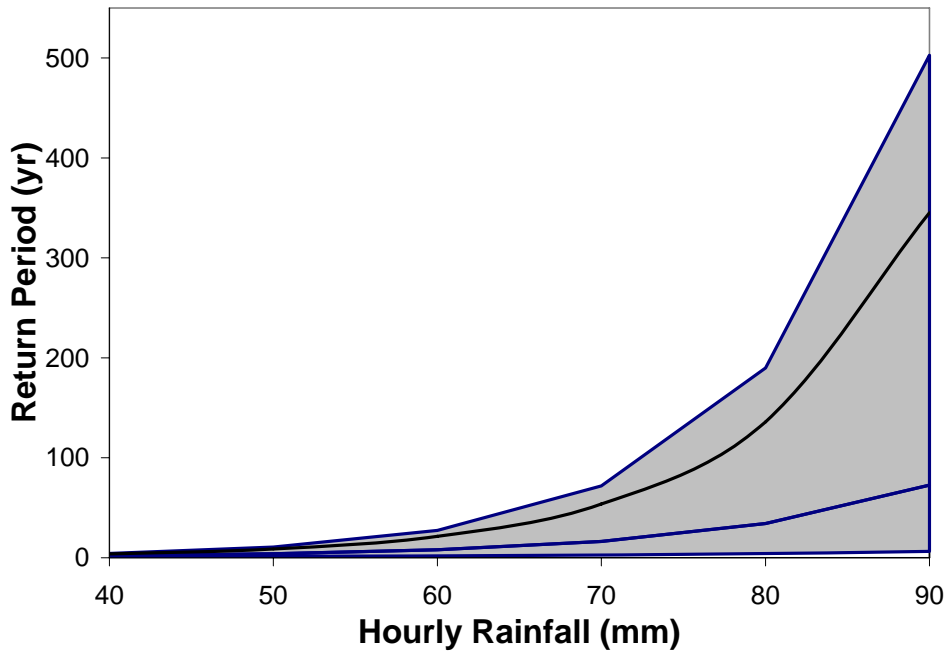


Figure 17 Relationship between six-hour rainfall and return period for Betio, for present day (black line) and 2050 (blue lines). The uncertainty envelope shows the maximum and minimum estimates of return periods for 2050, for all possible combinations of the available global climate models and emission scenarios.

Drought

Figure 18 presents, for Betio, the number of months in each year (1961 to 2005), and each decade, for which the observed precipitation was below the ten percentile. A monthly rainfall below the ten percentile is used here as an indicator of drought.

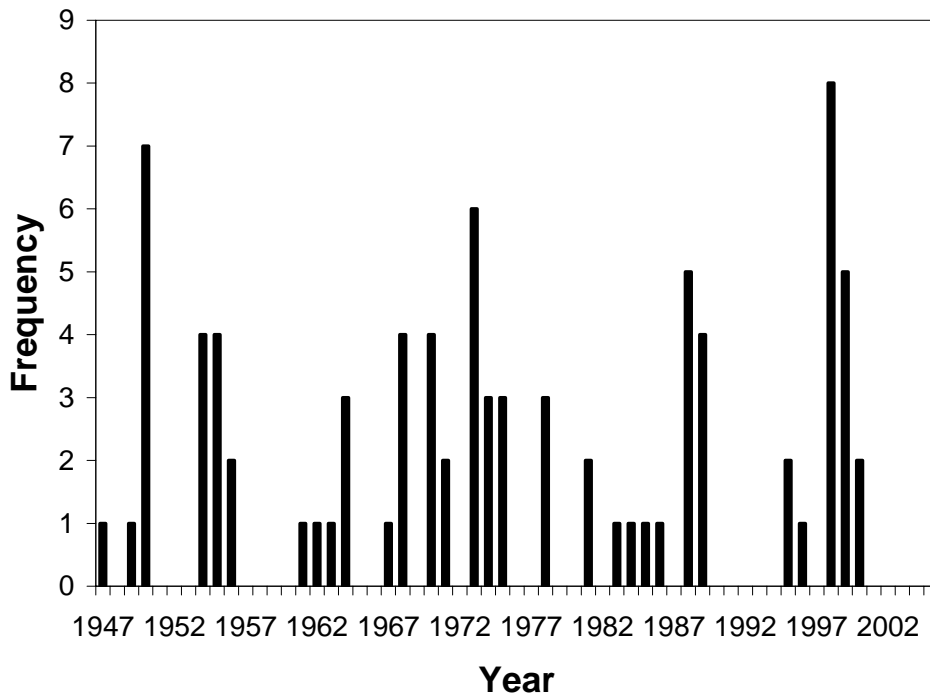


Figure 18 Number of months in each year for which the precipitation was below the ten percentile. Data for Betio (1947 to 2005).

There is considerable inter-annual and inter-decadal variability in this indicator of drought, with no obvious long term trend. In Kiribati many occurrences of drought are associated with La Niña events. Figure 19 shows the relationship between the Southern Oscillation Index (SOI) and drought frequency. A positive SOI indicates a La Niña event.

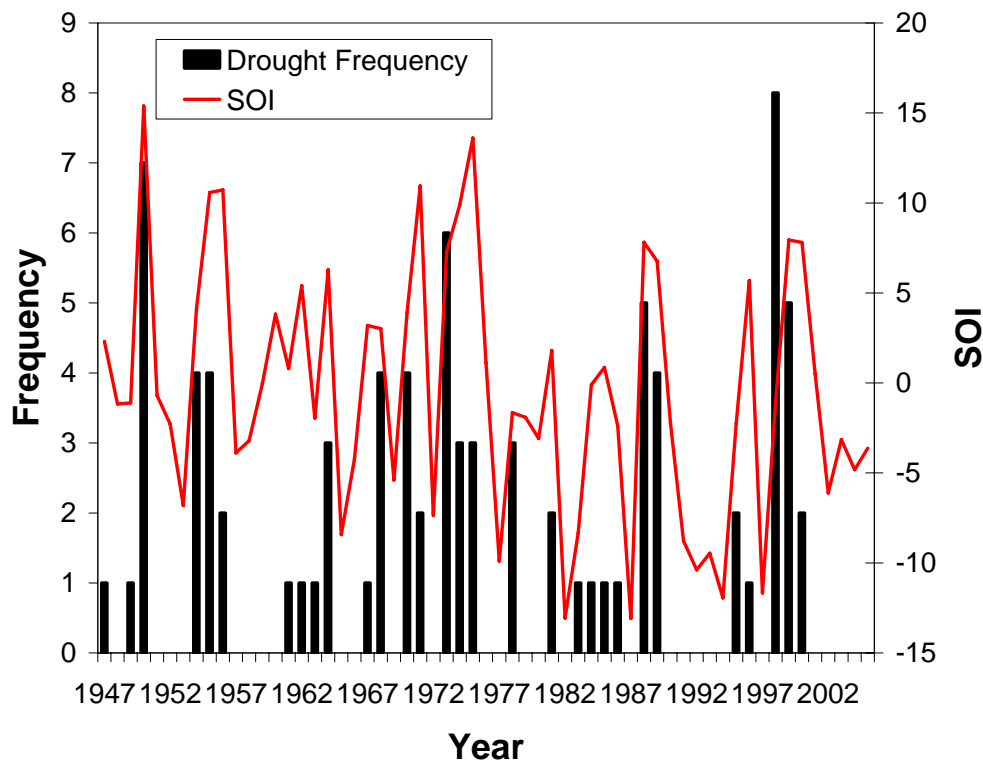


Figure 19. Relationship between the Southern Oscillation Index (SOI) and drought frequency. Drought frequency is based on the number of months in each year for which the precipitation was below the ten percentile. Precipitation data for Betio (1947 to 2005).

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 (Figure 20). 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 modelling studies (e.g. Yamaguchi and Noda, 2005) 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, van Oldenborgh and Philip (2005) found no significant changes toward El Niño-like conditions in 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.

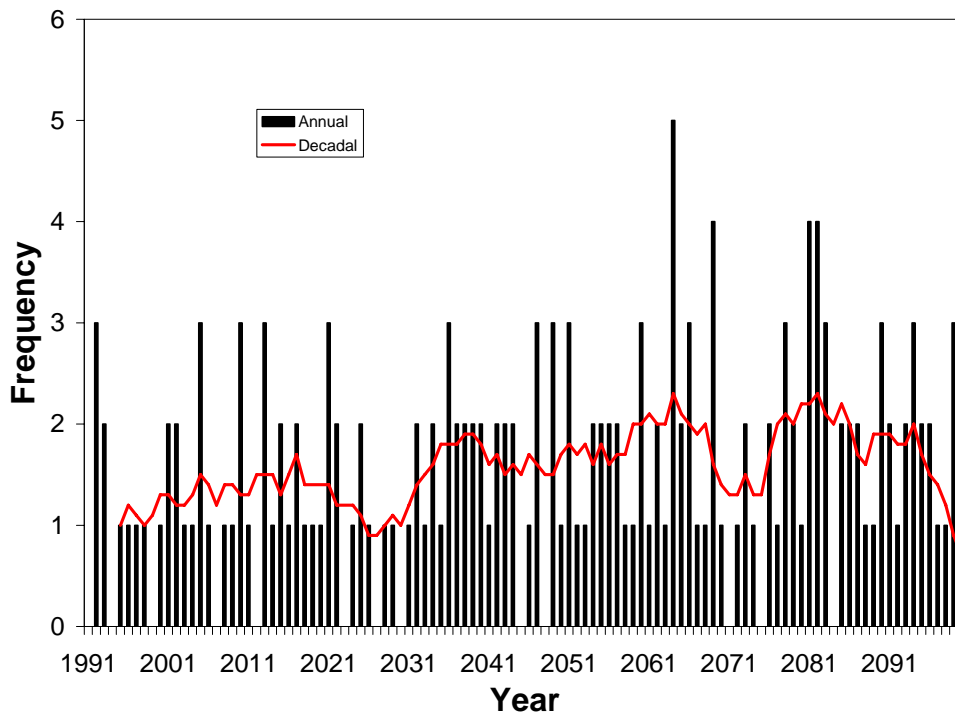


Figure 20 Annual and decadal frequencies of drought for a grid square centred on Tarawa , as estimated by the Canadian Global Climate Model using the A2 greenhouse gas emissions scenario. Source: IPCC Data Distribution Centre.

Extreme Winds

a) Current Risk Levels

Figure 21 shows the annual maximum wind gust recorded at Betio over the period 1993 to 2005. There is large interannual variability and no trend in the data.



Figure 21 Annual maximum wind gust recorded at Betio for the period from 1993 to 2005.

A wind gust of at least 30 m sec⁻¹ can be considered a relatively rare event, with a return period of approximately 15 yr (Table 5 and Figure 22).

Table 5

Return Periods (yr), for Peak Gust (m sec⁻¹) at Betio

Peak Gust of at Least (m sec ⁻¹)	1993 to 2005	2025	2050	2075	2100
25	4.6	3.8	3.2	2.7	2.5
30	15	12	9.3	7.4	6.4
35	51	39	29	22	18
40	179	129	94	67	55

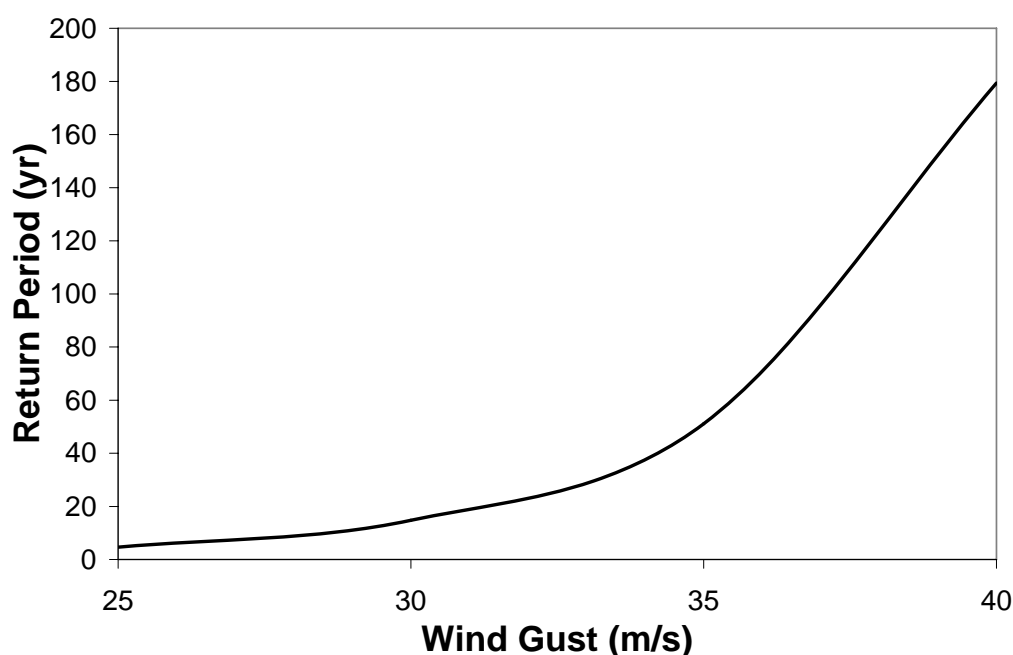


Figure 22 Relationship between wind gust and return period for Betio, based on observed peak gust data for 1993 to 2005.

b) Projected Risk Levels

Estimates of changes in extreme wind gusts are based on the assumption that maximum wind gusts will increase by between 2.5 and 10 per cent per degree of global warming, with a best estimate of 10 per cent. The emission scenarios listed in Table 1 are still explicitly included in the wind gust projections. The best estimate of the increase in extreme wind gusts is determined by averaging the ensemble of estimates for all combinations of percentage increase and emission scenarios.

Figure 23 shows the best estimate of extreme wind gust out to 2100, as well as the band of maximum uncertainty. The latter is estimated using the highest and lowest estimates of extreme wind gust, for all three percentage increases and emission scenario combinations. It is clear that there is substantial uncertainty in the maximum wind gust projections.

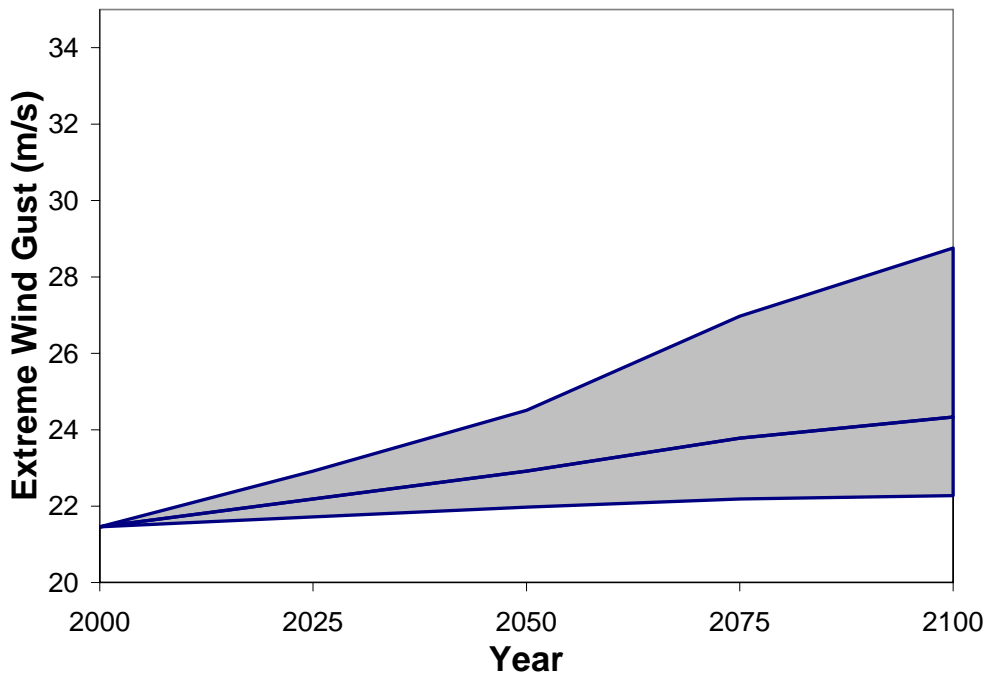


Figure 23 Best estimate of projected increase in extreme wind gust for Betio, along with the uncertainty envelope as given by the maximum and minimum estimates provided by all possible combinations of the percentage increases and the emission scenarios.

As indicated in Table 5 and Figure 24, global warming will influence the return periods of extreme wind gusts. For example, currently an extreme wind gust of 40 m sec^{-1} has a return period of around 180 years. By 2050 the return period for this extreme event will approximately halve to 90 years.

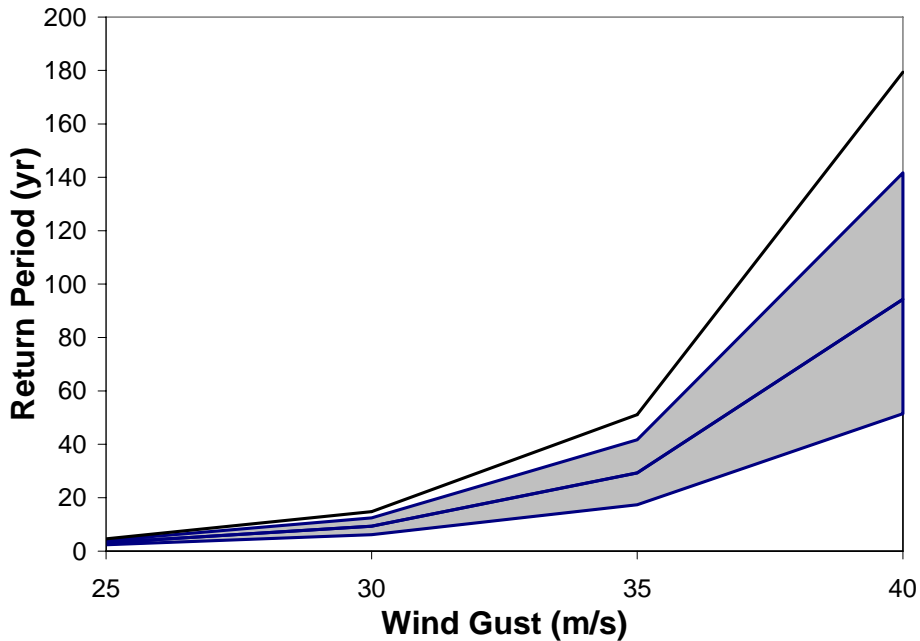


Figure 24 Relationship between peak wind gust and return period for Betio, for present day (black line) and 2050 (blue lines). The uncertainty envelope shows the maximum and minimum estimates of return periods for 2050, based on all possible combinations of the percentage increases and emission scenarios.

Extreme High Air Temperatures

a) Current Risks Levels

Figure 25 presents annual maximum air temperatures for Betio. Considerable interannual variability in the extreme air temperature is evident. There is no evidence of a trend in maximum air temperatures. A maximum air temperature of at least 35 C is a relatively rare event at Betio, with a return period of approximately 38 yr (Figure 26 and Table 6).

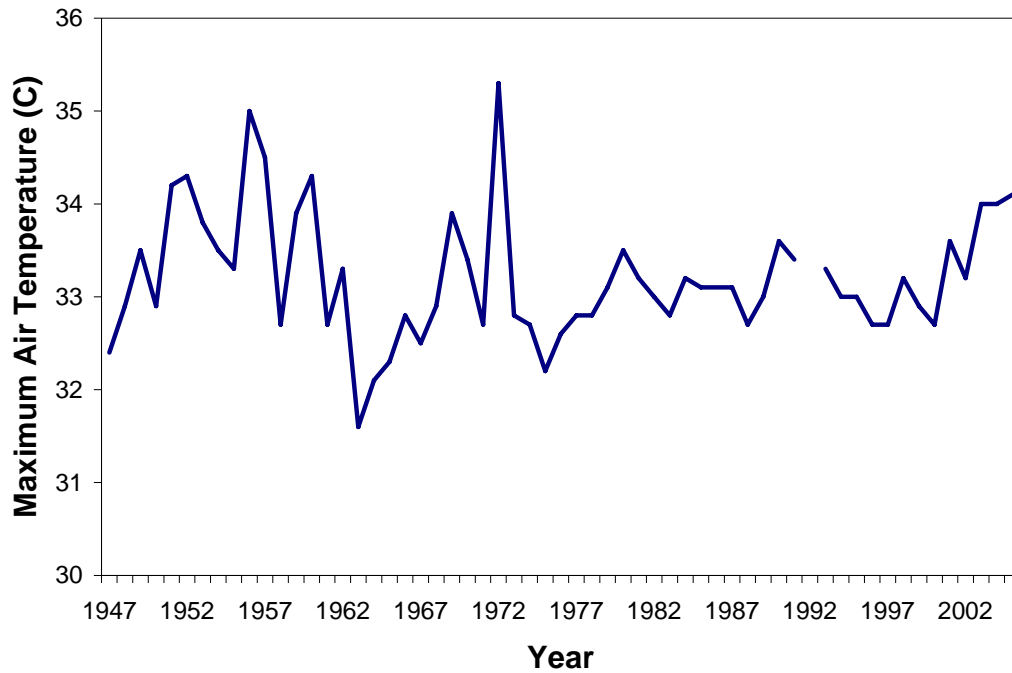


Figure 25 Maximum air temperature, by year, for Betio (1947 to 2005).

