



KIRIBATI JOINT IMPLEMENTATION PLAN for Climate Change and Disaster Risk Management (KJIP)

2014-2023



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Foreword



Kiribati is highly vulnerable to the impacts of climate change and disasters. Its vulnerability is principally due to geological and physical features as well as inherent socio-economic characteristics. Climate change and disasters can have serious adverse impacts on the environment, the people of Kiribati and their livelihoods. According to climate change projections, these impacts will intensify over time. The Government of the Republic of Kiribati has taken note of this worrying trend. It has therefore considered measures to cope with these impacts as high priorities in its National Development Plan 2012–2015.

The Kiribati Joint Implementation Plan on Climate Change and Disaster Risk Management (KJIP) has been developed to reduce the vulnerabilities to the impacts of climate change and disaster risks and to coordinate priorities so that every single dollar spent will derive maximum value.

This plan is consistent with the regional and international frameworks on climate change and disaster risk management that the Government of the Republic of Kiribati has ratified.

Kiribati appreciates ongoing and future support, whether financial or technical, from its development partners which will enable the effective implementation of this plan for the enhancement of sustainable development and more resilient communities.

I humbly urge all stakeholders to harmoniously work together in implementing the priorities set out in the KJIP to enhance the resilience of tei-I-Kiribati and the country as a whole.

H.E Anote Tong
President



Acknowledgements

The preparation of the KJIP was initiated by the Office of te Beretitenti and driven by the Kiribati National Expert Group (KNEG) with representatives from government ministries, private enterprises and non-governmental organisations (NGOs).

The KNEG was supported directly by a Regional Support Team, comprising representatives from the Secretariat of the Pacific Regional Environment Program (SPREP), the Secretariat of the Pacific Community (SPC), the SPC/Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH Coping with Climate Change in the Pacific Island Region program on behalf of the Federal German Ministry for Economic Cooperation and Development (BMZ), the United Nations Development Program (UNDP) and the United Nations Children's Fund (UNICEF). The KNEG received additional technical assistance from Australia's Aid Programme, the European Union (EU) and the United States Agency for International Development (USAID).

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List of Acronyms

ACIAR	Australian Centre for International Agricultural Research	MELAD	Ministry of Environment, Lands and Agriculture Development
ADB	Asian Development Bank	MFAI	Ministry of Foreign Affairs and Immigration
ANCORS	Australian National Centre for Ocean Resources and Security	MFED	Ministry of Finance and Economic Development
AUD	Australian Dollar	MFMRD	Ministry of Fisheries and Marine Resources Development
Ausaid	Australia's Aid Program	MHMS	Ministry of Health and Medical Services
BMZ	Federal German Ministry for Economic Cooperation and Development	MLHRD	Ministry of Labour and Human Resources Development
BoM	Australian Bureau of Meteorology	MOE	Ministry of Education
BPoA+10	Barbados Program of Action +10	MPWU	Ministry of Public Works and Utilities
CO ₂	Carbon dioxide	MTC	Marine Training Centre
CROP	Council of Regional Organisations in the Pacific	Mw	Moment Magnitude (of a Tsunami)
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Australia)	MWYSA	Ministry of Women, Youth and Social Affairs
DRM	Disaster Risk Management	NFCCCCA	National Framework for Climate Change and Climate Change Adaptation
EDF	European Development Fund	NDRMP	National Disaster Risk Management Plan
EEZ	Exclusive Economic Zone	NGO	Non-Governmental Organisation
EU	European Union	NPBC	National Biodiversity Planning Committee
ENSO	El Niño–Southern Oscillation	OB	Office of te Beretitenti (Office of the President)
FAD	Fish Aggregating Device	PIFACC	Pacific Islands Framework Action on Climate Change
FFA	Forum Fisheries Agency	PIMS	Pacific Islands Meteorological Strategy
FSPKI	Foundation of the People of the South Pacific Kiribati	PIFS	Pacific Islands Forum Secretariat
FTC	Fisheries Training Centre	ppm	parts per million
GDP	Gross Domestic Product	RST	Regional Support Team
GIS	Geographic Information System	SARS	Severe Acute Respiratory Syndrom
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH	SOPAC	Applied Geoscience and Technology Division (SPC)
IFAD	International Fund for Agricultural Development	SPC	Secretariat of the Pacific Community
IPCC	Intergovernmental Panel on Climate Change	SPCZ	South Pacific Convergence Zone
ITCZ	Inter-Tropical Convergence Zone	SPREP	Secretariat of the Pacific Regional Environment Program
ITPGRFA	International Treaty on Plant Genetic Resources for Food and Agriculture	SRDP	Strategy for Climate and Disaster Resilient Development in the Pacific
KAP	Kiribati Adaptation Project	TVET	Technical and Vocational Education and Training
KCCI	Kiribati Chamber of Commerce and Industry	UNCBD	United Nations Convention on Biological Diversity
KDP	Kiribati Development Plan	UNCLOS	United Nation Convention on the Law of the Sea
KIT	Kiribati Institute of Technology	UNDP	United Nations Development Program
KJIP	Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management	UNESCO	United Nations Educational, Scientific and Cultural Organization
KMS	Kiribati Meteorological Service	UNFCCC	United Nations Framework Convention on Climate Change
KNDSAC	Kiribati National Disability Survey Advisory Committee	UNICEF	United Nations Children's Fund
KNEG	Kiribati National Expert Group on Climate Change and Disaster Risk Management	UNISDR	United Nations International Strategy for Disaster Reduction
KNSO	Kiribati National Statistics Office	USAID	United States Agency for International Development
KPA	Key Policy Area	USP	University of the South Pacific
KTC	Kiribati Teachers College	WHO	World Health Organization
MIA	Ministry of Internal Affairs	Wol	Whole of Island approach
MCIC	Ministry of Commerce, Industry and Cooperatives	WMO	World Meteorological Organization
MCTTD	Ministry of Communications, Transport and Tourism Development		



Executive Summary



Background

The Republic of Kiribati is made up of three main island groups: The Gilbert, Phoenix and Line Islands and one isolated raised limestone island, Banaba (Ocean Island). The groups of islands contain 33 scattered atoll islands, dispersed over 3.5 million square kilometers in the central Pacific Ocean. The three main island groups stretch over 800 kilometers from north to south and over 3,210 kilometers from east to west.

The Kiribati 2010 census determined that the total population was 103,058, of whom 50.7% were female and 49.3% male. In all, 48.7% of the population lives in the capital of South Tarawa (in the Gilbert Islands), which has a population density of 3,173 people per square kilometer (KNSO & SPC 2012). The mean age of the I-Kiribati population is 24.9 years and 15.9% of the population is aged five years or younger, reflecting the high birth rate of 31.3 per 1,000 people per year (KNSO & SPC 2012). The latest Kiribati National Disability Survey identified 3,840 people living with disabilities, with 23% of those under the age of twenty (KNDSAC 2005).

The climate of Kiribati is hot and humid year around. This tropical climate is closely related to the temperature of the oceans surrounding the atolls and small islands. However, its seasonal rainfall is highly variable from year to year, mostly due to the El Niño–Southern Oscillation (ENSO).

Kiribati is blessed with a vast ocean territory and great diversity of marine biodiversity, but is limited in its land area and terrestrial resources. The Kiribati economy depends heavily on its rich marine resources for employment, income and subsistence living. However, the resources provided by its limited land and terrestrial biodiversity are also central to the Kiribati way of life.

The public sector dominates Kiribati's economy. It provides two-thirds of all formal sector employment and accounts for almost 50% of gross domestic product. Kiribati is highly exposed to external economic shocks, particularly surges in food and fuel commodity prices, due to its limited revenue base and high dependency on imports.

Kiribati is categorised by the United Nations as both a 'Small Island Developing State' and a 'Least Developed Country'.



Climate change and disaster risk context

As a result of its inherent characteristics as an atoll nation, a least developed country, and with its fragile economy and environment, Kiribati is extremely vulnerable to climate change and has little capacity to cope with natural and man-made disasters.

Climate variability, driven by the natural phenomena ENSO, intermittently causes extreme weather events. There are also other non-weather related hazards such as oil spills (man-made) or tsunamis (tectonically caused). Coupled with climate change, extreme weather events are predicted to become more frequent. Additionally, existing socio-economic and environmental pressures are intensifying. This highlights how these factors are strongly interrelated in the Kiribati context. It is therefore logical to consider and address climate change adaptation and disaster risk management in a systematic and integrated manner.

Already climate-related hazards such as salt-water inundation, droughts, plagues and epidemics as well as man-made hazards such as fires, oil spills and aircraft accidents pose challenges to the nation's economy, food and water security, as well as the overall well-being of its people. Climate variability and climate change are already causing and are predicted to continue to cause: increasing surface air and sea temperatures, increasing precipitation throughout the year, more days of extreme rainfall and heat, rising sea-levels and increasing ocean acidification. In addition, although the risks are generally considered minimal, Kiribati could also be affected by a tsunami.

The social, economic and environmental ramifications of the observed and projected climatic changes and hazards are multiplied when overlaid with the high levels of vulnerability of people and their environment.

Climate change and disaster risks are being addressed in policies and strategies relating to population, water and sanitation, health and environment, and are progressively being incorporated into policies and strategies relating to fisheries, agriculture, labour, youth and education. However, only a few sectors have transferred strategic actions to address climate and disaster risks into their annual Sector Operational Plans and Ministerial Plans of Operations and budgeting. A climate change and disaster risk management rapid assessment report on budgetary allocations for 2011, 2012 and 2013 revealed that, over this period, a total of AUD 83 million (about 15.7% of the national budget) was allocated to programs related to climate change while AUD 90 million (about 17% of the national budget) was allocated to disaster risk management programs. Further analyses showed that between 2011 and 2013, the Consolidated Budget and Development Fund committed approximately AUD 82 million to addressing climate change and AUD 89 million to disaster risk management. Such budgetary commitments support the notion that, while measures to address climate change and disaster risks seem to be well integrated into key sectors, these efforts need to be maintained and upscaled in order to improve the resilience of the Kiribati population.

Development of the KJIP

The Government of the Republic of Kiribati, following consultation with regional technical advisory organisations, initiated the process of developing a Kiribati Joint National Action Plan on Climate Change and Disaster Risk Management (KJIP) in 2011. This document is designed to complement the National Disaster Risk Management Plan (GoK 2012b) and the National Framework for Climate Change and Climate Change Adaptation (GoK 2013). By identifying tangible, on-the-ground actions for resilience and measures that enable the Government to facilitate these, the plan will guide the implementation of these complementary policies in an integrated approach.

The main rationale for this approach is that a systematic and integrated plan, where tangible actions are identified, will maximise the efficiency and effectiveness of existing capacities and resources as well as ensuring new initiatives are well targeted and have maximum impact. In addition, the development of this plan was seen as a key vehicle for integration of climate change and disaster risks into all sectors, thus promoting a holistic approach that involves the cooperation of Government, civil society and the private sector.

Vision and goal

The vision of the 9 year KJIP (2014-2023) is that:

I-Kiribati unique culture, heritage and identity are upheld and safeguarded through enhanced resilience and sustainable development.

The goal of the KJIP is:

To increase resilience through sustainable climate change adaptation and disaster risk reduction using a whole of country approach

**The KJIP identifies the following twelve major strategies:**

1.	strengthening good governance, policies, strategies and legislation;
2.	improving knowledge and information generation, management and sharing;
3.	strengthening and greening the private sector, including small-scale business;
4.	increasing water and food security with integrated and sector-specific approaches and promoting healthy and resilient ecosystems;
5.	strengthening health service delivery to address climate change impacts;
6.	promoting sound and reliable infrastructure development and land management;
7.	delivering appropriate education, training and awareness programs;
8.	increasing effectiveness and efficiency of early warnings and disaster and emergency management;
9.	promoting the use of sustainable, renewable sources of energy and energy efficiency;
10.	strengthening capacity to access finance, monitor expenditures and maintain strong partnerships;
11.	maintaining the existing sovereignty and unique identity of Kiribati; and
12.	enhancing the participation and resilience of vulnerable groups.

Each strategy identifies results and a combination of outcome- and output-based indicators.

KJIP implementation arrangements – governance, coordination, communication and monitoring:

The KJIP is building on and intended to strengthen existing implementation, financing and monitoring functions by integrating them with climate change and disaster risk management considerations. In addition, it is designed to strengthen coordination and communication among the Office of te Beretitenti, Ministry of Finance and Economic Development, Ministry of Foreign Affairs and Immigration and line ministries as well as civil society and development partners.

The KJIP formalises the role of the newly established Kiribati National Expert Group on Climate Change and Disaster Risk Management (KNEG) to become the main advisory body and coordination mechanism as well as the entry point for climate change and disaster risk management initiatives. Furthermore, it is intended that a KJIP Secretariat will be established, with the main roles of: facilitating KNEG meetings; reviewing and monitoring KJIP implementation together with responsible lead agencies; and communicating with the general public, Parliament, Cabinet, development partners and the international community. The KJIP Secretariat will be under the guidance of the Development Coordinating Committee.

The KJIP vision, goal, strategies and results will be disseminated by all implementing partners through existing information sharing networks, media and forums at international, regional, national and local levels. This work will align with the Kiribati Climate Change and Climate Risk Communications Strategy that is currently being finalized.

The KJIP will be monitored through the Kiribati Development Plan Monitoring and Evaluation Framework (2012) in compliance with the Monitoring and Evaluation Policy. At the ministerial level, the KJIP strategies will be monitored through the annual Ministry Strategic Plans, which will have to incorporate relevant KJIP actions and outcome indicators. The KJIP is understood to be a living document and as such the KNEG can adjust it to meet emerging needs, to be approved by the Development Coordinating Committee.

Funding the KJIP

The implementation of the KJIP is to be financed through already existing strategies, ranging from the national budget to Overseas Development Assistance, including additional climate change funding and disaster related humanitarian aid.

The overall gross indicative value of the resources needed to implement the KJIP over the period 2014-2023 is estimated to be AUD 103,107,161. Of this total, it is estimated that the financial costs constitute 96%, as detailed in Table I.

Table 1: Financial costs (rounded)

	Financial costs (in 1,000 AUD)	In %
Strategy 1	\$6,697	6
Strategy 2	\$5,555	5
Strategy 3	\$4,932	4
Strategy 4	\$4,694	4
Strategy 5	\$473	2
Strategy 6	\$52,477	50
Strategy 7	\$7,478	7
Strategy 8	\$4,508	4
Strategy 9	\$15,340	11
Strategy 10	\$354	2
Strategy 11	\$181	1
Strategy 12	\$417	2
TOTAL	\$103,107	100





1: Background

1.1 Key geographical and geological features

The Republic of Kiribati is made up of 33 scattered islands, dispersed over 3.6 million square kilometres in the Central Pacific Ocean. From north to south of the group, the distance is only 800 km, but from east to west, it is more than 3,210 km (see Figure 1). There are three main island groups: Gilbert, Phoenix and the Line Islands consisting of 32 low-lying atolls that rise to no more than 2-3 metres above sea level, apart from Banaba, a raised coral island with a highest point of 81m, which was once a rich source of phosphate.

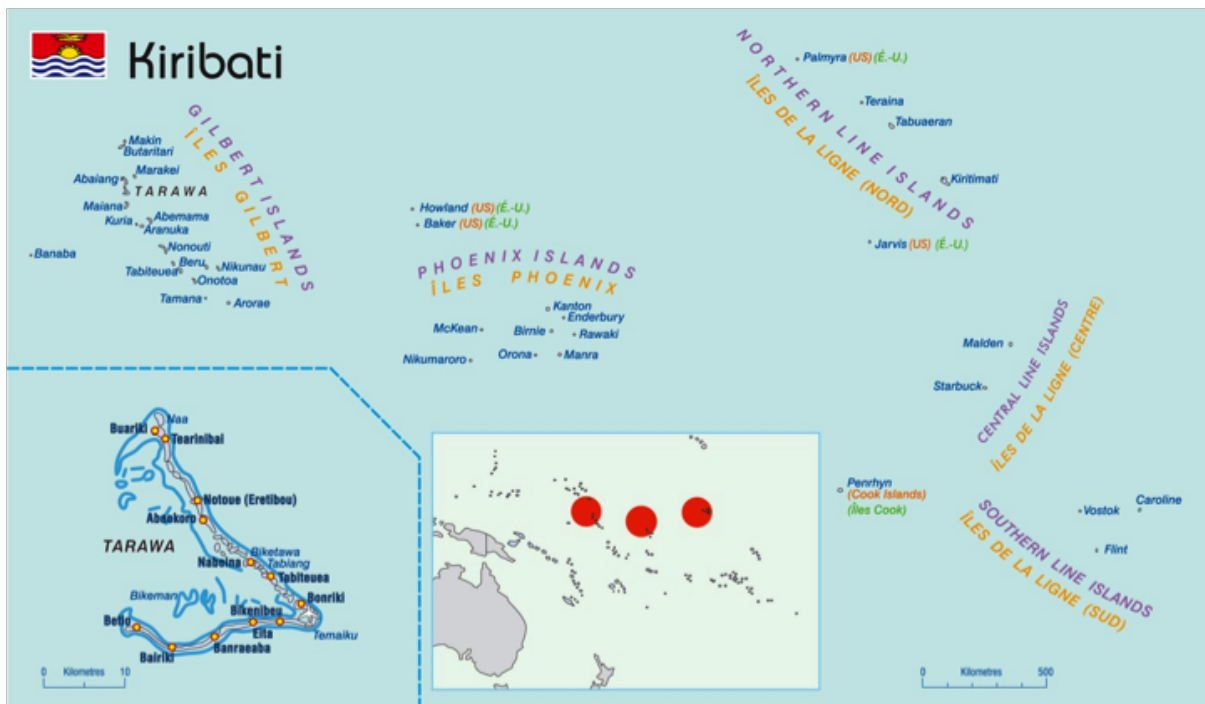


Figure 1: Map of Kiribati

The Kiribati 2010 census determined that the total population was 103,058, of whom 50.7% were female and 49.3% male. This indicates an increase of 11.4% or 10,525 people over the five years since 2005, when the census recorded a population of 92,533. This increase represents an average annual rate of growth of 2.28% (KNSO 2010).

On the capital island South Tarawa (in the Gilbert Group) the population density is one of the highest at 3,173 people per square kilometre. It is here that 48.7% of the population of Kiribati resides, and that the population increased by 24% over the five years between 2005 and 2010 (ADB 2011). On the outer islands of the Gilbert Group the 2010 census recorded a population of 45,299, and another 7,577 in the islands of the Line and Phoenix Groups (MELAD ALD 2012).

More specifically, the populations in the islands of Teraina, Tamana, Butaritari, Kiritimati and North Tarawa increased from 2005 to 2010, whereas populations in Banaba, Makin, Tabuaeran, Nonouti and Onotoa decreased. High rates of population growth in urban centres have placed stress on water and sanitation infrastructure, causing a high incidence of water-borne disease (ADB 2009).

Youth represent more than 20% of the population of Kiribati and this percentage is projected to grow over the next decade (KNSO 2012). The mean age of the population is 24.9 years and 15.9% of the population is aged five years or younger, reflecting the high birth rate of 31.3 per 1,000 people per year (KNSO 2012). The latest Kiribati National Disability Survey identified 3,840 people with disabilities, with 23% of those under the age of 20 years (KNDSAC 2005).



Geographical and Demographical Data

Geographic coordinates ⁴	Lat. 4°N–3°S, long. 157°W–172°E
Total land area ²	810,5 km ²
Coastline ⁴	1,410,000 km
Exclusive economic zone ²	3,6 Mio km ²
Geography ²	33 islands, 21 inhabited; three island groups: Gilbert Islands, Line Islands and Phoenix Islands & one isolated volcanic island, Banaba
Population ¹	103,058
Female population ¹	52,262
Youth ¹	21,292 (males 10,824; females 10,468)
People with disabilities ⁵	3,840 (males 2,122; females 1,718)
Population forecast (2015) ²	110,280
Annual population growth rate ²	2.26% (South Tarawa & Kiritimati: 4.1% ⁶)
Population density ²	142 people per km ² (South Tarawa: 3,184)
Infant mortality rate ²	45 deaths before 1 year of age, per 1,000 life births
Life expectancy at birth ²	63.2 (males 59.7, females 67.5)
Labour force participation rate ²	59.3 % (male 66.8%, female 52.3%)
Climate ³	Hot, humid, tropical
Nationality	I-Kiribati
Language	te-Kiribati, English
Religion ²	Catholic 55.8%, Protestant 33.6%, Mormon 4.6%, Baha'i 2.3%, Seventh-Day Adventist 2%, other 1.7%

Sources: ¹KNSO 2012; ²KNSO & SPC 2012; ³KMS & BoM & CSIRO 2011; ⁴ADB 2011; ⁵KNDSAC 2005

I.2 Environment and biodiversity

Kiribati ratified the United Nations Convention on Biological Diversity (UNCBD) in 1994 as well as the International Treaty of Plant Genetic Resources for Food and Agriculture (ITPGRFA) in 2005 and the Cartagena Protocol on Biosafety in 2004. It has a National Biodiversity Planning Committee (NPBC) which is made up of a multi-disciplinary team comprising of stakeholders from a variety of Government Ministries as well as Civil Society partners.

Ocean

With its large ocean territory, Kiribati has a rich marine biodiversity. The Phoenix Group is one of the largest marine parks in the world and in 2010 was added to the list of United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage sites. There are two submerged reef systems in this protected area, the greater part of which is comprised of ocean floor with a water column averaging more than 4,000 metres deep and reaching a maximum at 6,147 metres. It is home to a number of predatory fish, sea turtles, sea birds, corals, giant clams and coconut crabs, most of which have been depleted elsewhere in the region (MELAD ECD 2006).

The relatively rich variety of marine fauna (consisting of approximately 300 to 400 species) continues to provide the people of Kiribati with their main source of protein – fish.

Land

In contrast, the indigenous land-based flora and fauna of Kiribati are among the poorest on earth and there are few, if any, endemic species. Despite the limitations of land, soil and freshwater resources, the people of Kiribati have developed sophisticated subsistence agricultural systems based mainly on coconut, breadfruit, pandanus and swamp taro.

Kiritimati in the Line Group is the largest atoll in the world and holds a diversity of avifauna that is of both regional and international significance. The atoll provides nesting, roosting, feeding and migration sites for over 40 bird species (MELAD ECD 2006).

I.3 Current climate and climate variability

The climate data presented here are derived from temperature and rainfall records that were started between 1909 and 1950 up to 2009 and analysed by the Kiribati Meteorological Service (KMS), the Australian Bureau of Meteorology (BoM) and the Commonwealth Scientific and Industrial Research Organisation (CSIRO, 2011). Kiribati is operating five meteorological stations – in Tarawa for the Gilbert Group, in Kiritimati for the Line Group and in Beru, Kanton and Tabuaeran.

Current Climate

Kiribati has a hot, humid, tropical climate with an average air temperature of 28.3°C and average rainfall of about 2100 mm per year in Tarawa (1980–1999; Bell et al. 2011). Its climate is closely related to the temperature of the oceans surrounding the small islands and atolls. Across Kiribati the average temperature is relatively constant year round. From season to season the temperature changes by no more than about 1°C. Kiribati has two seasons – *te Au Maiaki*, the dry season and *te Au Meang*, the wet season. The periods of the seasons vary from location to location and are strongly influenced by the seasonal movement of the South Pacific Convergence Zone (SPCZ) and the Intertropical Convergence Zone (ITCZ) (see Figure 2; KMS, BoM & CSIRO 2011 Vol 2).



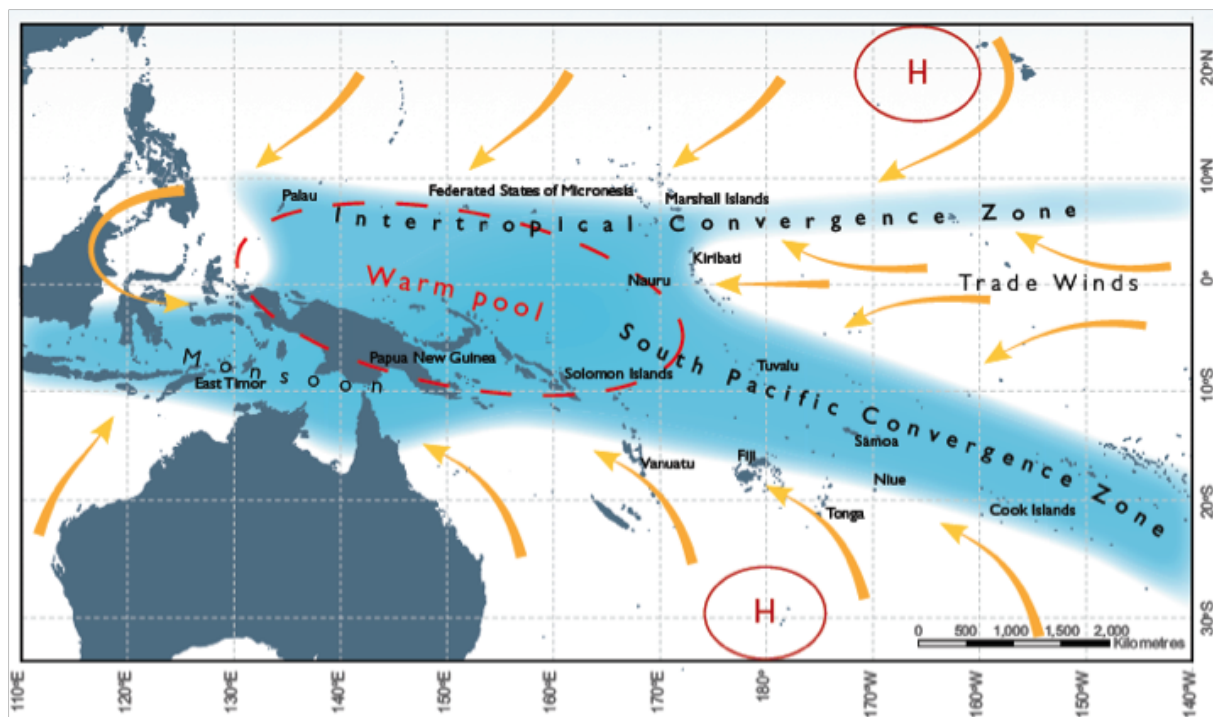


Figure 2: Average positions of the major climate features from November to April

The arrows show near surface winds, the blue shading represents the bands of rainfall convergence zones, the dashed oval shows the West Pacific Warm Pool and H represents typical positions of moving high pressure systems.' Source KMS, BoM & CSIRO 2011 Vol 1: 37

The six-month dry season (*te Au Maiaki*) for Tarawa starts in June, with the lowest mean rainfall in October. The wet season (*te Au Meang*) starts in November and lasts until April; the highest rainfall occurs from January to March, peaking with a mean of 268 mm in January. The highest rainfall usually occurs when the ITCZ is furthest south and closest to Tarawa; there are also high rainfalls, though to a lesser extent, when the SPCZ is strongest.

The average sea-surface temperature of oceans around Kiribati is 29.2°C (1980–1999). As Kiritimati is 2000 km to the east from Tarawa, its wet season starts at a different time, from January to June, with the wettest months being March and April (see Figure 3). Rainfall in the northeast of Kiribati is only affected by the ITCZ.

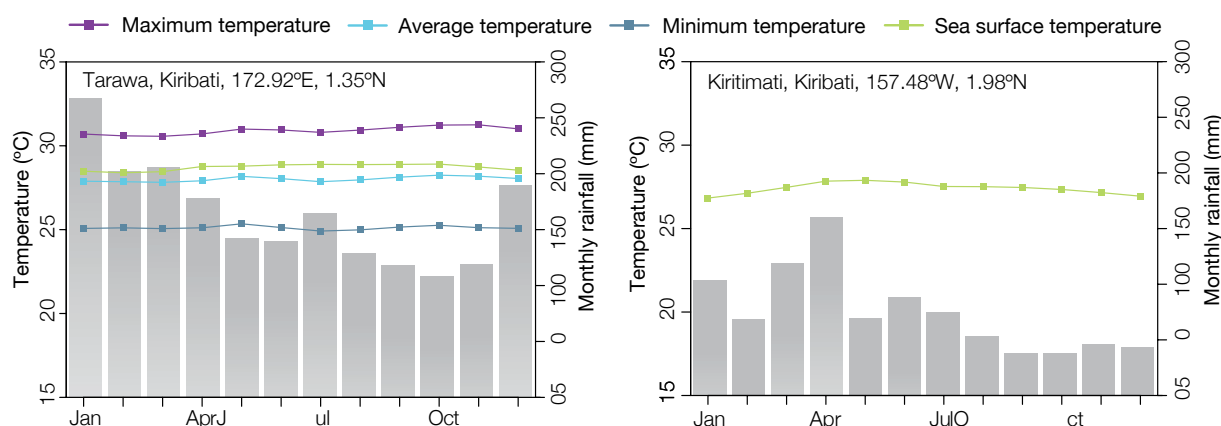


Figure 3: Seasonal rainfall and temperature on Tarawa and Kiritimati

Grey bars: mean annual cycle of rainfall. Source: KMS, BoM & CSIRO 2011: Kiribati Country Brochure

Across Kiribati there is a change in mean monthly rainfall towards the end of the year. There is however, a large variation in mean annual rainfall across Kiribati. A notable zone of lower rainfall, less than 1500mm per year exists near the equator and extends eastwards from 170°E. On average, Tarawa at 1.1416°N receives just under 2100mm, while the island of Butaritari at 3.1678°N only 350km to the north, receives around 3000mm (KMS, BoM & CSIRO 2011).

