



# KIRIBATI FIFTH NATIONAL REPORT TO THE CONVENTION ON BIOLOGICAL DIVERSITY

(FINAL DRAFT)



Source: ECD 2014

Significance of Kiribati Biodiversity

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## **ACRONYM**

Agriculture & Livestock Division	ALD
Australian Agency for International Development	AUSAID
Convention on Biological Diversity	CBD
Climate Change Study Team	CCST
Center for Pacific Crops and Trees	CePaCT
Central Pacific Producer's Limited	CPPL
Development Coordination Committee	DCC
Ecosystem Based Adaptation	EbA
Environment & Conservation Division	ECD
Exclusive economic zone	EEZ
Environment Licenses	EL
El Niño–Southern Oscillation	ENSO
European Union	EU
Foreshore Management Committee	FMC
Gross Domestic Product	GDP
German Development Cooperation	GIZ/ BMZ
Global Climate Change Alliance for Pacific Small Island States	GCCA:PSIS
Globally Harmonize System	GHS
Government of Kiribati	GoK
Hydrochloroflorocarbon	HCFC
International Society for Mangrove Ecosystem	ISME
International Treaty of Plant Genetic Resources for Food and Agriculture	ITPGRFA
Kiribati Adaptation Project	KAP
Kiribati Biodiversity Area	KBA
Kiribati Development Plan	KDP
Kiribati Fish Limited	KFL

Kiribati Integrated Environment Policy	KIEP
Kiribati Joint Implementation Plan	KJIP
Key policy areas	KPA
Least Developed Country	LDC
Multi Environment Agreements	MEA
Ministry of Environment, Lands and Agriculture Development	MELAD
Millenium Development Goals	MDGs
Ministry of Finance and Economic Development	MFED
Ministry of Fisheries and Marine Resources Development	MFMRD
Marine Protected Areas	MPA
National Biodiversity Planning Committee	NBPC
National Chemical Coordinating Committee	NCCC
National Disaster Risk Management Plan	NDRMP
National Development Strategy	NDS
National Disaster Risk Management Officer	NDRMO
National Economic Planning Office	NEPO
National Framework for Climate Change and Climate Change Adaptation	NFCCCA
Non - Government Organization	NGO
National Invasive Species Strategy Action Plan	NISSAP
National Population Strategic Taskforce	NPST
Office of Te Beretitenti/ President	OB
Overseas Development Assistance	ODA
Ozone Depleting Substances	ODS
Protected Areas	PA
Phoenix Islands Protected Area	PIPA
Population Policy	PP
Small Island Developing State	SIDS

Sustainable Land Management	SLM
Strategic Approach to International Chemical Management	SAICM
State of Environment	SOE
Southern Oscillation Index	SOI
Secretariat of the Pacific Community	SPC
Secretariat for the Pacific Regional Environment Programme	SPREP
Strategic National Policy Unit	SNPU
United Nation Framework Convention on Climate Change	UNFCCC
Third National Communication	TNC
Unites States Agency for International Development	USAID

## **EXECUTIVE SUMMARY**

The Fifth national report (NR) updates the progress of the 4th National Report specifically highlighting the importance of biodiversity, its trends and status drawing on several case studies that are significant to Kiribati. The report also highlights common threats to the biodiversity in Kiribati, mainstreaming of biodiversity into national policies and plans. Lastly the report highlights the national achievements in relation to NBSAP as well as discussing national targets and actions that are relevant in achieving the global targets (AICHI TARGET).

Biodiversity provides economic and cultural benefits to the I-Kiribati. Terrestrial biodiversity provides natural resources for copra production which is identified as one of the main sources of revenue for Kiribati through the process of senile coconut trees fruits. Marine biodiversity also contributes to revenue generation through processing and selling of marine products mainly fish, sea cucumber and seaweed, within and outside. Cultural uses of biodiversity were generally stated, however, specific reference was made to the use of plants for traditional medicine, construction materials and other uses.

Several case studies were drawn up based on significant highlights of biodiversity conservation works during the period of this report. These case studies include the Live and Learn initiatives in promoting the planting of resilient food crops with the local communities. Additionally, demarcation of mangrove areas and mangrove replanting in several outer islands through the support of the Kiribati Adaptation Program III as well as the restoration of the coastal through the ICCAI project were also highlighted as key milestones achieved.

The change in biodiversity in Kiribati was triggered by several factors including the human activities, population size, natural phenomenon, climate change impacts, urbanization and the low level of awareness activities. These factors were regarded as threats to both the marine and terrestrial biodiversity impinging on the services of the ecosystem and the livelihood of local communities in Kiribati. It was reported generally that Kiribati experienced the declined in biodiversity in terms of agro-biodiversity such as traditional staple foods such as breadfruits, pandanus, fig tree, coconut trees and giant swamp taro. Common causes of the decline in agro biodiversity include the intrusion of seawater inland, prolong drought in some places, and change in human behaviors (decline of interest in cultivation).

Biodiversity is mainstreamed into a number of policies as stated in the Kiribati Integrated Environment Policy (KIEP), KJIP, Kiribati Fisheries Policy, Cultural policy; to name a few. National targets set against the global AICHI target are mainly taken from the KIEP as well as the operational programs of the Environment and Conservation Division.

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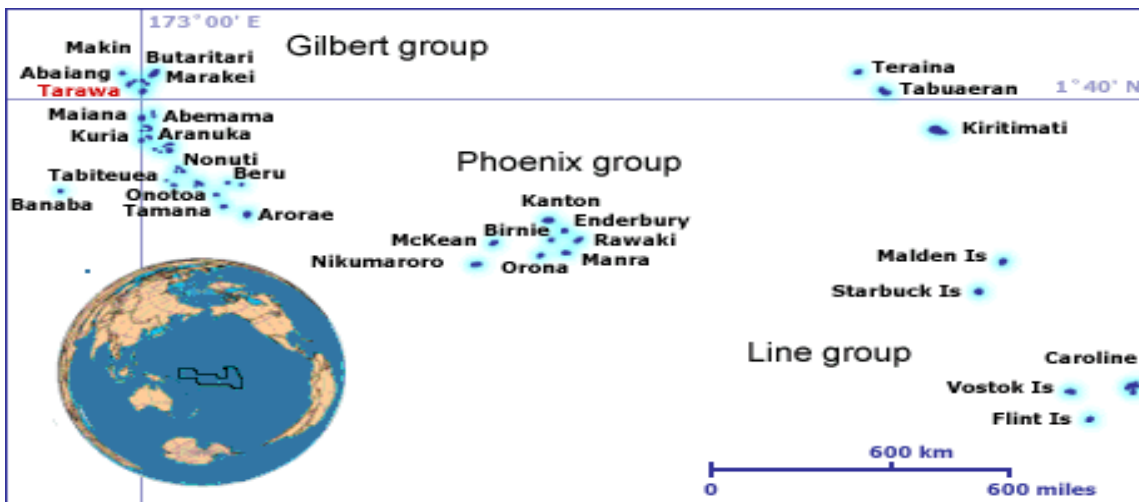
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# PART I: OVERVIEW OF BIODIVERSITY STATUS, TRENDS, THREATS AND IMPLICATIONS FOR HUMAN WELL-BEING IN KIRIBATI

## 1.1. OVERVIEW OF THE REPUBLIC OF KIRIBATI

The Republic of Kiribati consist of three main groups that are far from each other and distinct in time differences. The time difference in Kiribati is that the Gilbert Island is 1hour late from Phoenix Island and 2hours late from the Line Island groups. Kiribati lies close to the equator, located between latitude 4 degrees north and 11 degrees south, and longitude 170 degrees east and 150 degrees west.

Figure 1: Geographical map of Kiribati



(Source: [http://www.kiribatislandsmap.org/1\\_images/jpg](http://www.kiribatislandsmap.org/1_images/jpg))

Figure 2: Map of PIPA Area



(Source: [http://www.phoenixislands.org/1\\_images/3dPerspective\\_wSeamounts\\_11-19-08.jpg](http://www.phoenixislands.org/1_images/3dPerspective_wSeamounts_11-19-08.jpg))

Over 90% of the country’s population lives in the Gilbert group, where more than 50% lives particularly on South Tarawa (MFED, 2010). The Phoenix and Line Islands are inclusive of Kiritimati Island, which is the world largest coral atoll island, the Millennium Island and the

renowned Phoenix Islands Protected Area (PIPA). The PIPA area has increased now with full closure to commercial fishing by 2015, see case study on PIPA.

The shorelines of the islands in Kiribati are surrounded by coral reefs and its atolls are low lying which usually consists of a broken ribbon of land enclosed by a lagoon. The temperature varies between 25 to 33 degrees centigrade in most days. The rainy season extend from November to April within the year in most islands (Turvey R, 1992), but have been believed to generally change recently. The northern islands of the Gilbert groups due to their geographic positions are generally wetter than the southern islands (Island Report, 2013). As a result, the terrestrial biodiversity is expected to abundant and healthier than those in the southern islands, although the central Kiribati mainly Abemama is well known with its rich coconut tree production.

### 1.1.1 Demographic

The 2010 census count indicated that the population of Kiribati was at 103,508 of which 50.7% are female and 49.3% male. This also confirms that the population of Kiribati has been steadily increasing at an average annual growth rate of 2.2% and at the rate of 5.6% for the capital islands and main urban centers of South Tarawa and Betio. (KNSO & SPC, 2012). An annual exponential growth rate of 3.87% has been assumed as the basis for the high growth projection for South Tarawa. The recent average annual growth rates in each inter-census period are not consistent and are shown below.

**Table 1: Kiribati Population Trends (1995 – 2010)**

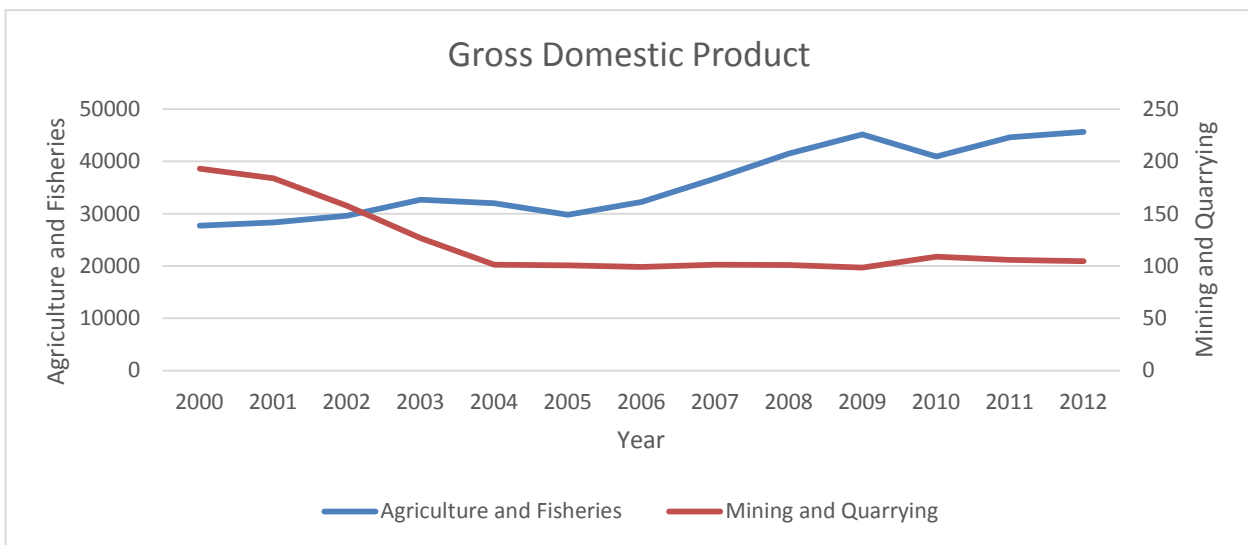
<b>Historic Pop. Growth/Pop. Trends 1995 ~ 2010 for S. Tarawa versus Outer Islands</b>							
<b>Area</b>	<b>Pop. 1995</b>	<b>Pop. 2000</b>	<b>Av. Annual Growth Rate 1995~2000</b>	<b>Pop. 2005</b>	<b>Av. Annual Growth rate 2000~2005</b>	<b>Pop. 2010</b>	<b>Annual growth rate 2005~'2010</b>
<b>South Tarawa</b>	28,350	36,717	5.3%	40,311	1.89%	50,010	4.4%
<b>Outer Islands</b>	49,308	47,777	-0.063%	52,222	1.80%	53,456	0.47%
<b>National</b>	77,568	84,494	1.70%	92,533	1.83%	103,466	2.26%

Kiritimati Island in the Line Island Group is recently identified as a growth and urban centre and lightly populated until the 1970s with only 1,265 people in 1979. Since then, its growth rate has

gradually accelerated. By 2005 its population numbered at 5,115 compared with 3,431 in 2000. This 2000/2005 inters - censual annual growth rate of 7.9 is one of the highest in Kiribati.

Kiribati is classified as the Least Developed Country (LDC), and predominantly a rural society with subsistence-based economy. It is characterized by the persistence of formidable constraint to development such as; geographical isolation, narrow resource base, small domestic market and vulnerability to destabilizing external forces and lack of skilled and technical manpower. The output of its two major traditional exports (copra & fish) has been fluctuating. The Gross Domestic Product (GDP) dropped by about 4% in 1990 due to a sharp decline of export outputs of productive sectors (Turvey R,1992). Graph 1: Gross Domestic Product of Agriculture & Fisheries with Mining & Quarrying shows the updated GDP in relation to the Biodiversity of Kiribati. Agriculture and Fisheries going up and steady while Mining and Quarrying going down and steady again.

**Graph 1: GDP of Agriculture and Fisheries with Mining and Quarrying**



She also receives considerate amount from remittances from nationals working abroad at an estimated value at US\$5million each year. Foreign financial aid from development partners including Australia, New Zealand, Japan and Taiwan accounts for 20-25% of GDP annually, but still not enough to cater the needs of the I-Kiribati in terms of Biodiversity.

## **1.2. IMPORTANCE OF BIODIVERSITY TO KIRIBATI**

Kiribati as an atoll nation has limited variety of biodiversity in comparison with other Pacific Islands. With the limited variety of biodiversity the I-Kiribati has a unique way of living utilizing all these biodiversity in different means and ways. The cultural and traditional practices of Kiribati are still predominant mainly in the outer islands. South Tarawa and Kiritimati are considered as urban centers where urban drift as well as a slight drift in cultural and traditional practices are commonly experienced. Kiribati biodiversity sectors each generate benefits for I-Kiribati. These may be in the form of government revenues; providing direct livelihood benefits such as employment, income and revenue, subsistence food security or they may provide some combination of the above.

Kiribati is unique geographically, biologically, socio-economically and culturally. Kiribati depends on its marine and agricultural resources to sustain people's livelihood. It is characterized by 33 different small islands spread across its vast EEZ supporting numerous diverse ecosystems that is rich in marine. Some of the main key factors highlighting importance of biodiversity in Kiribati include the followings:

### **1.2.1. Economic Benefits of Biodiversity in Kiribati**

#### **1.2.1.1. Agricultural Products:**

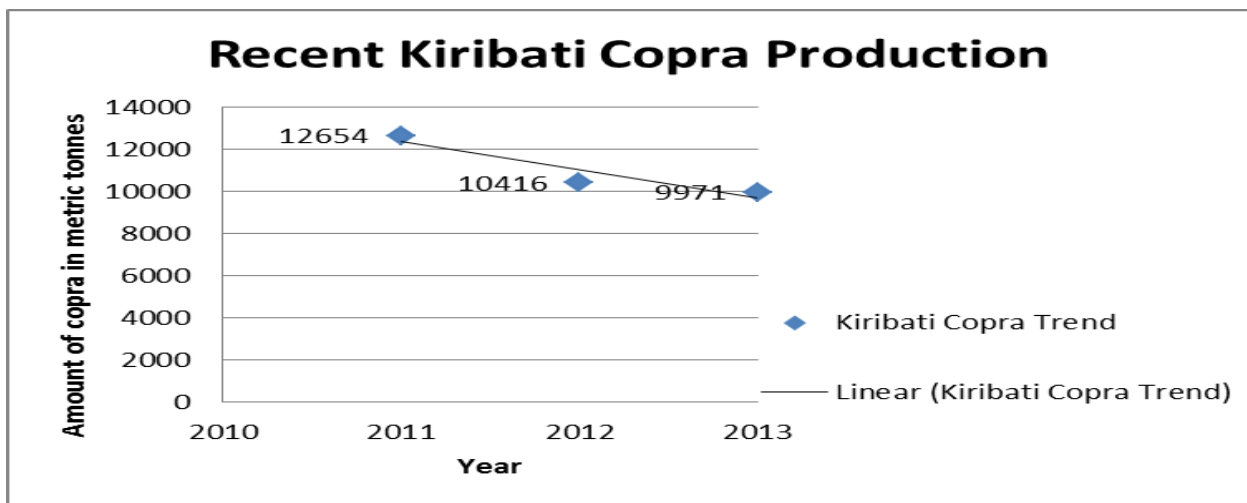
The coconut tree is the sole cash crop in terms of international market. It plays fundamental importance in the economy of Kiribati. It has been, and will remain, the only crop of real merit, with copra providing most of the export earnings. Coconut is still form a central part of the life of nearly every I-Kiribati and is known as the most versatile tree. Its uses range from being a staple part of the diet to drink to construction materials. During the pre-colonial periods, oil is the main product from coconut that was used for trading. However this was changed since 1869-1870 onwards in which copra superseded coconut oil and trade in the latter soon ceased (Town, 1982).

The high significance of coconut in the life of I-Kiribati has been reflected in national census reports. The 1990 national census reports revealed that in the outer islands 67.8% of households listed copra as their main source of cash income, 87.1% tapped coconut trees for toddy for drink and food preparation. With vegetation cover, it has been estimated that 80% of the land area of main Gilberts Group (where 93.3% of the population live) is covered with coconuts (Catala, 1957).

Copra production has been the major export earner of Kiribati since 1870. However copra export has decreased dramatically in 2007 amounting to only \$0.9million and holding just 7% of the exports. The other emerging agricultural product is crude oil which holds 51% of the total exports from Kiribati (2007 Trade Statistics).

The 2007 Trade Statistics showed an increase in exports due to the high domestic export of Coconut Crude Oil. It is more than triple the amount sent for the previous year. Coconut crude oil is a newly established product, which was introduced in 2004, and so far has contributed a lot to the economy of Kiribati. The export of coconut crude oil however declined in the last few years demonstrating the vulnerability of economies relying on one product for export.

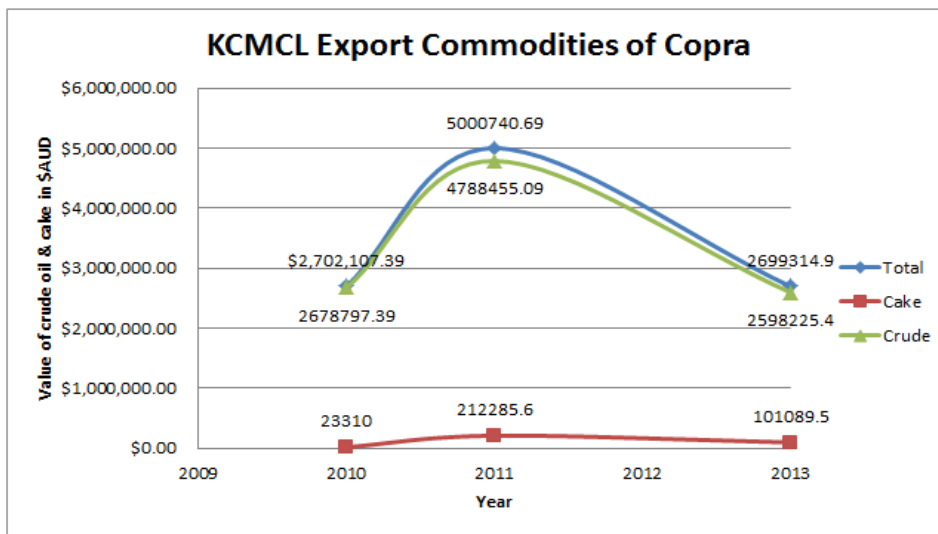
**Graph 2: Recent Copra Production for Kiribati.**



The above graph shows the copra production for the whole Kiribati Island Groups. It indicates the decline in copra production and this status is also an evidence of the decline in our biodiversity nationally as well. This would be a major concern since it is one of the main important trees for Kiribati economy.

