KAP II TA - TOR 4.1, 4.2, 4.3

TARAWAIETA (North Tarawa)

Community Consultation, Risk Assessment, Training and Island Profiling

compiled by

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For KAP II (Phase 2)

Office of Te Beretitenti

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Executive Summary

A visit to Tarawaieta (North Tarawa) is similar to those made to Tamana, Beru and Onotoa under the terms of reference (TOR) of the National Consultant, Dr. Temakei Tebano. The selection criteria are fully discussed in the reports for the above named islands. The training component under Component 4.2 is integrated into Component 4.1 and 4.3 targeting local government community workers and representatives of small communities within village community set ups.

Because Tarawaieta has more than ten villages with about half of them only partly connected to each other with unrepaired causeways or walkways, two consultation venues were considered most appropriate to serve the large rural population there. Abaokoro, being the Island Council station and accessible to most northern villages by road was selected to cater for the villages of Buariki, Tearinibai, Nuatabu, Tebangaroi, Taratai, Nooto, Marenanuka and Tabonibara. Abatao (KPC quarter) only accessible by sea or foot was selected to serve the remaining southern villages of Nabeina, Kainaba, Tabiteuea, Abatao and Buota. Two days were given to each consultation. Monday (12th May) and Tuesday (13th May) were scheduled for Abaokoro consultation, Friday (16th May) and Saturday (17th May) were scheduled for Abatao consultation. The contents of both consultations were the same except for the starting hours. Abatao sessions started and finished late as most participants had to be transported by sea.

The two-man team comprised Dr. Temakei Tebano (ThEcoCare Group and current National Consultant to KAP II for Components 4.1 and 4.2 and 4.3) and Miss Rosalind Kiata, a public awareness consultant responsible for activities under Components 1.2.2 and 1.2.3) assisted by the IPO – Eritaia and Mr. Maungatabu Temariti, the latter provided the digital and video filming of the two consultations. The discussions focused on vulnerabilities and risks related to water, coastal erosion and natural resources in light of the impact of climate change and sea level rise. Problems arising from human physical structures such as causeways and aggregate mining were also positively discussed in light of their compounding impact on coastal erosion and marine resources in response to queries raised by participants. These were done by Dr. Tebano, through a series of lectures and video documentaries that took all morning sessions of day 1. Adaptation strategies to overcome or reduce risks and vulnerabilities in these areas were taught through media training activities that included radio news clips, poster presentations, mini drama and song composition. These activities took half of day 1 and the morning sessions of day 2 with a one hour wrap up on all issues raised and discussed during the two-day consultation. The relocation issue was discussed in a very relaxed atmosphere as Tarawaieta has a mixed population originating from other islands and from outside of Kiribati.

Dr. Tebano presented his factual lectures on linkages between and among systems (on power point) and emphasized that all systems are linked in many ways most of which are not understood. Destroying one system will eventually affect other immediate or farther systems sooner or later. The connectivity between and among them is through air, land, energy, water currents and waves, food chain, and many more.

Village representations comprised a mixture of teens and adults (18 -50 years) from unspecified village groups as the selection was done through ‘drawing a lucky number’ and not according to the requirement of the consultation that targets particular groups such as youth, women, fishermen, village social welfare groups and other functional groups within a village set up. The selection criterion appears to be the practice being adopted by Eutantarawa Island Council (ETC) for all village representation matters.

Whether a person is fit for any particular job requiring specific skills is a non-issue. The underlying principle is 'fairness' and equal opportunity, that everyone must be given a chance to earn money through a non-biased selection mechanism. An IPO was present at all sessions at both venues and assisted in many ways including working with drama groups to get the meaning of concepts rightly dramatized. The Tiibi Kauntira came for the opening of the consultation and was not able to attend because of unspecified commitments. Likewise the ICW was reported not able to attend either. Hence any follow up in future on CCA and SLR will have to depend on the IPO himself with questionable assistance from village participants. It may be worth rethinking of any other similar activities in light of putting time and money for a useful cause.

Of great interest was the application of knowledge gained from lectures and media training. Participants came up with clear suggestions that there is a need to reconsider how best the existing causeways on the island could be improved in light of diminishing marine resources and serious coastal erosion in most vulnerable areas. Dr. Tebano felt that the details of such a sensitive issue would be best left to the Tarawaieta people to discuss at a village level with elders and the Island Council.

Coastal erosion appeared to be aggravated by human activities in terms of aggregate mining and seawall construction. Most of the lagoon coastal area is protected by mangroves and those without mangroves appear to be vulnerable. The marine resources are heavily fished on a daily basis as there is no bylaw to protect them or the existing ones are ignored and not enforced. Fishermen from South Tarawa share all fishing grounds with Tarawaieta fishermen. The imaginary boundary splitting the lagoon between the two identities was discussed in previous years among the three councils did not eventuate. As such it appears that there is an urgent need for the three councils, Eutan Tarawa Council (ETC), Betio Town Council (BTC) and Tarawa Urban Council (TUC) to devise a regulatory mechanism for all fishing activities within the Tarawa lagoon to ensure the sustainability of resources. Drought on the other hand is having a significant impact on water resources and fruit trees and some urgent actions also need to be put in place soon.

The level of awareness on CCA and SLR on the island is low and so adaptation measures have not been thought out seriously. The traditional coping mechanisms may not be appropriate to the current events affecting the islands. Hence there is a need to intensify training and consultation on CCA and SLR complimented with media training in its various forms. The participation of IPOs, ICWs and village representatives is an important integral part of the training and consultation to ensure public awareness continues after the conclusion of this Project. The assistance of Island Councils in all matters required by the outer islands consultation and training of local government community workers is very important in light of the aims and objectives of the consultation. The selection of participants based on the requirement of the consultation needs to be seriously accommodated by the island Council if the lessons learnt and experience gained from the consultation should bear fruit on the population.

ACRONYMS

ACP	Asia-Caribbean-Pacific
AG	Attorney General
BTC	Betio Town Council
CC	Climate Change
DRCS	Digital radio concentrator system
EC	European Commission
ECD	Environment Conservation Unit
EDF	European Development Fund
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
ETC	Eutan Tarawa Council
GPS	Global Positioning Sattelite
IC	Island Council
ICT	Information Communication Technology
ICW	Island Community Worker
IPO	Island Project Officer
JSS	Junior Secondary School
KAP II	Kiribati Adaptation Project II
KCCSC	Kiribati Climate Change Steering Committee
KPC	Kiribati Protestant Church
LDC	Least developed countries
MDGs	Millenium Development Goals
MELAD	Ministry of Environment, Lands and Agricultural Development
MFMRD	Ministry of Fisheries and Marine Resources Development
MISA	Ministry of Internal and Social Affairs
MPWU	Ministry of Public Works and Utilities
MTR	Medium Term Range
SEC	Solar Energy Company
SLR	Sea Level Rise
SPC	Secretariat of Pacific Communities (formerly South Pacific Commission)
TCH	Tungaru Central Hospital
TK	Tiibi Kauntira (Chief Council)
TOR	Terms of Reference
TUC	Tarawa Urban Council
UNCDF	United Nations Conservation Development Fund
UNDP	United Nations Development Program
USA	United States of America
WHO	World Health Organization

Chapter 1: INTRODUCTION

1.1 Scope of the Report

Because of time, personnel and financial constraints this report focuses mainly on the physical environment and those factors that are most related to climate change and variability, sea level rise and adaptation strategies. A review of some past activities carried out in Tarawaieta will be revisited to link them to the current activities to ensure that the most pertinent actions on any particular development needing urgent action, in particular those that are related to risks and vulnerabilities identified under this task, are taken to the fore for appropriate action by respective ministries of Government and relevant agencies.

1.2 Selection Criteria

The selection criteria are fully discussed in the Tamana Report by Tebano, *et al*. (2008). KAP II senior management presented them in early May to the KCCSC and was approved unanimously. For transparency purpose hand written copies of island presentations during the 2007 National Consultation are available from KAP II office.

1.3 Rationale of the Tarawaieta Visit

A visit toTarawaieta is a follow up from the 2007 National Consultation held at the Otintaai Hotel from 4th to 7th December, 2007, similar to those made to Tamana in February, Beru and Onotoa in April. The aim was to put together results of discussions and observations on the island's vulnerabilities and risks in relation to climate change, climate variability and sea level rise. This exercise falls under public awareness and consultation, TOR Component 4.2 of the Consultant (Dr. Temakei Tebano) and Training Component 4.3 now under the same TOR. Tarawaieta is one of the Government's pilot sites for a number of projects being implemented.

Findings from this visit will compliment those already compiled on other activities carried out on the island by other government ministries and NGOs; all will provide useful information to Kiribati Government for short, medium and long term planning in light of appropriate adaptation measures to reduce or contain potential risks and vulnerabilities related to the impact of climate change and sea level rise.

Itinerary

11th May, 2008.

7.30 am, Sunday:

Departed South Tarawa for Tarawaieta (North Tarawa) by skiff, arrived Abaokoro 9 am, checked in at the ETC Quest House, not cleaned or mopped, no water (bail own water for all purposes), rooms not prepared, mattresses old and torn. Met by the Clerk to ETC, briefed her of the purpose of the visit and requirements in terms of transport and participant selection criteria. Being a Sunday it was agreed that the confirmation notice to all village councilors be done right away as day 1 was scheduled for Monday. The consultation would run for 2 days. Participants will be compensated with lunch money; there will be morning and afternoon teas for each day. Each village nominates 15 participants (women and men, youth and other group representatives).

2 pm:

Hired motor cycles and inspected the northern villages – Buariki, Tearinbai, Taratai, Tebangaroi, Nooto and Abaokoro for any coastal and water problems. Made notes of the eroded areas and cross-check with participants of each respective village.

12th May

9 am:

The consultation was opened by the Tiibi Kauntira, followed by a morning session taken by Dr. Tebano. Tea was served at 10.30 am, continued with more lectures on CC and SLR, linkages between all systems, big and small. Lunch was at 12.30 pm. The media training took the whole afternoon from 1.30 pm to 3.30 pm conducted by Miss Kiata. Dr. Tebano revisited the northern villages, filmed and recorded exact locations (with a GPS) of badly eroded and vulnerable sites with information from participants.

13th May

9.30 am

The media training continued till before lunch with tea in between. Group work presentations were done from 11 am till noon. The afternoon session began at 1.30 pm. A reflection and wrap up on all concepts spoken, sung, dramatized and put on poster was led by Dr. Tebano. A video on water problem in Kenya was shown to give participants a feeling of a community working together to achieve a certain goal. A documentary on real life bad weather and surge storms in Kiribati related to CC and SLR was also screened. Day 2 finished at 3 pm. A trip to the southern villages to check eroded lagoon areas at Marenanuka and Tabonibara was done. Pictures were taken and locations recorded with a GPS.

Important Issue to note:

[The Tiibi Kauntira requested Miss Kiata on day 1 if she could pay $5 from all participants' lunch money to the Council Cashier as an advance for head tax. The request was not entertained. During morning tea a cashier requested for his inclusion in the program and delivered a persuasive talk on the importance of paying tax while they have the money, there was a mixed feeling among participants and the matter was left to each individual to pay up if so wish. The insistence of the ETC to collect tax money from participants' lunch money is a disregard of respect for the

purpose of the consultation. Lunch money is meant for participants to buy food so that they do not go hungry and hence remain active throughout the day].

14th May

11 am

Departed Abaokoro for Abatao, arrived Abatao at 1 pm.

15th May

Being a Thursday and a day of mid-week prayer by the KPC community at Abatao day 1 and 2 of the consultation were scheduled for Friday and Saturday.

16th May

The first day for the remaining villages started around 10.30 am as participants from Nabeina and Kainaba came pretty late. There was confusion about transport as they did not know which skiff was to take them to the consultation venue. Buota and Abatao were not informed by the ETC but a lot of residents heard about it over radio announcements. Hence, Abatao residents replaced the Buota participants for the two-day consultation. Similar contents of day I and 2 in Abaokoro were presented at Abatao. Pastor Totinnang Tewannanti opened the consultation with a short prayer and short reading from the Bible about the responsibilities of mankind to look after and serve the Earth.