Climate variability

The climate of Kiribati, especially rainfall, is highly variable from year to year. Tarawa, for example, receives more than 4000 mm of rainfall in the wettest years, but only 150 mm in the driest. This huge range is similar in Kiritimati and has enormous impacts on water availability and quality, crop production and health.

The main reason for this variability is the El Niño–Southern Oscillation (ENSO). Many Kiribati islands lie within the equatorial waters that warm significantly during an El Niño event and cool during a La Niña event. As a result rainfall is much higher than normal during an El Niño and much lower during a La Niña. Maximum air temperatures tend to be higher than normal during El Niño years, driven by the warmer oceans surrounding the islands, while in the dry season minimum air temperatures in El Niño years are below normal. At Kiritimati, El Niño events also bring wetter conditions in both seasons and La Niña events bring drought (KMS, BoM & CSIRO 2011; Vol. 2).

El Niño is generally associated with above-normal rainfall and strong westerly winds, while La Niña is associated with below-normal rainfall and the risk of drought.

1.4 Economy

Small scale

The natural resources of Kiribati provide a narrow production base, consisting largely of subsistence agriculture, copra and fish. The very limited natural resource base and infertile soil of atoll islands constrain agricultural development. Kiribati does, however, possess abundant ocean resources – principally fish, seaweed, manganese nodules and cobalt-rich crusts.

The maritime and fisheries sector offers strong employment opportunities for I-Kiribati. Access agreements currently dictate I-Kiribati crewing requirements and I-Kiribati crew have built a strong regional reputation, particularly among Japanese fleets. It is estimated that approximately 325 I-Kiribati crew are working on Japanese fishing vessels and between 100 and 200 on Korean, Taiwanese and Chinese fleets (MFMRD 2013).

In addition, I-Kiribati are developing expertise and reputations as merchant seafarer with over 600 employed abroad. These maritime positions are now providing significant national income of over AUD 8 million for Kiribati through remittances. Maritime training for I-Kiribati is a key development field.

The limited employment opportunities within the country have, however, forced skilled nationals to migrate abroad in search of jobs (Mendani et. al. 2008). Youth unemployment or underemployment is particularly high at 54% for those aged 15–24 years – more than double the rate of the broader Kiribati population (KNSO 2012).



Large scale

The public sector dominates the Kiribati economy. 34% of the paid labour force is employed by government and the government sector accounts for almost 31% of the gross domestic product (GDP). Agriculture and fishing account for 25 % followed by real estate with 12% of the GDP (real GDP in 2006 prices, MFED KNSO 2012 & KNSO & SPC 2012). Remittances and earnings from the Revenue Equalisation Reserve Fund are also important. Tourism plays a fairly modest role in the Gilbert Islands but for the Northern Line Islands, especially Kiritimati, tourism has a high priority (ADB 2009; Hay and Onorio 2006).

Economic information

Real GDP (2011) ¹	AUD 156,681,000
Real GDP per capita (2011) ¹	AUD 1,468
Real growth rate (2011) ¹	3.3%
Paid employment in labour force (2010) ²	50.2 % (men 55%, women 45%)
Unpaid work in labour force (2010) ²	19.2 % (men 61%, women 39%)
Unemployment rate in labour force (2010 estimate) ²	30.6% (men 27.6%, women 34.1%)
Not in the labour force (2010) ²	40 % (men 33%, women 48%)

(Sources: ¹MFED KNSO 2012; ²based on KNSO & SPC 2012)

Fishery resources are critically important to the Kiribati economy for revenue, employment and income. The combined value of all Kiribati lagoon, coastal and oceanic fisheries is estimated to exceed AUD 110 million per year (MFMRD 2013). The lagoons and rich oceanic waters of Kiribati are home to numerous artisanal and small-scale commercial fisheries, aquaculture operations and commercial joint ventures, as well as foreign distant water fishing fleets that fish in Kiribati's exclusive economic zone (EEZ) and primarily land in foreign ports for foreign markets.

Kiribati receives significant support from its development partners, which finances almost all the Government's development expenditure. External grants in 2010 were estimated at AUD 55.8 million. The Government also borrowed AUD 4 million for development projects in 2010. No donor provides direct budget support at present. The proportion of aid flows that are managed using national procedures is relatively low (MFED 2008).

Kiribati is highly exposed to external economic shocks, particularly surges in food and fuel commodity prices, due to its limited revenue base and high dependency on imports. Progress toward achieving the Millennium Development Goals is poor, even by regional standards, particularly in relation to certain aspects of health, water and sanitation. It is unlikely that Kiribati will achieve the target of halving poverty by 2015 (Hay and Onorio 2006; World Bank n.d.).

1.5 Communications and transport

Communication services remain limited throughout Kiribati and when they are available they are very expensive. Television service has been re-established recently. The radio is providing the main form of mass communication. There are currently two radio stations as well as a number of weekly print newspapers.

Internet penetration remains relatively weak, with just 4% of households having access to the internet in 2010 (see figure 4). This figure does, however, represent an increase from 2% of households in 2005 (KNSO 2010). While those on the outer islands (almost half of the population) are unlikely to have access to an internet connection, even those based in the capital South Tarawa are constrained by high costs of services.

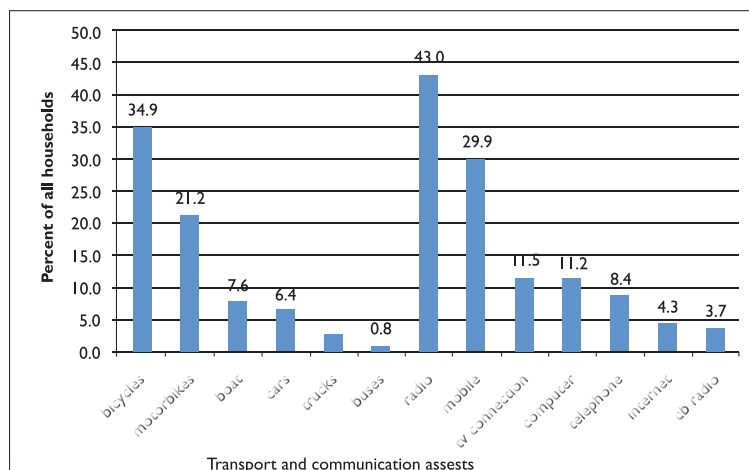


Figure 4: Ownership of transport and communication assets, Kiribati 2010

Source: KNSO & SPC 2012: 75

Access to telephones is also extremely limited. Just 29.9% of the households in 2010 owned a mobile phone and only 8.4% of households had a landline phone (KNSO & SPC 2012). In 2013 a 3G network was introduced on Tarawa. To some extent, the high costs and lack of access reflect how much the population of Kiribati relies on satellites for communication. However, neighbouring island nations that also rely on satellites have a stronger telecommunications private sector and have managed to keep costs to approximately a quarter of those in Kiribati (World Bank 2012).

In addition to limited access to communication technology, communication between islands, particularly outer islands, is difficult because of extreme geographical constraints including isolation and a lack of access to affordable transport. Only 6.5% of the population own a car, 21% a motorbike and 7.6% a boat of any kind. Bicycles are the main form of land transport, particularly in the outer islands where road infrastructure is limited (KNSO & SPC 2012).

The main island of South Tarawa is connected through commercial flights twice weekly to both Fiji Islands and Nauru. Kiritimati is connected to Fiji Islands once a week and there are domestic services offered by the two operating domestic carriers. These services are, however, limited to the Gilbert Group. Transport from the capital South Tarawa to the biggest atoll and key tourist destination, Kiritimati, requires international transit through Fiji Islands (World Bank 2012). There are also four inter-island ferry and shipping services and a number of small, higher-speed boats available for charter.

1.6 Government and governance

Formerly part of the British territory known as the Gilbert and Ellice Islands, Kiribati became an independent republic in 1979 and now enjoys full membership of the United Nations and all regional organisations. The country is a member of the Commonwealth and adopted a blend of both the British and American parliamentary systems. It is a sovereign, democratic state with a 42-member Maneaba ni Maungatabu (House of Parliament), elected every four years. The Beretitenti (President) is elected nationally from among three or four candidates nominated by the Maneaba from its ranks. The Beretitenti chooses a 12-member cabinet from the Maneaba.

The outer islands are well represented in Parliament, with 35 members representing the outer islands and six members for South Tarawa. Women make up just 4.3% of the members of the Kiribati Parliament, even though they represent 50% of the workforce (UNWomen n.d.).

There are 20 island councils and three urban councils. Members of the island councils have discretionary power through issuing licences for business development and setting prices such as bus fares (KILGA 2013). A number of councils have developed strategic and operational plans, including Betio Town Council, Eutan Council and Abaiang Council, and Teinainono Council has launched its plan.

Disability falls under the responsibility of the Ministry of Women, Youth and Social Affairs (MWYSA) although there is neither a dedicated budget nor a dedicated position for it. Neither the Ministry of Education (MoE) or Health and Medical Services (MHMS) has dedicated positions that focus on disability support (UNICEF 2010).

While some women hold significant positions in the public service, historically not many women have been involved in the highest level of decision-making. Women's voice and issues at the community level are being heard and incorporated into planning where women participated or had their views voiced by the men.



2 Climate Change and Disaster Risk Context

As a result of its inherent characteristics as an atoll nation and a least developed country, Kiribati is extremely vulnerable to climate change and has very little capacity to cope with natural and man-made disasters.

Climate variability is causing and will continue to cause more frequent and increasingly intense weather events, and climate change will heighten existing socio-economic and environmental pressures. While some natural hazards are not climate related, such as tsunamis or oil spills, they share the common factors of vulnerability (including exposure) and the similar tools used to monitor, analyse and address adverse consequences. Therefore, it makes sense to consider and address disaster risk management and climate change adaptation in a systematic and integrated manner.

While it must be acknowledged that there are barriers to addressing these concepts in a joint approach, the potential benefits of doing so are immense. Both disaster risk management and climate change adaptation and mitigation aim to improve the resilience of communities so an integrated approach will help to advance sustainable national development, making better use of existing national and regional capacities and resources as well as more effectively targeting new initiatives to address multiple hazards and phenomena.

Chapter 2.1 to 2.2 report on the results of an analysis of the observed and predicted climatic changes and existing hazards Kiribati is exposed to. Chapter 2.3 highlights general and sector specific the socio-economic, physical and environmental sensitivities that Kiribati faces, and the observed as well as potential future impacts of its vulnerabilities. Chapter 4 presents responses to these challenges, with strategies and actions that address the vulnerabilities to increase resilience and offer ways of coping with potential impacts.

2.1 The changing climate of Kiribati

Most of the global emissions that contribute to climate change originate from burning fossil fuels for transportation, electricity, heating and industry in economically fast-growing and industrialised countries. Since the beginning of the 20th century, global industrial activity has grown by 40 times, and the emission of greenhouse gases has grown by 10 times. In addition, land use changes due to deforestation and agricultural production have contributed to the higher emissions.

Despite all international efforts to reduce emissions, the amount of carbon dioxide (CO₂) in the atmosphere increased from around 280 parts per million (ppm) at the beginning of the century to 400 ppm in 2013 (Tans and Keeling 2013). According to scientists, the safe upper limit for CO₂ is 350ppm. In addition, methane (CH₄) rose from a pre-industrial atmospheric concentration of around 700 parts per billion (ppb) to about 1789 ppb by 2007 (see Figure 5).

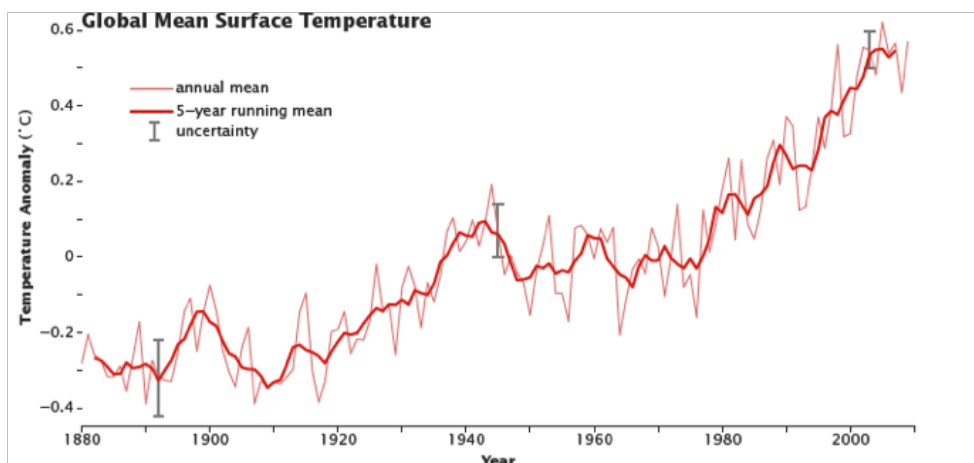


Figure 5: Rising global mean surface temperatures

Source: NASA and Earth Observatory 2013

The climate of Kiribati is changing and will continue to change in the future. Steadily increasing emissions of greenhouse gases have enhanced the greenhouse effect, causing the climate to warm all around the world, including in Kiribati.



This trend is of great concern to Kiribati, as the increasing temperatures have a huge range of global implications. Due to the melting of land-based glaciers and ice sheets and the thermal expansion of the ocean, the sea level is rising. Rainfall patterns are changing and extreme weather events will get more frequent and intense. In addition, warmer oceans that take in more carbon dioxide impact on growth and productivity of marine life – in tropical areas, the effects are particularly negative for coral reef habitats.

The following subsections report on changes in climate in Kiribati – both those already observed and those predicted for the future.

Observed trends

Table 2 summarises the trends already observed in variables such as temperature, rainfall, sea level, extreme events and ocean acidification in Kiribati.

Table 2: Climate trends in Kiribati observed over a period from 1950 to 2009

Climate Variable	Observed Trends
Air temperature	Annual and seasonal mean air temperatures are getting warmer: <ul style="list-style-type: none"> • Maximum temperatures have increased at a rate of 0.18°C per decade. • Annual and seasonal minimum air temperatures have increased slightly more than the increase in maximum air temperatures.
Sea-surface temperature	Water temperatures have risen since the 1970s: <ul style="list-style-type: none"> • in the Gilbert Group by approximately 0.15°C per decade; • in the Line Group by approximately 0.1°C per decade; and • in the Phoenix Group by approximately 0.12°C per decade. Since 1950 the rise has been gradual in the waters around the Gilbert Islands, but it has been variable from one decade to the next in the Line and Phoenix Islands.
Rainfall	Annual rainfall has increased: <ul style="list-style-type: none"> • Annual and wet season rainfall has increased for Kiritimati but there is no trend in the dry season. • At Tarawa, rainfall data show no clear trends. • At both the above sites, rainfall has varied substantially from year to year.
Droughts	The impact of droughts, usually associated with La Niña, can be severe in Kiribati; for example: <ul style="list-style-type: none"> • In 1971, 1985, 1998 and 1999 annual rainfall was less than 750mm. • The recent drought from April 2007 to early 2009 severely affected the southern Kiribati islands and Banaba. During this period, groundwater turned brackish and the leaves of most plants turned yellow.
Cyclones, severe storms and extreme sea levels	<ul style="list-style-type: none"> • Tropical cyclones rarely pass between the Kiribati islands. • Between 1969/70 and 2009/10 three cyclones passed within 400km of Arorae Island in western Kiribati and three cyclones within 400km of Caroline Island in eastern Kiribati. • Storm surges and extreme sea levels occur occasionally.
Sea level	Sea level has risen (see figure 6): <ul style="list-style-type: none"> • Sea level measured by satellite altimeters has risen by 1–4mm per year (global average is 3.2 +/- 0.4mm per year). • Sea-level rise naturally fluctuates from year to year at levels of about 26cm. There are also decade to decade variations. These fluctuations over both timeframes are a result of phenomena such as ENSO.
Ocean acidification	Ocean acidification has been increasing: <ul style="list-style-type: none"> • Since the 18th century ocean has been slowly becoming more acidic. The aragonite saturation state has declined from about 4.5 in the late 18th century to an observed value of about 3.9 ± 0.1 by 2000. • 'Based [on] the large-scale distribution of coral reefs across the Pacific and the seawater chemistry, Guinotte et al. (2003) suggested that seawater aragonite saturation states above 4 were optimal for coral growth and for the development of healthy reef ecosystems, with values from 3.5 to 4 adequate for coral growth, and values between 3 and 3.5, marginal. Coral reef ecosystems were not found at seawater aragonite saturation states below 3 and these conditions were classified as extremely marginal for supporting coral growth' (KMS, BoM & CSIRO 2011, Vol. 2, p.100).

Source: KMS, BoM & CSIRO 2011

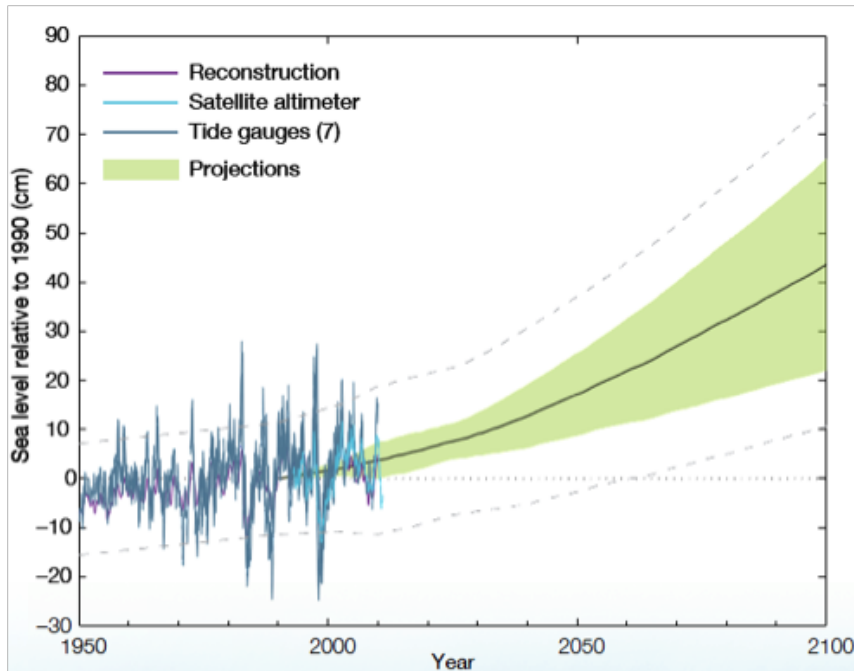


Figure 6: Observed and projected sea-level change in Kiribati relative to 1990 levels

The observed sea-level records are indicated in dark blue (relative tidegauge observations) and light blue (the satellite record since 1993). Reconstructed estimates of sea level near Kiribati (since 1950) are shown in purple. The projections for the A1B (medium) emissions scenario (representing 90% of the range of models) are shown by the shaded green region from 1990 to 2100. The dashed lines are an estimate of 90% of the range of natural year-to-year variability in sea level.'

Source: KMS, BoM & CSIRO 2011

Projections based on Global Models

The projections for the climate of Kiribati in future presented here are based on up to 18 global climate models for up to three emission scenarios – low, medium and high – and three 20-year periods – centred on 2030, 2055 and 2090, relative to 1990 (see Figure 6, Table 3, 4 & 5). There is no single projected climate future for Kiribati, but rather a range of possible futures. Projections represent an average change over either the whole of Kiribati or over smaller but still broad geographic regions such as the Line Group. However, projections are not for specific locations such as towns (KMS, BoM & CSIRO 2011, Vol. 2).

The projections listed in Table 3 are presented along with confidence levels based on expert judgement by scientists who conducted the analysis. The levels range from very high, high and moderate to low confidence.

**Table 3: Climate projections for Kiribati over the 21st century**

Climate Variable	Projected changes
Air temperature	<p>Surface air temperature will continue to increase (very high confidence). Under a high emission scenario (see also Table 4):</p> <ul style="list-style-type: none"> • Annual and seasonal mean temperature will increase by 0.3–1.3°C for the Gilbert Islands and by 0.4–1.2°C for the Phoenix and Line Islands by 2030 (high confidence). • Annual temperature increases could be greater than 3°C by 2090 (moderate confidence). <p>(As there is no consistency in projections of future ENSO activity, it is not possible to project interannual variability in temperature.)</p>
Sea-surface temperature	<p>Sea-surface temperature will continue to increase (very high confidence):</p> <ul style="list-style-type: none"> • Sea-surface temperatures will increase by 0.6–0.8°C by 2035 and by 1.2–2.7°C by 2100 (Bell et al. 2011). <p>(As there is no consistency in projections of future ENSO activity, it is not possible to project interannual variability in sea-surface temperature.)</p>
Rainfall	<p>Rainfall patterns will change:</p> <ul style="list-style-type: none"> • Wet season, dry season and annual average rainfall will increase (high confidence). • Annual and seasonal mean rainfall will increase (>5%) by 2030. The majority of models simulate a large increase (>15%) by 2090 (low confidence).
Extremes	<p>There will be more extreme rainfall and very hot days:</p> <ul style="list-style-type: none"> • The intensity and frequency of days of extreme heat and warm nights will increase and cooler weather will decline (very high confidence). • The intensity and frequency of days of extreme rainfall will increase (high confidence).
Drought	<p>The incidence of drought will decrease (moderate confidence):</p> <ul style="list-style-type: none"> • In the Gilbert, Phoenix and Line Islands mild drought will occur approximately seven to eight times every 20 years by 2030, decreasing to six to seven times by 2090 (low confidence). • The frequency of moderate drought is projected to decrease from two or three times every 20 years by 2030 to once or twice by 2090 (low confidence). • Severe drought will occur approximately once or twice every 20 years by 2030, decreasing to once every 20 years by 2055 and 2090 (low confidence).
Sea level	<p>Mean sea level is projected to continue to rise (very high confidence):</p> <ul style="list-style-type: none"> • Mean sea level will rise by approximately 5–15cm by 2030 and 20–60cm by 2090 under the higher emissions scenario (moderate confidence; see Table 5 and Figure 5). • Interannual variability of sea level will lead to periods of lower and higher regional sea levels with levels similar to the past. • The sea-level rise combined with natural year-to-year changes will increase the impact of storm surges and coastal flooding. <p>(Scientists warn that due to the melting of large ice sheets such as those in Antarctica and Greenland, rise could possibly be larger than predicted. But currently not enough is known to make predictions confidently.)</p>
Ocean acidification	<p>The acidification of the ocean will continue to increase (very high confidence):</p> <ul style="list-style-type: none"> • The annual maximum aragonite saturation state will reach values below 3.5 by about 2045 in the Gilbert Islands, by about 2030 in the Line Islands, and by about 2055 in the Phoenix Islands. The aragonite saturation will continue to decline thereafter (moderate confidence). • Ocean pH will decrease by –0.1 units by 2035 and by –0.2 to –0.3 units by 2100 (Bell et al. 2011). • Coral reefs are projected to degrade progressively with losses of live coral of > 25% by 2035 and > 50% by 2050 due to rising sea-surface temperatures and more acidic oceans (Bell et al. 2011).

Source: KMS, BoM & CSIRO 2011; Bell et al. 2011

Table 4: Climate change projections of parameters

Parameter (relative to 1990 baseline)	Year			
	2025	2050	2075	2100
Temperature (mean in °C)	28.5 – 29	29 – 30.3	29.7 – 32	30 – 33
Precipitation (mean in mm)	2,171 – 2,322	2,338 – 2,714	2,540 – 3,252	2,683 – 3,702
Sea-level rise (mean in cm)	15 – 18.5	26 – 40.5	38 – 70	50.6 – 107

Source: Warrick et al. 2013

Table 5: Climate change projections of variables with different emission scenarios

Climate variable and emission scenario	Time Frame		
	2030	2055	2090
Temperature (change relative to the average of period 1989–1999 Kiribati recorded data) in degrees Celsius (°C)			
Low emission	0.2 – 1.2	0.6 – 1.9	1.0 – 2.4
Medium	0.2 – 1.4	0.9 – 2.3	1.6 – 3.5
High	0.3 – 1.3	1.0 – 2.2	2.2 – 3.8
Sea-level rise (change relative to the average of period 1980–1999) in cm			
Low	4 – 13	9 – 25	16 – 45
Medium	5 – 14	10 – 29	19 – 57
High	5 – 14	10 – 28	20 – 58

Source: CSIRO 2013

2.2 Hazard profile for Kiribati

Traditionally disaster plans have focused on acute impact events, categorised as either ‘natural’ or ‘manmade’. However, chronic events that result from social, economic and environmental pressures have the potential to be as damaging to sustainable development and community vulnerability as acute impact events.

The National Disaster Risk Management Plan (NDRMP; GoK 2012b) identifies the following acute impact events threatening Kiribati that arise from ‘natural’ sources.

Inundation

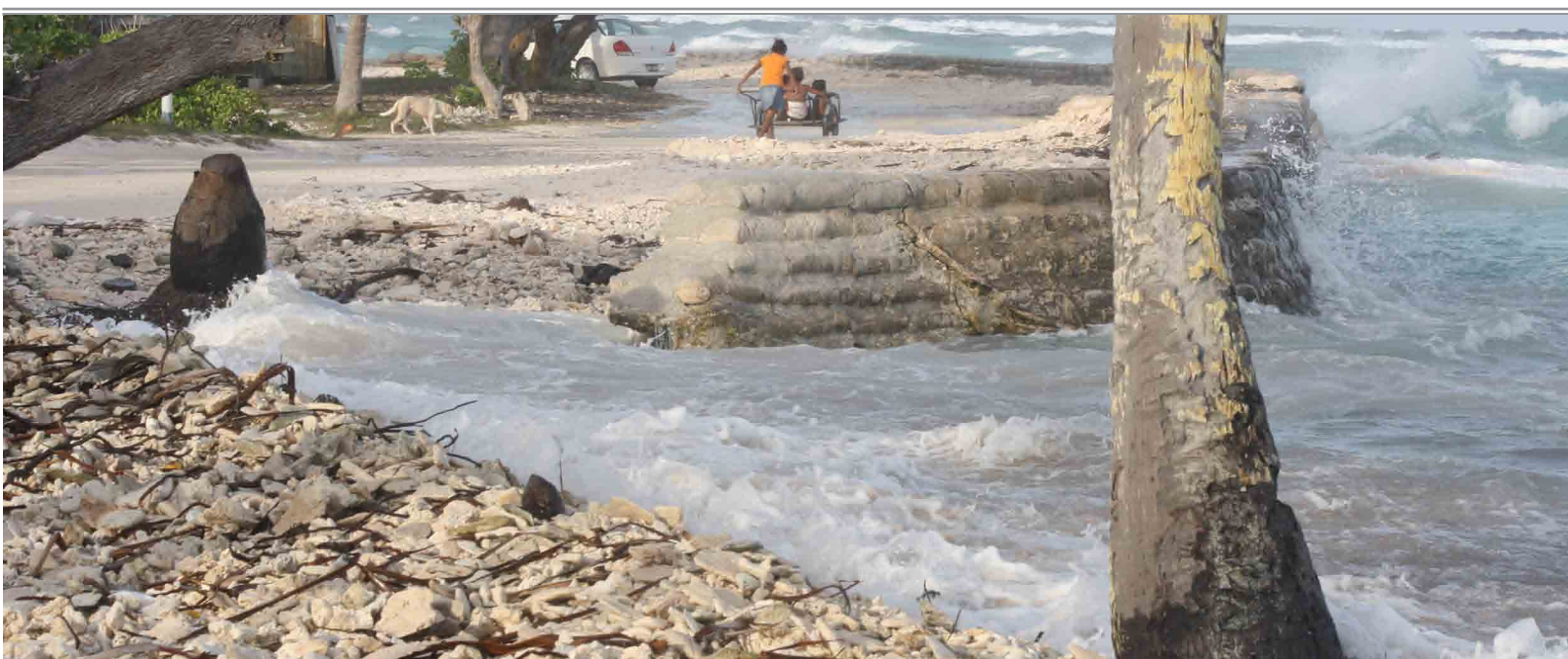
As a result of ENSO events, Tarawa already experiences significant natural fluctuations in sea level of about 0.5 metres. These fluctuations will affect the inundation potential of the atoll, particularly when combined with storm surges and the projected increase in sea level. The low-lying places along the atolls have already experienced this.

Inundation is also experienced in the atoll islands as the result of unexpected extreme high tides. The extreme high tides, when they coincide with the spring tide, result in a threshold of >2.8 metres, as in 2010 when wave overtopping damaged infrastructure and properties.