The Kiribati Copra Mill Company Limited is a new Government Copra Mill company first launched on 27<sup>th</sup> September, 2003 with a support from the Kiribati Government and Techso Co. Ltd from Australia (KCMCL, 2003). It has a major contribution towards the economic development of the country. Its major export commodities include Coconut Natural Oil /crude oil (CNO) and a copra cake (Cake).

**Graph 3: Major Export commodities of copra from KCMCL**



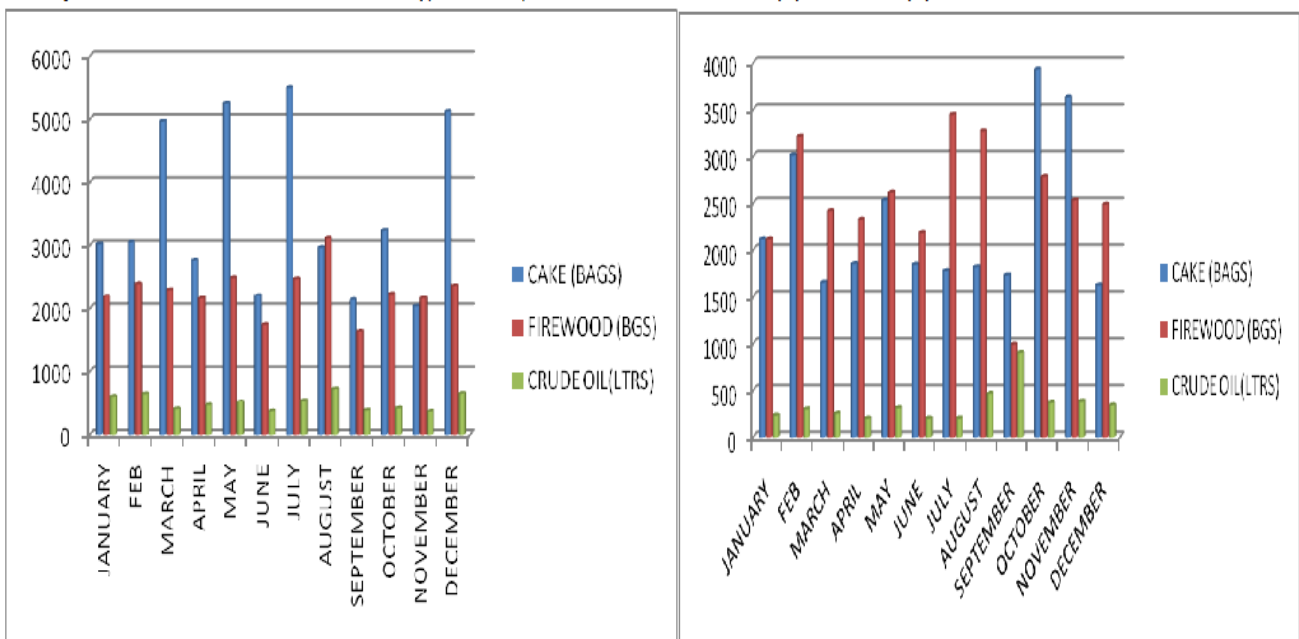
Source: KCMCL, 2014

As shown, CNO or crude oil (in blue line) is highly exported compared with Cake (in red line). The value of crude oil plus cake in cash amounted to \$5000740 AUD which is the highest figure in 2011 and is going down to

\$2699314 AUD in 2013. This also proves the decline in copra production with possible reasons discussed under the status and trends of biodiversity. The total value of cake and crude oil is high in 2011 and low in 2013.

KCMCL domestic marketing involved mainly local businesses on South Tarawa and outer islands. Cakes, CNO and firewood are the main source of goods sold from its operational canteen together with soap and body oil. The Graph 4 below shows this Company's domestic marketing on those three copra production.

**Graph 4: KCMCL Domestic Marketing of Cake, CNO and firewood for (a)2013 and (b) 2012**



Graph 4(a)

Source: KCMCL

Graph 4(b)

Source: KCMCL



There is a fall and up in graph trends as can be noticed in the graph especially in Cakes (blue) regarding demand increases by people when price decreases mainly occur during sales discount.

Also ecosystem services such as the selling of marine and agricultural products by local farmers support the economic benefits of biodiversity in Kiribati. See case study 1 on the complement work of the Government through the assistance of the ‘Live and Learn’ (NGO). This NGO involved in extending across the communities climate resilient crops and cropping technologies to improve and sustain community food resources and income benefits and providing support resilience building. In Graph 1 in this case study, the total of \$10,331.00AUD is gained by only the communities of South Tarawa participated in the Live and Learn Project implementation.

### 1.2.1.2. Fisheries:

In Kiribati, fisheries activities provide different revenue streams, of which access fees and licensing revenue from oceanic tuna fisheries constitute the majority and others. The FD licenses both local and foreign entrepreneurs to export coastal marine products under four processing and establishment. The following data and charts are some common commercial and consumption uses of marine resources in Kiribati – fisheries export. (Campbell B & Hanich Q, 2014)

**Table 2: The four processing to export coastal marine products**

License Categories	Type	2006 Revenue(A\$)
1.Foreign investor	100% foreign owned	5000
2. Semi-foreign	>50% foreign owned	3500
3. Semi-foreign	>50% local owned	1500
4. Local company (base fee)		300

The Licensing fee is another fisheries revenue stream in Kiribati. The annual offshore licensing fees in Kiribati is shown in the table below as they relate to the Kiribati GDP. The table below shows in 2010, foreign vessel access licensing fees generated A\$41.7 million in revenue following the application of the PNA vessel day scheme. This increased to more than A\$58 million in 2012 when Kiribati significantly exceeded it PNA allocation because of transitional issues and implementation (Campbell B&Hanich Q, 2014, 36).

**Table 3: Annual Kiribati Offshore licensing fees as they relate to the national GDP**

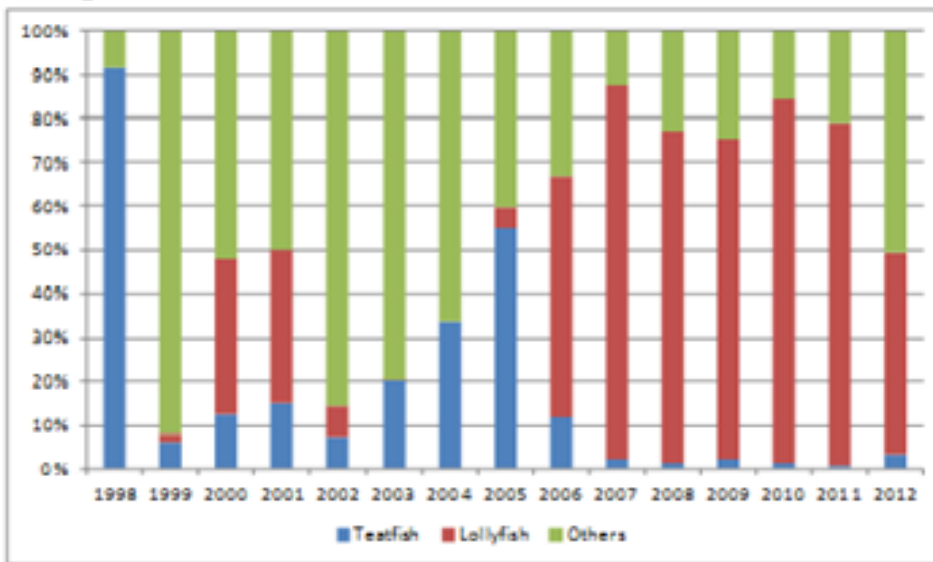
	2009	2010	2011	2012	2013
Fishing license fees (A\$ millions)	29.5	41.7	29.2	58.3	86.8
Percentage of GDP (%)	18	24.9	17.3	32.7	71
Source: MFMRD 2013d; Ministry of Finance 2014(unpublished data)					

[Source: Campbell B & Hanich Q, 2014, 36]

Seaweed is also one of Kiribati fisheries exports and is the national's largest and longest running aquaculture product. The red algae species *Kappaphycus alvarezii*, also referred to as cottonii is vital in carrageenan production. It is lagoon grown, sun dried and then packed into bales and exported abroad (Campbell B&Hanich Q, 2014, 26). The highest production and exports in 2000 exceeds 1,400 tonnes valued to almost a million AUD and then slowly going down. The production not publically available beyond 2007 and exports decline to less than 10 tonnes in 2010. In 2011 private sector buyers with Chinese connections were becoming involved in the seaweed exports market (Ibid, 26). The other common fishery export is sea cucumber

Sea cucumber (bech-der-mer) is one of major export earnings for I-Kiribati reaching maximum in

**Graph 5: Sea Cucumber Production in Kiribati.**



**Source: Fisheries Division, 2014**

export value of AUD \$5 million dollars in 2007.

The Kiribati Fish Limited (KFL) is a new and the first ever fish processing company established and located in South Tarawa (Betio) at the Betio Wharf. KFL is a joint

venture between Central Pacific Producer's Limited (CPPL) based in Kiribati, Golden Ocean Fish (Fiji) Ltd based in Fiji and Shanghai Deep Sea Fishery based in China. The investment in the fish processing factory and fishing operation base was more than USD8.0millions. The Fish processing factory is built according to the requirements of USFDA and the European Union (EU).

**Marine Income-Generating Opportunities**

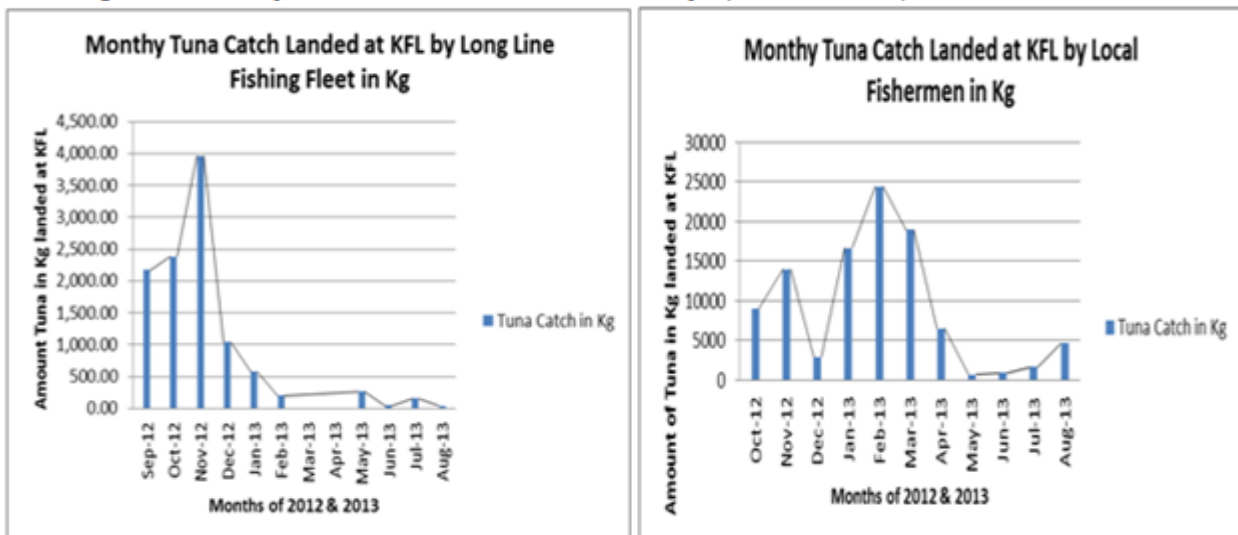
With the involvement of local fishermen, KFL is expecting more than 2,000 local fishermen to participate in tuna fishing for its supply. The current employment for the Factory operation is more than 100 locals. There are more than 80 local boat owners that are supplying fresh tuna to the factory and earning money from the sale of their catch. Four long line vessels are based in Tarawa and are supplying their catch to the factory as well. The four long liners currently employ

30 locals and in the near future there would be more fishing vessels to be based in Tarawa creating more job opportunity to the locals.

Therefore the marine resources in Kiribati could provide direct employment to the locals, and as stated in the KFL report “the total tuna catch landed at the factory by the local fishermen was recorded at 10.9 metric ton generating revenue to the fishermen in the amount of \$29,555.00” (KFL Report, 2014) by conversion of Kg (in Graphs) to \$.

The two graphs below shows the monthly tuna catch species composition by the long line fishing fleet (graph a) and by the local fishermen (graph b) in selected months of 2012 and 2013 since KFL’s operational in September 2012. It shows more tuna catch by local fishermen since during the months when the tuna migrate away from the islands; the local fishermen would switch to reef fishing and sell their catch to the company. The long line fishing fleet (LLFF) and the local

**Graph 6: Monthly Tuna Catch Landed at KFL by a) LLFF and b) LF**



Source: KCMCL, 2014

fishermen (LF) provide almost the same catch amount to KFL.

The following are the main fish products for Kiribati Fish Limited:

1. Fresh tuna in H&G, Loin and Block
2. Frozen Tuna loin, block, Saku, steak, cubes, minced, etc
3. Frozen Sword fish (*Xiphias gladius*) loin, Block, steak, Portion, etc
4. Frozen Marlin Fish (*Makaira nigricans*) loin, block, steak, portion, etc
5. Frozen MahiMahi (*Coryphaena hippurus*) fillet, steak, portion
6. Frozen Wahoo(*Acanthocybium solandri*) fillet, loin, steak, portion, etc
7. Frozen Sail Fish (*Istiophorus platypterus*) loin, steak, Portion
8. Frozen Spear Fish (*Tetrapturus angustirostris*) loin, steak, portion
9. Frozen Sun Fish (Opah) fillet, steak, portion

10. Frozen Escolar (Oil Fish) (*Ruvettus pretiosus*) Fillet, steak, Portion, Saku, etc

In September and October 2012, buyers from the EU and Japan visited the plant to inspect and observe KFL operation. They were very pleased with the conditions & operation of the JV Company and the EU customer placed order for 3,000 metric tons of tuna products per year. At the end of October 2012, KFL sent its first trial shipment of 400kg of fresh sashimi tuna products to Japan by air. The sashimi tuna product from Kiribati gained high reputation in the Japan market, and Japan customer confirmed an open order for any volume products processed by KFL. To date KFL has opened up market links with Japan, China, Australia and New Zealand, including the US.

Besides being used economically, the marine resources are the main diets of I-Kiribati providing protein for all the growing young people. The table below indicate the consumption of fish in some islands of Kiribati proving the fact that the I-Kiribati is mostly depending entirely on marine resources for protein source. It was stated in Onotoa Report from FD that fish has been rated by the Ministry of Health as the healthiest source of protein(FD Onotoa Report, 2013) in Kiribati Islands.

**Table 4: Fish Consumption Per Island of Kiribati**

Years	Islands	Consumption rate (grams)	Protein intake (grams)	Comment
2006	N/Tarawa	329	64	Highest amount of protein intake
2006	Tamana	214	42	Average amount of protein intake
2006	Arorae	133	26	Lowest amount of protein intake
2006	S/Tarawa	163	32	Rated amongst the low protein intake
2007	Marakei	203.1	39.8	Average amount of protein intake
2007	Banaba	217	43	Average amount of protein intake
2007	Abemama	252	49	Rated amongst highest protein intake
2011	Onotoa	172	33	Onotoa is found within Kiribati rates

The consumption rate and protein intake were calculated using recommended rates from the World Bank with other important factors such as total finfish weight and population, etc. As for

North Tarawa rated with the highest protein intake per person and Arorae rated with the lowest protein intake per person. This would be used as reference for comparison purposes to see the level of fish consumption rate for each of the islands around Kiribati. The table confirmed that the major diet for the residing population of Kiribati (FD Onotoa Report, 2013).

### 1.3 STATUS AND TRENDS OF BIODIVERSITY UPDATES

With its large ocean territory, Kiribati has a rich and diverse marine biodiversity. In contrast, its indigenous land-based flora and fauna are limited and among the poorest on earth and there are few, if any, endemic species. Much of this is has to do with its soil quality as it is composed mainly of alkaline coral with high porosity. The islands have no surface water, and the only water supply is ground water which is replenished by rainfall, percolating through the porous surface soil.

Based on the data collected through consultations with communities by concerned Government Ministries and NGOs, it proved that the status of Kiribati biodiversity is declining. The data and information cannot justify whether biodiversity status in Kiribati declining rapidly or not.

#### 1.3.1. Terrestrial Biodiversity & Avi-fauna

It has been reported from Island Reports and Agro-biodiversity Unit of Agricultural & Livestock Division (ALD) that there is a declining in number of varieties on traditional staple food crop species. These traditional staple food crop species, most of them do have high value in the Kiribati Culture where most people depended on them during long drought period, including community and family functions.

**Table 5: List of main traditional food crops species that are decline in numbers of varieties**

Local Name	Common Name	Scientific Name	Value
Te kaina	Pandanus	<i>Pandanus tectorius</i>	Handicrafts, medicine, food, building materials make money
Te Mai	Breadfruit	<i>Artocarpus mariennesis</i> , <i>A. altilis</i> , <i>A. mariennesis</i>	Food, medicine, make money, others,
Te Bwabwai	Giant swamp Taro	<i>Cyrtosperma merkusii</i>	Food, medicine, make money, etc,
Te Bero	Native Fig	<i>Ficus tinctoria</i>	Food and medicine, make money, etc

Te Nii	Coconut	<i>Cocos nucifera</i>	Food & drink, medicine, building materials,
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The listed traditional trees and crops in the table above are of high traditional value, and might have more values not mentioned here, and are believed now to be declining in numbers. There are other trees that are of high value especially in herbal or local medicines and building materials that are believed to be declining too, especially at urban centers, such as te kiaiai (beach hibiscus), te ukin (beach almond), te uri (Guettarda), te ren (tree and beach heliotrope), te mao and others.

Diversity of food crops, both introduced and traditional for climate resilience, varies between the island groups of Kiribati. The variation is largely dependent on the distinct growing conditions between the islands. The Northern Group islands receive high rainfall and thus have rich organic matter level in the soil to support wide range of food crops (see Table 12). The islands at this region have high productivity and diversity of water-loving or water-sensitive crops such as banana, giant swamp taro, taro, xanthosoma, cassava, and sweet potato. This is also the same as in the Line group islands such as Tabuaeran and Teraina. The table below shows the introduced crop species to selected islands by the Agriculture projects. It shows that Butaritari (Northern and wet-island) receive more varieties of crops and through the accessibility of Abaiang and Tarawa (North and South), they receive more crops.