17th May

Day 2 of the consultation started at 10.30 am and finished at 3.30 pm. Activities done at Abaokoro were repeated. Pastor Tewannanti closed the consultation with a thanksgiving prayer for such an important consultation in line with the teachings of the Bible.

18th May

Back to South Tarawa.

Issue for mention and noting:

[It appeared that ETC had not done its part in informing Buota and Abatao councilors about the consultation despite of two council meetings prior to the scheduled dates. It was assumed that ETC depended on unofficial radio announcements made by Ms Kiata through a 05 quiz program sponsored by KAP II. The Abatao councilor claimed that the ETC Clerk described the consultation as not conforming with the Council's protocol and administrative procedures. What that means needs to be clarified with the Clerk to ETC. If the Abatao councilor were right in his claim then the reason why the two villages were not officially informed about the consultation must be correct].

1.4 Location of Kiribati

Kiribati consists of three main island groups scattered over 3 million km^2 of the Central Pacific, between latitudes 4° N and 3° S, and longitudes 172° E and 157° W (Fig. 1a). The total land area is 810.8 km^2, comprising 33 low-lying coral islands, 10 of which are coral atolls (Figure 1a). The Gilbert Island group consists of 17 islands (including Banaba) with a total land area of 285.7 km^2. Tarawa Atoll, in the Gilbert group and the location of the capital, consists of more than 20 named islets, the southern six of which are linked by causeways. The distance between Tarawa and outer islands in the Gilbert group ranges between 51 km and 600 km (Thaman and Tebano, 1995).

The Phoenix Island group consists of 8 largely uninhabited islands with a total land area of just 28.6 km^2 located some 1 750 km east of Tarawa. The only inhabited island of the Phoenix group is Kanton (Canton) Island with the land area of 9 km^2. The Line Island group consists of 8 islands with a total land area of 496.5 km^2, extending over a north-south distance of 2 100 km, located at a distance of between 3 280 and 4 210 km east of Tarawa, and some 800 km south of Hawaii. This group includes the largest island in Kiribati, Kiritimati, having an area of 388.4 km^2. Most of the islands are not more than 2 km wide, or more than 6 m above sea level, except Banaba in the Gilbert group which rises about 87 m above mean sea level. The depth of water wells in most cases varies from 0.5 m to 3.0 m (Thaman and Tebano, 1995).

Tarawa Atoll, divided into two distinct districts, Urban Tarawa or South Tarawa being the main administration center of Kiribati and Rural North Tarawa or Tarawaieta.

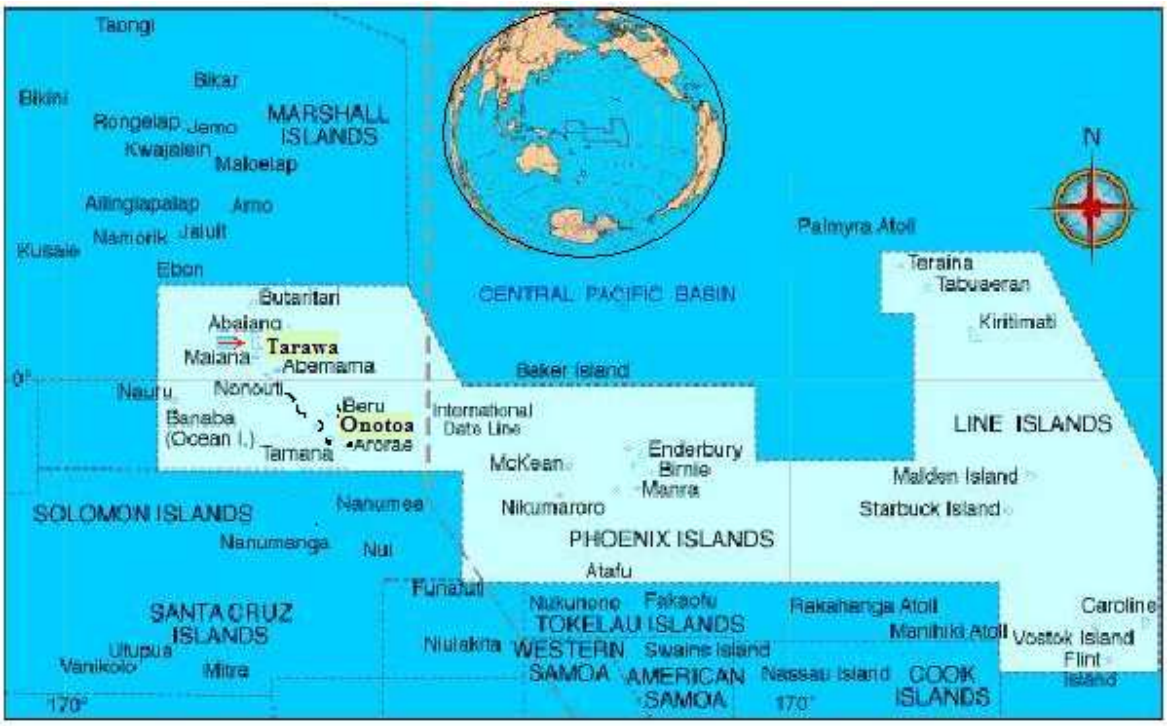

Figure 1a: Islands in the Gilbert Group at left, Kiribati showing the position of Tarawa.

1.5 History and Background

Tarawa is an island in Central Gilbert Group and the main administrative center of the Republic of Kiribati. It was settled perhaps simultaneously with the rest of the islands in the Gilbert Group beginning more than two millenia ago by successive waves of migrants from Southeast Asia, Tonga, and Fiji. The first Europeans to sight the islands were the Spanish (1606). In the late 1800s many islanders were often taken against their will to work abroad. The islands were administered (1892–1916) with the Ellice Islands as a British protectorate that became (1916) the British Gilbert and Ellice Islands colony. They gained self-rule in 1971, and, after the Ellice Islands gained (1978) independence as Tuvalu, the remaining islands were granted independence (1979) as Kiribati (Wikipedia, 2008).

The area now called Kiribati has been inhabited by Micronesians speaking the same Oceanic language since sometime between 3000 BC and 1300 AD. The area was not isolated; invaders from Tonga and Fiji later introduced Polynesian and Melanesian cultural aspects, respectively. Intermarriage tended to blur cultural differences and resulted in a significant degree of cultural homogeneity.

Colonial era

The islands were first sighted by British and American ships in the late 18th and early 19th centuries. The main island chain was named the Gilbert Islands in 1820 by a Russian admiral, Adam von Krusenstern, and French captain Louis Duperrey, after a British captain named Thomas Gilbert, who crossed the archipelago in 1788. From the early 19th century, Western whalers, merchant vessels and slave traders visited the islands, introducing diseases and firearms.

The first British settlers arrived in 1837. In 1892 the Gilbert Islands consented to become a British protectorate together with the nearby Ellice Islands. Together they became the crown colony of the Gilbert and Ellice Islands in 1916. Kiritimati (Christmas Island) became part of the colony in 1919 and the Phoenix Islands were added in 1937.

Tarawa Atoll and others of the Gilbert group were occupied by Japan during World War II. Tarawa was the site of one of the bloodiest battles in US Marine Corps history. Marines landed in November 1943; the Battle of Tarawa was fought at Kiribati's former capital Betio on South Tarawa.

Independence to present day

The Gilbert and Ellice Islands gained self-rule in 1971, and were separated in 1975 and granted internal self-government by Britain. In 1978 the Ellice Islands became the independent nation of Tuvalu. The Gilbert Islands became independent as Kiribati on July 12, 1979. Although the indigenous Gilbertese language name for the Gilbert Islands proper is "Tungaru", the new state chose the name "Kiribati", the Gilbertese rendition of "Gilberts", as an equivalent of the former colony to acknowledge the inclusion of Banaba, the Line Islands, and the Phoenix Islands, which were never considered part of the Gilberts chain. In the Treaty of Tarawa, signed shortly after independence and ratified in 1983, the United States relinquished all claims to the sparsely inhabited Phoenix Islands and those of the Line Islands that are part of Kiribati territory.

1.6 Geography

Tarawa Island is located in the Central Gilbert Group in the Pacific and is part of the Republic of Kiribati. South Tarawa is one third of Tarawa Island and houses the Capital of Kiribati. It is the only urban part of the country. All administrative headquarters for government and non-government organizations, social services, media, transport and communication, entertainment, and gateway to the World are situated on South Tarawa. The land mass on South Tarawa is around 16 square kilometers. Forty four percent of the total population lives on less than 2.2 percent of the total land mass. This makes urban Tarawa densely populated. This large population ratio on South Tarawa puts pressure on social services and natural resources and contributes to health risks, including overcrowding, unemployment, and crime.

Two thirds of Tarawa (in lengthwise) is rural but very much influenced from its urban center; this can be seen through affluence living lifestyle. Tarawa lies north of the Equator and west of the International Date Line. Tarawaieta (North Tarawa) is between the northernmost village of Buariki at 1º36’529”N, 172º 57’181”E and Buota at 1º28’634”N, 173º015’70”E.

The shape of Tarawa is triangular with the base forming South Tarawa and the remaining elbow shape forming Tarawaieta. Tarawaieta has a landmass of 15.26 sq. km while South Tarawa has approximately 16 sq. km. The lagoon is fairly deep in some parts and average 10 meters with scattered patch reefs of 5 meters water depth. A barrier reef at the windward side forms a back reef and the reef flat is exposed during low tide. The submerged western reef forms the outer reef connecting to the deep oceanic waters with a white sandy bottom. The north western part of the lagoon is shallow with numerous large coral boulders ubiquitous during spring low tide making navigation difficult at night. Front reefs are numerous connecting the shallow mud flats that are quite wide in some areas and narrow in others making it very irregular. Numerous islets are

connected to each other with defunct bridges or damaged causeways. The number of people per sq. km is 372 as compared to South Tarawa of 2,558 peoples per sq. km (Census 2005).

Fig. 1b: Map of Tarawa Island (obtained from Mineral Unit, MFMRD)

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1.7 Myth and Legend from Tarawa

The people of Tarawa believed that their ancestors were the first spirits and that they lived on the first created island which is now called Tarawa. They also say that Nareau the Creator created everything from this island: all the islands in the Gilberts and the continents on earth. He created the *I-Matang* world, the land of white-skinned spirits, and sent Nareau the Wise to care for it. He then created the *Batabata* world, the land of black-skinned spirits, and sent *Nareau Te Kikinto* (Nareau the Cunning) to supervise it. Nareau the Creator ruled that on no account should the white and black-skinned people migrate to each other's lands. If they did, trouble would occur. The Gilberts was Nareau the Creator's world and this was where he remained.

This except is taken from ‘Myths and Legends from Beru’. Readers are encouraged to cite the entire story from various sources for full details. The best original sources are from the writings of Sirs Arthur Grimble and Harry Maude, former resident commissioners during the British colonial era.

‘The first spirit to migrate from Tekaintikuaba in Samoa was Baretoka, who took his branch with him. He went northwards. On his way, he met Nei Batiauea, a female spirit, who had originally come from the

intestines of Na Atibu, Nareau the Wise's father, whom he had killed in *Te Bomatemaki*. Baretoka anchored Batiauea's canoe, using his branch to prevent it from moving any further. When Batiauea's canoe was stopped so abruptly, it swung around him stretching into a curved shape. It was called Teraea or Taraea, which was the original name of Tarawa. Those two spirits lived on this newly formed island and had four children; Tearikintarawa, Kirabukentarawa, Taorobantarawa and Nei Arirei.'

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1.8 Literature Review on Previous Projects

Previous reports on various aspects of development within Kiribati indicated that there had been projects conducted on the island in the past years with the involvement of different international agencies. These included, among others, fisheries, water and sanitation, solar energy, communication, education and health.

