Kiribati Adaptation Project
Implementation Phase (KAP II)

[GEF Grant TF. 05627]

Report on
KAP II First national Consultation

compiled by
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(National Consultant)

for
KAP II PROJECT
Office of Te Beretitenti
Bauriki, Tarawa. Kiribati

Held at Otintaal Hotel, Bikenibeu,
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Executive Summary

The First National Consultation for the second phase of Kiribati Adaptation Project (KAP II) was conducted between 4th to 7th December of 2007 at the Oltaian Hotel Conference Hall. Participation comprised outer islands Tiibi Kaumira (Chief Councillors) accompanied by Island Project Officers and Island Community Workers, in some cases Island Council Clerks replaced either one of the latter two. Island Councils from Betio and South Tarawa were also invited together with registered church representatives from South Tarawa. Guest speakers came from a wide range of fields that included social science, environmental science, fisheries and agriculture, coastal processes, financial development, weather monitoring, traditional navigation, biblical interpretation of human’s role in God’s creation, land use and degradation. Some government sectors could not make it for reasons beyond the control of KAP II.

Island vulnerabilities and potential risks linked to climate change and sea level rise were presented by respective councils. The main issues raised were water supplies, coastal erosion, declining marine and terrestrial resources, climate-related diseases such as diarrhoea, sore eyes, dry cough and stroke. Under each respective island there is great need for improvement on existing seawalls and causeways, the latter requires the making of channels along the solid structures to allow water exchange and other biological processes to function. Other issues specific to each island are listed under island vulnerabilities and risks (Appendix 3).

Participants expressed their disappointment with the Kiribati Meteorological Services (KMS) for not providing update forecasts to fishermen and for other general and daily purposes in the past months. The drawbacks resulted from old machines and equipment that malfunctioned and unable to cope with compiling adequate and reliable information. The only solution to the problem is the procurement of appropriate and proper equipment and the training of staff for required skills in the area. To date, the weather office reported that new equipment is being purchased for some operations on the outer islands. However, a variety of sophisticated equipment is still needed to enhance the national capacity of KMS.

Issues that came out of the consultation assessment and evaluation relating to adaptation strategies include mangrove planting and seawall construction along vulnerable coastlines coupled with planting trees and bushes that will keep the shorelines from bad weather and rising sea level. Outer island consultation is requested as a follow up exercise to firm up understanding and knowledge gained from the Consultation, at the same time is to discuss further issues of concern to each respective council.

Participants insisted that presentations are delivered in Kiribati language with more time given to guest speakers and questioning; this would require a longer time frame in future consultations. Participants would appreciate that handouts are in Kiribati language and distributed prior to a scheduled presentation.
It is highly recommended that in future consultations:
- suitable personnel are part of the delegation,
- resource personnel from relevant ministries turn up for their presentation,
- presentations are well prepared for the target audience,
- the delivery of presentations are in Kiribati mode if participants include those from outer islands.

Equally important are:
- government and its ministries provide leadership and support to projects like KAP II;
- government ministries and departments commit their services to closer cooperation in closely related projects;
- appropriate government ministries take the lead in dealing with vulnerabilities and risks most serious to individual outer islands including Tarawa;
- appropriate and affordable adaptation activities are encouraged at a village and island level while those requiring financial assistance are considered by government;
- KMS is properly equipped with appropriate equipment through the support and commitment of Kiribati Government and other external agencies, and that staff undergo proper training;
- outer island consultations are conducted more frequently to ensure a larger portion of the rural population is informed on important issues relating to global climate change and sea level rise affecting their very existence and wellbeing.
Acknowledgement

I like to acknowledge the following persons for their invaluable assistance and contributions towards the organisation and implementation of the Consultation without which this would not have been possible.

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Mr. Kiarake Taburea KAP II Manager
Mr. Tekoreuau Kairoto KAP II Procurement Officer
Ms. Atu M. Moaniba KAP II Project Accountant
Ms. Ruti Kautchiri KAP II Office Assistant

Dr. Tim O’Meara International Advisor
Dr. Christine Hogan Regional Advisor

Special thanks also go to the following resource people who have diligently prepared and shared useful information on what they do at their respective ministries in relation to climate change and sea level rise, or presented talks that inspired participants to be more proactive in what they do for their islands in light of the knowledge and skills they gained from the consultation.

Mr. Timi Kaikeiki National Economic Planning Office, MFEIP
Dr. Komori Onorio ThEcoCare Group, Abarac
Dr. Herentaho MacKenzie Director, University of South Pacific Kiribati Campus
Rev. Dr. Kambali Uriam Principal, Tangintebu Theological College
Ms. Moarante Nasaenamua Outer Islands Development - MISA
Mr. Materi Tarii Kibibi Kiribati Meteorological Services, Butotu
Mr. Tahaqonga Fitaqotu Commissioner of Lands, MELAD
Mr. Atan Malia Kiribati TV, Telecom Kiribati Limited
Mr. Ioane Utabeni Senior Agricultural Officer - MELAD
Ms. Reenato Willie Mineral Unit, MFMRA
Ms. Taereti A. Rupena Director, Environment Conservation Division, MELAD
Ms. Tonti Tokainaiti Acting Director, Fisheries MFMRA

Many thanks to the Management and support staff of Otintaai Hotel for the catering, preparation and arrangement of the Conference Hall. And last but not least are the bus company proprietors that assisted with transporting participants to wherever they are required, in particular Tibeta Tomizaka, Manu Bakatokia and Roko Timeon.

Kam bar na rebara
Abbreviations and Acronyms

AoG
Assembly of God
AusAID
Australian Agency for International Development
BTC
Betio Town Council
CC
Chief Councillor
CCA
Climate Change Adaptation
CPPL
Central Pacific Producers Limited
CCST
Climate Change Study Team
CoG
Church of God
ECD
Environment and Conservation Division of MELAD
EIA
Environmental Impact Assessment
GEF
Global Environmental Facility
GoK
Government of (the Republic of) Kiribati
IC
Island Council
ICW
Island Community Worker
IPO
Island Project Officer
KAP I
Kiribati Adaptation Program, Phase I
KAP II
Kiribati Adaptation Program, Phase II
KAP
Kiribati Adaptation Project
KIIA
Kiribati Housing Authority
KIFHA
Kiribati Family Health Care Association
KMS
Kiribati Meteorological Services
KPC
Kiribati Protestant Church
KTV
Kiribati Television
LDS
Latter Day Saints (Mormon Church)
LRD
Land Resource Development
MELAD
Ministry of Environment, Lands and Agricultural Development
MoE
Ministry of Education
MFE
Ministry of Finance and Economic Planning
MFMRD
Ministry of Fisheries and Marine Resources Development
MHMS
Ministry of Health and Medical Services
MCTTD
Ministry of Communications Transport Tourism Development
MISA
Ministry of Internal and Social Affairs
MOEP
Ministry Operational Plans
MPWU
Ministry of Public Works and Utilities
NAPA
National Adaptation Program of Action
NASC
National Adaptation Steering Committee
NDS
National Development Strategies
NEPA
National Environment Policy Act
NEPO
National Economic Planning Office
NSRM, NSRMU
National Strategic Risk Management (Unit)
NZAid
New Zealand Aid
<table>
<thead>
<tr>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>NZODA</td>
<td>New Zealand Overseas Development Agency</td>
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<tr>
<td>OB</td>
<td>Office of Te Beretitenti</td>
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<tr>
<td>OI</td>
<td>Outer Islands</td>
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<tr>
<td>PIP</td>
<td>Project Implementation Plan</td>
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<tr>
<td>PUB</td>
<td>Public Utilities Board</td>
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<tr>
<td>PWD</td>
<td>Public Works Department</td>
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<tr>
<td>RAK</td>
<td>Reita-a-Ni Kiribati (Protestant Women Group)</td>
</tr>
<tr>
<td>RC</td>
<td>Roman Catholic</td>
</tr>
<tr>
<td>SOPAC</td>
<td>South Pacific Geoscience Commission</td>
</tr>
<tr>
<td>SPC</td>
<td>Community of South Pacific</td>
</tr>
<tr>
<td>ST</td>
<td>South Tarawa</td>
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<tr>
<td>TUC</td>
<td>Teinaínano Urban Council</td>
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<tr>
<td>USP</td>
<td>University of the South Pacific</td>
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<tr>
<td>VP</td>
<td>Vice President</td>
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<td>WB</td>
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1. Introduction

All islands in Kiribati, except Banaba, are barely more than 3 meters above sea level (Thaman and Tewo, 1995). Kiribati is listed as one of the most vulnerable countries in the South Pacific to the effects of climate change and sea level rise. Not only warmer climate and rising sea level that these islands are going to be affected by but there are also events of droughts and strong winds and high waves that can wash over the whole islands in a few minutes leaving everything in a mess and critical situations (Government of Kiribati, 2004, 2005). The minor effects of climate change and higher tides over time will impact on coastlines, water sources, vegetation, and people at large. The king tide events of February 9, 2005 (Greenpeace, 2005) is just a reminder of similar but more intense events yet to come. It is time to think and act now rather than wait and see. Perhaps it may be useful to think of what the World Bank (2000) terms as a ‘no regret’ attitude that focus on doing things that will help us in times of hazards whether they show up or do not show up at all but benefit us even more in the long term.