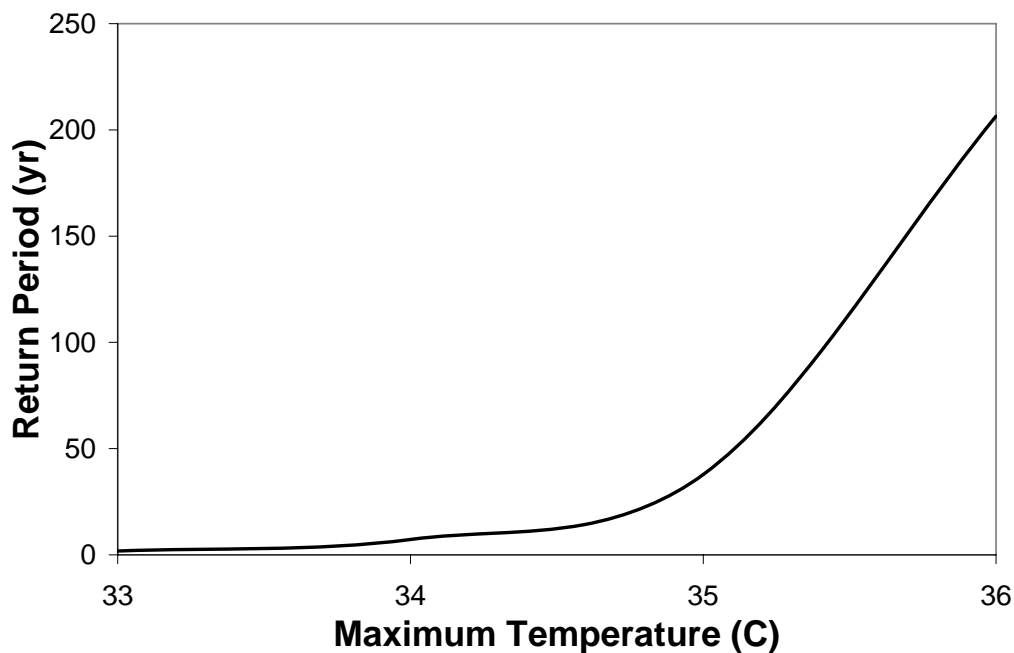


Figure 26 Relationship between maximum air temperature and return period for Betio, based on observed daily maximum temperature for 1947 to 2005.

Table 6

Return Periods (yr), for Maximum Air Temperature (C) at Betio

Maximum Temperature (C) of at Least	1947 to 2005	2025	2050	2075	2100
33	1.8	1.2	1.0	1.0	1.0
34	7.3	3.7	1.3	1.2	1.0
35	38	18	4.1	3.5	2.0
36	207	97	20	17	8.7
37	>1100	>500	226	91	46

b) Projected Risk Levels

Best estimates of changes in maximum air temperature are based on an average of the estimates using a multi model and emission scenario ensemble (see Table 1). Figure 27 shows the best estimate of maximum air temperature out to 2100, as well as the band of extreme uncertainty. The latter is estimated using the highest and lowest estimates of extreme daily rainfall, for all model and emission scenario combinations.

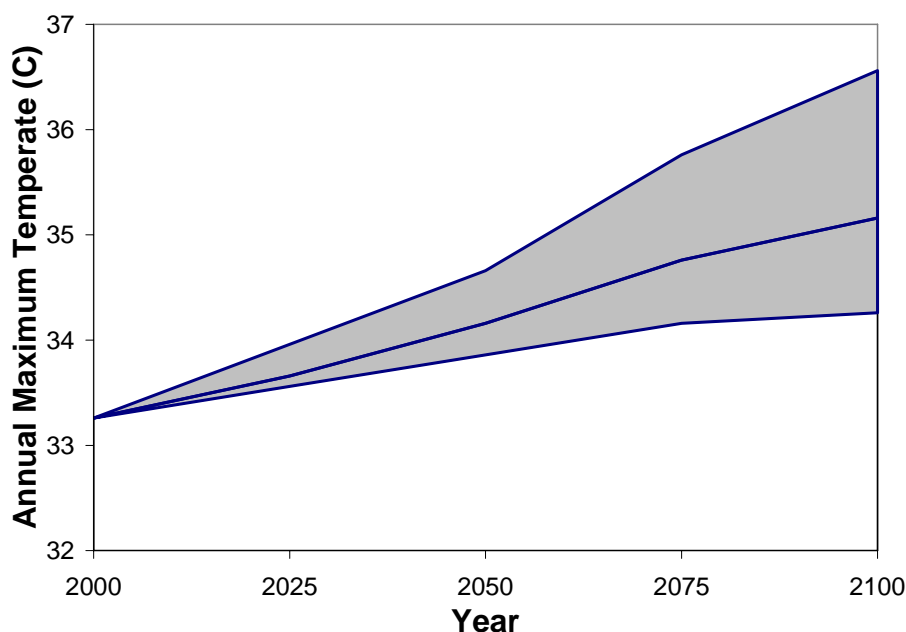


Figure 27 Best estimate of projected increase in annual maximum air temperature for Betio, along with the uncertainty envelope as given by the maximum and minimum estimates provided by all possible combinations of the available global climate models and emission scenarios.

As indicated in Table 6 and Figure 28, global warming will influence the return periods of maximum air temperatures. For example, a maximum air temperature of 36 C is currently well in excess of a 200-year event. By 2050 it will likely have a return period of 40 years.

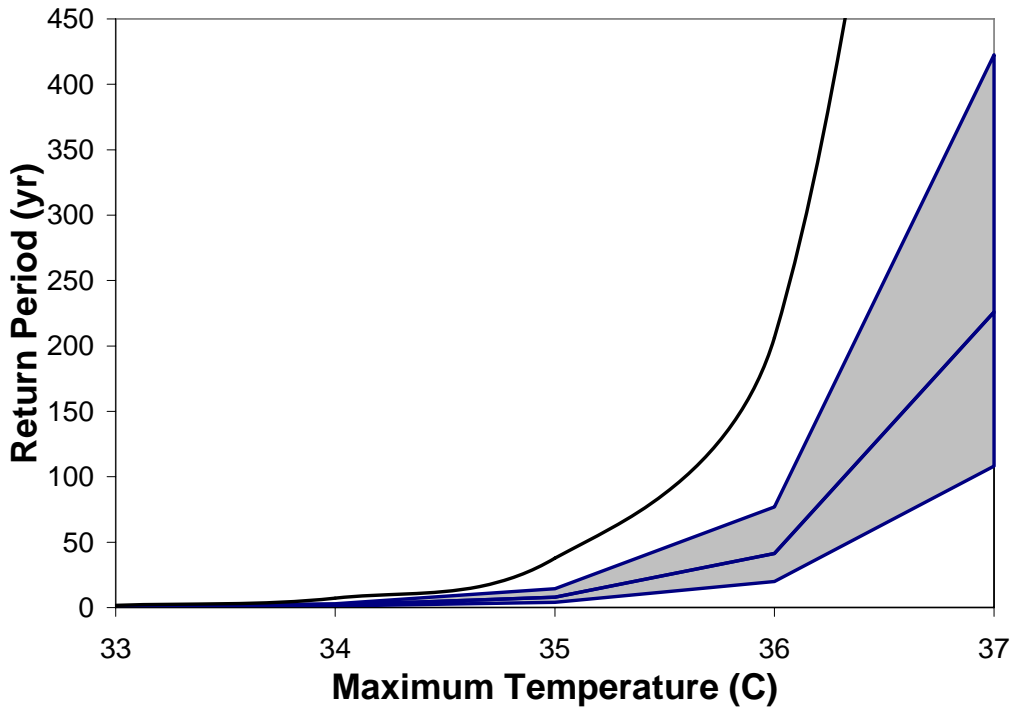


Figure 28 Relationship between maximum air temperature and return period for Betio, for present day (black line) and 2050 (blue lines). The uncertainty envelope shows the maximum and minimum estimates of return periods for 2050, based on all possible combinations of the available global climate models and emission scenarios.

Extreme High Water Temperatures

a) Current Risks Levels

Figure 28 presents annual maximum open water temperatures for a grid square centred on South Tarawa. A maximum temperature of at least 30.5 C is a relatively rare event, with a return period of approximately 13 yr (Figure 25 and Table 6).

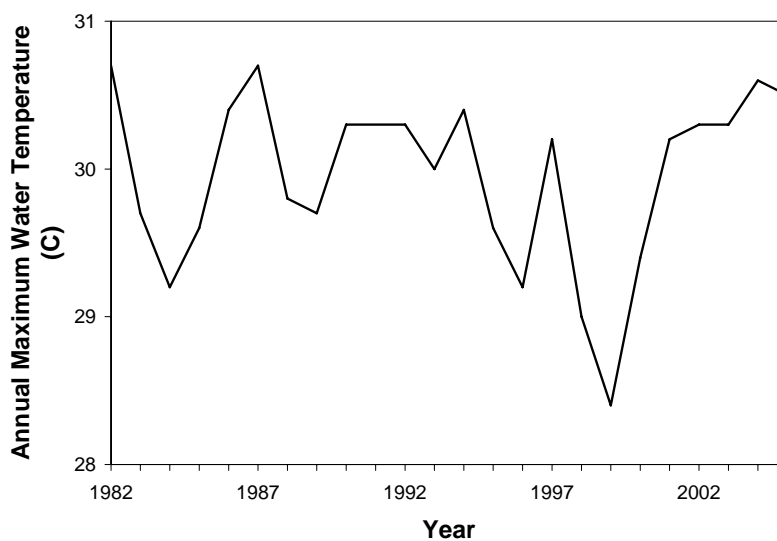


Figure 24 Maximum water temperature, by year, for a grid square centred on South Tarawa (1982 to 2005). Source: PODAAC-ESIP <http://poet.jpl.nasa.gov>

Table 6

Return Periods (yr), for Maximum Water Temperature (C) at Betio

Maximum Temperature (C) of at Least	1982 to 2005
29	1.0
30	2.4
31	13
32	79
33	>500

Conclusions

The foregoing analyses convey two key messages: (i) increased occurrences of extreme high sea levels, air temperatures and winds are highly likely in the coming decades; and (ii) there is less certainty regarding changes in the frequency of intense precipitation events (daily or hourly), but there are indications that the frequency of these events will also increase in the future.

The present CRP is the first step in analysing the climate-related risks facing Kiribati. Additional data for Betio should be analysed, with both the current and additional data being subjected to rigorous quality control.

Data for other locations should also be included in a future climate risk profile, as Betio is certainly not representative of the entire country.

A future climate risk profile might also include assessments of the consequence components of the climate-related risks, for relevant sectors and social groups.

References

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- Yamaguchi, K., and Noda, A. (2005). Global warming patterns over the North Pacific: ENSO versus AO. *J. Meteorological Society of Japan*, submitted.

Annex 2

List of People Consulted

Person/Position

Ministry of Finance and Economic Planning (MFEP)

Hon. Nabuti Mvemwenikarawa	Minister of Finance
Mr. Taneti Maamau,	Secretary
Ms Wiriki Tooma	Deputy Secretary
Mr. Tom Murdoch,	Senior Assistant Secretary
Dr. Iete Rouatu,	Director of Planning
Mr. Tiimi Kaiekieki	Chief Economist
Nei Nuntaake	Economic Planner
Ms. Fajtele Pine	Economic Planner

Ministry of Fisheries and Marine Resources Development (MFMRD)

Mr. David Yeeting	Secretary
	Deputy Secretary
	Director of Mineral Resources
	Director of Fisheries

Office of the Beretitenti

Ms. Makurita Baaro	Chief Secretary
Mr. Taam Biribo	Secretary for Foreign Affairs
Mr. Ross Allen	Strategic National Policy and Risk Assessment Unit
	Commissioner of Police
Mr. Kaiarake Taburuea	Project Coordinator of KAP

Ministry of Environment Lands and Agriculture Development (MELAD)

Mr. Tukabu Teroroko	Secretary
	Project Development Officer
Mr. Tebutonga	Director of Lands
	Director of Agriculture
Ms Tererei Abete Reema	Director of Environment
Mr. Fahran Redfern	Environment Inspector
Mr. Nakibae Teuatabo	Project Coordinator of NAPA
	Legal Officer

Ministry of Education Youths and Sports (MEYS)

Ms. Reina Rimeta	Secretary
	Director of Education

Ministry of Internal and Social Affairs (MISA)

Ms. Karibaiti Taoaba	Secretary
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Ministry of Health and Medical Services (MHMS)

Mr. Riteti Maninraka	Secretary
Dr. Teraira Bangao	Director of Health Services
Ms. Teboranga Awira	Deputy Secretary
Mr. Botii Nauan	Senior Assistant Secretary

Ministry of Labour and Human Resources (MLHR)

Mr. Peter Tong	Secretary
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Ministry of Public Works and Utilities (MPWU)

Mr. Taakei Taoaba	Secretary
Mr. Eita Metai	Chief Engineer

Ministry of Communications, Transport and Tourism Development (MCTTD)

Mr. Tebwe Ietaake,	Secretary
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Ministry of Commerce, Industry and Co-operatives (MCIC)

Ms. Tekoa Ietaake	Secretary
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Mr.	Hon. Attorney General
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Others

Greg MacPherson	AusAID
Mat Halsey	NZAID

Nei Toka	Coordinator, FSP
Ms. Roko Timeon	Coordinator of KANGO
Mr. Paul McLaughlin	Cab'ella Construction

Annex 3

Agenda for the National Dialogue

National Dialogue on Integrating Environmental Considerations in Economic and Development Planning Processes in Kiribati

Tuesday, June 20, 2006

Board Room, Betio Town Council

Agenda

- 09:00 Welcome (Chair: Taneti Maamau, Permanent Secretary, Finance and Economic Development)
- 09:05 Opening Remarks (Hon. Nabuti Mwemwenikarawa, Minister of Finance)
- 09:25 Purpose of Dialogue, Agenda, and Dialogue Process (Komeri Onorio, ADB Consultant)
- 09:30 *Refreshments*
- 09:50 Sustainable use of the Environment: Constraints and Opportunities (Tererei Abete-Reema, Director of Environment and Conservation Division, Ministry of Environment, Lands and Agricultural Development)
- 10:15 Balancing Environment and Infrastructure Development: Constraints and Opportunities (Eita Metai, Acting Director, Ministry of Public Works and Utilities)
- 10:40 Strengthening Kiribati's Economic and Development Planning Policies and Procedures: Constraints and Opportunities (Tiimi Kaiekieki, Chief Economist, National Economic Planning Office, Ministry of Finance and Economic Development)
- 11:05 Strategic Policies and Operational Procedures for Integrating Environment and Development: Constraints and Opportunities (Ross Allen, Strategic National Policy and Risk Assessment Unit)
- 11:30 Key Findings of the Country Environmental Analysis for Kiribati (Komeri Onorio, ADB Consultant)
- 11:40 Discussion, and Validation of Findings (Chair: Taneti Maamau, Permanent Secretary, Finance and Economic Development)
- 12:30 *Lunch*
- 13:30 Proposed Priority Areas and Integrating Initiatives (John Hay, ADB Consultant)
- 13:50 Discussion, and Consensus Building (Chair: Taneti Maamau, Permanent Secretary, Finance and Economic Development)
- 14:30 Closing Remarks (Hon. Martin Tofinga, Minister of Environment, Lands and Agricultural Development)
- 14:45 Close of National Dialogue
- 14:45 *Refreshments*

Annex 3

List of Participants for the National Dialogue

NAME	DESIGNATION	ORGANISATION
H.E. John Goodman	NZ High Commissioner	NZ High Commission
H.E. Samuel Chen	Taiwanese High Commissioner	Taiwan High Commission
Harry Tong	Member of Parliament	South Tarawa
Kataotika Tekee	Member of Parliament	North Tarawa
Taneti Maamau	Secretary	Ministry of Finance and Economic Development
Iamti Rakautu	Secretary	Public Service Office
Tiimi Kaiekieki	Chief Economist	Ministry of Finance and Economic Development
Matereta Raiman	Commissioner of Taxation	Ministry of Finance and Economic Development
Tererei Abete-Reema	Director of Environment & Conservation	Ministry of Environment, Land, Agriculture Development
Karawe Teroroko	Chairman	KANGO
Beia Kaaitara	Vice-Chairman	T.U. Association
Teororo Tearawa	Accountal General	Ministry of Finance and Economic Development
Teibaba Abera	Finance Manager	Kiribati Copra Coop. Society
Kautuna Kaitara	Comptroller of Custom	Ministry of Finance and Economic Development
Kinoia Boutabu	Assistant Principle of Disabled	School for Disabled
Ross Allen	Technical Adviser	Office of Te Beretitenti
Kaiarake Taburuea	Coordinator	Kiribati Adaptation Project
Aritita Tekaeiti	Senior Statistician	Ministry of Finance and Economic Development
Nakibae Teuatabo	NAPA Advisor	Ministry of Environment, Lands, Agriculture Development
Katarina Tofinga	Chief Executive Officer	KCMCL
Aren Ueara-Teannaki	Senior Women Development Officer	Ministry of Internal and Social Affairs – AMAK
Marea Itايا	Coastal Programme Coordinator	Foundation of South Pacific
Maruia Kamatie	Director of Fisheries	Ministry of Fisheries and Marine Resource Development
Kautoa Tonganibeia	Environment Inspector	Ministry of Environment, Lands, and Agriculture Development
Raikaon Tumoa	Senior Fisheries Officer	Ministry of Fisheries and Marine Resource Development
Takoe Beaiera	Assistant Coordinator RAK	KANGO
Farran Redfern	Environment Inspector	Ministry of Environment, Lands and Agriculture Development
Riibeta Abeta	Environment Inspector	Ministry of Environment, Lands and Agriculture Development
Marcus Hipking	Legal Adviser-Environment	Ministry of Environment, Lands and Agriculture Development
Nuntaake Tokamauea	Economist	Ministry of Finance and Economic Development
John Hay	Consultant	Asian Development Bank
Komeri Onorio	Consultant	Asian Development Bank
Eita Metai	Acting Director	Ministry of Public Works and Utilities
Toka Abiete	Acting Team Leader	Foundation of South Pacific
Faitele Mika	Economist	Ministry of Finance and Economic Development

Annex 5

Country Information

A. Background Information

1. **Society.** The people of Kiribati are Micronesian, living in village groups on 23 of the 33 islands of Kiribati. The focus of life in the village community is the *maneaba* which combines theory, institution and process and represents the village and the island traditional social system. The *Maneaba* System embodies the whole of society: the *kainga* (extended family), the village and the island community as a whole. The *maneaba* in the Kiribati tradition symbolises the ultimate reality of life for people on the islands. It stands as the house of justice and the house of entertainment and accommodation. Each *kainga* has its own individual sitting position in the *maneaba* - called the *boti*. Thus every individual has a place in the *maneaba*. In the *maneaba* ideas are processed, news is communicated, information is given, conflicts are resolved, domination is avoided, and justice is sought. Rule and authority are applied - not by the majority, but by everyone, through consensus. The objective of the elders when they meet is to invite the inhabitants of the village and to allow them to participate in good work that shows their generosity, their cooperation and their willingness to assist others.

2. Kiribati society retains strong traditional practices and values based on family relationships, the sharing of resources and incomes and a co-operative approach to economic activity. Kiribati remains relatively egalitarian and the government is stable and democratic institutions are strong.

3. **Geography.** Kiribati is a group of 33 islands in the central Pacific. It straddles the Equator (Figure 1). The three island groups of Kiribati -- Gilbert, Line, and Phoenix Groups -- are spread over a 3.5 million square kilometre exclusive economic zone (EEZ). The total land area of Kiribati is 811 square kilometres, with Kiritimati Island making up more than half of the total land area of Kiribati. Only 23 of the 33 islands in Kiribati are inhabited. The capital island is Tarawa, in the Gilbert Group. Currently it has about half of the total population of 92,400.

4. The islands are mostly low-lying coral atolls, consisting of a narrow band of coral sand overlying hard coral pans, fringed by coral reefs on the ocean side and often a surrounding lagoon. The resource base is very narrow. The arid climate and poor soil offer little potential for agricultural development. A few atolls have natural underground water lenses; elsewhere a perennial shortage of fresh water constraint human habitation and other activities. The geographic fragmentation of Kiribati, and its location in the central Pacific, makes transport and communications both costly and difficult. Transport within Kiribati is extremely limited and is primarily by boat, although islands in the Gilbert group also have an inter-island air service once or twice a week. Tarawa now receives three international flights a week while Kiritimati is serviced from Nadi and Honolulu on a weekly basis.

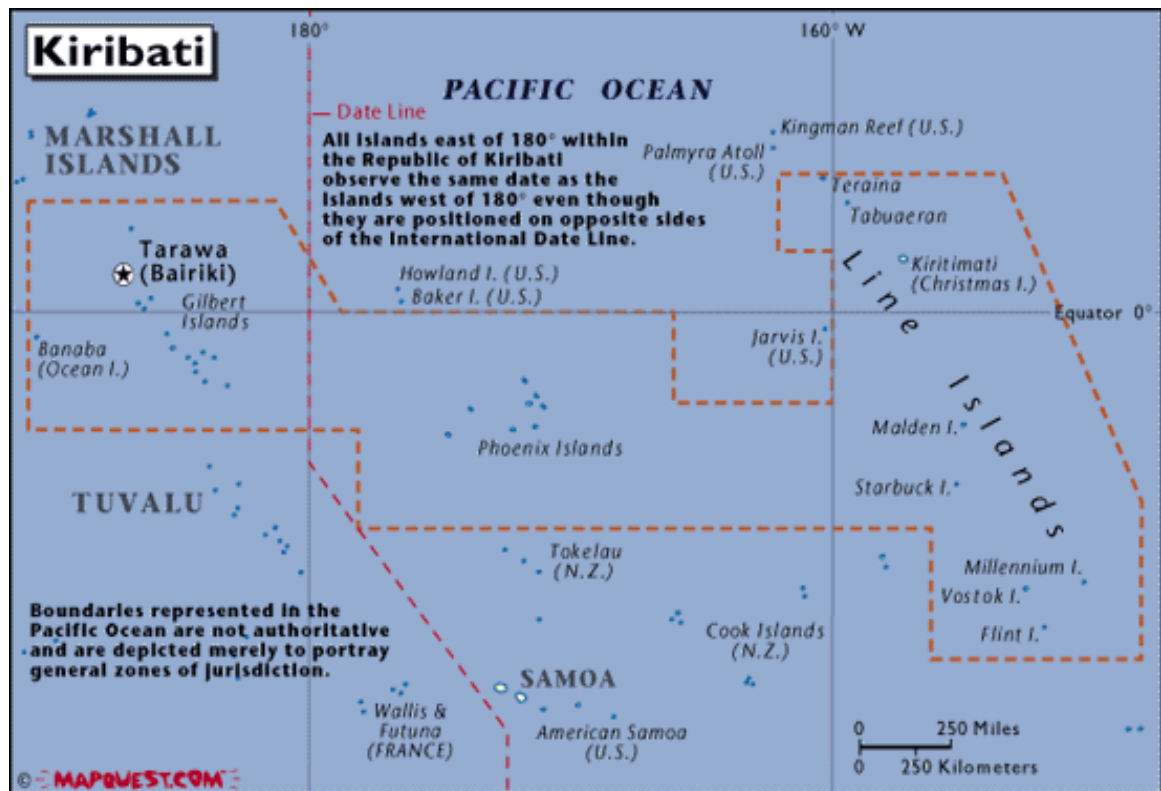


Figure 1. The South Pacific and Kiribati

5. **Geology and Geomorphology.** The geological development of Kiribati is described by Woodroffe and McLean (1998) as traditional coral atoll formation combined with fluctuations in sea-level over the last 200,000 years due to the various ice ages. Deep drilling on Islands has confirmed the presence of basaltic rocks of volcanic origin. As this volcanic seamount rose to near the surface coral reefs formed fringing reef and/or barrier reefs. The continued growth of corals was interrupted by changes in sea level associated with various glaciations in the northern and southern hemisphere. These changes in sea-level exposed the coral reef during ice ages when sea levels were lower than today and flooded the atolls between ice ages when sea levels were higher than today. This has resulted in a sequence of reef building during higher sea levels and erosion and/or in filling during lower sea levels. Drilling carried out in Kiribati reveals sequences of older limestone at depth overlain by depositional lagoon sediments which in turn are overlain by further reef growth. At times this occurred above current sea level, as represented by former corals that are now exposed.