1.8.1 Water System

Water is one of the natural endowment and assets of Kiribati. It is the lifeline for all forms of life. Water is particularly important for urban South Tarawa with a fast growing population. The rural Tarawaieta (North Tarawa) is sharing the same need to develop water reservoirs to ensure all have access to good portable water from water lenses across the island.

One of the recent water surveys was conducted at both South and North Tarawas between 2005 and 2006 as part of a regional project. This was carried out by Australian Center for International Agricultural Research (ACIAR) with funding from Government of Australia. The title of the Project is 'Equitable groundwater management for the development of atolls and small islands'.

Project objectives were: to understand the impact of agriculture on groundwater resources and the impact of groundwater extraction on agriculture; to explore management options for mitigating droughts; and to combine these outcomes with information on hydrology and on the economics and social aspects of island communities to produce a system to lessen conflicts over water allocation and use. Local and expert knowledge on groundwater and water supply has been collected and this has been incorporated with the hydrology and salinity dynamics into a Multi-Agent System for groundwater use and management, AtollScape (ACIAR, 2006).

Analysis of demand and the impact of frequent severe El Nino-related droughts has demonstrated that additional groundwater sources will have to be found for South Tarawa by 2010. The government of Kiribati has decided to initiate investigations for these additional sources. In doing so, intensive surveys were made at both Bonriki (South Tarawa), and Buota, Tarawaieta.

Tarawa has two regions - the heavily populated, urbanised South Tarawa and sparsely populated rural North Tarawa. In the low islands studied in Tarawa, Bonriki in South Tarawa and Buota in

Tarawaieta, respectively, are currently used for groundwater extraction, and the undeveloped Abatao and Tabiteuea in Tarawaieta, the spatial extents of their groundwater lenses have been measured.

A previous water project, 'Water Supply and Sanitation Improvements' funded by Kiribati Government with borrowing from Asia Development Bank' was conducted in 2003. The Project was designed to improve the development potential of Kiribati and the health and well-being of its people through a sustained program of improvements in water supply, sewerage, solid waste disposals and environment conservation. The Project was classified as primarily human development with environment management as secondary. The Project aims to (i) implement institutional reforms in the management of the public utilities and environmental resources (ii) improve the quality and availability of safe drinking water (iii) rehabilitate and expand sewerage and sanitation systems and (iv) promote hygiene and sanitation through better solid waste management. The focal area of the Project is primarily South Tarawa and selected areas of North Tarawa, where the large majority of the population is concentrated (ADB, 2003). These projects made Tarawaieta (North Tarawa) one of Government's pilot islands.

1.8.2 Fisheries Sector

Conservation Area

Of the 20 proposals for Conservation Area Projects (CAPs) received from all 14 countries participating in the program, 17 were approved by South Pacific Biodiversity Conservation Program. This is by far, the largest contribution by any one program to the conservation of the natural resources of the Pacific region. Amongst the selected CAPs was North Tarawa and Kiritimati.

The CAPs were a mixture of marine and terrestrial sites. The marine areas included North Tarawa. Local communities adopted rules and by-laws in many CAPs to control activities in the project areas. Examples include a community ban on fishing nets with mesh sized below 2.5 inches in North Tarawa, and limiting access to resources by a system of permits in Kiritimati. The project stressed from 1994 through 2001 (SPC, 2003).

1.8.3 Education

Tarawaieta originally had two primary schools during the British colonial era, one ran by the Island Council based at Abaokoro, the other was owned and ran by the Roman Catholic Church and was based at Taborio/Nooto. Catholic village schools were run by village catechists and monitors which eventually closed in the early sixties. In early 1980s government took control of all primary schools. A Junior Secondary school was added in late 2003. In 1975, the Roman

Catholic Church established what was known as a girl's boarding school 'Immaculate Heart College', was successively turned into a junior coeducational and currently a senior secondary school.

1.8.4 Energy (Solar Energy for Outer Islands 8 ACP KI 2)

Access to electricity and other energy services, through either grid extension or decentralized energy technologies, in both urban and rural areas, including main program objectives, were determined for their impacts and progress. On the capital South Tarawa (Betio to Tanaea villages) the access to grid extension is about 95% for the residential sector due mainly to the slow development of power utility to meet the growing electricity demand. However the grid extension extends to the rural areas of North Tarawa namely Buota, Abatao and Nabeina villages with the grid access of around 50%. On the outer islands in the use of PV solar home systems, the Solar Energy Company (SEC) set the tariff also to sustain their operation fixed and variable costs also covering the replacements of parts during technical failures or after reaching their lifetime. However, the tariff is usually debated by politics and therefore the actual sustainable tariff calculated by the company is not enforced but a rather a lower and affordable tariff for the rural dwellers is taken.

Tarawaieta is slowly benefiting from the solar project and many villages have their *maneabas* solar systems installed. Likewise a number of village homes have solar systems providing lighting and energy for radios and CB radios. The use of alternative, renewable energy sources will help to offset future dependence on imports and contribute to the overall aim of achieving the maximum degree of energy independence, while providing opportunities for development primarily in the rural sector. The Island Council is making use of solar energy to power lightings at its new clinics and dispensaries.

1.8.5 Health (Improvement of Health Services on the Outer Islands)

There has been an increase in submission of EDF9 funded project proposals with over 60 health related project proposals have now been submitted to KANGO's EDF9 Outer Island Project Office in Bairiki for funding consideration and approval. The submissions, according to the project manager, followed a series of successfully conducted workshops trainings, awareness raising and training of trainers by the EDF9 project team on the islands of Abemama, Kuria, Aranuka, and North Tarawa. Most applications relate to water supply and sanitation, while a lesser number are associated with various activities such as vegetable gardening, and sports activities.

Several clinics and dispensaries have been completed on some outer islands such as Tamana and Beru. The EU health project had expanded to Tarawaieta. One health center and two new dispensaries would have been opened Saturday, April 5 2008. The Health and Medical Services said

that the three new health centers are part of a nationwide EU funded project to improve health services excluding the Line and Phoenix group of islands. Clinics are in the district's capital Abaokoro, Taratai village and Tearinibai village. "The health center in Abaokoro is much bigger being a service hub or headquarter for the two dispensaries in the other two villages of North Tarawa and a third dispensary in Tabiteuea village would also have been opened (RMAT, 2008).

1.8.6 Communication (ICT)

Voice and other similar communication means have been very poor due to the scatteredness of the islands in a vast Pacific Ocean. Government sees a need to concentrate on improving the basic ICT infrastructure first and envisaged to slowly develop the Kiribati Outer Islands Telecommunications Development Plan, using the recovered Digital Radio Concentrator System (DRCS) equipment provided free of charge by TELSTRA to provide the local access network. Telecommunications is a capital-intensive industry and Kiribati needs cash to improve and maintain the services. Like any other Least Developed Countries (LDCs), Kiribati still relies heavily on aid-funds for developing its basic ICT infrastructure. A Satellite terminal + switch + cable has been installed in Tarawaieta as part of improving communication between and among islands and South Tarawa, the main administrative center. About 30 telephone links have been installed at several locations in Tarawaieta including the Island Council station of Abaokoro, Nooto and Taborio villages.

1.8.7 Aggregate study

Bathymetric, seismic and alternative sand and gravel resources surveys for Tarawa were carried out by SOPAC in 1994 and the recent ones in 2005. The surveys were aimed at identifying alternative sources of aggregates. An EIA was also carried out to map and assess areas vulnerable to coastal erosion on Abaiang and Tarawa. Analyses were also done on seismic data for Tarawaieta aggregate resources and on sediment samples from Tarawaieta for aggregate resources. These studies will positively reduce aggregate mining from coastal areas around the island hence protect coastlines in the islands studied.

1.9 Information Collection Templates

The templates below reflect on the approaches described above as a result of consulting with appropriate ministries, and the advice of international and regional advisors, a list of problems and vulnerabilities provided by island representatives of the first National Consultation of 2007, ranking and prioritizing them by seriousness by participants. Some modifications were made as appropriate to suit the current consultation and risk assessment on the outer islands. Risk assessment focuses on water, coastal erosion and marine resources. Physical environment and structures, and human resources are added for additional information on island profiling.

Below are the form templates (see Appendix i) to guide the recording of information in a systematic and uniform manner for all islands visited. They contain information collected from Tarawaieta Island in the areas of risks (brackish water, coastal erosion, declining food resources, the physical environment and infrastructure, and human resources.

Risk Assessment

- Island Risk Assessment *(form 1.1)*
- Ranking Risks - Island Level *(form 1.2)*
- Ranking islands for risk response – National Level (*form 1.3*)

Island profiling

- Island Profiling - Natural Resources *(form 2a)*
- Island Profiling – Physical Environment and Infrastructure *(form 2b)*
- Island Profiling – Human Resources *(form 2c)*
- Ranking Resources, Environment and Infrastructure –Island Level *(form 2d)*
- Ranking Resources, Environment and Infrastructure – National Level *(form 2e)*

Island Risk Assessment *(form 1.1)*

Island **[Tarawaieta]**	**Vulnerability/ Risk**	**Hazard/ danger**	**Nature of disaster**	**Location/Site**	**Ranking [1=not serious; 2=serious; 3=very serious]**	**Proposed Adaptation measures [reactive/ preventive]**	**Responsible agency/ministry**
Refers to islands in the Gilbert Group [reef/raised or atoll – needs to be specified]. Number of villages to be visited, number of participants, sex, age and occupation.	Island residents identify the vulnerabilities and risks they are experiencing in light of climate change and sea level rise. A list given during the 2007 consultation is checked against this new listing.	Causative hazard type identified	Extent and impact of disaster, who are affected, how are they affected	Identify area(s) on the island where the problem occurs – name of district or village is recorded and marked on a map. Pictures of these sites are videotaped or shot with digital camera.	Implication on urgency of response	Measures and strategies must be proposed by the communities themselves with the assistance of a consultant or members of the visiting team; reactive implies immediate practical actions to mitigate impacts (e.g. planting mangrove, seawall construction, construction of wooden embankments). These strategies are *reactive* in that they are actions taken to mitigate the effects of erosion for example; Preventive – includes warning systems, planning and regulatory measures.	Government ministries or other agencies that are involved or have similar interest in the programs/issues are identified, results of similar activities from other ministries are put together with the recent findings of KAP II outer islands reports.
Tarawaieta Island,atoll island, second farthest in the southern Gilberts; 8 main villages15 workshop participants from each village representing all village sectors.	*Fresh water becoming brackish day by day.*	*Drought*	*Prolonged drought with no rain for more than ten months, people are fetching water from wells further inland, fruit trees within village compound (breadfruit, fig tree, etc) are turning yellow and dying.*	*All villages along the western coastline- Fig. 1b, 1c).*	*2 –serious if the rains do not come in another 6 months or longer.*	*Freshwater sources from further inland are tapped with the use of solar pumps for overhead tanks - reactive*	*Ministry of Works and Public Utilities – Public Utilities Board' Ministry of Internal and Social Affairs; Ministry of Health and Medical Services.*
.	*Coastal erosion*	*King tides, storm surge and sea level rise.* *[aggregate mining on the rise for more*	*Coastline at Buariki; seawalls damaged, some homes destroyed, wells contaminated with sea water, some areas eroded and plants and trees fell to the sea.*	*causeway.*	*2*	*Law to regulate aggregate mining on the island; properly designed seawall along currently affected areas- preventive.*	*Ministry of Works and Public Utilities; MELAD, MISA.*

		permanent structures]					
	Declining marine resources	*Cool water caused by LaNina; overharvest of some fish species*	*Protein from sea may not be available for a few days in times of rough weather; malnutrition in children and adults as well*	*Residents of all villages on Tarawaieta.*	*2*	*Law to regulate fishing activities and quota per effort per day - preventive*	*Ministry of Fisheries and Marine Resources Development; Office of the Attorney General.*
	Declining terrestrial resources	*Drought*	*Prolonged drought with no rain for more than ten months;, fruit trees within village compound (breadfruit, fig tree, etc) are turning yellow and dying; brackish water cannot be used for watering purposes.*	*All over the island*	*3*	*Watering scheme carting soft water from further inland or use solar pump for purpose.*	*Ministry of Environment Lands and Agricultural Development; MWPU*
	Public structure – church inundation, overtopping and flooding.	*Close to coastline rising sea level and storm surge*	*Location of church makes it vulnerable to storm surge and coastal erosion*	*All residents of the island*	*2*	*The construction of a sea wall along the west coastal area at the location of the church*	*MISA, PWD*
	Private homes wash off by storm surge and bad weather and rising sea level	*Sea walls not high enough to protect vulnerable homes along the coastline.*	*Location of homes and material used to build sea walls*	*Those who live right on the coastal area*	*2*	*Relocation of homes to further inland; assistance on material for concrete and stronger and appropriate construction design*	*MISA, PWD*