The Kiribati Adaptation Project, also known as KAP, has now come to Stage II in its implementation. Under KAP I, the First National Consultation was held from 21st – 25th July, 2003 (KAP II team, 2003); it was preceded by a Consultation involving representatives from Banaba, Betio Town Council (BTC) and Teimarinako Urban Council (TUC) that was held from 22nd – 26 June, 2003 (KAP II team, 2003). The second National Consultation took place from 3rd – 5th November of the same year.

KAP II is managed by a core staff comprising the Coordinator (Mr. Kaituna Kaitana), the Manager (Mr. Kaituna Tabunaka), the Procurement Officer (Mr. Tekurua Kaimoro), the Project Accountant (Mrs. Atu Moaniba) and the Office Assistant (Ms. Riti Kaitabiri). The First National Consultation was planned for 4th – 7th December, 2007 the Ofuhaati Hotel in Bikenibeu Village. Some government ministries such as, of Environment Lands and Agricultural Development (MELAD), of Education (MoE), and of Health and Medical Services (MHMS) are located in this same village. The remaining ministries are either in Bairiki (the main center of Government business) or on the island of Betio, the most populated islet in Kiribati. KAP II is currently housed at one of the rented living quarters of the Kiribati Housing Corporation (KHC) in central east Bairiki a few blocks from the offices of some overseas missions. The coordinating body is the Office of Te Beretitenti (OB).

The Consultation was conceived under the auspices of the World Bank (WB) in partnership with Global Environment Facility (GEF), governments of Australia and New Zealand (co-financiers) and the Government of Kiribati (GoK), the latter implemented the Project by hiring a range of consultants and advisors through KAP II (Government of Kiribati, 2004). The aims and objectives of the consultation were to identify main issues related to climate change and sea level rise from stakeholders, discuss ways and means of adapting and planning appropriate strategies to overcome or minimize them.

The Consultation was designed and facilitated by Dr. Temakei Tewo, a former Director of the Atoll Research Center of the University of the South Pacific based in Tarawa,
Kiribati. Dr. Tchano was also tasked to take on risk assessment and similar consultations on the selected outer islands in 2008 and 2009 of the Gilbert Group and a second national consultation in 2009. The latter will depend on the outcome of the consultations on the outer islands.

2. Schedule of KAP II First National Consultation.

The tentative date mentioned earlier was confirmed, preparatory plans were finalized and implemented. The dates coincided with the election of a new President under which office this Project runs. The first part of the Consultation was the official opening by the Vice President, Ms Teima Onorio; the second part was the consultation proper, and the last part was the official closing by the President himself at the State House in Bairiki. The four days were portioned into morning and afternoon sessions with government and private guest speakers, and with lunch and tea provided. Site visits were made on the afternoon of the third day while the fourth day was dedicated to reflection on guest speakers’ presentations, group discussion and evaluation.

The selection of outer islands participants was made in consultation with the Ministry of Internal and Social Affairs (MISA) and respective Island Councils. Travel arrangements were made in advance prior to the dates of the consultation through KAP II Office. Most participants arrived a day or a few days before the actual start up date. Participants from North Tarawa traveled by double hulled canoe that connect their rural villages with the urban South Tarawa. The South Tarawa and Betio participants, including church representatives traveled to the workshop together with outer islands participants on arranged transports.

3. Agenda for the Consultation

The Agenda depended partly on previous consultations and workshops of which respective reports highlighted the main issues discussed, acted on, implemented and those that need to be followed up. Reports compiled by several consultants, including the 2000 World Bank Report (2000), listed all types of vulnerabilities and potential risks from the impact of climate change and sea level rise. They were also categorized and allocated to appropriate government ministries and other stakeholders.

In the Terms of Reference of the National Consultant what came out clear were the appropriate adaptation strategies to counter or minimize identified risks and vulnerabilities. One step further is to start thinking of doing things on manageable budgets or small grant projects. These have to be thought out properly in the planning process and in partnership with all stakeholders. The development and evaluation of the best possible solutions to be implemented by the communities in order to minimize, reduce or even stop the vulnerabilities identified is crucial and is one of the expected outcomes of the consultation. Assessment of the most appropriate, practical and costeffective possible solutions to address the challenges is important at this stage. This will be continued and reinforced during the outer islands consultations that will follow in 2008 and 2009.
In the planning and design of the Consultation agendas four resource personnel categories were engaged, that included key project professionals from each ministry, academics, community representatives (including churches), and island council representatives. The design allows all stakeholders the opportunity to voice their own opinions based on their understanding and experience with key issues and vulnerabilities to be discussed. At the same time it also encouraged them to participate and get involved in the adaptation processes on their respective islands and bring back those knowledge and understanding to their respective islands. The design basically gave all participants a chance to share their knowledge and skills on any particular issue of interest to the audience. Selected resource people were properly introduced and hard copies of their presentations were distributed during or before the sessions.

4. Proceedings of the Consultation

The Consultation was conducted as planned at the Oticea Hotel Conference Hall. Tuesday was the first day as Monday was a public holiday to honor human rights. Friday was the last day with a closing ceremony held at the State House in the later hours of the day. The order of the Consultation is presented below.

Arrival of Participants to the Consultation

Day One (Tuesday 4th December, 2007) - Participants arrived around 8.30 am. They were invited upstairs to the Conference Hall to register and be seated before the arrival of the Vice President (VP), Honourable Teina Onerio. Mr. Tekeraua Kaitu, an official from KAP II escorted the VP. Participants were asked to fill in the registration forms. Short instructions regarding the contents of the folders which each participant was provided. The folders contained background information on the sciences related to climate change and sea level rise, extracts from KAP II Implementation Plan and other relevant information and quotes from a variety of sources. Record sheets to note important issues raised by individual guest speakers and those discussed during the consultation were provided.

Official Opening, Tuesday 4th December

The Facilitator of the Consultation, Dr. Tamoko Tabano, first showed the order of the events on power point projector. The Vice President arrived at 08.55. The Manager of the Project, Mr. Kainake Tabuna, who co-facilitated and chaired the opening session delivered a short welcome to the VP and all participants that included island chief councilors and officials, Secretary to Cabinet, church representatives and others who witnessed the opening of the Consultation. Reverend Buyunganke was requested to open the occasion with a short prayer. The VP was invited to deliver an opening speech (in Kiribati language) with a summary extract translated to English below:
"I am hallowed indeed to be given the task of opening the consultation in the place of the Minister for Environment who is away in Indonesia to present our concerns on climate change and sea level rise. Climate change and sea level rise affect all aspects of our livelihood. They affect our water, food, health, resources and land in many ways. We must think seriously of means and ways of countering and doing activities that will help us survive the harsh conditions of climate change and sea level rise. The Government has been proactive since its election into power and there have been talks with large countries to encourage them to reduce their greenhouse gas emissions. The USA and Australia were two industrial countries that have not ratified the Kyoto Protocol; I am glad to tell you that the newly elected Prime Minister of Australia Mr. Kevin Rudd has promised to make the signing of the Kyoto Protocol a number one on his agenda. We should work hand in hand with government and stakeholders to try and define priority vulnerabilities and show to government what you can do and what assistance government can give in light of our poor economy. I thank KAP II staff and those consultants (past and present) who have and are assisting in finding solutions to the many problems Kiribati is facing in relation to climate change and sea level rise. It is my hope that you do your utmost to identify your own vulnerabilities at island level. I wish you all the best and declare the Consultation, OPEN. Te mani, te moi no te tabono. Kam bati ni raba."

Scope of Project

Mr. Kautuna Kaitara, the Coordinator of KAP II, delivered a short presentation outlining the roles and functions of KAP and which activities were executed between 2003 through 2005 with KAP I as a preparatory foundation for KAP II. The latter carries out the recommendations from KAP I and its functions are described as more of putting words into planning and action. KAP II is meant to be a pilot project that will trial adaptation strategies to vulnerabilities identified in this and previous consultations. Toward the end of his presentation, Mr. Kaitara challenged participants with the saying of John F. Kennedy, former President of the United States, ‘what can I do for my country but not what my country can do for me’ or ‘what can I do for Kiribati but not what Kiribati can do for me’.

Introductions

The next session was the introduction of participants. The Co-Facilitator asked the Chief Councillors (CCs) to introduce themselves and their team members. The order proceeded from Makin Island and finished with Arorae, Banaba and the Lnie Group were not represented because of difficulty in travel arrangements. Most Chief Councillors were accompanied by their Island Project Officers (IPO) and Island Community Workers (ICW). Where IPOs and IWCs were not available because of other important commitments Island Council Clerks or other officials stood in.

Presentations by Guest Speakers

The sessions after tea and those delivered after lunch till 4 o’clock were co-facilitated by Mr. Kautuna Kaitara, coordinator of KAP II. The first session was taken by Dr. Ueaanabo MacKenzie, Director of the University of South Pacific Kiribati Campus. "The Sun came closer to my home" was the title of his presentation, a phrase spoken by one of the old women whom he interviewed in Butaritari during his social survey in 2003 and 2004. Dr. MacKenzie outlined major issues and findings that included: water resources,
coastal erosion, decline in marine and terrestrial resources and the dying coasts. He also
mentioned a connection between a decline in food resources impacted by climate change
and sea level rise with food security, that I-Kiribati are more vulnerable to becoming poor
because of loss of natural food sources, hence are becoming more dependent on imported
food items. An interesting point that he brought forward was that I-Kiribati have not
thought seriously about a long term solution in a scenario of Kiribati being under water.
As in the case of Tuvalu that has started the long term strategies that included relocating
its people to higher grounds elsewhere, Kiribati is probably in the process of doing so. It
is important that Kiribati starts planning for short, medium and long term solutions to
adapt and lessen the impact of climate change and sea level rise. Participants were
encouraged to ask questions for clarification with responses from both Dr. MacKenzie
and Mr. Kaitara.