6. Developable land consists of a ring formed by raised limestone reef overlain by coralline sands that runs around the exterior of the Island. Soils are sparse and mainly consist of coralline sands with little humic/organic matter. They are generally shallow. Jenkin and Foale (1968) describe two associations of soils, consisting of oceanic deposits and lagoon deposits.

7. **Climate.** Kiribati is located in the dry belt of the equatorial oceanic climatic zone, with mean daily temperatures ranging from 26 to 32°C. The record lows and highs are 22°C and 37°C, respectively. The mean annual rainfall for Tarawa is 1.5 m, most of which falls during October to March. Water temperature does not vary much from a mean of 27°C. Average solar radiation is 390 cal cm⁻²d⁻¹. Trade winds blow from the east about 81% of the time. Typhoons are rare, but westerly winds associated with storms occur frequently, particularly in June – November. Winds in the sector North East to South East are most prevalent.

8. **Land tenure.** Land was of premium value and far-reaching importance in Kiribati society given the small size of the islands. Apart from being the basis of sustenance, it also had social, political and legal significance. Land indicated wealth and social standing. It was one of the most common causes of conflict between groups when one party sought to consolidate its land holding while another party sought to defend and secure its rights. Land was a major medium of exchange in support and recognition of new social relationships created by marriage and adoption.

9. The *kainga* was the original land-owning unit in Kiribati society. Apart from its residential site in the village, the *kainga* had other properties, including *buakonikai* or bush area lands, which were used for gathering coconuts and other fruits (particularly pandanus), *bwabwai* pits (*rua*), fishing traps (*ma*) and fishing areas on the ocean reef (*maran*) or lagoon mud flat (*nama*). Because of the practical difficulties involved in having members of the *kainga* jointly work a piece of land, the lands of the *kainga* were subdivided between its member families (*utu*). Each *utu* had exclusive rights to these lands, independent of other members of the *kainga*, provided the transfer of rights to them was confined within the *utu* or the *kainga*. Within each *utu*, rights to lands and properties like *bwabwai* pits were held individually, or jointly with other siblings.

10. Forty percent of land in Kiribati is customary owned while 60% (consisting of the Line and Phoenix islands) is owned by government. Less than half of the land in South Tarawa is leased by government to house its administration areas. One third of the population is concentrated in South Tarawa, part of the Gilbert Islands Group. South Tarawa is the seat of government and has a population density of 1,610 persons per km². The Phoenix Islands and Kiritimati in the Line Group are now targeted for population expansion and development initiatives. The declaration of the Phoenix Islands Protected Area is designed to ensure sustainable management of the islands in relation to human expansion and development initiatives.

11. **Economy.** The economy is relatively small with aggregate gross domestic product (GDP), in current prices, of AUD \$97,703,000 in 2005. This implies a per capita income of AUD\$1,128. Kiribati's economy depends primarily on ever-fluctuating world prices for copra and fish, interest from a Revenue Equalisation Reserve Fund (RERF), remittances from I-Kiribati seafarers abroad, licence fees for foreign-owned fishing ships registered locally, and on foreign aid. In 2000 Kiribati was recognised by the UN as an least developed country. This reflected Kiribati's low per capita GDP, limited natural and human resources and its high vulnerability to external shocks.

12. The public sector is the main source of formal employment, with the government deeply involved in most sectors of the economy. Since December 2003, when the Government released its National Economic Development Strategy for the period 2004 – 2007, efforts have been made to address the weaknesses in the economy and rationalise the role of Government in 'enhancing growth and ensuring equitable distribution'.

13. The distinguishing feature of the economy is the RERF. This holds foreign reserves in overseas accounts which are prudently managed. Its value has grown steadily and is now equivalent to around AUD \$654 million. This is equal to six times the 2005 GDP. As a result of the RERF, since 2000 Kiribati's gross national product (GNP) 2000 has been about twice its GDP.

B. Governance; Institutional, Policy, Legal and Budgetary Frameworks

14. Kiribati became independent on 12 July 1979. It has a President (Beretitenti) who is both Head of Government and Head of State and a unicameral 35 member *Maneaba ni Maungatabu*, or Parliament. The normal term of office for the President is 4 years, and an

individual can serve for a maximum of 3 terms. Cabinet is made up of the President, Vice-President, the Attorney General and no more than eight others whom the President selects from the Parliament (*Maneaba ni Maungatabu*). Tenure for the *Maneaba ni Maungatabu* is four years. All citizens of Kiribati who have attained the age of 18 years, and who have resided within an electoral district for a continuous period of 12 months, are entitled to be registered as voters. However, only those who have attained 21 years of age are entitled to stand for election to the *Maneaba ni Maungatabu*.

15. Starting in 2004 a major effort has been made to formulate, refine and implement national frameworks for 'enhancing growth and ensuring equitable distribution', including the management of the environment and natural resources. Government reforms occurred in order to enhance economic growth, equitable distribution, improve public sector performance, sustain the use of physical resources, protect and conserve the use of financial reserves, and equip people to manage environmental, social and economic changes. The changes were driven by the government's conscious efforts to reduce the country's vulnerabilities to both external events and domestic development constraints.

16. A major approach underpinning the development of these frameworks was the 1st National Consultation Workshop, held in Tarawa in 2003. Participants included Chiefs, Island Councillors, Unimwaane (Elders), Women, Youth, Clerks and Project Officers, as well as representatives of Government Agencies and NGOs. A collective stock-take was undertaken and the basis for the National Development Strategies (NDS) was agreed.

17. The remaining parts of this section provide a historical perspective on the development of the main governing frameworks for social and economic development and environmental management. They also provide a brief analysis of the strengths and weaknesses of these institutional arrangements.

1. Governance.

18. Kiribati's supreme law, The Constitution of Kiribati, establishes a modern governing order based on the traditional *maneaba* governing system. This governing framework was extensively developed with the formulation and enactment of the Local Government Act in 1984. That Act established Local Government Island Councils and more recently has specified the membership of the Island Councils, including representatives of the island's *unimane*, or elders, women community groups, and youth. This governing system has increased island community participation in national governing processes and has formalised the legal powers of the local traditional governing system.

19. The effectiveness of governing systems depends on three aspects of governance: the quality of the governors; the quality of governing structures and quality of governing processes. Important national policy frameworks have been developed which strived to comprehensively address the environmental, social and economic needs of civil society.

20. In terms of structures and processes, the national governing system is essentially organised and functions along western style democratic norms. This is in contrast to local government where the traditional authorities and practices of the village *maneaba*, are adopted. The inclusion of the village *maneaba* system in the country's governing system has useful implications for the social and economic development of Kiribati, including management of its natural resources. For instance, since over 40% of the country's land resources are under the direct stewardship of the traditional authorities, the national Government has been able to collaborate with village councils to effectively influence the development and management of the country's natural resources.

21. Since independence the main link between the national and local Governments has been the Island Councils. The Clerks to Island Councils service the Island Councils and are employees of the national Government. The Island Councils facilitate the exchange of information between the villages and central Government, and assist with the promotion and implementation of national development plans that are intended to benefit Kiribati's grassroots society. Long before the colonial years the main churches, Catholic and Protestant, were important development structures behind the village community life and activities. Other important structures, such as NGOs, have been established and many also directly address the needs and concerns of grassroots society.

22. National governance is based on a democratic parliamentary system of Government with a nationally elected President as Head of State and Head of Government selected from four elected members of Parliament. Universal suffrage has been practiced from the mid-1970s. The responsibilities of Government are carried out by the President and cabinet ministers. The latter are appointed by the President from the elected members of parliament. Each minister is given a portfolio for guiding the work of one or more of the existing Government ministries, corporations and statutory bodies.

23. Over the past 27 years the Government of Kiribati has enjoyed undisturbed political stability, including a strong majority leadership by successive Presidents and their supporting Members of Parliament. There is no official political party. The ruling President must have a straight majority votes in the general election as well as a majority of support from Members of Parliament.

24. In terms of economic and environmental governance, three Government institutions play leading roles. The Office of the Beretitenti administers strategic national policy and risk assessment, the Ministry of Finance and Economic Planning oversees economic and development planning processes and the Ministry of Environment, Lands and Agriculture Development (MELAD) has overall responsibility for the environmental management processes of the Government.

2. Policy Frameworks

25. Economic and Development Planning Frameworks. The Government of Kiribati has established a straight forward and streamlined institutional framework for preparing and implementing economic development strategies. This framework has four major components – (i) Policy and Macro Analysis; (ii) Aid Management and Coordination; (iii) Budget formulation; and (iv) Investment. Figure 2 demonstrates the cycle of economic and development planning, including implementation of the overarching NDS. It also shows the relationships the various components of the process. It is important to note that opportunities can be identified and utilised to incorporate national environmental concerns into these main components of the economic planning and development process.



Figure 2. Kiribati's current economic and development planning cycle.

26. Following is a brief summary of the economic and development planning process. The main goal is to maintain a stable macro economic state of the country, as a pre-condition for achieving a better quality of life for every I-Kiribati. Its key objectives are the growth of government corporations (public enterprises) and the private sector; efficient management of revenue generation; and the effective allocation of resources to high priority national development goals. The NDS is formulated through a multi-stakeholder consultation. It sets out the over-arching vision, goals and objectives for the country's economic development in the next successive four year term, for the benefit of the people, including their wellbeing and security. At the sector planning stage, outputs for implementing these goals are defined in detail in the plans of the various ministries (Ministry Operational Plans (MOPs)) and public sectors (Public Enterprise Business Plans (PEBPs)). At the budget formulation stage each of the sector organisations negotiates the annual budgetary allocations and other resource allocations for achieving the intended outcomes in each of the four years. The assessment and evaluation of the outcomes considers the performance of the organizations and especially their impacts on the I-Kiribati and society's well-being and security over the four year period. The findings feed into the formulation of the new NDS.

27. While the Ministry of Finance and Economic Development has the over-arching coordination and management role for economic and development planning, it works with the other Government, non-governmental, community and private sector organisations that undertake activities related to the various economic and development goals and objectives set under this framework. The national development concerns of Government are organised into six key policy areas (KPA). Table 1 describes the key policy areas and the respective

organisations that are responsible for strategic planning and addressing the sector goals and objectives.

Table 1.

Economic and Development Sectors and Responsible Organizations¹

Key Policy Areas	Lead Ministries	Support Ministries
1. Economic Growth	MFED	MHMS, MISA, MELAD, MCIC, MFMRD, MPWU, MCTTD
2. Equitable Distribution	MISA	MFED, MCTTD, MPWU, MELAD, MCIC, MLPID, MLHRD
3. Public Sector Performance	OB	PSO, MFED, MCIC, MWPU, MCTTD
4. Equipping people to manage change		
4.1 Education and training	MEYS	MCIC, MCTTD, MLHRD
4.2 Health	MHMS	MCTTD, MPWU, MCIC, MISA, MFED
4.3 Culture	MISA	MEYS,
4.4 Governance	MISA	OB, All Ministries
5. Sustainable use of physical resources		
5.1 Maintenance of assets	OB	MFED, MLPG, MWPU
5.2 Environment	MELAD	MFED, OB, MISA, MWPU, MFMRD
5.3 Marine resources	MFMRD	OB, MELAD, MCIC, OAG
5.4 Mineral resources	MFMRD	OB, OAG, MCIC, MISA, MFED
5.5 Land resources	MELAD	MISA
6. Protection and use of financial reserves		
6.1 Financial system	MFED	MISA
6.2 Revenue Equalisation Reserve Fund	MFED	MISA

28. Environmental and Natural Resources Management Frameworks. Kiribati has developed a comprehensive policy and institutional framework for the management of its natural resources and the environment. Detailed, action-oriented strategies have been formulated and implemented in order to address the key environmental concerns of the country. Table 2 summarises the existing relevant national environmental policy frameworks and the respective key issues they address.

¹ Government of Kiribati: National Development Strategies 2004-2007

Table 2

National Environmental Policy Frameworks Scope of Issues Covered

Year	Policy Frameworks	Key Environmental Issues
1979 – 2000	Public Health and Population Policy. Local Council By-Laws. Land Use Management Policy. National Waste Management Policy. Wildlife Conservation Policy	Unsanitary urban areas, urbanisation and demands for water and land resources. Population needs, land use management, waste management and conservation of wildlife.
1994-2000	National Population Policy (NPP) National Land Use Policy (NLUP) National Waste Management Policy (NWMP) National Biodiversity Policy	Population needs, land use management, waste management, and conservation and sustainable management of biological resources.
2000	Coastal Infrastructure Management Strategy	Coastal erosion, landslide and flooding hazard zones.
2001	National Biodiversity & Action Strategy	National priorities for the conservation and sustainable use of the country's marine, freshwater and terrestrial biological resources.
2004	National Adaptation Programme of Action	Vulnerabilities to and resilience against the impacts of global warming and climate change
2004-2007	National Development Strategies, Environment Framework	Increase rural agriculture and fisheries production. Equitable distribution. Equipping people to manage change. Wise use of environment, land resources, mineral resources
2004	Coconut Sawmill Programme	Coordinate the use of senile coconut trees for timber and replanting of coconut trees.
2005	National Implementation Plan	Impacts and management of persistent organic pollutants and toxic chemicals
2006	National Biosafety Framework	Handling and use biotechnologies and biotechnological products
2006	National Biodiversity Conservation Policy	Update of the National Biodiversity Policy of the '90s

29. The main goal of environmental frameworks is the maintenance of the carrying capacities of the country's natural and physical resources, through the promotion of environmentally sound and sustainable development, and through the preservation of critical aspects of the country's biological resources. While MELAD is charged with the over-arching responsibility for monitoring and promoting the implementation of these environmental policy frameworks, it is only able to fulfil this responsibility with the cooperation and assistance of many other relevant Governmental, non-governmental and private organizations and of village councils. With respect to the key environment policy framework issues Table 3 indicates the agencies with leading and supporting roles in addition to the over-arching environmental management role of MELAD.

Table 3

Agencies with Allocated Lead and
Support Roles for Key Environmental Policy Framework Issues

Key Environmental Policy Framework Issues	Ministry(ies) with Potential Role(s) Leading	Ministries with Potential Supporting Roles (Examples)
Water and water resources utilisation and management of water utilisation systems.	MWPU	MHMS, PUB, MISA
Population needs, environmental health, and waste management.	MHMS	MELAD, MISA, MWPU
Built environment for the control and management of coastal erosion, seawater intrusion and flooding hazard zones.	MWPU	MISA, MFMRD
Management of agro-biodiversity and sustainable use of marine and terrestrial biodiversity.	MELAD	MISA, MLPID
Built environment (infrastructures) to cope with vulnerabilities to and enhance resilience against the impacts of global warming and climate change	OB	MFED, MISA, MCTTD, MWPU
Management of persistent organic pollutants and toxic chemicals	MELAD	MWPU, MHMS
Handling and use of biotechnologies and biotechnological products	MHMS	MHMS
Land use and land degradation management	MELAD	MISA

3. Legal Frameworks

30. Kiribati's legal system is a common law system. As noted earlier, the supreme law is the Constitution of Kiribati. Legislation is found in the Acts of the Maneaba ni Maungatabu, enacted with the assent of the President. Subsidiary legislation (e.g. regulations) may be made within the ambit of these Acts. Island Councils may also make bye-laws. These have force within their areas of authority.

31. For the key environmental management themes Annex 4 lists the national legislation and the lead institutions responsible for compliance and enforcement. The annex also identifies the legislation that provides MELAD's over-arching mandate for development planning and environmental management processes.

32. **Economic and Development Planning.** The principal legislation which provides the MFED with an over-arching legal mandate to lead and implement the country's economic and development planning processes are: (i) Chapter VIII of the Constitution of Kiribati; (ii) the Public Finance (and Control and Audit) Act; and (iii) the Financial Regulations Act. Additional legislation which authorises other key financial and economic management actions of the Government gives a mandate to other key Government ministries. This includes the legislation relevant to public enterprises, the Bank of Kiribati and the Development Bank, Provident Fund, Hotels, Insurance and the Internal Revenue Agency.

33. **Environmental Management.** The principal legislation related to environmental management in Kiribati is: (i) the Environment Act 1999 and Regulations 2001; (ii) the Wildlife Conservation Ordinance (CAP 100); (iii) the Foreshore and Land Reclamation (CAP 35); and (iv) the Native Lands Ordinance (CAP 61). The Environment Act and Regulations provide the basis for the conservation and sustainable development of natural resources as well as for environmental protection in general. Establishment and management of protected areas, the control and management of wastes, pollution and invasive species, the requirement for environment impact assessment and sustainable development regulations are also covered by the legislation. Further legislation mandates other ministries, such as the Ministry of Fisheries. It provides for the protection and sustainable development of other key areas of natural resources, such as marine resources and agro-biodiversity.

34. The Environment Act 1999 spells out specific objectives in Clause 3, namely:

- to provide for and establish integrated systems of development control, environmental impact assessment and pollution control;
- to prevent, control and monitor pollution;
- to reduce risks to human health and prevent the degradation of the environment by all practical means, including the following:
 - regulating the discharge of pollutants to the air, water or land;
 - regulating the transport, collection, treatment, storage and disposal of wastes;
 - promoting recycling, re-use, reduction, composting and recovery of materials in an economically viable manner; and
- to comply with and give effect to regional and international conventions and obligations relating to the environment;
- protecting and conserving the natural resources threatened by human activities, particularly those resources of national and ecological significance as may be classified under the categories of terrestrial vegetation, coral, fish and marine life.

35. **Prescribed Development Process.** The Environmental Protection Act, 1999 (EP Act) controls environmental assessment by utilising the Prescribed Development process outlined in Section 14 of the Act as a development listed in Section 14 of the EP Act. Prescribed Development includes any development that may impact the environment in some way, such as abattoirs, manufacture of cement, fish processing, hotels, landfills, port and harbours. Responsibilities under the Prescribed Development process are outlined in Table 4.

36. Prescribed Developments are currently assessed by the KLLPB and requires the above process to be followed. The level of enactment for the prescribed development process appears to vary between projects with some prescribed developments exempted from the environmental assessment process.

37. **The National Building Code of Kiribati.** The Building Act 2005 has been passed by Parliament, thus empowering the National Building Code. The enabling legislation empowers the Administration to regulate certain aspects of the building process and contains the necessary administrative provisions for the work of Approval Authority. The legislation also imposes responsibilities on the authorities or other persons or bodies, and describes particular administrative procedures.

38. The following administrative matters are covered in the enabling or subordinate legislation:

- Plan submission and approval procedures;
- Issue of building permits;

Table 4²

Summary of the Prescribed Development Process

Proponent	Minister and/or Secretary
Lodge application for prescribed development	<ul style="list-style-type: none"> ▪ Minister to consider the level of environmental assessment required (IEE or EIS or exempt) based on the probability of significant impact ▪ Notify the Secretary within 15 working days ▪ Secretary notifies the proponent (note. no time limit set for notification from Secretary to the Proponent)
Conduct environmental assessment IEE or EIS and lodge with application	<ul style="list-style-type: none"> ▪ Minister to assess application and IEE/EIS with advice from concurrence agencies and provide conditions for the development ▪ May request additional information on the proposed development ▪ Minister to publish IEE/EIS in manner deemed suitable ▪ Public to provide objections within thirty days of publication ▪ Minister to consider objections and provide consent/provide consent with conditions/request further information/EIS/refuse development ▪ Minister to notify developer of mitigation and monitoring requirements ▪ Secretary may monitor or cause to be monitored potential impacts
May appeal refusal to minister within 14 days	Minister to reconsider decision
May appeal to high court within 30 days of above	High Court to provide decision
Apply for a license to discharge waste	<ul style="list-style-type: none"> ▪ Secretary to assess application in relation to objectives of Env. Prot. Act ▪ Secretary to seek public consultation (no timeframe) ▪ Secretary to consider public submissions and issue license with conditions/refuse application
Conduct environmental monitoring as per license conditions	Regularly assess compliance with license conditions

² Source: TA No. 4456 - KIR: Preparing the Outer Islands Growth Centers Project, Kiribati - SKM.

- Inspection during and after construction;
- Provision of evidentiary certificates;
- Issue of certificates of occupancy and compliance;
- Accreditation or approval of materials or components;
- Review and enforcement of standards; and
- Fees and charges.

39. The basic objective of the Code is to ensure that the acceptable standards of structural sufficiency, fire safety, health and amenity are maintained for the benefit of the Kiribati community now, and in the future.

40. The code sets down the Performance Requirements and the corresponding Deemed-to-Satisfy Provisions which apply to the construction of buildings for all classes of occupancy. It is recognised that a building code cannot cover every issue concerned with the design and construction of buildings. In the case of innovative, complex or unusually hazardous building proposals, or other building work beyond the scope of the Code, legislation may provide for other suitable action.

41. Where appropriate the Code allows for variations in environmental conditions of the land in terms of climate and geology. The Code covers those aspects of buildings which are controlled by Approval Authorities such as structure, fire resistance, access and egress, fire fighting equipment, and certain aspects of environmental health and amenity, including sanitary plumbing and drainage to safeguard the underground freshwater lenses.

4. Budgetary Framework

42. The second and third components of the economic and development planning cycle, namely Aid Management and Coordination, and Budget Formulation, are the main frameworks for the allocation of financial, human and other resources to both the economic development and environmental management functions of Government. These frameworks are used annually during formulation and approval of annual budgets, for the whole of Government and for each of its ministries. The formulation of each Ministry's budget is guided by the planned outcomes described in the MOPs and PEBPs.