Storm surges have been experienced as well due to strong low-pressure systems that were nearing the Kiribati borders. A number of houses were washed away at Marakei in 2008, providing an example that needs to be considered even though the low pressure resulting in cyclones does not affect the country.

Tsunami

The following general background information provides an overview of potential sources of tsunami threat and the history of tsunami in Kiribati. It is not, however, a comprehensive picture of tsunami hazard and vulnerability for Kiribati. The dispersed nature of the islands and the features of the seabed within the archipelago mean that exposure to tsunami and possible tsunami impacts are likely to vary from island to island and between island groups.



Tsunami risk modelling and the limited historical records of tsunami events would suggest Kiribati has a lower tsunami risk relative to other Pacific Island countries and territories closer to subduction trenches, where earthquakes with the potential to generate tsunami can occur. Although the Kiribati population and Government have had no direct experience with tsunami impacts, they are aware of the susceptibility of low-lying atolls to rising sea levels associated with climate change and of the potential for tsunami impact.

Historical stories collected revealed that unusual historical sea behaviour may provide anecdotal evidence of tsunami. Felt earthquakes caused a cracked reef and large rocks deposited on two islands by a series of three 'magic waves' to southern islands (Tamana and Makin) and eastern islands (Kiritimati) facing tsunami risk.

Thomas, Burbidge and Cummins (2007) used scenarios for 8.5 Moment Magnitude (Mw) and 9.0 Mw earthquakes to investigate normalised offshore (to a notional depth of 50 metres) wave amplitudes for tsunami caused by earthquakes along subduction zones (see Figure 2 in Section 1.3.1). In this study, Kiribati's maximum amplitude for all tide gauges for all Mw 9 tsunami was 99cm, with the most significant source region being Peru (amplitude greater than 75cm at 50m depth or single most significant source region if no amplitude exceeds 75cm). For a Mw 8.5 tsunami the maximum amplitude reduced to 49cm but Peru still remained the most significant source region.

The southern end of the South Solomon trench poses a threat to the eastern end of the Gilbert Islands. Only events of very large magnitude pose a significant threat. The islands have not experienced a measurable tsunami from this source in the past 20 years. The central section of the New Hebrides trench and the northern half of the Tonga trench pose some limited threat to Kiribati. Although the tsunami energy is not anticipated to be directed specifically at the island groups, side lobe energy may result in detectable events. The last event that originated on the New Hebrides trench that was detected in Tarawa was in 1994. The Tarawa sea-level gauge has shown no records of tsunami impacting from the Tonga trench.

Since 1994 there have been three small events detected at the Tarawa sea-level gauge from the Kuril and Japan trench. These were 8.3 Mw events on 4 October 1994 and 15 November 2006 and a 9.0 Mw event on February 2012. Two events in 1994 and 2006 resulted in waves less than 10cm in height, while the 2012 event resulted in 20cm height recorded at the Tarawa tide gauge. Most recently, Kiribati has been placed under a 'tsunami warning' by the Pacific Tsunami Warning Centre.

Drought

During La Niña events, the South Pacific Convergence Zone, which is associated with enhanced cloudiness (high rainfall), is shifted southwest of its normal position (away from the southern islands in Kiribati). As a result cloudiness is reduced, particularly over Nauru and western Kiribati. La Niña has historically been related to less precipitation (rainfall), and sometimes to drought, in the Kiribati region. In contrast, some parts of the Pacific such as Australia experience high rainfall during La Niña episodes.

Past La Niña events have shown that the impacts of droughts can be very severe in Kiribati. For example, in 1971, 1985, 1998 and 1999 annual rainfall was less than 750 mm. The recent drought from April 2007 to



early 2009 severely affected the southern Kiribati islands and Banaba. During this period, groundwater turned brackish and the leaves of most plants turned yellow. Copra production, the main income source for people in the outer islands, declined. During the 1970–1971 drought, a complete loss of coconut palms was reported at Kenna village on Abemama in central Kiribati (KMS, BoM & CSIRO 2011).

Epidemics

Epidemics that have threatened the Kiribati population include severe acute respiratory syndrome (SARS) in 2002–2004 and H1N1 ('swine flu') in 2009. Both epidemics had a global impact, to which the Kiribati authorities responded by strengthening border control. Other epidemics have a stronger relationship with climate change such as water, food and vector-borne diseases and are expected to increase because of climate change.

Maritime disasters

Maritime disasters are frequent in Kiribati due to the vastness of the ocean separating the islands as well as the population's heavy dependence on marine resources for daily food needs.

With weather extremes becoming more severe due to climate change, Kiribati is at high risk of experiencing more intense storms and wave events, extreme rainfall, sea-level rise and increased temperatures and associated inundations and damage to buildings and infrastructure, plagues and epidemics, coastal erosion as well shortages of food and fresh water.

The impacts of all these hazards on Kiribati's economy, environment and livelihoods are analysed in Section 2.3 below.

2.3 Vulnerabilities and Impacts

The social, economic and environmental ramifications of the observed and projected climatic changes and hazards presented above are amplified when overlaid with the vulnerability of the i-Kiribati people and their environment. This is reflected in Kiribati's status as a least developed country under Annex 6 of the Cotonou Agreement and in its 11th out of 14 ranking on the Pacific Human Development Index.

Whilst the exposure of Kiribati and its people to climate and disaster risks is described in chapter 2.1, this chapter focuses on the sensitivity of Kiribati as a whole and in its relevant sectors. Furthermore, the present and predicted future impacts of climate change and disaster risks are described in this chapter.

The following factors are contributing to the nation's vulnerability to climate change and disaster risks, which apply across the various sectors:

- A high population and growth rate on South Tarawa in the Gilbert Group (50,182 inhabitants with a population density of 3,184 persons per square kilometer) as well as on Kiritimati in the Line Islands Group (5,586 inhabitants; GoK 2010 & KNSO & SPC 2012), which is due to: a high proportion of children and youth, high levels of fertility, low rates of contraceptive use, and disparities between the different islands of Kiribati (resulting in internal migration, displacement, and urbanisation) (GoK 2012c).
- In fast-growing urban areas, especially South Tarawa with a growth rate of 4.4% and to a certain extent also North Tarawa and Kiritimati, (KNSO & SPC 2012), the population pressure and lifestyle changes have strained the already limited freshwater resources. In many areas, the freshwater consumption rates are already exceeding the estimated sustainable yield of groundwater sources (such as in the Bonriki and Buota Water Reserves on South Tarawa).
- The increase in non-biodegradable waste usage in urban areas, as well as poor waste and sanitation management, result in limited access to unpolluted land and sea, degradation of land and ocean based ecosystems, and numerous isolated occurrences of diarrhoeal and vector borne diseases.
- Traditional food systems are declining in favour of imported food, and the number of people who preserve and apply traditional knowledge is decreasing.
- In rural outer islands, the people have limited access to employment opportunities, effective transport, communication, and community services such as education and health. These factors, combined with a high dependency on subsistence agriculture and coastal fisheries, make rural communities more vulnerable.
- Government revenue is declining and highly dependent on fisheries revenue (40–50%) with limited capacity to maximise the benefits of these resources (GoK 2012c).



- Government programs, decision-making processes and budgets are centralised, with decision bottlenecks at all levels from national to local. The public finance management, reporting and monitoring system has been reviewed and changes are being implemented to meet development partner requirements for budget and sector-wide support. The development of an Island Council Strategic Plan will enhance the planning, budgeting and monitoring functions at the local government level.
- There are institutional challenges such as a high staff turnover rates in senior executive positions, limited sector specific training, and a lack of clarity on internal roles and responsibilities. Furthermore, there are constraints on knowledge sharing, coordination and collaboration among ministries as well as with non-governmental organisations (NGOs), the private sector, faith-based organisations and development partners. Yet, with the creation of the MWYSA there are increased opportunities for the community, especially women and youth, to participate in broader governance (GoK 2012c).
- There are knowledge, skill level and capacity gaps with regards to climate change adaptation and disaster risks throughout Kiribati society, particularly in the outer islands and among marginalised populations. A key challenge is to translate the climate science and predicted impacts into messages that the i-Kiribati population can relate to. In some instances there are cultural and religious barriers to awareness and action, such as cultural practices of guarding traditional knowledge and religious beliefs.
- Many laws do not take into account sustainable management concerns, climate change predictions and disaster risks. Laws relevant to these topics need to be reviewed in order to mainstream such issues.
- The safety and emergency response capacities of Kiribati are limited. However, with the implementation of the NDRMP, issues such as a lack of a dedicated marine rescue service, the inaccessibility of fire trucks to densely populated areas on South Tarawa, and the lack of evacuation plans for emergencies, will be addressed.
- The low-lying atoll islands are already experiencing severe coastal erosion and inundation due to natural and human causes, leading to a loss of land, public and private buildings, and infrastructure. The Environmental Impact Assessment under the Environment Act may need to be enforced on major projects throughout all of Kiribati's islands. This would help to curb the removal of mangroves and mining of sand and aggregates that contribute to erosion.

In the long-term, the most serious concern is that sea-level rise will threaten the very existence of Kiribati as a nation. But in the short to medium term, a number of other projected impacts are of immediate concern. Of particular note is the question as to whether the water supply and food production systems can continue to meet the needs of the rapidly increasing population of Kiribati (GoK 2013).

Past La Niña events have shown that the impacts of droughts can be very severe in Kiribati. For example, in 1971, 1985, 1998 and 1999, annual rainfall was less than 750mm. The recent drought from April 2007 to early 2009 severely affected the southern Kiribati islands and Banaba. During this period, copra production significantly declined, depressing the outer island economies which rely on copra as a main income source. The groundwater also turned brackish and the leaves of most plants turned yellow. During the 1970–1971 drought, a complete loss of coconut palms was reported at Kenna village on Abemama in central Kiribati (KMS, BoM & CSIRO 2011).

The effects of climate change and disasters are felt first and most acutely by vulnerable and marginalised populations, including women, children, youth, people with disabilities, minorities, the elderly and the urban poor (GoK 2012c, Burton, D. et al. 2011). Violence against women and children is a widespread issue within Kiribati society, which can be exacerbated in times of disaster when normal social protection may be missing. In addition, the population is facing stress due to the uncertainty over their livelihood, culture and homeland (GoK 2012c).

Climate variability, climate change and disaster risks, in combination with the factors that make Kiribati particularly vulnerable to them, are affecting the environment and all socio-economic sectors, including agriculture, education, fisheries, freshwater, health, infrastructure, trade and commerce. For an overview of sector-specific sensitivities and existing and potential future impacts in relation to climate change and disaster risks, see Tables 6 to 13 below.

Table 6: Sensitivity and impacts - environment

Sensitivity	Observed and potential impacts
<ul style="list-style-type: none"> • Low-lying atolls with limited land-based natural resources and biodiversity. High dependency on and demand for coastal and marine resources. • Narrow and low-lying land, climate variability influencing ocean characteristics and components, thin underground freshwater lens. • Negative impact of poorly designed infrastructure on the environment due to lack of capacity, understanding natural processes and resources; e.g seawalls causing erosion or causeways harming marine habitats. • Mining of beach sands and aggregates. • Pests and invasive species. • Low level of communication, education and public awareness and lack of priority given to conservation and management of biodiversity including habitats at all levels. • Low level of budget allocation and integration of climate change, disaster risk management, gender, environmental conservation and biodiversity management considerations in development strategies. • Limited capacity for integrated assessments of risks, including gaps in enforcement of environmental impact assessments, cost–benefit analyses and feasibility studies. 	<ul style="list-style-type: none"> • Increasing coastal inundation, erosion and loss of land. • Increasing loss of island biodiversity on land and at sea and degradation of important habitats (such as mangroves, coral reefs). • Increasing environmental degradation and vulnerability of marine and terrestrial ecosystems and habitats to the additional stressors caused by climate change and hazards. • Increasing outbreaks of invasive species, pests and diseases. • Increasing water-, food- and vector-borne diseases. • Potentially high environmental costs of development or private sector projects that have yet to fully consider environmental and possible disaster and climate change impacts. • Salinisation of groundwater lens and decline in size of groundwater lens.

Sources: GoK 2012c; MELAD ECD 2006, MELAD 2007; Elrick and Kay 2009; KJIP Consultations 2013



Table 7: Sensitivity and impacts - economic development, trade and commerce

Sensitivity	Observed and potential impacts
<ul style="list-style-type: none"> • Limited employment opportunities in country and overseas, especially for youth. • Lack of access to capital and land for private sector development. • Private sector environment is not conducive to investment due to excessive licensing and tariffs in current government service regulations and outdated laws. • Increasing trade deficit. • Increasing household hardship and rates of poverty. • Potential of oceanic tuna fisheries not fully capitalised for private sector development. • No insurance coverage available for certain natural hazards i.e. erosion, loss of land, inundation and flooding (Kiribati Insurance Company). Also gaps in obtaining existing insurances (such as fire). • Low levels of financial literacy and gaps in training on business development. • State owned enterprises (which get government subsidies) benefit from unfair competition with private sector. • Cultural barriers to conducting business: property and wealth traditionally belong to the community whereas private sector business development is building on individualistic profit principles. • Low quality and insufficient numbers of local private vessels that provide outer islands with basic food and other commodities. • Private businesses sell low-quality imported food and equipment with short life cycles. • Negative messages on the impacts of climate change (e.g. 'Kiribati is sinking') affecting investment. 	<ul style="list-style-type: none"> • Decline in remittances and GDP, thus reducing capacity to reduce vulnerability and increasing hardship and poverty. • The outbreaks of fire are threatening businesses in urban areas, especially as fire trucks cannot access densely populated areas. • Economic losses due to damage caused by fire, erosion, loss of land and flooding. Small retailers might also have to close down. • Decreasing investment from overseas. • Economic losses for small- and medium-scale businesses (e.g. in artisanal fisheries, agriculture, handicrafts and food processing) due to decreased productivity of agriculture and coastal fisheries, which in turn increases hardship and poverty. • Bad weather conditions (such as heavy storms) cause delays of freight ships to Tarawa and smaller trade vessels to outer islands, leading to shortages in basic food commodities (sugar, rice, flour) and economic losses. • Coral bleaching will make Kiribati less attractive to tourists and foreign investment in the tourism sector.

Sources: GoK 2012c; MFMRD 2013; Elrick and Kay 2009; KJIP Consultations 2013



Table 8: Sensitivity and impacts - infrastructure

Sensitivity	Observed and potential impacts
<ul style="list-style-type: none"> • Costs of construction are high, with most materials, tools and equipment needing to be imported and transported long distances. • Lack of financial resources needed to maintain key infrastructure such as causeways, seawalls, buildings, government houses, health clinics and schools. • The salty, humid and hot environment leads to rapid deterioration of equipment, while lack of funds means that much plant and machinery is being used beyond its planned economic life. • Infrastructure such as causeways, seawalls, buildings, government houses, health clinics and schools are sometimes build very close to the sea (both South Tarawa and outer islands). • Causeways and other coastal infrastructure often do not take into account their potential negative impact on marine ecosystems and coastal fish productivity. • Lack of access to environmentally safe aggregates and increasing practice of beach mining carried on by individuals, households, communities and building contractors. • Conflicts around land ownership and demarcation. 	<ul style="list-style-type: none"> • Increasing loss of usable land and existing investments. • Increasing destabilisation of beaches contribute to erosion (especially in South Tarawa, but potentially also other islands except Banaba). • Increasing risk of damage and/or loss of major transport facilities (airport, ports). • Increasing costs and challenges for maintenance. • Increasing risk of damage to government property with negative impacts on basic services (hospital and health service, school and education, government housing). • Increasing damage and interruption to roads, causeways and bridges, which might lead to isolation of communities, increased risk of accidents and increased costs for maintenance and repair of cars and road transport. • Increasing risk of damage to civil society and cultural facilities (private schools, NGOs, churches, maneaba). • Increasing damage to services water mains, sewerage and electricity. • Increasing conflicts among private landowners if private buildings have to be relocated. • Increasing conflicts between private landowners and Government about land demarcation if public infrastructure and buildings such as schools have to be relocated.

Sources: GoK 2013; GoK 2012c; Elrick and Kay 2009, KJIP Consultation 2013



Table 9: Sensitivity and impacts - fresh water and sanitation

Sensitivity	Observed and potential impacts
<ul style="list-style-type: none"> • Availability of drinking water is inadequate. • In urbanised areas with high population growth, demand for fresh water is growing. • Lack of information on or systematic monitoring of the microbiological quality of water supplies, especially on rural outer islands. • Industrial contamination, particularly leaking hydrocarbons from diesel power generators. • Despite regulations, encroachment is a continuing threat to water reserves especially in South Tarawa, Banaba and Tabakea. • Lack of involvement of local landowners in management of water reserves. • Lack of regulations for protecting water sources in rural areas or outer islands. • Traditional practices of defecating on the beach cause algal bloom and ultimately can lead to health problems. • Risk of plume of sewage from the Betio outfall to enter into the lagoon, and some households on South Tarawa are not connected to the sewerage system. • Cultural sentiments against composting toilets. 	<ul style="list-style-type: none"> • Continued and increasing contamination of groundwater. • Increasing water-borne illnesses and high infant mortality rates • Increasing socio-economic costs of water-borne illnesses (loss of family members, work absences and general lack of wellbeing). • Continuous and increasing tensions and conflicts between affected communities and the Government because of declaration of water reserves over privately owned land, leading to costly ongoing disputes and vandalism of water infrastructure and groundwater monitoring boreholes. • Increasing risks of contaminating the Tarawa lagoon with sewage, with impacts on health of people and the marine habitat. • Frequent, long and severe droughts occurred regularly in the past (e.g. in South Tarawa, Banaba) causing severe shortages of fresh water and dramatic increases in salinity in domestic wells, death of some trees and dieback in others, and increasing demand for potable, reticulated water. Some islands were temporarily abandoned. It is still unclear, though, if and how the frequency and intensity of La Niña events will change. • Increasing risks that the sea will overtop parts of or even whole islands, causing salinisation of some fresh groundwater.

Sources: GoK 2008a; GoK 2008b; SOPAC et al. 2007; White et al. 1999; 2010, et al. 2012, Falkland 2011; KJIP Consultation 2013



Table 10: Sensitivity impacts - fisheries and food security

Sensitivity	Observed and potential impacts
<ul style="list-style-type: none"> • High dependence on coastal fisheries for subsistence (main protein source). • Diminishing stocks of reef fish, especially for lagoon and coastal fisheries in South Tarawa, due to population pressure and associated socio-economic and environmental problems. • A lack of understanding of actual fisheries stock which will make it more difficult to set distant fishing fees for the future. • Bycatch of commercial oceanic tuna fisheries remains unused for food or for generating income. • Coastal fisheries are largely unregulated, with existing management arrangements focusing on licensing revenue only and island councils tending to only discuss fisheries in the context of infrastructure concerns (e.g. lights, wharves). • Design and building of causeways and other coastal infrastructure often do not take into account their potential negative impact on marine ecosystems and coastal fish productivity. • While women dominate marketing and sales of fish and are engaged in shore-based harvesting and gleaning for marine resources, they are not granted the same status or public recognition as fishermen. • Transshipment activities in Tarawa have exacerbated alcohol abuse and increased the incidence of prostitution involving young women and teenagers. • Periodic outbreaks of ciguatera, shellfish contamination and algal blooms. • Gaps in monitoring of ciguatera outbreaks, other outbreaks and coral reef bleaching and collaborative actions with the Ministry of Health and Medical Services (MHMS). 	<ul style="list-style-type: none"> • The productivity for coral reef fish and invertebrates is projected to decline by 20% by 2050 due to both the direct effects (e.g. increased sea-surface temperature) and indirect effects (changes to fish habitats) of climate change. Population growth is further reducing the potential supply of reef fish per person. • Higher water temperatures and rainfall and/or increased ocean acidification are expected to progressively reduce the efficiency of culturing seaweed, giant clams, pearl oysters and sea cucumbers. • Possibly increasing incidence of ciguatera fish poisoning, shellfish contamination and algal blooms. • Changes to the distribution and abundance of tuna: Concentrations of skipjack tuna will likely be located further to the east than in the past (potentially beneficial). • Kiribati tuna-based revenue improves during El Niño years but drops during La Niña years. • Sea-level rise will progressively convert the large areas of intertidal lagoon habitat in Kiribati to subtidal areas, with uncertain effects on the shellfish population. • Mixed trends in aquaculture: Milkfish farming in earthen ponds is expected to be favoured by higher air temperatures and increased rainfall but the effects of sea-level rise are yet to be determined. • Potentially increasing damage to infrastructure: More powerful storms, inundations and potential tsunami can damage wharfs and essential infrastructure. This may also increase financial risks for coastal aquaculture due to more frequent damage to equipment. • Potential increase in social problems such as conflict between subsistence fisheries and commercial fishers over declining fish stocks and the risk of more prostitution and higher HIV rates with increased transshipment. • Loss of traditional fishing skills and knowledge if marine habitats change and also due to a change in lifestyle. • Potential discouragement of future national and overseas investors.

Sources: MFMRD 2013; Bell et al. 2011; KJIP Consultations 2013

Table 11: Sensitivity and impacts - agriculture and food security

Sensitivity	Observed and potential impacts
<ul style="list-style-type: none"> • Harsh agricultural conditions due to small and remote atoll islands with poor soil conditions, high salinity and limited groundwater supply. • Limited crop and genetic diversity. • Crop farming mostly for subsistence (trade and export limited to coconut products: oil and copra). • High dependency on imported basic food commodities and public outcries when shortages occur (especially rice, sugar and flour). • Low quality of imported food due to a lack of national food standards. • Imported equipment and tools are of poor quality and expensive. Lack of vocational and academic training in agriculture. • Loss of traditional agroforestry systems. • Limited choices of livestock species for production, poor housing conditions and high imports of livestock products. • Animal waste is polluting coastal land, contaminating underground water and transmitting diseases and parasites to humans. • Run-down livestock and agriculture facilities and challenges in the distribution system at the Agriculture and Livestock Division (Tanna). • Urban migration. 	<ul style="list-style-type: none"> • Increasing risks that the sea will overtop parts of or even whole islands, causing salinisation of some fresh groundwater, destruction of infrastructure and the death of crops and livestock. • Decline in production of food crops (already observed) due to increase in salinity, extreme weather events, spread of pests and diseases. • Reduced livestock productivity due to heat stress, increased disease susceptibility, lack of fresh water, water-borne diseases, decrease in production of feed, potential damage to livestock infrastructure, inundation. • Diseases will interact with climate hazards to manifest in different ways. Some current disease problems will be exacerbated due to stress and nutrition-related immune challenges. Shifts in vector populations will change disease prevalence in different areas. • Loss of traditional agriculture skills and knowledge. • Poor nutrition and malnutrition. • Increase in noncommunicable diseases due to change of diet.

Sources: MELAD-ALD 2012; MELAD-ALD & SPC & GIZ 2013; MELAD-ECD 2007; KJIP Consultations 2013



Table 12: Sensitivity and impacts - health

Sensitivity	Observed and potential impacts
<ul style="list-style-type: none"> Existing high levels of diarrhoeal diseases, infant mortality and malnutrition among children and the elderly. Inefficient distribution of fresh water. Unprotected sources of drinking water (especially wells). A large proportion of households use the beach, bush, lagoon and sea for toileting. Difficulties in avoiding bacterial and chemical contamination of water reservoirs: coliform counts frequently exceed World Health Organization (WHO) guidelines, in both reticulated water supplies and wells. Difficulties in maintaining high standards of food hygiene. Presence of breeding sites for mosquito vector (<i>Aedes aegypti</i>), including abandoned vehicles and solid waste in proximity to settlements (e.g. South Tarawa). Changes in lifestyle, including poorer nutrition and less physical exercise, leading to a higher level of non-communicable diseases. Low immune status of the population and gaps in effective health care; access to health services especially limited in outer islands. Lack of specialised knowledge to conduct health assessments and treat health problems; e.g. health staff lack capacity to differentiate between food poisoning and ciguatera. The health information system is still struggling to provide sufficient, accurate and timely information for decision-making in planning, strategy and policy development. This is also true for disease surveillance and response systems, which are currently not meeting international agreed standards. Gaps in data storage and monitoring and collaborative actions with Ministry of Fisheries and Marine Resources Development (MFMRD), Ministry of Environment, Lands and Agriculture Development (MELAD) and Ministry of Public Works and Utilities (MPWU). 	<ul style="list-style-type: none"> Diminishing water safety and increase in water-borne diseases: Increasing risk of diarrhoeal diseases due to runoff following heavy rains and contamination of drinking water sources. Densely populated areas are at high risk. Diminishing food safety and increase in food-borne diseases: As temperatures rise, the risk of enteric infections transmitted by food increases (especially illnesses caused by salmonella, campylobacter and a wide range of enteroviruses). The risk is especially high in crowded conditions. High population density increasing risk of rapid transmission of infectious diseases. Increase in vector-borne diseases, especially dengue fever. During warmer and wetter conditions, outbreaks increase (already observed during El Niño events and wet season). Higher dependence on food imports with low nutrition value leads to increasing noncommunicable diseases. Increasing cost of health care.

Sources: GoK, MHMS & WHO 2011; Hales et al. 1999; KJIP Consultations 2013



Table 13: Sensitivity and impacts - education and human resources

Sensitivity	Observed and potential impacts
<ul style="list-style-type: none"> • In primary education, the net enrolment ratio has fallen from 92% to 84% for boys and from 93% to 87% for the girls between 2008 and 2010. • More than a quarter of students do not make the transition to upper secondary levels. • Gaps in professional standards of teachers. • The Ministry of Education (MOE), Marine Training Centre (MTC), Kiribati Institute of Technology (KIT), Fisheries Training Centre (FTC), Kiribati Teachers College (KTC), schools, teachers and lecturers have insufficient capacities and resources to teach the students on matters relating to climate change (specifically on impacts and adaptation) and disaster risk management. • Lack of training for police on preparedness and response to disasters, including operation of machinery such as fire trucks. • Lack of effective early warning systems. • Lack of disability-friendly resources on climate change and natural hazards and a lack of capacity to cope with and reduce risks among people with disabilities. 	<ul style="list-style-type: none"> • General uncertainty and feelings of helplessness among the population about their country's future. • Schools, students, teachers and trainers are affected by climate change and hazards in relation to their safety, food security, access to drinking water, ability to commute and health. • School infrastructure might have to be relocated due to coastal erosion and retro-fitted to withstand harsher conditions such as drought, heavy rain or heavy storms. • Increasing maintenance costs for school infrastructure (also due to salt spray and rising temperatures). • Lower rates of enrolment and secondary education limit opportunities for human resource development and employment (including overseas). • Potential loss of life and damage due to lack of early warning systems and limited capacity to cope, especially for vulnerable groups (such as children, people with disabilities and women).

Sources: GoK 2012c; MoE 2012; KJIP Consultations 2013





2.4 The current status of mainstreaming climate change and disaster risk management in sectoral policies and strategies

Climate change and disaster risks are being addressed in policies and strategies relating to population, water and sanitation, health and environment. Similarly disaster risk management is progressively being incorporated into policies and strategies relating to fisheries, agriculture, labour, youth and education. The new Kiribati Integrated Environment Policy encourages all government programs to collect, manage and use environmental data to safeguard the environment and strengthen resilience to climate change and disasters.

The National Energy Policy incorporates measures to mitigate carbon emissions by promoting renewable energies and energy efficiency.

Only a few sectors have transferred strategic actions to address climate and disaster risks into their annual Sector Operational Plans and Ministerial Plans of Operations and budgeting.

Policies and strategies relating to human resource development, minerals and foreshore development, private sector development, investment, transport, communications, tourism and minerals do not explicitly consider climate change and disaster risks.

Most laws need to be reviewed as, with the exception of the Disaster Management Act 1995, they do not regulate responses to climate change and disaster risks and impacts.



3 Development of the Kiribati Joint Implementation Plan on Climate Change and Disaster Risk Management

3.1 Rationale and guiding principles for the KJIP

The Government of the Republic of Kiribati, following consultation with regional technical advisory organisations, initiated the process to develop a joint national action plan on climate change and disaster risk management in 2012. This document is designed to complement the NDRMP (GoK 2012b) and the National Framework for Climate Change and Climate Change Adaptation (NFCCCCA; GoK 2013). By identifying tangible, on-the-ground actions for resilience, along with actions the Government can take to facilitate these, the plan will guide the implementation of these policies in an integrated approach.

The main rationale for this approach is that a systematic and integrated plan, identifying tangible actions, will maximise the efficiency and effectiveness of existing capacities and resources as well as ensuring new initiatives are well targeted and have the maximum impact. In addition, the development of this plan was seen as a key vehicle for integrating climate change and disaster risks into all sectors, and promoting a whole-of-country approach that involves the cooperation of the Government, civil society and private sectors.