Ranking Risks for Action – Island Level *(form 1.2)*

Island	Risk	Ranking score as in *form 1.1*; 3 highest, 1 lowest	Responsible ministry/agency	Current status of activities	Timing and estimated duration of response (months)
Name of village and area be stated, map of site provided	**List of risks.**	**Risk with highest score appears first, those with lowest score come last**	**Name of agency or government ministry specifies**	**Describes whether there had been similar activities carried out before or a new issues; if risk has been responded to describe status of the activities and future direction** **(contact MISA and other relevant ministries)**	**This needs to be factored in with the budget or obtained from relevant agency/ministry.**
Tarawaieta	*Water resources* *Marine resources* *Terrestrial resources* *Coastal erosion* *Public structure* *Private structure*	*3* *3* *2* *2* *2* *2*	*MWPU, MISA* *MELAD, MISA* *MWPU, MISA* *MFMR,AG Office* *MISA, PWD* *MISA, PWD*		

Ranking islands for responses to risks – National Level *(form1.3)*

Island	Type of risk	Ranking score *(forms 1 and 2)*	Implementing agency/ministry	Partners	Start-up date
Provide island name **(and district – Gilbert northern, central, southern**	**List of risks identified for island**	**Provide corresponding ranking score**	**Provide name of agency tasked to carry out the required job**	**Provide names of agencies and funding donors in the project**	**Supply exact date of the start-up date for implementation**

Island Profiling – Natural Resources *(form 2a)*

Terrestrial/Marine Resource	Current Status	Potential cause(s) of problem	Action needed [low/high priority]	Partners	Cost of activity [AU$]	Source of funding identified
Specifies type of resource – terrestrial or marine; specifies whether fauna or flora; name resource	Refers to observed status by residents whether dying, declining, extinct, etc. Verification needed if can be done during a visit – photos and site visits	Residents' list of causes, verification needed – survey or research may be required; examine existing reports and relevant information.	Consultation, cooperation, team work, regulation, etc. Specify urgency for action	Identify partners who can assist or who are responsible [government or private]	To be determined by agency	To be identified by agency
Water	*Becoming brackish and contaminated with sea water – in particular in villages close to the shoreline.*	*Drought for many months, closeness of villages to coast, increasing population.*	*Inspection and island visit; low priority*	*Government, PUB*		
Finfish and non-finfish resources	*Sharks and flying fish depleted, others declining.*	*Overfishing, unregulated fishing, heavy harvest during spawning runs.*	*Byelaws to be set up to regulate fishing activities and protect spawning seasons; quota limits and off-seasons – high priority*	*MFMRD, OAG*		
Fruit trees (terrestrial)	*Dying and scarce*	*No replanting scheme, drought*	*Replanting scheme encouraged, home gardening encouraged- high priority.*	*MELAD*		

Island Profiling – Physical Environment and Infrastructures *(form 2b)*

Terrestrial/Marine Environment or infrastructures; public or private	**Current Status and site/location**	**Potential cause(s) of problem**	**Response type required [urgent or not urgent]**	**Partners**	**Costs**	**Source of funding**
Specifies type of environment or structure in question – eg. Reef, lagoon, coastline, mudflat, marshland, buildings, causeways, seawalls, land reclamation, etc.	Refers to observed status by residents – damaged, dead, lost, wave over wash, etc. Verification needed if can be done during a visit – photos and site visits	Residents' list of causes, verification needed – survey or research may be required; examine existing reports and relevant information.	Consultation, Cooperation, team work, etc. Specify urgency for action	Identify partners who can assist or who are responsible [government or private]	To be determined by agency	To be identified by
Island Council causeway	*Storm search and king high tide over-wash making it unsafe for people and vehicles*	*Bad design and poor maintenance*	*urgent response*	*MISA, PWD, KPC*		
KPC church at Taratai	*Storm search and king high tide over-wash making it unsafe for people and vehicles*	*Poor choice of building site and planning.*	*Urgent response*	*MISA, PWD, KPC*		
west coastline	*Storm search and king high tide over-wash making it unsafe for people and vehicles*	*Unpredicted impact of CC and SLR; bad choice for village location.*	*Very urgent response.*	*MISA, PWD, KPC*		
Sea wall: *All villages*	*Storm search and king high tide over-wash making it unsafe for people and vehicles*	*Location selection prone to storm search and bad weather*	*Not urgent*	*MISA, PWD*		

Island Profiling – Human Resources *(form 2c)*

Population by sex	Age groups	Schools/Public utilities	Government/non-government paid workers	Major occupation	Production/export	Imports
Number of males and females (2005 Census)	Schooling, non schooling, over 50 years old	Name of school (primary, secondary, jss) and number of children; name of public utilities. Types of buildings (concrete or local) within each establishment	Number belonging to each group, level of education	Apart from paid jobs	List	List
2,756:2,922	*3-21, 40+*	*Primary: Amoanga, Aratokotoko,B.T. Uekera, Bwaan Nei Kanna,Mamatannana, Nangintokato, Nei Tabwara, Nunteweia, Raweaitina, UeenNooto.* *JSS: Eutantarawa* *Senior Seconday: Immaculate Heart College*	*around 50government and island councilemployees*	*fishing, toddy and copra cutting, weaving.*	*copra, shark fin, handicraft, sea cucumber*	*food items, machinery and fuel*

Ranking Resources, Environment and Infrastructure for Action – Island Level *(form 2d)*

Island	**Type of resource, environment and infrastructure**	**Ranking score** *(Forms 2a and 2b)*	**Agency/ministry for further observation and research**	**Partners**	**Start-up date**
Provide island name (and district – Gilbert northern, central, southern	List of resources identified for island	Provide corresponding ranking score	Provide name of agency tasked to carry out the required job	Provide names of agencies or ministries who may be involved in the process	Supply exact date of the start-up date for the task
Tarawaieta	*Marine*	***3***	***Fisheries***	***MFMRD***	***Not available***
Tarawaieta	*Terrestrial*	***2***	***Agriculture, MELAD***	***MELAD***	***Na***
‘	*Public structure - church*	***2***	***PWD***	***MWPW***	***Na***
‘	*Private – sea walls*	***2***	***PWD***	***MWPW***	***Na***
‘	*Buariki coasline*	***2***	***PWD***	***MWPW***	***Na***

Ranking for Action and Implementation – National Level *(form 2e)*

Island	**Type of resource, environment and infrastructure**	**Ranking score** *(Forms 2a and 2b)*	**Implementing agency/ministry**	**Partners**	**Start-up date**
Provide island name (and district – Gilbert northern, central, southern	List of risks identified for island	Provide corresponding ranking score	Provide name of agency tasked to carry out the required job	Provide names of agencies and funding donors in the project	Supply exact date of the start-up date for implementation
Na	na	na	Na	Na	Na

1.10 Topography

Tarawa Island is a lagoon island hence atoll by definition. Its fringing barrier reef at the east-windward side and submerged reef at the west-leeward side both form protection from enormous wind and wave actions. The windward shoreline slightly rises from sea level to over a meter as the highest point while the leeward shoreline is less than a meter in most areas. Ruderal vegetation is common along the coastal area with more disturbed vegetation replaced with fruit trees and dwarf coconut trees. There are no bushes in South Tarawa while Tarawaieta still has acres of bush-land in most parts (Thaman and Tebano, 1995). Rocky shorelines with mangrove forests are quite common in Tarawaieta making it less vulnerable to coastal erosion however the affected areas are those that have no natural protection at all. Where there are *babai* pits the ground may be uneven as unearthed sand resulting from digging is deposited within the vicinity of the pits. The lagoon area has many patch reefs and knolls; front reefs are wide in most parts of the island.

1.11 Main Settlements

Figure 1c below shows the approximate locations of the main villages. The northernmost village is Buariki with Naa Islet facing Abaiang once occupied by the Bahai Faith that established its vocational school there. Tearinbai, Nuatabu, Tebangaroi, Taratai, Nooto and Abaokoro are other major main northern villages. Smaller and newer villages include Marenanuka and Tabonibara. Further in the Tarawa mid-south part are the old villages of Nabeina, Kainaba, Tabiteuea, Abatao and Buota, the latter is very much part of South Tarawa as is most accessible by road and sea.

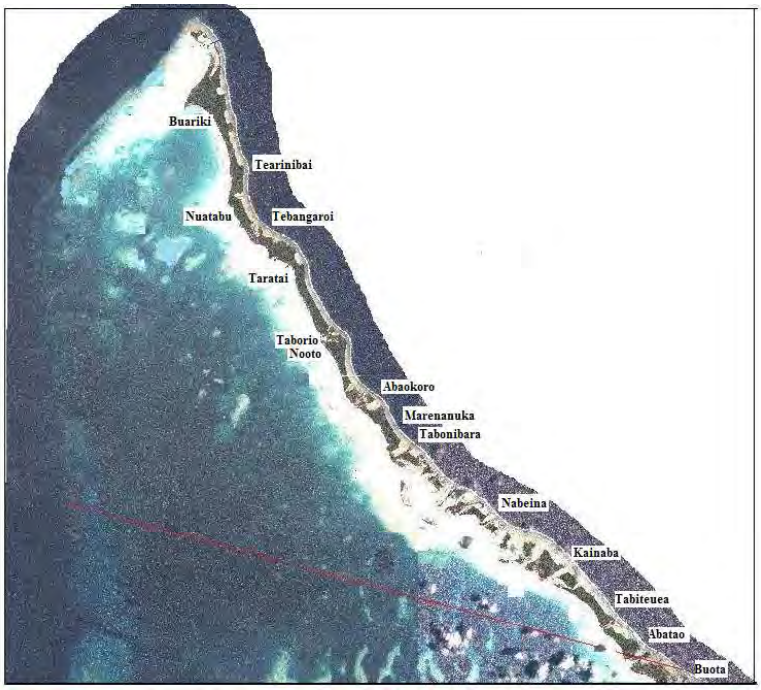

Fig. 1c: Map of Tarawaieta,all villages lie along the lagoon coastline.

Chapter 2: CONSULTATION FINDINGS

2.1 Status of Natural and Human Resources

Rural Tarawaieta or North Tarawa shares its lagoon resources with South Tarawa. Like most other outer islands, Tarawaieta has few terrestrial, marine and other important resources to support much needed development. Of particular importance for the sustenance of the island's population coconut and fish are the main staples. Both marine and terrestrial resources are being overstressed, in particular the former. The Tarawaieta people are finding it hard to cope with their harsh environment, especially at the time of prolonged droughts, high temperatures are taking their tolls on all forms of life. Being closest to the most affluent urban South Tarawa imported food supplies are readily accessible and supplement local food in times of shortage. Unlike the southern islands there is no such storage of coconut or pandanus fruit for future needy times. Imported food items and other commodities are influencing tradition and cultural lifestyles.