43. Table 5 illustrates the trend in national budgetary allocations to the key sectors of the economy that are underpinned by environmental and natural resources, namely agriculture, fisheries, public works, health, Outer Island Councils and environment. Over the last seven fiscal years (2000-2006) the Government's financial commitment to the environmental management and the management of natural resources has averaged 18% of total national annual budgetary allocations. There has been very little variation from this average over these years. This trend is similar to the Government's commitment to agriculture – also a highly relevant environmental management area, especially in terms of biodiversity use and conservation.

Table 5

Percentage of Annual National Budgetary Allocations for
Key Environmental Management Areas of the Economy³

FISCAL YEAR	2000	2001	2002	2003	2004	2005	2006
Local Government	0.81	0.70	0.78	1.03	0.86	0.78	0.89
Environment	0.10	0.09	0.15	0.28	0.37	0.37	0.44
Health	3.47	13.40	12.77	16.93	14.00	15.19	17.77
Public Works	3.47	2.95	2.96	3.43	2.47	2.69	3.40
Agriculture	1.74	1.30	1.35	1.36	1.07	1.22	1.33
Fisheries	1.37	1.02	1.07	1.03	1.09	1.10	0.88

44. Table 6 shows the trend in percentage of total foreign aid allocations for the key sectors of the economy that are underpinned by the environment and natural resources, namely agriculture, fisheries, public works, environment, water and energy. For environmental management there has in general been a high level external aid commitment in the last three years. A reasonable level of outside funding has been maintained during this time in comparison to agriculture and fisheries. These sectors have maintained a low level aid funding over the same period.

Table 6

Percentage of Annual Foreign Aid Allocations to Ministries administering
Key Environmental Management Areas of the Economy

FISCAL YEAR	2000	2001	2002	2003	2004	2005	2006
MISA	3.14	4.9	3.27	8.27	2.2	2.87	3.1
MELAD	10.2	6.1	6.8	1.9	3.4	1.8	5.3
MHMS	2.5	2.7	3.8	3.3	13.0	6.6	15.5
MNRD	3.4	12.0	2.0				
MFMRD				2.9	2.2	2.9	3.1
MWPU	7.1	15.2	40.1	24.0	18.0	4.1	13.2

45. It is also worth noting the considerable increase in assistance provided to the Ministry of Works and Public Utilities during 2001 to 2004. The increase in aid related to infrastructure development including the refurbishment of Government structures on South Tarawa and also the outer islands. Some of this assistance was through and ADB loan for the recently completed Sanitation and Public Health and Environment Project.

46. In general, small allocations in terms of national budget and external aid have been provided in the last seven years to address environmental and natural resource management needs. In turn, much of the environmental management related work in the country is funded through external bilateral and multilateral assistance. This is shown by the latest information on current and planned public sector investment projects which are relevant to environmental and natural resource management. Approximately 37% of the total value of the Government's public sector investment projects is related to environmental and natural resource management.

³ Calculated from budgetary expenditures for the financial years 2000-2006.

C. Key Performance Indicators

47. Largely as a result of political stability, public sector reforms and prudent management of the reserve fund, Kiribati has been able to maintain a stable economy over the past five years. However, some major challenges still remain. These include further strengthening of the private sector, development of outer island centres and further development of the wider community. Annex 5 provides information on key performance indicators, including economic, social, poverty and environment indicators.

48. In terms of environmental protection and sustainability, Kiribati has, most recently, achieved a significant increase in protected areas and the preparation and implementation of major national environmental management frameworks.

1. Economic

49. Economic growth slowed from an estimated 3.3% in 2004 to 0.3% in 2005, largely as a result of a fall in fishing license fees in previous years. In 2001 revenue from these fees amounted to AUD \$46.6 million, dropping to AUD \$24.5 million in 2004, reflecting a cyclical downturn in the catch from Kiribati's EEZ. Tourism remains limited, except on Kiritimati Island, where game fishing is popular. The public sector dominates the formal sector.

50. As noted previously, the overseas earnings received from fishing license fees, income from the RERF, and seafarers' remittances make the country's GNP about 70% higher than its GDP. The narrow production base renders the economy vulnerable to external shocks. At the same time, however, external earnings offer some buffer. Through the RERF, the Kiribati Provident Fund and the only commercial bank, Bank of Kiribati, the Government holds substantial financial assets offshore. These have for the most part been invested prudently and have performed well. External debt was about 25% of GDP in 2005. In the first quarter of the year, official reserves, mainly the asset base of the RERF, remained significant, at the equivalent of more than 4 years of imports.

51. Public domestic revenue increased from AUD \$55.7 million in 2004 to an estimated AUD \$60.5 million in 2005, external grants-in-aid increased from AUD \$49.7 million to about AUD \$62.7 million, and overall government financial resources rose from AUD \$105.5 million to AUD \$123.2 million. However, this was exceeded by recurrent and development expenditures of AUD \$145.8 million. Drawdowns from the RERF have covered the deficits, but this has led to apprehension that is also driven by fears the RERF's value could be entering a long-term decline. The Government is reviewing the management arrangements of this fund.

52. In the medium term, the economy is vulnerable to climate change (extreme events as well as rising sea levels) and fluctuations in global commodity prices (copra is a major source of export income, and the country imports most other commodities, including petroleum products). The atolls face a loss of causeway infrastructure and erosion of the coastline at high tide. Growth potential is principally limited to marine resources, agriculture, and tourism. Overall population growth and overcrowding on the capital atoll must be tackled if living standards are to improve. Although the economy benefits from a strong external asset position, very limited growth of GDP is projected over the medium term.

53. Budget reforms are a focal point of the public sector reform programme. As noted earlier, the MFED maintains a multiyear budget framework to link the development planning and budgeting processes. However, as will be highlighted later in this report, the links between the two systems are presently overly weak. As much as 30% of government

expenditure, comprising aid agency contributions to the development budget, is outside the direct scrutiny of the Government apart from auditor general reports. Little is known publicly about disbursements at local government level (Island Councils). The accounts of public enterprises are subject to little oversight, except when they overspend.

54. The Government plans to establish standards for several public enterprises so as to improve their prospects for successful commercialization and privatization. On the revenue side, the introduction of a broad-based tax on wholesale and retail sales is proposed for 2007. There is also room to improve the effectiveness of donor funding, particularly by increased use of Government funds for development purposes and by increasing financing for basic infrastructure.

55. Between the years 2000 and 2006 the highest growth rate (3.3%) was recorded in 2004⁴. Remittances continue to contribute to the country's economy and were largely responsible for the increase in the commerce industry. Agriculture increased in 2003. Particularly significant increases occurred in copra exports, but these then declined in subsequent years as a result of insecurity of export markets. Fish exports remain a steady, but small, contributor to real growth. Public administration, personal services, tourism, manufacturing and construction industries continued a steady growth in 2005. Figure 3 shows the pattern of remittance earnings over the past six years.

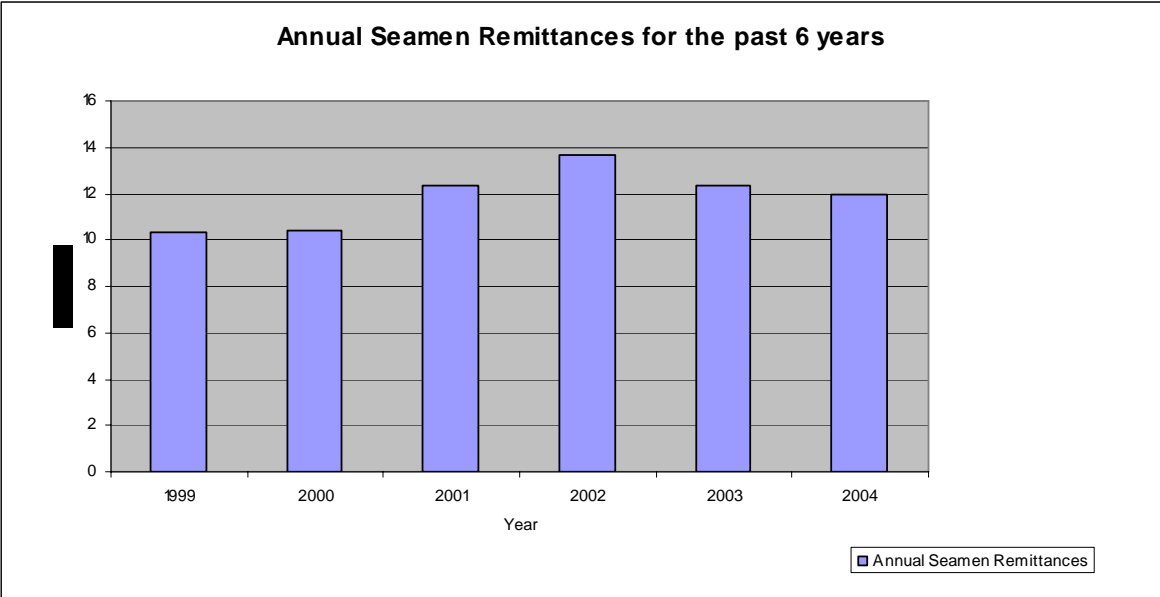


Figure 3. Annual Seamen Remittances (AUD \$M) Source: Planning Division, MFED.

56. Figure 4 demonstrates the change in the value of exports and imports over the past ten years. In general export earnings showed a steep decline after 2000 while imports continued on a steady increase. In 2000 exports were high due mainly to good sales of copra, seaweed and other fisheries products. Other economic indicators are provided in the CSPU for Kiribati.

⁴ Planning Division, MFED.

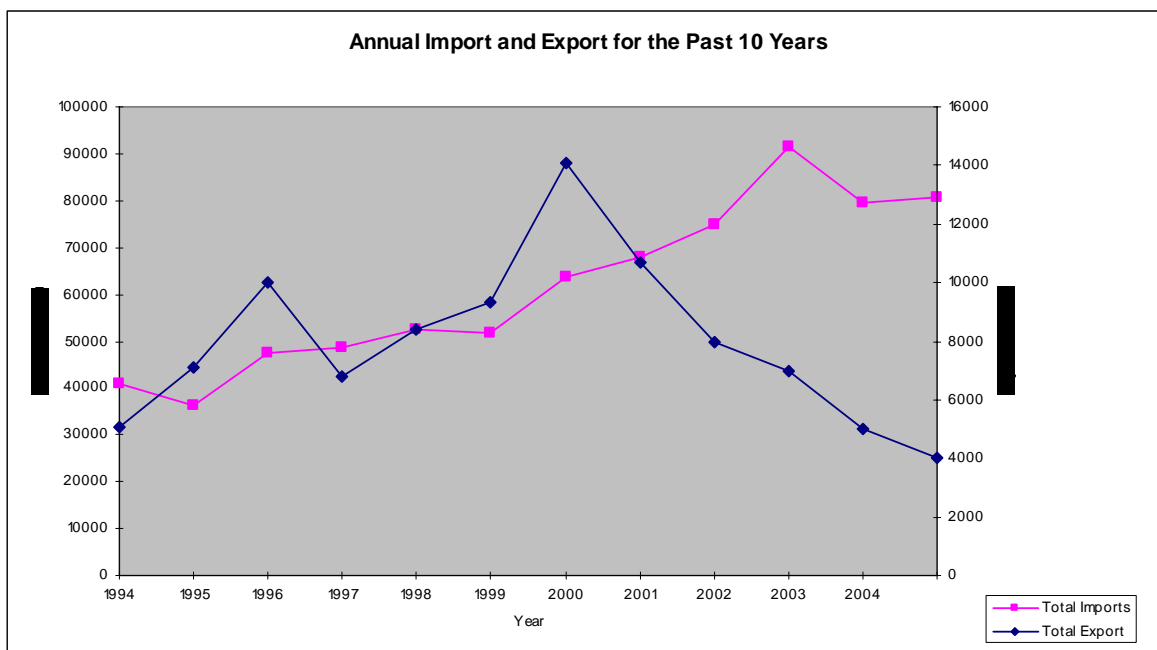


Figure 4. Annual Import and Export (AUD \$000) 1994-2005. Source: Planning Division, Ministry of Finance.

2. Environment

57. Within the last five years one indigenous community-managed marine protected area has been established at *Naa*, North Tarawa and one government owned recreational park has also been established. This added to the declared wildlife sanctuary of Kiritimati Island and several closed conservation areas.

58. In March 2006 the Government of Kiribati established the Phoenix Islands Protected Area (PIPA) - the third largest Marine Protected Area (MPA) in the world today. The Phoenix group of islands are located in the central Pacific, almost at the juncture of 180° East and West latitudes and the Equator. The total management area of the PIPA is 184,700 sq km. This is formed by a 60 nautical mile boundary around each atoll in the Phoenix Islands Group, as shown at Figure 5. Kiribati has now achieved a major level of protected areas, with more than 50% of its total terrestrial and 30% of its total EEZ under some form of protection.

59. During the same period the Government approved responses to Kiribati's obligations and commitments to key multilateral environment agreements (MEAs) to which it is a party, including:

- UN Framework Convention on Climate Change;
- UN Convention on Biological Diversity;
- UN Convention to Combat Desertification;
- Vienna Convention and Montreal Protocol to control substances that deplete the ozone layer;
- Basel Convention to control the transboundary movement of hazardous waste and their disposal;
- Waigani(regional) Convention to control the transboundary movement of radioactive and hazardous waste;
- SPREP Convention;
- London (dumping) Convention;
- World Heritage Convention;

- Stockholm Convention on persistent organic pollutants; and
- Cartagena Protocol on Biosafety to the CBD.

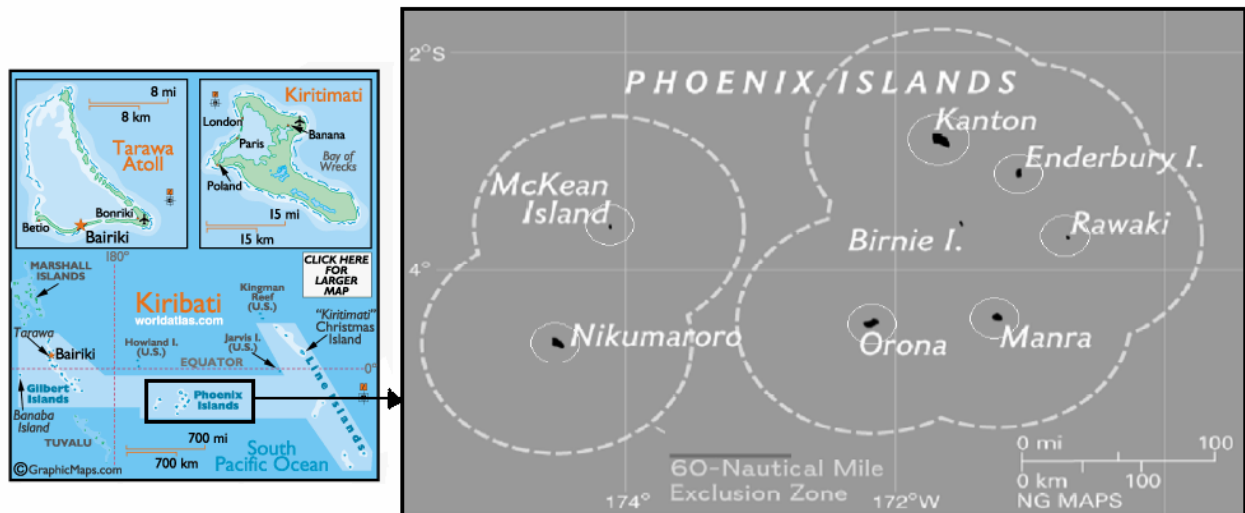


Figure 5. Protected Areas in Kiribati – State and Community Managed Protected Areas, as of 2006.

60. The following national policy frameworks for environmental and resource management correspond to Kiribati's obligations and commitments to key MEAs to which it is a party:

- NBSAP - National Biodiversity Strategy & Action Plan 2001;
- NAPA - National Adaptation Programme of Action 2004 on Climate Change Impacts;
- KAP - Kiribati Adaptation Programme 2004. Mainstreaming Climate Change Adaptation Programme in National Planning;
- NIP - National Implementation Plan 2005 on Organic Pollutants;
- NBF - National Biosafety Framework 2005 to the Convention on Biological Diversity;
- IWPK - International Waters Programme for Kiribati on waste management and prevention of contamination of underground freshwater lenses; and
- Development Consent and Pollution Control Regulations.

61. Other environment indicators can be found in the CSPU for Kiribati.

3. Sustainability

62. With a score of 0.515, Kiribati is ranked 11th of 14 Pacific Island countries in the 2000 Human Development Index. In terms of the Millennium Development Goals, Kiribati is currently meeting its targets with respect to gender equity in primary and secondary education, infant and under five mortality, tuberculosis prevalence and death rate, terrestrial and marines areas under protection, CO₂ emissions, phase out of ozone depleting substances and urban and rural sanitation. Kiribati is also making slow progress towards achieving the goals related to completion of primary level education, maternal mortality, and rural and urban water supply.

63. Other sustainability indicators can be found in the CSPU for Kiribati.

64. In spite of the country's political and economic stability there remain important concerns which will demand attention in the coming years. These include building the capacity to

ensure a sustainable expansion and consolidation of the private sector as well as the wider community's full engagement in, and ownership of, the country's economic development. There is also a need to ensure adequate capacity to sustain the expansion and consolidation of environmental protection and natural resources preservation in the country.

65. Over 50% of the country's natural and human resources that are available to support economic development are under the direct management of village communities. Priority conservation action also rests with these communities. This implies that future efforts will need to focus more attention on developing the grassroots communities, including their individual, institutional and systemic capacities. This is the most logical way forward, not only for expanding and consolidating environmental management in the country, but also for sustaining economic and social development.

D. Nature and Coordination of External Assistance Related to the Environment

66. MFED provides oversight and administration of both grant aid and loans. Acting on behalf of the Government, it convenes a Development Partners Meeting on a regular basis. The main purpose of these meetings is to bring to the attention of development partners the country's planned development initiatives as reflected in both the NDS and the MOPs, as well as the business plans of the public enterprises. The meetings also provide an opportunity for the development partners to gain first hand knowledge of Kiribati and its people. They also allow an exchange of views on the national focus on resource application in the effort to achieve sustainable development from the perspective of Kiribati, and to scrutinize such efforts from the perspective of the development partners. Thus the meetings facilitate mutual appraisal of development assistance by both providers and recipients.

67. Coordination also occurs on a bi- and multi-lateral basis. Examples are the cooperation on public sector management and planning (AusAID, NZAID, and ADB), education sector (AusAID and NZAID), and AusAID's planned assistance in the urban sector to complement ADB's outer island assistance. The Government, ADB, and World Bank are discussing ways to streamline implementation processes with a view to moving toward greater harmonization.

68. NZAID and AusAID are currently working towards combining their development assistance programmes in Kiribati under a Joint Country Strategy that would guide a common programme of support. Currently NZAID's programme is focused on three key areas: improving access to basic education, improving access to tertiary education, and building an effective and efficient public sector. Other priority areas include gender equality and empowering women. Australian support for Kiribati is concentrated in basic education, human resource development and public sector management. A priority for the Government is to improve the public sector's financial and economic management, with a view to using Government resources more efficiently. Australia is assisting Kiribati to achieve this objective through activities to improve financial management and enhance revenue collection.

69. Kiribati receives substantial external assistance from the international community to help finance its development initiatives. In 2005 external assistance totalled A\$63 million. Major sources of funds are the governments of Japan, Australia, United States, and New Zealand. The main multilateral funding agencies are ADB, the World Bank, GEF, European Union (seaweed, solar energy, and health clinics on the outer islands), and United Nations Development Programme (improved access to basic services, capacity building, governance, and improved communication to outer islands). The South Pacific Applied Geoscience Commission, often working with donors such as ADB, provides substantial technical and other assistance in areas such as water development, coastal protection and surveys to identify sources of construction aggregate.

70. The South Pacific Applied Geoscience Commission and ADB cooperated on a recent TA to promote improved water resources management through the development of a water resources action plan and strategy. They continue to cooperate on water resources issues at a regional level. Opportunities for specific cooperation in Kiribati will be considered in the context of broader assistance, e.g., Kiritimati Island Growth Center-sector project. Climate change adaptation initiatives, which World Bank and AusAID support directly, will be mainstreamed into the ADB Kiritimati Island Growth Center-sector project.

71. As noted above, much of the funding for environmental management comes from the financial mechanisms related to multilateral environmental agreements. The principal funding source is the Global Environment Facility (GEF). Recent and current funding levels are as follows: Convention on Biological Diversity (~US\$390K); Cartagena Protocol on Biosafety (~US\$198K); Montreal Protocol - ozone depleting substances; Stockholm Convention - persistent organic pollutants (~US\$400K); UN Convention to Combat Desertification (US\$33K-500K); UN Framework Convention on Climate Change (>US\$500K); International Waters Program (US\$400K); and National Capacity Self Assessment (US\$200K); Second National Communication (US\$15K).

72. As noted above, an example of coordination of aid related to environmental management is the Kiribati Adaptation Project (KAP). This is a major, multi-phase, multi-dimensional project to help Kiribati adapt to the challenges of climate change, climate variability and sea-level rise. The project has support, directly or indirectly, from numerous donor and other international agencies including AusAID, NZAID, the European Union, GEF, the World Bank, ADB, the United Nations Development Programme and the United Nations Environment Programme. The total budget for Phase II of the project is US\$6.6M. The Government contribution is approximately US\$2.3M with the donor community providing the remainder of the funds. Phase 2, which will run from 2006 to 2008, involves activities in the areas of water (strategy; freshwater resources), population policy, meteorological capacity and protection of public assets. The KAP II coordinating arrangements are shown in Figure 6.