**Table 6: List of Introduced Crop species to selected Islands**

<b>Introduced Crop Species</b>	<b>Islands Introduced To</b>
sweet potato ( <i>Ipomea batatas</i> )	Butaritari, Beru, Tarawa, Banaba, Aranuka, Nonouti, Abemama
Banana ( <i>Musa spp.</i> )	Butaritari, Nonouti, Tarawa, Aranuka, Christmas, Beru, Arorae, Maiana, Marakei, Abemama
cassava ( <i>Manihot esculenta</i> )	Butaritari, Nonouti, Tarawa, Aranuka,
yam ( <i>Dioscorea spp</i> )	Butaritari, Tarawa, Banaba,
swamp taro ( <i>Cyrtosperma merkusii</i> )	Abaiang
taro ( <i>Colocasia esculenta</i> )	Butaritari, Beru, Tarawa, Banaba, Abaiang

Source: ALD, 2014

Going from Northern Gilbert island groups to the Central and Southern Island Groups, productivity and diversity of these crops falls markedly. This is because these islands receive less rainfall and are often experience prolonged periods of drought. Major crops that produce well at these islands are those that do not require much water such as breadfruit, coconut, and pandanus.

There might be more but not much data and information collected at this time, and through projects with financial & technical assistance the other islands would probably be reached.

Plant species which are relevant to food and agriculture in Kiribati consists of no more than 60 species. These include plant species of nitrogen fixing trees and cover crops, species of roots and tuber crops, fruit tree crops, and vegetable crops. In terms of animal food species (livestock), there are only 3 species which include ducks, pig and chicken (local, crossbred, and exotic). However in some islands of Kiribati such as Arorae and Tamana in the southern part of the Gilberts Group, dogs are raised as another important animal food species. These plant and animal food species are found throughout Kiribati islands today and they are mostly descendants of those that arrived by early settlers, early colonizers, and voyagers that discovered or first sighted Kiribati islands during pre-colonial periods. Some of these plant species came into Kiribati through the Agriculture and Livestock Division's (ALD) research programs on crop improvement which started since 1970s.

However, even though Kiribati faced declining of its biodiversity; there are programs executed at the National Level to minimize the problems encountered. Introduced staple food crops species (Table 6) are introduced through Food Security program from ALD and its partners around the region including Taiwan Technical Mission (TTM) office based in Tarawa. The Centre for Pacific Crops and Trees (CePaCT) of the Secretariat of the Pacific Community (SPC) in Fiji is one of ALD partner in this Food Security program. This was started in 2013 through CePaCT multi-lateral benefit sharing system of the International Treaty of Plant Genetic Resource for Food and Agriculture (ITPGRFA) program, where CePaCT assist ALD to supply big quantities of tissue culture plantlets and have been distributed widely throughout Kiribati.

As a result from CePaCT program on Food Security assistance to Kiribati (ALD) and from the Taiwan Technical Mission, Makin, Butaritari, Marakei and Abaiang are becoming now the major internal (domestic) trading islands on Banana and Pumpkin to Tarawa (Capital). Slowly growing in demand at domestic markets are cassava, taro and sweet potato. According to 2013 report of Agriculture Assistant report, there were 828 vegetable crops grown, 209 staple food crops and 6 tree crops planted.

On Tarawa, vegetable crops are also start marketed at urban supermarkets and this including Chinese cabbage, tomato, cucumber, sweet pepper, eggplant, long bean, pumpkin, papaya and others.

**Table 7: Vegetable production on South Tarawa for 2013**

<i>Group name</i>	<b>Annual yields (kg)</b>							
	<i>Cabbage</i>	<i>Pepper</i>	<i>Cucumber</i>	<i>Eggplant</i>	<i>Tomato</i>	<i>Pumpkin</i>	<i>Papaya</i>	<i>Long Bean</i>
Ueen Tamo Community	931.1	174.3	729	43.1	647.3	18	155	133.9
BKNB	7	5.6	0	3	0	14	0	0
Eita Group	2432.1	299.9	273.9	91.7	0	781	62	0
BNARB	262	72.1	156	205	0	8.8	5.9	0
TRRK	1092	77.8	18.1	194.1	0	186.3	158.6	0.8
BNRK	202.5	9.2	19.9	0	0	203.8	171.6	0
BRKT	118.4	19.7	153.2	13.2	0	73.7	16.8	0
<b>TOTAL YIELDS PER CROP</b>	<b>5045.1</b>	<b>658.6</b>	<b>1196.9</b>	<b>550.1</b>	<b>647.3</b>	<b>1285.6</b>	<b>569.9</b>	<b>134.7</b>

Source: ALD, 2014

Besides introducing crops, species conservation is another program executed by Agriculture and Fisheries Departments. The following table shows the species conserved by these Ministries

**Table 8: Methods of Species Conservation by ALD and FD**

Method of species conservation	Agricultural Division	Fisheries Division
In-situ programs	In – situ propagation programs is done with coconut tree pandanus, breadfruits and many other useful agricultural tree crops.	Threatened species raised in the wild at certain selected sites is done with giant clams, te bun.
Ex-situ	Work collaboratively with CePaCT through ICCAI funds to establish ex-situ genebanks of giant swamp taro and pandanus. This genebank is located in Tebero Abaiang currently with 5 varieties of pandanus, 3 varieties of giant swamp taro conserved in the genebank. 3 food crop species of cultural and social value in vitro-conservation at CePaCT tissue culture laboratory.	Threatened species raised in a controlled environment, away from the wild before transferring to certain selected sites. Sea cucumber, te bun and other marine species at Tanaea



## Birds of Kiribati

The loss of native plants gave rise to the loss of birds as well because of climate change influence (less rainfall in some parts of Kiribati). Invasive Alien Species and impact of rapid population growth are also cause the loss and declining of Kiribati biodiversity. For instance, in this case, most of breeding sites for land birds especially an only endemic bird species for Kiribati known as Bokikokiko (Christmas Warbler-Figure 3) that found on Kiritimati (Christmas) Island in the Line Islands Group are badly affected because of growing size of village areas. This related to the cleaning up of lands where Te Ren and Te Mao are the main affected trees when this activity carried especially in the village of Tabwakea, Kiritimati Island. These two native trees are best nesting grounds for Bokikokiko since it one of bird species that nest on branches.

**Figure 3: Bokikokiko**



**Source: Dr Ray Pierce, 2013**

The growing population on Kiritimati Island, do also affect the breeding colonies of seabirds especially during the breeding seasons (March/April – May/June and Oct/Nov – Jan/February every year) outside village areas. This happened because of poaching activities carried out by locals

**Figure 4: Birds of Kiribati: i) Enderbury frigate birds, Xmas, ii) Breeding season, Xmas, iii) Birds of Aiwa, TabNorth**



**Source: Ray Pierce**



**Source: Ray Pierce**



**Source: ECD, Tabiteuea, 2014**

hunt for bird meat and collecting eggs. If they (local people) are not poached, they contributed to growing population of IAS in the wilderness that causes the rapid declining of seabirds population in particular smaller birds like terns and noddies. Kiribati have 1 endemic land bird, 19 seabirds species that breed in Kiribati and 4 visitors from the Arctic that only transits. Some outer islands of Kiribati have uninhabited islets where birds inhabit. In the island report of Tabiteuea North, the islet of Aiwa survives many birds. These might need classification and distinguishing of bird species. Not only birds, but in relation to biodiversity concerned, these uninhabited islets between Tabiteuea North and Tabiteuea South are rich in many biodiversity lives and could be a good place in establishing protected areas.

Also, the island consultations made confirmed the following information in visited islands only.

**Table 9: Island Proposed Important Biodiversity Areas and New Findings**

Island	Proposed Biodiversity Areas with Island recommendation	New Findings
Butaritari	<p>Butaritari has a lush biodiversity with diverse land resources. Like other islands in Kiribati, the dominant fruit trees are coconuts however Butaritari people are more dependent on bananas for a living. Butaritari has abundant marine resources due to its vast lagoon and reef areas, but faced issues such as lack of resources in fishing, marketing as in the remote island, depletion of sea cucumber.</p>	<p>From the visit to this island a new species of mangrove is found and is believed to be <i>Lumnitzera racemosa</i></p>
Marakei	<p>Proposed biodiversity areas of important for future generation food security:</p> <ol style="list-style-type: none"> <li>1. Milkfish pond at the middle of the island.</li> <li>2. Ark shell breeding area within the lagoon of the island.</li> <li>3. Marine areas under different villages for te ororo (fishing method using crowbars) to be protected.</li> </ol> <p>Those 3 areas are very crucial to islanders since it is their main source of income, food and livelihood.</p>	<p>No new findings as most are same with other islands, except ciguatera as an issue</p>
Abaiang	<p>Biodiversity is also affected and believed to be declining compared to the past. Participants identified the cause as sea level rise, increase in temperature, absence of mangrove and coastal vegetation, construction, uncontrolled sand and gravel mining. Abaiang request a need in protection of giant clam (locally named te were). Protection required for both marine and terrestrial ecosystem. They see the need of</p>	<p><b>Confirmation of Te Reiangō to be poisonous accordingly:</b> From ALD confirmation through Prof. Art Whistler (Pacific botanist) confirmed ‘te Reiangō’ (Kiribati local name) as a poisonous plant tree. It comes originally from the family called Apocynaceae. Fruits and leaves contain potent cardiac substance (glycoside) called cerberin which is extremely poisonous if ingested. The tree sap used for animal</p>

	<p>Protected areas as they stated it is useful for sustainable food supply and livelihood.</p>	<p>hunting in olden times (Tomlison, P.B.1995 The Botany Mangroves). In Madagascar, the seeds were used in sentence rituals to poison kings and queens. The fruit was reportedly eaten to commit suicide in the Marquesas islands (Whitler, W.A, 1992, Flowers of the Pacific Island Seashore). In Hawaii <i>Cerbera manghas</i> is sometimes called suicide apple. According to Thaman, 1987, ARB no 296, and mentioned that the local name – Te Reiangō is not a new species to our flora checklist. It is used to infect coconut crabs; where <i>Cerbera manghas</i> make coconut crab toxic due to the presence of cardiac and this coconut crabs used in tricking people before consumption. See picture in Table 10 of IAS section.</p>
Abema ma	<p>No protected area since the land is owned by landowners and the island is a chiefly island and forbid others to go to other areas. Protected area is not well understood by villages and thus more awareness needed so that more people could support it with species conservation. NBSAP will look into this for future reference.</p>	<p>Strange new looking mangrove species found in Kabangaki and Baretoa and is assumed to be an hybrid of red mangrove with another species. Although the confirmation of DNA test is to be advised later (by ISME- Japanese team joining the team to the island) but as for now, the species could be called an hybrid.</p>
Tabiteuea North	<p>Biodiversity is changing on the island and much affected by human activities and climate change (change in temperature and erosion). Less rainfall in the southern part of the island known as Utiroa and Kabuna (Very hot and dusty). The participant at the workshop reported that crops are not like</p>	<p>Islet of Aiwa is inhabited by many birds of some species and need identification of these bird species Brackish water in Utiroa, and mainly in Islets that worse in Bangai. The water issue is really a concern and they request help to higher level.</p>

	<p>before and even copra production is really affected. On the other hand they said marine resources are plentiful but land biodiversity is a big problem now days.</p>	
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The case study below shows the ecosystem services in Kiribati that includes the selling of marine and agricultural products by local farmers.

**CASE STUDY 1: LIVE AND LEARN (NGO) – COMPLEMENT WORK OF GOVERNMENT  
*LIVE & LEARN***

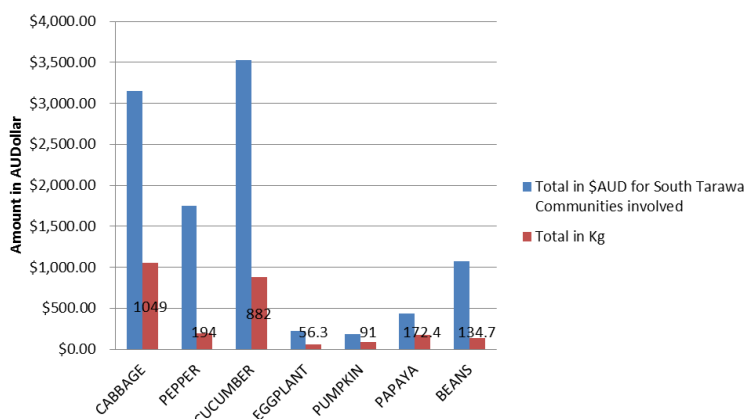
The complement work of the Government on ecosystem services is mainly through the assistance of NGOs and other vital Organization such as Church groups, and even governmental organizations.

The Live and Learn Environmental Education (LLEE) is an NGO established in 1 January, 2013. The main focus program of this newly established organization is on Food Security and Climate Change where it targeted the most isolated and vulnerable communities to climate change. The programs of the LLEE assist to facilitate the establishment, strengthening and extension of community based knowledge hubs (KHs), support and promote the uptake of climate resilience crops and farm technologies and climate change leadership at the community level.

The LLEE have identified three community based knowledge hubs including Temaiku (South Tarawa), Tebunginako (Abaiang) and Nonouti. In line with the key objective of the KHs, the LLEE have worked collaborately with these communities to promote the adoption of climate resilient crops and farm technologies, and provision of training as part of capacity building to local farmers. Expanding of the farm technologies and communities were needed to continue in the next phase of the program.

As being an active stakeholder it performance on community work on agricultural farming reported in the graph below. For 2013, the total of \$10,331.00AUD is gained by only the communities of South Tarawa participated in the Live and Learn Project implementation. The only 7 communities participated includes; Bikenibeu, Eita, Banraeaba, BRKT, BNRK, Tamoia, and Teaoraereke. These communities income for the year 2013 is 10331.00 AUD which gave rise from the prices: cabbage \$3/Kg, Pepper \$9/Kg, cucumber \$4/Kg, eggplant \$4/Kg, pumpkin \$2/Kg, papaya \$2.50/Kg and beans \$8/kg. The dominated crop species sold is cucumber followed by cabbage. However, this graph support the fact that through the financial assistance (Live and Learn Project) and technical assistance the people learn to use farming in generating income even with the vulnerable island and atoll nation and with the poor soil they have. Some of the notable benefits of the KHs approach identified include;

**Total Cash Earned by Involved Communities in Live and Learn Farming project of Agricultural Crops (AUD)**



(i) the close interaction and network amongst local farmers from different communities, and information sharing through technology demonstrations.

(ii) the distribution of climate resilient crops and promotion of farm technologies amongst farmers and communities was another benefit of the KHs. The distribution was facilitated by

the KHs with the support of LLEE and other partners. The two identified KHs where the distribution activities undertaken at is Temaiku (S.Tarawa) and Tebunginako (Abaiang). The Tamoa KH (S.Tarawa) has established a bulking plot and greenhouse using community labour. A variety of climate resilient crops supplied by the SPC's CenPAC were established at the bulking plot. Additionally, the seedling and planting materials provided by the Agriculture and Livestock Division and Taiwan Technical Mission were distributed to community members through KHs. There are 171 in total the number of households from the KHs in South Tarawa that were actively engaged in vegetable and root crop production and fruit tree planting. In supporting the communities, the KHs organized a system for marketing excess farm products to market outlets and supermarkets throughout the island, and (iii) the facilitation of a system of information sharing between stakeholders and on planting materials. Climate resilient crops and technologies are new extended across the communities which contribute to sustainability of food resources and income benefits. This is done through capacity development of communities in Ecosystem-based adaption (EbA) practices through demonstration modality which resulted in the adoption of these practices by the KHs and community.



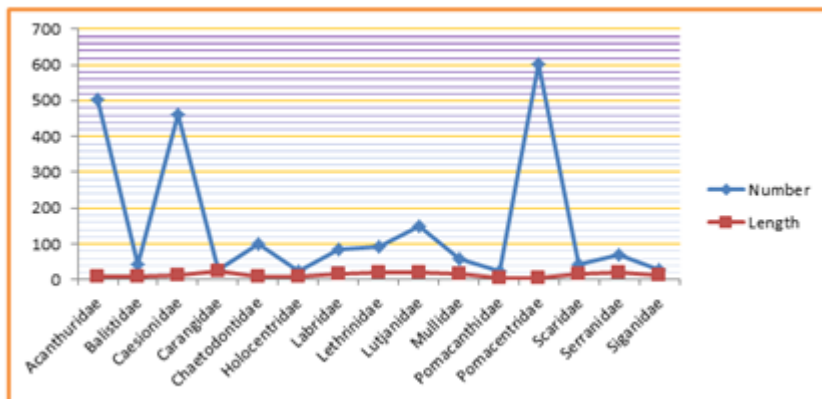
### 1.3.2. Marine Biodiversity

Throughout Kiribati communities, marine resources are very important beside our terrestrial resources. It only because its provide food for us every day as our fishing ground or giving us a place to collect and make our handicrafts, or to use the available resources to support the

development of Kiribati economy. The sea/ocean itself helps to connect island to island in Kiribati and to neighboring countries. However, over the years, number of coastal marine resources has declined in particular where the population concentrated living especially at Urban centers like South Tarawa and Kiritimati where unsustainable harvesting of marine resources took place for commercial purposes. For instance, sea cucumbers have confirmed to be highly depleted in the Kiribati waters and Kiritimati Island in the Line Islands Group is one of the islands that sea cucumber resources have been heavily fished.

The finfish survey carried out in Onotoa by the FD in 2012 shows that the Pomacentridae family were the damsel fishes came top to 26% as the highest percentage recorded for Onotoa during the event of data collection. This Pomacentridae species is hardly eaten because of their small size and other reasons. This trend of this species would be more likely the same in other parts of

**Graph 7: Results of UVC on Onotoa Island, 2012**



Source: Fisheries Division, Onotoa Report, 2013

Kiribati. The underwater visual census (UVC) done in Onotoa is the first survey of coastal species in Onotoa and the results is shown in Graph 7.

It should be noted however, that what was compared here was based on the outer reef record. Damsel fishes were not

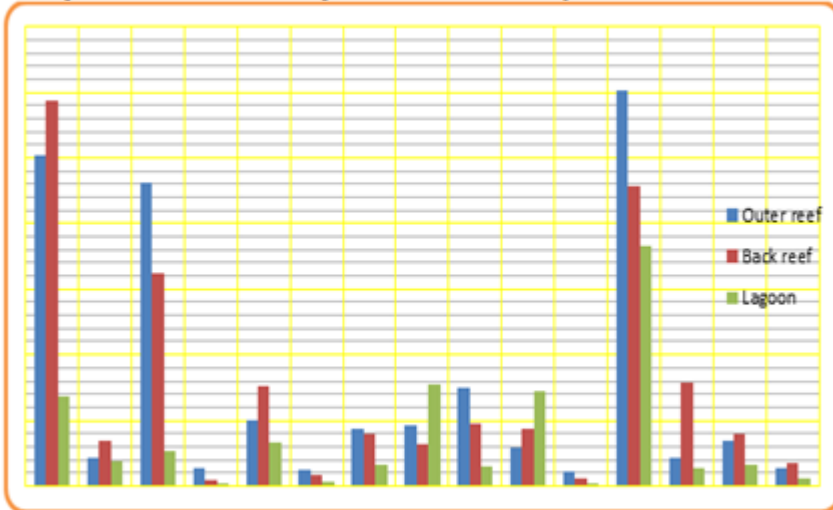
being eaten in Kiribati despite their small sizes. This might be the reason why the species was very high in abundance as observed during the surveying week in Onotoa. (Onotoa Report, FD, 2014)

Also, the overexploitation in Onotoa of other important reef, lagoon and oceanic species is a common practice on and it is becoming a great concern by Fisheries Division. This involves the trading on shark fins where most fishermen comment that it brought good business to them. Fishermen reported that in 2009 the price for a best grade shark fin was AUD\$70.00/lb but then AUD\$150.00/lb in 2011 where they current used nowadays (2014).