In recognition of the strong need to implement existing policies and to take more and stronger tangible actions to increase resilience, the Government of the Republic of Kiribati decided to call this action plan the Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management (KJIP) and agreed on the following principles:

- The KJIP is to reflect the recently endorsed NFCCCCA and NDRMP and relevant sector policies and strategies of line ministries, and identify actions for implementing them.
- The KJIP has to align to rules and procedures that the Government of the Republic of Kiribati must follow.
- Long-term consequences of climate change must be considered.
- Because climate change and disasters have negative impacts on welfare of I-Kiribati, the process needs to be consultative and inclusive of all people, including the most vulnerable and the outer island population.
- The KJIP is to be based on priorities identified during the development phase, reflect country priorities and build on ongoing initiatives.
- To build resilience the KJIP needs to be implemented in the next 10 years or so.
- Priorities may change over time; hence regular reviews through a sound monitoring and evaluation framework are important.
- Adaptation to climate change is a long-term and ongoing task for Kiribati; hence, after the current KJIP has been implemented and a final evaluation has been conducted, a follow-up plan should be developed.
- The KJIP is to enhance and strengthen the sense of ownership by the Government, private sector, faith-based organisations, NGOs and communities.

It is expected that, as part of the process of developing and implementing the KJIP:

- required funds and resources for climate change and disaster risk management priority actions will be identified and planned, and required budgets allocated;
- access to financial resources and technical assistance will be increased;
- local capacities will be built and technologies transferred to plan, write and cost proposals and monitor implementation;
- roles and responsibilities of all stakeholders will be clarified, collaboration and coordination enhanced and the competition for resources reduced; and
- national, sectoral and community priority actions to cope with climate change and reduce disaster risks are communicated inside and outside of the country.

3.2 KJIP in the context of national development priorities

The Kiribati Development Plan (KDP) 2012–2015 is the overarching national development plan detailing national priorities (GoK 2012c). The KDP is linked to the Millennium Development Goals, the Pacific Plan and the Mauritius Strategy for Small Island Developing States (BPoA+10).

The KDP has six broad key policy areas (KPAs). Climate change is incorporated into KPA 4 on environment, providing the link to the KJIP. The key objective of KPA 4 is to facilitate sustainable development by mitigating the effects of climate change through approaches that protect biodiversity and support the reduction of environmental degradation by the year 2015.

The NFCCCCA highlights that climate change has more far-reaching implications than for the environment alone and that it has the potential to impact on all six KPAs of the current KDP (GoK 2013).

Legal functions and responsibility for climate change adaptation, disaster risk reduction and disaster responses and management continue to be vested in various agencies, as determined by national legislation. However, some laws need to be adjusted to enable agencies to respond effectively to impacts of climate change and disasters.

The KJIP contributes to the realisation of the KDP outcomes and provides the implementation plan for the NFCCCCA (2013) and the NDRMP (2012). Figure 7 below shows how it links to these and other national frameworks.

The KJIP is leading in advocating and operationalising an integrated approach to including climate change and disaster risks in national and community development planning, implementation, monitoring and evaluations.

The Government of the Republic of Kiribati sees the KJIP as a means to prioritise actions on climate change and related disaster risks that are highlighted in national communications (see also chapter 3.3) and sector policies and action strategies impacted by climate change and disaster risks.

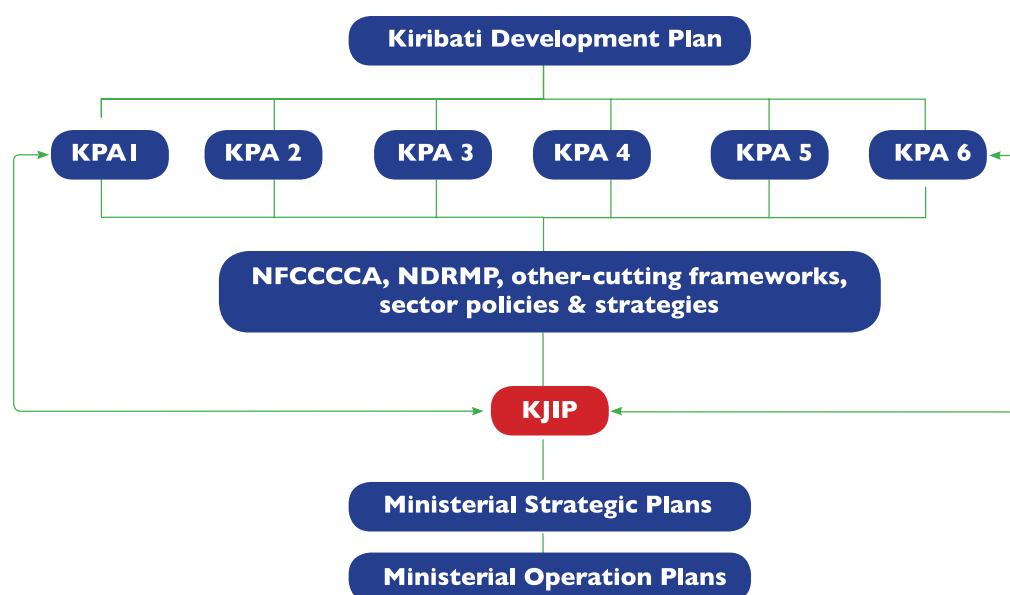


Figure 7 Linkages of the KJIP to national frameworks

3.3 KJIP linkages to relevant regional and international frameworks

This KJIP is part of the commitments Kiribati made under the Pacific Islands Framework for Action on Climate Change (PIFACC), the Regional Framework for Action on Disaster Risk Management endorsed by the Pacific Leaders in 2005 and the Pacific Islands Meteorological Strategy (PIMS) approved in 2012. The KJIP is consistent with these three inter-related regional frameworks, specifically in terms of the national priorities for actions.

The KJIP is also timely as the region moves towards an integrated regional framework, the Strategy for Climate and Disaster Resilient Development in the Pacific (SRDP), by 2016.

As party to the United Nations Framework Convention on Climate Change (UNFCCC; ratified in 1992), the Government sees the KJIP as its National Action Plan on climate change. Similarly, the KJIP is contributing to the implementation of the Hyogo Framework for Action (2005–2015) under the United Nations International Strategy on Disaster Risk Management (UNISDR) and the Climate Services priorities of the World Meteorological Organisation (WMO).

3.4 KJIP development methodology

The Office of the Beretitenti (OB) led the development of the KJIP. For this task, it established a Kiribati National Expert Group on Climate Change and Disaster Risk Management (KNEG), encompassing experts from core and line ministries, NGOs, the Kiribati Chamber of Commerce and Industries and other non-state actors.

A Regional Support Team (RST), led by the Secretariat of the Pacific Regional Environment Program (SPREP), supported the KNEG and the development of the KJIP. Other members of the RST were representatives of the Secretariat of the Pacific Community (SPC) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) (through the SPC/GIZ Coping with Climate Change in the Pacific Island Region program), United Nations Development Program (UNDP – Suva Office), United Nations Children's Fund (UNICEF) and Department of Climate Change and Energy Efficiency (Government of Australia).



Table 14 below provides an overview of the steps involved in developing the KJIP from October 2012 to June 2014, along with the steps required following its development into the future.

Table 14: KJIP development methodology

Steps	KJIP development tasks	Lead responsibility	Timeframe
1	Planning for engagement <ul style="list-style-type: none"> Country request Regional partnership planning 	<ul style="list-style-type: none"> OB RST 	October to December 2012
2	Consultation – Part I Introductory and advocacy Situation analysis <ul style="list-style-type: none"> Information collection Identification of key problems (hazards context, risk and vulnerability context, institutional arrangements and policies, stakeholders analysis, existing programs/ projects, donor analysis etc). 	<ul style="list-style-type: none"> KNEG RST 	January to February 2013
3	KJIP strategic action development process <ul style="list-style-type: none"> Problem validation process Problem prioritisation process Problem–solution tree analysis Strategy (theme) development Action matrix development 	KNEG supported by RST	April to August 2013
4	Costing of KJIP and development of the strategic plan <ul style="list-style-type: none"> Institutional arrangements Results-based monitoring framework Funding strategy Communication strategy Project concepts Narrative 	KNEG supported by RST	April to September 2013
5	National approval process for the KJIP, including consultation on Kiritimati island	KNEG	August 2013 to June 2014
6	Country and development partner discussions	KNEG supported by RST	Third quarter of 2014
7	KJIP implementation, monitoring and evaluation	All Ministries, KNEG, KJIP Secreteriat	August 2014 to 2023

3.5 Costing methodology

The estimated cost of the KJIP includes both the financial cost of actions and the in-kind contributions made by the Government of the Republic of Kiribati and partners (such as bilateral and multilateral development partners and the Council of Regional Organisations in the Pacific – CROP) to execute actions. The estimated costs include ongoing and future investments. The indicative cost was developed using various assumptions that were based on information from local suppliers as well as from government departments.

The following were the assumptions used:

- Costs of travel to the outer islands are for air travel only, except where agencies have their own boat in which cases the cost of fuel and rations are included.
- Lump sum estimates are being made on implementation of recommendations of reviews, studies or assessments.
- The cost of technical assistance differs between an overseas and a locally engaged consultants based on (i) experience and qualifications and (ii) travel costs and per diem. The use of only local rates to estimate the cost of consultants can therefore under-cost an activity if an appropriate local consultant is not available.
- Advertisement costs are being estimated on the 30-minute slots made by the Publication and Broadcasting Authority. In most instances, single messages may be provided at cheaper rates.
- The costings are estimates and the actual cost may be determined during the development of proposals when a relevant donor is being identified and interested in supporting that particular action.
- A number of actions were proposed to recruit short-term project position. If the agency wished the position to be ongoing, it had to seek the necessary support from the Government.

4 The Kiribati Joint Implementation Plan for Climate Change and Disaster Risk Management

4.1 Vision & goal

The vision of the 9-year KJIP (2014 – 2023) is:

I-Kiribati unique culture, heritage and identity are upheld and safeguarded through enhanced resilience and sustainable development.

The goal of the KJIP is:

To increase resilience through sustainable climate change adaptation and disaster risk reduction using a whole of country approach

4.2 Strategies and key actions

To reduce vulnerabilities and respond to observed and likely impacts of climate change and disaster risks, the KJIP identifies 12 major strategies, as shown in Figure 8.

- 1 Strengthening good governance, policies, strategies and legislation
- 2 Improving knowledge and information generation, management and sharing
- 3 Strengthening and greening the private sector, including small-scale business
- 4 Increasing water and food security with integrated and sector-specific approaches and promoting healthy and resilient ecosystems
- 5 Strengthening health-service delivery to address climate change impacts
- 6 Promoting sound and reliable infrastructure development and land management
- 7 Delivering appropriate education, training and awareness programmes
- 8 Increasing effectiveness and efficiency of early warnings and disaster and emergency management
- 9 Promoting the use of sustainable renewable sources of energy and energy efficiency
- 10 Strengthening capacity to access finance, monitor expenditures and maintain strong partnerships
- 11 Maintaining the sovereignty and unique identity of Kiribati
- 12 Enhancing the participation and resilience of vulnerable groups

Figure 8: The 12 KJIP strategies



Each strategy has one or more key actions, sub-actions, outcomes and performance indicators (outcome- and output-based) to address climate change and disaster risks in response to the identified vulnerabilities and impacts. Table 15 summarises the results of each strategy. For the detailed strategic plan with key actions, sub-actions, results and performance indicators, lead and support agencies and partners associated with each strategy, see Annex 1.

All strategies and actions in the KJIP are inclusive of vulnerable groups, considering gender, youth and children, the elderly and people with disabilities.



Table 15: Overview of KJIP strategies and anticipated results

Strategy 1: Strengthening good governance, strategies and legislation
Results
1.1 All policies, strategies, Sector Operational Plans, Ministry Annual Workplans, Ministerial Plans of Operations, project proposals and monitoring and evaluation systems enable the proactive and inclusive reduction of climate change and disaster risks.
1.2 Appropriate national and sector legislation is providing an enabling environment to enforce climate and disaster risk reduction.
1.3 Climate change and disaster risk management initiatives are coordinated by government departments, island councils, NGOs, faith-based organisations and the private sector in a collaborative manner across sectors.
Strategy 2: Improving knowledge and information generation, management and sharing
Results
2.1 An integrated and up-to-date national database providing all relevant information for resilient development is available and accessible for all.
2.2 Capacities to communicate science and best practices are strengthened by developing and disseminating effective and relevant information, communication and awareness products for decision-making and awareness raising across sectors and at all levels (see also Strategy 7).
2.3 Capacities for data collection, assessment, analysis, interpretation, monitoring and reporting are strengthened across sectors.
Strategy 3: Strengthening and greening the private sector, including small-scale business
Results
3.1 The number of small-scale businesses that process local produce for domestic and export markets (fish produce, agricultural produce, livestock, handcraft) increases.
3.2 The private sector implements greening initiatives (in areas such as tourism, trade, transport, import/export).
3.3 The private sector incorporates climate change and disaster risks into its strategic and business plans (and assesses feasibility of insurance).
Strategy 4: Increasing water and food security with integrated and sector-specific approaches and promoting healthy and resilient ecosystems
Results
4.1 Communities with island councils manage and implement climate change adaptation and disaster risk reduction measures as an integral part of their development efforts and inclusive of vulnerable groups.
4.2 Salt-, drought-, rain- and heat-stress resilient crops, fruit, vegetables and livestock breeds are identified and promoted and communities preserve local food (fruit trees and seafood).
4.3 Communities manage coastal fisheries taking into consideration sustainability of marine resources as well as climate change and disaster risks.
4.4 Communities have constant access to basic food commodities.
4.5 Communities manage their water resources (including during extreme events such as drought, heavy rain and storm surges; see also Strategy 6).



Strategy 5: Strengthening health-service delivery to address climate change impacts

Results

- 5.1 The public is aware of water safety and proactively reduces the spread of vector-, water- and food-borne diseases.
- 5.2 Routine systems for surveillance of environmental health hazards and climate-sensitive diseases are strengthened.
- 5.3 Capacities are enhanced and equipment provided to the MHMS Central Laboratory and Environmental Health Laboratory to test water and food, conduct vector control activities and analyse results.
- 5.4 I-Kiribati population's general health status is enhanced to be more resilient to climate-related diseases.
- 5.5 A national outbreak preparedness and response plan and a sectoral environmental health plan, which incorporate surveillance and response to climate-sensitive diseases, are in place.

Strategy 6: Promoting sound and reliable infrastructure development and land management

Results

- 6.1 The livelihood of I-Kiribati is improved through public buildings, infrastructure and utilities that are well maintained and resilient to climate change and disasters (climate proofing).
- 6.2 Land planning and management for all islands that provides clear regulations on land development with competent planning authorities strengthened to implement & enforce land use regulatory frameworks and water regulations (see also Strategy 1).
- 6.4 Water reserves are protected and communities have access to sufficient and adequate fresh water at all times (including during extreme events such as drought, heavy rain and storm surges; see also Strategy 4) and to improved sanitation facilities.

Strategy 7. Delivering appropriate education, training and awareness programs

Results

- 7.1 Students and professionals have capacities to take action on adaptation, and risk reduction and coping strategies before, during and after disasters and emission mitigation.
- 7.2 The I-Kiribati population is well informed and all stakeholders have access to up-to-date and accurate, contemporary and traditional information on climate change and disaster risk management (see also Strategy 2) and communities take voluntary action to reduce climate change and disaster risks.
- 7.3 The I-Kiribati population (inclusive of vulnerable groups) are well qualified with formal and Technical and Vocational Education and Training (TVET) qualifications to get employment outside of Kiribati.

Strategy 8: Increasing effectiveness and efficiency of early warnings and disaster and emergency management

Results

- 8.1 Damage to infrastructure and properties, and injuries and loss of life are reduced.

Strategy 9: Promoting the use of sustainable renewable sources of energy and energy efficiency

Results

- 9.1 Renewable energy has an increased share of the total energy mix.
- 9.2 Energy efficiency and conservation measures increase.

Strategy 10: Strengthening capacity to access finance, monitor expenditures and maintain strong partnerships

Results

10.1 Existing coordination and approval mechanisms are strengthened to review proposals from the perspective of climate change and disaster risk reduction, and the national and external finance to support climate change and disaster risk initiatives increases (as reflected in national budgets, overseas development assistance and additional climate change and disaster finance).

Strategy 11: Maintaining the existing sovereignty and unique identity of Kiribati

Results

11.1 The rights of Kiribati over its existing EEZ and the resources within it are protected forever for the people of Kiribati.

Strategy 12: Enhancing the participation and resilience of vulnerable groups

Results

12.1 Members of vulnerable groups are increasingly engaged in climate change and disaster risk management initiatives and their needs are addressed.

4.3 KJIP indicative costs

The overall gross indicative resource costs to implement the KJIP over the period 2013–2023 are estimated to be AUD 103,107,161. Of this total, it is estimated that financial cost constitutes 96% of overall costs while the in-kind contributions constitute 4%. Table 16 below details the estimated costs for each strategy of the KJIP.

Table 16: Overall costs by strategy

	Total cost in (AUD)	In %
Strategy 1	6,697,308	6
Strategy 2	5,555,248	5
Strategy 3	4,932,242	4
Strategy 4	4,693,577	4
Strategy 5	472,747	2
Strategy 6	52,476,513	50
Strategy 7	7,478,480	7
Strategy 8	4,508,477	4
Strategy 9	15,340,322	11
Strategy 10	354,340	2
Strategy 11	180,532	1
Strategy 12	417,375	2
TOTAL	103,107,161	100

The single greatest cost arises in implementing Strategy 6: “Infrastructure”, which accounts consequently for 51% of the estimated cost of the entire KJIP. Followed by Strategy 9 (11%), Strategy 7 (7%), Strategy 1 (6%), Strategy 2 (5%), Strategies 3, 4, and 8 (4%), Strategies 5, 10 and 12 (2%) and Strategys 11 (1%), as shown in Figure 9 below.

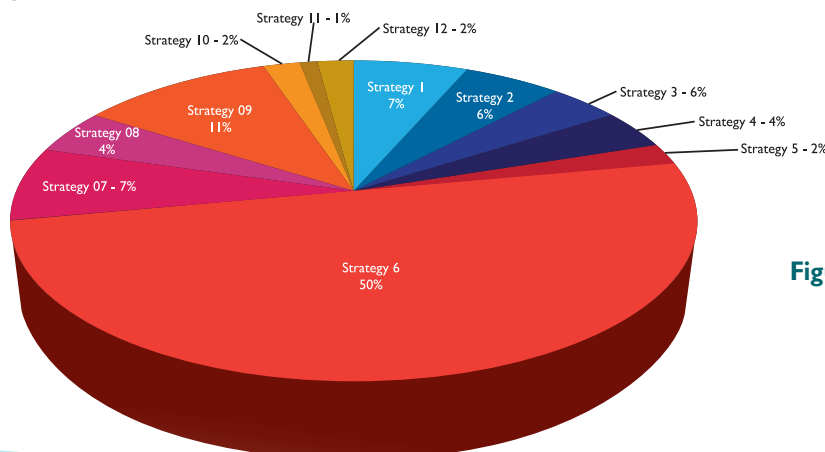


Figure 9 Share of costs per strategy

5 KJIP Implementation Arrangements

The Kiribati Joint Implementation Plan is to be implemented through existing mechanisms and aligned to rules and procedures that the Government of the Republic of Kiribati must follow.

The KJIP is building on and intended to strengthen existing implementation, financing and monitoring functions by integrating climate change and disaster risk management considerations. To strengthen coordination and communication among the Office of the Beretitenti, Ministry of Environment, Lands and Agriculture Development (MELAD), Ministry of Finance and Economic Development (MFED), Ministry of Foreign Affairs and Immigration (MFAI) and line ministries, as well as civil society and development partners, the KJIP formalises the role of the newly established KNEG to become the main coordination mechanism and entry point for climate change and disaster risk management initiatives. Furthermore, it is intended that a KJIP Secretariat will be established, with the main roles of facilitating KNEG meetings; reviewing and monitoring KJIP implementation together with responsible lead agencies; and communicating with the general public, Parliament, Cabinet, development partners and the international community. The KJIP Secretariat will be under the guidance of the Development Coordinating Committee.

It is expected that the KJIP, the KJIP Secretariat and the KNEG will guide development partners and support the realisation of the Cairns Compact on Strengthening Development Coordination. The Pacific Islands Forum designed this Compact in 2009 to strengthen coordination and use of all development resources in the Pacific, in line with international best-practice as expressed in the Paris Declaration on Aid Effectiveness, the Accra Action Agenda and Principles on Aid Effectiveness.

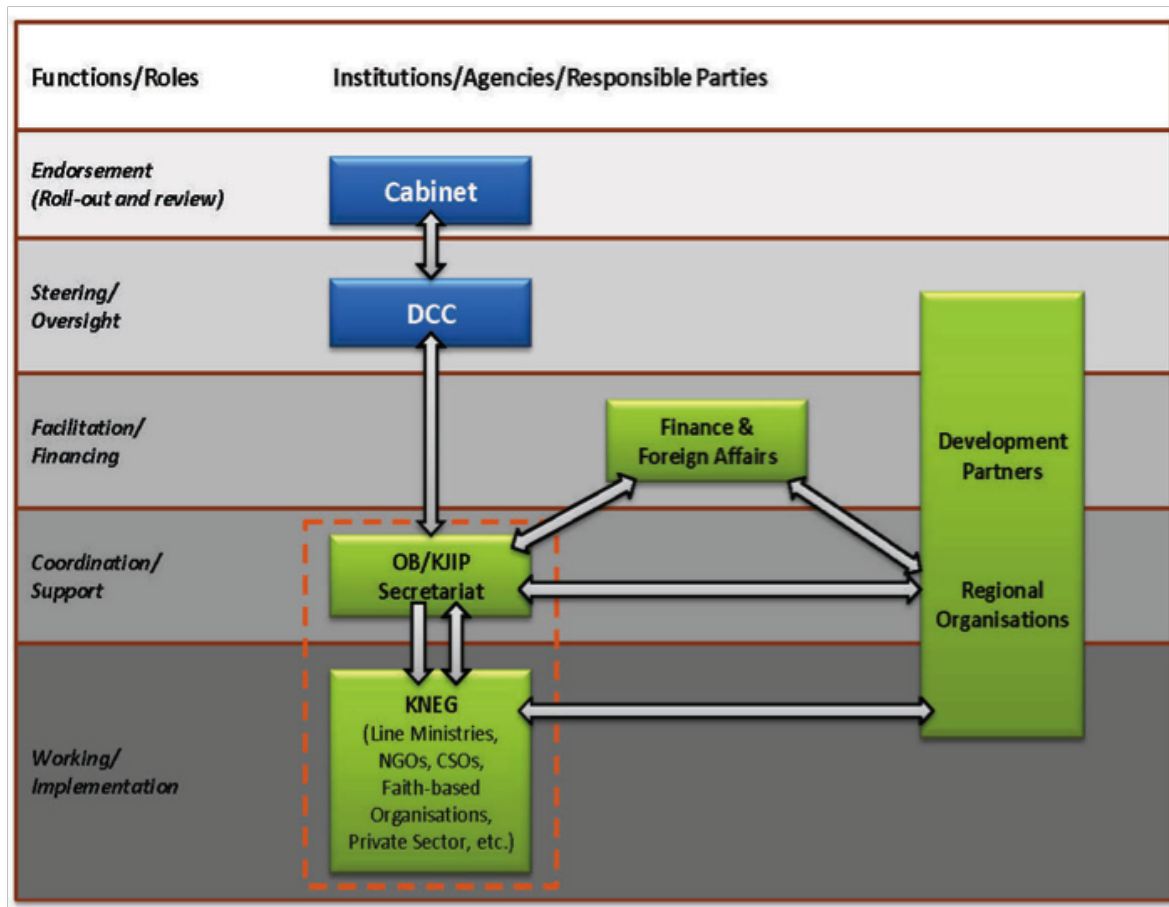


Figure 10 Institutional arrangements under the KJIP

5.1 Institutional arrangements

The newly established KJIP Secretariat under the Office of the Beretitenti will facilitate the coordination, implementation and monitoring of the KJIP through the KNEG, guided by the Development Coordination Committee. Figure 10 provides an overview of the institutional arrangements under the KJIP.

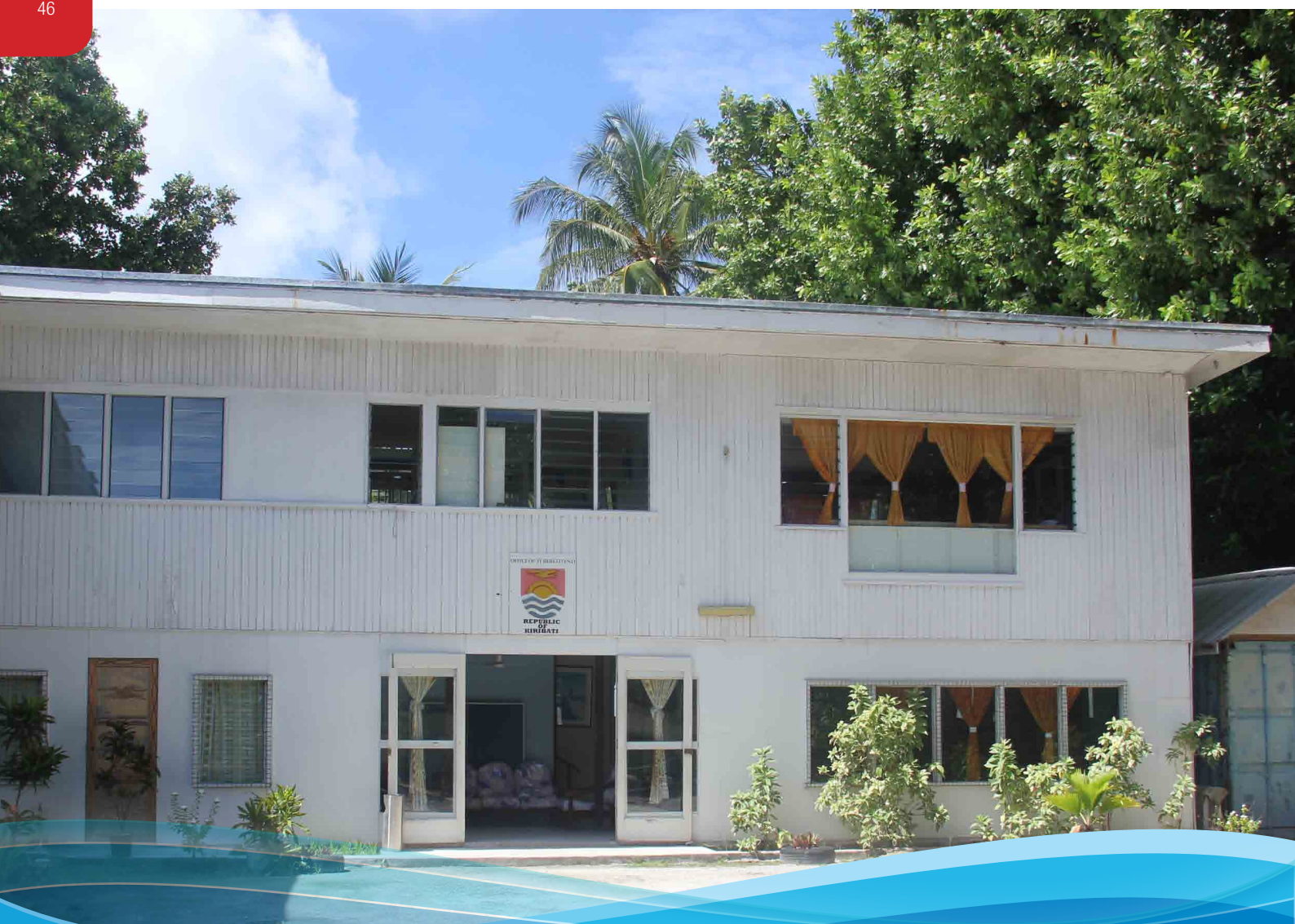
The KJIP Secretariat

The KJIP Secretariat, hosted by the Office of te Beretitenti, will be responsible for coordinating the implementation, monitoring and reporting of the KJIP. It will convene and facilitate meetings of the KNEG and ensure that relevant information is shared with all KNEG members, partners, observers and the public. It will be a focal point for new climate change and disaster risk management initiatives and will act as a guiding partner for the KNEG and its members.

The KJIP Secretariat, through the KNEG, will collate priorities and progress reporting to be tabled to the Development Coordinating Committee, for discussion during biannual donor roundtables, and to Parliament as requested.

Before undertaking any new initiatives relating to climate change and disaster risk management, MFAI, MFED, line ministries, NGOs, faith-based organisations and development partners are asked to inform the KJIP Secretariat and consult with the KNEG.

The KJIP Secretariat will be housed within the Office of te Beretitenti and will compile reports to the Development Coordinating Committee through the Office of te Beretitenti. The KJIP Secretariat does not replace the Development Coordinating Committee Secretariat which is hosted in MFED.