Babai (giant taro – *Cyrtosperma chamissionis*) is utilized on special and important occasions but is also frequently consumed, while *te mai* (breadfruit – *Artocarpus* varieties) and *te tou* (pandanus – *Pandanus tectorius*) compliment the main staples when in season. Some banana (*Musa*) and papaya (*Carica papaya*) varieties and citrus fruits such as lemon and lime are also grown but the porous sandy soil makes agriculture difficult hence composting and the use of natural fertilizers such as pig and chicken manure helps sustain the cultivation of Chinese cabbage and other vegetables. Some villages of North Tarawa, particularly Buota and Abatao are being part of some agricultural activities. The later once was the center of agroforestry research, has wound down according to plan.

2.1.1 Marine Resources

Most lagoon fish species are declining (*form s1.1; 1.2*). The consultation participants, with a good proportion of fishermen, claimed that with the increasing number of fishermen from South Tarawa using a variety of fishing gears and destructive fishing methods (Fig. 2a) including motorized skiffs (Fig. 2b) the daily and unregulated harvest of the resources is a real threat to all marine pelagic and lagoon resources. All fishable zones within the island system are being fished in one way or another (Fig. 2c). Gang fishing for family needs and cash revenue is on the increase. Giant clams, *te kima* or *aubunga* (*Tridacna gigas*) are threatened and the smaller species *te were* (*T. maxima*, *T. squamosa*) are depleted. Bonefish – *te ikari* (*Albula glossodonta*) and other finfish are declining. Shellfish – *te bun* (*Anadara holoserica)* in particular, is depleted and a cone shell – *te nouo*, (*Strombus luhuanus*) is overharvested. The impact on all resources is becoming severe and a management plan, backed by effective regulatory measures, is a must.

Shark is depleted and threatened, a red snapper - *ikanibong* (*Lethrinus gibbus*) is declining, and flying fish - *te onauti* (*Cypselurus* sp.) populations are heavily exploited but appear to be healthy. Mangrove crabs – *te mwanai* (*Cardissoma* sp.), Saguin clam - *te koikoi* (*Barbatia* sp.) are

declining, *te nikatona* (*Arcopagia* sp.) are abundant. All sea cucumber species (Holothuriodes) are depleted leaving the lagoon to the mercy of filamentous green algae. Mudworm – *te ibo* (Sipunclid sp.) are still abundant on the lagoon mudflats of Buota, Kainaba and Nabeina but are constantly being exploited for South Tarawa markets. Lobsters and octopus are still caught in numbers but the populations are going down.

Tarawaieta Island representatives at the December 2007 consultation claimed that among other urgent issues the scarceness of their marine resources requires urgent attention as they touch the daily lives of their people (Tebano, 2007). Among other reasons given was the impact of causeways and increasing water temperature that affect corals and fish species associated with them. The presumed impact of climate change in terms of warmer water is yet to be verified, however, the more obvious direct impact of humans and fishermen in terms of excessive fishing cannot be overlooked.

The overharvest of sea cucumbers contributes to the poor quality of water in the lagoon while warm water encourages algal growth hence the widespread of filamentous green algae is no coincidence. This problem is occurring in the lagoons of Onotoa and Beru where sea cucumber populations are overharvested for commercial trade. The non-existence of effective bylaws to regulate catches and commercial species in particular, has not offered any protection to the island's marine resources. There is a need for effective bylaws to regulate all fishing activities on Tarawaieta and all three councils, BTC, ETC and TUC need to come up with a comprehensive and effective regulatory mechanism to ensure the marine resources keep feeding the large populations living on Tarawa.

One newly developed destructive fishing method a combination of gillnetting, water splashing using a heavy metal (galvanized pipe) and metal cling-cling. The later requires an iron metal or similar with the bottom end in the water while the upper end is beaten with another smaller metal. This method is particularly used to catch a bonefish, *Albula glossodonta*. The other method is a combination of gillnetting and scoop net where a school of fish especially red snapper is surrounded and scooped up with a smaller mesh size net. Other schooling fish such as surgeon and rash are occasionally netted.

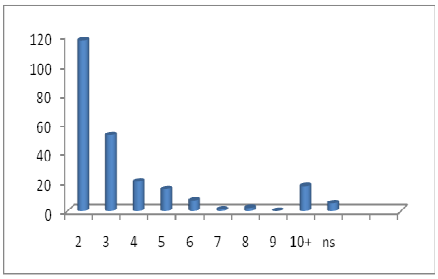

Fig. 2a:Households with number of nets

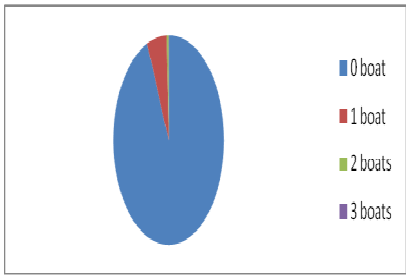

Fig. 2b: Proportion of families owning boats.

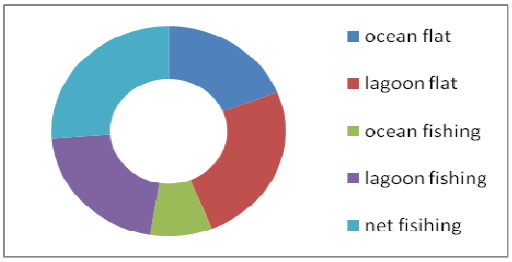

Fig.2c: Fishing locations preferred.

2.1.2 Terrestrial Plant Resources

Like other islands in the Gilbert Group the natural terrestrial vegetation types found on Tarawieta are limited to coastal strands vegetation, small strands of inland forest. Secondary and cultural vegetation types include *te nii* (*Cocos nucifera*) coconut-palm-dominated agricultural lands, including *babai* pits, houseyard and village gardens, areas of ruderal vegetation. There is little (or none at all) natural inland forest, almost all of it has been replaced by coconut plantations or cleared for schools, dwellings and other purposes. Papayas and some varieties of pandanus are grown within or along the edge of a compound, so as breadfruit varieties. A pandanus variety, *te anti-na-karewe* (*Pandanus tinctoris* variety) is very popular as is best for chewing and other purposes. Decorative flower plants and vegetable gardens are common around homes.

Prolonged droughts are affecting vegetation in many ways, most significantly fruit trees such coconut, breadfruit and pandanus (*forms 1.1; 1.2*). It was reported during the December 2007 consultation mentioned above that all kinds of trees and plants are dying. The watering of houseyard plants and trees was not reported and it is assumed the impact of drought compounds the neglect of residents leaving plants and trees to the cruelty of the sun. During the writing of this report the rains have appeared to come back as predicted by the Meteorological Office in Betio.

2.1.3 Agricultural and Land Resources

The long western lagoon coastline of Tarawaieta is occupied by villages separated by bush-land with old coconut plantations, pandanus and *babai* pits further inland. The mid-inland is the most productive part of the island where a huge reservoir of fresh water lens lies. The coastal area is planted with pandanus, dwarf coconut trees, breadfruit and other tropical fruit trees suffering from excessive heat and dryness caused by the prolonged drought.

Like other atolls, land use in Tarawaieta falls under three main categories, settlement (villages), agricultural and bushland (mostly uncultivated land). Most of the land is owned by families; a significant proportion is being sub leased, the remainder is privately leased (Fig. 2d).

The scorching heat during the day is seriously affecting all forms of life, plants and animals (Fig. 2e). The adverse impact, compounded by bush fires made the situation even worse (Fig. 2f).

Bush fires can either be accidental or deliberately set, the latter is common over land disputes and personal dislike.

Limited land resources make many terrestrial and near shore resources, including freshwater, vulnerable to over exploitation and pollution from poorly planned waste disposal. Limited land resources have become especially troubling for low lying atolls, in view of the projected rates of sea level rise over the next 50-100 years.

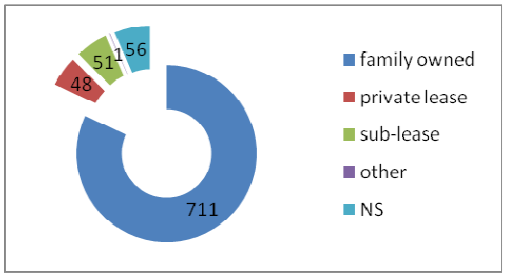

Fig. 2d: Land owning proportions

Fig: 2e: The impact of drought on trees and plants is very serious.

Fig. 2f: Bush fires deliberately set or by accident are common, worse than drought.

2.1.4 Animal Resources

Domesticated pigs and chickens provide *meat* on special occasions. Dogs and cats are kept as pets. Although dog meat is a delicacy on some islands it is not consumed on the island. Coconut crabs are found but rare. Avifauna includes white and black terns, black noddy and occasional visits by frigate birds and herons. Geckos and lizards are common in homes, so as other smaller and inconspicuous animals such as ants, millipedes, bugs and cockroaches. Mosquitoes cannot be ignored as they can cause dengue fever (as currently nationally widespread) and other mosquito borne diseases.

2.1.5 Minerals/Aggregate/Water Resources

Tarawaieta is naturally endowed with aggregate resources. However the increasing amount of construction work on the island in terms of housing, schools, offices and other public assets are contributing to an increase in demand for sand, gravel and coral stones and boulders. With recent surveys on the potential for lagoon aggregate mining Tarawaieta stands a good chance of benefiting from the operation.

The underground resource on Tarawaieta as for other islands is underground water. Tarawaieta has a vast reservoir of fresh water with densest lens in the broadest parts of the island such as Buariki, Nooto, Abatao and Buota. The remaining villages lie on narrow portions while Tabuarorae is experiencing water hardness in most areas of the islet (refer to Fig. 1b, 1c). Wells along the lagoon are being affected (*forms 1.1; 1.2*). Fresh water is a fundamental resource for small island nations. Most development plans are pivotal on the availability of fresh water. Clean water and proper sanitation enhance the health and productivity of the work force and have particular implications for the children and future generations.

Private and community water catchments in Tarawaieta are few and only last two or three months at most. Most wells (private and public) are not properly maintained or properly looked after to avoid contamination. Fresh water replenishment from rain that penetrates into the porous sandy soil and into the reservoir has not been happening for a long time (estimated from early 2007). As of May 2008 some rain has come back but more is needed to replenish the underground reservoirs.

Over 300 wells are open, that is, uncovered while about the same number are covered (Fig. 2g). There are few homes with aluminum roofing and with one or two 5,000l plastic tanks. Concrete catchments are not maintained and most of them are abandoned or replaced with plastic tanks.

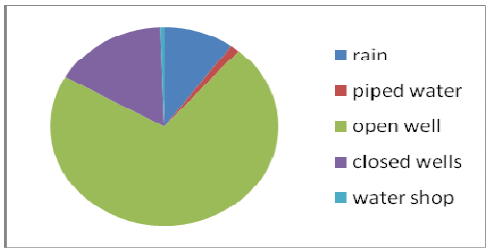

Figure 2g: Proportion of sources of drinking water.

The availability of water has been a long-standing problem throughout Kiribati. The freshwater lenses are floating on the higher-density seawater beneath the atolls. These are highly vulnerable due to loss of land and inundation resulting from climate change. Groundwater resources in Kiribati are commonly contaminated from human and other solid wastes. This arises from rapid population growth and urbanization, inadequate use of proper toilet facilities and lack of infrastructure in the sanitation sector. Due to the shallow water tables, seepage of waste into the fragile groundwater system is a common occurrence in Kiribati.

2.1.6 Energy

Kiribati relies heavily on imported fossil fuels for its commercial and transportation energy needs, but many problems are faced by the energy sector. Diesel generators supply electricity to most of the urban centers like Tarawa. For the outer islands, however, where there is no regular supply of fuel for generators, solar photovoltaic technology has been promoted. Importing fossil fuels for energy generation has been putting an increasing strain on the economy of Kiribati, while the technical expertise and infrastructure needed to utilize the resources better are lacking.

The use of alternative, renewable energy sources will help to offset future dependence on imports and contribute to the overall aim of achieving the maximum degree of energy independence, while providing opportunities for development primarily in the rural sector.