This Onotoa survey was concentrated in the outer and back reefs on Onotoa. The survey found that there is a low count of fish families in the lagoon where it believed that it might be related to shallow water depth within the lagoon. This is because most of lagoon areas in Onotoa located at

**Graph 8: Distribution of major fish families surveyed in Onotoa Island, 2012**



Source: FD, Onotoa Report, 2013

the range of 2-5m deep. Or it is because of the lagoon is in the close proximity of the reef system to the land where most people easy access to it. At the same time it made fish species living in that environment susceptible to gillnet fishing as most people use gillnet as their common fishing gear.

These surveys and monitoring activities monitor the status of marine resources and also raise awareness to local communities, build capacities and mostly record new species if found to update the status of species in terms of rare, vulnerable, etc.

Therefore, both commercial fishing and daily consumption contributed to the decline of Marine biodiversity. In other words, economic value of Kiribati Marine resources contributed a lot to Kiribati economy starting local communities, Government and Foreign Investors. Kiribati community is not only benefit from that, but also support and improves their social life. But there is a great need to carry out good management plan to support the sustainability of these Marine resources.

The other updates from the FD on marine resources are as follows.

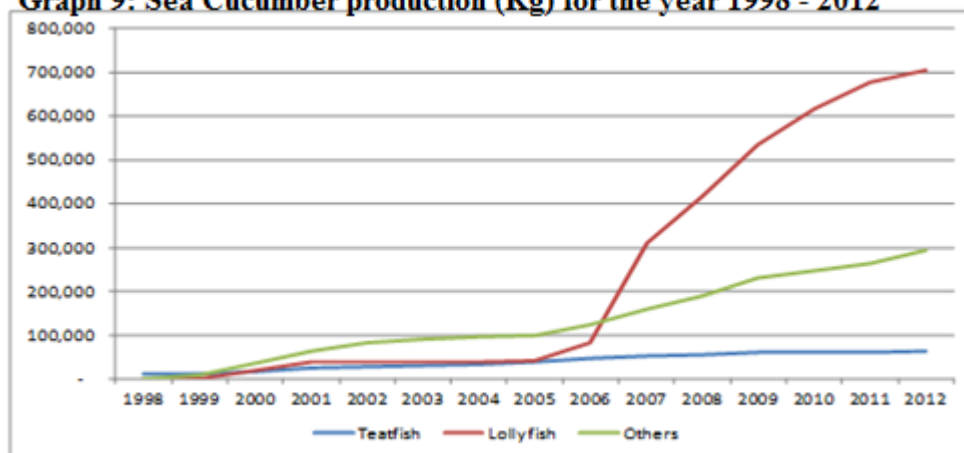
### Coastal Fisheries

- 1) It is confirmed that some finfish with other invertebrate stocks had declined according to the Underwater Visual Census that was conducted in North Tarawa in December, 2009. The survey concluded that families of Lethrinidae (emperors te morikoi), Mullidae (goatfishes te tewe) and Lutjanidae (snappers ikanibong) their abundances are relatively low.
- 2) Moreover, other invertebrates such as *Hippopus hippopus* (clams or neitoro), *Tridacna gigas* (te kima) and sea-cucumber species are relatively low abundance in most islands.
- 3) Coastal fisheries resources are mainly commercialized are the ones that are declining rapidly such as sea-cucumber species and pet-fish fishery for aquarium trades.

- 4) Even though some finfish and invertebrate species are declining, however, some species are still abundant to support the livelihood of Kiribati people as reference to the social economic survey conducted in 2012, 76% of Kiribati population still depend on finfish as their main source of protein.
- 5) In this respect, the abundance of coastal resources varies by island. For example, the abundance of *Tridacna maxima* is relatively high in Nonouti and Tabiteuea islands compared to North Tarawa.
- 6) In Abaiang island *Anadara* species are still abundant, while in South Tarawa the species is relatively low.
- 7) The strombus(te nouo)species in South Tarawa is relatively high as one of the main protein source for the people.

This graph shows the trends of sea cucumber in the Kiribati economy between the years 1998 to

**Graph 9: Sea Cucumber production (Kg) for the year 1998 - 2012**



Source: Fisheries Division, MFMRD, 2014

2012. The trends shown is increasing in lollyfish followed by other species of sea cucumber and lastly the teatfish which is increasing a little and then gradually steady.

### Offshore Fisheries

As stated in the KFL report the tuna species landed at the factory shows the composition of the following. The common tuna species is Big Eye and the By-catch (skipjack, bill fishes, barracuda, sunfish Dolphin fish & leather jacket fish). The least common tuna species is the Albacore and the yellow fin is the second last common tuna species.

Table 10 below shows the total catch landed by the local fishermen at the factory since the factory

**Table 10: Species composition of the catch landed at KFL by the LLFF**

Species	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13
Yellow fin	24.2%	8.2%	0%	8.5%	13.6%	16.2%
Big Eye	44.6%	41.9%	2%	38.2%	37.4%	43.9%
Albacore	0.5%	0.0%	0%	0.0%	0.0%	0.0%
By catch	30.6%	50.0%	98%	53.4%	49.0%	39.8%

Source: KFL Report, 2014

became operational in September 2012. The graph 7 in 1.2 shows the monthly catch of the long line vessels



fishing in the EEZ of Kiribati for selected months in 2012 and 2013. It is clear from the data that the average catch for a fishing vessel fluctuates significantly over the months indicating the availability of tuna in the EEZ of Kiribati and the ability of the vessel's Fishing Masters to catch tuna during these months. For these months, the by-catch dominated the catch followed by the Big Eye tuna and Yellow Fin. The proportion of the by-catch at any month is quite significant thereby generating less revenue to the fishermen. The other chart shows the total catch landed by the local fishermen at the factory since the factory became operational in September 2012.

## Turtle Updates

Turtles in Kiribati are caught and consumed as a traditional food in Kiribati but no actual fishery been reported for them. Nooto village in North Tarawa has been designated as Ramsar site due to

**Figure 5: Turtle Taggin in Naa Buariki, North Tarawa in 2014**



Source: Arawaia, ECD, 2014

but only 6 juvenile turtles managed to get caught and tagged that day.

its importance as a turtle nesting site. The Rodeo report of turtle tagging June 2014, Naa Buariki in North Tarawa, indicated that many juvenile turtles found

From the island reports of ECD, turtle fishing is common on all visited islands for food and commercial. In Tabiteuea North, it was reported that traditionally, turtles' mouth bubbles are used for medicine and especially to enhance the strength of traditional oil. This oil makes people (divers & spear fishers) strong and to enable them to stay long under water without breathing (ECD, Tabiteuea North Report, 2014). ECD have highlighted the importance of turtle through media and consultations, and now is regarded as one marine species to be protected. These have been achieved through financial assistance by the Government and existing biodiversity projects. However, there is still a need on more awareness and outreach programs to other islands to be done on turtle.

Mangroves are becoming popular now in Kiribati as being climate resilient coastal species. Through many awareness programs including consultations by ECD and other relevant sectors, mangroves are now well known of their resilient value and as a result one couple reported of

being engaged in replanting mangroves on their own. See the case study below on mangroves of Kiribati for picture of this couple.

## CASE STUDY 2: MANGROVES UPDATES IN KIRIBATI

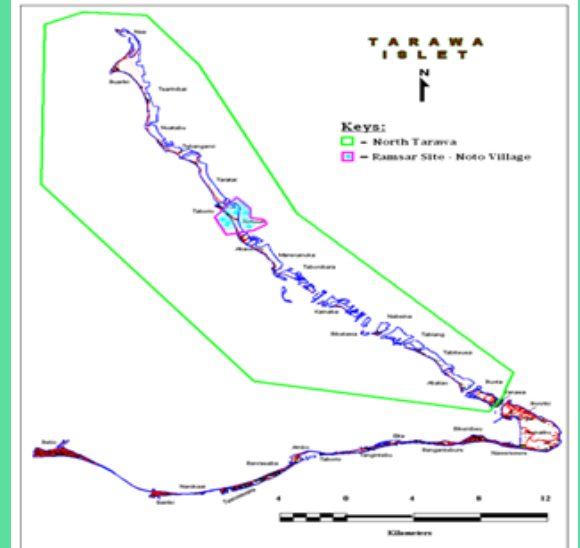
In Kiribati there are three major projects that support the mangroves replanting of which NBSAP is co-financing with IAS in mangroves initiatives.

### 1. RAMSAR

The Convention on Wetlands is an intergovernmental treaty adopted on 2 February 1971 in the Iranian city of Ramsar. Thus, though nowadays the name of the Convention is usually written “Convention on Wetlands (Ramsar, Iran, 1971)”, it has come to be known popularly as the “Ramsar Convention”.

Kiribati ratifies to the RAMSAR Convention on the 3<sup>rd</sup> August 2013, Nooto – North Tarawa has been designated as a RAMSAR site for Kiribati. The implementation of the RAMSAR activity in Nooto has focuses on mangrove

Figure 1: Ramsar site (shown in blue) NTarawa



SPREP, 2014

Figure 2: i) Nooto replanting. ii) Nooto maneaba consultation. iii) Tekaai & wife & their mangroves



Source: Arawaia, ECD, 2013

Source: ECD, 2013

Source: Joanna Ellison, 2013

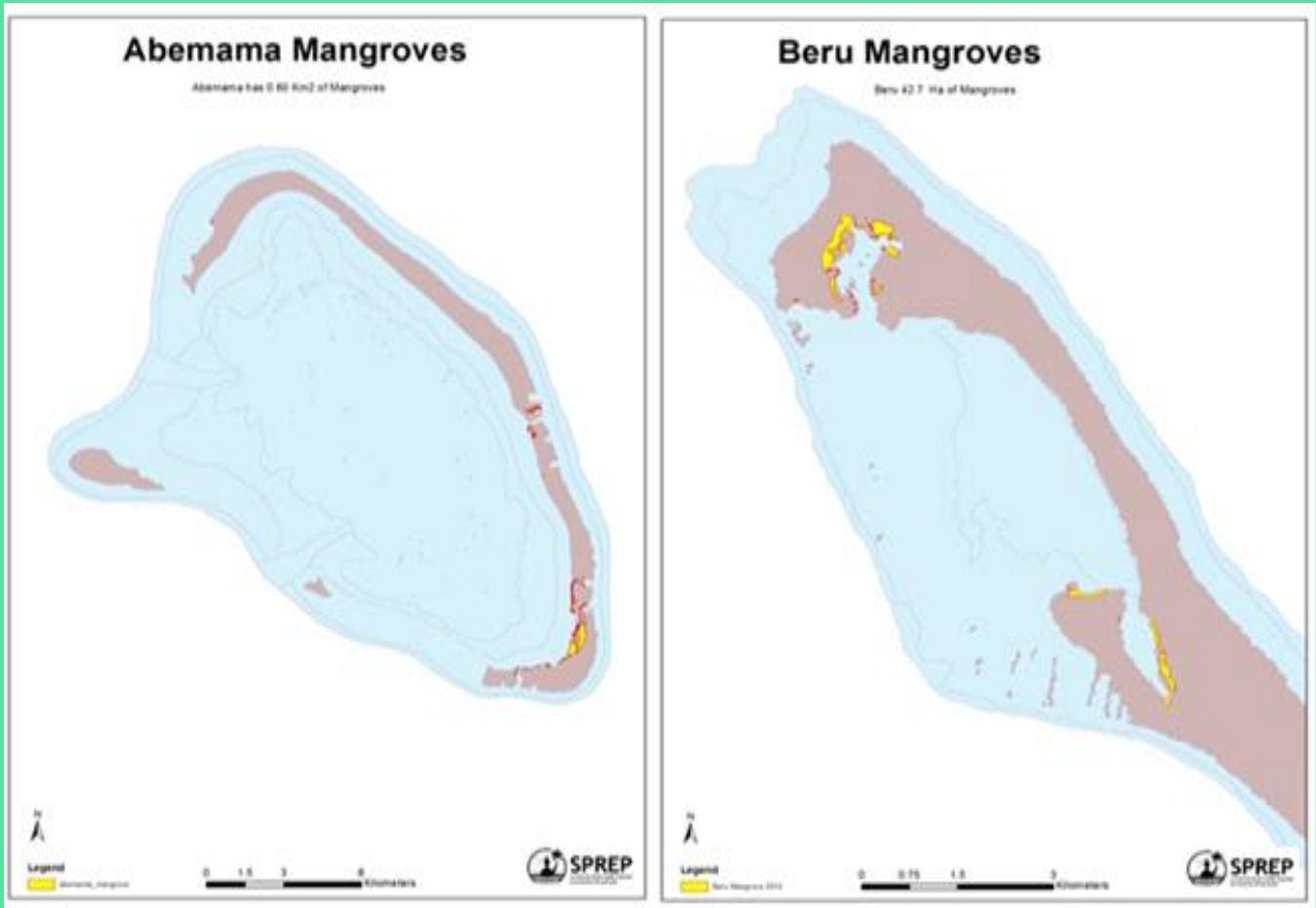
of the above mentioned activities with the support from RAMSAR project and with the assistance from Environment and Conservation Division, where at the same time this is another opportunity for them to practice and learn the procedure on how significant it is to help protecting and safeguard their coastal areas. Approximately 3,966 mangroves planted that day.

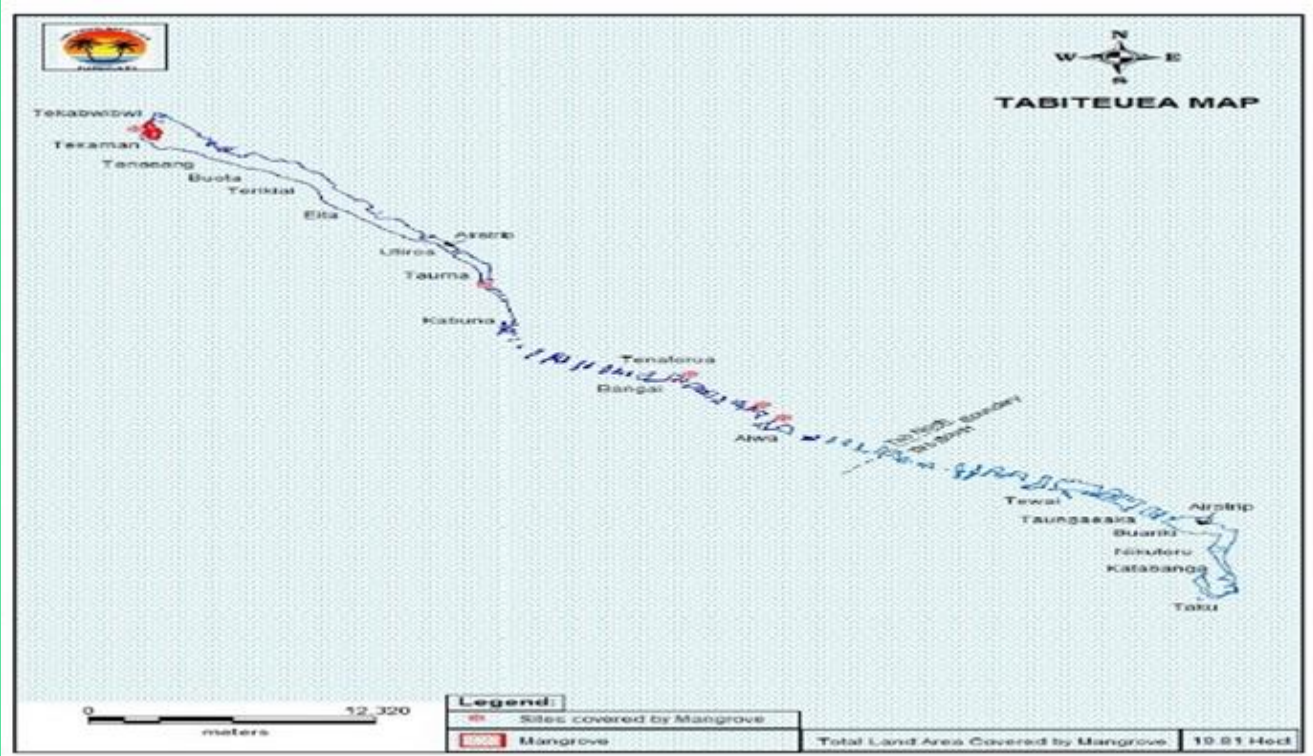
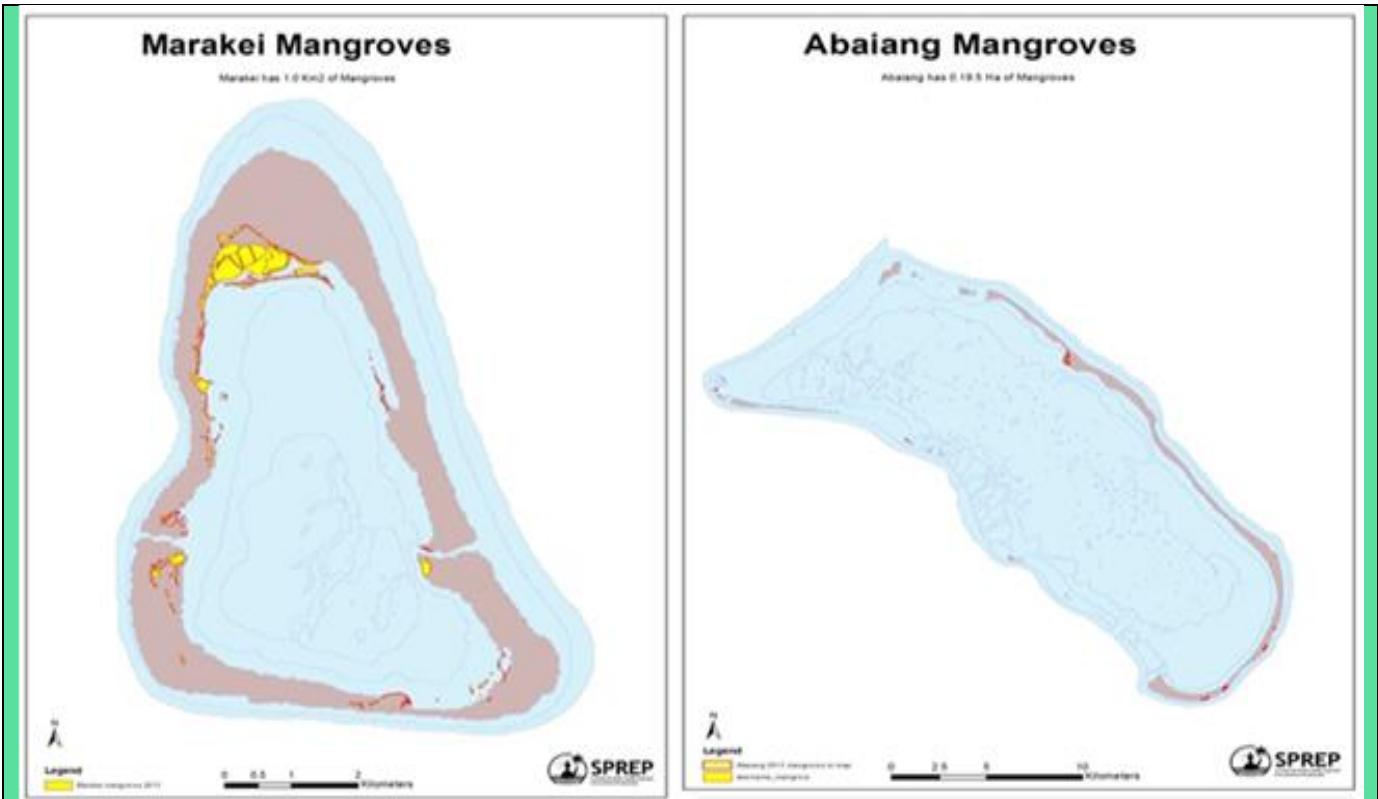
The first replanting of mangroves in Nooto was done in 2007 with a total of 4,401 mangroves planted. They were planted about almost 30 meters from shore, but all not successful since they all expose to the high energy of the water and also from a disturbance from fishermen. Apart from that, other families and also students from Taborio secondary school continue the replanting and seem all successful as they planted further to the shore.

replanting, awareness and part of that activity introduce coastal cleanup. June 2014, members of the village in Nooto carried out all

## 2. KAP III

As stated in the 4NR, mangroves are protected under the environment Act amended 2007 support KAP III in mangrove replanting. Mangrove replanting is one adaptation initiative towards climate change resilience and sustainable living. Demarcation of mangrove is also part of activities besides mangrove replanting. Efforts made in updating mangroves status and trends are as follows under KAP III. The islands covered in KAP III from north to south includes; Butaritari, Marakei, Abaiang, Abemama, and Tabiteuea Meang, and Beru while the previous KAP II includes; Mwakin, Butaritati, Maiana, Aranuka. Below are the demarcation maps done under KAPIII, NBSAP & IAS.