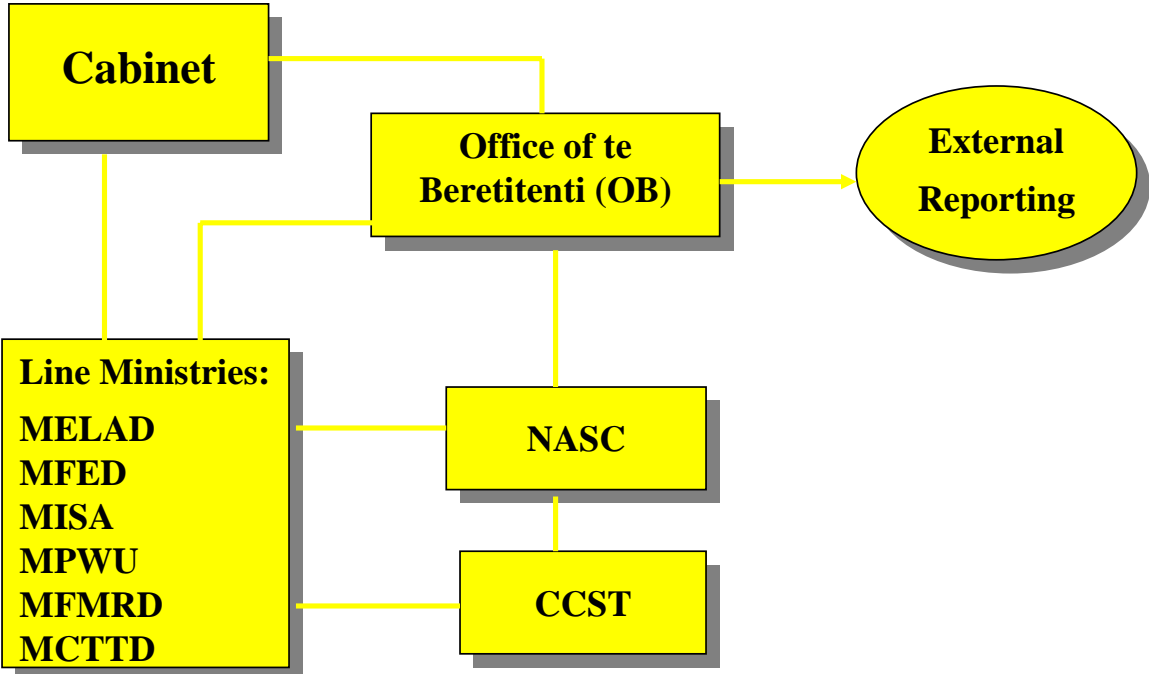


Figure 6. KAP II Coordinating Arrangements (Source: Strategic National Policy and Risk Assessment Unit, Government of Kiribati).

Annex 6

Key National Legislation For Development Planning and Environmental Management

1. Water resources

1.1 Legal framework

Public Utilities (Cap 83)

The Public Utilities Ordinance (Cap 83) establishes the Public Utilities Board (PUB) and sets out its responsibilities in relation to the supply of electricity, water and sewerage disposal. The PUB is given the exclusive right, in any water supply area, to supply, distribute and sell water. The Minister may declare any area to be a water supply area. The PUB is also empowered to: collect, supply and sell water; construct and manage waterworks; and to declare water reserves. The Ordinance includes a range of offences connected with water supply including fouling, diverting or damaging the water supply.

The PUB may declare an area to be a water reserve in order to protect or conserve a water catchment area. The PUB may require the owner or occupier of the area to remove any structures or fill in any pits on the land, however, the PUB must compensate any owner or occupier for consequent losses. It is an offence to soil or foul a water reserve or to build a structure or dig a pit on the reserve.

The Ordinance also includes an express statement that the Minister may give the PUB policy directions and the Board must give effect to those directions.

1.2 Administration

Responsibility for the water delivery system in South Tarawa lies with the Public Utilities Board (PUB) as established by the PUB Ordinance. The water system is partly reticulated (pumps, pipes, tanks and taps) and partly well-based. Meters are installed in South Tarawa and water consumption has been billed on a per cubic metre basis. Many residential meters are currently not working and these households are not being charged for water consumption. The PUB charges Government ministries at a flat rate.

In January 2005, Cabinet decided to charge water tariffs on a flat rate per household across the country, rather than on a consumption basis. This reflects a move away from a commitment to repair and use the meters already installed. The MPWU and PUB face difficulties with enforcing the water tariff system as many people take the view that they are entitled to free water which has always been available from their wells. The Government is promoting the message that the payments are for the water delivery service, and not the water itself.

In the outer islands, water is collected from wells. MPWU has installed solar pumps in 20 villages. While MPWU does not charge villages for pump installation, it does charge for maintenance and spare parts.

There is a concern amongst stakeholders that the current legislation is not adequately enforced in relation to the regulation, monitoring and supply of water (which is handled solely by PUB). The Police, Attorney-General's Office and the PUB work cooperatively when enforcement issues arise. Some stakeholders suggested that the PUB functions should be separated so that three different agencies are responsible for: water supply and distribution; monitoring of water quality; and regulatory functions.

There is also an issue about geographical coverage of the regulatory regime. The PUB legislation is not applicable to the outer islands where regulation, monitoring and supply of water is vested in island councils. This concern may be reviewed through a project funded by SOPAC.

2. Coastal protection and inundation

2.1 Legal framework

Foreshores and Land Reclamation (Cap 35)

The Foreshores and Land Reclamation Ordinance (Cap 35) deals with the ownership of foreshore, licences for sand and gravel extraction, authorisation of land reclamations and ownership and dealings in reclaimed land. The Ordinance has broad application as reclamation is defined to include construction of causeways, bridges, embankments, seawalls, landing places and other structures.

The Ordinance provides that the foreshore and seabed are owned by the Government. This applies to areas of sea that are alternatively covered and uncovered during high and low tide and the seabed of tidal waters. The Ordinance does not place a general prohibition on removing sand and gravel from the foreshore. The Minister, however, may designate certain areas of foreshore from which sand and gravel cannot be taken without a licence. Designated areas have been declared from the north-eastern area of Bonriki airstrip to the south-western corner of Temaikū Water Reserve (see LN 82/77) and from the western end of the Anderson Causeway at Nanikai to Bairiki (see LN 18/78). Removal of sand and gravel from designated areas without a licence is an offence.

The Minister may authorise land reclamations by any person, regardless of who owns the adjacent land. The Ordinance prescribes a public notification process whereby the Minister must publicly advertise the reclamation and consider objections before authorising the reclamation. Once reclaimed, such land is owned by the Government and the Government may deal with the land through grant or lease. Any pre-existing rights (including fishing, navigation, access and use) relating to that area of foreshore or seabed are extinguished once the reclamation has taken place.

The authorisation process does not apply to Government or local government councils constructing causeways and landing places. It also does not apply to landowners who are reclaiming foreshore next to their land. Such reclamations can be undertaken without authorisation and the reclaimed land is owned by the landowner (subject to the rights of others). However, a landowner does not have a right to reclaim adjacent foreshore.

Foreshores Bill

A Private Members Bill dealing with foreshore ownership was recently introduced into the Maneaba Ni Maungatabu. The Bill aimed to change the ownership of the foreshore from government to the owner of the adjacent land. The Bill passed its first reading and was scheduled for second reading in the April/May sittings of the Maneaba Ni Maungatabu. Since the time of writing, the Bill has been amended and passed into law so that the Government retains ownership of the foreshore. Under the amended regime, landowners are given some rights to seek compensation for the use of gravel and sand only on the restricted part of the foreshore adjacent to their land. Landowners, however, do not have a right to mine or use adjacent foreshore.

Environment Act 1999

The Environment Act 1999 sets in place a system for development consents, environmental impact assessments and pollution control. The Minister has power to exempt certain areas from the Act. Of relevance to coastal protection and inundation are the development consents. These permissions apply to commercial developments that affect erosion control, causeways, seawalls and land reclamation. Development consents, however, are not required for non-commercial or domestic developments.

The development consents system requires developers to first apply to the Minister and submit either an Initial Environment Evaluation (IEE) or an Environmental Impact Statement (EIS). "Development" is limited to commercial or industrial undertakings. Within those parameters, development is defined broadly to include erection of buildings and the carrying out of work in, on or under land and sea. It specifically includes fishing activities in Kiribati waters, erosion control, causeway developments, watershed management, seawalls and land reclamation developments.

The Act specifies the contents, procedure and approval mechanisms for IEE and EIS. These documents are also required to be published for a 30 day notice period. It is an offence to carry out a development without the appropriate development consent or exemption. Inspectors have powers to monitor developments and issue directions for appropriate safeguards to mitigate adverse environmental affects. Inspectors may halt developments that are not the subject of a development consent.

The Act includes two "soft" enforcement provisions of broad application. Firstly, the Minister may advise any public authority of environment performance targets, including pollution control and other environment protection standards. These performance targets may relate to any activity that has a direct or indirect bearing on the Ministry's activities. Secondly, Te Beretitenti may direct any public authority to do anything that contributes to the objectives of the Environment Act, or to refrain from doing acts that detract from the Act's objectives. "Public authority" includes Ministries, statutory bodies, local government and town and urban councils.

The Environment Regulations 2001 provide expanded definitions of "pollution" and "waste". They prescribe the factors to be considered when deciding whether an IEE or EIS is required and the forms and fees for development consents.

Mineral Development Licensing (Cap 58)

The Mineral Development Licensing Ordinance (Cap 58) licenses the search, prospecting and mining for minerals. It establishes three different categories of licences for reconnaissance, prospecting and mining. It also prescribes the processes, requirements and conditions of each licence.

The licensing regime applies to mining of both land and sea. "Mineral" is defined broadly as "any substance, whether in solid, liquid or gaseous form, occurring naturally in or on the earth, or in or under the seabed formed by or subject to a geological process, but does not include water". However, there are exceptions for the taking of minerals in accordance with customary law and for searching and "winning" materials to build roads and other constructions. Such activities may be undertaken without a licence.

Royalties for licensed mining activities must be paid to the Government. There are also provisions dealing with the interaction of mineral licences with land rights and fishing rights.

2.2 Administration

The Foreshore Management Committee is responsible for administering the approval process for foreshore mining, land reclamations and seawalls. Support for the Committee is provided by the Lands Management Division of MELAD. The process of granting a foreshore mining licence usually involves an environmental assessment before a licence is issued for typically 3 month duration. These approvals are in addition to any development consent requirements, also administered by MELAD. During the course of consultations, a number of stakeholders voiced the view that the administrative procedures for obtaining various MELAD consents should be streamlined. This included foreshore licences, development consents and planning consents. Since the time of writing, Cabinet has approved the results of a review of the development consent regime undertaken by MELAD which tailors the existing consent processes.

It appears that many regulatory powers relating to land use, structure design and foreshore management are regularly bypassed by developers. This may be in part due to the fact that a large number of developments are exempt from the requirements. For example, Government (the major developer in Kiribati) is not required to obtain authorisation for land reclamations or development consents. Landowners can also proceed with foreshore reclamations next to their own land without requiring permission. The plethora of different development consents and resulting confusion on the part of applicants may also contribute to the bypassing of permission. The conflict between traditional land tenure and the pressures of modern development is resulting in an environment that is under stress.

3. Marine resources

3.1 Legal Framework

Fisheries (Cap 33)

The Fisheries Ordinance (Cap 33) provides for the annual licensing of commercial fishing vessels, both local and foreign. It does not require the licensing of sailing boats, traditional paddling canoes or boats of less than 7 metres in length. There are penalties for fishing without licences, which, in the case of foreign fishing vessels, are substantial. Authorised officers have the power to stop, board and search vessels, and enter processing plants, to enforce the law.

“Fish” is defined broadly to include any aquatic animal, and includes coral and seaweed. Fish processing establishments must also have a licence. The Ordinance makes it an offence to fish with explosives, poisons and other noxious substances. Customary fishing rights are protected so that members of a kainga or utu may fish in ancient customary fishing grounds, but non-members of the traditional group require a licence. The Minister may also enter into agreements with individuals, governments and international organisations to advance the purposes of the Ordinance.

The Fisheries Ordinance contains a broad regulation-making power that permits regulations relating to, among other things: conservation; closed seasons; fishing quantity, size, weight and species restrictions; prohibited fishing areas or species; prohibited fishing gear or methods; and minimum fishing net mesh sizes.

Various regulations and subordinate rules have been made including the following:

Proclamation of Fishery Limits (Cap 33) which specifies the domestic fishery limits at 200 nautical miles from the low-water mark outside the reef, or any point equally distant

between Kiribati and another territory;

Prohibited Fishing Areas Regulations (Cap 33) which prohibits fishing in Pelican Lagoon, Isles Lagoon, the Tonga Channel and the adjoining Artemia Ponds, and Azur Lagoon; and

Rock Lobster Protection Regulations (Cap 33) which prohibits catching, possessing and dealing in crayfish with a carapace under 85 cm or any female carrying eggs.

Marine Zone (Declaration) Act 1983

The Marine Zone (Declaration) Act 1983 specifies the rights of Kiribati and other nations in various marine zones, being internal waters, archipelagic waters, the territorial sea and the exclusive economic zone (EEZ). The Act also includes a regulation making power that includes regulations for the protection and preservation of the marine environment of the EEZ.

3.2 Administration

The Fisheries Ordinance and Marine Zone (Declaration) Act 1983 are administered by the Ministry of Fisheries and Marine Resources Development (MFMRD). The Ministry is responsible for regulation of both domestic and foreign fishing vessels that fish in Kiribati waters.

Kiribati's fisheries legislation is currently being reviewed by an Australian-based consultant through an FAO-funded project. The legislative review project included a stakeholder consultation workshop held in Tarawa in March 2005, in which Island Council representatives participated. Possible changes to the legislation include demarcation of areas in the lagoon for different marine activities including aquaculture, pearl farming and conservation. MFMRD is looking to strengthen its management, monitoring and enforcement roles in partnership with local government. It is working with Island Councils to increase awareness about the importance of managing marine resources.

The Wildlife Conservation Ordinance is administered by MELAD. It could potentially be used to protect marine animals that are not fish, such as marine mammals.

4. Resettlement and land acquisition

4.1 Legal Framework

The scarcity of land in Kiribati has resulted in a tightly controlled scheme of land ownership and use. Kiribati's complex land regime is found in a range of laws including the Constitution and various Acts, Ordinances and subordinate legislation. The complexity of these rules reflects the high value placed on a scarce resource. There are various categories of land including native land, State land and freehold land. The State land regime includes some novel forms of land tenure in order to encourage settlement on the Line and Phoenix Islands. The legislation also includes a number of restrictions on dealings in land. For example, the Government is given first right of refusal in transactions where non-natives are dealing in land, and in the State land regime. Government may also acquire neglected land.

Kiribati's land legislation may be divided into three main categories of laws that deal with:

1. fundamental categories of land;

2. other land areas; and
3. procedural matters.

Constitution of Kiribati

The Constitution of Kiribati contains a number of fundamental rights that are relevant to resettlement and land acquisition.

Section 8 of the Constitution ensures protection from deprivation of property. Property may only be compulsorily acquired if: the acquisition is for a prescribed public purpose; there is reasonable justification for the causing of any resulting hardship; and adequate compensation is paid within a reasonable time. The prescribed public purposes are defence, public safety, public order, public morality, public health, town or country planning or the development or utilisation of any property for a public purpose. However, the Constitutional protection for property is not absolute. There are some limited exceptions that permit the Government to enact laws that override private property rights in certain circumstances. Consequently the law may make provision for the taking of possession or acquisition of property under a lease or mortgage, where the property is in a state that endangers health, where conservation or agricultural work is required, or where mining rights have been granted.

Section 9 of the Constitution ensures protection for privacy of home and other property. No person will be subject to search of his or her person or property, or the entry of other people onto his or her property, without his or her own consent. There are certain exceptions to this right, where laws allow such search or entry in the public interest.

Section 14 of the Constitution ensures protection of freedom of movement. Citizens of Kiribati shall not be deprived of freedom of movement, which includes the right to move freely throughout Kiribati, the right to live in any part of Kiribati and the right to enter and leave Kiribati. The Constitution provides several exceptions to this right including any limitations imposed by law that are reasonably required in the interests of defence, public safety or public order, public morality, public health, environmental conservation or in fulfilment of the Kiribati's international treaty obligations. There is a further exception permitting laws that impose restrictions on the acquisition or use by any person of land in Kiribati.

Native Lands (Cap 61)

The Native Lands Ordinance (Cap 61) establishes a regime for dealings in native land, including a registration system. "Native" is defined to mean an aboriginal inhabitant or descendent of an aboriginal inhabitant. Land owned by a native may not be sold to a non-native and may only be leased to a non-native with the local Magistrate's Court and Minister's approval (unless it is subject to a native lease). Such leases must be first submitted to the local court to confirm various facts including that the lessor owns the land and the lessor will have sufficient land left to support himself and his dependants. Once court approval is obtained, the lease must be submitted for the Minister's approval. Native leases must also be submitted for court approval but do not require the Minister's approval. "Native leases" are defined to be leases of native land to a native for a term of less than 21 years and for less than 5 acres. The Ordinance also deals with surveying, and unlawful occupation, of land.

The Native Lands Code (Cap 61) is subsidiary legislation that makes provision for the transfer and use of land such as neglect of land by next of kin, transfer of land to family, gifts of land and distributions of fishponds and fishtraps. The Native Lands Leases Regulations (Cap 61) provides a form for leases and requires them to be registered.

Non-Native Land (Restriction on Alienation) (Cap 63)

The Non-Native Land (Restriction on Alienation) Ordinance (Cap 63) requires non-natives to notify the Minister before they may deal in land (including selling, gifting or leasing the land). The Government effectively has a first right of refusal and may acquire the land by agreement. If the landowner and Government cannot agree on the terms, then the Government may compulsorily acquire the land. Any dealings in land by non-natives without prior Ministerial notification are void.

State Acquisition of Lands (Cap 95B)

The State Acquisition of Lands Ordinance (Cap 95B) establishes the procedure by which the Government can compulsorily acquire land. Land may be acquired for a broad range of public purposes that includes exclusive Government use, general public use, new townships, Government housing, sanitary improvements and road construction and improvements. It is not permissible to erect any buildings or plant trees in a road reserve, which is deemed to be nine metres on either side of a public highway.

The Government may acquire land by agreement or by payment of compensation, subject to adequate notice being given to the landowner. Any disputes about compensation are heard by the High Court which must consider various factors when determining compensation. An expert may be engaged to value the land in question.

State Lands Act 2001

The State Lands Act 2001 establishes a new land tenure and administration system for the development and use of State owned lands. According to the Act's explanatory memorandum, it was driven by a need to compel the sustainable use of land resources that the English-style land tenure system proved unable to achieve. The regime therefore combines land tenure with planning requirements that gives the State sufficient rights to control land use and avoid issues such as overcrowding and diminishing plot sizes. The Act's explanatory memorandum states that it is effectively a settlement plan and will mostly be used in the Phoenix and Line Islands. It includes a requirement for a strategic plan relating to the relevant land, which may include a land use plan prepared under the Land Planning Ordinance (Cap 48).

The Act specifies that State land can only be occupied by a family and cannot be subdivided. People outside of the defined family group may only reside on the plot with the Minister's permission. The plot cannot be sold to a person outside of the family but may be transferred to family members with the State's consent. The State retains the right to take the land back (ie a right of reversion) if the family abandons the land or does not use it in accordance with the land use requirements. The Act also reflects implicit family planning policies, as only one child of the family is permitted to remain on the plot with their own family.

The first owners of the land enter into a contract with the State that specifies the terms of the grant, including land use requirements. The contract is recorded in a register and once registered, forms an indefeasible title. The Minister may declare that the State land regime applies to certain land and once so declared, the land is not considered to be native lands.

State Pre-Emptive Right of Purchase Act 2001

The State Pre-Emptive Right of Purchase Act 2001 is a companion piece of legislation to the State Lands Act 2001. Together, these Acts implement Government strategic policy to encourage settlement and sustainable use of State land, particularly in the Line and

Phoenix Islands.

The Act provides the State with the right of first refusal in relation to the sale of specified land in Tabuaeran, Teraina and Kiritimati Islands. This land was formerly State land and was transferred to private owners as freehold land. With a change of government policy, the Act allows the State to acquire these lands at market value so they may then be dealt with under the State Land regime (outline above). The Act provides a procedure for the State to be notified about the land transaction. There are offences for non-compliance.

Neglected Lands (Cap 62)

The Neglected Lands Ordinance (Cap 62) empowers the Minister to acquire neglected land, whether through agreement or by compulsory acquisition. "Neglected land" is land that is suitable for agriculture but is not being fully and efficiently used for agricultural purposes.

The Minister may purchase or compulsorily acquire neglected lands for the purposes of sale to "indigent natives" who do not have sufficient land to support themselves and their family. Alternatively, the land may be sold or gifted to a local council. Neglected land that is acquired by the Government or a local council does not cease to be native land.

The Ordinance specifies the procedures for identifying and notifying owners of neglected lands. It also contains a procedure for determining compensation on compulsory acquisition of land. The compulsory acquisition procedures of the Constitution (see above) also apply to compulsory acquisitions under this Ordinance. The proper utilisation of land and making land available to natives in need of land are deemed to be public purposes for the objective of compulsory acquisition.

Closed Districts Act 1990

The Closed Districts Act 1990 permits Te Beretitenti, on the advice of Cabinet, to declare areas "closed districts". Districts may be closed in the interests of: defence; public safety; public order; public morality; public health; environmental conservation; or in fulfillment of international treaty obligations, as permitted by the Constitution.

Once declared, the only persons permitted to enter a closed district are: "natives" and ordinary residents of the areas; government officers or persons acting under Government orders; and persons licensed by the Minister to enter the area. The Act includes a procedure for licensing entry to closed districts. It is an offence to enter a closed district without a licence or to act in contravention of any conditions of that licence.

The following areas have at various times been declared to be closed districts: Banaba (Ocean Island) (Legal Notice 6/75); Kiritimati Island (Legal Notices 13/75 and 13/92); and Tabuaeran (Fanning Island), Teraina (Washington Island) and Kanton Islands (Legal Notice 13/92). However, not all these islands remain closed districts today.

Prohibited Areas (Cap 77)

The Prohibited Areas Ordinance (Cap 77) allows Te Beretitenti, on the advice of Cabinet, to declare an island and its territorial waters to be a prohibited area. "Territorial waters" means three geographical miles from the low water mark or the fringing reef. A person may not enter or remain in a prohibited area without the permission of Te Beretitenti. An administrative officer or police officer may remove and detain persons who enter a prohibited area without permission.

Under the Prohibited Areas Declaration (LN 46/72), Birnie Island, Canton Island, Enderbury

Island and Hull Island (all in the Phoenix Group) have been declared prohibited areas.

Recreational Reserves Act 1996

The Recreational Reserves Act 1996 permits the Minister to declare recreational reserves on any land owned or leased by the Government. The Minister may make regulations concerning the protection and management of reserves. The Act creates the Recreational Reserves Administrator who is empowered to manage reserves, however, this office does not appear to have been established. It is an offence to damage or litter a reserve.