The Kiribati National Expert Group

The KNEG will act as a coordination mechanism for climate change and disaster risk management initiatives. In particular, it will:

- ensure any initiatives are aligned to national development and KJIP priorities;
- guide and coordinate program implementation and monitoring;
- develop joint annual work plans on the KJIP and relevant initiatives;
- provide institutional and advisory support to national agencies, beneficiaries and partners;
- help to mobilise current and future resources to support program implementation;
- share key results and outcomes annually; and
- exchange information and lessons learned regularly.

It can take an overall steering function for the design, implementation and monitoring of climate change and disaster risk management initiatives and also form sub-steering groups for sector-specific measures or integrated approaches targeting outer islands and community level (such as the Whole of Island Approach; WoI). It can be an entry point for new initiatives.

The KNEG is chaired by the Office of te Beretitenti and consists of representatives from MFED, MFAI, MIA and all line ministries, the private sector, NGOs and faith-based organisations.

5.2 Financing strategy

The implementation of the KJIP is to be financed through already existing strategies ranging from national budgets and other internal sources to overseas development assistance, additional climate change funding and humanitarian aid.

National budgets are being and will be used in all areas where climate change and disaster risks are mainstreamed into the budgets of Ministerial Plans of Operations and corresponding projects across sectors. MFED will have a key role in ensuring climate change and disaster risks and response measures are incorporated into project proposals, budgeting, reporting and monitoring procedures. The KJIP Secretariat and the KNEG meetings will increasingly be maintained through national budgets. The implementation of the KJIP is further enabled through in-kind contributions such as staff time. Furthermore, communities, NGOs and faith-based organisations may contribute by cost sharing for similar activities and fund-raising.

Development partners are invited to consider supporting KJIP strategies with programs such as budget support and strategy-wide approaches. The Government of the Republic of Kiribati would like to investigate the feasibility of a National Climate Change Fund. It wishes to acknowledge its partners for their support in enhancing institutional capacities and performance requirements to ensure all ministries have robust management and financial systems in place.

Existing technical and financial assistance mechanisms should be used to support the implementation of the KJIP, including multilateral, international and bilateral development partners, CROP agencies, NGOs and faith-based organisations. Development partners need to consider national priorities and follow national procedures in making decisions on development assistance and also integrate the consideration of climate change and disaster risks into their development aid.

As the KJIP strategies represent both ongoing and new activities, the KJIP Secretariat and the KNEG will work to identify resource gaps to be presented to Kiribati development partners during biannual donor roundtables and respective funding and programming cycles of development partners. (This work includes direct exchange with line ministries.)

5.3 Communication strategy

All implementing partners will disseminate information about the KJIP and its vision, goal and strategies and results through existing information-sharing networks, media and forums at international, regional, national and local levels.

Tangible outputs, such as lessons learned, knowledge products, awareness and education materials, reports and media products, will be produced in most KJIP strategies. This information will also be made available to contribute to national and international best practice.

The Climate Change and Climate Risk Communications Strategy (currently being developed by the Office of te Beretitenti) aims to strengthen awareness, partnerships and practical actions to increase resilience of I-Kiribati in response to the impacts of climate change. In support of the KJIP, the Strategy outlines clear and targeted



communications initiatives aimed to help the Government to promote priority actions. It identifies the key messages, channels and tools to reach national and community stakeholders, civil society organisations, agencies and development partners. Part of this work involves a media engagement strategy, products to promote the KJIP, a partnership mechanism to promote and build on existing and future opportunities, and a knowledge management system.

5.4 Monitoring and evaluation

The KJIP will be monitored through the KDP Monitoring and Evaluation Framework (2012) in compliance with the Monitoring and Evaluation Policy (expected to be endorsed).

At the ministerial level the KJIP strategies are to be monitored through the annual Ministry Strategic Plans, which will have to incorporate relevant KJIP actions and performance indicators. Detailed baselines and targets for the performance indicators will have to be identified by the respective national stakeholder (government or non-government) that has been identified as responsible lead agency.

The KJIP Secretariat through the KNEG will compile a biannual KJIP Progress Report. As the KJIP is a 10-year plan, it will be reviewed in alignment with the KDP period, with the first one due by 2015 (the second by 2019 and the third by 2023). Progress reports and reviews have to be approved by the Development Coordinating Committee before being endorsed by Cabinet.

The KJIP is understood to be a living document and as such the KNEG can adjust it to meet emerging needs, subject to the approval of the Development Coordinating Committee.



Glossary



Adaptation	<p>Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. (UNFCCC 2013)</p> <p>In simpler terms, adaptation is making changes in order to reduce the vulnerability of a community, society or system to the negative effects of climate change, or make the most of potential positive effects. It includes building skills and knowledge, as well as making practical changes, such as strengthening coastal infrastructure, adjusting farming systems, and improving water management. (SPREP 2013)</p>
Aerosol	<p>A collection of airborne solid or liquid particles, with a typical size of between 0.01 and 10 micrometres (a millionth of a metre), that reside in the atmosphere for at least several hours. Aerosols may be of either natural or anthropogenic origin. Aerosols may influence climate in several ways: directly through scattering and absorbing radiation, and indirectly through acting as cloud condensation nuclei or modifying the optical properties and lifetime of clouds. (IPCC 2007)</p>
Afforestation	<p>Establishment of forest through planting and/or deliberate seeding on land that, until then, was not classified as forest. (FAO 2010)</p>
Anthropogenic	<p>Resulting from or produced by human beings. (IPCC 2013)</p>
Aragonite	<p>A form of calcium carbonate that makes up the shells and skeletons of key organisms in reef ecosystems, including reef-building corals. (Australian Bureau of Meteorology and CSIRO 2011, Vol. 1)</p>
Atmosphere	<p>The gaseous envelope surrounding the Earth. The dry atmosphere consists almost entirely of nitrogen (78.1% volume mixing ratio) and oxygen (20.9% volume mixing ratio), together with a number of trace gases, such as argon (0.93% volume mixing ratio), helium and radiatively active greenhouse gases such as carbon dioxide (0.035% volume mixing ratio) and ozone. In addition, the atmosphere contains the greenhouse gas water vapour, whose amounts are highly variable but typically around 1% volume mixing ratio. The atmosphere also contains clouds and aerosols. (IPCC 2007)</p>
Biodiversity or Biological Diversity	<p>The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems. (CBD 2013)</p>
Carbon cycle	<p>The term used to describe the flow of carbon (in various forms, e.g. as carbon dioxide) through the atmosphere, ocean, terrestrial biosphere and lithosphere. (IPCC 2007)</p>
Carbon sequestration	<p>The process of removing carbon from the atmosphere and depositing it in a reservoir. (UNFCCC 2013).</p>



Carbon sink	A natural or artificial reservoir that takes up and stores carbon. Trees, plants, oceans, rocks and soils are natural sinks, while landfills are artificial sinks. (SPREP 2012)
Climate	The average weather conditions over a long period of time (usually over at least 30 years), based mainly on measurements of temperature, precipitation and wind. (SPREP 2012)
Climate change	<p>A change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use. Note that the UNFCCC, in its Article 1, defines climate change as: 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods'. The UNFCCC thus makes a distinction between climate change attributable to human activities altering the atmospheric composition, and climate variability attributable to natural causes. (IPCC 2013)</p> <p>In simpler terms, climate change involves changes in the Earth's climate due to human activities (anthropogenic climate change) or natural processes that are already occurring or predicted to occur. These include increasing air and sea-surface temperatures, changing rainfall patterns, sea-level rise, ocean acidification, and changes in frequency and intensity of extreme events such as droughts, floods and tropical cyclones. Anthropogenic climate change is expected to happen much more rapidly than natural changes in the climate, posing an enormous challenge to both natural and human systems. (SPREP 2012)</p>
Climate variability	Variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability). (IPCC 2013)
Convergence zone	An area where winds flow from different directions toward each other, thus meeting at one point or along one line (like the ITCZ or SPCZ). Convergence zones could be called 'cloud meeting places' (BoM, CSIRO, RCCCC 2013). Similarly, in oceanography, where water currents flow toward each other and meet. Horizontal convergence usually forces vertical motion to occur, such as convection (BoM & CSIRO 2011, Vol. 1).
Coral bleaching	The paling in colour which results if a coral loses its symbiotic, energy providing organism. (IPCC 2007)
Cyclone (also typhoon or hurricane)	A violent rotating windstorm that develops over tropical waters warmer than 26.5°C and located between 5° and 15° latitude.
Deforestation	The conversion of forest to other land use or the long-term reduction of the tree canopy cover below the minimum 10% threshold. (FAO 2010)
Deposition	The process by which sediments, soil, rock and other matter are laying down / added to a landform or land mass such as a soft beach or coast.
Disaster	A serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceed the ability of the affected community or society to cope using its own resources. (UNISDR 2009)
Disaster management	Component of the social system that involves the planning, organising, leading and controlling of activities related to the managing of disasters in any of its phases and stages. (TAF/OFDA 2008)
Disaster preparedness	Policy and administrative decisions and operational activities at all levels to ensure preparedness for, response to and recovery from potential disaster events. (Pacific Disaster Net 2012)
Disaster risk management	The systematic process of using administrative directives, organisations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster. (UNISDR 2009)
Disaster risk reduction	The minimising of vulnerabilities and disaster risks through prevention and mitigation to avoid or reduce the adverse impacts of hazards within the broad context of sustainable development. (TAF/OFDA 2008)



Drought	<p>A period of abnormally dry weather long enough to cause a serious hydrological imbalance. Drought is a relative term, therefore any discussion in terms of precipitation deficit must refer to the particular precipitation-related activity that is under discussion. For example, shortage of precipitation during the growing season impinges on crop production or ecosystem function in general (due to soil moisture drought, also termed agricultural drought), and during the runoff and percolation season primarily affects water supplies (hydrological drought). Storage changes in soil moisture and groundwater are also affected by increases in actual evapotranspiration in addition to reductions in precipitation. A period with an abnormal precipitation deficit is defined as a meteorological drought. A megadrought is a very lengthy and pervasive drought, lasting much longer than normal, usually a decade or more. (IPCC 2013)</p> <p>In simpler terms, a drought is a long period with no rain during a time when rain would be expected. It results in reduced groundwater, and a shortage of water for drinking, sanitation and watering plants. It is a slow-onset phenomenon – which means it does not happen suddenly, caused by one single event like a storm or cyclone, but emerges gradually over time. (SPREP 2012; IFRC 2013)</p>
Earthquake	<p>Sudden break within the upper layers of the earth, whether on land or underwater, causing massive vibration. The resulting vibration on land causes liquefaction, cracks on ground surfaces, collapse of buildings and destruction of life. An underwater earthquake causes displacement of huge volume of water and generates tsunami waves that can travel thousands of miles at high speed. There are two scales for measuring the impact of an earthquake: the Richter scale and the Mercalli scale.</p>
Ecosystem	<p>A complex set of relationships of living organisms functioning as a unit and interacting with their physical environment. The boundaries of what could be called an ecosystem are somewhat arbitrary, depending on the focus of interest or study. Thus the extent of an ecosystem may range from very small spatial scales to, ultimately, the entire Earth. (IPCC 2007)</p> <p>A community of plants and animals, and their relationships and interactions with each other and with their physical environment. (SPREP 2012)</p>
Emergency	<p>A situation generated by the real or imminent occurrence of an event that requires immediate attention. A significant or unusual event, requiring the coordinated response of more than one agency. (TAF/OFDA 2008)</p>
Emission	<p>The release of a gas into the atmosphere. (SPREP 2012)</p>
ENSO – El Niño Southern Oscillation	<p>The term El Niño was initially used to describe a warm-water current that periodically flows along the coast of Ecuador and Peru, disrupting the local fishery. It has since become identified with a basin-wide warming of the tropical Pacific Ocean east of the dateline. This oceanic event is associated with a fluctuation of a global-scale tropical and subtropical surface pressure pattern called the Southern Oscillation. This coupled atmosphere–ocean phenomenon, with preferred time scales of two to about seven years, is known as the El Niño–Southern Oscillation (ENSO). It is often measured by the surface pressure anomaly difference between Darwin and Tahiti or the sea-surface temperatures in the central and eastern equatorial Pacific. During an ENSO event, the prevailing trade winds weaken, reducing upwelling and altering ocean currents such that the sea-surface temperatures warm, further weakening the trade winds. This event has a great impact on the wind, sea-surface temperature and precipitation patterns in the tropical Pacific. It has climatic effects throughout the Pacific region and in many other parts of the world, through global teleconnections. The cold phase of ENSO is called La Niña. (IPCC 2013)</p>
Epidemic	<p>An unusual increase in the number of cases of an infectious disease as a result of changes in climatic conditions or even natural disasters such as tropical storms, floods, earthquakes and droughts. Epidemics may also attack animals.</p>
Erosion	<p>The process by which soil and rock are removed from the Earth's surface by wind or water flow, and then transported and deposited in other locations.</p>
Flood	<p>Significant rise of water level in a river, lake, reservoir or coastal region causing harmful inundation of property and land used by humans. (TAF/OFDA 2008)</p>
Forest	<p>Land spanning more than 0.5 hectares with trees higher than 5 metres and a canopy cover of more than 10%, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. (FAO 2010)</p>
Forest degradation	<p>The reduction of the capacity of a forest to provide goods and services. (FAO 2010)</p>
Fossil fuels	<p>Carbon-based fuels from fossil hydrocarbon deposits, including coal, peat, oil and natural gas. (IPCC 2007)</p>



Global warming	The increase in average global temperature that has occurred since industrialisation, due to increased levels of greenhouse gases in the atmosphere. Since the early 20th century, the average surface temperature of Earth has increased by 0.8°C, and it is predicted to continue to rise, with the actual amount depending on mitigation measures taken in the coming years. (SPREP 2012)
Greenhouse	A glass house in which plants are grown. It is usually used in colder climates to trap heat and moisture for plants, especially vegetables and flowers, to grow better than they would outside.
Greenhouse effect	The infrared radiative effect of all infrared-absorbing constituents in the atmosphere. Greenhouse gases, clouds and (to a small extent) aerosols absorb terrestrial radiation emitted by the Earth's surface and elsewhere in the atmosphere. These substances emit infrared radiation in all directions but, everything else being equal, the net amount emitted to space is normally less than would have been emitted in the absence of these absorbers because of the decline of temperature with altitude in the troposphere and the consequent weakening of emission. An increase in the concentration of greenhouse gases increases the magnitude of this effect; the difference is sometimes called the enhanced greenhouse effect. The change in a greenhouse gas concentration because of anthropogenic emissions contributes to an instantaneous radiative forcing; surface temperature and troposphere warm in response to this forcing, gradually restoring the radiative balance at the top of the atmosphere. (IPCC 2013). In simpler terms, the greenhouse effect is the heating of the Earth's surface as a result of certain gases in the atmosphere, which radiate heat back to the Earth. (SPREP 2012)
Greenhouse gases	Gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of terrestrial radiation emitted by the Earth's surface, the atmosphere itself and clouds. This property causes the greenhouse effect. Water vapour (H ₂ O), carbon dioxide (CO ₂), nitrous oxide (N ₂ O), methane (CH ₄) and ozone (O ₃) are the primary greenhouse gases in the Earth's atmosphere. Moreover, there are a number of entirely human-made greenhouse gases in the atmosphere, such as the halocarbons and other chlorine- and bromine-containing substances, dealt with under the Montreal Protocol. Besides CO ₂ , N ₂ O and CH ₄ , the Kyoto Protocol deals with the greenhouse gases sulphur hexafluoride (SF ₆), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). (IPCC 2013)
Hazard	A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage. (UNISDR 2009). In simpler terms, a hazard is the potential for a natural- or human-induced event to occur with negative consequences.
Indicator	Quantitative or qualitative factor or variable that provides a simple and reliable basis for assessing achievement, change or performance in a specific condition. (GoK 2012c)
Intertropical Convergence Zone (ITCZ)	A band of high rainfall that stretches across the Pacific just north of the equator. It is an east-west band of low-level wind convergence near the equator where the southeast trade winds of the southern hemisphere meet the northeast trade winds of the northern hemisphere. ITCZ is strongest in the northern hemisphere summer and affects most countries on, or north of, the equator. (BoM & CSIRO 2011, Vol. 1)
Kyoto Protocol	The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) was adopted in 1997 in Kyoto, Japan at the Third Session of the Conference of the Parties to the UNFCCC. It contains legally binding commitments, in addition to those included in the UNFCCC. Countries included in Annex B of the Protocol (most Organisation for Economic Co-operation and Development countries and countries with economies in transition) agreed to reduce their anthropogenic greenhouse gas emissions (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride) by at least 5% below 1990 levels in the commitment period 2008 to 2012. The Kyoto Protocol entered into force on 16 February 2005. (IPCC 2013)
Mitigation (of disaster risks)	The lessening or limitation of the adverse impacts of hazards and related disasters. (UNISDR 2009)



Mitigation (of emissions)	<p>A human intervention to reduce the sources or enhance the sinks of greenhouse gases. (IPCC 2013).</p> <p>In simpler terms, mitigation of emissions involves efforts to reduce the levels of greenhouse gases in the atmosphere, either by limiting the sources or by enhancing the sinks. Examples include using fossil fuels more efficiently, switching to renewable energy sources such as solar energy and hydro-power, and expanding forests and other sinks to remove greater amounts of carbon dioxide from the atmosphere. (SPREP 2012)</p>
Objective	A specific statement detailing the desired accomplishments or outcomes of a project at different levels (short to long term). (GoK 2012c)
Ocean acidification	<p>A reduction in the pH of the ocean over an extended period, typically decades or longer, which is caused primarily by uptake of carbon dioxide from the atmosphere, but can also be caused by other chemical additions or subtractions from the ocean. Anthropogenic ocean acidification refers to the component of pH reduction that is caused by human activity (IPCC 2011, p. 37).</p> <p>In simpler terms, ocean acidification is an ongoing rise in acidity of ocean and sea waters. This is due to higher levels of dissolved carbon dioxide, which are a direct result of increased levels of carbon dioxide in the atmosphere. Acidification is likely to damage ocean ecosystems (SPREP 2012). The pH of Earth's oceans is decreasing, caused by the uptake of carbon dioxide from the atmosphere. Lower pH makes the oceans more acidic (BoM & CSIRO 2011, Vol 1).</p>
Oil spill	Accidental discharge of oil from a ship in the open ocean, with the potential to damage marine life.
Outcome	The result achieved in fulfilling the 'purpose' of activities, as identified in the hierarchy of objectives. An outcome can also be a change in conditions, or maintenance of a set of conditions, resulting from the interaction of outputs and external factors, which is described so that the direction and extend of any such change can be assessed. (GoK 2012c)
Output	The product of one or more activities, intended to contribute to a desired outcome, described so that its quantity, quality and time of completion can be verified, and the inputs used in producing it can be identified, measured and costed. (GoK 2012c)
Performance	The degree to which a development intervention or a development partner operates according to specific criteria/standards/ guidelines or achieves results in accordance with stated goals or plans. (GoK 2012c)
Preparedness	The knowledge and capacities developed by governments, professional response and recovery organisations, communities and individuals to effectively anticipate, respond to, and recover from, the impacts of likely imminent or current hazard events or conditions. (UNISDR 2009)
Prevention	The outright avoidance of adverse impacts of hazards and related disasters. (UNISDR 2009)
Reforestation	Re-establishment of forest through planting and/or deliberate seeding on land classified as forest. (FAO 2010)
Rehabilitation	Restoring people's lives back to normal after a disaster, including by beginning to repair the physical, social and economic damage.
Renewable energy	Energy that comes from sources that are not depleted or can be easily replenished; for example, hydroelectric power, solar energy and biofuels.
Resilience	The capacity of a community, society or natural system to maintain its structure and functioning through stress or change. (SPREP 2012)
Result	The measurable output, outcome or impact (intended or unintended, positive or negative) of a development situation Strategies. The overall direction and approach to be taken in planning and managing activities to achieve a desired result (GoK 2012c)
Risk	The probability that loss will occur as the result of an adverse event, given the hazard and vulnerability.
Runoff	That part of precipitation that does not evaporate and is not transpired, but flows through the ground or over the ground surface and returns to bodies of water. (IPCC 2013)



Salt water intrusion	Displacement of fresh water by salt water in coastal areas or estuaries. Salt water enters the underground freshwater lens as an effect of sea-level rise, storm surges, periods of low rainfall and high temperatures and when large quantities of fresh water are removed for human use. Seawater seeps in from the bottom of the lens and eventually mixes with the fresh water to form brackish water, which is unfit for humans to drink and for plants to survive. (SPREP 2012)
Sea-surface temperature	The temperature of the ocean surface. It represents the temperature of the upper few metres of the ocean as opposed to the skin temperature, which is the temperature of the upper few centimetres. (BoM & CSIRO 2011, Vol. 1)
Sink	Any process, activity or mechanism that removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere. Forests and other vegetation are considered sinks because they remove carbon dioxide through photosynthesis. (UNFCCC 2013)
South Pacific Convergence Zone (SPCZ)	A band of high rainfall stretching approximately from Solomon Islands to the east of the Cook Islands. It is a persistent and greatly elongated zone of low-level convergence. It is strongest in the southern hemisphere summer and affects most countries in the South Pacific. A persistent and greatly elongated zone of low-level convergence extending from approximately 140°E near the equator to approximately 120°W at 30°S. The zone is not quite linear, but is oriented more west to east near the equator and has a more diagonal orientation. (northwest to southeast) at higher latitudes. (BoM & CSIRO 2011, Vol. 1)
Storm surge	A sudden rise of the sea as a result of high winds and low atmosphere pressure; sometimes called a storm tide, storm wave or tidal wave.
Sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs. (UNFCCC)
Target	A specified objective that indicates the number, timing and location of that which is to be realized (GoK 2012c)
Thermal expansion	The increase in volume (and decrease in density) that results from warming water. (BoM & CSIRO 2011, Vol. 1)
Trade winds	The wind system occupying most of the tropics that blows from the subtropical high pressure areas toward the equator. (BoM & CSIRO 2011, Vol. 1)
Tsunami	Series of large sea waves generated by sudden displacement of seawater (caused by earthquake, volcanic eruption or submarine landslide); capable of travelling over a long distance.
Vulnerability	The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity. (UNFCCC 2013; note this definition is in the climate change context only). In simpler terms, and broadened to include disasters as well, vulnerability is the level of susceptibility of an individual, a community, an organisation or a system to adverse conditions, emergencies or disasters; a measure of its ability, or inability, to cope. (SPREP 2012)
Warm pool (West Pacific warm pool)	An extensive pool of the world's warmest water, with temperatures higher than 28–29°C ranging from the central Pacific to the far eastern Indian Ocean. (BoM & CSIRO 2011, Vol. 1, p. 250)
Weather	The effects of atmospheric conditions, at a specific time and place, in terms of variables such as temperature, rainfall and wind (SPREP 2012). Compared with climate, which is a long-term description, weather describes the current situation or predictions for the next few days. Apart from daily weather, also seasonal and annual weather patterns are described and sometimes referred to as the 'prevailing climate'.
West Pacific monsoon (WPM)	The West Pacific Monsoon (WPM) moves north to mainland Asia during the northern hemisphere summer and south to Australia in the southern hemisphere summer. The seasonal arrival of the monsoon usually brings a switch from very dry to very wet conditions. It affects countries in the far western Pacific. (BoM & CSIRO 2011, Vol. 1)

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Annex 1: KJIP Detailed Action Matrix

All strategies and actions in the KJIP shall be inclusive of vulnerable groups, considering gender, youth and children, the elderly, and people with disabilities.

Strategy 1: Strengthening good governance, strategies and legislation					
Actions and sub-actions	Performance indicators	Responsible lead agencies	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Output) 1.1: All policies, strategies, Sector Operational Plans, Ministry Annual Workplans, Ministerial Plans of Operations, project proposals and monitoring and evaluation systems enable the proactive and inclusive reduction of climate change and disaster risks.					
<p>Integrate climate change adaptation and disaster risk management considerations in existing and new national sector strategic plans, ministries' policies and strategic plans, Ministerial Plans of Operations (inclusive of vulnerable groups; identified frameworks²).</p> <ul style="list-style-type: none"> • Seek ministerial approval for the review. • Engage relevant resource personnel to lead the review. • Conduct public consultation of the draft policy (6 community consultations meetings – 3 in Outer Gilbert Island, 1 in Line and Phoenix, 2 in Tarawa). • Finalise draft and submit for endorsements. 	<p>Increased percentage of policies, strategies, legislation, Ministry Annual Workplans, and Ministerial Plans of Operations and Sector Operational Plans that have provisions for reducing climate change and disaster risks, inclusive of vulnerable groups³</p>	<p>Responsible Ministries</p>	<p>AG Office, OB, MFED, KNEG</p>	<p>AusAID, New Zealand Aid Programme, USAID, EU, UN-Organisations, ADB, WB, GIZ/ BMZ, etc.; SPC, SPREP</p>	<p>2,566,442.00</p>

² Frameworks to be reviewed: Human Resource Development Policy, Integrated Investment Policy, Private Sector Development Policy, Tourism Management Plan for Phoenix Islands Protected Area, Frameworks to be in development: Agriculture Policy, Eco-Tourism Policy, Fisheries Implementation Strategy (based on KNIP) (draft), Labour Mobility Policy (draft), Minerals Strategic Plan, MLHRD Strategic Plan, National Foreshore Management Plan, National Pandemic Plan, Urbanisation Policy.

³ Linked to KDP Performance Indicator KPA 4: Number and status of policies, sector plans and legislation integrating disaster risk management and disaster risk reduction.



Strategy 1: Strengthening good governance, strategies and legislation					
Actions and sub-actions	Performance indicators	Responsible lead agencies	Support agencies	Development partners and CROP members	Indicative cost (AUD)
<p>Result (Output) 1.2: Appropriate national and sector legislation is providing an enabling environment to enforce climate and disaster risk reduction.</p> <p>Review and develop enabling legislation and enforcement mechanisms to support effective risk reduction, legal responses to impacts (identified legislation⁴).</p> <ul style="list-style-type: none"> • Seek ministerial approval for the review. • Engage relevant resource personnel to lead the review. • Conduct public consultation of the draft policy (6 community consultations meetings – 3 in Outer Gilbert Island, 1 in Line and Phoenix, 2 in Tarawa the second for MPs). • Finalise draft and submit for endorsement to Cabinet and then, in case of Bill and Act, to Parliament. 	See page 60	Respective ministries, Office of Attorney General	OB, KNEG	Australia's Aid Program, New Zealand Aid Program, USAID, EU, ADB, WB, UNDP, WHO, WMO German Development Cooperation FFA, SPC, SPREP etc	\$3,793,167.00

⁴Legislation to be reviewed: Biosecurity Act, Biosafety Regulation, Declaration for Water Reserves, Disaster Management Act, Environmental impact assessment licensing system, Fisheries Act, Foreshore and Land Reclamation Ordinance, health impact assessment system (policy), Local Government Act, MCLC legislation, Public Health Ordinance, Quarantine Ordinance, regulations underpinning levy for local agricultural produce, Tourism Act. Legislation to be developed: Energy Bill, Environment General Regulation, Kiribati Meteorology Bill, Marine Pollution Standards and other marine legislation, Minerals Development Act, Protected Areas Regulation, Protected Species Regulation.



Strategy 1: Strengthening good governance, strategies and legislations						
Actions and sub-actions	Performance indicators	Responsible lead agencies	Support agencies	Development partners and CROP members	Indicative cost (AUD)	
Result (Output) 1.3: Climate change and disaster risk management initiatives are coordinated by government departments, island councils, NGOs, faith-based organisations and the private sector in a collaborative manner across sectors.						
<p>Establish and strengthen mechanisms to coordinate, communicate and collaborate climate change and disaster risk management initiatives (KJIP Secretariat, climate change communication plan).</p> <ul style="list-style-type: none"> Establish the KJIP Secretariat (to coordinate the KNEG and Climate change and disaster risk management (DRM) initiatives) with resources and full equipment within the OB. Establish mechanisms for the KJIP Secretariat to regularly report on the KJIP implementation to decision-makers and the public. Establish mechanisms and processes for the KJIP Secretariat to formalise its linkages and communications with KNEG, faith-based organisations, private sector, NGOs and community groups. Coordinate and implement the Communications Strategy on Climate Change and Disaster Risk Management. Integration of CCA and DRM issues into island councils strategic plans and by-laws. <p>Develop and implement a Climate Change and Climate Risks Communications Plans.</p> <ul style="list-style-type: none"> Develop a Communications Plan based on wide consultations. Implement the Communication Plan, including capacity building and potentially equipment. 	<p>All ministries, outer island councils, the Kiribati Chamber of Commerce and Industries, NGOs and faith-based organisations have nominated focal points for climate change and disaster risk management by 2014</p> <p>Number of climate change and disaster risk management initiatives the KNEG has taken a steering function with.</p> <p>Number of island councils strategic plans and by-laws incorporating CCA & DRM issues</p>	OB, KNEG	MFED, private sector, NGOs, community and vulnerable groups, faith-based organisations		\$305,338.31	
<ul style="list-style-type: none"> Develop and implement a Climate Change and Climate Risks Communications Plans. Develop a Communications Plan based on wide consultations. Implement the Communication Plan, including capacity building and potentially equipment. 	<p>Consultation reports</p> <p>Number of Communication Plans approved and implemented</p>	OB	All ministries, KNEG	Australia's Aid Program, EU; SPC (Global Climate Change Alliance), SPREP	\$32,361	
Total Costs Strategy 1					\$6,697,308	

⁵Linked to KDP KPA 4 Indicator: Number of joint climate change initiatives (programs, projects, committees etc).