There are only 5 mangrove species found in Kiribati so far after the consultation made in selected islands under KAPIII and NBSAP. However, the 4NR in page 17 state that there are four species found in Kiribati, which means there is an additional species identified under KAP III on the island of Butaritari which is *Lumnitzera racemosa*. The mangrove species abundant in different islands is summarized in the table below, which shows the most abundant species is red mangrove or *Rhizophora*



*stylosa* and the least abundant of *Lumnitzera racemosa*.

**Table 1: Mangrove Replanting Data in Kiribati**

Island	Area (1996 USDA Forest Service)	Area (KAP II/III Mangrove Replanting, Data Update and Outreach) 2010 and 2014
Butaritari	177 hectares	417 hectares
Tarawa (North and South)	57 hectares	660 hectares
Maiana	21 hectares	250 hectares
Aranuka	14 hectares	87 hectares
Makin	No data	56 hectares
Abemama	No data	60 hectares
Marakei	No data	100 hectares
Abaiang	No data	19 hectares
Tab North	No data	19.81 hectares
<b>Kiribati</b>	<b>269 hectares</b>	<b>1668.81 hectares</b>

Source: ECD, 2014

Under this replanting activity most islands visited are community based initiative with zero cost, and therefore the people have to implement using their own resources available. Future trips to the islands listed above will allow the Environment and Conservation Division or ECD to go directly to the village that has past involvement

**Table 2: Abundance of Mangrove Species in Kiribati**

ISLAND	Te tongo Red mangrove <i>Rhizophora stylosa</i>	Te Tongo Buangi Black mangrove <i>Bruguiera gymnorrhiz</i>	Te Aitoa Oriental mangrove <i>Lumnitzera littorea</i>	Nikabubuti White mangrove <i>Sonneratia alba</i>	<i>Lumnitzera racemosa</i>
Makin	v	v	v	v	
Butaritari	v	v	v	v	v
Tarawa	v		v		
Maiana	v				
Aranuka	v				
Abemama	v		v	v	
Marakei	v	v	v	v	
Abaiang	v		v		
Tab - North	v				

Source: ECD, 2014

those villages.

### 3. ICCAI

Human trampling of dune vegetation has high impact on plants because of the loose abrasive nature of sand, causing vegetation dieback followed by sand disaggregation and erosion. While beaches undergo morphological cyclic change of erosion and deposition within longer time scales, up to 70% of the world's beaches are experiencing erosion and this is expected to further increase with global sea level rise.

Under this replanting activity most islands visited are community based initiative with zero cost, and therefore the people have to implement using their own resources available. Future trips to the islands listed above will allow the Environment and Conservation Division or ECD to go directly to the village that has past involvement with, and from there they could build good relationship with the village and could bring further program to

It is increasingly recognized that a relevant response to impacts including climate change is the application of



ecosystem-based adaptation approaches, which integrates use of

ecosystem services in an adaptation strategy. The EBA was first initiated in Buariki, North Tarawa in 2013 under the ICCAI project and extended to other islands with the initial objective of removing the cause by using fencing to reduce effects of human trampling, elevated dune walkovers to provide access from the road to the beach, and information posters to educate the public regarding damage.

Beach profiling (picture above) before mangrove planting (second picture above) is part of the initiatives within ICCAI, since ICCAI support sand disaggregation. Mangrove replanting and mangrove planting as part of ICCAI implementation involved communities to participate in picking and planting mangroves. The left figure shows the beach profiling in North Tarawa before the actual planting is done at Baonkewe kainga (Dr Ellison, 2014). Mangroves support sand aggregation and help prevent coastal erosion.

**Replication of ICCAI Initiatives in; i) Onomwaru Butaritari, ii) Aiwa Tabiteuea Meang, iii) Eriko Beru**



Source: ISME, 2013



Source, Keebwa, ECD, 2014



Source: Arawaia, ECD, 2014

**1.4 THREATS AND IMPACTS ON BIODIVERSITY UPDATES**




Based on various national, outer islands and household surveys undertaken as part of the formulation of the Kiribati National Biodiversity Strategies and Actions Plan (NBSAP) from 1996 – 2004, it has been confirmed that the present state of biodiversity in Kiribati is being socially, economically, politically and even judicially degraded. The main threats associated with this degradation include climate change, pollution (water and land), deforestation, and


overfishing, invasive species, overpopulation, and infrastructure developments. The main driver for the identified threats is rapid urbanization particularly on the capital island – South Tarawa. South Tarawa has one of the highest population densities in the world, with 3,184 people per square kilometre. (KBA, August 2013,10)

Apart from the threats mentioned in the 4NR, the following are considered also as high contributing factors to the decline in biodiversity of Kiribati.

### 1.4.1. Invasive Alien Species

**Table 11: Invasive species inventories on outer- island visited.**

Outer Island	Invasive Alien Species Found	
	Marine Species	Terrestrial Species
Marakei	Cat fish- <i>Siluri forms</i> Tilapia- <i>Oreochromis niloticus</i>	Ship rat – <i>Rattus rattus</i> , Mealy bug
Abaiang	Crown of Thorns- <i>Acanthaster palci</i> ,  Cat fish- <i>Siluri formes</i> Bloom algae	Ship rat – <i>Rattus rattus</i> pigs. For pictures of poisonous and toxic plants,  [Adapted from Abaiang Report, Bwatoromwaio.K,2014] ‘Te Aronga’ or otherwise known as the Acalypha tree is a creeping weed that occurs in some parts of Abaiang. The year and how the weed arrived in Abaiang is unknown. The weed is considered a nuisance to the villagers as they have no use for it and wherever it is established, it tends to smother the indigenous weed and plants eventually taking over the area. The villagers indicated that there are two varieties/species of ‘Te Aronga’. Both species shown above.  [Adapted from Abaiang Report, Bwatoromwaio.K,2014]
Tarawa	Crown of Thorns- <i>Acanthaster palci</i> , Cat	Mynah bird- <i>Acridotheres tristis</i> , Feral Pigeon- <i>Columba livia</i> , Wedelia plants- <i>Wedelia trilobata</i> , Ship rat <i>Rattus</i>

	fish- <i>Siluri forms</i> , Tilapia- <i>Oreochromis niloticus</i> ,	 <i>rattus</i> , mealy bug, castor plant (poison)
Abemama	Tilapia- Oreochromis niloticus	Feral Pigeon- Columba livia, Ship rat Rattus-rattus, mealy bug
Tabiteuea Meang	Tilapia- Oreochromis niloticus,	Ship rat Rattus-rattus, mealy bug, pigs. For new unkown species found,
Onotoa,	Tilapia- Oreochromis niloticus	Mynah bird- Acridotheres tristis, Ship rat Rattus-rattus.
Kiritimati		Yellow Crazy Ants- Anoplolepis gracilipes

#### 1.4.2. Socio-cultural impacts

Another indirect impact to the decline in biodiversity is the changing of lifestyles. This is gained mainly through media, education , travelling and others whereby the I-Kiribati changed his/her cultural practices . The change of I-Kiribati lifestyles fully occupied the new generations today in other activities where by cultural planting seems to be replaced. One example of the evidence of this direct impact as reported from outer island consultation, is the decline in giant taro (bwabwai) in the bwabwai pit by some people. Another good example is kava drinking where people are pre exhausted from this function, and the next day rest for the hangover night instead of planting bwabwai. This would soon replaced cultural diets into western or other diets since it is more easier to buy from shops rather than cultivating, planting etc. Before kava drinking came into Kiribati, people are more engaged in replanting and cultivating in their own lands as a cultural practice but today this habit is becoming unobvious compared to olden days, although there are many who still engaged a lot with this. However through awareness programs with the aid of externally funded projects, and with Governmental initiatives the issue is slowly addressed in other means as replanting is encouraged through ALD and others including NGOs.

#### 1.4.3. Climate Change

Kiribati climate and changing climate is one of the major contributing factors to the decline in biodiversity in this remote coral atoll nation. The following table shows the temperature change over the last centuries and this century.



### i. Temperature Change

From the Table 11 shown here, it appears that there is new minimum temperature of 25°C. This

**Table 12: Average temperature 1970 - 2006**

Temperature averages	1970-2000	1976-2006
Annual monthly mean temperature	27.8°C	28.4°C
Annual monthly average of max temperature	31.1°C	31.2°C
Annual monthly average of minimum temperature	25.25°C	25.41°C

Source: Data extracted from Kiribati Meteorological Service office

implies that the temperature range i.e. the variability of the temperature of Kiribati has also been increased.

### ii. Rainfall

Rainfall is highly variable and is largely affected by the ENSO. During El Niño, heavy rainfall is

**Table 13: Average, maxima, minima of annual rainfall in mm for period 1947-2006**

Station	Average	Max	Min
Butaritari	3160	482 (1990)	1447 (1950)
Betio	2029	456 (1992)	397 (1950)
Kanton	940	3473 (1987)	198 (1954)
Kiritimati	947	3635 (1997)	177 (1954)

Source: Data extracted from Kiribati Meteorological Service office 2010

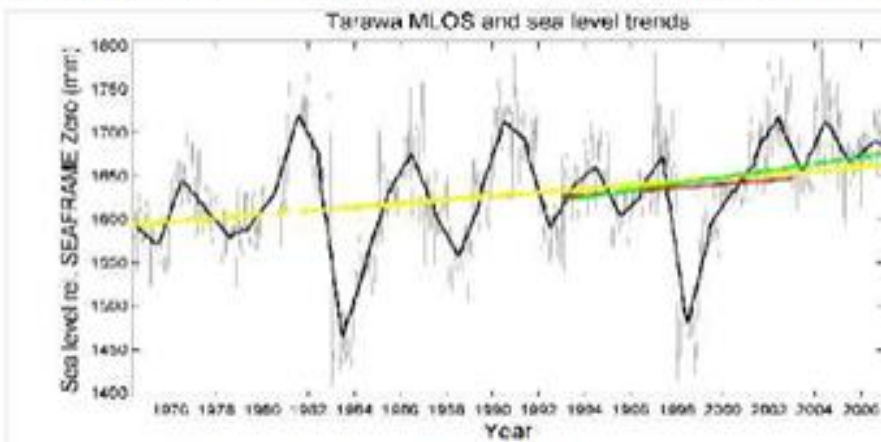
experienced in Kiribati, while La Niña is associated with drought. Inverse correlation between the

SOI and the amounts of rainfall is well established. Rainfall data for the periods 1947 to 2004 are available from Butaritari and Betio stations in the Gilbert Group, from Kanton in the Phoenix Group, and from Kiritimati in the Line Group. There are some gaps in few monthly records. Monthly records are summed for each year over the whole period, 1947-2004. Annual averages, maxima and minima in the annual totals for each of the stations are shown in the Table 13 above. As shown in the table above, Butaritari is the second island from the north, not far from the most northerly island of Makin, in the Gilbert Group. Tarawa, where Betio station is located, is south of Butaritari and record less rainfall. Islands further south are drier and their annual rainfalls are close to those of Kanton and Kiritimati.

### iii. Sea Level Rise

Sea level is rising in Kiribati and caused damage to some islands, the datum for each of the tide

**Graph10: Tarawa Atoll Sea Level with analysis of trends of different time series**



Source: Kiribati Meterological Service Office, 2010

adjusted sea level for Tarawa – Kiribati from 1974 – 2007 (33.25 year records relative to SEAFRAME gauge Zero). This work is made possible through NIWA as part of the Kiribati Adaptation Project (KAP).

Linear rates of sea-level rise since 1974 to present (yellow line), 1993 to 2003 (red line) and 1993 to 2007 (green line). The grey line is the Mean Level of the Sea (MLOS) as measured at the SEAFRAME and earlier sea level gauges, and the black line the annual average MLOS.

From the graphs above, they also show that there is a slight increase in sea level rise. Even though the rise in sea level is very small, however it did tell us that a very small increase in sea level would impose great impact on SIDs like Kiribati (SNC Report 2013).

### iv. Natural disaster

With the increase in sea-level rise, Biodiversity is altered and one which should be carefully maintained for the coastal people of Kiribati. The people of Kiribati are coastal people and therefore with the living space being scarce and developments taking place, there is a need to consider the harm on Biodiversity and ways to carefully address potential risks to our coastal areas.

### v. Erosion

Rates of change (Erosion and accretion) along with contributing factors e.g. human influence, sea level rise, El Nino/La Nina Between 2005 and 2009, ca 50% of the shoreline on islands in Kiribati displayed a discernable shift in position; some shorelines were accretionary (at net rates up to

gauges were different, however this was taken into account when plotting the

8m/year) and others were erosional (up to 18m/year). Long term net rates of Maiana between 1969 and 2009 were lower than short term net rates measured 2005 and 2009. Both short-term and long-term observations illustrate some of the greatest change occur near terminations of the largest, north–south oriented islands, associated with long-shore movement of coarse sand and gravel. Direct hits by tropical depressions and marked seasonality, factors interpreted as being

**Figure 6: GIS Analysis of shoreline change 1998–2013 in Naa. Buariki. North Tarawa**



Source: Joanna Ellison, 2013

essential in island growth and shoreline dynamics elsewhere, do not directly impact these equatorial atolls and can be eliminated as fundamental controls on shoreline Dynamics.

Observations over four years suggested that shoreline variability probably is not influenced directly by marked sea-level change, although a recent increase in the rates of shoreline change

could reflect instability related to the cumulative effect of a long-term increase in the rate of sea-level rise. Global change, local anthropogenic effects, autogenic shoreline processes and El Niño/Southern oscillation influenced wind and wave variability control many aspects of these dynamic shorelines.

Many village shores are eroding locally, especially in areas with construction of sea walls or groynes. On the sparsely populated atolls, these are relatively localised impacts and marked change occurs in many areas with no direct human influence, example in Figure 6 above of a severe erosion. The figure shows the eroding evidence of Naa Buariki in North Tarawa and it should be noted that there are many other places around Kiribati with a similar situation but this is reported as an example of erosion. The update on coastal erosion per island visited is shown in Table 14 below.

**Table 14: Coastal Erosion Update in Visited Islands**

Island	Erosion
Butaritari	To implement the project known as International Climate Change Adaptation Initiative to address the issue of coastal erosion at suitable sites vulnerable or experiencing exacerbated erosion in some part but very little.
Marakei	Severe erosion experienced after building lots of seawalls by people and from increase in sea level. Severe coastal erosion (Rawannawi meang, Temotu, Raweai, Tekarakan, Tekuanga, and Norauea). Rawannawi ocean side was the worst as identified during the full council meeting.

Abaiang	Coastal erosion is severe at Tebunginako where the maneaba fell and villagers re-located further inland. Fishpond now turned into bay/cove. But even other parts are also eroding like Takarano, Ubwanteman, Aonobuaka- severely eroded as well
Abemama	Coastal erosion is severe in two main villages, Tekatia and Kabangaki which believed by islanders, it caused by the causeways builds in Kariatebike and Kenna, and also affecting other villages except Baretoa, and Karen te kabwaia and little in Tebwanga and Kariatebike.
Tabiteuea North	Coastal erosion is severe in islet of Tenatorua, and Terikiai, Buota, Taneang and Tekaman.

### **Habitat Loss**

The loss of natural habitats and degradation of terrestrial ecosystems is directly linked to population growth with shifts in land use patterns catering for human settlements and other non-residential supporting uses.

The stated concept holds true and evident for urban Tarawa/Betio compared to rural/outer islands. South Tarawa and Betio being hub for the central government administration and commercial sectors with concentration of expenditure on infrastructure and services development have stimulated influx of people from the rural areas. The driver for this rural-urban drift is the perception on the part of the migrant seeking better economic opportunities in particular cash employment.

The 2010 census report show that the population for Betio is 15,755 and South Tarawa at 34,427 with land areas of 1.7 sq. km and 14.1 sq. km respectively.

With limited land availability the in-migration have significance influence on the use of land with pressing demand for residential and other supporting land uses.

The limited land area and fragile nature of the atolls poses serious environmental challenges for South Tarawa in particular with activities associated with urban development can have a wide variety of impacts on the natural environment including contamination of ground water, land degradations and overharvesting of coastal resources amongst other things.

In South Tarawa and Betio the scarcity of land compared to rate of urban development results in many areas formerly reserve as open spaces and recreational purposes being developed with less

or no consideration of environmental consequences. The rate at which open spaces and reserve areas diminishing is at an alarming rate with more and more settlements areas and commercial development being build or planned for future development.

Classical example is the JSS areas in Teaoraereke and Bikenibeu formerly an Atoll Research Centre and coconut plantations respectively with variety of plants having local medicinal values. The BTC JSS is formerly the water reserve area for Betio residents while the water reserve in Teaoraereke reverted back to landowners to accommodate the demand for settlement areas resulting from the growing number of population living on south Tarawa.

Existing land use for urban Betio provides that about 50% of the total land area is designated for residential use, 45% serve as for commercial, civic or industrial use whereas the remaining 5% or less is set aside as open space and park areas.

**vi. Urbanization**

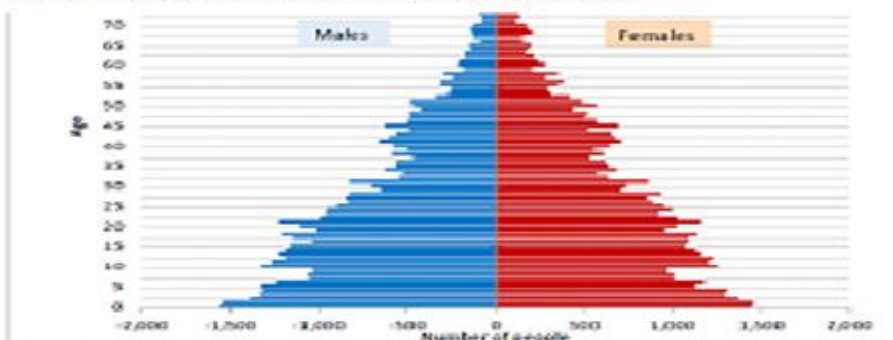
The 2010 census figure reported that South Tarawa and Betio accommodates a population of 50,402 that is 48% of the total national population showing an increase from 44% in 2005.

The population of Kiribati now stands at 103,000 with a growth rate of 2% p.a. Young and fertile population – the bulk of the population is in its reproductive years. The pyramid below shows that despite any aggressive measures the population will continually grow in number.

Furthermore, in South Tarawa, the high birth rate coupled with uncontrolled migration from outer

islands, results in an alarming growth rate of 4.5% between 2005 and 2010. Overcrowding on South Tarawa is putting a strain on public services and the already limited natural resources.