Biomass plays an important role for domestic purposes such as cooking in the outer islands and for most families in South Tarawa. Timber products including coconut palms constitute the biomass resources in Kiribati. For Tarawaieta, biomass is not a problem and is the main source of fuel for open fire cooking. On Betio and South Tarawa, coconut cake has to be purchased to meet the growing demand. Both methane and kerosene are currently at their highs and likely to go up further.

Electricity generated via solar units for family households are increasing in number and is providing a significant proportion of lighting on the island. However, pressure lamp is the most popular source of lighting (Fig. h) on Tarawaieta. Village and private generators are also available for *maneaba* and household lighting, respectively, and for other purposes (Fig.2h). The

Island Council has its own gasoline generator providing lighting for its workers but mainly to operate office equipment during working hours.

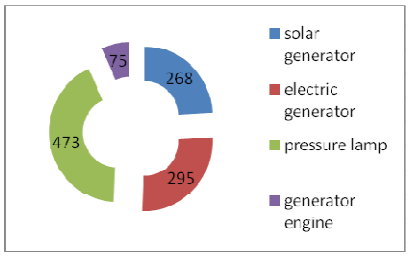

Fig. 2h: Sources of energy and lighting.

2.1.7 Human Resources

The total number of people on Tarawaieta in 2005 was 5,678 individuals (2005 Census). About 99% were of I-Kiribati origin, the rest were of mixed origin or Tuvaluans or expatriates working for private schools or for community groups (Figure 2i; *form 2c*). The proportion of males to females is around 1:1.06 (Fig. 2j, *form 2c*) (Census 2005), similar to Onotoa.

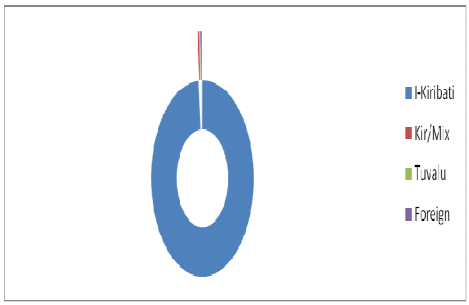

Fig. 2i: Composition of Tarawaieta population by ethnicity.

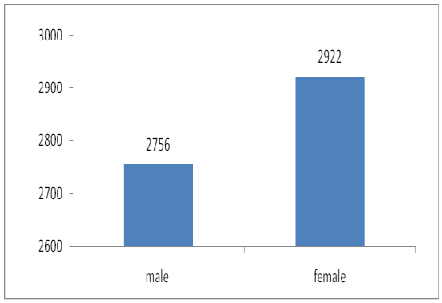

Fig. 2j: Population by sex.

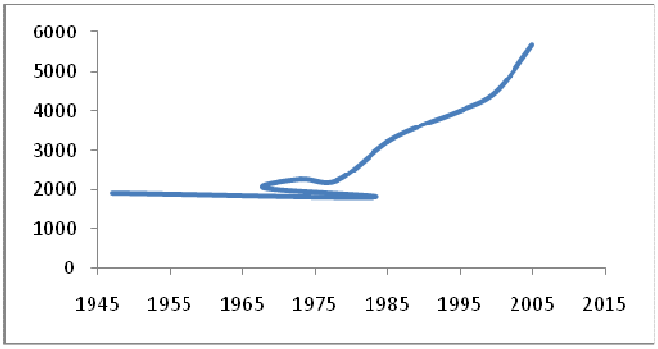

Fig. 2k: Population growth trend

Unlike Tamana, Beru and Onotoa there has been a drastic increase in population growth rate for Tarawaieta since the late 1980s and it appears the rate is steadily going up. The return of workers

from Nauru after the closure of Nauru Phosphate Corporation from around late 1990 could have contributed to the significant increase (Fig. 2k). Population explosion in South Tarawa is spilling to the southern villages of Buota, Abatao and Tabiteuea and progresses steadily to other villages. Tarawaieta has the second largest population of around five thousand after South Tarawa and it is likely to be so in the years to come.

Chapter 3: SOCIAL SERVICES AND ECONOMICS

3.1 Social Services

Items falling under this sub-heading are education, health, sanitation, culture and lifestyle, transport and communication.

3.1.1 Education

Formal education on Tarawaieta is in the forms of pre-school, primary, junior secondary (JSS) (Forms 1, 2 and 3) and senior secondary. By late 2000 to early 2003 all islands in Kiribati had one JSS which automatically absorb primary school leavers and preparing them to senior secondary or technical schools. The largest proportions of children are engaged in these educational institutions. Children between 2 to 5 years go to pre-schools, those aged 6 to 9 attend primary and continue to junior secondary at ages between 10 and 14 years. A large proportion of the population is within the adult range age group between 18 – 50 years (Fig. 3a). This is the largest group within the Tarawaieta population. The post-school age may begin as early as 18 if young men and women did not continue to senior secondary and tertiary levels (Census 2005).

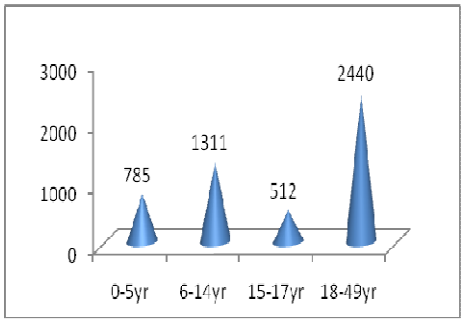

Fig. 3a: Broad age groups

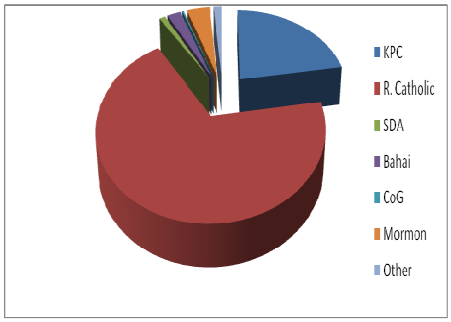

Fig. 3b: Population by denomination

The 2005 Digest of Education Statistics showed that there were 958 children enrolled at the Tarawaieta ten primary schools with 33 registered teachers. Increases in both numbers are expected.

Catholicism is dominant comprising about 90% while Protestantism being second largest. Other denominations comprise an insignificant proportion (Fig. 3b). Most houses are traditionally built and privately owned, a small proportion is concrete. There are few communal houses including the Eutan Tarawa Island Council guest house.

3.1.2 Health

Tarawaieta people are considered healthy by Kiribati standard. Men go out fishing or work family lands, collect coconuts and cut toddy. Women do most of house chores such as preparing food, do weaving and other daily domestic activities. Imported polished rice, flour and sugar are

taking their tolls. Sour toddy is popularly drank as well as imported alcoholic beverages and *yagona*. Smoking is rife on the island among teens and adult populations contributing to heart diseases and hypertension. The consumption of *yagona* is becoming a grave concern as more men join village clubs and spend a lot of money costing $60 - $70 a kilogram. Productive hours are being wasted, turned into sleeping and lazing hours. Skin dryness and under-nourishment are common among *yagona* drinkers. Kidney failure related to the heavy consumption of this potent drink is being the cause of death identified in many liver failure cases.

Cultural upbringing where little vegetable and fruits are consumed also contributes to the earlier onset of malnutrition in children and diabetes in adult populations. Fresh and semi-fermented toddy are readily available sources of Vitamin C and A, respectively, but processed imported sugar is easier to obtain and is the main drink sweetner in Kiribati; a more nutritious fresh and partly fermented toddy require consistent effort and daily commitment to make them. A local fruit, *Morinda citrifolia* (*te non*) and other nutritious wild plants are rarely consumed while imported fresh and frozen vegetables are becoming very popular in South Tarawa. Tarawaieta has access to these imported vegetables. Papaya, bananas and citrus fruits (lemon and lime) which are also good sources of vitamins are rarely planted on the island despite their availability from the Agricultural Unit there. Chinese cabbage grows well in compost soil but also rarely grown as it requires daily watering and attention.

3.1.3 Sanitation

A significant number of households still rely on the beach, sea and bush for sanitation purposes. Although there are a variety of toilet designs available on the island the habit of open toileting still lingers on (Fig. 3c) (2005 Census). A substantial number of land toilets are operational and village welfare groups encourage residents to adopt any affordable design. Figure 3c depicts the proportion of toilet designs currently operational on the island with a latrine most popular.

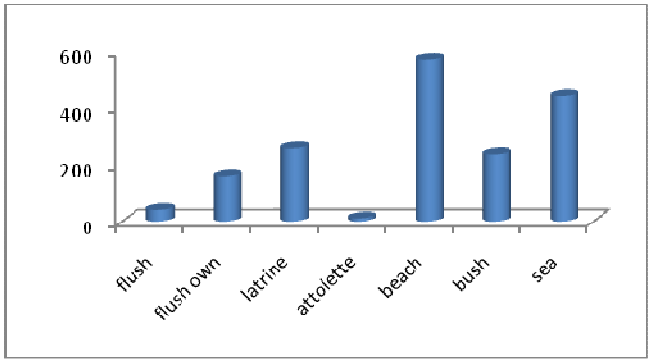

Figure 3c: Types of toilets available at Tarawaieta

3.1.4 Culture and Lifestyle

Health, culture and lifestyle are interwoven and cannot really be separated. The people of Tarawaieta are neither poor nor rich by world standard however residents are healthy and active. They are kind, friendly and humorous. Decision making cannot be made without the presence of all household representatives except when there are other commitments preventing their presence. That everyone should be given equal right to representation is the belief of Tarawaieta people.

Residents live a subsistence living and make some cash through selling fish, copra and shark fins, or receive remittances from relatives working abroad or on South Tarawa. Those who work for the Island Council receive small salaries in comparison with those working as senior officials in government ministries or private companies. Entrepreneurship in retailing shops, church or village owned, is becoming popular as imported food items are becoming part of daily living. Smoking is a widespread habit and is regarded as part of traditional custom to provide or offer a cigarette or a locally rolled Irish tobacco to a visitor or even offering to a *maneaba* gathering a tin of Irish tobacco cakes costing about $30.

The villages are run by the old men (*unimwane*) who preside over all village and island matters. Middle-aged men assist by enforcing all rules laid out by the *unimwane* or by implementing certain binding commitments as a result of the decision making of the *unimwane*. Within a village and island set up, there are also other groupings such as youth, women interest and welfare groups, church groups and fishermen groups. These groups discuss and carry out activities that support the wellbeing of family and village members. 'Y*agona*' groups or clubs as better known, are becoming popular, however the profound impact of continuous consumption of such a drug must be seriously determined in terms of health, time and money.

3.1.5 Transport

The size of the island requires regular transportation by road and sea. The ETC is providing regular road transport with trucks for primary and junior secondary schools. Motor cycles, mopeds and bicycles are most common on narrow unsealed coral road. Skiff boats and outboard motor boats provide fast sea transportation for fishing trips or regular visits to South Tarawa for various business activities. Catamaran-like canoes carrying up to 30 people per trip also provide daily and weekly sea transport to and from South Tarawa for food vendors and the general public. 2005 Census showed that there were more than 100 motorcycles and 300 bicycles, more than 100 skiff boats and traditional canoes. These numbers must have increased up to the time of report writing. Those who want to travel outside of Tarawaieta via sea or air need to go to South Tarawa as is a gateway to the outside world.