Rent Review (Cap 90)

The Rent Review Ordinance (Cap 90) provides for reviews of rents under all leases (including native lands) every 5 years. Where rent cannot be agreed between the parties to the lease, it is determined by the Magistrates' Court.

Land Registration Grievance Tribunal Act 2002

The Land Registration Grievance Tribunal is empowered to consider errors in land registrations made between 1940 and 1980. The Act's explanatory memorandum states that the Tribunal is established to hear outstanding complaints by direct descendants of persons who were denied land in the Gilbert Group by mistake or fraud during that period.

The Tribunal does not have power to award land or compensation and can only make recommendations through reports to the interested parties and to Government. It operates in a similar fashion to a Commission of Inquiry.

Land Registration (Nikunau) (Validation) Act 1992, Land Registration (South Tarawa) (Validation) Act 1997

These two Acts establish commissions to create replacement Registers of Native Lands for Nikunau and South Tarawa as the previous registers had been lost or destroyed. The registers record all titles to Native Lands, pits, ponds, fish traps and sea walls as decided by various land commissions and lands courts. The replacement registers must be published and affected persons have a right to lodge an objection or claim. Land titles are indefeasible once the register is finalised, subject to the correction of any errors or omissions.

The Land Registration (South Tarawa) Validation Regulations 1999 prescribe formats and usage of the register and remuneration for members of the commission.

Landowners Taxation (Cap 49)

The Landowners Taxation Ordinance (Cap 49) provides for taxation of all land in the Gilbert Islands, including native land held by natives and freehold land held by non-natives. The local council will determine and publish the method of assessment and amount of tax payable. The council calculates the tax payable for each plot and landowners may request a review of the assessment. When determining the amount of tax, the council must consider the amount of revenue needed to be raised for the council fund and any directions given by the Minister about contributions to Consolidated Funds. The Ordinance includes enforcement provisions for the council to recover unpaid taxes, which may eventually lead to the council seizing and selling the land.

4.2 Administration

Land laws are administered by the Lands Management Division of MELAD. This Division comprises four main areas of responsibility for: lands management; planning; surveying; and lands management in the Line and Phoenix Islands.

The Resettlement Committee, co-chaired by the Minister for Environment and the Minister for Line and Phoenix Islands Development, is overseeing the resettlement process under the State Lands scheme. Other members of the Committee are drawn from various Ministries and Island Councils with secretariat support provided by MELAD. The Committee's role includes developing resettlement criteria and considering and approving applications for resettlement. The Committee has also conducted public consultations in November 2004 and will be conducting further outer island consultations in April/May 2005.

So far, the Committee has received a large number of resettlement applications for both business and residential leases. There is particular interest to resettle on Tabuaeran Island because of the opportunities available through cruise liner visits. People have already started moving to Kiritimati Island, particularly when they have family members living there already. Kiritimati is no longer a closed district and most of the remaining closed districts in Kiribati are limited to the Southern Line Islands (which are being considered for World Heritage listing under a UNESCO project).

5. Land planning and use

5.1 Legal Framework

Land Planning (Cap 48)

The Land Planning Ordinance (Cap 48) establishes the Central Land Planning Board which has power to prepare general land use plans for designated areas. Local boards (often the relevant local council) prepare detailed land use plans for those designated areas. Public consultation requirements apply to planning at both central and local level.

The Ordinance requires any development within designated areas to comply with any general and/or detailed land use plans in force. A person undertaking a development in an area under a general land use plan must first seek development permission from the local board. This permission is valid for one year. Local boards cannot grant permission for development or redevelopment that does not comply with the relevant land use plans. It is an offence to develop or redevelop land in a designated area without first obtaining board approval. However, a local board may grant permission for non-conforming land uses to continue.

Development and redevelopment are broadly defined. "Development" means any works, the erection of any structure, use of land or subdivision of land. "Redevelopment" means whole or partial dismantling or demolition of any structure and the replacement or restoration of the structure. Further, redevelopment includes any variation of the use to of land, works or structures.

The Central Land Planning Board may exercise control over and supervise local boards. This includes power for the Central Land Planning Board to specify development densities for local boards. Appeals from decisions of local boards may be made to the Central Land Planning Board and eventually to the High Court.

A local board may make rules prescribing the design, structure and materials to be employed in the construction of any works or buildings within the local board's

designated area. Such rules must be made in consultation with the Central Board and with the Minister's approval. The Central Board may also make rules dealing with a broad range of issues including the control of development and redevelopment and procedural matters.

The Designated Areas Notice (Cap 48) designates areas of Tarawa (Bairiki, Bairiki Wharf, Nankai, Betio, Betio Wharf and Bikenibeu) and Makin Island for the purposes of the Land Planning Ordinance. Positions to the Central Land Planning Board and the local land planning board of the government wharf at Betio are specified by Appointment to Boards (Cap 48). The Land Planning Regulations 2001 establish a standard easement certificate for subdivisions and information to be provided to adjoining landowners of a subdivision.

Environment Act 1999

As outlined above, the Environment Act 1999 sets in place a system for development consent, environmental impact assessment and pollution control. The development consents system requires developers to submit an Initial Environment Evaluation (IEE) or an Environmental Impact Statement (EIS) to the Minister. "Development" is defined to include erection of buildings and the carrying out of work in, on or under land and sea, however, it is limited to commercial or industrial undertakings. It specifically includes erosion control, causeway, seawalls and land reclamation developments.

The Act specifies the contents, procedure and approval mechanisms for IEE and EIS (as described above). It is an offence to carry out a development without the appropriate development consent or exemption. Inspectors have monitoring and enforcement powers. The Environment Regulations 2001 prescribe the factors to be considered when deciding whether an IEE or EIS is required. They further prescribe various forms and fees relating to development consents.

Closed Districts Act 1990

As outlined above, the Closed Districts Act 1990 permits Te Beretitenti, on the advice of Cabinet, to declare areas "closed districts" in the interests of specified public purposes. Limited classes of persons may enter closed districts, including those licensed by Government to do so.

5.2 Administration

The land planning regime is administered by the Central Land Planning Board (CLPB) and local planning boards (often local councils). The Lands Management Division of MELAD implements a range of land planning responsibilities. The membership of the CLPB includes representatives from various areas of MELAD and MPWU, amongst other agencies. Some local councils also assist with development consents by, for example, including a development consent section in their forms for approval to construct permanent structures.

The development consent regime is administered by the Development Control Unit, Environment and Conservation Division, MELAD. The Division also includes the Environment Inspectorate which undertakes monitoring and enforcement. Development consents are issued for various lengths of time depending on the activity licensed. For example, mining and foreshore activities are licensed for three months, non-commercial activities for six months and recurring commercial activities (such as fisheries and brickmaking) for one year. MELAD maintains a database of valid consents.

An ADB funded land management programme is underway on Kiritimati. Targeted to end in April 2005, the programme is linked with revisions of the land planning regime. Since the time of writing, Cabinet has approved the results of a review of the development consent regime undertaken by MELAD.

6. Building and construction

6.1 Legal Framework

National Building Code of Kiribati

The National Building Code of Kiribati is based on the Tuvalu Building Code and incorporates relevant standards from Australia and New Zealand.

The legislation empowers the government to regulate aspects of the building process administered by an Approval Authority. Subordinate legislation (such as regulations) will cover: plan approval; building permits; inspection of construction; certificates of compliance and occupancy; approval of materials; review and enforcement of standards; and fees.

The Building Code's standards include weatherproofing, roof drainage, rainwater storage and animal housing standards. The rainwater storage section does not require the installation of rainwater tanks, but rather sets guidelines for the use of tanks and the factors that affect the suitability of rainwater tanks (including volume of rainfall, roofing material, rate of water consumption and storage volume).

Waste management issues are covered in some detail in the Building Code. It provides specifications and information about composting and pit latrines. These include minimum set back requirements of 30 metres from a well, 6 metres from the front boundary and 3 metres from any other boundary or dwelling. The Building Code also includes detailed specifications about septic tank construction.

Housing Corporation (Cap 40A)

The Housing Corporation Ordinance (Cap 40A) establishes a scheme to provide for the housing needs of government employees. The Housing Corporation may undertake housing schemes, which includes the construction of houses, acquisition of land, laying of roads, provision of drainage and other amenities within the scope of the Ordinance.

6.2 Administration

Once the Draft Building Code is legally enforceable, it states that it will be administered by an Approval Authority, most likely the MPWU. The MPWU constructs government buildings (but not government houses), roads, seawalls, bridges and water supply infrastructure. Given the large levels of government construction, MPWU is one of the main constructors in Kiribati.

The Housing Corporation Ordinance is administered by the Housing Corporation, a statutory authority that designs and constructs government houses.

7. Waste management and sanitation

7.1 Legal Framework

Public Health (Cap 80)

The Public Health Ordinance aims to protect and advance public health. The legislation provides a bare framework that facilitates detailed public health measures to be provided in regulations.

The Sanitary Districts Declarations (Cap 80) identifies the following sanitary districts: Ocean Island (Banaba) Sanitary District; Northern Gilbert Islands Sanitary District; Southern Gilbert Islands Sanitary District; Fanning Island Sanitary District; and Phoenix Islands Sanitary District. Sanitary inspectors are appointed in relation to those districts.

Under LN 62/76, various persons whose names are recorded on the Medical and Dental Register and health inspectors are appointed as sanitary inspectors.

The Public Health Regulations (Cap 80) provide a range of provisions dealing with public health and sanitation. There is a broad requirement that all buildings and premises and surrounding land shall be kept clean. Inspectors may enter any premises for the purposes of inspection and have powers to clean premises.

In relation to water, the Regulations contain prohibitions against uncovered pools and containers of untreated water. Sanitary inspectors may order wells or water supplies to be closed if they are injurious to health. The Secretary may order the destruction or drainage of trees or other plants that retain water, such as bananas.

The Regulations include provisions dealing with garbage and promote burning of biodegradable waste. They prohibit leaving empty tins and bottles on land or in public places. All garbage and rubbish is to be placed daily in positions convenient for collection.

Every building shall include an approved latrine which must be kept clean. Sanitary facilities are now dealt with more comprehensively in the Draft National Building Code.

The Regulations also contain provisions dealing with safe handling of food and infectious diseases.

Local Government Act 1984 and Island Council Bye-Laws

Many Island Council bye-laws deal with waste management and garbage control at a local level (see further below).

Environment Act 1999

The Environment Act 1999 includes pollution control provisions that licence the emission of any waste, pollution, noise, odours or electromagnetic radiation. It is an offence to engage, without a licence, in emissions that unreasonably interfere with the health, welfare and comfort of any person. Pollution abatement notices and stop notices can be issued to enforce compliance. The Act also includes prescribed discharge standards for vehicles, vessels and aircraft. "Soft" enforcement mechanisms in the Act include environment performance targets and Te Beretitenti directions.

The Environment Regulations 2001 provide expanded definitions of "pollution" and "waste" and procedural matters for pollution licences.

Recreational Reserves Act 1996

As noted above, this Act makes it an offence to litter a recreational reserve.

Public Highways Protection Act 1989

The Public Highways Protection Act 1989 provides for the protection of public highways from encroachment and damage from unauthorised digging of drains, sewers and electric power cables. It also contains an offence for littering public highways. "Public highway" includes any footpath, bridge, drain, causeway, kerb or gutter associated with the road.

Harbours (Cap 40)

The Harbours Ordinance includes an offence to deposit any substance on land that may wash into a harbour. It is also an offence to discharge sewerage into a harbour without permission. Areas at Betio and Banaba are declared to be harbours under the Declaration of Harbours (Cap 40).

Customs Act 1993

The Customs Act 1993 provides for the collection and management of customs duties and control of import and export of prohibited and restricted goods. Te Beretitenti, on the advice of Cabinet, may promulgate an order to prohibit or restrict the import, export or carriage of any goods. The Act specifies a range of prohibited imports including weapons, counterfeit coins, unfit food and indecent articles. It also specifies a range of restricted imports including alcohol, ammunition, drugs and second-hand clothing, that may only be imported with permission.

7.2 Administration

Reflecting the broad range of waste management and sanitation issues raised in the Kiribati Adaptation Project process, a number of agencies administer the laws outlined above.

Ministry of Health and Medical Services (MELAD)

The Public Health Ordinance regime is administered by MHMS. While the Public Health Ordinance includes waste management provisions, these do not appear to be currently administered and enforced by MHMS. A number of agencies have an interest in waste management, including MELAD, MPWU and the urban councils. MHMS's role is now limited to health inspections. Health inspectors were previously seconded to local councils, however, they are now all located in the Ministry. On the outer islands, the bulk of public health issues are administered by local councils under applicable by-laws. However, the MHMS's inspectors visit the outer islands on an annual basis.

MHMS's health inspections focus on mosquito control, water testing and outer-island sanitation. Mosquito control activities concentrate on checking for bottles and containers that contain water in mosquito breeding grounds. Health inspectors take random samples to test water quality in South Tarawa. The samples are subject to physical and chemical testing at the public health laboratory and are measured against WHO guidelines. While the Environment Regulations contain guidelines for maximum levels of water pollutants, these do not appear to be used by MHMS. There is little awareness in MHMS of the existence of the Environment Regulations.

Sanitation activities focus on the outer islands where on-site disposal methods are used (particularly pit latrines). While composting toilets and septic tanks have been trialled in outer islands and on South Tarawa, there are cultural and cost barriers to their introduction. Medical waste is disposed at the hospital incinerator, however, there have been some problems with medical waste making its way into the community. MHMS is working with MELAD to address this issue.

Ministry of Environment, Lands and Agriculture Development (MELAD)

MELAD administers the Environment Act 1999, including its pollution control provisions. This regime, however, is focused on pollution at the broader level rather than household waste. Pollution regulatory functions are undertaken by the Pollution Control Unit, Environment and Conservation Division, MELAD.

In recognition of the current fragmentation of waste management responsibilities, MELAD is considering establishing a waste management authority within its portfolio. An interdepartmental Waste Management Committee has implemented some waste management projects, however, this was on an ad hoc basis.

MELAD is considering developing a waste strategic waste management policy. A consultant conducted a review of legislation relevant to waste management and recommended the better utilisation of environment plans under the Environment Act 1999 rather than developing new legislation. Significant elements of a waste management policy would be implemented outside of MELAD, such as rubbish collection, which is undertaken by the two town/urban councils.

The pollution control licence scheme has been utilised. The new and upgraded landfill facilities built under the SAPHE project required pollution control licences. Enforcement of the scheme appears to be working as one landfill's licence was revoked on the basis of safety. Shortly afterwards, the landfill in question partially collapsed in a storm.

Town and urban councils

The two town and urban councils in South Tarawa collect household rubbish on a commercial "user pays" basis. The schemes rely on payment of rates for collections. Collections are reliable for government houses as the collection fees are deducted automatically from government employees' salaries. However, the councils will not collect from those households that do not pay. This has a disproportionate impact on economically disadvantaged households.

Highways Authority

The Highways Authority administers the Public Highways Protection Act 1989. The Authority is chaired by a Deputy Secretary in the Ministry of Communication, Transport and Tourism Development. While the Act includes offences for littering around public highways and roadside areas, these provisions do not appear to be enforced. Recent rubbish collection initiatives have been undertaken by community groups.

8. Local governance and institutions

8.1 Legal Framework

Local Government Act 1984

The Local Government Act 1984 establishes local councils (including island, town and urban councils) that have a broad range of functions including power to regulate:

agriculture, livestock and fisheries;
buildings and town planning;
education;
trees;
land maintenance and reclamation (including establishment of parks);
relief of famine and drought;
markets;
public health;
public order, peace and safety; communications and public utilities; and trade and industry.

Local councils have a duty to maintain order and good government, discharge their functions conferred by law and prevent the commission of criminal offences in their local area. They also have a duty to levy rates and may charge fees for any service, licence or permit.

Council membership is determined by the warrant establishing the council. Membership usually consists of members elected by registered electors and ex-officio members (who are local members of parliament) and other persons appointed by the council. There are detailed procedural provisions about council meetings.

Councils may acquire land (whether by purchase, lease or gift). They may request that the Minister acquires land on the council's behalf under the State Acquisitions of Lands Ordinance.

The Act includes provisions for the financial management of local councils. The Minister may also issue financial instructions to councils. If a local council is not performing its functions, the Minister may direct the council to perform its functions. The Minister may also transfer the functions to another body and suspend or dissolve the council.

Councils may make bye-laws for any function. Bye-laws cannot override legislation, but they may override customary law. The Minister must approve bye-laws before they have legal effect, and may also amend them. Councils must make their bye-laws freely available at the council offices. Bye-laws vary between Island Councils, however, the most common laws deal with business licences and head taxes. Other examples of council bye-laws, as identified by Marcus Hipkins' study are:

Building	Building approval requirements Building must have appropriate guttering and water storage Building cannot cover more than half the land parcel Council can inspect buildings, require repairs or demolition and prohibit use of the building
Animal Control	Dogs must be licensed Pigs must be in clean pens that are more than 100 feet away from a well, street or dwelling Councils may catch, impound, sell or destroy stray animals
Burials	No burial outside a cemetery

	No burial less than 4 feet deep, or within 150 feet of dwellings
Public space	No dumping of corpse or carcass in any public open space Regulation of the use of parks, recreation grounds and maneabas
Public health	Prohibitions on damaging or littering the beach Beach latrines permitted with approval from Clerk Prohibitions on throwing or depositing rubbish in the village, street, sea or other public place Powers to order landowner or occupier to clear away refuse. Powers to order the drainage of stagnant water. Requirements for wells to be fenced, walled and clean. No wells without the Clerk's permission. Limitation on activities within 50 feet of wells (such as bathing or polluting) Council may fill in polluted wells.
Waste disposal	Council may enter and inspect dwelling or building Council may determine yearly rate for collection and disposal of rubbish
Roads	No tree or pit within 12 feet of the centre of a road
Fishing	Council may prohibit fishing in certain areas, at certain times of the day, during certain seasons and using certain methods (eg trolling, using lights). Council may require fishing licences Prohibition on taking certain animals or shells (eg pearl shells) from lagoons without permission

8.2 Administration

Island council bye-laws, once passed by councils, are sent to the Minister for approval. Bye-laws only have legal effect once Ministerial approval is obtained. The Attorney General's Office may consider the text of the bye-laws before submission to the Minister for clearance.

Councils enforce their own bye-laws and will take court action to do so. For example, the North Tarawa council is vigilant about enforcing its ban on fishing nets.

MISA has started to devolve more of its centralised functions to island councils, such as building maintenance and project administration. Councils increasingly have financial and administrative responsibility for projects with a financial acquittal to MISA. Examples of such projects include: income generating projects such as fish ponds for live fish exports, handicrafts and produce growing; construction of buildings and seawalls; and establishment of women's centres.

9. Terrestrial conservation

9.1 Legal Framework

Recreational Reserves Act 1996

As outlined above, the Recreational Reserves Act 1996 permits the Minister to declare recreational reserves on any land owned or leased by the Government. The Minister may make regulations concerning the protection and management of reserves and it is an offence to damage a reserve.

Local Government Act 1984

Under the Local Government Act 1984 (discussed above), local councils' functions include power to:

regulate areas and methods of planting and types of crops and trees;
establish, preserve, maintain, improve and control tree nurseries, forests and woodlands;
plant and tend trees in, and remove trees from, any public place; and
establish, control and manage recreation grounds, open spaces and parks.

9.2 Administration

Relevant agencies in this area include various local councils, MISA and MELAD.

Annex 7
Case Studies

Box 1. Population Growth and Density

Most of the environmental and broader challenges facing Kiribati today have their origins in a population that is not only increasing rapidly on a national basis, but is also concentrating in the limited land areas of South Tarawa (Figure B1.1). Between 1947 and 2005 the population of Kiribati increased from 31,500 to 92,428 - an increase of almost 300% in 58 years. In the same period, the population of South Tarawa increased by over 20 times, highlighting both a higher natural rate of increase and significant migration from the outer islands. Between 1985 and 2005 the population of Kiribati had an annual growth rate of 1.83%. However, over this period the population numbers for many outer islands have decreased – overall annual growth was only 0.43%. The growth has focused on South Tarawa, where the population increased by 3.05% per annum. One consequence is that the population of the small islet of Betio is now over 12,500, giving a population density of around 7,400 per km². Migration to South Tarawa is driven by employment (over two thirds of waged jobs are in South Tarawa) and educational opportunities.

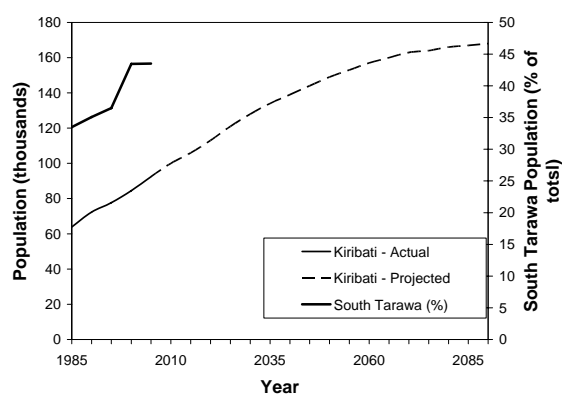


Figure B1.1 Actual and projected population for Kiribati and South Tarawa. Sources: Census reports, devdata.worldbank.org/hnpstats/HNPDemographic/totals.pdf and present study.

Unless there are substantial changes in population policies and their implementation, population projections (Figure B1.1) suggest that these trends, and the resulting pressures on the environment and natural resources, are likely to accelerate in the coming decades. The population of Kiribati is likely to stabilize by the end of this century, but at about twice its current value. A worst case scenario has the population density in South Tarawa nearly doubling from its present value of 2900 to 5400 per km² by 2090.

The consequences of high population growth rates in Betio are significant (Box 2). Based on the 2005 census, almost 50% of families rely on open wells for drinking water and almost 40% lack adequate sanitation. Household waste is often dumped locally.

There is a scarcity of vacant land for new houses to accommodate the rapidly growing population. The shortage of land is reflected in a high dependency on store-bought foods. These tend to be low in fibre but high in sugar and fat, and as a result contribute to the growing incidence of diabetes, cancer and circulatory system diseases. Overcrowding is associated with high rates of infectious diseases in Kiribati, including respiratory, diarrhoeal and skin diseases, and an increasing incidence of Hepatitis B. An estimated 31% of the population are Hepatitis B carriers.