The second presentation ‘What caused climate change?’ was delivered by Ms Tereteli A.
Reena, Director of the Environment Conservation Division (ECD) of the Ministry of
Environment, Land and Agricultural Development (MELAD). Ms Reena specifically
focused on the impact of climate change and sea level rise on biodiversity and soils in
particular, as they are barely above sea level and would probably one day go under water
with ease scenarios showing how South Tarawa would look like in 2025, 2050 and 2100.
In other words this town can support only a few people as most of it will be under water,
the coastal areas will be inundated leaving a narrow strip of land above sea level. She
also stressed associated problems affecting our marine and terrestrial biodiversity.
MELAD has National Adaptation Program of Action (NAPA) and can help in whatever
they can in relation to climate change adaptation and sea level rise.

The third presentation on ‘Water Problems in Kiribati’ after lunch by the Public Utilities
Board (PUB) was not delivered for reasons beyond the control of KAP II. However, the
Facilitator, Dr. Teamakisi Temara showed videos on the ferocity of bad weather on coastal
areas and island biodiversity with additional scenes on the impact of droughts on fruit
trees, coral reefs and marine life. Another video on the problems of gravel and sand
mining in South Tarawa and Biloa, that is linked to coastal erosion, was screened.

Afternoon tea break was called up after which sessions five and six were taken by Ms
Tooti Tekinati, Principal Fisheries Officer, Ministry of Fisheries and Marine Resources
Development (MFMRD), and Mr. Toane Ubalosi, Plant Genetics Officer of the
Agricultural Division of MELAD, respectively. Ms Tekinati with ‘Impact of Climate
change on marine resources’ outlined factors affecting fisheries and marine resources in
connection to climate change and sea level rise. These included over-fishing, habitat
destruction, pollution, excess nutrients, invasive species and warmer water temperatures
that impact the ecological, physiological and biological aspects of marine resources in
various ways. Direct impacts of climate change include increasing surface water
temperature, increasing sea level, increasing weather variability, more frequent droughts
and storms causing flooding, changes in deep and surface water circulation, and variation
in oxygen and carbon dioxide availability to living organisms. Because of increasing
temperatures corals and fish are affected, invasive species may flourish, phytoplankton
and zooplankton on which other larger organisms and fish depend on are also affected resulting in reduction and decline in marine resources.

Mr. Ioane Ubaitoi opened up his presentation titled 'Impact of Climate Change and Sea Level Rise on the Terrestrial Resources and the Potential Practical Adaptation Strategies' with God's promise to Noah that 'there will be no more floods'. The floor was full of laughter and giggles as the verse seemed to contradict the theme of the consultation that focused on potential risks and vulnerabilities from climate change and sea level rise. Mr. Ubaitoi went on to say that the impact of climate change and sea level rise could wipe out plant species that are currently endangered. They may also have substantial impact on rural areas on wildlife for subsistence living. Loss of species would impact the functions and biological processes provided by wildlife through distinct roles within an ecosystem (processes like pollination, natural pest control), including recreation, cultural and religious practices of indigenous people. The lowest coastlines will be flooded and inundated; sea water will intrude into dry land causing damage to plants, animals and drinking water. Adaptation strategies include the promotion of planting resilient food crops and drought tolerant livestock for food security; promote community agro-forestry and forestry management. Those responsible will be the Agricultural divisions under MELAD. Potential development parties include GFF, SPC (Land Resource Development) and FAO. The mention of the Biblical saying in the introduction was used in the context that people should think of sustainable development in agriculture for their own benefit and wellbeing regardless of floods or no floods.

The sixth session was taken up by Mr. Moreti Tibiriano, Director of Kiribati Meteorological Services (KMS) under the Ministry of Communications Transport and Tourism Development (MCTTD) with his paper titled 'Rules of the Kiribati Meteorological Services'. Mr. Tibiriano outlined the roles of KMS, the problems it is facing in terms of equipment and modern technology to enable them forecast accurate and update information. These are necessary for weather and marine forecasts, awareness and advance weather predictions and even issuance of a 3-month seasonal outlook and early warnings for bad weather and related events. The importance of having stations on outer islands will help KMS collect useful data that can be used to predict events such as droughts, El-Nino and La Nina effects on our weather pattern. There is a great need for new and powerful equipment to replace the old ones; staff need proper training to ensure equipment are properly operated, events are properly recorded and interpreted for public consumption. Equipment deployment on outer islands is a must and government support is critically needed. As of the compilation of this report Mr. Tibiriano reported that some equipment have been acquired and are enhancing the capability of KMS to some extent. The day ended with a wrap up of the sessions and housekeeping matters.

Day Two (Wednesday, 5th December) – The second day of the consultation was opened by Mr. Tobaunona Tora, Commissioner of Lands under MELAD with his paper titled 'Lands Adaptation Strategies'. Mr. Tekorona Kalaro, a Procurement Officer of KAP II co-facilitated and chaired most of the day's sessions. Issues linking land use with climate change and sea level rise include outlook of land use now and 30 to 40 years to come, problems that affect terrestrial resources, laws and regulations related to the above,
strategies related to land use to prepare us counter or reduce our vulnerabilities and risks from any disaster related to climate change and sea level rise. Problems impacting on terrestrial resources include increasing human population, lack of physical planning, dwelling located at the lagoon high tide areas prone to bad weather and rough seas. Strategies to counter or reduce vulnerabilities and risks include knowledge retention on how traditional ways of living and managing our resources. Government should strive to seek assistance from overseas donors to help in projects beyond national economic strength, law enforcement on land use and planning, enforcement of land planning in particular on coastal areas, the establishment of land care groups on the outer islands to manage and protect coastlines and foreshores.

Session Two of the second day on ‘Construction Designs, Successes and Failures’ with particular reference to construction activities on the outer islands were not presented; reasons could not be obtained from a respective division of the Ministry of Public Works and Utilities. The next session by Moaaki Buretouni with her paper ‘Island Council priorities’ was advanced to fill the potential gap in the program. Moaaki discussed and encouraged participants on the importance of well planned projects in light of EIA at an island level before they are submitted to MISA for funding consideration. Island Council priorities for the years 2004 through 2006 were shown, some have been completed while others still await funding.

The allocated 20 minute time slot for Public Works Division (PWD) was filled in by Dr. Temakei Tebano who briefly presented the results of his survey on traditional navigation. His report titled ‘Are traditional navigation skills and knowledge still useful today?’ revealed that traditional navigation skills and knowledge are becoming less useful due to climate change that substantially affect weather forecast at regional and national levels. The heavenly bodies such as moon, stars and sun can no longer be accurately read as used to be hence fishermen and travels are becoming more reliant on weather forecast warnings provided by western modern equipment. The most obvious signs of weather variation are rainy and dry seasons occur at unexpected months, droughts, heavy rains and storms are becoming more frequent with higher intensities as social science findings by Dr. MacKenzie (2003, 2004) supported. There was a general agreement amongst participants supporting the claims of the respondents involved in the survey.

Mr. Kauna Kaitara, KAP II Coordinator, utilized the Ministry of Education’s time slot presenting the outline of the project, aims and objectives, expected outcomes and financial donors. Mr. Kaitara also outlined and discussed the duration of the current project to end in 2009. He also thanked co-financers such as GEF, AusAID, NZAid and Kiribati Government, the implementing agency of the World Bank, for their assistance and contributions to this project. Outer island consultation will be carried out as early as January of 2008 where island vulnerabilities and development projects, related to climate change and sea level rise, will be discussed in full at grassroots and village levels.

Dr. Temakei Tebano, a national consultant, took up a session after morning tea where he discussed linkages between all systems, the heavens, land and sea, stressing the point that whatever you do anywhere will affect any system. He also pointed out that everything
has a purpose and role to play in nature and when tampered with may cause changes within their systems and other systems. An example given was air pollution caused by industrial wastes, greenhouse gases keeping the heat in the Earth's atmosphere that in turn contributes to increasing temperatures which in turn is causing weather variables and sea level rise. No matter where the pollutant is disposed of, one day it will come to any part of the earth and even the equator via ocean deep and surface currents. Dr. Tebano emphasized the importance of Environmental Impact Assessment known as EIA as a crucial tool for any activity to be executed. Examples of human destructive activities were briefly explained and the importance of the role of all kinds of plants and animals, with local examples given, was discussed. The session was summed up as 'before you embark on any activity, remember that whatever you do here will also affect something else elsewhere near or far, and that everything has a role to play in nature.' Following Dr. Tebano's presentation were island presentations.