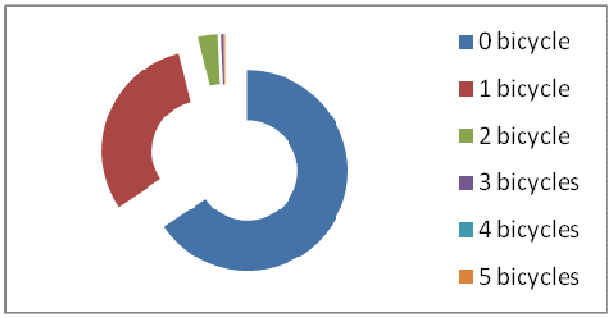

Fig. 3d: Proportion of population owning bicycle

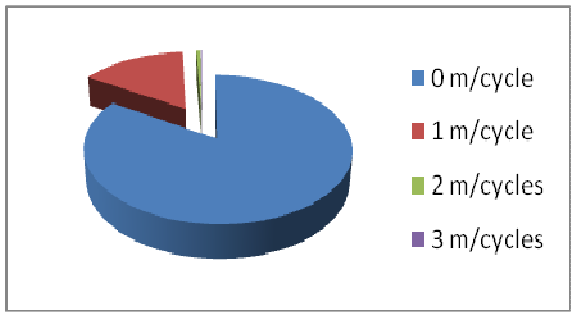

Fig. 3e: Proportion of population owning motor cycle

3.1.6 Communication

The main source of daily information and news is a transistor radio (battery or solar operated). Radio news is broadcast by either the Government's Broadcasting Commission of a privately owned FM 89 radio. Communication via CB radio (over 40) is also available. There are more than 60 telephone lines being installed on the island. In any village there are a few family owned transistor radios to which neighbors can listen to for daily local news. Videos and DVDs provide visual and audio entertainments. Four local newspapers, Temauri (KPC), TeTarakai (Betio Fishermen Association), Te Uekera (Government) and Newstar (Private) provide weekly news on local, regional and international news and sports mostly in local language. The Kiribati Times is a new addition to the existing local newspapers focusing mainly on sports and national events.

3.2 Economic Aspects

3.2.1 Trade

Since 2000 and previous years up to 2005 the balance of trade had been on the imports exceeding the exports (Balance of Trade, 2006, unpublished report). The price of copra which is the main export commodity has been fluctuating thus making the balance of trade less favorable for Kiribati economy, hence is affecting all the islands including Tarawaieta. The 2005 trade balance has been the highest in the history of Kiribati that amounted to $9.4 million as compared to $7.9 million for 2006 (Fig. 3f). Government is striving to reduce debt by focusing more on export in other sectors.

Overall, Tarawaieta's contribution to offset trade imbalance is insignificant but the impact of trade on economies of small islands is immense. Fuel and imported food items are impacting the island socially and economically.

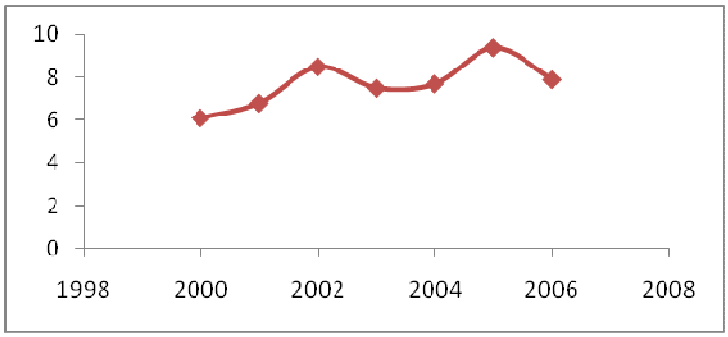

Fig. 3f: Kiribati balance of trade (A$ million)

3.2.2 Imports

The main import commodities to Kiribati include polished and high in fat and salt food items, machinery and equipment, fuel and miscellaneous manufactured goods. Plastic wares are most popular among local shops importing them from some Asian and metropolitan countries. Including plastic bags, these wares are potential hazard to our fragile environment. Import partners include Australia 33%, Fiji 27.1%, Japan 18.1%, NZ 6.9% (Balance of Trade, 2006, unpublished report). Hon Kong, Taiwan, Philippines, Malaysia, and others are being added to a growing list. Imports exceed export value by about 7 times (Fig. 3g).

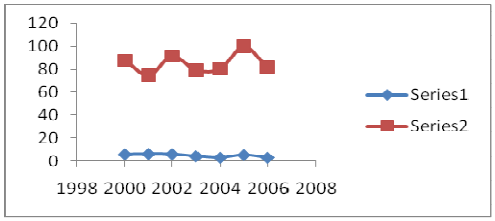

Fig. 3g: Import and Export levels (Series 1 – imports; series 2 – exports).

3.2.3 Exports

Export commodities include copra, coconuts, seaweed and fish. Pet fish from Kiritimati is popular in Hawaii and the mainland of USA. Export partners are US 22.8%, Belgium 21.5%, Japan 14.3%, Samoa 7.8%, Australia 7.5%, Malaysia 6.7%, Taiwan 5.6%, Denmark 4.6% (unpublished Trade Balance report, 2006). The export value is predicted to remain in future until Kiribati finds some other means of balancing the trade deficit (Fig. 3g) by aggressively looking into light manufacturing and reducing heavy dependence on imported food through encouraging domestic markets on more nutritious local food items. Tarawaieta is standing a good chance of benefiting from pet fish and a small tourism industry in the years to come.

3.2.4 Income Revenue

The end of phosphate revenue from Banaba in 1979 had a devastating impact on the economy of Kiribati and indirectly on the outer island on which development assistance is derived in the

areas of road, island council facilities and other public infrastructure. The Revenue Equalization Reserve Fund, a trust fund financed by phosphate earnings over the years, is still an important part of the government's assets and contained more than U.S. $600 million in 2007. Kiribati has prudently managed the reserve fund, which is vital for the long-term welfare of the country. This year the value of the reserve fell and US$22 million was claimed to be linked to world market and the devaluation of the US currency. Similarly the Kiribati Provident Fund fell by about US$6 million.

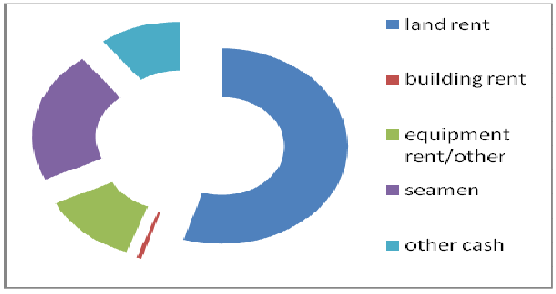

Figure 3h: Sources of revenue

In one form or another, Kiribati gets a large portion of its income from abroad. Examples include fishing licenses, development assistance, tourism, and worker remittances. External sources of financing are crucial to Kiribati, given the limited domestic production ability and the need to import nearly all essential foodstuffs and manufactured items. Historically, the I-Kiribati is a notable seafarer, and today 1,400 I-Kiribati are trained, certified, and active as seafarers. Women seafarers are being added. Remittances from seafarers are a major source of income for families in the country, and there is a steady annual uptake of young I-Kiribati men to the Kiribati Maritime Training Institute. Tarawaieta has a significant number of men working on overseas vessels who send money back to their relatives. Remittances from Kiribati workers living abroad provide more than $11 million annually. Those who are employed by Government or private sectors in South Tarawa are a regular source of income for the entire family. Most islanders, like I-Tarawaieta, still engage in subsistence activities such as fishing and growing of food crops like *babai*, bananas, breadfruit, and papaya. The leading export is the coconut product, copra, which accounts for about two-thirds of Kiribati’s export revenue. Other exports to which Tarawaieta contributes include shark fins, sea cucumber and handicraft. Kiribati's principal trading partners are Australia and Japan. The Australian dollar (AUD$) is the official currency used in Kiribati replacing the pound sterling used during the British colonial era.

Chapter 4: THE PHYSICAL ENVIRONMENT AND STRUCTURES

4.1 The Physical Environment

4.1.1 Coastal Erosion

In all islands so far visited, coastal erosion appears to be mostly linked with aggregate mining for construction purposes such as housing, road filling (Fig. 4a), causeway construction and maintenance (Fig. 4b), and land reclamation activities. Where there are seawalls and causeways coastal erosion will continue as long as these exist.

Participants of the consultation explained that the latest storm surge, that also damaged the Nippon Causeway between Bairiki and Betio, had caused considerable damage to the Abaokoro-Marenanuka causeway, has recently been repaired.

Fig. 4a: An eroded lagoon coastline at Buariki village. Fig. 4b: An eroded lagoon side at Marenanuka village

One of the most affected areas on Tarawaieta is the north-western end of Buariki village (Fig. a). Other vulnerable areas include the lagoon sides of, Marenanuka (Fig 4b), Tabonibara (Fig. 4c) Taborio where te Itoiningaina is located (Fig. 4d). Buariki residents claimed the erosion there had started after the completion of causeways in the villages of Tebangaroi and Taratai. Erosion in other villages are presumed to be linked to reclaimed land, seawalls and causeways as far as the consultation participants are concerned. Storm surges and sea level rise are potential contributors to erosion.

Fig. 4c: Eroded beach at Tabonibara Fig. 4d: Eroded lagoon side at Taborio with te bwibwi *protection.*

Lack of understanding of the wave and current dynamics around the islands and the misconception that the coasts will recover, these atoll environments are under severe stress and are affected by significant erosion, pollution and damage to marine coastal biodiversity. The entire island on all atolls is coastal and hence is vulnerable to storm surge and rises in sea level.

Most of the lagoon areas in Tarawaieta is protected with mangrove bushes. Those areas without mangroves, because they have been cleared or are naturally void of mangroves, are the most vulnerable and most of it is affected. Mangrove bushes at Abatao are protecting the islet from coastal erosion, hence is claimed to be growing lagoon-ward in size.

4.1.2 The Coastal Zone

The ocean side of the island is suffering from wave action, at times aggravated by strong north-easterlies, bad weather and storms, hence causing erosion along the entire windward coastline. Coastal plant strands protecting the coastal area are suffering from saltwater accumulating in the leaves and cooked up by the endless scorching sun. Remnants of the recent drought is testimony of how much damage prolonged and frequent droughts can cause to fruit trees and island vegetation. The roots of the dying or dead plants and trees offer little protection in gluing the sandy soil together from being eroded away.

A reef flat, with coral boulders remaining after the construction of causeways on the island, offer some habitats to reef organisms. This is the least productive zone in terms of life forms but further toward a reef crest more marine life becomes luxuriant. Algae and sea-grass species including turtle grass – *te keang* (*Thalassia hemprichii*) are abundant but most of them are not edible except for a seasonal *Caulerpa racemosa*.

The lagoon is beginning to enhance the growth of filamentous green algae as is void of sea cucumber and most in-faunal organisms. Sea cucumber species have recently been over-exploited for lucrative markets in Asia and Japan through island agents and Chinese businessmen on Tarawa.

A continuing removal of coral boulders, in some villages of Tarawaiea, from the lagoon mudflat for sea wall and reclaimed land purposes is weakening coastline protection as the muddy sand and beach are more exposed to current and wave action resulting in faster material shift and movement. There is no effective law to safeguard the island's coastal areas in terms of aggregate mining and the current 2007 Environment Act may be too weak to moderate activities causing coastal erosion at both South Tarawa and Tarawaieta. The proposed aggregate mining in Tarawa lagoon is yet to be seen as it aims at substantially reducing the purchase of aggregates from land-based and coastline mining. One foreseeable feasible solution is to get the people and Island

Council of Tarawaieta sit together and discuss best strategies to address the current problem. Aggregate mining at unproductive land may offer some short and medium term solutions.

4.1.3 The Marine Environment

The oceanic water surrounding the island is cooling the entire landmass during hot sunny days. LaNina brings in easterly cool trade winds. Water pollution from the overharvest of sea cucumbers and other human activities such as toileting and rubbish dumping are contributing to the poor quality of water and hence a decline in most finfish and invertebrate species. A large proportion of residents still rely on the beach, sea and bush for sanitation purposes thus making the marine environment unsafe to the general public (Fig. 3d). Coral growth is limited to the shallow and narrow portion of the windward reef backdrop at the eastern side of the island. The submerged leeward at the western side offers habitats for a variety of fish and algal species.