The Kiribati Population Policy was approved by Cabinet in August 2004. It includes a 20-year strategy to restrict population growth to 120,000 by 2025 and achieve an eventual maximum population size of about 132,000. The substantial reduction in fertility that is required if these goals are to be achieved will have to take place in the absence of the usual economic incentives that trigger fertility decline - in contrast to developed countries where population decline accompanies economic growth, declining population growth rates in Kiribati are seen as a precondition for economic growth, rather than a spin-off. The Policy calls for population education, to raise awareness of the linkages between population and development and to promote lower fertility. Potential child bearers will need to see early benefits from having fewer children.

Box 2. Environmental Quality and Human Health

This case study is based on Betio, the most densely populated islet in South Tarawa. The population in 2005 was 12,510, with an estimated land area of only 150 m² per household. Access to safe drinking water and adequate sanitation is very poor. Even today over a third of the 1640 households use the beach or sea as a toilet (a traditional practice), while half of the households use rainwater and/or an open well for drinking water. Drinking water supplies, including the reticulated supply, are often contaminated (Figure B2.1)

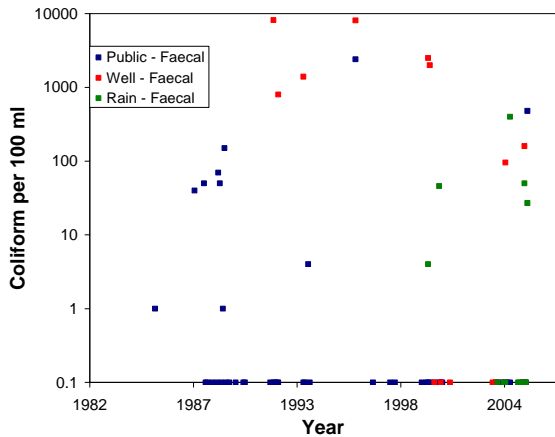


Figure B2.1 Faecal coliform counts per 100 ml for given sources of drinking water in Betio. Zero count shown as 0.1 on the logarithmic scale. Samples with too many coliform to count shown as 50,000. Source: Kiribati Ministry of Health.

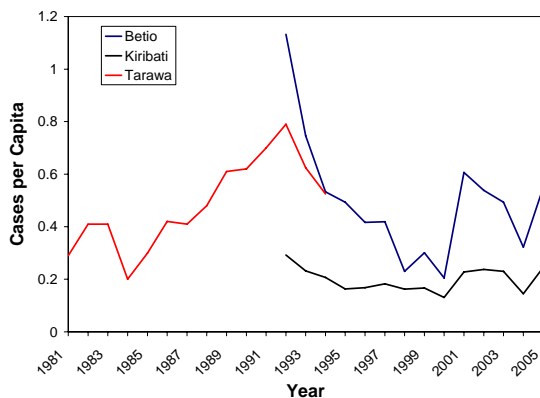


Figure B2.2 Incidence of diarrhoea for Tarawa, and diarrhoea and dysentery for Betio and Kiribati. Sources: Abbott (1996) and Kiribati Ministry of Health.

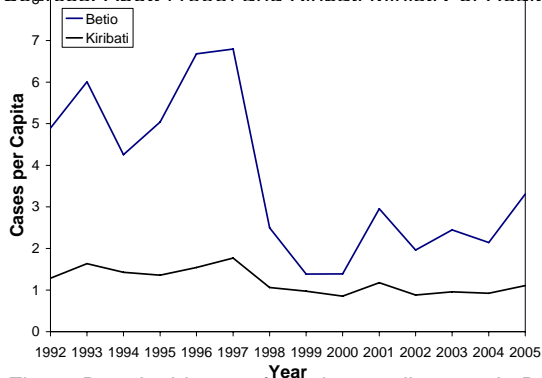


Figure B2.3 Incidence of respiratory diseases in Betio and Kiribati. Source: Kiribati Ministry of Health.

One consequence of the cramped living conditions, poor sanitation and waste management practices, and contaminated water sources is a high incidence of infectious and water borne diseases. In Kiribati diarrhoea is one of the top three causes of death. Figure B2.2 shows that infection rates for Betio are always substantially higher than the national average. The increasing incidence of diarrhoeal diseases in Tarawa was halted in 1992, largely as a result of public awareness campaigns promoting the boiling of drinking water.

Some of the interannual variability in infection rates can be attributed to climatic conditions. Higher rates tend to occur after a prolonged period of low rainfall, during which faecal and other contaminants accumulate on the ground and water catchments. Moreover, when outbreaks of the disease occur, the effect is always disproportionately large in Betio. There is also an indication that the incidence of diarrhoea and dysentery is increasing again. This may be linked to the presence of thermo-tolerant bacteria in the drinking water. Boiling will not eliminate the health risk.

Cramped living conditions also increase the risk of respiratory infections such as pneumonia, influenza and bronchitis. Again the incidence of such diseases in Betio is substantially higher than the national average (Figure B2.3). As a result of public health campaigns infection rates declined substantially between 1997 and 1999, but also appear to be on the increase again as living conditions in Betio continue to decline with an ever increasing population being crowded into a fixed area of land.

Box 3. Subsistence and Commercial Fisheries – Social and Economic Well-being

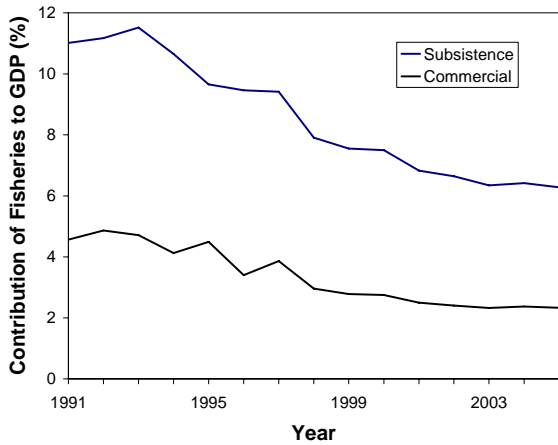


Figure B3.1 Relative contributions of the subsistence and commercial fisheries to the domestic economy. Source: Kiribati MFED.

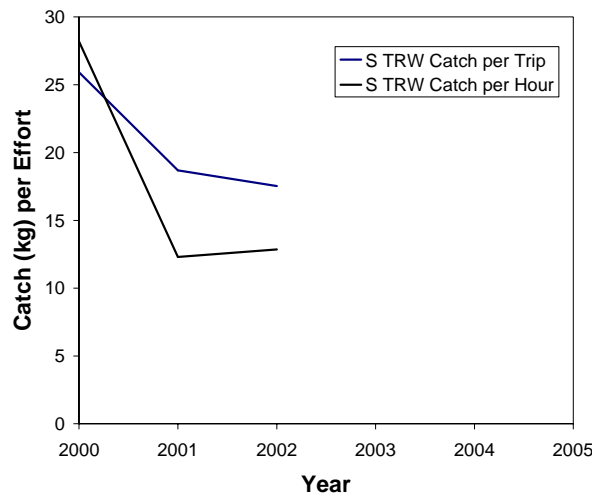


Figure B3.2 Catch per effort (trip and hour) for lagoon fishing by households in South Tarawa, based on week long survey in given year. Source: Kiribati Ministry of Natural Resources.

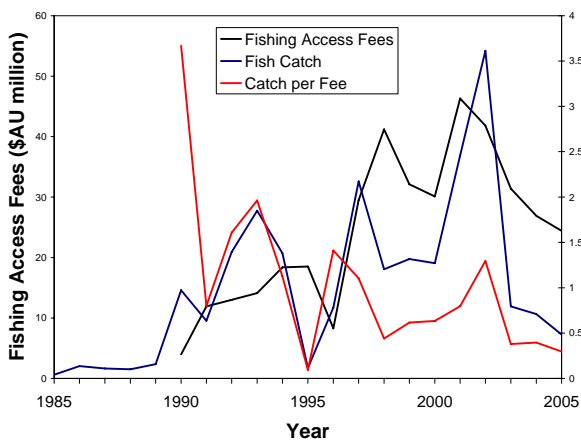


Figure B3.3 Fishing Access Fees (\$AU million) Fish Catch (10^{10} ton) and catch per fee paid. Sources: Kiribati Ministries of Natural Resources, and Finance and Economic Development.

A. Subsistence Fishery

Subsistence fishing is exceedingly important in Kiribati - nearly 90% of households fish part time. Figure B3.1 presents the relative contributions of the commercial and subsistence fisheries to GDP. It is clear that the subsistence fishery makes a greater contribution to the domestic economy, though both are declining in their relative importance.

This case study focuses on South Tarawa, where closer to 78% of households engage in fishing, 9% full time, 4% part time and 87% subsistence. Only 23% of all fishing households own a boat, with the dominant type being a skiff. Collecting is the dominant fishing activity (54%), followed by fishing in the lagoon (21%), reef (18%) and ocean (2%).

Estimated fish consumption is almost 200 g per person per day, representing a daily protein intake of 30.4 g per person. Annual fish sales for full time fishers total \$230 while on average part time fishers earn \$59 per year from fish sales.

Figure B3.2 shows that two indicators of the health of the lagoon fishery in South Tarawa, namely catch per fishing trip and catch per hour spent fishing, have declined significantly in the early 2000s. It is impossible to say if this is part of a long term trend due to the intense pressure on marine resources in South Tarawa. However, between 1997 and 2001 the same indicators for North Tarawa more than tripled. This suggests unsustainable fishing is occurring.

B. Commercial Fishery

Figure B3.3 shows that at its historic peak, over 325,000 million ton of fish were caught in a single year and over \$AU 40 million was charged in access fees. The catch per fee shows a declining trend, as does the income from fees in recent years. All three indicators tend to have higher values during El Niño.

Box 4. Energy – Economic, Social and Environmental Considerations

The cost of fuel imports to Kiribati has increased substantially in recent years, as both the economy has grown and international fuel oil prices have increased (Figure B4.1). This is in turn increasing the financial pressures on both the utilities (fuel prices are a major factor in the costs of providing electricity, water and waste water services) and the transport sector - land, sea and air.

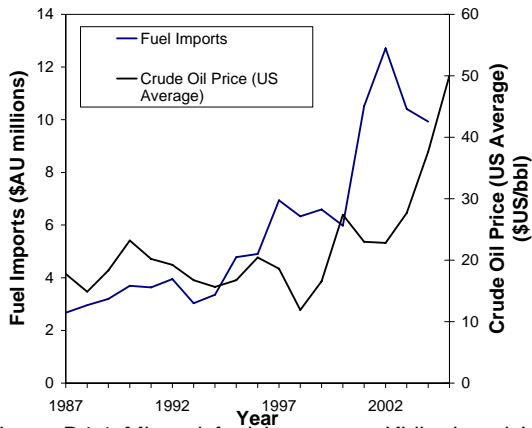


Figure B4.1 Mineral fuel imports to Kiribati and US average crude oil price. Sources: Kiribati MFED and http://inflationdata.com/Inflation/Inflation_Rate/Historical_Oil_Prices_Table.asp

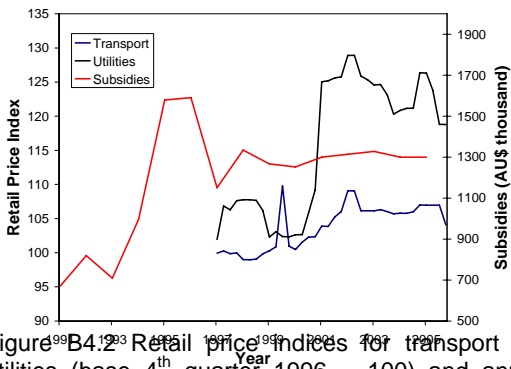


Figure B4.2 Retail price indices for transport and utilities (base 4th quarter 1996 = 100) and annual subsidies paid by the Government of Kiribati. Sources: Kiribati MFED.



Figure B4.3. Vehicle fuelled on coconut oil.

Such cost increases are eventually passed on to the consumer. For example, Figure B4.2 shows changes in the transport and utilities components of the retail price index. Over the last few years there have been substantial increases in both these components. Given that only 10% of the population is in paid work, these price increases add to individual and family hardship. In order to buffer the population from major price increases the Government subsidises basic consumer items such as gasoline, water and electricity. These subsidies are themselves placing increasing pressure on Government budgets (Figure B4.2).

In order to reduce dependency on imported fossil fuels the Government is considering using coconut oil (CNO) as a substitute for diesel. There are already demonstration vehicles running on coconut oil (Figure B4.3).

In recent years unfavourable world market prices for copra and CNO have required the Government to provide substantial subsidies - approximately US\$ 245 per ton of copra. Annual copra production can reach more than 12,000 ton per year (see Box 6), yielding approximately 6,500 tons of CNO. But long term supply is constrained by a failure to replace senile trees and by irregularity and low capacity of inter-island shipping services.

The annual capacity of the new mill is 5,000 ton of CNO. Without shipping constraints, actual CNO production could be approximately 4000 tons annually, equivalent to about a third of current diesel usage. Engines should be run on a blend of petroleum diesel and CNO, or esterification can produce a diesel equivalent – “biodiesel”. It costs about \$450 a ton to produce CNO and \$650 for biodiesel. Current diesel cost is about \$600 per ton.

Box 5. Coastal Erosion - Human Activities; Natural Processes; Sustainable Solutions

The numerous studies undertaken in Kiribati over recent decades have generated some key messages, including:

- the soft coast environments of South Tarawa are dynamic and sensitive environments, which are subject to natural changes over a variety of time scales;
- disturbance and additional changes have occurred due to engineering on domestic (hand-built seawall) and national (causeways, wharves, channels) scales; and
- population pressure and lack of thorough assessments and effective policies, have lead to settlement and building of infrastructure in inappropriate vulnerable coastal locations.

Nearly all of South Tarawa's present erosion problems could have been avoided. Erosion resulting from "natural causes" is not a problem. Rather, the common cause is human use or destruction, and alteration of natural defence systems, through such activities as beach mining, poorly located or conceived coastal development, reclamation and causeway construction. There is also a longer-term issue of a large amount of local sand and aggregate mining back from the beach, as is occurring at Bonriki, South Tarawa, for example.

A study of community involvement in sand mining is currently being undertaken by the Ministry of Fisheries and Marine Resources Development. Of the 109 households surveyed, 35 were involved in sand mining (see table). The 35 households mined over 33,600 bags of

Number of Sampled Houses Involved in Sand Mining in South Tarawa,
and the Reported Extraction Rates

No. Bags	Daily	Daily+	Weekly	Bi-weekly	Monthly	6 - Months	One Off
1					1	1	1
2 - 5			6		2	1	1
6 - 10				1	1		
11 - 15		1	1			1	1
16 - 20	2	1	1		1		1
21 - 25							
26 - 30							2
> 30	1		2		2	3	

sand per year, representing 96 bags per household per year. Assuming the sample is representative, over 1700 homes in South Tarawa mine sand. They will mine over 160,000 bags of sand per year.

Only one household reported selling sand. This suggests a high under-reporting of local sand sales, likely because sand mining is illegal without a permit. For this one household the 20 bags per week, at \$1 per bag, represents an

income of at least \$1000 per year.

Currently erosion concerns are largely addressed through uncoordinated efforts to defend an affected section of coastline. But the growing direct human pressures on South Tarawa's coastal environment, along with the likelihood of rising sea level and other changes in climate, emphasizes the need for a conservative, precautionary approach designed to preserve and enhance the natural sea defences in an integrated manner. This requires the complete protection of all soft beach environments from aggregate removal and inappropriate engineering.

The following example serves to illustrate the practical dimensions of the preceding comments. The lagoon coast of Tebunginako Village, Abaiang Island has receded up to 80 m since 1964. Over the last 30 years large amounts of time, energy and money have been spent trying to stop the natural movement of the lagoon shoreline. These efforts have failed. Further investigations revealed that until about 100 years ago there was an ocean-lagoon passage immediately south of the village. Recent and current changes on the coast are caused by the natural blocking of this channel. The coast will remain unstable for many years to come. With a clearer understanding of why shoreline instability is now a dominant feature of their coast, the village elders and community have agreed not to try to rebuild seawalls, but rather to move important village buildings and impacted homes to less vulnerable locations.

Box 6. Copra Production - Environmental, Social and Economic Considerations

A major commercial activity in Kiribati is the harvesting of coconuts for domestic consumption and for the export of copra. Copra is the main cash crop and export. Figure B6.1 shows the contributions made to the domestic economy by the copra industry. The Government subsidises copra purchased by the Kiribati Copra Cooperative Society from local cooperatives.

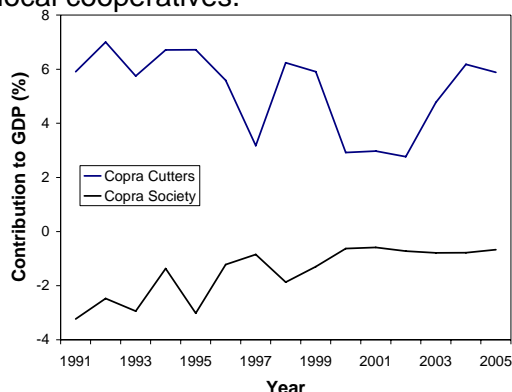


Figure B6.1. Contributions of copra to the domestic economy. Source: MFED.

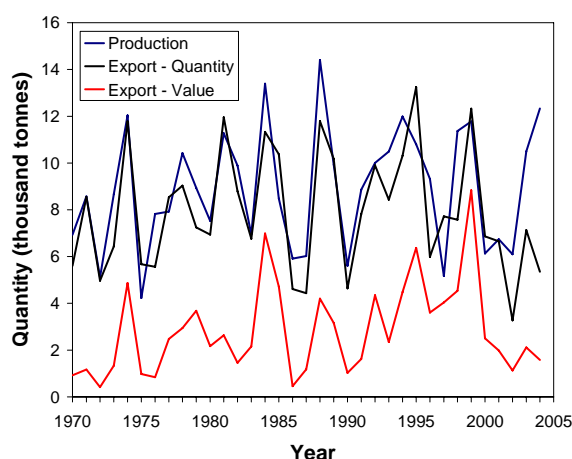


Figure B6.2. Copra production and export. Source: MFED.

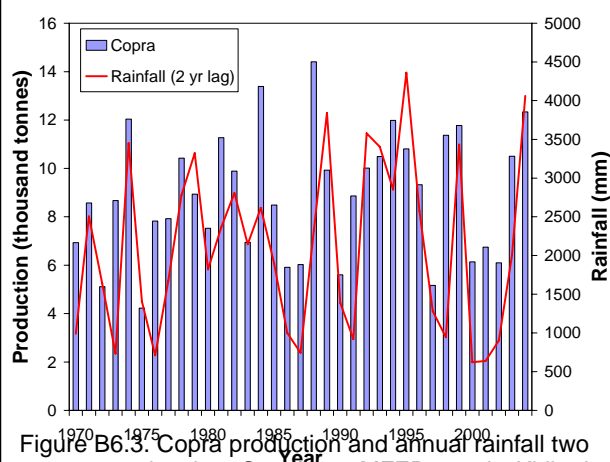


Figure B6.3. Copra production and annual rainfall two years previously. Sources: MFED and Kiribati Meteorological Service.

In the outer islands the coconut tree provides food and housing. In addition, a proportion of the produce provides monetary income from the sale of copra. This income derived from copra sustains the outer island economies where smallholders produce practically all the copra. The cost structure of the copra buying and processing operations means that is likely the substantial subsidies by Government will be needed for the foreseeable future.

Annual production and earnings from copra exports fluctuate considerably (Figure B6.2), reflecting the vulnerability of the industry to climatic conditions and to the changing world prices for copra. In addition, the dispersed nature of the islands means that shipping service are of critical importance to the copra industry. Irregular shipping schedules frequently limit access of rural producers to the domestic and international markets.

As noted above, climatic conditions influence the maturing of coconuts. Figure B6.3 illustrates the relationship between copra production and the annual rainfall two years previously. Over 40% of the variation in copra production is explained by the year to year variation in rainfall.

Most of Kiribati's coconut palms are nearing 50 years old. As a result their yield will soon begin to decline. A coconut replanting scheme is urgently needed to ensure there is sufficient copra to keep the new mill running at near capacity in the coming years. The replanting scheme could also promote the harvesting of old palm stemwood for use in the furniture/construction industries, using existing sawmills. This would generate additional income in the outer islands, though again current shipping constraints would have to be addressed.

Box 7. Sea Level Extremes - Quantifying and Managing Risks

Kiribati consists of 32 low lying atolls and 1 raised limestone island (Banaba). Numerous studies have identified rising sea level as a major threat to Kiribati, in part due to small area and low lying nature of the atolls (most have maximum elevations between 1 and 4 metres above sea level). Other reasons can be grouped into the limited ability to respond to rising sea levels, at the individual, household, community, island and national levels.

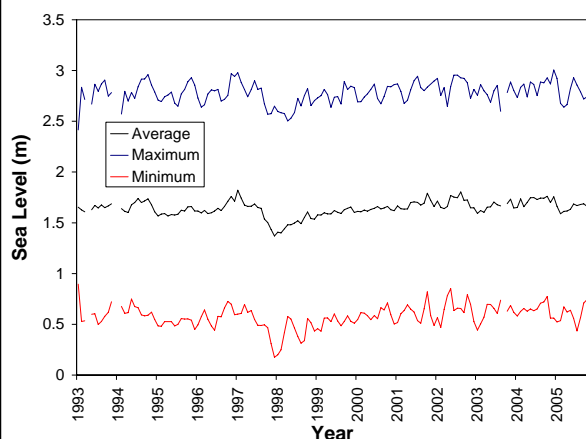


Figure B7.1. Monthly mean sea level at Beitio, South Tarawa, and maximum and minimum hourly sea levels for the same month. Source: National Tidal Centre, Australian Bureau of Meteorology.

Figure B7.1 shows how sea level at Beitio, South Tarawa, has varied since 1993. Over the period sea level at Beitio has risen by approximately 5 mm per year.

While there is considerable variability in mean monthly sea level, there is even greater variability for the maximum and minimum hourly values observed in each month. This highlights the importance of extremes in sea level – both high (due to contributions to erosion, flooding and salt water intrusion) and low (due to exposure of reef systems and exacerbating coral bleaching).

Table B7.1 shows return periods for hourly sea levels at Beitio, based on observed data and for future time periods using a best estimate of future sea levels based on the average projections by a combination of four global climate models and six greenhouse gas emission scenarios.