Strategy 2: Improving knowledge and information generation, management and sharing					
Actions and sub-actions	Performance indicators	Responsible lead agencies	Support agencies	Development partners and CROP members	Indicative cost (AUD)
<p>Result (Output) 2.1: An integrated and up-to-date national database providing all relevant information for resilient development is available and accessible for all.</p>					
<p>Develop a National Data and Information Centre (including a geographic information system – GIS) to coordinate, share and manage information related to disaster risk and climate change for improved decision-making and increased effectiveness and efficiency (Centre to cover socio-economic, environmental and species migratory data, GIS and maps).</p> <ul style="list-style-type: none"> Conduct a stocktake of available databases, existing data sharing mechanisms (e.g. websites, publications), responsibilities and needs. Design a concept for data and information management based on the results of the stocktake and develop a national data sharing protocol for internal decision-making and development needs. Establish the National Data and Information Centre (potentially under existing National Statistics Office, linked to existing national and regional portals such as Pacific Disaster Net and Pacific Climate Change Portal). Establish and support a Kiribati National Data and Information Sharing Group. Establish a linkage mechanism between outer-islands and national data information system (including tools, instruments and training on outer islands) Establish a formal communications link between outer-island council, MIA and OB Recruitment of personnel in MIA and Island councils to act as focal point and to provide and coordinate monitoring and reporting of CC & DRM (potentially reviewing and defining Island Project Officer TOR) 	<p>A national database is accessible and provides up-to-date information</p> <p>Increase of data availability and frequent updates on climate change and disaster risk indicators on outer islands.</p> <p>The number of recruitments for CCA & DRM focal point position on outer islands and in strategic ministries</p>	<p>National Statistics Office (MFED) and OB</p>	<p>MFMRD, MELAD, MIA, MPWU, KMS, MCTTD, MOE (all line ministries), NGOs, faith-based organisations, media, telecommunications, etc.</p>	<p>All development partners, especially SPC (including Statistics), FFA, SPREP, USP and PIFS with existing databases, online portals and research programs</p>	<p>\$200,854</p>



Strategy 2: Improving knowledge and information generation, management and sharing					
Actions and sub-actions	Performance indicators	Responsible lead agencies	Support agencies	Development partners and CROP members	Indicative cost (AUD)
<p>Result (Output) 2.2: Capacities to communicate science and best practices are strengthened by developing and disseminating effective and relevant information, communication and awareness products for decision-making and awareness raising across sectors and at all levels (see also Strategy 7).</p> <p>Develop and interpret integrated data sets for dissemination to support planning and decision making at all levels (including information and awareness products).</p> <ul style="list-style-type: none"> Analyse data sets based on needs. Amend the format of Household Income and Expenditure Surveys to effectively capture data related to climate change and disaster risk management. Develop and disseminate relevant information and awareness products for a range of uses (such as agricultural maps). Equip resource centres on outer islands with information products and low-cost means of communication. 	<p>Needs-based weather and climate information is applied by a range of users in a timely manner</p>	<p>OB and all ministries, NGOs, faith-based organisations and private sector</p>		<p>As on page 64</p>	<p>\$ 156,180</p>

Strategy 2: Improving knowledge and information generation, management and sharing					
Actions and sub-actions	Performance indicators	Responsible lead agencies	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Output) 2.3: Capacities for data collection, assessment, analysis, interpretation, monitoring and reporting are strengthened across sectors.					
<p>Strengthen the capacity of the Kiribati Meteorological Service (KMS) to collect and manage data and information on weather and climate variability – especially severe weather and natural hazard events and impacts.</p> <ul style="list-style-type: none"> Modernize data logging for wind, solar, tidal, sea level, sea surface temperature. Replace weather and climate services stations with newly established ones. Establish a well-equipped weather forecasting office. Mobilise on-shift staff 24/7 at the main office and outer islands. Build capacity with weather forecasting, data analysis and equipment maintenance. Enhance outreach and communication networks. Set up an effective monitoring system to improve early warnings for all hazards. Research and incorporation of traditional skills on seasonal and weather forecasting Research and on-trial use of seasonal forecast to predict movement of highly migratory species (e.g Tuna) 	<p>The number of needs-based weather and climate information is applied by a range of users in a timely manner</p> <p>The number of well-equipped weather stations established and operational 24/7</p> <p>Number of trained and qualified staff</p> <p>Effective communication network established</p> <p>Availability of special weather bulletin to Fisheries</p> <p>The use of seasonal forecast in predicting the hot spot of highly migratory species (e.g Tuna species) starting 2015</p>	KMS (OB)	MPWU, MELAD, MFMRD, MHMS, MIA, outer island councils, NGOs, communities, faith-based organisations, media, telecommunications, etc.	Australia's Aid Program (including Bureau of Meteorology, CSIRO, COSPAC), UN Office for the Coordination of Humanitarian Affairs; WMO, SPREP (Finnish-Pacific Project), SPC, USP etc.	\$287,876



Strategy 2: Improving knowledge and information generation, management and sharing					
Actions and sub-actions	Performance indicators	Responsible lead agencies	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Output) 2.3: Continued					
<p>Strengthen capacities to collect, analyse, monitor and manage environmental data to establish the state of the environment, the trends and environmental outlook as a basis for decision making and learning in climate change adaptation initiatives.</p> <ul style="list-style-type: none"> Conduct training on collecting and analysing environmental data. Ensure the availability of necessary monitoring and assessment equipment. Develop an accessible and regular environmental outlook report. Review, update and manage environmental data. Review and update the environment outlook report. Implementation of the assessment report recommendations through training, procurement of required monitoring equipment, monitoring protocols and programmes. 	<p>Data management and monitoring capacity assessment report available</p> <p>Regular monitoring and review, outlook reports</p>	<p>Environment and Conservation Division (MELAD)</p>	<p>MPWU, MELAD, MFMRD, MHMS, MIA, outer island councils, NGOs, communities, faith-based organisations, media, telecommunications, etc.</p>	<p>All development partners, SPREP, USP, international and regional environmental NGOs</p>	<p>\$120,042</p>



Strategy 2: Improving knowledge and information generation, management and sharing					
Actions and sub-actions	Performance indicators	Responsible lead agencies	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Output) 2.3: Continued					
<p>Strengthen the capacity to collect, assess and analyse relevant agro-meteorological data and impacts on crop yields, diversity and seasonality of local crops, agricultural pests and diseases, invasive species, soil productivity and livestock.</p> <ul style="list-style-type: none"> Conduct training on generating, analysing, interpreting and communicating real time and accurate agro-meteorological data and information. Conduct national surveys (including data collection on invasive species present on outer islands, crop yield, diversity and seasonality of crops, agricultural pest and diseases, soil productivity and livestock) with the use of GPS Ensure the availability of necessary equipment including global positioning system (GPS), soil health analysis, crop modelling software and weather and climate forecasting equipment as related to agricultural needs. Develop GIS that integrate weather/climate and natural disasters information into soil type and productivity, incursions of pests and diseases, crop and livestock diversity, and seasonality production of food crops. Conduct research, especially modelling of impacts of climate change on coconut productivity (copra production). Develop a self-help service for farmers on climate change and natural disasters information and data relevant for adaptive farming. 	<p>National surveys published on agro-meteorological data, crop modelling applications</p> <p>10 % of farmers use adaptive farming produces</p>	<p>Agriculture and Livestock Division and Environment Conservation Division (MELAD)</p>	<p>KMS, Environment and Conservation Division (MELAD), MIA, communities</p>	<p>Kiribati development partners such as Australia's Aid Program, USAID, UNDP, FAO, Taiwan, EU, German Development Cooperation; SPREP, SPC and research institutions such as IFAD</p>	<p>\$309,466</p>
<p>Strengthen the capacity to regularly monitor the salinity, water quality, and thickness of freshwater lenses in locations that are used for water supplies (water reserves) on South Tarawa and the outer islands.</p> <ul style="list-style-type: none"> Acquire monitoring equipment and train monitoring officers on the use of and standard operating procedures for equipment. Review and strengthen equipment monitoring. Conduct training on analysing of data and provide support for reporting on the monitoring data. Develop a water reserves management plan. Develop an annual report on status of water lens and water protection zones. 	<p>Appropriate training programs and evaluation</p> <p>Number of staff trained and reports on monitoring results presented to Cabinet</p> <p>Number of reserves mapped, stocktakes undertaken, management plans in place and implemented</p>	<p>MPWU</p>	<p>MHMS</p>	<p>All</p>	<p>\$760,307</p>



Strategy 2: Improving knowledge and information generation, management and sharing					
Actions and sub-actions	Performance indicators	Responsible lead agencies	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Output) 2.3: Continued					
<p>Develop a national hub for GIS information to improve decision-making on sustainable development in the context of disaster risk reduction and climate change impacts (especially minerals, land use planning and management, and fisheries planning and management).</p> <ul style="list-style-type: none"> Establish a GIS system for the Mineral Division and Fisheries Division to facilitate access to data. Establish 'geodetic benchmarks' on selected islands of Kiribati for monitoring coastal movement and erosion/accretion in relation to climate change and sea-level rise – including Kiritimati, Tabuaeran and Kanton (procure global positioning system (GPS) including software and upgrading package with installation system, considering compatibility with existing software and equipment). Develop a website and staff to manage these monitoring activities in order to provide government bodies, partners and interested audience with regular updates on Mineral, Lands and Fisheries data and establish a virtual library to improve access to Ministry and Government e-reports to assist decision-making. Conduct monitoring surveys using established geodetic control benchmarks on selected islands of Kiribati for monitoring coastal movement – land erosion/accretion in relation to climate change and sea-level rise – (procure global navigational satellite system performance system, software and upgrading package, and install system, considering compatibility with existing software and equipment). Conduct and develop a Kiribati National Deep Sea Minerals Report. Train MFMRD staff on data entry and analysis to support decisions to achieve sustainable development of natural resources. Establish a virtual library to improve access to Ministry and Government e-reports to assist decision-making. Provide ongoing institutional strengthening and support for staff managing web page to be able to keep up with current relevant software etc. Collate reports from different regional organisations, government ministries etc., convert to e-copies and add to the virtual library. Collate existing GIS data and place on MD GIS system. 	<p>Spatial data is made readily available either as web or server based applications</p> <p>Benchmarks on islands are in place that could further be utilised to determine the extent of coast erosion/accretion</p> <p>Number of Deep Sea Minerals reports released</p> <p>Number of relevant staff included in on the job training and other relevant trainings and relevant reports released</p>	<p>Minerals Division, Fisheries Division (MFMRD), Lands (MELAD)</p>	<p>National Statistics Office,, OB</p>	<p>Kiribati development partners such as USAID, Japan; CROP members such as SPC (SOPAC Division); research institutions</p>	<p>\$441,887</p>



Strategy 2: Improving knowledge and information generation, management and sharing					
Actions and sub-actions	Performance indicators	Responsible lead agencies	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Output) 2.3: Continued					
<p>Establish and formalise an interdepartmental national monitoring team on coastal changes.</p> <ul style="list-style-type: none"> Undertake national consultation to identify current skills, areas of work and gaps in mapping and monitoring efforts. Develop a Cabinet paper to seek approval for establishment of national monitoring team. Establish a national monitoring team to map coral, seagrass, benthic habitats, water quality, ciguatera etc. Examine how well major contributors to reef island sediment such as corals and foraminifera will cope with climate change effects such as increased temperature, salinity and acidity of seawater. Conduct surveys and monitoring of marine life and coral bleaching at Phoenix Islands Protected Area⁶ and in the Kiribati Islands. Establish a natural marine science laboratory in Kanton⁷. Establish a monitoring and mapping system for ciguatera sites, and strengthen public awareness of how to identify potential ciguatera fish species and locations. Provide regular reports to policy advisers to improve decision-making. Translate science and key adaptation actions into awareness materials in te-Kiribati for the wider I-Kiribati community to increase understanding of the impacts of climate change on marine resources. 	<p>Number of monitoring surveys on coral bleaching in PIPA and at least 2 islands in Kiribati (excluding Abemama) published.</p> <p>Ciguatera outbreak sites are communicated to Island Development Councils and among Ministries on a regular basis.</p> <p>Number of ciguatera cases reduced by 10% by 2020</p> <p>Number of thematic island maps showing unique habitats and ecosystems (e.g. coral reef ecosystem, seagrass, benthic habitats etc.).</p> <p>Scientific report on the impact of ocean temperature, salinity and acidity on corals and foraminifera in Kiribati.</p> <p>All outer islands have access to relevant awareness materials on coastal changes (erosion, marine and land-based habitats) in te-Kiribati</p>	<p>Minerals Division, Fisheries Division (MFMRD), Lands; MHMS, MELAD (Phoenix Islands Protected Area Office)</p>	<p>All ministries</p>	<p>Kiribati development partners such as USAID, Japan; CROP members such as, SPREP and SPC (SOPAC Division); research institutions</p>	<p>\$3,278,636</p>
Total Costs Strategy 2					\$5,555,242

⁶Source: Phoenix Islands Protected Area SAP 2.7 (climate change).
⁷Source: Phoenix Islands Protected Area SAP 1.10 (research & science).



Strategy 3: Strengthening and greening the private sector, including small-scale business						
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost	
<p>Result (Outcome/Output) 3.1: The number of small-scale businesses that process local produce for domestic and export markets (fish produce, agricultural produce, livestock, handicraft) increases.</p> <p>Strengthen and achieve 'greening' of local processing business to add value to local produce and develop small- to medium-scale businesses (using crops, fish, livestock and handicraft and focusing on niche markets).</p> <ul style="list-style-type: none"> Identify and promote crops and species of livestock, fruit and fish that are more resilient to the impacts of climate change. Promote processing of and adding value to selected crops, fruits, nuts, livestock, fish and other products that are resilient to the impacts of climate change (this can include preserving food e.g. dried tuna or processing food like virgin coconut oil and coconut sap sugar). (Note: review Kiribati Handicraft and Local Produce company's capacity to process fruit and to take over the operation of the fruit processing factory at Temwaiku.) Investigate how private sector can get engaged in meeting the demands for organically processed food and other local products (marine and agricultural products). Procure and deliver required and suitable equipment and machinery for processing (e.g. Direct Micro Expeller for virgin coconut oil processing, pots for producing coconut sap sugar, solar dryers for breadfruit, fish). Develop and provide training on processing and marketing of 'climate resilient products' (on Tarawa and outer islands). 	<p>Income generation of local producers increased by 10 % through better processed and marketed products.</p> <p>Number of small to medium scale businesses involved in greening of local processing/value adding.</p> <p>Increase in productivity of crops, livestock and fish farming</p> <p>Number and variety of locally produced and processed food and other products for domestic and export markets</p>	<p>MELAD, MFMRD, MCIC, MLHRD</p>	<p>KHLR, MIA, KCCI, private sector, NGOs</p>	<p>Australia's Aid Program, USAID, New Zealand Aid Program, GIZ/ German Development Cooperation, SPC, international NGOs</p>	<p>\$2,062,633</p>	



Strategy 3: Strengthening and greening the private sector, including small-scale business					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost
Result (Outcome/Output) 3.1: Continued					
<p>Strengthen capacities of existing export companies to increase export of locally made products.</p> <ul style="list-style-type: none"> Improve capacities of existing export companies to increase their exports (such as Kiribati Copra Mill Company Ltd and Kiribati Fish Ltd, private sector businesses). Facilitate and promote establishment of new processing and manufacturing businesses to venture into new products that have niche markets. Strengthen the Kiribati Handicrafts and Local Products Marketing Authority (in charge of marketing) to facilitate domestic markets (local products) and exports. 	<p>% increase in volume of exports</p> <p>Number of new processing and manufacturing businesses established</p>	MCIIC	MFMRD, MELAD, MLHRD	All partners	\$389,811
Result (Output) 3.2: Private sector implements greening initiatives (in areas such as tourism, trade, transport, import/export).					
<p>Explore and implement opportunities of greening import-based private sector (especially in South Tarawa and Kiritimati).</p> <ul style="list-style-type: none"> Consult and raise awareness on green growth (including climate change and disaster risks) with private sector to identify opportunities (e.g. low-impact products, green technologies, minimum energy performance standards and labelling). 	<p>Increase in number of businesses adopting greening initiatives</p> <p>Number of ecotourism businesses (that also support CC adaptation and DRM).</p> <p>Number of selected green tourism products being promoted.</p>	KCCI, private sector	MELAD, KNEG	All partners, international NGOs, foreign green businesses	\$87,878
<p>Strengthen and achieve ecotourism initiatives that support CCA and DRM (e.g. bonafish tourism)</p> <ul style="list-style-type: none"> Review and analyse existing and new potential tourism destinations and products (building on existing studies). Work with tourism companies and guest houses to develop and promote selected green tourism products (for all islands, including bonafishing on Kiritimati and Nonouti). Encourage people to establish ecotourism businesses, and provide guidance on tourist demands as well as greening and marketing tourism projects. 		MCTTD, private sector	MOE, OB, MIA, outer island councils, MELAD and other concerned ministries	All partners, South Pacific Tourism Organisation, SPREP, SPC	\$768,227



Strategy 3: Strengthening and greening the private sector, including small-scale business					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost
Result (Output) 3.2: Continued					
<p>Develop and strengthen local businesses and artisanal fisheries to capitalise on the likely increase in skipjack tuna stocks and to better use bycatch for food security.</p> <ul style="list-style-type: none"> Develop Transshipment and Secondary Services Business Plan (for baitfish, local machine shops, salt etc.), covering prohibition and enforcement of all transshipments at-sea in EEZ (including longline⁸). Identify viable market niches for tuna species of less than 10 kg in weight and concomitantly develop viable products processed from such tuna. Establish Bait-Catching Units (Bagans) at relevant locations in lagoonal islands to complement supply of bait for small-scale artisanal fishers to use in their fishing operations targeting skipjack, yellowfin and bigeye tuna species. Establish and maintain effective and well-resourced Competent Authority, with expertise and resources to develop and certify chain of custody processes (important for enabling the export of seafood products to European markets). Implement Parties to Nauru Agreement Vessel Day Scheme and other commitments through access/licensing agreements. 	<p>At least 10 Bait-Catching-Units established on outer islands by 2020.</p> <p>A Competent Authority is fully operational by 2018</p> <p>% of integration of national commitment in compliance to PNA</p>	MFMRD	National tuna fishing associations, fishers' cooperatives (inclusive of women), KCCI and private sector, MCIC, urban councils, and others	Kiribati development partners such as Australia's Aid Program, EU, New Zealand Aid Program, World Bank, etc.; CROP members such as SPC, FFA; Parties to Nauru Agreement Secretariat	\$1,122,005

⁸Source: MFMRD (2013).

⁹Source: MFMRD (2013).

Strategy 3: Strengthening and greening the private sector, including small-scale business					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost
Result (Output) 3.2: Continued					
Develop Fisheries Management Plans for key commercial species, including: beche-de-mer, aquarium, bonefish (sport fishing and subsistence), arc shells, giant clams, seaweed etc., to strengthen sustainable management and resilience and considering likely effects of climate change and disaster risks on these commercial resources. <ul style="list-style-type: none"> • Develop Management Plans (including consultations). • Develop regulations (including consultations). • Gain approval from Cabinet. • Implement Management Plans and enforce regulations. • (Potentially restore the fishery for arc shell (te bun) in Tarawa.) 	Proportion of fish stocks within their safe biological limits Restoration of 10% of 'te bun' stock at selected pilot MPA sites (such as Teoraereke- Nanikai and Abaiang) by 2017	MFMRD	MIA, MELAD, Office of Auditor-General, island councils, and other relevant ministries, fishers' association (including women)	All partners, SPC, FFA	\$261,260
Review aquaculture activities and develop aquaculture development strategy to maximise food security and to benefit livelihoods. <ul style="list-style-type: none"> • Review and conduct feasibility study on existing aquaculture context in Kiribati to determine constraints and potential for enhancing economic growth, employment and food security (including existing pond infrastructure of Tarawa and Kiriritimat). • Formulate national aquaculture development strategy. • Implement the national aquaculture development strategy by 2015. 	Increase in aquaculture productivity by 20 % in 2018.	MFMRD	MIA, island councils, Taiwan Technical Mission, Eco-Farm, Kiribati Fish Ltd, fishers' associations (including women), private sectors	Kiribati development partners such as Australia's Aid Program, New Zealand Aid Program, FAO, Taiwan Government, etc.; CROP members such as SPC, FFA; international NGOs such as WorldFish	\$27,440



Strategy 3: Strengthening and greening the private sector, including small-scale business					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost
<p>Result (Output) 3.3: Private sector incorporates climate change & disaster risks into its strategic & business plans (and assesses feasibility of insurance).</p> <p>Incorporate the consideration of risks and responses to climate change and hazards into strategic and business plans and explore options to transfer risks to the third parties (micro insurance) to protect local businesses from loss of business and/or profit due to damage caused by fire, inundations, storms, coastal erosion and tsunami.</p> <ul style="list-style-type: none"> Develop guidance on integrating adaptations and risk-reducing measures into business operation plans (as a baseline). Conduct a feasibility study on introducing micro insurance schemes (potentially product development, training and promotion through Kiribati Insurance Corporation). 	<p>Increase in percentage of businesses incorporating climate change and disaster risk in their strategic and business plans including insurance by 2018</p>	<p>MIC, Kiribati Insurance Corporation</p>	<p>MFED, private sector, KCCI, OB</p>	<p>Reinsurance companies, all partners</p>	<p>\$212,989</p>
Total Costs Strategy 3					\$4,932,242



Strategy 4: Increasing water and food security with integrated and sector-specific approaches and promoting healthy and resilient ecosystems					
Actions and sub-actions	Performance Indicator	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
<p>Result (Output) 4.1: Communities with island councils manage and implement climate change adaptation and disaster risk reduction measures as an integral part of their development efforts and inclusive of vulnerable groups.</p> <p>Develop and implement a program for community based integrated vulnerability assessment, climate change adaptation and disaster risk management (such as the Whole of Island Approach, WOI).</p> <ul style="list-style-type: none"> Develop a national community-based integrated vulnerability assessment framework (indicators, survey approach, planning and costing of actions), building on the Government's existing vulnerability assessment framework (2011). Pilot new or continue applying existing approaches on selected outer islands. Establish local steering function at outer island council level and focal point. Conduct integrated and participatory vulnerability assessments to identify adaptation and disaster risk reduction actions, building on existing assessments. Develop a local adaptation and DRM plan and/or respectively integrate identified actions into Island Council Strategic Plans and Island Council Operational Plans (annual). Raise awareness and conduct training on climate change and DRM, targeting outer island council members, outer island chief executive officers and treasurers, and extension officers, NGOs, youth and women, private sector and faith-based organisations' representatives. Exchange information on and replicate good practices on further outer islands. Monitor and evaluate achievements. Exchange information on and replicate good practices on further outer islands. Review of the Whole of Island Approach (WOI) (selection criteria, lessons learnt,...) Develop a whole of country plan for replication of "WOI" 	<p>Kiribati Integrated Vulnerability Framework developed and approved by 2014</p> <p>Number of Island Council Strategic Plans and island council steering committees that consider CC & CCA and DRM</p> <p>Kiribati approaches to community-based climate change adaptation and disaster risk management (integrated and sector-specific) are being replicated based on lessons learned and best practice reviews on at least six outer islands by 2015</p> <p>Increased share of outer island council strategic plans incorporate climate change adaptation and DRM (baseline: in 2013 Abaiang, Teinainano Urban Council and Betio Town Council have strategic plans, with Betio Town Council considering climate change; target to have all outer island councils incorporating climate change adaptation and DRM into their plans by end of 2015)</p> <p>Biosecurity Act is incorporated into the island councils' bylaws on all outer islands by 2023 (baseline 2013: Abaiang is done)</p> <p>Lessons learned and best practices from whole-of-island approach to climate change and DRM are published by 2016</p>	<p>MELAD, MFMRD, MIA, MPWU, outer island councils</p>	<p>OB, KNEG MFED, National Statistics Office, Kiribati Local Government Association, NGOs, faith-based organisations</p>	<p>Australia's Aid Program, New Zealand Aid Program, USAID, GIZ/ German Development Cooperation, EU, ADB, WB, UNDP, SPC, SPREP, USP, INGO</p>	<p>\$757,990</p>

Strategy 4: Increasing water and food security with integrated and sector-specific approaches and promoting healthy and resilient ecosystems					
Actions and sub-actions	Performance Indicator	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Output) 4.1: Continued					
<p>Develop community-based protected areas and protect species at outer island level.</p> <ul style="list-style-type: none"> Develop outer island community-based protected areas. Undertake control and eradication measures to combat invasive species. Develop networking and outer island counterparts with communities to enhance local participation in maintaining and reporting on the status of invasive species, and impacts on environmental problems affecting community-based protected areas and protected species. Identify local counterpart to be trained on environmental issues to carry out invasive alien species monitoring system in outer islands. Integrate community-based protected areas and protected species into outer island bylaws. Conserve island biodiversity through controlling invasive alien species (mynah bird) on all outer islands (starting with Onotoa and Tab North). 	<p>The number of community-based protected areas and protected species established on outer islands.</p> <p>The number of controls that have been applied to address the issue on invasive species.</p> <p>Invasive species have been generally reduced by 10% by 2020.</p> <p>The number of invasive species network battlers and outer island invasive species reporters established.</p> <p>The number of trained local counterparts that participated in invasive species monitoring.</p> <p>The Island council bylaw integrates the provisions for community-based protected areas and protected species by 2020</p> <p>Invasive alien species (mynah birds) are reduced on Onotoa & Tab-North by 10% by 2020.</p>	<p>Environment and Conservation Division (MELAD)</p>	<p>Kiribati Local Government Association, NGOs, faith-based organisations, Island Councils, ALD,</p>	<p>All development partners, SPREP, international NGOs</p>	<p>\$132,970</p>

Strategy 4: Increasing water and food security with integrated and sector-specific approaches and promoting healthy and resilient ecosystems					
Actions and sub-actions	Performance Indicator	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
<p>Result (Output) 4.2: Salt, drought, rain & heat-stress resilient crops, fruit, vegetables & livestock breeds are identified & promoted and communities preserve local food (fruit trees and seafood).</p> <p>Conduct agricultural research programs on sustainable and resilient food crop and livestock production systems (including soil–water management techniques in vegetable production, grey water use and wastewater treatment, livestock waste management, pest and disease control, construction, wetlands).</p> <ul style="list-style-type: none"> Upgrade the Agriculture and Livestock Division and its Centre of Excellence research stations and facilities for research related to crops and livestock – Tanaea, Abatao and Butaritari stations (including research and diagnostic equipment for and staff training on field research and analysis). Identify sources and conduct trials and experiments on resilient crops and livestock breeds and evaluate them for their tolerance and resistance to climate change impacts. Develop capacity of field and research staff of Agriculture and Livestock Division for conducting agricultural and climate change research. Improve diagnostic facilities and personnel of Agriculture and Livestock Division to deal with both crop and livestock pests and diseases. Conduct a trial on aquaponic food production system at the Centre of Excellence Establish revolving funds within community based cooperatives for agricultural activities 	<p>Increase in household access to fruit trees, roots and tuber crops, vegetables, chicken and cross-breed pigs that are considered resilient to climate extremes and salinity by 2016 and on an ongoing basis (baseline: based on the 2010 National Census, average access to food crops is six crops per household and to livestock (pigs and chickens) is six pigs and/or chickens per household; target is to increase these figures by 70%)</p> <p>Agricultural central and outer islands research and major producing stations are well equipped and established with planting materials</p> <p>Diagnostic and soil mini laboratory upgraded at ALD.</p> <p>ALD staff conducts diagnostics and research on pest and diseases and climate change in relation to crop and livestock.</p> <p>Evaluation report on aquaponic food production system results published. Revolving funds established</p>	<p>Agriculture and Livestock Division (MELAD)</p>	<p>MFED, MFMRD, MIA, Environment and Conservation Division and Lands (MELAD)</p>	<p>Australia's Aid Program, USAID, EU, FAO, UNDP, German Development Cooperation; SPC (Land Resources Division and SOPAC); ACIAR, IFAD, USP</p>	<p>\$ 1,133,098</p>