4.2 Public and Private Physical Structures

4.2.1 Public Physical Structures

Public structures likely to be impacted by storm surge and increased sea level are the existing causeways. A Protestant chapel at Taratai village is standing on the rocky lagoon shoreline. A wash-over or overtopping during extreme tides and surge storms is enough to wash off the entire building and compound (Figs. 4a and b).

Fig. 4e: Lagoon-ward view of chapel from main road Fig. 4f: Rocky shoreline on which chapel is standing

The existing causeways need improved designs and proper maintenance to reduce their impact on the environment and to reduce their vulnerabilities associated with surge storms and bad weather. Similarly the chapel is either relocated further inland or the entire shoreline is protected with properly designed seawall and the planting of mangroves along the foreshore.

Increasing attention over the last decade, and more in recent years, of the Pacific islands vulnerabilities, has received much attention by the international community. Exposure to natural disasters and to external global perturbations (for instance in climate change, trade, and capital markets) and a heavy reliance on a limited range of economic sectors, creates a high degree of

vulnerability. Moreover, the factors contributing to islands vulnerability appears to have increased in recent years. The baseline of assets and lives at risks is also increasing as population and infrastructure located in coastal areas expand. Small islands in Kiribati need to develop advance plans to curb or reduce their vulnerability associated with global warming and globalization in general.

4.2.2 Private Structures

Most private seawalls along the leeward side are being repaired but are showing signs of physical damage caused by previous surge storms, the recent one hit Tarawaieta toward the end of 2006. The frequency and stronger surges may cause irreparable damage to most seawalls hence plans need to be put in place right away to ensure the structures withstand unpredicted events such as increased sea level accompanied by higher and stronger storms.

Out of 867 respondents surveyed in 2005, 146 households claimed that they had seawall, the remaining 714 did not have seawalls Fig. 4c). The small number of seawalls in Tarawaieta reflects a link between the healthy status of mangroves along the shoreline. Compared to Tamana and the islands where mangrove does not exist or limited to some areas Tarawaieta lagoon foreshore is naturally protected with luxuriant mangrove growth.

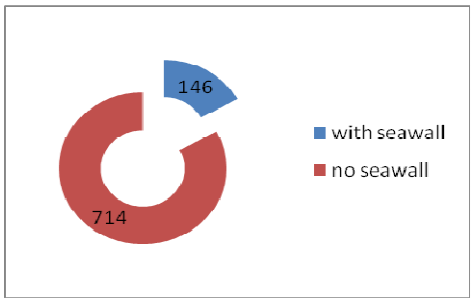

Fig.4g: Proportion of population with/-out seawall

Most private seawalls are properly maintained. Those showing signs of disrepair appeared to be associated with the non-presence of household occupants as they are either being away from home for many years or have recently died and there are no immediate family members to continue the maintenance work. These are the areas that are likely to be flooded during extreme tides and surge storms; attention should be given to these private structures as they will eventually affect the immediate and neighboring areas.

Chapter 5: ADMINISTRATION AND POLITICS

5.1 Administrative divisions

Kiribati was formally divided into districts until its independence. The country is now divided into two island groups which have no administrative function, including a group that unites the Line and the Phoenix islands (ministry at Ronton, Kiritimati). Each inhabited island has its own council (3 councils on Tarawa: Betio, South-Tarawa, North-Tarawa; 2 councils on Tabiteuea). The island groups are:

- Gilbert Group
- Line and Phoenix Group.

Each of the 21 inhabited islands has a local council that takes care of the daily affairs. Tarawaieta has its own council that performs its functions laid out by central Government under a Local Government Act (Kiribati and European Commission Joint annual Report, 2004).

The Island Council is run by a Tiibi Kauntira (TK - Chief Councilor), one of the village elected councilors, a vice chief and the remaining members of an Island Council. Councilors are elected by their respective villages through ballot voting and each councilor holds the position for a 4-year term but may be replaced any time in the case of death, migration or non performance.

As of August 1st 2008 a Tiibi Kauntira will be replaced with a Mayor elected from among elected village representatives by an entire island population. The Mayor's office will run the affairs of an Island Council. The positions last 4 years.

5.2 Politics

The Kiribati House of Parliament, *Maneaba ni Maungatabu*, is run under a parliamentary system that is headed by the *Beretitenti* who plays dual roles as Head of Government and Head of State nominated by MPs and elected by the people of Kiribati.

Currently there are 3 political parties, Boutokan te Koaua (current government with Mr. Anote Tong as President), Maneaban Te Mauri Party (opposition) and Temauri party (independent). There was news relating to TeMauri Party to take the Opposition seat having more members than Maneaban Temauri Party. Current members of Parliament from Tarawaieta are MP Nabuti Mwemwenikarawa and MP Inatio Tanentoa. None has ministerial portfolio in the Tong's government.

Chapter 6: GENERAL DISCUSSION ON NEEDS AND FUTURE DIRECTIONS

Kiribati's National Development Strategies 2008 – 2011identified climate change as a serious risk to economic growth and calls for ways to minimize and manage the loss. The Government has adopted a Policy statement on Adaptation to Climate Change and aims to mainstream adaptation planning throughout its development process. Assistance will be required to strengthen planning and monitoring mechanisms. Adaptation strategies and the Environment Act 1999, recently reviewed in the 2007 last sitting of the House of Parliament, are the two key pillars of government's current environmental policy.

The issue of domestic waste disposal becomes critical. This is especially the case in South Tarawa but is also problematical on outer islands. The Government has developed a basic waste disposal framework and waste management on South Tarawa has been greatly improved through a recycling program supported by UNDP. Water is the fundamental of life by people, animals and plants alike and must be properly managed and protected from contamination from domestic and industrial wastes.

The adoption of urgent adaptation measures for coastal management and environmental vulnerability assessment is very important in small island states like Kiribati. As Tarawaieta is in close proximity to South Tarawa the exploding population will spill across their borders and aggregate mining for construction will increase having a highly detrimental impact on its coastal areas thus increasing their vulnerability to erosion. Its current causeways will remain contributing to erosion and accretion as been happening in the past years. Coastal erosion threatens settlements, arable land, water lenses and the coastal ecosystem. Control of aggregate mining requires alternative sources for aggregate mining and effective implementation of the 2007 revised Environmental Act 1999 needs to be put in action soonest. Proper environmental impact assessment (EIA), before any similar activities, is carried out to ensure that the impact of such an activity is foretold and expected; furthermore have least impact on marine, terrestrial and other resources. Appropriate designs need to developed, or better still such destructive structures are discouraged. Improvement on the existing ones is the proper way forward in an effort to bring back much needed resources that have been locked away or impacted in one way or another.

Environmental Impact Assessment (EIA) procedures need to be is integrated into all prescribed developments. In addition, being prone to storm surges and drought there is a need to set up efficient disaster prevention and preparedness mechanisms, including climate adaptation measures, prediction mechanisms and monitoring systems with a view to reducing the consequence of disasters. Outer islands that lack functional coordination for such vital services need to be included in all planning processes to ensure that they are aware of the necessary procedures when required.

Water and sanitation cannot be overlooked as they are vital for the existence of all forms of life, humans in particular. There is a great need to overhaul Tarawaieta's water and sanitation systems to ensure all have access to good water for domestic and agricultural purposes and proper sanitation to protect ground water reservoirs. More acceptable and affordable land toilet facilities need to be reviewed and determined. Community campaign is required for attitude change toward toileting to discourage the use of beaches and bushes.

Marine resources are the main protein staples on Tarawaieta as agricultural land is very limited due to drought and reducing access to family owned plots. Proper management of all types of edible and non-edible marine resources needs to be put in place as soon as possible. Fisheries and expert advice is greatly needed to help fishermen manage their own resources. Likewise, agricultural and terrestrial resources also need to be managed through proper planting techniques and the selection of most appropriate plant species that thrive on atoll harsh conditions. Home gardening is lacking on the island and the replanting of main fruit trees such as coconut, pandanus and breadfruit need to be encouraged.

Some physical infrastructures (public and private) on Tarawaieta are prone to storm surge and bad weather. Any increase in sea level over the next decades will undermine the welfare of coastal communities. A long term planning process involving appropriate government ministries and non-government organizations needs to be put in place to ensure adaptation measures are undertaken. The relocation of public structures such as churches and *maneabas* must be considered right away to ensure their longer term sustainability.

The consumption of local food need to be encouraged and the responsible agencies and ministries must work together to reduce heavy dependency on imported food items which is not healthy for the people of Tarawaieta and I-Kiribati in general. This translates to preventing health risk and the ability of each family to save money in order to fund family and local projects that will allow them adapt to climate change, climate variability and sea level rise. The soaring cost of rice, sugar and flour will impact the economic viability of the islanders and much of family incomes will be spent on such food items rather than developmental projects for the welfare of families. Dependency on costly fossil fuel must be drastically reduced through the implementation of projects that promote the use of clean energy sources such as solar, wind and wave.

Tarawaieta is very much influenced by its urban neighbor, South Tarawa, as in the cases of water and aggregate mining. Whichever development is carried in South Tarawa in future will eventually spread to Tarawaieta in which case will slowly become a sub-urban center. The reality may materialize if land transportation is ever extended beyond Buota and Nabeina villages and ultimately the whole of Tarawaieta. Population pressure in South Tarawa will ease but urban problems now currently faced here will slowly creep in thus transforming Tarawaieta. Vulnerabilities and risks associated with climate change and sea level rise will compound the current problems now faced by Tarawaieta. Stringent plans to curb the impending scenario need

to be put in place to ensure Tarawaieta is prepared to take head on the challenges in the years to come.

A final note relates to the success of the current project, particularly after its conclusion, depends largely on the contribution of each local government in continuing similar activities in the areas of public awareness, consultation and risk assessment with proper implementation adaptation strategies put in place. The appropriate personnel are the IPOs, ICWs, Clerks to Island Councils who have attended the 2007 Consultation and training in Tarawa and who are still part of the outer islands consultations and trainings. A monitoring mechanism developed by government through its appropriate ministry is necessary to ensure local government activities are supported and enhanced.

The latest consultations carried out in Tarawaieta indicated that Eutantarawa Island Council, through its responsible officers, was not serious enough to continue a drive in support of the aims and objectives of the project. This needs to be rectified through its mother ministry, MISA, to ensure that similar activities in future are fully supported.

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REFERENCES

ACIAR, 2006. Equitable groundwater management for the development of atolls and small islands. Project ID: LWR/2001/050:

Arthur Grimble and Rosemary Grimble. Migrations, Myth and Magic from the Gilbert Islands: Early Writings of Sir Arthur Grimble.

Asia Development Bank, 2005. Water Supply and Sanitation Improvements [Executing Agency: Ministry of Finance and Economic Planning]

Britanica Concise Encyclopedia: Kiribati

JICA, 2003. Improved efficiency in energy supply in North and South Tarawa.

Kiribati Balance of Trade 1972 – 2006 (unpublished document).

Moul, E.T., 1959. The Halimeda and Caulerpa of Onotoa, Gilbert Islands. *Bulletin of the Torrey Botanical Club*, Vol. 86, No. 3 (May - Jun., 1959), pp. 159-165

National Statistics Office Ministry of Finance. Volume 1: Basic Information and tables (revised edition).

Republic of Kiribati and European Commission Joint Annual Report 2004. Final Report, 30 April 2005.

Republic of Kiribati Ministry of Education, Youth and Sports. Digest of Education Statistics 2005.

Robert Smith', Simon Young' and Naomi Biribo, 1994. Bathymetric, Seismic and Alternative sand and gravel resource surveys in Tarawa Atoll, Kiribati. *August 1994 SOPAC Preliminary Report* 72.

Rongorongo Man Ami Tautaeka (RMAT) Maati 28, 2008.

Secretariat of Pacific Communities. Pacific South Pacific Biodiversity Conservation Programme.

Thaman, R and Tebano, T., 1995. Plants and Fishes of Kiribati. A Preliminary Listing. Curriculum Development Unit, Ministry of Education, Government of Kiribati.

Wikipedia