Table B7.1

Return Periods (yr) for Hourly Sea Levels at Beitio, South Tarawa

Sea Level (m) of at Least	Observed	2025	2050	2075	2100
1.4	1	1	1	1	1
1.5	1.9	1	1	1	1
1.6	7.8	1	1	1	1
1.7	42	2	1	1	1
1.8	232	8.6	1.1	1	1
1.9	1300	46	3	1	1
2.0	7300	254	14	1.2	1

With a sea level of 1.8 m, 15 to 17% of the coast is overtopped while 12 to 14% of land area will be flooded. Currently this represents a two hundred year event, but by 2025 it is likely to be a ten year event. Similarly, a sea level of 2 m is currently a 7000 year event, but in 2050 it will be a 14 year event. Under these conditions 33-38% of the coast will be overtopped and 28-30 % of the land area will be flooded. A range of management options are available to provide protection for infrastructure and communities against possible future erosion and flooding caused by climate change and sea-level rise. In general there are broad approaches to managing erosion and flood hazards at the coast: (i) do nothing and allow erosion and flooding to occur; (ii) reflect erosion and flooding problems in ongoing planning; (iii) plan to retreat from the erosion and flooding hazards; and (iv) protect the coastal areas from further erosion and flooding.

Box 8. Fresh Water Resources – Climate Change and Drought Frequency

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.

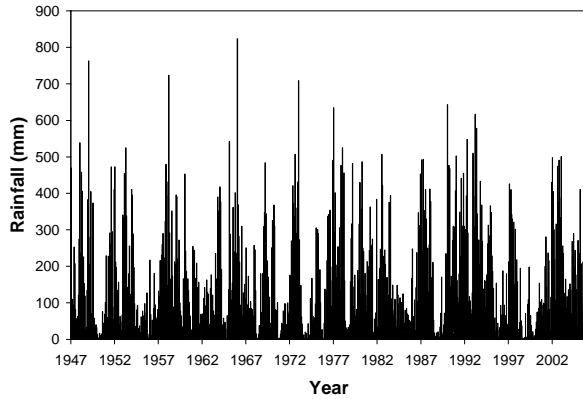


Figure B8.1. Monthly rainfall totals for Betio, South Tarawa. Source: Kiribati Meteorological Service.

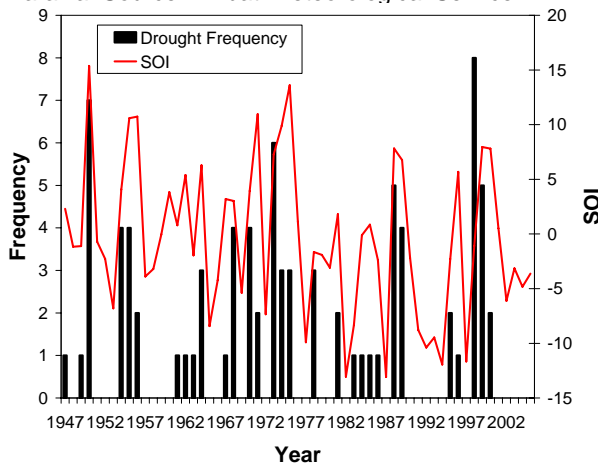


Figure B8.2. Annual drought frequency for Beittio, South Tarawa and Southern Oscillation Index. Sources: Kiribati Meteorological Service and Australian Bureau of Meteorology.

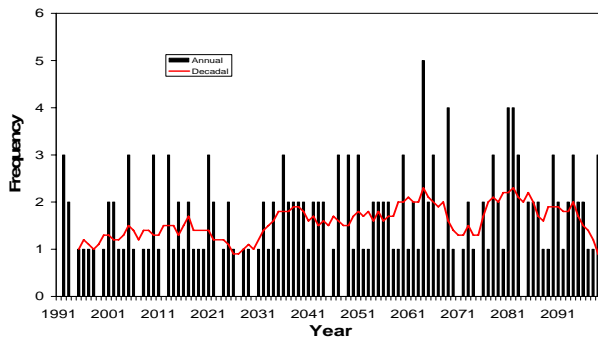


Figure B8.3. Annual and decadal frequencies of drought for a grid square centred on Tarawa, as estimated by the Canadian Global Climate Model using the A2 greenhouse gas emissions scenario. Source: IPCC Data Distribution Centre.

Figure B8.1 highlights the high variability in rainfall at Betio, South Tarawa and also indicates a trend towards fewer high rainfall months. Figure B8.2 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.

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.

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 modelling 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.

Box 9: Environmental Management – Complaints, Consents and Compliance

In 1999 the Environment and Conservation Division of MELAD began recording complaints from residents of South Tarawa regarding environmental nuisances and related issues. Table B9.1 summarises the complaints. Note that no data were available for 2002 and 2004.

Table B9.1

Recorded Complaints from Public in South Tarawa (Source: GoK and MELAD)

Environmental issue	1999	2000	2001	2004	2005
PUB Sewage	5	2		12	1
Toilet (odour, legality)				5	3
Reef disruption			1		
Solid waste	1	1	1	3	
Oil pollution beach			1		
Coastal erosion		3	2	1	
Waste oil			1	1	1
Bitumen issue		1	1		
Coastal/wharf pollution		2	1		
Coastal over-wash			1	1	
Air pollution (pig sty, chicken farm etc.)	5	4		14	18
Sand and gravel mining			3	15	2
Seawall		2	1	1	
Export		1			
Noise		1		5	2
Stagnant water (mosquito breeding)					1

Three important conclusions can be drawn from the table: (i) the number of complaints has increased over time; (ii) odours from animal farms now generate the greatest number of complaints; and (iii)

complaints related to malfunctions in the centralised sewerage system have declined markedly. The last change likely reflects the upgrading of the sewer system under the SAPHE project.

In 2004 sand and gravel mining generated the greatest number of complaints. The decline in 2005 may be attributable to improved regulation and enforcement.

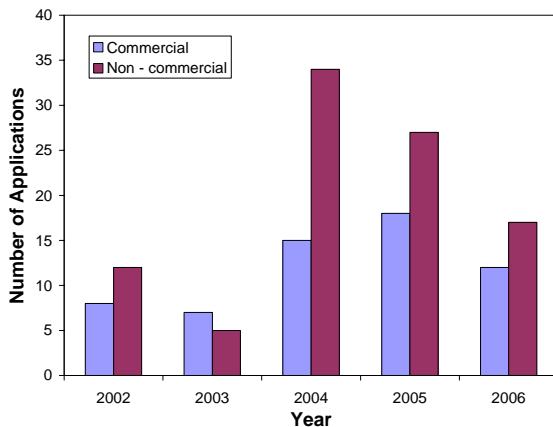


Figure B9.1. Number of applications for a permit to mine sand in South Tarawa. Data for 2006 is for January to May, inclusive. Source: Ministry of Environment, Lands and Agricultural Development.

the number of applications for development permits that involve sand mining in South Tarawa. The increased number of applications likely reflects both increasing extraction and increasing compliance. The figure also highlights the considerable and increasing extraction of sand occurring in South Tarawa, for both commercial and non-commercial purposes. It is likely that the number of applications underestimates actual extraction due to non-compliance with regulations and due the requirement for permits not being enforced in relation to small-scale mining for private purposes.

The importance of compliance monitoring can be demonstrated by way of an example relating to a brick making facility in South Tarawa. When the first inspection was made the following areas of non-compliance were noted: (i) no valid sand mining license; (ii) no brick making license; and (iii) contracted miners are selling sand and gravel to other parties. A subsequent inspection revealed that, though the facility had operated illegally for more than a month, the sand mining license had been renewed. However, the contracted miners were still selling sand and gravel to other parties.

Annex 8

Project Concepts

A. Incorporating Environmental Considerations in NDS 2008-2011

Background:

The state of the environment has a major influence on both the economic and social well-being of Kiribati and its people. So too does the ease with which natural resources can be accessed and utilized. There are many opportunities to reduce environmental constraints on development and to increase the beneficial use of the environment and natural resources. An important enabling step would be to ensure that the key policy areas in the *National Development Strategies 2008-2011* include specific strategies and actions to reduce these constraints and maximise the opportunities

Goal and purpose:

To assist with strengthening the *National Development Strategies 2008-2011* by having each of the key policy areas include specific strategies and actions to reduce environmental constraints on development and maximise the opportunities the environment offers for development.

Components and outputs: The project will include (i) working with ministries, public enterprises and other stakeholders to identify ways to reduce environmental constraints and take advantage of opportunities the environment provides for development; (ii) review draft key policy areas and strategies; (iii) identify ways to strengthen the key policy areas and strategies by including strategies that reduce environmental constraints and take advantage of opportunities; and (iv) work with stakeholders to revise the strategies related to each of the key policy areas. The main output of this TA will be the *National Development Strategies 2008-2011* with environmental considerations integrated into each of the key policy areas and associated strategies.

Expected results and deliverables:

The main deliverable is the *National Development Strategies 2008-2011* with environmental considerations integrated into each of the key policy areas and associated strategies. This document will provide the mandate to ministries and public enterprises to ensure that environmental considerations are incorporated in their operational and business plans.

Social and/or environmental concerns:

Numerous social and environmental benefits will result from this TA. There will be no adverse social or environmental impacts.

Plans for disseminating results/deliverables:

Reports, meetings, workshops, and seminars.

Proposed executing/implementing agency

Office of the Beretitenti and the Ministry of Finance and Economic Development

Nature/extent of government/beneficiary involvement in identifying or conceptualizing the assistance:

This TA is a direct consequence of participatory consultations conducted as part of the country environmental analysis (CEA), including a National Dialogue on Integrating Environmental Considerations in Economic and Development Planning Processes in Kiribati.

B. Enhancing Capacities of Development Ministries to Reduce Environmental Constraints

Background:

Successful integration of environmental considerations requires that relevant individuals in all Government institutions have the understanding and skills to ensure that ministry, public enterprise and cross-sectoral policies and plans include strategies and actions to minimize adverse environmental impacts and maximize the appropriate use of the environment and natural resources in ways that add further value to intended outcomes. It is also important that in each institution there are individuals with the ability to establish environmental performance targets and identify, monitor and evaluate appropriate performance indicators. Finally, all relevant Government institutions need to be able to access the expertise required to undertake the environmental assessments required as part of project planning and programming.

Goal and purpose:

The goal is to ensure that selected staff in development ministries have the knowledge and skills required to assess environmental impacts of development projects being proposed by their ministry and to prepare and implement environmental management plans for significant projects. The purpose of this TA is to ensure that all development projects are environmentally sound and to shift the responsibility to meet this requirement to those ministries that are proposing, planning and implementing the projects. At the same time the capacity of MELAD will be strengthened so that it can oversee this process to ensure that Government policies and plans, including its environmental targets, are achieved.

Components and outputs:

The project will include (i) working with relevant stakeholders to undertake capacity and needs assessments and prepare a capacity enhancement plan; (ii) identifying the development ministries, and staff in those ministries, who will participate in the capacity enhancement activities; (iii) undertaking the required training and wider institutional strengthening; and (iv) preparing and implementing a monitoring and review plan.

The main outputs are selected staff in development ministries who have the knowledge and skills required to assess environmental impacts of development projects being proposed by their ministry and to prepare and implement environmental management plans for significant projects.

Expected results and deliverables:

Responsibility for ensuring that development projects are environmentally sound is shifted to those ministries that are proposing, planning and implementing the projects.

MELAD strengthened so that it can oversee this process and hence ensure that Government policies and plans, including its environmental targets, are achieved.

Social and/or environmental concerns:

Numerous social and environmental benefits will result from this TA. There will be no adverse social or environmental impacts.

Plans for disseminating results/deliverables:

Meetings, workshops, and seminars.

Proposed executing/implementing agency

Office of the Beretitenti and the Ministry of Environment, Lands and Agriculture Development.

Nature/extent of government/beneficiary involvement in identifying or conceptualizing the assistance:

This TA is a direct consequence of participatory consultations conducted as part of the country environmental analysis (CEA), including a National Dialogue on Integrating Environmental Considerations in Economic and Development Planning Processes in Kiribati.

C. Strengthening Environmental Monitoring and Performance Audits

Background:

An important aspect of a move to greater self regulation and internal responsibility for environmental management in development ministries is the implications for the roles and responsibilities of the Environment and Conservation Division of MELAD, including those of its staff. Institutional strengthening will be required so the Division can review and encourage improvements in the environmental management practices of other sectors. Staff will require further advanced training in relation to reviewing environmental impact assessment reports as well as training and equipment for environmental monitoring, compliance inspections and awareness raising.

Goal and purpose:

The goal is to ensure that staff in the Environment and Conservation Division are provided with the added knowledge and skills needed to review and encourage improvements in the environmental management practices of other sectors and to review environmental impact assessment reports and undertake specialised environmental monitoring, compliance inspections and awareness raising activities.

The purpose of the TA is to ensure the Environment and Conservation Division has the capacity to meet its added roles and responsibilities as a consequence of the move to greater self regulation and internal responsibility for environmental management in the development ministries.

Components and outputs: The project will include (i) working with relevant stakeholders to undertake capacity and needs assessments and prepare a capacity enhancement plan; (ii) identifying the staff in MELAD who will participate in the capacity enhancement activities; (iii) undertaking the required training and wider institutional strengthening; and (iv) preparing and implementing a monitoring and review plan.

Expected results and deliverables:

The main result will be an Environment and Conservation Division with the capacity to meet its added roles and responsibilities as a consequence of the move to greater self regulation and internal responsibility for environmental management in the development ministries.

Social and/or environmental concerns:

Numerous social and environmental benefits will result from this TA. There will be no adverse social or environmental impacts.

Plans for disseminating results/deliverables:

Meetings, workshops, and seminars.

Proposed executing/implementing agency

Ministry of Environment, Lands and Agriculture Development (MELAD)

Nature/extent of government/beneficiary involvement in identifying or conceptualizing the assistance:

This TA is a direct consequence of participatory consultations conducted as part of the country environmental analysis (CEA), including a National Dialogue on Integrating Environmental Considerations in Economic and Development Planning Processes in Kiribati.

D. Increasing Voluntary Compliance

Background:

Currently in Kiribati there is a reasonably widespread view that there is too much reliance on improving environmental outcomes through enforcement of the environmental legislation. Concerns expressed generally relate to: (i) a lack of consistency in how the legislation is applied; (ii) the high financial and other costs of compliance; (iii) the frequent lack of a legal mandate; (iv) the frequent failure of the enforcement procedures to result in environmental improvements; and (v) the confrontational situation that often arises.

While enforcement should still be pursued where appropriate and necessary, much can be gained by encouraging more cooperative and harmonious approaches that encourage voluntary compliance. This may be particularly appropriate at the level of the individual, family and community. The more common methods to increase voluntary compliance are education and awareness raising, but many other options exist, including policy initiatives, incentives, competitions and administrative actions.

Goal and purpose:

The goal of this TA is to give more emphasis to education and awareness programmes that not only explain why specific activities are detrimental to the environment and natural resources, but also promote alternative, more environmentally sound ways in which people can meet their development and related objectives.

The purpose is to give less emphasis to the use of punitive measures to stop the environmentally damaging actions of individuals, families and communities. There is urgent need for increased understanding of both the opportunities the environment and natural resources provide for Kiribati, as well as the environmental consequences of all activities, from major development projects to the daily activities of families and individuals. Such understanding will help ensure that people have the knowledge, skills and technologies that will allow them to use the environment and natural resources in a more sustainable manner.

Components and outputs:

The project will include (i) identification of ways in which individuals, families and communities can undertake their customary practices in ways that have acceptable consequences for the environment; (ii) preparation and implementation of education, awareness raising and other programmes which focus on (a) why prohibited activities are detrimental and some other activities are undesirable; (b) the fact that the legislation can be enforced, and will be where necessary, in a consistent and transparent manner; (c) enforcement typically results in a lose-lose-lose situation – for the Government because limited resources are diverted from more productive use; for the violator because it costs them time, money and loss of reputation; and for the environment because detrimental actions have taken place rather than being avoided; (d) the more environmentally sound ways by which people can meet their needs, most of which go well beyond achieving compliance with the relevant legislation; and (e) the assistance and support that is available to ensure that improvements are socially just and equitable; and (iii) preparing and implementing a monitoring and review plan.

Expected results and deliverables:

Governmental institutions and non-governmental and community-based organisations with the capacity to place greater emphasis on the preparation and delivery of programmes that encourage sound environmental practices, and hence achieve more than mere compliance

with the environmental legislation. This includes staff trained in areas related to enhancing relevant knowledge and transferring needed skills. The ability to monitor and evaluate the effectiveness of the programmes designed to improve environmental sustainability will also be an important result of the TA.

Women, children and youth will be particularly targeted and encouraged to move towards more environmentally sound lifestyles. In this respect, agencies that can organize and mobilize such environmental advocates will be engaged in the TA and supported and encouraged to assist in developing and delivering programmes that educate, motivate and empower individuals, families and communities to adopt more environmentally friendly behaviours and to use natural resources in a sustainable manner.

Social and/or environmental concerns:

Numerous social and environmental benefits will result from this TA. There will be no adverse social or environmental impacts.

Plans for disseminating results/deliverables:

Reports, meetings, workshops, and seminars.

Proposed executing/implementing agency

Ministry of Environment, Lands and Agriculture Development (MELAD)

Nature/extent of government/beneficiary involvement in identifying or conceptualizing the assistance:

This TA is a direct consequence of participatory consultations conducted as part of the country environmental analysis (CEA), including a National Dialogue on Integrating Environmental Considerations in Economic and Development Planning Processes in Kiribati.

E. Maximising Benefits from Sustainable Use of the Environment

Background:

Many economic and social benefits for Kiribati and its people will be forthcoming if greater, but sustainable use is made of the country's environment and natural resources. Opportunities include improved management and utilization of the inshore and offshore fisheries, seaweed cultivation and export, copra production, nature-based tourism and improved environmental health. At present many of the activities that rely on the environment and natural resources are unsustainable and are depleting resources or are degrading the environment.

Goal and purpose:

The goal of this TA is to implement a whole-of-Government approach to resolving current issues and ensure sustainable use of the environment and natural resources, thereby ensuring a flow of economic and social benefits to Kiribati and its people. How to achieve this goal will be demonstrated by way of a project aimed at maximizing the economic and social opportunities provided by the near pristine state of the diverse and abundant fauna and flora of the Phoenix Islands.

Components and outputs:

The project will include (i) identifying relevant stakeholders and developing a plan that is designed to ensure sustainable use of the environment and natural resources within the Phoenix Island Protected Area and thereby ensure a flow of economic and social benefits to Kiribati and its people; the plan will include a monitoring and review component; (ii) working with relevant stakeholders to implement the plan; and (iii) documenting and disseminating the success stories and lessons learned.

Expected results and deliverables:

The expected results are a flow of economic and social benefits to Kiribati and its people as a result of sustainable use of the environment and natural resources within the Phoenix Island Protected Area. Deliverables will include a set of success stories and lessons learned.

Social and/or environmental concerns:

Numerous social and environmental benefits will result from this TA. There will be no adverse social or environmental impacts.

Plans for disseminating results/deliverables:

Reports, meetings, workshops, and seminars.

Proposed executing/implementing agency

Ministry of the Line and Phoenix Islands Development

Nature/extent of government/beneficiary involvement in identifying or conceptualizing the assistance:

This TA is a direct consequence of participatory consultations conducted as part of the country environmental analysis (CEA), including a National Dialogue on

Integrating Environmental Considerations in Economic and Development Planning Processes in Kiribati.

F. Increasing Use of Local Resources

Background:

As a semi-subsistence nation, Kiribati can ensure continuing economic and social benefits by enhancing the use of local resources, and thus reduce the demand for imported goods. An example is increased local production of food such as vegetables. Such initiatives also have the benefit of increasing the disposable income for families and improving the health individuals and families. Several community-based initiatives to develop and enhance family and village gardens are already demonstrating the multiple benefits of increases in local food production.

Increased production and use of coconut oil also presents an opportunity to enhance energy independency and security, as well improve outer island income generation.

Goal and purpose:

The goal of this TA is to highlight the economic and social benefits that will flow to individuals, families and the country as a whole as a result of enhancing the sustainable use of local resources. This outcome will be demonstrated by way of a project aimed at maximizing the economic and social opportunities associated with the use of small-scale copra mills in selected outer islands of Kiribati.

Components and outputs: The project will include (i) working with Outer Island Councils and relevant community-based organisations to identify islands where the demonstration projects can be implemented; (ii) identifying the opportunities and constraints these islands present in terms of implementing the project in a successful manner; (iii) assessing and selecting the relevant equipment and suppliers so that small -scale copra mills can be established on the selected islands and operated successfully by the communities; (iv) undertake the activities that will result in the successful deployment and continuing operation of the copra mills in ways that maximize the economic and social benefits; and (v) prepare and implement a monitoring and review plan.

Expected results and deliverables:

The local use of coconut oil as a fuel would reduce the current dependency on world copra prices. The price paid for copra would become more closely linked to the true costs of production than to the price of crude oil. This would result in substantial economic and social benefits, both nationally and more locally. Given the dispersed nature of copra growing areas in Kiribati the proposed TA develops an alternative to the current centralised processing of copra. Production of coconut oil in the outer islands lowers the cost of production since copra need not be transported to Tarawa. Labour costs will also be lower. The copra cake can be used as fertilizer and also, if of sufficient quality, for pig and chicken feed. The process waste can also be used as fuel for cooking and other fires, thereby reducing pressure on vegetation that is providing coastal protection and other benefits. The oil can be utilized in generators, outboard motors and vehicles. This extraction of coconut oil is at an appropriate scale and the cost of the technology is not excessive. The spin-off from this industry means that there is potential for significant environmental, social and economic benefits given that the oil also has other subsistence and commercial uses.

Social and/or environmental concerns:

Numerous social and environmental benefits will result from this TA. There will be no adverse social or environmental impacts.

Plans for disseminating results/deliverables:

Meetings, workshops, and seminars.

Proposed executing/implementing agency

Ministry of Public Works and Utilities

Nature/extent of government/beneficiary involvement in identifying or conceptualizing the assistance:

This TA is a direct consequence of participatory consultations conducted as part of the country environmental analysis (CEA), including a National Dialogue on Integrating Environmental Considerations in Economic and Development Planning Processes in Kiribati.