Strategy 4: Increasing water and food security with integrated and sector-specific approaches and promoting healthy and resilient ecosystems					
Actions and sub-actions	Performance Indicator	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Output) 4.2: Continued					
<p>Design, test, implement and evaluate agriculture production systems to establish food-secure communities in the face of climate changes and disaster risks at community level.</p> <ul style="list-style-type: none"> Identify and select community pilot sites highly impacted by climate change. Establish a multi-sensing and monitoring system for acquiring significant parameters related to agriculture and climate change (e.g. temperature, humidity, solar radiation, soil pH, soil moisture, leaf wetness, pest and disease accounting, carbon dioxide concentration, soil and water salinity). Carry out climate change vulnerability assessments and adaptive capacities in agriculture at selected farming communities. Document traditional knowledge, among men and women, of cultivation, preparation and preservation techniques for traditional food crops and fruit trees. Develop community and outer islands awareness program and demonstration sites to promote climate-resilient crop and livestock production systems (taking into consideration traditional and contemporary knowledge and practices, such as agroforestry, drought/salinity-resilient crops and livestock, sustainable management practices). Implement identified actions and monitor progress (such as promotion and enhancement of household agroforestry systems, re-planting of traditional and climate resilient staple food crops (e.g. coconut trees, cassava, sweet potato, etc), upgrading island nurseries, practice of organic and conservation agriculture, composting, mulching and cover crops). Evaluate agriculture programs to identify best practices and lessons learned. Replicate good practices on all outer island. 	<p>Increase in people trained on preservation on food</p> <p>Increase in number of households preserving traditional staple foods</p> <p>Reports, documents, and other awareness and promotional materials on traditional knowledge of food preservation techniques produced and promoted</p> <p>Number of communities and research stations at OIs with multi-sensing and monitoring system established and piloted (in collaboration with KMS)</p> <p>Number of OIs demonstration sites and pilot communities practiced or trialed climate-resilient crop and livestock production systems established (2 sites or communities at each Island of different groups/ regions to produce per year)</p>	<p>Agriculture and Livestock Division and Environment and Conservation Division (MELAD)</p>	<p>MIA, OB, KMS, Water Engineering Unit (MPWU), MFMRD, KNEG, MCIC, MCTTD, NGOs</p>	<p>Australia's Aid Program, USAID, EU, FAO, UNDP, German Development Cooperation; SPC (Land Resources Division and SOPAC); ACIAR, IFAD, USP</p>	<p>\$ 1,020,556</p>

Strategy 4: Increasing water and food security with integrated and sector-specific approaches and promoting healthy and resilient ecosystems					
Actions and sub-actions	Performance Indicator	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
<p>Result (Output) 4.2: Continued</p> <p>Improve agriculture services to promote sustainable agriculture management systems and resilient crops and livestock.</p> <ul style="list-style-type: none"> • Repair the chicken facility, the feed storage shed and the piggery, and implement water tanks to enhance production. • Develop and conserve adapted local pig and chicken breeds and feed. • Improve and promote animal waste management technologies. • Enhance livestock and crop distribution mechanism to outer islands. • Develop and distribute livestock and agricultural management guidelines. • Establish a revolving fund within Agriculture and Livestock Division to maintain the livestock facility. 	<p>Livestock production is maintained or increases in spite of climate change (within sustainable limits)</p> <p>Increase in number of livestock (pigs and chickens) distributed to OIs (Baseline need to establish by 2014)</p> <p>Increase in number of chicken and pig pens/houses and number of stocks maintained for breeding and improvement</p>	<p>Agriculture and Livestock Division (MELAD)</p>	<p>MIA, OB, KMS, Water Engineering Unit (MPWU), MFMRD, KNEG, MCIC, MCTTD, NGOs</p>	<p>USAID, Australia's Aid Program, German Development Cooperation, UNDR, FAO, SPC (SOPAC, Land Resources Division), IFAD</p>	<p>(Included in above total)</p>

Strategy 4: Increasing water and food security with integrated and sector-specific approaches and promoting healthy and resilient ecosystems					
Actions and sub-actions	Performance Indicator	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
<p>Result (Output) 4.3: Communities manage coastal fisheries taking into consideration sustainability of marine resources as well as climate change and disaster risks.</p> <p>Implement Community Based Fisheries Management (CBFM) in three pilot communities¹⁰ to increase resilience to climate change and make use of potential benefits (such as likely increase of skipjack tuna).</p> <ul style="list-style-type: none"> Identify pilot communities for CBFM. Conduct fisheries-specific vulnerability assessment to plan adaptation activities. Document traditional knowledge on fishing, navigation and preservation techniques. Develop community and outer islands awareness program and demonstration sites to promote CBFM (taking into consideration traditional and contemporary knowledge and practices). Implement identified actions and monitor progress (such as artificial reefs, preservation of seafood, deployment of nearshore fish aggregating devices (FADs), management plans, establishment of marine protected area, farming of clams, etc.). Evaluate CBFM programs to identify best practices and lessons learned. Exchange information on and replicate best practices. 	<p>Increase in household access to oceanic and aquaculture seafood</p> <p>At least three vulnerability assessment on fisheries reports published.</p> <p>Traditional knowledge and scientific and adaptation messages published as awareness materials and distributed to target communities</p> <p>Adoption of best practices to new identified sites</p>	<p>Agriculture and Livestock Division (MELAD)</p>	<p>MIA, OB, KMS, Water Engineering Unit (MPWU), MFMRD, KNEG, MCIC, MCTTD, NGOs</p>	<p>USAID, Australia's Aid Program, German Development Cooperation, UNDP, FAO, SPC (SOPAC, Land Resources Division), IFAD</p>	<p>(Included in above total)</p>

¹⁰Source: MFMRD (2013).

Strategy 4: Increasing water and food security with integrated and sector-specific approaches and promoting healthy and resilient ecosystems					
Actions and sub-actions	Performance Indicator	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
<p>Result (Output) 4.3: Continued</p> <p>Deploy networks of nearshore FADs¹¹ to increase access to pelagic fish and reduce pressure on coastal fisheries.</p> <ul style="list-style-type: none"> Identify FAD deployment priority locations and FAD number/budget (i.e. deploy and maintain 50–100 FADs for five years) and ratio of nearshore and deepwater FADs based on a country-wide cost-benefit analysis. Identify indicators and develop research plan to monitor FAD impacts/benefits and implement monitoring of catches. Identify and secure funding for continuous FAD deployment and maintenance program, with contribution from access agreement condition funding. Deploy and maintain FADs, with monitoring of impact indicators. 	<p>Increased access of households to oceanic and aquaculture seafood FAD deployed in at least 5 locations each year.</p> <p>Monitoring reports on FADs effects on increasing fish catches and maintenance costs published every 2cd year.</p>	MFMRD	MIA, MELAD, island councils, MCIC, OB, KNEG, private sector (such as Kiribati Fish Ltd) and NGOs, fishers (men and women, communities and artisanal fisheries)	Australia's Aid Program, UNDP, EU, GIZ / German Development Cooperation; SPC, FFA, ANCORS, WorldFish, ACIAR	\$385,170

¹¹ Source: MFMRD (2013).

Strategy 4: Increasing water and food security with integrated and sector-specific approaches and promoting healthy and resilient ecosystems					
Actions and sub-actions	Performance Indicator	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Outcome) 4.4: Communities have constant access to basic food commodities.					
<p>Ensure constant availability of basic food commodities (such as rice, sugar and flour) to increase food security on Tarawa and outer islands.</p> <ul style="list-style-type: none"> Review current national quota for basic food commodities (rice, flour and sugar) to ensure it meets the population's needs. Negotiate a better shipping route through arrangements with shipping agencies to ensure that the frequency of landing is compulsory (agreement could be part of the licensing arrangement). Conduct ongoing monitoring of minimum order levels to ensure major importers place monthly orders well in advance. Establish a reserve for basic food commodities to cater for shortage of cargoes in case of delays in imports and emergency cases (sugar, rice, flour) – often caused by severe weather conditions. Construct cargo warehouse (basic food reserve/buffer). Identify options to improve the cargo shipping arrivals from overseas and subsequent distribution in Kiribati (delays caused by bad weather conditions). Conduct logistical and economic cost-benefit analysis of existing private and public shipping lines to identify constraints and needs, prioritise strategic actions (note: private businesses prefer catering for neighbouring islands while government should look after long distance routes, unless subsidised) and enhance transport services. Implement prioritised strategic actions. 	<p>Reduction in number of times that MCIC has to ration basic commodities by 2016 (baseline 2013: rationing required once to twice a year)</p> <p>Annual review conducted</p> <p>Number of agreement made.</p> <p>Regular and consistent order placed from overseas</p> <p>National Reserve for basic food commodities established</p> <p>National cargo warehouse constructed</p> <p>Logistical and economic cost benefit analysis published.</p>	MCIC, MCTTD	KCCI, NGO, MFED, shipping lines, private sector (commerce and trade), MELAD	All	\$245,469



Strategy 4: Increasing water and food security with integrated and sector-specific approaches and promoting healthy and resilient ecosystems					
Actions and sub-actions	Performance Indicator	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Outcome) 4.4: Continued					
<p>Develop incentives and strategies for engaging local communities in protecting water sources for public water supply and form village water and sanitation committees.</p> <ul style="list-style-type: none"> Conduct cost-benefit analysis for providing free water to the landowners where the reserves are located Implement the results of the cost-benefit analysis. Develop and conduct education and community awareness programs on protecting water sources in Kiribati 	<p>Cost-benefit analysis report on providing free water to land owners conducted.</p> <p>Number of villages that received awareness materials on the protection of water sources.</p> <p>All outer islands have drought response plans in place by 2016 (baseline 2013: a drought response plan is in place in South Tarawa)</p>	MPWU	OB, MFED, MELAD	All	\$ 196,288
<p>Strengthen management of water resource during drought.</p> <ul style="list-style-type: none"> Develop drought management plans for all islands of Kiribati. Implement drought response activities for affected islands. Develop a water use Sector Operational Plan during drought for all islands. Review drought methodology for South Tarawa. Support timely response of National Disaster Council and Drought Committee during droughts. 	<p>Decrease of reported emergencies caused by droughts.</p> <p>Review carried out on drought methodology for South Tarawa</p> <p>The proportion of water quality samples with excess WHO standards for parameters such as coliform counts and nitrates is reduced (baselines and targets are parameter specific and will be established at the National Water Quality Monitoring Committee level)</p>	MPWU	National Water Quality Monitoring Committee	All	\$796,746
Total Costs Strategy 4					\$4,693,577



Strategy 5: Strengthening health service delivery to address climate change impacts					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
<p>Result (Outcome) 5.1: The public is aware of water safety and proactively reduces the spread of vector-, water- and food-borne diseases.</p> <p>Develop and provide communities with health information necessary to address health risks of climate change (including specific information targeting young people, people with disabilities, women and men).</p> <ul style="list-style-type: none"> Develop and commence implementation of a communication plan. Prepare communication tools e.g. web portal, brochures, fact sheets, posters. Develop health-related materials that can be used in the ongoing school curriculum revision. Develop public/household awareness and education materials. 	<p>An information system for environmental health parameters and disease outbreaks and a reliable system to record and archive environmental health data are in place</p>	MHMS	MISA, MOE, Faith-based Organisations, NGO	EU, WHO, UNICEF, SPC (GCCA)	58,940,00
<p>Result (Output) 5.2: Routine systems for surveillance of environmental health hazards and climate-sensitive diseases are strengthened.</p> <p>Strengthen routine systems for surveillance of environmental hazards and climate-sensitive diseases.</p> <ul style="list-style-type: none"> Conduct training in environmental health monitoring and data analysis (courses, attachments, on-the-job). Establish environmental health information system (under discussion). Refurbish and equip environmental health laboratory including equipment, reagents and computers. Procure vehicular transportation for environmental health monitoring and response. 	<p>See above</p> <p>25% increase in outer islands that are engaged in regular environmental health surveillance activities (target and baseline to be established by the end 2015)</p> <p>% decrease in the incidence of climate-related diseases (target and baseline to be established by 2016)</p>	MHMS	MFMRD, MELAD, MPWU, MIA	EU, WHO, UNICEF, SPC (Global Climate Change Alliance)	\$164,133

Strategy 5: Strengthening health service delivery to address climate change impacts					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Output) 5.3: Capacities are enhanced and equipment provided to the MHMS Central Laboratory and Environmental Health Laboratory to test water and food, conduct vector control activities and analyse results.					
<p>Strengthen preparedness for response to outbreaks of climate-sensitive diseases.</p> <ul style="list-style-type: none"> Review and revise processes and procedures of Environmental Health Unit and the Surveillance Committee for responding to disease outbreaks. Ensure Environmental Health Unit is equipped with response equipment e.g. vector control kits. Establish national outbreak preparedness and response plan. Strengthen diagnostic capacity to identify food poisoning cases (ciguatoxins vs food poisoning) 	<p>A national outbreak preparedness and response plan and a sectoral environmental health plan, which incorporates surveillance and response to climate-sensitive diseases, are in place the end of 2015¹²</p> <p>The EH capacity is strengthened to control vector-related disease outbreaks</p> <p>Data available differentiating specific food poisoning cases</p>	MHMS	KNEG	EU, WHO, UNICEF, SPC (Global Climate Change Alliance)	\$ 157,487
Result (Outcome): 5.4 I-Kiribati population's general health status is enhanced to be more resilient to climate-related diseases.					
<p>Reduce incidence of noncommunicable diseases (research and publicise nutrition content of local foods).</p> <ul style="list-style-type: none"> Conduct research on the nutrient content of local foods (mai, babai, kumara). Create awareness of the nutritional value of local foods. Relate pricing of imported food items to their nutritional values. 	<p>Overall health indicators improved using 2004 as a baseline</p> <p>Baseline survey completed</p> <p>The people are aware of the health-related importance of food</p> <p>Increased cost to unhealthy foods and reduced cost of healthy food</p>	MHMS	MELAD, MFMRD, MGIC, KCCI	EU, WHO, UNICEF, SPC (Global Climate Change Alliance)	\$52,107
Result (Output) 5.5: A national outbreak preparedness and response plan and a sectoral environmental health plan, which incorporate surveillance and response to climate-sensitive diseases, are in place.					
<p>Strengthen coordination, planning and budgeting mechanism within the health sector.</p> <ul style="list-style-type: none"> Employ two qualified staff to drive and implement the project. Prepare a maintenance and financing plan for beyond project life. Integrate environmental health information into the MHMS information management system. 	<p>Increased number of qualified health sector staff as compared with 2011 roster</p> <p>Environmental health information is captured in the national health database</p>	MHMS	OB, MFED	EU, WHO, UNICEF, SPC (Global Climate Change Alliance)	\$40,080
Total Costs Strategy 5					\$472,747

¹² Source: Logframe MHMS and SPC Global Climate Change Alliance 2013.

Strategy 6: Promoting sound and reliable infrastructure development and land management					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP and members	Indicative cost (AUD)
Result (Outcome) 6.1: The livelihood of I-Kiribati is improved through public buildings, infrastructure and utilities that are well maintained and resilient to climate change and disasters (climate proofing).					
<p>Retrofit school infrastructure where required to withstand extreme weather events (climate proofing) and relocate if required.</p> <ul style="list-style-type: none"> Assess the vulnerability of the infrastructure of each school in Tarawa and outer islands by end of 2013 (ongoing). Develop a plan and implement in stages, starting from northern islands and most vulnerable schools (together with the community where the schools are located). 	<p>% of school buildings either relocated or retrofitted after being assessed as at high risk (70% of high risk school buildings by 2016/17)</p>	MOE	MPWU, Lands (MELAD), MIA, MFED	World Bank, EU, ADB, Australia's Aid Program	\$1,551,054
<p>Establish a revolving fund (not the Revenue Equalisation Reserve Fund) to sustain infrastructure projects and their resilience to climate change and hazards.</p> <ul style="list-style-type: none"> Develop an option paper for infrastructure maintenance (linked to the action and sub-actions above), which can be used in discussions to identify the most feasible and sustainable option for approval. Consider and develop a Cabinet concept paper on the establishment of a revolving fund (linked to the most appropriate option) to present to Cabinet (including consultation on scope, fees, types of infrastructure projects, management and operation) for public infrastructures maintenance. 	<p>% of maintenance costs of public buildings and coastal and water infrastructure covered by the revolving fund (percentage to be established)</p>	MFED	OB, KNEG	PIFS, Australia's Aid Program, EU	\$525,805

Strategy 6: Promoting sound and reliable infrastructure development and land management					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Outcome) 6.1: Continued					
Retrofit coastal infrastructure (roads, causeways, jetties) to sustain it against threats of climate change and disaster risks. <ul style="list-style-type: none"> Assess the current status of roads, causeways and jetties in the context of current variability and future trend of climate change and disaster risks. Design suitable retrofitting alternatives to strengthen coastal infrastructure that is at high risk. Implement pilot retrofitting alternatives to coastal infrastructure that is at high risk. Assess and recommend appropriate retrofitting techniques to all public buildings that are under threat from climate change and disaster risks. 	Increase in the % of coastal infrastructure that has been retrofitted after being assessed as vulnerable to climate change and disasters (assessment needs to be carried by 2014)	MPWU, MCTTD	To be defined	Any interested partner	\$499,340 (actual retrofitting costs to be established after assessment)
Retrofit or relocate public, essential services buildings and emergencies and evacuation centres (including power, fuel and renewable energy installations and facilities). <ul style="list-style-type: none"> Review and assess the building code and/or minimal standards used and status of public and essential services buildings and infrastructure in the context of climate variability and disaster risks. Implement priority recommendations for retrofitting including design, material and techniques to public buildings and infrastructure that are at high risk. 	Safety standards for infrastructure and construction sectors are adopted by 2020 % of buildings and infrastructure complying with new safety standards by 2023 (target and baseline to be established in the assessment)	MPWU, OB	All ministries, Kiribati Oil Company Ltd, Public Utilities Board, Energy Planning Unit (MPWU)	Any interested partner	\$550,993 (actual retrofitting costs to be established after assessment)



Strategy 6: Promoting sound and reliable infrastructure development and land management					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Outcome) 6.1: Continued					
<p>Enhance air transport infrastructure and security to better withstand impacts of climate change and disaster risks.</p> <ul style="list-style-type: none"> Construct runway seawall and runway end safety area to protect runway from sea-level rise and erosion and to accommodate relief plane in times of disaster. Strengthen navigational capacity through calibration of navigational requirements and installation of navigational aids at every international and domestic airport. Improve/rehabilitate all airports (including Canton and Fanning). 	<p>Kiribati international airport meets basic international standards after rehabilitation</p> <p>Navigational aids installed and being used in 100% of airports nationally</p>	MCTTD	MPWU	WB, ADB, Any interested partner	\$19,874,352
<p>Enhance sea transport infrastructure to better withstand climate change and disaster risks.</p> <ul style="list-style-type: none"> Procure and install navigational/radio equipment (including Kiritimati). Include risk reduction considerations in rehabilitation of Kiritimati Port. 	<p>Navigational/ radio equipment installed in x % of all ships by 2020</p> <p>Disaster risks incorporated into the design of the rehabilitated Kiritimati Port.</p>	MCTTD	MCTTD, MPWU, Ministry of Line and Phoenix Development, Office of Attorney-General	EU, Any interested partner	\$249,245 (not including costs for rehabilitation of Kiritimati Port)

Strategy 6: Promoting sound and reliable infrastructure development and land management					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
<p>Result (Output) 6.2: Land planning and management for all islands that provides clear regulations on land development with competent planning authorities strengthened to implement & enforce land use regulatory frameworks and water regulations (see also Strategy 1).</p>					
<p>Formulation of land use plans and development guidelines for all Kiribati islands and strengthen competent land planning authorities at the central and local levels for effective management of contemporary land planning issues considering CC and DRM.</p> <ul style="list-style-type: none"> Strengthen & develop capacity of land planning authority at the central and local levels with relevant trainings, appropriate equipment and software are procured for producing realistic land use plans Conduct training for all appropriate officers from island councils with formulation of land use plans and land development guidelines for outer islands. Review of existing land use plans & urban development guideline incorporating elements of CCA & DRM where necessary. Adoption and implementation of land use plans & land planning development guidelines for all islands in Kiribati Urban/rural profiling studies for development of Rural Land Development Plan promoting the Outer Islands Growth Centre Concept ~investigate utilisation of neglected lands at the outer islands to address key issues of food security & decentralisation Designing & implement land planning for resilient communities (urban/rural/highly vulnerable communities) with ability & coping capacity to reduce damages & recover from unpredictable disaster & disturbances. 	<p>Publicly owned land is clearly demarcated by 2017</p> <p>Land use plans & development guidelines incorporating CCA & DRM are endorsed and implemented for all outer islands by 2016</p> <p>Planning authorities are provided with adequate trainings and are fully functional in performing delegated planning roles by 2016</p> <p>Rural Land Development Roadmap is prepared for endorsement by 2015. This Roadmap will complement the Urbanisation Policy (Strategy 1) and outer islands land use planning</p> <p>Communities are better prepared for uncertainties and able to adapt & respond to disasters & changing conditions</p>	<p>Lands (MELAD)</p>	<p>MPWU, MELAD Agriculture, OB</p>	<p>Any interested partner</p>	<p>\$4,317,052</p>

Strategy 6: Promoting sound and reliable infrastructure development and land management					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Outcome) 6.3: Water reserves are protected and communities have access to sufficient and adequate fresh water at all times (including during extreme events such as drought, heavy rain and storm surges; see also Strategy 4) and to improved sanitation facilities.					
<p>Identify and assess potential groundwater sources (and capacity), taking into consideration current variability and climate change projects on all islands¹⁴.</p> <ul style="list-style-type: none"> Conduct water reserve assessments on all the islands of Kiribati including Line and Phoenix Groups (including sustainable yield estimation of major groundwater resources). Provide training on the application of inundation models developed for the Bonriki water reserve and its applicability to other similar water reserves or water protection zones. Establish and provide training on GIS applications for water resource management and monitoring of water quality and potential yield of groundwater resources on all islands. Develop water maps that integrate seasonal climate predictions and water availability Implement appropriate water sources in 18 pilot sites. Conduct education campaign to explain the results of assessments and dangers of over-pumping to communities. 	<p>Water reserve assessments conducted and data on sustainable yield available for all islands</p> <p>GIS being used for water resource management and monitoring</p> <p>Water maps developed with integrated seasonal climate predictions and water availability</p> <p>The number of communities made aware of dangers of over-pumping</p>	MPWU, MIA	MOE, MHMS, MELAD, faith-based organisations (e.g. Mormons)	EU, Australia's Aid Program, ADB, UNICEF, SPC (SOPAC)	\$4,205,972

¹⁴ Ongoing with KIRIWATSAN, USSKAP, and past work of KAPII (North Tarawa, Tab North and Tamana).

Strategy 6: Promoting sound and reliable infrastructure development and land management					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Outcome) 6.3: Continued					
Identify and implement most appropriate technological and sustainable management measures to increase water safety (quality and quantity) at village level based on assessments of groundwater resources (see action above) and assessment of rainwater catchment capacity on outer islands (private households, public buildings such as schools, government offices, health centres, churches and maneaba). <ul style="list-style-type: none"> • Identify most appropriate water sources and technological actions such as infiltration galleries; protection of household wells from wave overtopping, contamination and heavy rain; rainwater harvesting; desalination plants. • Conduct cost-benefit analysis for the different options to select the most appropriate one. • Implement appropriate selected actions, including but not exclusively the following: <ul style="list-style-type: none"> – Establish a selection of guidelines and asset management plans for the delivery and maintenance of rainwater harvesting schemes to every household. – Provide rainwater harvesting facility to households in compliance with the building code through loans scheme. – Install infiltration galleries at village level on outer islands. – Implement appropriate water sources in 18 pilot sites. 	The number of water sources and technologies identified Cost-benefit analysis report produced 15% increase in the number of households and public buildings with rainwater catchments by 2013 and a 30% increase by 2018 50% increase in number of households and community systems that are connected to the public water supply by 2018	MPWU	MHMS	Any interested donors	\$6,894,140



Strategy 6: Promoting sound and reliable infrastructure development and land management					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Outcome) 6.3: Continued					
<p>Reduce water wastage and losses and rehabilitate and increase the coverage of reticulated water supply on South Tarawa (including protection and refurbishment of the Bonriki Water Reserve).</p> <ul style="list-style-type: none"> • Provide training and equipment to Public Utilities Board in leakage detection. • Detect and repair losses in transmission and distribution lines. • Deploy water meters on all connections to encourage water conservation. • Replace pumps at existing infiltration galleries and install additional infiltration gallery at Bonriki, treat chlorine gases with powered chlorine system, and aerate and rehabilitate chambers. <p>Develop sanitation and an open defecation-free environment for improved health in support of adaptation initiatives. (SMEC project)</p> <ul style="list-style-type: none"> • Rehabilitate existing sanitation infrastructure on South Tarawa (including outfalls, pumping stations, saltwater supply system). • Develop appropriate, acceptable and affordable on-site sanitation designs for non-sewered water supply systems for South Tarawa. • Incorporate on-site sanitation designs in the building code and implement inspection and monitoring of impacts. • Implement initiatives to eliminate open defecation on both South Tarawa and outer islands and support island councils in this task. • Construct and support community and school toilets and handwash facilities. 	<p>Training and equipment provided for leakage detection</p> <p>% of detected and repaired losses in transmission and distribution lines</p> <p>% of water metre connections coverage</p> <p>% of pumps replaced</p>	Public Utilities Board	Betio Town Council, MPWU, MOE, KIT and private sector	Australia's Aid Program, EU, World Bank, ADB, UN, any interested partners, SPC	\$ 3,554,652
<p>Develop sanitation and an open defecation-free environment for improved health in support of adaptation initiatives. (SMEC project)</p> <ul style="list-style-type: none"> • Rehabilitate existing sanitation infrastructure on South Tarawa (including outfalls, pumping stations, saltwater supply system). • Develop appropriate, acceptable and affordable on-site sanitation designs for non-sewered water supply systems for South Tarawa. • Incorporate on-site sanitation designs in the building code and implement inspection and monitoring of impacts. • Implement initiatives to eliminate open defecation on both South Tarawa and outer islands and support island councils in this task. • Construct and support community and school toilets and handwash facilities. 	<p>Indicators of sanitation markedly improved from a 2004 baseline</p> <p>Baseline survey completed using improved national indicators</p> <p>Sanitation infrastructure rehabilitated</p> <p>Appropriate sanitation designs developed and incorporated in building codes</p> <p>% of outer-islands adopting the elimination of open defecation initiatives (Kiribati to be ODF- Open Defecation Free by 2015)</p> <p>The number of communities and schools with handwash and toilet facilities</p>	MPWU, MIA	MHMS, MELAD	Any interested partners	\$43,268



Strategy 6: Promoting sound and reliable infrastructure development and land management						
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)	
Result (Outcome) 6.3: Continued						
Develop and implement asset management plans for water and sanitation resources <ul style="list-style-type: none"> Gather data for development of asset management plans. Develop asset management plans Conduct capacity building (training) on implementation of plans. Establish and support revolving fund for ongoing maintenance of community water and sanitation systems. 	Asset management plans are in place for all community and government infrastructure by 2018 (baseline 2013: number of government assets with asset management plans)	MPWU, MIA	MHMS, MELAD	Any interested partners	\$ 10,210,640	
Total Costs Strategy 6					\$52,476,513	



Strategy 7. Delivering appropriate education, training and awareness programs	Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
	<p>Result (Outcome) 7.1: Students and professionals have capacities to take action on adaptation, and risk reduction and coping strategies before, during and after disasters and emission mitigation.</p> <p>Define, specify and monitor climate change and disaster risk management learning outcomes and content in the new syllabus for formal primary and secondary education, including agriculture and livestock, fisheries, water, environment and health (based on Education for Sustainable Development principles – ongoing).</p> <ul style="list-style-type: none"> Incorporate relevant topics, learning outcomes and content on climate change and DRM, along with other areas, into syllabus of Years 3–6, Years 7–9 and Years 10–12 based on consultation outcomes and framework (including quality assurance). Consult on the new syllabus in the Gilbert and Line Groups (Kiritimati). Develop teaching materials and incorporate relevant content and methods into teacher guides (including quality assurance). 	<p>Climate change and disaster risk management elements are integrated into the national curriculum for primary schools, junior secondary schools by 2017</p> <p>Increase in number of extra-curricular activities on climate change and disaster risk management conducted by schools (target and baseline to be established by 2015)</p> <p>KTC lecturers have incorporated knowledge gained in Professional Development (PD) trainings on climate change, DRM and related areas into teacher guides by end of term 2 of 2014</p>	MOE (Curriculum Development and Resource Centre)	MELAD, OB, MFMRD, MPWU, MHMS, MLHRD, KNEG, Sandwatch Network, FSPKI, other NGOs	Australia's Aid Program, German Development Cooperation, UNESCO, UNICEF, SPC, SPREP, international NGOs such as Plan International	\$1,263,877
	<p>Incorporate climate change, DRM and other related areas such as agriculture, livestock, environment, fisheries, water and health into KTC's pre-service primary, junior secondary and senior secondary teacher training program and teacher professional development training (in-service programs – ongoing).</p> <ul style="list-style-type: none"> Train KTC lecturers on climate change, DRM and related areas and on teaching and delivery approaches and strategies to these subjects. Write pre-service and TPD courses, training materials and facilitator guides. Conduct teacher professional development trainings for all in-service teachers in South Tarawa and on all outer islands. Train student teachers at KTC based on revised courses in line with the new curriculum including climate change, DRM and related areas (pre-service).¹⁵ Provision of resources to support the delivery of CC, DRM and related areas for Pre-service and in-service programs 	<p>Pre-service and TPD training materials and facilitators guides writing on CC DRM and related areas for different Year levels completed by end of term 3 2014</p> <p>Kiribati teachers have incorporated knowledge gained in PD workshops on climate change, DRM and related areas and on delivery approaches and strategies into lesson plans for:</p> <ul style="list-style-type: none"> Year 1, 2, & 3 by end of term 3 2015 Year 4, 5 & 6 by end of term 3 2016 Year 7, 8 & 9 by end of term 3 2017 <p>New pre-service courses in delivering CC, DRM and related areas developed:</p> <ul style="list-style-type: none"> Teaching Primary by 2014 Teaching JSS by 2016 <p>Student and teacher resources are available for the different Year levels:</p> <ul style="list-style-type: none"> Year 1, 2 & 3 by end of term 3 2014 Year 4, 5 & 6 by end of term 3 2015 Year 7, 8 & 9 by end of term 3 2016 	MOE (KTC)	MELAD, OB, MFMRD, MPWU, MHMS, MLHRD, KNEG, Sandwatch Network, FSPKI, other NGOs	Australia's Aid Program, German Development Cooperation, UNESCO, UNICEF, SPC, SPREP, USP; international NGOs such as Plan International	\$3,218,949

¹⁵ Based on new syllabus, national teaching materials and teacher guides and the picture-based teaching resource 'Learning about Climate Change the Pacific Way' (SPC/GIZ 2013), the Kiribati Climate Change Framework for primary, junior secondary and senior secondary levels (UNESCO 2012) and other resources.