Island Presentations

Chief councilors or their nominees read out their list of vulnerabilities and potential risks that they are facing. Further explanations were provided in very serious cases such as water quality and quantity. An analysis on presentations showed that all islands are affected by the quality and quantity of water caused by prolonged drought with associated impacts on marine and terrestrial resources, hence food availability. Coastal erosion and declining marine and terrestrial resources followed; diseases linked to prolonged drought and water quality was next. The diseases listed included sore eyes, diarrhea, headache and sunburn. Details on each item can be sighted in forms under each respective island (Appendix 6). The concerns can be visualized in a graph below:

Chart 1: Visual presentation of vulnerabilities and problems by island listing

Vulnerabilities and problems

1. Increased temperature
2. Decreased rainfall
3. Drought conditions
4. Food insecurity
5. Human health impacts
6. Coastal erosion
7. Sea level rise
8. Marine life abundance
9. Increase in sea level
10. Increased human settlements
11. Increased urbanization
12. Increased human population

15
Day Three (Thursday 6th December) – the day’s sessions were co-facilitated by Mr. Kainiweke Taburene, the Manager of KAP II. Mr. Timi Kaiekiki, Chief Economist in the Ministry of Finance and Economic Development (MFED) took the first session with his paper titled ‘National Economic Planning in Kiribati’. Mr. Kaiekiki stressed the importance of mainstreaming that considers taking on board little ideas and plans, put together and integrate them into bigger plans or development project applicable and useful to a larger or whole community. With mainstreaming process communities can be made aware of vulnerabilities and risks they are facing or will be facing as in the case of climate change and sea level rise. Ministerial Operation Plans (MOPs) of government and island councils could be developed through mainstreaming exercises that need to be enacted and not left for later. The Ministry recognizes three main vulnerabilities: declining natural resources, declining quality and supply of ground water, and coastal erosion. To help counter the impact of climate change and sea level Mr. Kaiekiki listed four strategies, 1) continued research and public awareness; 2) cooperation and support of the public and government; 3) strengthening and empowerment of government ministries and agencies that are responsible for climate change and sea level implementation; 4) improvement in monitoring and reporting systems related to climate change adaptation (CCA).

Dr. Keone Onorio of TheEcoCare Group took up the second session of the day with his paper titled ‘National Environment Policy Act - NEPA’. Dr. Onorio discussed aspects of and the importance of Environmental Impact Assessment (EIA) for any physical development activity. The points that Dr. Onorio stressed were that the EIA is a part of project management, economic assessment and market research. The goal of the EIA is to predict how a development project will effect its environment, and to make recommendations to minimize the negative effects. EIA is not a hindrance to projects but helps describe the proposal and examines alternatives; identifies and addresses the concerns of the community; identifies and assesses the potential environmental effects; mitigates adverse effects and enhances potential benefits and contains environmental monitoring and management plans. EIA is the main planning tool that addresses sustainability of development which in turn is the changing activities so we “meet the needs of the present without compromising the ability of future generations to meet their own needs”. Dr. Onorio reiterated that NEPA should call for the public statement of the environmentally significant consequences of all federal actions, public input into project formulation and informed decision-making.

Reverend Dr. Kambai Uriam, Principal of Tangintchu Theological College, took up the next session with his presentation titled ‘Ecoizing Our Faith: The Role of humans in God’s Creation’. Rev. Uriam emphasized the importance of development for mankind but also reminded the audience that sometimes mankind is so greedy that it neglected to look after the environment as is in the case of climate change that is the result of industrialization from which material benefits were obtained by large industrial countries while the poor and small island nations are suffering as a consequence. Examining our own actions that may contribute to vulnerabilities and risks is a must. Localized destructive activities in the name of development must be realized. Looking after the
world and creation as our responsibility from God must be our guiding principle in whatever we do. He stressed ‘we must all look after God’s Garden.’

After tea, Ms. Reenale Willie of the Mineral Unit in the Ministry of Fisheries and Marine Resources Development presented a comprehensive power-point paper titled ‘Impact of climate change and sea level rise on our coastal areas’. Ms. Willie discussed in some details issues related to climate change and sea level rise and coastal processes. She first reflected on local activities that compound the effect of sea level rise, especially on Tarawa and the rest of the Gilbert group. First on the list is gravel and sand mining for construction and cash purposes. Problems associated with these activities are coastal erosion and plant dislocation from these areas, hence making our coastlines vulnerable to waves and wind actions. Second was seawalls and maintenance and land reclamation, both require material for filling and solidification, that is, gravel, sand and coral boulders are required. Local designs do not last long and are easily destroyed by strong winds and wave action. Neighbouring beaches can be affected by the construction of these structures.

Third on the list was the construction of causeways and groynes as is the case in many islands in the Gilbert Group as well as other neighboring countries such as Tuvalu, Marshall Islands and Nauru. Dredging coral boulders and reefs can cause many environmental problems like loss of habitats, marine life and coastal inundation. The removal of mangrove forests from foreshores and coastlines can also result in unprecedented environmental destruction. Some means of adapting to the discussed problems include abiding to rules and laws related to seawall construction, build seawall in areas most vulnerable to water inundation, engage EIA at all times before embarking on any physical structure development. In addition, the lagoons and oceans must be kept clean; limit coral boulder removal from coastlines, control on gravel and sand mining, setting up of gravel and sand mining company to meet the local demands and reducing mining along coastlines and foreshores, public awareness at village and school levels; encouraging the replanting of trees and plants along coastlines and where vegetation is impoverished.

Site Visits

After lunch the participants were taken for site visits, first to Betio Port where they observed a seawall protecting a wharf peer; this was constructed of Japanese-made tetrapod concrete solid blocks. Each block weighs at least a half a ton and stacked in such a way that the arms nest and intertwined into each other thus making them steady in the face of strong waves and currents. The 2006 spring tide accompanied by bad weather tested the strength of the structure, the blocks were put there a few days before a bad weather hit the Gilbert Islands. Many damages were reported from outer islands and Tarawa, among them were some walls of the Nippon Causeway along the ocean side collapsed, there was flooding in some villages including Temaiku village, and more.
The next stop was the Roman Catholic’s ‘mareaba’ standing on a reclaimed land about fifty meters into the lagoon. Near to this structure is a traditionally stone made ‘seawall’ that extends beyond the beach’s lowest mark, hence is a ‘reclaimed land’ by definition.

The third stop was opposite seawalls and land reclamation structures around Temoareke Fair Price area. A newly constructed land reclamation site in its initial stage showed vertical blocks using empty fuel drums. The design needs concrete and solid filling on the landward side to ensure it withstands harsh environmental elements related to strong winds and waves. The fourth stop was at the Parliament House standing on the reclaimed land. The seawalls surrounding the artificial island were constructed of concrete material laid at an angle of about forty five degrees, a design that most participants think is appropriate for their purposes; the cost of material was termed ‘prohibitive’ in Kiribati situation, one unit costs over $100.

A newly constructed concrete seawall and flourishing juvenile mangroves planted along the coastline at Bonriki Airport area were examined. These demonstrated what is termed as ‘dual coastal protection’ via natural and manmade means through the planting of mangroves and the erection of ‘seawall’ adjacent to each other in most vulnerable areas, a concept that many participants would like to support as their adaptation strategies on their islands where mangroves exist naturally. The next station was the ocean-north end of Bonriki Airport runway. Along the new road leading to and running through Anasei Village and continues toward this point of interest were sacks and heaps of gravel on the roadside apparently ready for sale. A government seawall at this location, vertically constructed with concrete, showed signs of near collapse. High waves have ended it from both the ocean back side and land front side. Piles of gravel at the collapsed end appeared to be still operated and owned, was a clear indication of unabated gravel mining activity in this vulnerable area. The last stop was a newly settled part of Temaiku Village where a causeway, built of concrete material, stretched across the entire width of what appeared to be the remnant of a passageway that was claimed to have closed up after a causeway connecting the eastern end of Tekabutikele and Bonriki airport was built in the early 1980s. Many dwellings are scattered in low lying areas vulnerable to water inundation during high tides, similar to that of 2005. Gravel and coral boulder mining is still active, sacks of gravel are ready for pick up, rock and stone piles are getting larger and higher, despising government efforts to build seawalls to protect the area and prevent high tides that has twice washed away homes and killing fruit trees on the way. The trip ended at the Taiwan Technical Mission where participants were taken around the gardens and husbandry compounds. A feast was hosted by Taiwan Embassy, Betio Town Council (BTC), Temainano Urban Council (TUC) and Kiribati Family Health Care Association (KIFHA).

Day Four (Friday 7th December) – The last day of the consultation was jointly co-facilitated by Mr. Kiarake Tabumca and the Consultation Facilitator, Dr. Temakei Tebano. The purpose of the first session was to jog everyone’s memories of each presenter’s talk. Dr. Tebano showed slides of names of resource people and the title of their presentations. Participants were encouraged to reflect on the main lessons and issues brought up; Dr. Tebano and others added their own comments thus summing up each
presenter's talk. The exercise took up about forty minutes after which morning tea was served.

Group Discussion and Presentation

Group Discussion was organized with six groups based on the most common vulnerabilities and problems areas listed by individual islands, the seventh group was extraordinary in that it visualized a worst scenario that just made every short and medium term adaptation worthless, that is, the islands are either partly inundated or completely drowned. Group members were randomly selected by calling out numbers from 1 through 7 in a systematic manner. Each participant with a number called out on them joined others with the same group number. Staff of the Environment and Conservation Division of MELAD came just in time for the exercise, disbursed and joined groups that fall within their interest and divisional allocated tasks. KAP II staff also disbursed themselves among discussion groups. Groups and issues are as follows:

Group 1: Water and associated problems
Group 2: Coastal erosion
Group 3: Declining marine and terrestrial resources
Group 4: Vulnerabilities and problems linked to causeway and seawalls.
Group 5: Weather related vulnerabilities linked to lack of meteorological information
Group 6: Health problems linked to weather variability and climate change
Group 7: If everything fails, what do we do from here???

The above groupings were derived from vulnerabilities and problems identified by island councils which also reflected the general prioritization based on the number of island listing. For example, all islands, including BTG and TUC put water as one of their main problems and potential vulnerabilities. The items are listed according to largest to lowest number of islands that listed that particular item on their island vulnerability inventory. Group 7 was a unique one but one that government and the people of Kiribati need to consider as a long term strategy for a worse case scenario when Kiribati is doomed to go under water. Individual island issues are listed under each respective island and appendix (Appendix 6).