**Graph 11: Population Growth of South Tarawa**



**(Source: National Census Report, 2010)**

The graph 11 clearly indicates that the population is young and therefore active with ages between 10 years and 25 for the average mean age. This translates to the population of Kiribati being at an age which is active, however with the increasing population numbers, the need to cater for opportunities and employment for this age group is an issue which the government is carefully addressing.

## **vii. Wastes management**

The main types of wastes and pollutants threatening biodiversity and human health within Kiribati are those typically associated with urbanised communities (e.g. solid wastes, sewage and wastewater discharges) and from agricultural activities and port areas (including nutrients, sediments, pesticides and anti-foulants). Lack of integrated management of these pollutants is a key threat to Kiribati's environment. The problem is exacerbated in an atoll nation like Kiribati due to its small size, high water table and rising sea levels and the lack of cover soil to bury wastes.

### **Inland Waters**

Experience has shown that the issue of land ownership and restrictions on land use of areas such as water reserves used to extract groundwater remains a contentious issue. In South Tarawa the Government gives traditional land owners of the water reserves in Bonriki and Buota an annual land lease payment for use of the water reserve. Under the Land Acquisition Act, compensation should be a one-off payment and the current payment is considered by some illegal. Acceptable and equitable solutions need to be found before further public water supply systems can be developed in other islands.

### **Water Pollution**

Water pollution is also of concern, and this often refers to the oil spillage and other common forms of ocean dumping. Some cultural practices, such as pig keeping, are also impacting water quality. It is anticipated that more than 90% of households in Kiribati contain a pigsty that, when managed improperly, deteriorates the water quality (both underground water lens and inshore reefs). Similarly, there have been documented cases of deliberate oil release by private bus companies in Tarawa. Fortunately, these actions were quickly controlled by the Environment and Conservation Division; however, it is believed that some environmental damage was already done.

Sanitation on South Tarawa is currently only available to the residents of Betio, Bairiki and Bikenibeu. This system, which uses salt water for flushing, is currently in very poor condition, and is in urgent need of rehabilitation. The remainder of the population of South Tarawa use septic systems (many of which are leaking and are inappropriately designed given the underlying water lens), pit latrines, or the beach or lagoon. Inadequate sanitation is believed to be partly

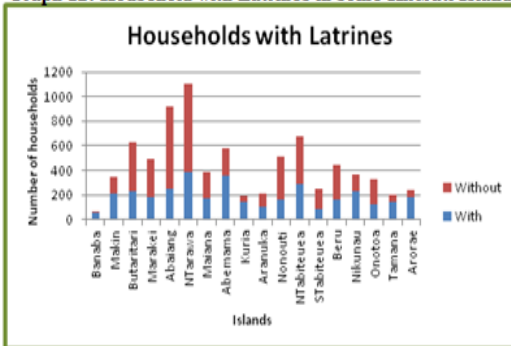
responsible for the very high incidence of water-borne illnesses and diseases on South Tarawa. Addressing this issue has thus been identified as being of critical importance.

Water and sanitation systems are intimately linked and are directly related to public health, especially in atolls. There is an urgent need for the development of a complimentary national sanitation policy to provide direction to donor agencies, government ministries and the community and to decrease contamination of drinking water. Addressing water and sanitation issues has been identified as being essential in improving the living standards and health of I-Kiribati, as well as being necessary in development and poverty alleviation throughout the nation.

### viii. Health Status

The bountiful rain also poses adverse health effects as well as drought giving off dust. Water,

**Graph 12: Household with Latrines in some Kiribati Islands**

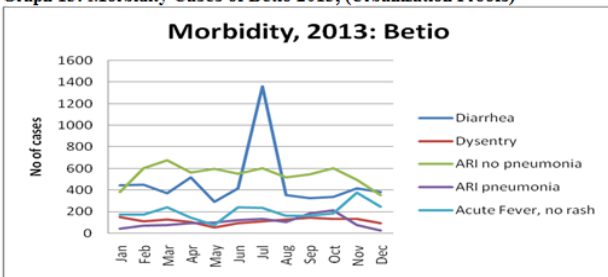


Source: Ministry of Health, 2014

dust, poor waste management, are very good vehicles for disease transmission. One common outer island issue and even South Tarawa is unavailable household latrines. This also contributes to the spreading of diseases and should be noted. Graph 12 shows the households with latrines in Kiribati. Another factor to health status is the unbalanced diets that contribute and promote diseases. One of the main health issue in

Kiribati (worst on Tarawa and common in northern & central Gilbert) is the incidence of diarrhea

**Graph 13: Morbidity Cases of Betio 2013, (Urbanization Proofs)**

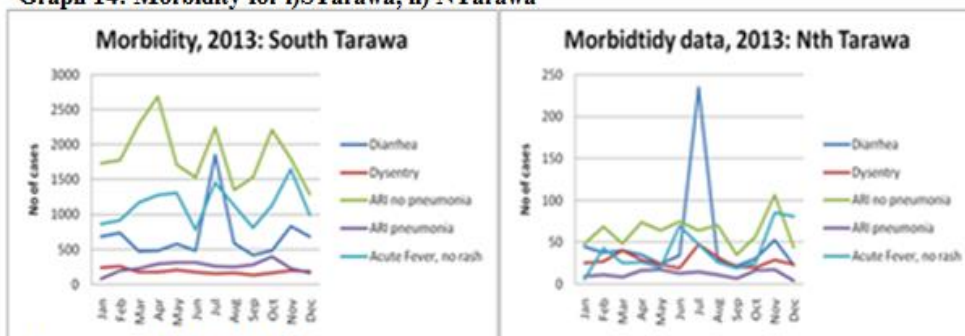


Source: MH, 2014

and other gastro-intestinal infections, which are water-borne diseases. Graph 13 and 14 shows the morbidity rate on Tarawa and Betio proving the increase in common diseases mentioned and it is also proving the urbanization issue in South Tarawa and Betio. North Tarawa is like

an outer island eventhough it is part of South Tarawa, but it is more like the outer island lifestyles

**Graph 14: Morbidity for i)Starawa, ii) NTarawa**



Source: MH, 2014

with lesser population in comparison to South Tarawa and Betio.

In the Southern group, drought is a

problem and droughts leads to water and food shortages which is a health issue of concern. Without the nutritious traditional food, the people are depending more and more on the imported food commodities and these are mostly processed food with high salt, sugar, fat, etc. contents, non-communicable risk factors and NCD's are the current number one cause of death and disability worldwide (Global Health)

The two most common diseases in the island is Acute Respiratory Infections (ARI's) and Gastro-intestinal Infections, common diseases in islands with varied climatic conditions, poor quality of water and sanitation issues. The following graphs depict disease incidences as reported from the islands in their monthly syndromic reports for 2013 (Source: MHMS, 2013). There was also a Rota-virus diarrhea outbreaks in July, 2013 and most of the islands were affected, a result of the improved internal transportation, especially to those islands close to the densely populated administrative center of South Tarawa.



## **PART II: NBSAP UPDATES, IMPLEMENTATION AND MAINSTREAMING OF BIODIVERSITY IN KIRIBATI**

As a party to the CBD, Kiribati is obligated to fulfill country implementations as set out under the Convention. This includes, but not limited to, the development, implementation and updating of National Biodiversity Strategic Action Plans and mainstreaming of biodiversity to national and local development and poverty reduction strategies and policies.

Since the submission of the 4<sup>th</sup> National Report, a number of biodiversity developments and milestones were documented and this section entails to describe these national progresses.

### **2.1 NBSAP UPDATES**

Kiribati embarked on the formulation of its NBSAP in 2004 and culminated in the development of its NBSAP which entails the biodiversity priorities and strategies for the year 2006-2010 and its implementation kicked off simultaneously. These priorities and strategies are set in accordance to the biodiversity targets set out in the Kiribati Development Plan 2006-2010.

The NBSAP is currently due for review and Kiribati has received an allocation for this activity from GEF-UNEP. National consultations and data updates and collation for the review commenced in 2013 and is in working progress.

The Plan is considered as an Action/Implementation Plan for the biodiversity targets and strategies set forth in the KIEP and the review will be crucial to integrate the new emerging issues and targets dictated in the KIEP 2011-2015 and the Aichi Biodiversity Target 2020.

### **2.2. NATIONAL BIODIVERSITY TARGETS**

Kiribati biodiversity objectives are set out in the Kiribati Integrated Environmental Policy which acts as the overarching framework for environment priorities. These objectives are aligned to the national, regional and international biodiversity targets namely the Kiribati Developed Plan (2011-2015) and the Aichi Biodiversity Target 2020. The KIEP 2012-2015 sets out national priorities for the following environmental policy areas: i) Climate Change; ii) Island Biodiversity Conservation and Management; iii) Waste Management and Pollution Control, iv) Resource Management; and v) Environmental Governance. The implementation of these policy areas are guided through the relevant Strategic Action Plans (SAP) i.e. NBSAP, SAICM Implementation Plan, NAPA etc.

The existing national biodiversity targets are comprehensive and encompass areas of: i) education, information and technology, ii) national coordination; iii) improved national capacity;

and iv) biodiversity and climate change. The national progresses towards the achievement of these targets since 2011 are commendable with a number of milestones accomplishments. The following are descriptions of the significant achievements under the KIEP and Aichi Biodiversity Targets 2020:

### **2.2.1. Key Biodiversity Areas Analysis Report**

As a key requirement under the CBD Programme of Work on Protected Areas (PoWPA), Kiribati conducted an ecological gap analysis for its three island archipelago – Gilbert, Lines and Phoenix Island Groups. The purpose of this analysis was to i) assess the effectiveness of the current Protected Area Network towards achieving the NBSAP targets, and ii) to identify priority areas for Protected Areas development and expansion in Kiribati. The activity was conducted by the Kiribati MELAD with the technical assistance of SPREP and Conservation International's Pacific Island Program (CI-PIP).

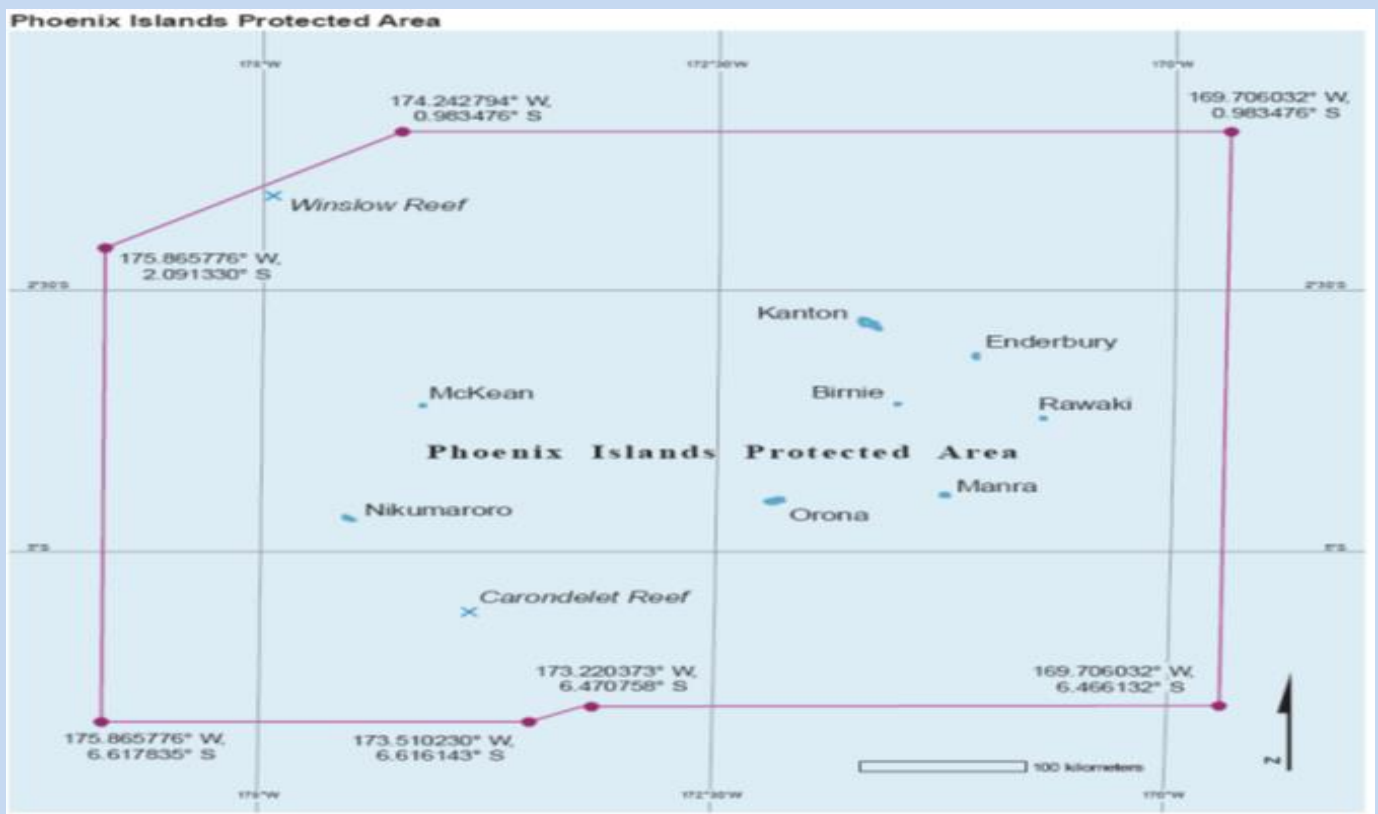
The Key Biodiversity Areas (KBA) approach was used for this analysis using the following criteria: i) Vulnerability – refers to the likelihood that a site's biodiversity value will be lost in the future; and ii) Irreplaceability – refers to the degree to which geographical options for conservation will be reduced if that particular site is lost. In addition to these, the IUCN Red List Criteria was included as the third criterion in KBA analysis. This criterion is triggered by the presence of IUCN Red List species. Based on national context and needs, these international standards were integrated with local criteria as follows: i) frequency of species of local concern; ii) KAP II mangrove project areas; iii) areas of local expert concerns and iv) habitat diversity and types.

The KBA Analysis Report outlines key recommendations for Kiribati for Protected Area network and expansion. Twenty-two KBAs were identified as a result of the KBA analysis – 7 islands in the Gilbert Group, 8 in the Phoenix and 7 in the Lines Group. The KBA Report is a first of its kind in Kiribati and the first PA framework for the GoK and this was made all possible through both national and regional collaborative initiatives.

The protected area in the Phoenix Islands has extended its boundary and updated its management plan. The following case study discussed this.

### CASE STUDY 3: PHOENIX ISLANDS PROTECTED AREA UPDATES RESEARCH SURVEYS AND EXTENSION BOUNDARY

Cabinet reaffirms PIPA will close to commercial fishing by 2015. It is official at the meeting in January 29, 2014 cabinet reaffirms it earlier decision to close off PIPA and approved 31<sup>st</sup> December, 2014 as an effective date for full closure. Translation : on January 1 2015, the PIPA will be closed to all commercial fishing. This adds 393 thousand square Kilometers of no take zone to the Pacific ocean as seen in the map below(<http://www.phoenixislands.org/>)



See the table below for the summary of the updates

<i>New event</i>	<i>Objective</i>	<i>Outcome</i>
1. Kanton Mission 2012	- On site visit for surveillance from government ministries and lead by PIPA director	Different ministries aware of their gaps for the development of Canton Is.
2. Rat eradication verification 2013	To verify the 2011 rat eradication on Enderbury & Bernie	Enderbury rat eradication fail
3. Recruitment of PIPA – Kanton Officers	PIPA Kanton Supervisor; Mr Iannang Teaioro and PIPA Kanton Assistant; Mrs Rakentai Kaiuea-Kabotoa	New officers now in office and attach currently with PIPA Implementation Office. Both have different TORs
4. Sea education 2014	Attended by Iannang Teaioro (PIPA)	Improve capacity building

5. Establishment of PIPA Management Sub - Committees	The TOR of the 3 sub-committees (PIPA Biosecurity Advisory, PIPA Monitoring and Surveillance, PIPA Tourism Advisory) were designed by PIPA Management Committee (PMC) and aimed to concentrated on their respective TOR and to report to the PMC	The three sub-committees comprises of related government ministries/divisions have met and amend their TOR.
<b>Threats</b>	<b>Opportunities</b>	<b>Updates/Progress</b>
1. Illegal and Overfishing	<ul style="list-style-type: none"> <li>- Full closure of PIPA zone by 2015</li> <li>- Related acts or regulations to be enforced</li> </ul>	<ul style="list-style-type: none"> <li>- Japanese fishing vessels licensing have phased off</li> <li>- Involvement of AG's office rep in management committee</li> </ul>
2. Unregulated visitors	<ul style="list-style-type: none"> <li>- Issuing of application forms, Permit Terms and Conditions and Visitors Guidelines; for foreign vessels - 2006</li> <li>- Issuing of Canton Arrival Form for domestic vessels (section part inquire for personal data) – May 2014</li> </ul>	<ul style="list-style-type: none"> <li>- Observer officer to be recruited on the trip and all expenses to be borne by tourists operator; 2012</li> <li>- The only trip have utilized the form; CPPL shipping line ETD 31<sup>st</sup> July 2014</li> </ul>
3. Pest and diseases	<ul style="list-style-type: none"> <li>- Issuing of Kanton Arrival Form for domestic vessels (with specific part inquire specifically for plant and animal products) – May 2014</li> </ul>	<ul style="list-style-type: none"> <li>- Only one ship have complied and implemented the Kanton arrival form; CPPL's etd 31/07/14</li> </ul>
4. Climate change and global warming	<ul style="list-style-type: none"> <li>- Enhance resilience aptitude of the natural resources</li> </ul>	<ul style="list-style-type: none"> <li>- Mark the area of the resources as restricted zones</li> </ul>

### 2.3. SECTORAL MAINSTREAMING OF BIODIVERSITY

The formulations of national strategies (NDS, KDP and KIEP) have boosted great efforts in mainstreaming biodiversity to implement, enforce and put to practice the activities to address issues identified under NBSAPs and CBD. These issues have been translated into the Ministerial Operational Plan of the Government agencies in particular MELAD/ECD and other relevant sectors that becomes their ongoing activities to produce outputs and outcome to ensure that sustainable development goals and targets are met and accomplished.

Identification of shortfalls in existing current regulatory framework require the need for a multi-dimensional approach by means of adjoining conventions, signing and ratifying agreements and protocols, integration of environmental impact assessment processes as well as involving the public/civil society in international talks/dialogues while trying to strengthen, enforce the existing

and enact newly developed/amended relevant national legislations. With this approach it has been possible to implement and mainstream NBSAPS and biodiversity issues into national policies, plans and legal framework to meet the national, regional, and international/global goals of the Conservation of Biological Diversity (CBD) and toward achieving sustainable development goal. As mentioned earlier the formulations of national strategies (NDs, KDP, KIEP) are to ensure sustainable development goals are met.

Additional to the Global and Regional Development Agendas, Kiribati has signed to a series of regional and multi-lateral agreements associated with the sustainable development agenda as it relates to the primary economic sectors, including the Pacific Plan. In relation to specific Multilateral Environmental Agreements (MEAs), Kiribati is party to the global and regional Multilateral Environmental Agreements. MEAs whether global or regional, make obligations of participating states and require the taking of specific measures for compliance. Among the requirements includes; (*National Assessment Report; On the Implementation of the BPOA, MSI+5, MDG and Rio+20, MFED, 30th June 2013*)

- Enactment of implementing legislation;
- Establishment of specific enabling administrative/institutional arrangement;
- Public awareness and education;
- Environmental management measures; and
- Regulation and enforcement.

Joining these global agreements and MEAs has made Kiribati to source opportunities internationally in terms of financial and technical supports.