Strategy 7. Delivering appropriate education, training and awareness programs					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Outcome) 7.1: Continued					
<p>Integrate relevant climate change and disaster risk management content and skills into Technical and Vocational Education and Training (TVET).</p> <ul style="list-style-type: none"> Conduct awareness campaign for new TVET policy (partly ongoing). Integrate already identified competencies and learning outcomes into existing training programs of Fisheries Training Centre, Marine Training Centre, School of Nursing and Kiribati Police Service. Conduct training need analyses with relevant TVET training providers. Train lecturers on strategies for teaching about climate change and DRM. Develop and/or provide sector-specific and generic training materials on climate change and DRM. 	<p>Climate change and disaster risk management elements are integrated into the TVET syllabus by 2015</p> <p>Assessment results show that students achieve competencies for climate change and disaster risk management</p>	MLHRD (KIT, FTC, MTC), MHMS (School of Nurses), Kiribati Police Service	Apprenticeship Board, MTC, FTC, KIT, regional TVET bodies	Australia's Aid Program, New Zealand Aid Program, German Development Cooperation, UNESCO, SPC, SPREP, USP	\$1,500,026
<p>Develop and implement a human resource development plan to support long-term climate change adaptation and DRM.</p> <ul style="list-style-type: none"> Assess capacity gaps and needs for climate change adaptation and DRM. Identify training programs and resource needs, and align to pre-service and public service training programs on climate change adaptation and disaster risk management skills (water engineers, coastal engineers, ocean modellers, climatologists, meteorologists, entomologists, psychologists). Develop new human resource development policy for NSA procedures, along with a training manual. 	<p>Increase in the number of I-Kiribati with qualifications related to climate change and disaster risk management by 2018 (tertiary qualifications, professional on-the-job training certificates, attachment certificates; target and baseline to be established by 2015)</p>	Public Service Office	OB, KNEG	Any interested partners	\$269,330

Strategy 7. Delivering appropriate education, training and awareness programs					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Output) 7.2: The I-Kiribati population is well informed and all stakeholders have access to up-to-date and accurate, contemporary and traditional information on climate change and disaster risk management (see also Strategy 2) and communities take voluntary action to reduce climate change and disaster risks.					
<p>Strengthen the capacity of community-based organisations to provide training and awareness on climate change and disaster risk management to communities (churches, NGOs, etc.).</p> <ul style="list-style-type: none"> Train NGO staff with training of trainers approach on community-based climate change and DRM (including integration of climate change and DRM in the design, implementation and evaluation of projects with communities; inclusive of vulnerable groups). Conduct awareness workshop in villages (outreach). Improve planning to make programs sustainable by developing NGO Action Plan with long-term objectives and providing grant-writing training to long-term projects. Build advocacy skills on climate change and DRM among community-based organisations. <p>Strengthen capacities of media outlets, government departments, NGOs and faith-based organisations to deliver messages on climate change and DRM.</p> <ul style="list-style-type: none"> Messages follow the Kiribati CC and DRM Communications Strategy currently being finalized The Strategy is implemented according to the activities outlined in the workplan Develop a media program to convey climate change and DRM issues based on the Strategy in radio, newspaper and television. Develop plays or dramas on climate change and DRM based on the key messages outlined in the Strategy. 	<p>Increase in number of community-based organisations providing training to communities on climate change and disaster risk management initiatives (target and baseline to be established 2015)</p> <p>All new climate change and disaster risk management awareness, education and training materials include up-to-date and accurate, locally relevant, contemporary and traditional knowledge</p>	<p>NGOs such as KiriCar, Pacific Calling Partnership, Caritas, EcoCare, FSPKI, Sandwatch Network, Te ToaMatoa, MIA</p>	<p>KNEG</p>	<p>Australia's Aid Program, German Development Cooperation, UNESCO, UNICEF, New Zealand Aid Program; SPC, SPREP, USP; international NGOs such as Plan International</p>	<p>\$533,420</p>
<p>Strengthen capacities of media outlets, government departments, NGOs and faith-based organisations to deliver messages on climate change and DRM.</p> <ul style="list-style-type: none"> Messages follow the Kiribati CC and DRM Communications Strategy currently being finalized The Strategy is implemented according to the activities outlined in the workplan Develop a media program to convey climate change and DRM issues based on the Strategy in radio, newspaper and television. Develop plays or dramas on climate change and DRM based on the key messages outlined in the Strategy. 	<p>Media outlets, government departments, NGOs and faith-based organisations use common key messages for CC and DRM communications in Kiribati</p> <p>The Kiribati CC and DRM Communications Strategy is implemented</p>	<p>OB, KJIP Secretariat Environment and Conservation Division (MELAD), Kiribati Broadcasting, Youth Group Caritas</p>	<p>MIA</p>	<p>Australia's Aid Program, EU, UNESCO, UNICEF, New Zealand Aid Program, German Development Cooperation, SPC (Global Climate Change Alliance), SPREP, USP; international NGOs</p>	<p>\$90,240</p>

Strategy 7. Delivering appropriate education, training and awareness programs					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Output) 7.3: The I-Kiribati population (inclusive of vulnerable groups) are well qualified with formal and TVET forms of qualification to get employment outside of Kiribati.					
Generate further employment opportunities in international markets. <ul style="list-style-type: none"> Form a task force across key ministries, training institutions and the private sector. Conduct a tracer survey for Kiribati people with significant vocational qualifications. Analyse skill gaps for international labour market requirements against existing vocational training. Re-design vocational courses with assistance from local technical experts. Make a marketing/promotional visit to Australian employers for employment opportunities in accommodation, cotton, sugar cane and aquaculture industries. Negotiate with Technical and Further Education South Australia for future employment opportunities for KIT graduates. Integrate labour mobility goals into trade agreements and strengthen MCIC in negotiations. Undertake labour marketing/promotion in overseas markets. 	Increase in remittances from this overseas employment (target to be established) Increase in number of I-Kiribati employed overseas (target to be established)	MLHRD, MCIC, MFAI	OB, KNEG, MOE, MHMS, MTC, Kiribati Australia Nursing Initiative, KIT, FTC, KCCI, MHMS, Apprenticeship Board, private sector	Australia's Aid Program, New Zealand Aid Program, UNESCO, SPC, USP, South Pacific Tourism Organisation, FFA, Fiji National University	\$602,638
Total Cost Strategy 7					\$7,478,480

Strategy 8: Increasing effectiveness and efficiency of early warnings and disaster and emergency management					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Outcome) 8.1: Damage to infrastructure and properties, and injuries and loss of life are reduced.					
<p>Enhance governance institutional arrangements for disaster management at national and local levels (National Disaster Management Office; Island Disaster Committee).</p> <ul style="list-style-type: none"> Formalise a policy for the National Disaster Council to provide a quarterly report to the Development Coordination Committee meetings. Establish the National Disaster Management Office with full-time staff and resources within government structure. Establish Island Disaster Committee in close collaboration with island councils. 	<p>Increase in number of island and town council Strategic Plans that incorporate climate change and disaster risk management considerations by 2015</p> <p>Infrastructure losses due to disasters are reduced by 2023</p> <p>Reported cases of injuries and fatalities due to disasters are reduced (baseline to be established, to be disaggregated by sex, age and people with disabilities)</p>	OB, National Economic Planning Office	MIA, outer island councils, MOE, faith-based organisations, MHMS, NGOs, Kiribati Police Service	EU, World Bank, SPC, SPREP, any interested partners	\$ 1,811,041

Strategy 8: Increasing effectiveness and efficiency of early warnings and disaster and emergency management					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Outcome) 8.1: Continued					
Strengthen effective preparedness, response and recovery arrangements by reviewing the airport and other communication; developing Sector Operational Plans, hazard support plans, training and awareness campaigns; and establishing stock distribution centres, emergency evacuation plans and trialling. <ul style="list-style-type: none"> Construct a permanent National Disaster Risk Management Office with all appropriate equipment. Review airports/airstrips and ensure they are functioning with relief support and communication equipment in the outer islands that can be used to issue early warning and disaster response. Develop and consistently test Standard Operating Procedures for the National Emergency Operation Centre. Develop hazard support plans and models of key hazards that pose threats (drought, fire, loss at sea, tsunami, and storm surges). Develop models that can better assist in understanding hazards (tsunami, storm surges). Conduct capacity building programs to enhance staff performance in disaster risk management. Develop community disaster plans in pilot villages to guide community response in disasters. Conduct community awareness campaigns and training for community leaders, women, youth and other groups (considering community roles of women and men) on all hazards, in local languages. 	Increase in number of island and town council Strategic Plans that incorporate climate change and disaster risk management considerations by 2015 Infrastructure losses due to disasters are reduced by 2023 Reported cases of injuries and fatalities due to disasters are reduced (baseline to be established, to be disaggregated by sex, age and people with disabilities)	OB, Kiribati Police Service, all ministries, Kiribati Red Cross Society	MIA, Outer Island Councils, MOE, faith-based organisations, MHMS, NGOs, OB, MCTTD	EU, World Bank, SPC, SPREP, any interested partners (NZ Navy, Australian Navy for the Police Maritime Unit)	\$2,586,395



Strategy 8: Increasing effectiveness and efficiency of early warnings and disaster and emergency management					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Outcome) 8.1: Continued					
<ul style="list-style-type: none"> Establish and stock distribution centres of non-food items in collaboration with Red Cross Develop a strong disaster information system that can enhance information sharing between National Emergency Operation Centre and outer islands in Gilbert, Line and Phoenix Groups. Develop and test emergency evacuation plans for businesses, offices, schools, hotels, guest houses and hospitals for fast-onset hazards (fire and tsunami) and establish annual drill programs in all sectors. Strengthen inter-operability of emergency services (Police, Health and National Disaster Management Office). Review the capacity of the Police Service and implement fire-fighting priorities. Facilitate process for Kiribati Fire Service to become member of Pacific Islands Fire Services Association. Work with community policing and develop community awareness of fire safety. Conduct in-country training on search and rescue for both maritime and land-based rescues. Improve the skills of the Police Maritime Unit to include management and leadership training. Upgrade equipment to perform search and rescue, including communications equipment for all operations of the patrol boat. 	<p>Increase in number of island and town council Strategic Plans that incorporate climate change and disaster risk management considerations by 2015</p> <p>Infrastructure losses due to disasters are reduced by 2023</p> <p>Reported cases of injuries and fatalities due to disasters are reduced (baseline to be established, to be disaggregated by sex, age and people with disabilities)</p>	<p>OB, Kiribati Police Service, all ministries, Kiribati Red Cross Society</p>	<p>MIA, Outer Island Councils, MOE, faith-based organisations, MHMS, NGOs, OB, MCTTD</p>	<p>EU, World Bank, SPC, SPREP, any interested partners (NZ Navy, Australian Navy for the Police Maritime Unit)</p>	<p>\$2,586,395</p>

Strategy 8: Increasing effectiveness and efficiency of early warnings and disaster and emergency management					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Outcome) 8.1: Continued					
<p>Increase the capacity of services to address the specific needs of people with disabilities during times of emergency (training, shelter availability, disability mainstreamed in disaster action plan).</p> <ul style="list-style-type: none"> • Provide training for carers, families and teachers on first aid (including men and women). • Provide training for emergency personnel on mobilising people with disabilities (including gender considerations). • Designate a safe space where people with disabilities can go in disasters (including gender considerations). • Develop an island-specific disaster plan in consultation with people with disabilities, including provision of rations, water, blankets and emergency equipment as required, taking into account traditional protocols and governing systems. <p>Ensure all emergency and disaster management initiatives are responsive to gender.</p> <ul style="list-style-type: none"> • Develop and deliver gender sensitivity training for all emergency and disaster management personnel. 	<p>Increase in number of island and town council Strategic Plans that incorporate climate change and disaster risk management considerations by 2015</p> <p>Infrastructure losses due to disasters are reduced by 2023</p> <p>Reported cases of injuries and fatalities due to disasters are reduced (baseline to be established, to be disaggregated by sex, age and people with disabilities)</p>	<p>MHMS, Kiribati Police Service, MIA, OB</p>	<p>Red Cross, Marine Training Centre, FTC, Kiribati Rehabilitation Centre, churches, businesses, village councils</p>	<p>EU, World Bank, UNICEF, SPC, SPREP, any interested partners</p>	<p>\$63,831</p>
<p>Total Costs Strategy 8</p>					<p>\$4,508,477</p>



Strategy 9: Promoting the use of sustainable renewable sources of energy and energy efficiency					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Outcome) 9.1: Renewable energy has an increased share of the total energy mix.					
<p>Maintain grid stability with high solar penetration</p> <ul style="list-style-type: none"> Develop standards and guidelines for future solar photovoltaic grid-connected systems. Build capacity to manage high levels of grid connected solar installations. Automate diesel gensets and provide appropriate storage technology to power utilities. Investigate options of connecting more renewable energy to the grid in Tarawa and Kiritimati. Investigate the appropriateness of privately owned solar photovoltaic grid-connected systems, including feed-in-tariff and/or net-metering. Develop best practice regulations and standards for the safe and reliable supply, generation, transmission and distribution of power in urban and rural institutions 	<p>Increased share of grid connected renewable energy (Baseline: 0% solar energy intermittent in 2013; target 60% by 2025).</p> <p>Best practices, standards and regulations understood and put into practice for electrical supply and distribution in urban and rural areas.</p> <p>Intermittent renewable energy reaches parity with standard grid power.</p> <p>Power utilities functioning at a higher efficiency due to automation and storage technology.</p> <p>Policy established and implemented for encouraging feed-in-tariff and/or net-metering. Electricity Act approved and enforced.</p>	MPWU (Energy Planning Unit), Public Utilities Board	Environment and Conservation Division (MELAD), MFED, MIA	Australia's Aid Program, EU, ADB, New Zealand Aid Program, German Development Cooperation; SPC, PIFS; SPREP, International Renewable Energy Agency	\$94,511
<p>Strengthen coconut oil (CNO) capacity for biofuels</p> <ul style="list-style-type: none"> Develop a coconut oil implementation plan for Kiribati to determine the specific actions and sub-actions and timelines necessary to develop coconut oil as an acceptable diesel fuel replacement. Establish fuel standards and a testing facility for coconut oil-based biofuel to be used for power generation and transport. Develop a mobile copra mill for Biodiesel production and refining for use on outer islands. Conduct a feasibility study on the use of small-scale, mobile crushing mills for the preparation of adequate quality CNO for biofuel on outer islands. Develop industry scale CNO biodiesel plant for Kiritimati and Tarawa. Support the Power utilities to procure a genset designed for use with CBI for base load generation. 	<p>Roadmap developed for substituting diesel fuel with coconut oil biofuel for power generation and transportation.</p> <p>Testing facility established and CNO Biofuel meets required standard.</p> <p>Feasibility study report provided</p> <p>Establishment of industry scale CNO biodiesel plant.</p> <p>Dual fuel gensets installed.</p> <p>Increase in usage of biofuel as compared to diesel fuel in Kiribati</p>	MPWU (Energy Planning Unit), Public Utilities Board, Kiribati Copra Mill Company Limited, MELAD	Finance, MCIC	Australia's Aid Program, EU, ADB, New Zealand Aid Program; SPC, PIFS; SPREP, International Renewable Energy Agency	\$3,533,338



Strategy 9: Promoting the use of sustainable renewable sources of energy and energy efficiency					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Outcome) 9.1: Continued					
<p>Increase use of renewable energy for off-grid electrification on all outer islands</p> <ul style="list-style-type: none"> Solar Kits for lighting in all rural households. Outer Island Council PV- mini grid system Mereang Tabwai Secondary School PV-mini grid PV-mini grid system for Southern Kiribati Hospital Junior secondary school solar system Outer Island Fish Center PV-grid Desalination plant for vulnerable rural community Outer island Police station solar water system habilitation Outer island clinic solar system rehabilitation 	<p>Rural electrification roadmap developed for utilising renewable energy sources.</p> <p>Rural household access to clean and adequate lighting reaches 100%</p> <p>All island councils utilise pv-grid systems</p> <p>MTSS fuel reduction.</p> <p>SKH fuel reduction.</p> <p>All rural JSS utilise solar power for office duties and study venue at night.</p> <p>All OI Fish Centers achieve significant fuel reduction.</p> <p>All vulnerable communities have access to portable water</p> <p>All OI Police post solar systems rehabilitated</p> <p>All OI clinics solar systems rehabilitated.</p>	<p>MPWU (Energy Planning Unit)</p>	<p>MFED, Ministry of Line and Phoenix Development, MIA, Kiribati Solar Energy Company All Ministry stakeholders</p>	<p>Australia's Aid Program, EU, ADB, New Zealand Aid Program, German Development Cooperation; SPC, PIFS; SPREP, International Renewable Energy Agency</p>	<p>\$8,809,500</p>

Strategy 9: Promoting the use of sustainable renewable sources of energy and energy efficiency					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Outcome): 9.2 Energy efficiency and conservation measures increase.					
<p>Promote energy efficiency and conservation.</p> <ul style="list-style-type: none"> Develop a policy to guide and enforce the efficient use of energy in the transport sector and power sector. Develop a policy to minimise the importation of second-hand vehicles that are not environmentally friendly and fuel efficient. Develop a financing mechanism for energy efficiency (energy efficiency revolving fund). Install a pre-paid meter system to conserve energy. Establish standards and labelling for minimum energy performance of electrical appliances. Develop best practice guidelines for supply side management. Develop and implement public awareness and educational programs for: <ul style="list-style-type: none"> good transport management; electricity use; and energy efficiency and conservation. 	<p>Legislation for minimum energy performance standards and labelling approved</p> <p>Decrease in number of imported used and inefficient vehicles by 2020</p> <p>Revolving fund established.</p> <p>Number of pre-payment meters installed in residential and commercial grid customers.</p> <p>Standards and labelling guidelines developed and enforced</p> <p>Reduction in intensity of conventional energy used 6690kj/GDP in 2012.</p>	MPWU (Energy Planning Unit), Public Utilities Board	MFED, MCTTD, MOE, NGOs	Australia's Aid Program, EU, ADB, New Zealand Aid Program; SPC, PIFS; SPREP, International Renewable Energy Agency	\$2,766,313
Result 9.3 (Output): Renewable energy and energy efficiency are supported by appropriate policy, legislation and regulation.					
<p>Strengthen energy governance through review and creation of appropriate policies and regulations.</p> <ul style="list-style-type: none"> Establish a Kiribati National Energy Coordinating Committee (KNECC). Review existing incentives, regulations and policies relating to energy and propose changes where there are disincentives for renewable energy. Review human resources and technical capacity needed in the energy sector. Review the Kiribati Solar Energy Company business model. 	<p>KNECC formalised and established.</p> <p>Related energy Acts reviewed to be conducive for renewable energy transition.</p> <p>Increase in number of professionally trained staff in the energy sector</p> <p>KSEC performing and competing in the local market.</p>	MPWU (Energy Planning Unit), Public Utilities Board	MFED, MCCTT, MoE, NGO	Australia's Aid Program, EU, ADB, New Zealand Aid Program; SPC, PIFS, SPREP, International Renewable Energy Agency	\$ 136,660
Total Costs Strategy 9					\$ 15,340,322



Strategy 10: Strengthening capacity to access finance, monitor expenditures and maintain strong partnerships					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
<p>Result (Outcome/Output) 10.1: Existing coordination and approval mechanisms are strengthened to review proposals from the perspective of climate change and disaster risk reduction and national and external finance to support climate change and disaster risk initiatives increases (as reflected in national budgets, overseas development assistance and additional climate change and disaster finance).</p> <p>Include climate change and DRM in the implementation of the public finance and fiscal reform program (MFED Strategic Plan, Action 7) to facilitate budget support and to monitor expenditure on climate change and DRM.</p> <ul style="list-style-type: none"> Adapt and strengthen existing database to include climate change and DRM (e.g. coding). Include climate change and DRM in improvement of reporting systems (actions, result indicators, expenditure). Strengthen communication mechanism between OB and MFED so both are aware of key donors for climate change and disaster risk management. Train MFED staff on climate change and DRM. <p>Strengthen the integration of climate change and DRM into monitoring and evaluation at national and local levels within MFED, line ministries, MIA and KJJP Secretariat.</p> <ul style="list-style-type: none"> Incorporate climate change and DRM considerations into MFED Strategic Action 10 to improve management for development results through capacity development for monitoring and evaluation and results based management. Assess capacity needs broadly to monitor and evaluate climate change and DRM initiatives Train identified government, outer island and NGO staff. Develop and integrate climate change DRM indicators for monitoring and evaluating across sectors, local government programs and MFED project proposal templates. Link monitoring and evaluating of climate change and DRM indicators to the National Data Centre and respective sector-specific data monitoring systems (see Strategy 2). Conduct mid-term and final review and evaluation of KJJP (KJJP Secretariat). 	<p>All sectoral and corporate plans and annual budgets explicitly reflect climate change and DRM considerations</p> <p>Increase in expenditure on climate change adaptation and disaster risk management as an achievable percentage of GDP</p> <p>Increase in funds sourced from successful resource mobilisation with a focus on climate change adaptation (KDP KPA 4).</p> <p>The monitoring and evaluation system under MFED provides regular reports against KJJP outcome Performance Indicators and sector level performance Indicators that relate to the KJJP</p>	MFED	OB, KNEG, all ministries	<p>Kiribati development partners such as EU, World Bank, ADB, Australia's Aid Program, UN/UNDP, New Zealand Aid Program</p> <p>Australia's Aid Program, New Zealand Aid Program, EU, ADB, World Bank, USAID, German Development Cooperation, UN, PIFS, SPC, SPREP, FFA, USP, South Pacific Tourism Organisation</p>	<p>\$90,465</p> <p>\$258,829</p>



Strategy 10: Strengthening capacity to access finance, monitor expenditures and maintain strong partnerships						
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)	
Result (Outcome/Output) 10.1: Continued						
<p>Improve aid coordination and donor harmonisation for climate change adaptation and DRM.</p> <ul style="list-style-type: none"> Table climate change and DRM KJIP reports and resource gaps during biannual donor roundtables. Establish a coordination mechanism for international NGOs. 	<p>See above and Strategy 1</p> <p>Effective and efficient financing modality for external climate change adaptation and DRM fund</p>	<p>MFED, MFAI, MIA, NGO</p>	<p>OB (KNEG), international NGOs</p>	<p>Australia's Aid Program, New Zealand Aid Program, EU, ADB, World Bank, USAID, German Development Cooperation, UN, PIFS, SPC, SPREP, FFA, USP, South Pacific Tourism Organisation</p>	<p>\$5,046</p>	
Total Costs Strategy 10					\$354,340	



Strategy I I : Maintaining the existing sovereignty and unique identity of Kiribati					
Actions and sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost (AUD)
Result (Output/Outcome) I I. I : The rights of Kiribati over its existing EEZ and the resources within it are protected forever for the people of Kiribati.					
<p>Safeguard Kiribati sovereignty (EEZ) on impacts of sea-level rise,</p> <ul style="list-style-type: none"> Develop project to conduct research on the impacts of sea-level rise as a result of climate change on Kiribati EEZ base points. Assess the UNCLOS and its implications on Kiribati EEZ in the context of climate change impacts (sea-level rise). Review existing Kiribati Constitution and relevant legislation affecting the EEZ and the provisions of the UNCLOS and provide recommendations to Government on how to protect Kiribati sovereignty and extend current EEZ. Seek other low-lying countries that would be affected by this issue to gain support on issue at the international arena. Submit national report on issues to UNCLOS secretariat. Amend national constitution and legislation as appropriate to safeguard Kiribati sovereignty. 	<p>Research and policy review completed with recommendations for the EEZ as related to climate change</p> <p>An internationally recognised agreement between UNCLOS members to safeguard Kiribati's EEZ</p>	<p>MFMRD, Office of Attorney General, OB, MFAI</p>		<p>EU, World Bank, ADB, Australia's Aid Program, UN/UNDP, New Zealand Aid Program; PIFS</p>	<p>\$ 180,532</p>
Total Costs Strategy I I					\$ 180,532

Strategy 12: Enhancing the participation and resilience of vulnerable group					
Actions and Sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost
Result (Outcome/Output) 12.1: Members of vulnerable groups are increasingly engaged in climate change and disaster risk management initiatives and their needs are addressed.					
<p>Facilitate the participation of children and young people in climate change adaptation and disaster risk management initiatives and conduct youth empowerment.</p> <ul style="list-style-type: none"> Train young people (girls and boys), using training of trainers method, on climate change adaptation and DRM to deliver child- and youth-friendly information and training, including in outer islands. Establish youth representation on climate change working groups and committees in order to facilitate youth to youth communication and integrate into climate change adaptation and DRM planning. Deliver support to youth and child-led adaptation project, with a focus on youth-to-youth and child-to-child knowledge sharing and capacity building. Develop communication strategies with the involvement of both young men and young women. Communications strategies should involve the delivery of messages through the school curricula, extra-curricular activities, advisory/support services in schools as well as through community-based and non-governmental organisations (KNYP 3.2). Develop and implement strategies with young people to promote mental health for young people (KNYP 3.3) and address anxiety about uncertain future related to climate change. Explore opportunities to develop markets and provide livelihoods and training for young people based on Kiribati cultures and traditions, in order to build resilience to climate change (KNYP 2.3). 	<p>Increase in number of vulnerable groups effectively engaged in climate change and disaster risk initiatives</p> <p>Sector Disaster Risk Reduction plans consider the needs of vulnerable groups</p>	<p>MIA – Youth Division, MELAD, MOE</p>	<p>Pacific Youth Council, Kiribati National Youth Council, FSPKI, 350.org, KiriCAN</p>	<p>UNICEF, all partners; SPC, SPREP; USP; international NGOs</p>	<p>\$200,016</p>

Strategy 12: Enhancing the participation and resilience of vulnerable group						
Actions and Sub-actions	Performance indicators	Responsible lead agency	Support agencies	Development partners and CROP members	Indicative cost	
Result (Outcome/Output) 12.1: Continued						
Promote the equal participation of women and men in climate change and DRM initiatives. <ul style="list-style-type: none"> Develop a gender sensitivity indicator/ measure/ toolkit 	Gender sensitivity toolkit produced and being applied	MIA	KNEG	UNICEF; UNDP; all partners; SPC; SPREP; USP; international NGOs	To be estimated	
Develop conduct-appropriate training and awareness programs targeting communities and specifically women, youth, people with disabilities, on climate change and disaster risk management linked to safety, security and livelihoods		MIA – Youth Division	Pacific Youth Council, Kiribati National Youth Council, FSPKI, 350.org, KiriCAN		\$76,642	
Increase knowledge and awareness of climate change and DRM among people with disabilities in CC and DRM initiatives: <ul style="list-style-type: none"> Deliver disaster preparedness training for people with disabilities and those that are supporting them 		Ministry of Education/MIA	Toamatoa, School and centre for children with special needs Kiribati		\$140,717	
Total Costs Strategy 12					\$417,375	
OVERALL TOTAL COSTS					103,107,161	





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