After lunch each group presented the results of their discussion under the given headings as:

- Vulnerability/issue
- Origin/Cause
- Adaptation strategies
- Intensity of vulnerability (light-1/medium-2/serious-3)

The intensity numbers signal aspects of the problems that need the most urgent or least urgent responses. It was clear from the presentations that vulnerabilities are inter-related, that is, one cannot discuss one issue without mentioning others; basically all are linked to the impact of climate change and sea level rise.
The presentation of Group 7 was controversial in that they deliberated on unavoidable relocation to other countries in the event of Kiribati being partly or completely under water. The clear message was that the Meteorological Station ought to be provided with powerful and sophisticated equipment to enable it to warn Kiribati Government and its people of the imminent need to implement evacuation plans to other safer locations. There was much disagreement on who should be relocated and where to. At the end of the day some island chief councilors expressed their concern on what to tell their people when they go back home. Others are so moved by the thought of leaving their motherland and finding themselves alien to other cultures and living with no Kiribati identity. There was a misunderstanding in the area of relocation that some the implication is that ‘there is going to be flood sooner or later and that we should make plans for that now’. The Facilitator and the Manager of the Project repeatedly clarified the issue saying that we should not make our people nervous about foundation. The issue was that a long term plan as in the case of relocation would help Government start thinking of strategies that must be put in place starting from today. Short and medium term adaptation plans are necessary to apply and implement them to reduce our vulnerabilities and risks from the extreme events of climate change and sea level rise. Equally important are long term strategies that are critical components of those plans to ensure that Kiribati is not taken by surprise. Kiribati must be mentally, physically and economically fit for the challenges it may encounter in the short, medium and long terms as is the key strategy of KAP II (Government of Kiribati, 2005).

Closing

The closing of the Consultation was held at the State House maneaba in Bairiki. Mr. Kainarake Tafururu (KAP II Manager) greeted all invited guests that included the participants and guest speakers of the Consultation, Members of Parliament, Government Ministers, Permanent Secretaries, foreign missions such as Australian and New Zealand High Commissioners to Kiribati, Taiwan Ambassador, and other important dignitaries. His Excellence, Te Beretititi (President), Mr. Aeote Tong, warmly welcomed all guests on behalf of his government and the people of Kiribati. He particularly praised island councils and members of Parliament (returning and new) for their continuing effort in carrying out development projects for their respective islands. He also thanked government civil servants for their support to all development initiatives of the Government including KAP II. KAP II aims to prepare Kiribati to become physically, financially and mentally fit to meet the challenges of global warming, climate change and sea level rise. Our islands are vulnerable and at risk in the face of accelerated sea level caused by the unabated activities of the industrialized nations who continue to reap financial benefits while small nations like Kiribati are suffering as a consequence. We must all join hands in doing things that can reduce or counter the impacts of climate change and sea level rise, hence sustainable adaptation is necessary. Government will try and assist wherever it can. Short, medium and long term adaptation strategies must be planned and implemented to ensure Kiribati is well prepared before the unpredictable. While relocating our people to other safer locations may seem scary to some we must bear in mind that a long term adaptation strategy like this will help Government start planning now to ensure that the people of Kiribati are safe and well today and in the future. The function finished around 10 pm.
The tables below are listed according to vulnerability listing and island numbers (most to least).

**Group 1: Water Resources with associated vulnerabilities and problems**

<table>
<thead>
<tr>
<th>Water (aspects)</th>
<th>Causes</th>
<th>Adaptation Strategies</th>
<th>Level of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brackish</td>
<td>Long droughts; increasing sea-water temperature; so much already used water; increasing sea level</td>
<td>Provision of water catchments</td>
<td>3</td>
</tr>
<tr>
<td>Contamination</td>
<td>Leaky sanitation water pipes; dirty water from pigsties; lack of proper and functional toilets; the use of beaches as toilet venue; unmanageable solid and liquid waste disposal; chemical pollutants disposal; ground disposal of waste oil and fuel</td>
<td>Management and proper care for water holes and wells</td>
<td>2</td>
</tr>
<tr>
<td>Insufficient amount</td>
<td>High human population; fresh water scarce; increasing temperature; lack of water catchments; prolonged droughts</td>
<td>Water desalination plants</td>
<td>3</td>
</tr>
<tr>
<td>Untreated</td>
<td>Lack of chemicals for treatment; lack of knowledge on importance of clean water</td>
<td>Proper water treatment as for Tarawa</td>
<td>3</td>
</tr>
<tr>
<td>Water worm</td>
<td>Dirty surrounding of wells and water holes; closeness of wells to piggy areas; closeness of wells to toilets and shower facilities; lack of water cleaning chemicals;</td>
<td>Must be treated and cleaned</td>
<td>2</td>
</tr>
<tr>
<td>Mosquito larvae</td>
<td>Ungoverned mosquito breeding grounds; dirty surrounding;</td>
<td>Appropriate location of wells and water holes identified</td>
<td>2</td>
</tr>
<tr>
<td>Purulent smell</td>
<td>Closeness to waste dumps; wells not cleaned; bathing close to wells</td>
<td>Proper treatment with appropriate technology</td>
<td>1</td>
</tr>
<tr>
<td>Waste water from various sources</td>
<td>Water used for washing; kitchen waste water; water from bathing and water activities; water from pigsties</td>
<td>Water resources and reserves identified</td>
<td>2</td>
</tr>
<tr>
<td>Water holes distant from settlement</td>
<td>Land formation and topography; well locations not properly selected; linked to village end town planning</td>
<td>Solar water pump</td>
<td>3</td>
</tr>
<tr>
<td>Wise use of water lacking</td>
<td>Requires strong public awareness, training and education</td>
<td>Secondary use of waste water and public awareness on wise use of water; adequate budget and training</td>
<td>3</td>
</tr>
</tbody>
</table>
### Group 2: Coastal Erosion and Land Degradation

<table>
<thead>
<tr>
<th>Vulnerabilities related to erosion and degradation</th>
<th>Causes</th>
<th>Adaptation strategies</th>
<th>Level of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land degradation</td>
<td>People movement for need for dwelling site; development activities</td>
<td>Proper planning</td>
<td></td>
</tr>
<tr>
<td>Coastal erosion</td>
<td>Sea level rise; impact of industrial development by big countries</td>
<td>Tree planting along coastal areas</td>
<td></td>
</tr>
<tr>
<td>Gravel and sand mining</td>
<td>Destruction of reefs and rocks from coastal areas</td>
<td>Law enforcement and control of activities (EIA)</td>
<td></td>
</tr>
<tr>
<td>Neighbor coastal land affected</td>
<td>The construction of seawalls and reclamation activities</td>
<td>Ban private developments and assignments</td>
<td></td>
</tr>
<tr>
<td>Terrestrial and marine ecosystems disrupted</td>
<td>Causeway construction</td>
<td>Proper designs and planning; engage EIA</td>
<td></td>
</tr>
<tr>
<td>Coastal damage</td>
<td>Natural disaster</td>
<td>Wind breakers (mangroves), seawalls, trees and plants</td>
<td></td>
</tr>
<tr>
<td>Land stability and resilience reduced</td>
<td>Sand excavation with backhoe</td>
<td>Ban the activity or more control, locate other sites away from problem coastlines</td>
<td></td>
</tr>
</tbody>
</table>
Group 3: Decline in marine and terrestrial resources.

<table>
<thead>
<tr>
<th>Vulnerabilities</th>
<th>Causes</th>
<th>Adaptation strategies</th>
<th>Level of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Marine Resources</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Te Bura (Anadara</td>
<td>Heavily fished; dirty water</td>
<td>Law enforcement</td>
<td>2</td>
</tr>
<tr>
<td>holosperica)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Te Waro (Tridacna</td>
<td>Little water exchange resulting in warmer water; change in current</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>maxima)</td>
<td>direction as result of human physical activities and heavy harvesting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Te Likabuit (Spawning</td>
<td>No restriction on harvest; just fished till vanish</td>
<td>creation of Law if none exists</td>
<td>2</td>
</tr>
<tr>
<td>fish)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Te Kareboli (sea</td>
<td>Cutting sea cucumber in lagoon impacting all marine organisms and</td>
<td>Plus</td>
<td>2</td>
</tr>
<tr>
<td>cucumber)</td>
<td>quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Te Banimareva (tuna and</td>
<td>Polishing our EEZ and 12 nautical mile zone not adequate</td>
<td>Public awareness in schools</td>
<td>1</td>
</tr>
<tr>
<td>pelagic fish)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Te Utrusti n maru</td>
<td>Seaweed planting not productive due to climate change and warm water</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>(seaweed)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Te Anu/Saga (Corals)</td>
<td>Corals are not healthy and unattractive to fish due to climate change</td>
<td>Proper screening of all proposed 'development projects'</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>and warm water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Te Chi (Turtle)</td>
<td>Heavy harvesting and lack of law enforcement</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td><strong>Terrestrial resources</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Te Mai (Breadfruit)</td>
<td>The following causes apply to the rest of the named and other fruit</td>
<td>Maintain public awareness programs as in</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>trees: warmer days, water getting brackish, felling and non-replacement</td>
<td>radio and local newspapers;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>of trees and plants, land littered with chemicals like used dry and</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>car batteries, increasing sea level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Te Nii (Coconut trees)</td>
<td>No proper planning for settlement schemes and replanting, damage caused</td>
<td>Agriculture training; law enforcement;</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>by invasive species such as rats, beetles and other reported fruit</td>
<td>formulation of law/act if non-existent,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>problems, lack of enforcement on regulations on tree felling, bush</td>
<td>support for replanting and home gardening;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>fires and land use planning, wish to become healthier;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Te Kaina (Pandanus)</td>
<td>As above</td>
<td>proper land use especially on South Tarawa</td>
<td>2</td>
</tr>
<tr>
<td>Te Bero (Figue sp.)</td>
<td>As above</td>
<td>and Beto; requesting government for</td>
<td></td>
</tr>
<tr>
<td>Other fruit trees</td>
<td>As above</td>
<td>assistance through international, regional</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>and national fora.</td>
<td></td>
</tr>
</tbody>
</table>
### Group 4: Upgrading existing seawalls and causeways