From the foregoing, quite a lot has been done in terms of laws and policies for environmental protection in Kiribati. However, to translate these efforts into lasting initiatives towards the goals of sustainable development, the need arises for the integration of stronger environmental legal and policy frameworks into all industrial, development and social economic activities. (LEAD report pp 268)

Further and in general of the current situation at the national level, there are lot of existing national legislations that directly and indirectly supports Kiribati in reaching its goals at all levels, however specifically there are six (6) current and existing national legislations that directly

supports CBD in meeting its goals and objectives. This is particularly where biodiversity conservation and management is concerned. Out of these four legislations, five (5) of them are administered by the MELAD. (4th NR to CBD, Aug 2013).

The establishment of regulations and legislations together with these policies and strategies has emphasized the importance of supporting Biodiversity (CBD) toward aiming to achieve sustainable development at the national, regional and international levels. The table 14 below shows the relationship and linkages between the following regional and international strategies and how important they are in addressing the issues of Environment in particular Biodiversity/CBD/NBSAP in terms of the areas each of these instrumental strategies implement/enforce.

**Table 15: Consolidated strategies at national, regional and international levels**

KDP (6 KPAs)	MDG (8 goals)	BPoA (priority areas)	MSI(thematic areas)	Rio+20/UNCSD (key priority areas)
Human resource development	Eradicating extreme poverty	Climate change and sea level rise	Trade	Decent jobs
Economic growth and Poverty reduction	Achieving universal primary education	Natural and environmental disasters	Sustainable production and consumption	Energy,
Health	Promoting gender equality and empowering women	Management of wastes	Health	Sustainable cities
Environment	Reducing child mortality	Coastal and marine resources	Knowledge management	Food security
Governance	Improving maternal health	Freshwater resources, land resources, energy resources	Culture.	Water and sustainable agriculture
Infrastructure	Combating HIV/AIDs, malaria, and other diseases	Tourism resources, biodiversity resources		Oceans and disaster readiness
	Ensuring environmental Sustainability	National institutions and administrative capacity		

	Developing a global partnership for development	Regional institutions and technical cooperation		
	Source: (UNCSD 2000)	Transport and communication		
		Science and technology		
		Human resource development		

The area of focus of such international and global agenda and strategies as abovementioned covers a broader area of priorities that Kiribati is looking into particularly for Biodiversity and NBSAPs. Listed below highlights the linkages as aforementioned.

MDG: Ensuring Environmental Sustainability

KDP: Economic Growth & Poverty reduction, Environment

MSI: Sustainable production and consumption & culture

Rio +20: Food Security, Water and Sustainable Agriculture

BPoA: Coastal and marine resources

### **Policies**

As for policies the Government agencies have their own policy/strategic plans. These policies have been formulated in accordance and in line to the priorities of the nation but are then specifically addressed at different ministry levels that falls within their different portfolios and priorities.

The KIEP is particularly relevant for 2012 the year of Rio+20 as Government of Kiribati takes stock of what Government has done since the Earth Summit in 1992 and look into the future to guide and enhance its work to safeguard the environment as one of the important pillars of sustainable development.

### ***Policy Framework within KIEP and KDP***

The Environment Policy (the KIEP) recognizes and is intended to support and complement all other government strategic policy documents. It integrates all the thematic plans and strategies within the Environment and Conservation Division's mandate into a single strategic framework

document. It will facilitate ‘on the ground’ implementation of the environment key policy area of the Kiribati Development Plan 2012 – 2015. Thus, the KIEP will enhance the Government’s effort to mainstream the environment into the national development planning as well as assisting to provide a framework that would assist line Ministries, development partners, communities and other stakeholders to effectively contribute to our collective actions to address environmental problems. This initiative is the first of its kind in the Pacific Islands region that also assists to set the scene by SPREP to replicate in other Pacific Islands as relevant. (KIEP documents pg 2 of foreword).

Kiribati has managed its development plan through a 4 year development planning cycle since its Independence in 1979. In 2008-2011’s development cycle, some initiatives like the mangrove replanting in some outer islands including the capital island of South Tarawa; the establishment of the Phoenix Islands Protected Areas (PIPA) and its designation as the first ever World Heritage site in Kiribati, to name a few, had been undertaken up until now to address environmental issues. These initiatives have been reflected also in the fourth national report on biodiversity to the CBD that has been submitted to the CBD Secretariat.

The formulation of Kiribati Development Plans (2008-2011&2011-2015) and National Development Strategies (2004-2007) together with the Kiribati Integrated Environment Policy (KIEP) have been instrumental in enforcing all strategies through the implementation of activities that will address the environmental issues of biodiversity. For example; the implementation of gap analysis of the Key Biodiversity Areas (KBA) for Kiribati which measures the level of efficiency and effectiveness of the existing PA network in achieving Kiribati NBSAP conservation goals and in identifying priority areas and key gaps for expansion of PA (Protected Area) network. This analysis also set actions for improved management for the existing and future PAs in Kiribati. (KBA Report, MELAD, Aug 2013). These National strategic plans have been formulated in consistence to the MDG, as well as the BPoA, MSI and the Rio+20.

From this, Wildlife & Conservation Unit (WCU) of the Environment & Conservation Division (ECD) under the Ministry of Environment, Lands & Agricultural Development (MELAD) is the responsible office based on Kiritimati Island to enforce Wildlife & Conservation Ordinance CAP 100. This Ordinance responsible for the full protection of protected species and protected areas. Kiribati has been received number of supports from Internal and Regional Agencies through Technical and Financial Support over the years. In 2013, Kiribati started implementing its project on IAS through the support of SPREP and part of regional project known as GEFPAS IAS. This



project has lots of components but one of them is the revision of National Invasive Species Strategy and Action Plan (NISSAP) which will assist Kiribati to develop revised plan to address issues against IAS. Constant support from New Zealand Aid Program under its Ministry of Foreign Affairs & Trade (MFAT), by assisting Kiribati to deal with IAS issues especially in the case of eradication and control of IAS (this program assist Kiribati-WCU/ECD to restore and protect bird population on Kiritimati) and on-going project where it support Urban Development Plan (UDP).

Other sectors have also formulated their own policies of which a number of them are related and supported Biodiversity. Some of these policies are as follows; Fisheries policies, Agricultural, Sanitation, Cultural, and Water Policies. All these policies have objectives in line with sustainable and resource management safeguarding the national biodiversity and in attention to climate change and natural disasters. Some of the supporting tools below are of sectorial mainstreaming.

### **Kiribati Joint Implementation Plan (KJIP) and the Whole Island Approach**

The Kiribati Joint Implementation Plan (KJIP) is an example of such a cohesive, integrated and systematic approach that the Government is now in a process of drafting and formalizing it. 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 actions that enable the Government to facilitate these, the plan will guide the implementation of such policies in an integrated approach.

In cases where Biodiversity is greatly impacted and therefore affects the people and their livelihoods, the Government of Kiribati through the Office of Te Beretitenti, holds a role through the SNPU ( Strategic National Policy Unit) to closely develop guidelines and policies related to addressing Climate Change and Disaster Risk Reduction.

The National Disaster Risk Management Officer has developed a National policy to address issues related to Disaster, the National Disaster Risk Management Plan. The plan immediate response to disasters and addressing issues related.

The NDRMP was developed in 2012, which embraces all hazards approach that is to be utilised by all ministries, departments, divisions, offices and other key stakeholders, in all aspects of Disaster Risk Management (DRM). The arrangements are designed to ensure that disaster

preparedness and the outcome of disaster events inform sustainable development strategy, and link to the annual strategic planning and budgeting cycles, and also provides consistency with the themes within the Pacific

Regional Framework for Action for Building the Resilience of Nations and Communities to Disasters 2005 – 2015. This statement is also supported by the Environment Act 1999 and the National Adaptation Program for Action (NAPA). Natural disasters will therefore take a relevant toll on coastal and on-land biodiversity which has been considered by the Office of Te Beretitenti (OB) aimed at responding and controlling disasters for times to come.

Another initiative is the Whole of Island Approach of which the objectives are set as to increase the capacity of communities to cope and be resilient with the continuing impacts of climate change and hazards, aiming towards sustainable development

The Government of Kiribati through the Office of Te Beretitenti (President), has taken great focus towards addressing the Impacts of Climate Change and Disaster Risk Management. The National Framework on Climate Change and Climate Change Adaptation (NFCCCCA) was launched in Kiribati in the year 2013. This document provided information regarding the challenges and issues new to the Kiribati and one which the Government of Kiribati will aim at addressing.

Another initiative and the action plan for the KJIP is that of the Whole of Island Approach, the selection criteria and the integrated vulnerability assessment have been approved by Cabinet in August 2013. However at this point, the Cabinet is to be formally informed of the approach which is currently being put into action. That of addressing Climate Change adaptation and Disaster risk management on the outer-islands firstly selected.

The main rationale for this approach is that a systematic and integrated plan, identifying tangible actions, will maximize 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 integrating climate change and disaster risks into all sectors and promoting a whole-of-country approach that involves the cooperation of Government, civil society and private sectors.

This rationale of the Whole of Island Approach addresses Climate Change & disaster risks which impact all sectors and livelihoods of people living in Kiribati hence, the need for integration. Also a range of partners have agreed to support this approach through joint efforts to enhance coordination, collaboration & capacity building of the people and national counterparts.

## **Population Policy**

In relation to the population policy and implementation strategy have been endorsed by Government and yet to see implementation. There is a vision to see that opportunities for I-Kiribati are provided, where ever on Kiribati they may be. Therefore creating opportunities in the outer-island is an initiative from the Government which will see implementation.

The problem of overpopulation is an issue which is constantly discussed at the national and international level. The government is carefully looking at providing strategic solutions which in turn may look towards decentralization and dispersal of the population from the overpopulated South Tarawa and Betio back to their respective outer-island. This is a daunting task that the Government of Kiribati through the SNPU (Population) is carefully looking into to by providing services, infrastructure and opportunities in the outer-islands as a means to evenly spread the population across Kiribati.

## **Fisheries Policy**

The Fisheries have policies and regulations and even being parties to some conventions that supports the sustainable management, safeguarding the livelihood through the marine resources. Aside from the old policies and regulations the following are the updated policies that includes; (Campbell & Hanich, 2014, 47)

- The National Sea cucumber Management plan, approved by cabinet in mid 2013. It is for establishing an enforcing management structure for the ecologically sustainable development of the sea cucumber fishery.
- National Fisheries Policy approved by cabinet in 2013 with a roadmap for effective fisheries management, conservation and development for the next 12 years.
- Kiritimati Aquarium Trade Management Plan is in co-development with SPC

## **INSHORE AND OFFSHORE**

Both fisheries have seriously impacted due to open access fishery which is one major challenge in the management of fisheries within the FD and other related sectors. To date very few species had been regulated and these are mainly the species with commercial importance such as lobster and bonefish in Christmas Island. The Ministry of Fisheries and Marine Resources Development has recently developed the NOMC (National Offshore Mining Committee) which will complement

the drafting of the Deep Sea Mining Policy. The NOMC is chaired by MFMRD. The Secretariat role is also with the Ministry of Fisheries through its Minerals Division. Deep Sea Minerals is something that Kiribati is having a look at more in depth. With the guidance and assistance from SOPAC, the deep sea mineral resource that Kiribati has in its EEZ is a feature which will help boost the Kiribati's economic development.

In response to the need of good management plan to support sustainability of marine resources; the Fisheries Division had developed Kiribati Fisheries Policy (KFP) where it (KFP) to be a major tool accordingly. Conducting on-going surveys and monitoring throughout Kiribati is one of the key policy under KFP in which Fisheries Division working closely on this with local communities on each islands. These surveys and monitoring are not only monitor the status of Marine resources but also raising awareness to the local communities including building their capacity to carry out their activities in sustainable way to the Marine resources. At the same time, surveys also carried out to update Kiribati Marine Species record if there are new species found plus update status of species in terms of rare, vulnerable, etc.

### **The Kiribati Solar Energy Company Limited**

The Kiribati Solar Energy Company Ltd, a state owned enterprise, was set up in 1987 with the objectives of promoting the use of solar energy in Kiribati. Its mission statement is to enhance economic and social development throughout Kiribati through the provision and maintenance of affordable and reliable solar photovoltaic (PV) systems and other accessories so as to improve the standard of living. KSEC promotes the use of clean energy through solar photovoltaic, thus helps secure and sustain the environment that we live in. It also has been proven to be cost effective on the outer islands.

In relation to biodiversity mainstreaming, KSEC will provide basic electrical services on the outer islands to enhance family and community life. KSEC service will raise the living standards of the people in the Outer Islands by providing lighting not just for individual homes but in particular for the maneaba which play a significant role to the development of community life in each and every village. This will have indirect impacts to biodiversity improvements in some ways. With the following objectives, the issues addressed accordingly.

- To address the current socio-economic imbalance between the urban and rural areas by achieving a more equitable distribution of resources to the outer islands. This will assist in the decentralization strategies and others.
- To expand the use of renewable energy through the application of solar photovoltaic on outer islands and in urban districts, thus complies with the government policy to provide

rural electrification on the outer islands, and in line with KDP 2012 – 2015 strategy of 6.1.4.4 This encourage use of renewal energy’.

- Promotion of advance solar technologies such as PV-Grid system and Mini-Grid systems and demonstrating energy efficient solar products to Government institutions and private sectors, thus reduce electricity consumption on South Tarawa by 5% every year. This also supports poverty reduction indirectly increasing human well-being.

Over a period of more than two decades the company managed to continue operating largely due to financial supports from the Kiribati government and also through aid funds. The performance of the company over this 20+ years of existence had been of a fairly mix one.

Source: (Kiribati Solar Energy Company Ltd, 2013)

### **Kiribati Cultural Policy**

The National Cultural Policy recognizes the importance of culture in relation to the following concerns;

- ensuring a healthy environment for cultural creativity towards distinctively Kiribati culture.
- monitoring Kiribati cultural diversity.
- importance of environment to culture value of culture
- the input of a symbol of material identity.
- ensuring a cultural heritage for the enjoyment of the people of today and the children of tomorrow.
- guarding against cultural abuse and exploitation.

The Cultural Division of the Ministry of Internal Affairs will endeavors to;

- ◆ ensure a cultural heritage for the people of Kiribati today and tomorrow.
- ◆ safeguard Kiribati cultures against abuse and exploitation
- ◆ fostering the development of distinctly Kiribati culture for today, and the future.
- ◆ maintaining cultural diversity within national unity.
- ◆ protect and maintain the environment as basis for culture
- ◆ foster culture as important component to education .

It main objectives are:

- (1) To assist and facilitate, preserve, protect, develop and promote traditional cultures of the indigenous people of Kiribati.

- (2) To encourage the development, promotion and protection of the contemporary cultures of Kiribati.
- (3) To facilitate the marketing of selected and approved aspects of the material cultures of Kiribati.
- (4) To co-ordinate with related Government and non-government's agencies on cultural matters.
- (5) To co-ordinate cultural activities with local government cultural bodies.
- (6) To liaise with non-government organizations on cultural matters.
- (7) To liaise with international cultural organizations.

## **PART III: NATIONAL PROGRES TOWARD THE 2020 AICHI BIODIVERSITY TARGETS AND MILLENIUM DEVELOPMENT GOALS**

### **1.1 PROGRESS TOWARDS IMPLEMENTATION OF STRATEGIC PLAN AND ITS AICHI TARGETS**

With the multi-dimensional approach Kiribati as a member country aims to achieve the 2020 Aichi Targets through the implementation and mainstreaming process of NBSAPs that are already integrated into the Kiribati Integrated Environment Policy (KIEP) at this stage. Kiribati current NBSAP needs to be revised as it will be done soon.

However, Kiribati used the KIEP to monitor its progress towards the 2020 Aichi Targets and the tables listed below will all show the status of where Kiribati now in meeting its obligations as a Party to the Convention on Biological Diversity at the National Level.



**Table 16: INTERNATIONAL AICHI BIODIVERSITY TARGETS WITH KIRIBATI BIODIVERSITY TARGETS AND NATIONAL PROGRESS**

Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and Society</b>				
<b>1. By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably</b>	Improve the formal and informal education system to support biodiversity conservation and management concept	Review school curriculum for year 1-3 to integrate biodiversity conservation issues	New school curriculum developed for year 1-3 integrating biodiversity	Number of reviews done
		Implementation of school programs (presentations, talks, quizzes)	Enhanced students' knowledge on biodiversity issues	Number of school programs undertaken
	Enhance public awareness at all levels of society to improve	Awareness programs to Parliamentarians	Enhanced knowledge of parliamentarians on biodiversity related issues	Number of awareness programs conducted

<p>decision- making and participatory approach in biodiversity conservation and management</p>	<p>Engagement of decision makers (parliamentarians, church &amp; youth leaders, mayors and councilors) in biodiversity conservation initiatives (mangrove and coconut and food crops replanting)</p>	<p>Increased participation of Decision makers in biodiversity conservation initiatives (Ramsar, ICCAI, Turtle Monitoring, ISME &amp; KAP III Mangrove Planting, GEF PAS IAS, UDP – NZ Aid Program &amp; Darwin Initiatives)</p>	<p>Number of community-based activities undertaken at the national level</p>
<p>Implement practical and cost- effective national campaigns on biodiversity related celebrations</p>	<p>Commemoration of international events related to Biodiversity conservation at the national level.</p>	<p>Enhanced awareness on biodiversity at the national level</p>	<p>Number of biodiversity related events celebrated nationally.</p>

Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and Society</b>				
<b>2.By 2020, at the latest biodiversity values have been integrated into national and local development and poverty reduction strategies and planning process and are being incorporated into national accounting, as appropriate, and reporting system</b>	Improve coordination and collaboration with key stakeholders	Regular meetings with the national biodiversity committee consisting of government and non-governmental organizations.	Improved collaboration and coordination	Number of Committee meetings undertaken.
	Mainstreaming of biodiversity conservation into national policies, legislation and sector's plans.	Integration of biodiversity conservation matters into the Kiribati national development plan (KDP 2012 - 2015)	Biodiversity conservation issues are integrated into the national policy	Number of biodiversity issues reflected in the KDP
		Development of sector policies (Kiribati Integrated Environment Policy, Fisheries Policy, Kiribati Joint Implementation Plan, SAICM Implementation plan) incorporating biodiversity issues	Biodiversity issues are incorporated into sector policies.	Number of biodiversity issues reflected in the sector policies.

Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and Society</b>				
<b>3.By 2020, at the latest, incentives including subsidies harmful to biodiversity are eliminated phased out or reformed in order to minimize or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent</b>	Controlling economical incentives (selling	Development of plans to phase out harmful chemicals (eg. HCFC Phase out management plan, green business initiatives)	Improved control on harmful chemicals	The number of plans developed.
	of ODS based products, plastic products, and marine and terrestrial	Development of plans and policies to control i) the over-exploitation of marine resources (eg. sea cucumbers used for income generation) and ii) the fishing destructive methods	Fisheries policy developed	Number of plans developed.
	products) that have adverse impacts on biodiversity	Review environment licensing system under the Environment legislation to effectively manage the impacts of economic developments (commercial food processing facilities)	Environment Licensing system is reviewed	Number of reviews done.
	Promote positive incentives and mechanisms for the conservation	Support the existing private and public partnership for the recycling facility through the provision of capacity building and public awareness programs.	Self Financing and Environmentally Project Promoted and Implemented	Number of Self Financing Project Promoted and Implemented

<p><b>and in harmony with the convention and other relevant international obligations, taking into account national socio economic conditions.</b></p>	<p>and sustainable use of biological diversity</p>	<p>Support the establishment of community-based conservation initiatives (eg. Mangrove replanting, turtle monitoring, community food security program, and Ecosystem Base Adaptation approach)</p>	<p>Community based conservation measures established, promoted, and implemented</p>	<p>Number of community based conservation measures established, promoted, and implemented</p>
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Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and Society</b>				
<p><b>4.By 2020, at the latest, government, business and stakeholders at all levels have taken steps to achieve and have implemented plans for sustainable production and consumptions and have kept the impacts of use of natural resources well within safe ecological limits.</b></p>	<p>Managing the sustainable use of biodiversity resources</p>	<p>Implementing and enforcing the existing regulatory environmental and fisheries licensing system that sets standards/conditions that are acceptable for the sustainable use of biodiversity resources.</p>	<p>Existing regulatory licensing systems are continuously implemented and enforced.</p>	<p>Number of enforcement undertaken.</p>

Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal B: Reduce the direct pressures on biodiversity and promote sustainable use.</b>				
<b>5. By 2020, at the latest, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought closed to zero, and degradation and fragmentation is significantly reduced.</b>	Eradicate, control and manage invasive species that may adversely affect the Kiribati's biodiversity and livelihoods	Revision of the National Invasive Species Strategy Action Plan (NISSAP) is in progress.	The revision of the NISSAP is completed	Number of meetings/consultation undertaken for the review of the plan.
	Enhance and improve biological resources to maintain biological diversity in the short and the long run	Development of Key Biodiversity Areas (KBA) report	KBA report is completed and published.	The number of KBAs identified in the report.
		Drafting of environmental regulation on protected area and species is in progress	Protected area and species regulation is implemented and enforced.	The number of protected area and species regulated.

Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal B: Reduce the direct pressures on biodiversity and promote sustainable use.</b>				
<b>6.By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem-based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impact on threatened species and vulnerable ecosystem and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.</b>	Sustainable use of island biodiversity	Development of integrated coastal management plan	Integrated coastal management plan is implemented.	The number of plans developed.
		Development of specific fisheries management plan for threatened marine species (eg, ark shell, giant clam, conch shell, sea cucumber, snapper and tuna)	Specific fisheries management plans are implemented and enforced	The number of specific fisheries management plans developed.
		Review of Fisheries Act 2010 is in progress	Amended Fisheries Act is implemented and enforced.	The number of reviews done.



Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal B: Reduce the direct pressures on biodiversity and promote sustainable use.</b>				
<b>7.By 2020, areas under agriculture, aquaculture and forestry are managed sustainably ensuring conservation of the biodiversity</b>	Integrate the concept/principle of biodiversity conservation in organic farming	Development of <i>Okaeniki Abaiang</i> (Organic Abaiang) by-law	Organic bylaw is endorsed and enforced.	The number of prosecutions recorded.
		Establish community-based knowledge hub consisting of capacity building to organic farmers and information sharing	Community capacity on organic farming and information sharing is enhanced	Number of capacity building to organic farmers undertaken.  Number of communities accessed to organic farming information.

Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal B: Reduce the direct pressures on biodiversity and promote sustainable use.</b>				
<b>8.By 2020, pollution including from excess nutrients has been brought to levels that are not detrimental to ecosystem function and biodiversity</b>	Protection of biodiversity through the establishment of integrated waste and chemical management approaches.	Implementation of the existing HCFC Phase out Management Plan	HCFC consumption level is adhered to the agreed phase out schedule.	The number of ODS phased out at the national level  The number of imported HCFC and non-HCFC relying products consumed.
		Implementation of chemical and waste management plan (SAICM)	Chemical and waste management plan (SAICM) is implemented.	The number of trainings undertaken on waste and chemical management.
		Development of National Stakeholder Participation Policy and GHS	Policy is endorsed and implemented	Number of policies developed.
		The operation of the existing Joint Enforcement (JET) Taskforce for waste and pollution minimization	Waste containment and pollution control from vehicles and pigsty on South Tarawa is improved.	Number of enforcement undertaken on waste and pollution control

		The ongoing monitoring of fresh water and marine water quality by the WQMC	Baselines established for water quality parameters	The number of baseline established.
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Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal B: Reduce the direct pressures on biodiversity and promote sustainable use.</b>				
<b>9. By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their</b>	Eradicate, control and manage invasive species that may adversely impact on Kiribati's biodiversity and livelihoods	Develop and initiate actions to protect and restore at least 2 threatened species in each of the Gilberts, Line & Phoenix Groups – NISSAP revision & endorsement	Pathways identified and draft biosecurity management plan completed for PIPA & Line Islands.	Number of pathways identified and Management plan developed
			Bait stations were installed on local ships for control and prevent further introduction of IAS	Number of bait stations installed
			Eradication of rats (Polynesian & <i>Rattus rattus</i> ) carried out on Kiritimati Island & PIPA (for protecting and restoring White-throated Storm Petrel ( <i>nesofregatta</i>	Number of eradications undertaken

<b>introduction and establishment.</b>			<i>fuliginosa</i> ) and Phoenix Petrel ( <i>ptreodroma alba</i> )	
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Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal B: Reduce the direct pressures on biodiversity and promote sustainable use.</b>				
<b>10.By 2015, the multiple and anthropogenic pressures on coral reefs, and other vulnerable ecosystem impacted by climate change or ocean acidification are minimized, so has to maintain their integrity and functioning</b>	Extension of marine protected areas at the national level.	<ul style="list-style-type: none"> <li>• Declaration of PIPA as a marine protected area.</li> <li>• Endorsement of KJIP with inclusiveness of marine and terrestrial areas protected and areas yet to be protected.</li> <li>• Endorsement of KBA report under PoWPA project identifying marine and terrestrial potential areas in need for protection</li> </ul>	<ul style="list-style-type: none"> <li>• Coral reefs of the PIPA were being protected and free of any anthropogenic activities.</li> <li>• Whole of Island Approach under the KJIP also identifies areas in need for protection on land and at sea and also seeking funding to be protected.</li> <li>• Development of the IDC (Island Development Committee) on Abaiang to look after all conservation</li> </ul>	<ul style="list-style-type: none"> <li>• % of coral reefs being protected</li> <li>• Number of securely funded projects under the KJIP that help marine and on land areas to be protected.</li> <li>• Initiatives and mechanisms being established under the KJIP to look and monitor conservation and management measures for protected areas on</li> </ul>

			<p>and management measures.</p> <p>Identification of potential areas to be protected under the KBA. This will help to guide which areas to be protected and why they are critically have to be protected</p>	<p>land and at sea.</p> <p>Extension of protected area network being identified under the KBA report.</p>
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Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.</b>				
<b>11. By 2020, at least 17 % of terrestrial and inland water, and 10 percent of coastal and marine areas, especially</b>	Increase the number of terrestrial and marine Protected areas under effective	Refer PIPA Management Plan (full closure of PIPA)	Full closure of PIPA (size needs to be confirmed)	Number of MPAs
		Formalize the designation of the proposed Ramsar Site in North Tarawa at National Level	Enhance public awareness at North Tarawa community to improve decision-making and participatory in biodiversity conservation and management.	Number of Consultations

<b>areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective areas based conservation measures, and integrated into the wider landscapes and seascapes.</b>	management and planning		Developed management and protection plan	Number of Policies approved
			Nooto Ramsar Site designated at North Tarawa (with size of 1033 hectares including the entire village of Nooto and 1/5 of the site is terrestrial plus 100 hectares of patch reef with 27 hectares of well-established mangrove patches and mangrove restoration)	Number of Sites designated
		Implementation of MacBIO project	Consultation of economic valuation on Marine Ecosystem services	Number of consultations
			Established MACBIO National Technical Team	Number of meetings

Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.</b>				
<b>12. By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.</b>	Develop and initiate actions to protect and restore at least 2 threatened species in each of the Gilberts, Line and Phoenix Groups	Species Conservation of Threatened Native Stable Food Crops & Coastal Fisheries	Gene Bank(Terrestrial) & MPA	List of threatened Species Conserved
		Revision of NISSAP	Approval of Revised NISSAP	Number of IAS identified

Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
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**Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity.**

<p><b>13. By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing for genetic erosion and safeguarding their genetic diversity</b></p>	<p>Diversify and broaden genetic food base (species/variety that are tolerant to atoll environment and projected impacts of climate change (high salinity, prolonged drought, brackish water)</p>	<p>Mass produce and distribute of local food species (marine &amp; terrestrial)</p>	<p>Increased and strengthened food base</p>	<p>List of local species</p>
		<p>Introduced food species are screened and distributed (marine &amp; terrestrial)</p>	<p>Increased new variety of introduced species (marine &amp; terrestrial)</p>	<p>List of introduced species</p>
	<p>Identify and support initiatives that promote traditional preparation skills requiring the continuous planting/farming of Kiribati trees &amp; coastal species that are declining</p>	<p>Mass produce and distribute of trees and coastal species that have socio-economic and cultural values</p>	<p>Increased distribution of species that have socio-economic and cultural values</p>	<p>Number of studies undertaken</p>
		<p>Planting of coastal vegetation (e.g. mangroves &amp; pandanus)</p>	<p>Increased of community participation &amp; involvement in the coastal planting</p>	<p>List of coastal vegetation</p>



Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal D: Enhance the benefit to all from biodiversity and ecosystem services.</b>				
<b>14. By 2020, ecosystems that provide the essential services including services related to water, and contribute to health, livelihood and wellbeing, are restored and safeguarded, taking into account the needs of women,</b>	Identify, revive and integrate Traditional Knowledge systems and practices that support biodiversity conservation, management and sustainable utilization at all levels of society	Traditional Knowledge systems are identified, revived and integrated into biodiversity conservation & management plans (e.g. ICCAI – te buibui (traditional coastal protection) & mangrove replanting)	Implementation of ICCAI (Butaritari, North Tarawa & Tabiteuea Meang) & mangrove planting in some islands (Butaritari, Marakei, Abaiang, Tarawa, Maiana, Kuria, Aranuka, Abemama, Tabiteuea Meang & Beru)	Number of Islands visited & implementing ICAAI & mangrove planting
		Implementation of MacBIO project	Consultation of economic valuation on Marine Ecosystem services	Number of consultations

<b>indigenous and local communities and the poor and vulnerable</b>			Established MACBIO National Technical Team	Number of meetings
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<b>Aichi Targets</b>	<b>National Targets (2012-2016)</b>	<b>National Actions</b>	<b>Outcomes</b>	<b>Indicators</b>
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**Goal D: Enhance the benefit to all from biodiversity and ecosystem services.**

<p><b>15.By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhance, through conservation and restoration including restoration of at least 15 percent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to compacting desertification.</b></p>	<p>Enhance and improve biological resources to maintain biological diversity</p>	<p>Advocate the concept of community-based protected areas (CBPAs)</p>	<p>Agreement developed and signed with local communities for the establishment of conservation areas</p>	<p>Number of local communities agreed to the concept of community-based protected areas</p>
		<p>Establishment of community-based protected areas including mangrove areas</p>	<p>Community based areas are established.</p>	<p>The area of mangrove coverage is increased in size</p>
		<p>Develop and initiate actions to protect and restore at least 2 threatened ecosystems in each of the Gilberts, Line and Phoenix Groups</p>	<p>Threatened ecosystems are restored</p>	<p>Number of threatened ecosystems restored.</p>

**Goal D: Enhance the benefit to all from biodiversity and ecosystem services.**

**16. By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and equitable sharing of benefits arising from their utilization is in force and operational, consistent with national legislation.**

National targets and actions for this particular global goal were not yet established.

Aichi Targets

National  
Targets (2012-

National Actions

Outcomes

Indicators

2016)

Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal E: Enhance implementation through participatory planning, knowledge management and capacity building.</b>				
<b>17. By 2015, each party has developed, adopted as a policy instrument, and has commenced implementing and effective, participatory</b>	Develop an integrated environment management actions plan for Kiribati that address environmental issues in a multi-disciplinary manner	Series of outer islands and national consultations undertaken throughout Kiribati from 2009 - 2011	KIEP formulation, KIEP endorsed in June 2013 and effective since then.	List of environmental policies within KIEP
	Improve coordination with key stakeholders (national and local)	Mainstreaming of biodiversity conservation into the sector's strategic plans and KDP (2012-2015)	KDP reviewed & implemented	List of environmental policies & targets are incorporated

<b>and updated national biodiversity strategy and action plan.</b>		NBSAP revision	Progressing of NBSAP report	Number of consultations & list of Outer Islands visited
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Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal E: Enhance implementation through participatory planning, knowledge management and capacity building.</b>				
<b>18. By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary used of biological resources, are respected,</b>	Identify, revive and integrate appropriate customary rights into biodiversity conservation and management	Customary rights identified and integrated into biodiversity conservation and management plan	Local bylaws developed (established) on conservation and management enforcement	List of bylaws implemented
	Identify, revive and integrate Traditional Knowledge systems and practices that support	Traditional Knowledge systems are identified, revived and integrated into biodiversity conservation &	Implementation of ICCAI (Butaritari, North Tarawa & Tabiteuea Meang) & mangrove planting in some islands	Number of Islands visited & implementing ICCAI &

<b>subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the convention with the full and effective participation of indigenous and local communities at all relevant levels.</b>	biodiversity conservation, management and sustainable utilization at all levels of society	management plans (e.g. ICCAI – te buibui (traditional coastal protection) & mangrove replanting)			(Butaritari, Marakei, Abaiang, Tarawa, Maiana, Kuria, Aranuka, Abemama, Tabiteuea Meang & Beru)	mangrove planting
		Implementation of MACBIO project	Consultation of economic valuation on Marine Ecosystem services	Number of consultations		

Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal E: Enhance implementation through participatory planning, knowledge management and capacity building.</b>				
<b>19. By 2020, knowledge, the science based and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss are improved, widely shared, transferred and applied.</b>	To improve and enhance the storage, protection, management and dissemination of the knowledge and information on the sustainable use, conservation and management of biodiversity to the general public	Revision of school curriculum integrating science-based and technologies relating to biodiversity	Curriculum is emplaced and implemented at year 1-3 and progress at year 4-6	Number of Educational materials developed, used & distributed
		Development of knowledge based system (database)	Knowledge based system is implemented	Database is developed
		Review & update the Environment website & library cataloguing system	Environment website & library cataloguing system are reviewed & updated on regular basis	Number of updating done



Aichi Targets	National Targets (2012-2016)	National Actions	Outcomes	Indicators
<b>Goal E: Enhance implementation through participatory planning, knowledge management and capacity building.</b>				
<b>20. By 2020, at the latest, the mobilization of financial resources for effectively implementing the strategic plan for biodiversity 2011 – 2020 from all sources, and in accordance with the consolidated and agreed process in the strategy for resource mobilization, should be increased substantially from the current levels. These targets will be subject to changes contingent to resource</b>	Creation of sustainable financing mechanism for the protection and management of biodiversity	To increase Government budgetary allocation by 5% (yearly) to fund the protection and management of biodiversity	Government budgetary increased by 5% to cater for the new Biodiversity posts	Number of Biodiversity Permanent Posts established
	Accessibility to potential funding sources	To identify & secure new & additional funds to support biodiversity programmes	New biodiversity projects are implemented (GEF5, MacBio, ICCAI, Darwin Initiatives, UDP NZ Aid Program)	Number of biodiversity projects implemented
				Amount of funds secured for biodiversity programmes
Promote Community-based initiatives that support finance self oriented	To identify feasible community-based initiatives	Income-generating community-based initiatives are implemented	Number of Communities participated in these initiatives	

**needs assessment to be developed and reported by parties.**

### **3.2. Conclusions: Lessons Learnt**

Biodiversity mainstreaming and implementation is quite a broad issue and encounter many issues in a short and long process. The following are some recommendations from what has learnt in the past.

- Lack of Government financial support – with the 5% increased in the budget to support the Biodiversity activities, this still not sufficient to cater and meet all the expenses needed to support implementation of Strategic and Action plans set for Biodiversity & Conservation Unit (BCU). However, the continuous financial and technical supports through the assistance of regional, development partners, and overseas donor agencies (ODA), BCU within ECD-MELAD managed to execute its biodiversity strategic and action plans that are in line with projects supported by from these agencies and partners funding.
- Lack of coordination and mainstreaming – need to strengthened coordination of activities and projects existing in Kiribati to avoid duplication of activities and misuse of limited resource and capacity. Also to create a means for different agencies and sectors to work in collaboration with each other to ensure a smooth and correct process is attained.
- Access to information and dissemination of accurate data or information are also other problems faced. For this case, each responsible office such as Fisheries, Environment, Lands, Agriculture, etc do have their own information but accessing to their information or data require formality which includes clearance of releasing the data or information. For instance, all information and data included in this report are provided from individual stakeholders from National Biodiversity Steering Committee (NBSC) with condition that ECD can only used them in this report and nothing else. All rights reserved to individual stakeholders and it is a must to consult them first before reusing data or information provided here. Data and information provided in this report are collective data from NBSC.
- Lack of direction from relevant stakeholders or sectors – there is a clear need to coordinate activities and monitor outcomes to ensure direction set followed accordingly.
- The integration of Aichi Biodiversity into national strategies and policies would assist in improving the sustainability and resource management of biodiversity despite the daunting effect of climate change and other major national biodiversity issues.

- For more information and data flow for analysis and other concerns, there should be a linkage of internal activities within different sectors to this issue but it just a matter of readjusting programmes or data recording templates. In relation to data collection, there is a need for relevant Sectors to updates template reporting and template for data collection or questionnaires to cater the need of required data and information to assess monitor or analyze biodiversity issues for its status and trends with threats.
- The transport issue is one national issue with geographical barriers either small or big among the 3 island groups of Kiribati.
- High staff turnover contributes a lot to many issues within Biodiversity implementation such as failure to meet deadline of submissions of report(s) for instance.

Kiribati biodiversity both marine and terrestrial are a blessing to its people culturally and for so long the availability and accessibility had enabled them to survive regardless of the challenging climate and environment. The economy development is at peak from marine biodiversity and its large protected EEZ contributed to its recognition as one of the largest marine and terrestrial protected area in the world.

It is evident that Kiribati on its own capacity may not be able to meet its obligations under the Convention on Biological Diversity particularly at this era where Climate Change has become its grave concern for its very existence and future. Our biodiversity on the other hand are impacted not just by Climate Change alone but with the increasing population pressure and the urgent need to educate and raise awareness on both its short and long term value in all aspects. The lifestyles and practices of all I-Kiribati toward their biodiversity are almost uniform within the Gilbert and the group as a whole therefore the unsustainable measures need to be addressed in a holistic approach.

The government of Kiribati with all concern stakeholders have take and implement initiatives to effectively mainstream biodiversity conservation and wise use in favour of sustainable development and simultaneously to cater for food security in the phase of global climate change. The achievement presented as in case studies in the report aims to provide update and demonstrate Kiribati commitments and concern to its citizens and the global community. Like few pacific countries and territories, Kiribati holds limited terrestrial biodiversity to support livelihood and it economic progression given the inevitable growing population.

Last but not least, the mutual collaboration between every Ministry and Organisation proved the willingness of Kiribati to continue investing in Biodiversity conservation and ecosystem management for its future generations to enjoy its vast and unique benefits. The Aichi Targets set by the Convention and for the Conventions act as impetus for every party to share good practices and experiences in order to reiterate that our Island Biodiversity is our Island Blessing and hence we must take pride in our sincere conservation and management efforts. To all these, NBSAP has to consider all these biodiversity targets and to inline them with the existing environment policy KIEP in its review for further holistic management approach towards the concerns of biodiversity loss nationally.

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## ANNEXES

### ANNEX 1: LIST OF EXPERTS IN 5<sup>TH</sup> NATIONAL REPORT DRAFTING COMMITTEE MEMBERS

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