<table>
<thead>
<tr>
<th>Vulnerabilities</th>
<th>Causes</th>
<th>Adaptation strategies</th>
<th>Level of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damage to seawall</td>
<td>Bad design, erosion within area, strong winds and bad weather, rise in sea level and change in current direction</td>
<td>Improve and redesign, parallel to beach and shoreline, located away from wave/current and wind prone areas</td>
<td>1</td>
</tr>
<tr>
<td>Damage to causeway</td>
<td>Bad weather and strong winds, rise in sea level, solid structure with no water passages through, bad design, sand and gravel mining from within location, destructive human activities</td>
<td>Mangrove planting along coastline adjacent to seawall, regular maintenance, financial assistance for expensive wave breakers, slanting shape instead of vertical, lots of passages in between solid structure, bridges replace causeways</td>
<td>3</td>
</tr>
<tr>
<td>Coastal erosion</td>
<td>Natural process, removal of coral, pebbles and coral boulders for other construction purposes, planting of mangrove on the foreshore, seawall construction along prone coastlines</td>
<td>Protection and care, mangrove planting, planting trees and bushes along coastline, discourage construction of causeways and seawalls, encourage bridges than causeways, (burying stingray on a beach to create more beach - superstition?)</td>
<td>3</td>
</tr>
<tr>
<td>Declining marine and coastal resources</td>
<td>Coral and stone mining from the reef and lagoon; causeway construction (solid) obstructing water, nutrients, plankton, larvae and gas exchange between ocean and lagoon systems</td>
<td>Discourage destructive human activities; restriction on size limit, passages created along solid structured causeways to improve water exchange</td>
<td>3</td>
</tr>
</tbody>
</table>
Group 5: Weather Forecasting Problems linked to climate change vulnerabilities and risks

<table>
<thead>
<tr>
<th>Problems</th>
<th>Causes</th>
<th>Adaptation strategies</th>
<th>Level of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of suitable and powerful</td>
<td>Financial assistance minimal or non-existent</td>
<td>Procurement of proper equipment</td>
<td>3</td>
</tr>
<tr>
<td>equipment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current equipment out of date and</td>
<td>As above</td>
<td>Replacement of current old equipment with modern and powerful models</td>
<td>3</td>
</tr>
<tr>
<td>malfunction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff lacking required skills</td>
<td>As above</td>
<td>Frequent and appropriate training and upgrading of staff for required skills</td>
<td>3</td>
</tr>
<tr>
<td>No support from Government</td>
<td>As above</td>
<td>Government to provide support were required</td>
<td>3</td>
</tr>
</tbody>
</table>

The same group made a list of equipment needed to allow the Meteorological Unit function efficiently, as shown below:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Equipment</th>
<th>Purpose/Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>Anemometer / Anemograph</td>
<td>Speed and direction</td>
</tr>
<tr>
<td>Pressure</td>
<td>Barometer / Barograph</td>
<td>Air pressure – high/low, strong winds location/position</td>
</tr>
<tr>
<td>Temperature</td>
<td>Thermometers</td>
<td>Identifying and recording events happening over time scales for prediction purposes</td>
</tr>
<tr>
<td>Rainfall</td>
<td>Automatic / Manual rain-gauges (for outer islands)</td>
<td>Identifying and recording rainfall events for prediction purposes</td>
</tr>
<tr>
<td>Communication</td>
<td>RANET (for outer islands)</td>
<td>Early warning system</td>
</tr>
</tbody>
</table>
### Group 6: Health problems and vulnerabilities linked to climate change

<table>
<thead>
<tr>
<th>Health issues/ vulnerabilities</th>
<th>Causes</th>
<th>Adaptation strategies</th>
<th>Level of Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhea and vomiting</td>
<td>Dust; rise in sea level resulting in contaminated seawater infiltrating fresh water sources close to shoreline; poor quality of portable water</td>
<td>Boil drinking water; water the road and surrounding in village; plant lots of trees and plants; reduce greenhouse gases</td>
<td>3</td>
</tr>
<tr>
<td>Cough (cold and flu)</td>
<td>Dust; warmer and dry days; no rain or long drought</td>
<td>Water road running through a village; planting of trees; reduce greenhouse gases</td>
<td>3</td>
</tr>
<tr>
<td>Sore eye</td>
<td>Dust; warmer days; long drought and no rain</td>
<td>Use breast milk and other medications for treatment; plant trees; water road; reduce greenhouse gases; wear dark sunglasses</td>
<td></td>
</tr>
<tr>
<td>Worm-diarrhea</td>
<td>Polluted or dirty portable water for home use; water not boiled</td>
<td>Home hygiene; boil drinking water</td>
<td>2</td>
</tr>
<tr>
<td>Fish poisoning</td>
<td>Dead fish results from warmer water (misleading statement); waste disposal at sea and polluting water</td>
<td>Reduce greenhouse gases; stop polluting and disposal of waste into sea</td>
<td>2</td>
</tr>
<tr>
<td>Stroke</td>
<td>Heat stroke; not much physical activity as outdoor chores decreasing with increase in day temperatures</td>
<td>More exercises and outdoor activities such as planting fruit trees, etc.</td>
<td>1</td>
</tr>
</tbody>
</table>
Group 7: If nothing we can do to stop or minimize our vulnerabilities and potential risks from climate change, then what?

<table>
<thead>
<tr>
<th>Vulnerability</th>
<th>What to do</th>
<th>Adaptation strategies</th>
<th>Potential migration locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Islands will be completely covered with water</td>
<td>Hold discussions with all island and demand for a proper assessment and accurate research results; Adequate timeframe for a warning is critical; relocate all and day goodbye to Kiribati</td>
<td>Relocate everyone to safer locations in partnership with government, island councils and aid donors</td>
<td>Australia, New Zealand, Canada</td>
</tr>
<tr>
<td>Half of island inundated</td>
<td>Decide who to relocate in consultation with government, island councils, potential and willing migrants</td>
<td>Relocate teens and youths and those willing</td>
<td>Australia, New Zealand, Canada</td>
</tr>
</tbody>
</table>
5. Analysis and Synthesis based on past and current issues on climate change and sea level rise.

Rainfall – Radio New Zealand International on May 5, 2006 reported that a US climate scientist claimed that there is more rain in the Pacific due to climate change affected by a number of factors that include more moisture in the atmosphere; the wind system brings moisture collected from the Pacific Ocean from east to west where it precipitates as it rises. Hence Kiribati and Marshall Islands stand to experience more rain from the pattern.

As of the writing up of this report, Kiribati is experiencing a drought that had lasted about six months now following heavy rains in late 2006 to early 2007. The rains have not come by yet, only light showers come and go leaving dry and humid nights and days.

Rising temperature – United Nations Secretary-General Ban Ki-moon warned that some of the effects of rising levels of greenhouse gases may already be irreversible. The situation was already “so severe and so sweeping that only urgent, global action” could head off the crisis. The Kyoto Treaty reported that predictions claim a rise in global warming of around 0.2 degrees Celsius per decade (every ten years).

Sea level rise – A global average of 9-81 cm is expected over the next 100 years – ice melts and expands as it heats up. Associated problems will intensify. Changes in sea level do not occur uniformly around the world. There is actually fair amount of differences in sea level rise in different parts of the globe due to ocean circulation and wind pressure patterns. The effects of storm surges and spring tides needs to also be kept in mind when evaluating sea level rise impacts.

The Intergovernmental Panel on Climate Change proposes a maximum sea level rise of 81 cm (32in) this century. But in the journal Nature Geoscience, researchers say the true maximum could be about twice that: 163cm (64in). They looked at what happened more than 100,000 years ago – the last time Earth was this warm.

The results join other studies showing that current sea level projections may be very conservative. Sea level rise is a key effect of global climate change. There are two major contributory effects: expansion of sea water as the oceans warm, and the melting of ice over land.

In the latest study, researchers came up with their estimates by looking at the so-called interglacial period, some 124,000 to 119,000 years ago, when Earth’s climate was warmer than it is now due to a different configuration of the planet’s orbit around the Sun.

That was the last time sea levels reached up to 6m (20ft) above where they are now, fuelled by the melting of ice sheets that covered Greenland and Antarctica.

Read the article below copied from Greenpeace internet post.
King tide pummels Kiribati

09 February 2005

Plate 1: Young girl watches sea sweep into her family's land.

Plate 2: Teenagers testing the force of a king tide washing away seawall
“Betio, Kiribati — Less than a week before the Kyoto Protocol enters into force, the tiny island nation of Kiribati is ravaged by a ‘king tide’ — an example of the kind of sea-level rise we can expect to see more of as global temperatures increase.

Thousands of people living on the low-lying atoll of Kiribati in the central Pacific were hit by waves that reached 2.87 metres (9 and a half feet) today. Farmland was swept out to sea and fresh water wells contaminated. Betio Hospital in the south of the island was flooded when waves breached sea defence walls.

"Just a week before the Kyoto Protocol enters into force, this serves as a stark reminder that climate change is upon us and governments must go way beyond the emissions cuts outlined in the treaty," said our climate campaigner, Stephanie Tummers.

The pollution which causes global warming has reached dangerous levels and scientists have warned that low-lying islands face permanent inundation from rising seas. To save coastal communities and islands like Kiribati, governments must act to penalise polluters and invest heavily in clean energy sources in order to reduce emissions."

6. Evaluation and Assessment of the Consultation

The last day of the consultation largely focused on a review of the contents of the presentations that are significant and contribute to a better understanding of the participants about climate change and adaptation (CCA) and sea-level rise. It also focused on a feedback from participants about the site visits where they observed different seawall structures and land reclamation, their designs and likely impact on a coastline. A wrap up on all presentations was summed up as “Continue working on projects for the wellbeing of your communities but with no haste, examine them first with your understanding that you have gained from the consultation, involve experts from different fields as everything is linked in many ways some of which we have no idea and understanding about”.

In the last few minutes toward the end of the program all participants were asked to check if they have filled in the assessment form distributed during lunch. Forty five responses were returned out of the expected sixty two. The tally of the responses is given in Table 1 below, the versions in both Kiribati and English follow, respectively. There are 9 questions in all, each question was tallied according to similarity and differences in responses given.

(1) Goal and Objectives

Out of forty five responses forty one claimed that the goals and objectives of the workshop were achieved. Four responses had reservations saying that as far as three presentations not delivered (water, construction designs and education) the consultation failed to achieve its overall goal and objectives as those issues are very critical and important components of climate change and sea-level rise. Explanations given by the facilitator included staff movement within concerned ministries and communication problems to firm up engagements. However, the facilitator and KAP II staff filled in those time slots with very useful information that could not be fitted into the program because of time constraint within the four-day timeframe. As was expected, not all government ministries and NGOs could be included; some were on the draft program but were pulled out and replaced with others as seen necessary.
(2) Topic of Interest

Overall, respondents claimed that all topics are of great interest and very important for them. Among those responses some claimed that a topic on ‘the role of humans in God’s creation’ is of paramount importance as it reminds everyone of their responsibilities to look after the world; development activities are encouraged but must be properly considered in light of all of their aspects relating to people and the environment.

The linkages between and among all systems was also perceived as very important in that it gives participants a broad view of how one system can affect other systems no matter how big or small a system is. Other topics of interest also include how climate change has been perceived and expressed as ‘the sun is coming closer to my home’ meaning that the world is getting warmer that there is less time to work and more time for leisure. In addition to this, the idea of women more nurturing than men, implies that gender influences feelings and decision making about adaptation strategies, hence all views must be taken on board.

Climate change and sea level rise with their associated impact on the environment and very existence of mankind is also of great interest. Discussions on the ban of destructive activities to our reefs and coastline are also regarded as very important in light of their associated impacts to marine and terrestrial resources. Coastal erosion was of great interest as is also a big concern.

(3) Topic not of interest

Responses to this question were more concerned about the delivery of the presentations. Issues raised included the language of the presentation should be Kiribati since most participants are not comfortable with English. They also perceived some presentations as very brief and not properly prepared. Included under this heading is disappointment about sharing and discussion of issues out of consultation context, these must be controlled and discouraged by a workshop mediator.

(4) Interesting activities

Site visit to location with seawalls, land reclamation, mangrove planting and other structures was considered by most respondents as very interesting. A small number said it was a waste of time. Properly prepared presentations were listed as interesting. Doing warm ups and making jokes were encouraged and suggested that more of them should be planned and encouraged. Discussion on problems associated with causeways and seawalls was viewed as very important and interesting as both positive and negative impacts were highlighted with supporting scientific and environmental facts and interesting examples.
(5) Items not interesting

Included under this heading are: island presentations are boring because of repetition, the use of English on power point presentations and explaining ideas and issues, how industrial countries benefit from polluting the atmosphere.

(6) Attending similar consultation

As expected all wanted to be invited again to a similar consultation. Reasons include, that it is very important for the understanding of how human activities affect the environment and to see that things discussed in this consultation are carried out. It was also suggested that all kinds of vulnerabilities are discussed in more detail and more time be given to such a valuable consultation.

(7) Vulnerability to support

Coastal erosion, declining marine and terrestrial resources are mostly targeted with mangrove planting with seawalls along a coastline, coral and reef protection, a ban on destructive activities, public awareness and education on vulnerabilities and adaptation strategies, laws to ban gravel and sand mining including lagoon mining, activities to counter the impact of climate change and sea level rise on marine and terrestrial resources by replanting and coral and reef protection; formulation of laws to effect destruction in all forms; proper construction designs for solid structures.

(8) Adapting strategies relevant to island and village

A variety of strategies are mentioned above. These include mangrove planting with seawalls to protect shorelines; construction of properly designed seawalls and causeways; the use of proper material for construction; the ban on destructive activities to include gravel and sand mining, mangrove and tree cutting; consultation with villages at island level; bylaws to be drawn up and enacted; replacing causeways with bridges. The making of channels along causeways to improve water exchange and improvement on existing seawalls were considered important.

(9) Things needing improvement

There were many issues raised under this heading. Of those concerning the welfare of the participants include properly arranged transportation on first arrival, per diem to be increased, larger lunch, accommodation and sitting allowance be considered. Also considered important are the language of the consultation ought to be in Kiribati, papers are distributed before presentations to give participants a good background on the topics presented, presentations are properly prepared and guest speakers are confirmed to ensure important topics are delivered, more warm ups and jokes to avoid boredom, discourage sharing outside of consultation context, and to give more time to presenters and questioning. Other suggestions include a longer time period (2 weeks) for such an important consultation, follow up consultations on the outer islands, laws and acts related to climate change and sea level rise and their impacts must be
discussed properly to avoid conflict of interest by Councils and people. It was also suggested that government employees and non-governmental organizations must be included. This links up with reduction on the number of outer islands participation.

7. **Scenes from the Consultation** – Captions (from left: hand top to right and same order down)

<table>
<thead>
<tr>
<th>Vice President, Honorable Teina Geoio at the Opening of the Consultation.</th>
<th>Mr. Kautuma Kaikara, Coordinator of KAP II presenting KAP II</th>
<th>Mr. Kairarae Taburuca, Manager of KAP II welcoming participants at the opening of the Consultation.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Tchereama Kairoo, Procurement Officer, KAP II, co-facilitating the sessions.</td>
<td>Ms Atu Mooliba, Project Accountant, giving out per diems to participants.</td>
<td>Ms. Ratu Kutehina, Office Assistant, helping out with errands for the Consultation.</td>
</tr>
<tr>
<td>Dr. Temakei Tebano, National Consultant, delivering his presentation.</td>
<td>Ms. Tererei M. Reema, Director of ECD, MFLAD, delivering her presentation.</td>
<td>Dr. Ucaniafo MacKeazic, Director, USP Kiribati Campus, delivering his presentation.</td>
</tr>
<tr>
<td>One of working groups at work.</td>
<td>Another working group with lively discussion.</td>
<td>Another working group still working on their presentation.</td>
</tr>
<tr>
<td>Exercise time – Coconuts action chorus.</td>
<td>Group Presentation.</td>
<td>Gravel mining at Amraai Village next to Boalihi International Airport.</td>
</tr>
</tbody>
</table>

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Plate 3: Scenes from the Consultation
# 8. APPENDICES

## Appendix 1: List of participants and islands/organizations represented.

<table>
<thead>
<tr>
<th>Island/Organisation</th>
<th>Name</th>
<th>Title/Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malin</td>
<td>Yutoka Atoheta</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Tonga Kunhen</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Teke Kalu</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td></td>
<td>Tekekomoti Atikabi</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Malau Lele</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Raima Tunah</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Malaka</td>
<td>Karaka Kobo</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Tena Tale</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Teni Taliu</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Marakau</td>
<td>Chane Toso</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Aneke Gogo</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Ontiwa Kuidane</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Marakau</td>
<td>Todek Tala</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Briki Taliu</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Berekina Teatu</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Manaafua</td>
<td>Mario Ngina</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Mario Koomas</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Tahvoaavek Kikia</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Kureia</td>
<td>Yumma Marangi</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Kufino Mafina</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Asan Malolu</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Anetika</td>
<td>Diken Ambuka</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Tarku Konu</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Teena Musaka</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Aheuma</td>
<td>Tezika Tamunat</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Maseka Tangani</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Teini Kini</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Nucuuti</td>
<td>Teluka Rikita</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Mdlau Mapala</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Teviye Tako</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Tekekomoti North</td>
<td>Teke Komada</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Meloelo Robo</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Tana Sata</td>
<td>Island Council Chair</td>
</tr>
<tr>
<td>Tekekomoti South</td>
<td>Boina Kioda</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Maru Mocia</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Teviye Tako</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Ouvea</td>
<td>BurewaeTea</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Teviye Teva</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Ateflu Iwada</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Buma</td>
<td>Tetwawe Tani</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Tevawao Tevao</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Atana Iwada</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Nibinau</td>
<td>A tei Tiga</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Telekina Talara</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Tevawao Trei</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Tawua</td>
<td>Tevek Tobi</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Tevawao Tana</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Teviye Tevi</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Anefuna</td>
<td>Teluka Ruka</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Wiku Wiku</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Umitara Apita</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Baio Teua Council</td>
<td>Bumika Mulia</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td></td>
<td>Tura Anga</td>
<td>Island Project Officer</td>
</tr>
<tr>
<td></td>
<td>Teviye Tevi</td>
<td>Island Community Worker</td>
</tr>
<tr>
<td>Tetapita Urban Council</td>
<td>Tima Fina</td>
<td>Chief Councilor</td>
</tr>
<tr>
<td>Kaika Protestant Church</td>
<td>Tiekepa Ruri</td>
<td>Representative</td>
</tr>
<tr>
<td>Kanuap Catholic Church</td>
<td>Kaika Iroshu</td>
<td>Representative</td>
</tr>
<tr>
<td>Church of God</td>
<td>Rev Runngape Fekoa</td>
<td>Representative</td>
</tr>
</tbody>
</table>
Appendix 2: Consultation Program

TA – KAP II – 2007 First Kiribati National Consultation for Local CCA

Theme:
Adapt or Perish: Let us work together to survive.

Te Boto-ni-lango
Ti na konaa n tokokoi kabuanibwai ke ti na irii-nako – ti a ikarekebai bwa ti aonga n tokanikai.

(4-day workshop (4-7th December, 2007)
# First National Consultation Program
(Dec. 4 - 7, 2007)
[Consultation Facilitator -- Dr. Temaeki Tehano – National Consultant]

**Day 1:**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>0900</td>
<td>Registration</td>
<td></td>
</tr>
<tr>
<td>0930</td>
<td>Words of Welcome, Mr. Kairake Tuburnes (Project Manager)</td>
<td>[3 min]</td>
</tr>
<tr>
<td>0945</td>
<td>The Vice President arrives</td>
<td>[2 min]</td>
</tr>
<tr>
<td>0955</td>
<td>A few remarks from KAP Coordinator -- Mr. Knutuuna Kaitara</td>
<td>[5 min]</td>
</tr>
<tr>
<td>1000</td>
<td>Opening prayer by Rev. Bunangaie Tekuta</td>
<td>[5 min]</td>
</tr>
<tr>
<td>1015</td>
<td>Opening Speech: Honorable the Vice President, Tecma Onorio</td>
<td>[15 min]</td>
</tr>
<tr>
<td></td>
<td>Overview of KAP II</td>
<td></td>
</tr>
<tr>
<td>1030</td>
<td>Lunch</td>
<td>[30 min]</td>
</tr>
<tr>
<td>1100</td>
<td>Morning Tea (Co-facilitator: Mr. Kautuna Kaitara)</td>
<td>[30 min]</td>
</tr>
<tr>
<td></td>
<td>Aims and Objectives of the Consultation (Dr. Temaeki Tubano)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Session 1: Dr. Ucantabo Makkusie (Social survey – adaptation strategies?)</td>
<td>[20 min]</td>
</tr>
<tr>
<td></td>
<td> Questions</td>
<td></td>
</tr>
<tr>
<td>1200</td>
<td>Session 2: Mr Teresei Abote (impact of climate change on biodiversity</td>
<td>[20 min]</td>
</tr>
<tr>
<td></td>
<td> adaptation strategies?) – Questions</td>
<td></td>
</tr>
<tr>
<td>1300</td>
<td>Lunch</td>
<td>[30 min]</td>
</tr>
<tr>
<td>1349</td>
<td>Video: Kiribati and Global Warming (N. Tabora-ni Kau)</td>
<td>[5 min]</td>
</tr>
<tr>
<td></td>
<td>Session 3: Mr. Tabia Metunana (PUL – Water resources)</td>
<td>[20 min]</td>
</tr>
<tr>
<td></td>
<td> Questions [supplemented with videos]</td>
<td></td>
</tr>
<tr>
<td>1420</td>
<td>Session 4: More videos on gravel and sand mining on Tarawa</td>
<td>[20 min]</td>
</tr>
<tr>
<td></td>
<td> (impact of human activities on coastlines and environment – adaptation</td>
<td></td>
</tr>
<tr>
<td></td>
<td> strategies?) – Questions</td>
<td></td>
</tr>
<tr>
<td>1530</td>
<td>Afternoon Tea</td>
<td>[20 min]</td>
</tr>
<tr>
<td>1529</td>
<td>Session 5: Impact of climate change and sea level rise on marine and</td>
<td>[20 min]</td>
</tr>
<tr>
<td></td>
<td> terrestrial resources (Tono Tekina) – Fisheries and Inono Ubaitei</td>
<td></td>
</tr>
<tr>
<td></td>
<td> Agriculture: adaptation strategies?) – Questions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Session 6: Weather Forecast – Mureti Tibriano (adaptation strategies?)</td>
<td>[20 min]</td>
</tr>
<tr>
<td></td>
<td> Wrap up for the day – Please keeping matters</td>
<td>[5 min]</td>
</tr>
</tbody>
</table>

**Day 2:**

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>0900</td>
<td>(Co-facilitator: Mr. Tehonenui Kairoro)</td>
<td></td>
</tr>
<tr>
<td>0930</td>
<td>Session 7: Land Use and Management (Tebatonga Breatu, lands –</td>
<td>[20 min]</td>
</tr>
<tr>
<td></td>
<td> adaptation strategies?) – Questions</td>
<td></td>
</tr>
<tr>
<td>0940</td>
<td>Session 8: Construction Designs – Tooni Toata (outer islands developments</td>
<td>[20 min]</td>
</tr>
<tr>
<td></td>
<td> successes and failures – best design?) – PWU Works [session supplemented</td>
<td></td>
</tr>
<tr>
<td></td>
<td> with Traditional navigation by Dr. Temaeki Tehano] – Questions</td>
<td></td>
</tr>
<tr>
<td>1020</td>
<td>Session 9: Outer islands priorities (Montaone Burentolo)</td>
<td>[20 min]</td>
</tr>
<tr>
<td></td>
<td> Questions</td>
<td></td>
</tr>
</tbody>
</table>
1050  
**Morning Tea**  

1110  
**Session 10: Ministry of Education (Curriculum Development)**  
(supplemented with KAP II overview by Mr. Kantuma Kuhun, KAP II Coordinator)  
**Questions**  

1150  
**Session 11: Dr Temakei Tabano (linkages between/among all systems)**  
**Questions**  

1230  
**Session 12: Presentations from island groups: Makin, Kuria (problems related to climate change and sea level rise? – what was done, being done and to be done)**  
**Questions**  
**Session 13: Presentations from Baturi and Marakur – Questions**  

1330  
**Lunch**  

1345  
**Session 14: Presentations from Abaiang and Ni Tārava – Questions**  
**Session 15: Presentations from Maiana and Atarua – Questions**  
**Session 16: Presentations from Abiamanga and Nonouti**  

1445  
**Afternoon Tea**  

1500  
**Session 17: Presentations from Tab North and South – Questions**  
**Session 18: Session 12: Presentations from Quetoa and Bora – Questions**  
**Session 19: Presentations from Nikauau and Tanuma and Aruec – Questions**  

**Wrap up for the day – housekeeping matters**  

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**Day 3:**  
*(Thursday)*  
**(Co-facilitators: Mr. Kakaraka Tabatona)**  

6900  
**Session 20: Presentation: – Planning, MFG – Mr. Tinii Kniekki; government position in relation to continuing activities on climate change and sea level rise – Questions**  

**Session 21: Importance of FIA to all kinds of physical developments**  
**(Dr. Komori, Thépica Group) – Questions**  

**Session 22: Role of humans in God’s Creation (Rev. Dr. Kambati Uriam)**  
**Questions**  

1030  
**Morning Tea**  

1045  
**Session 23: Drama on Climate Change [not performed]**  
**Session 24: Ms. Reanute Willie (impact of climate change and sea level rise on coastal areas/strategies and adaptation**  
**Questions**  

1200  
**Lunch**  

**Site Visits**  
Belle Point (Japan wavebreaker design)  
Catholic Headquarters and reclamation  
Teaareareke seawalls (vertical and traditional)  
Anamama Causeway seawall construction and mangrove planting  
Anatai gravel and sand mining (new village near airport)  

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Bouiriki International Airport ocean end – seawall collapsing with gravel mining continuing. Temwalek settlement with causeway and seawalls, gravel and coral boulder mining next to government seawall.

**Day 4:**

**0900**
Overview of Presentations - Group critique on presentations (Dr. Tebano) [30 min]
Group Work (1 – 7) [40 min]

**1030**
*Morning Tea* [20 min]

**1100**
Group 1: Water problems
Group 2: Coastal erosion
Group 3: Declining marine and terrestrial resources
Group 4: Vulnerabilities and problems linked to causeway and seawalls.
Group 5: Weather related vulnerabilities linked to lack of meteorological information
Group 6: Health problems linked to weather variability and climate change
Group 7: If everything fails, what do we do from here???

**1230**
*Lunch* [30 min]

**1330**
Group Work [30 min]
Presentations [60 min]

**1600**
Evaluation and Wrap-Up, end of consultation

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**1900 – 2200**
*Closing: State House, Bauriki (MC: Mr. Kaisake Taburue)*

1. Greeting of guests by Tekeanginaimiawa Dancing Group.
2. His Excellency the President, Aotea Tonga, gave the closing remarks.
3. Words of thanks by Chief Counselor from Ratu Island.
4. Blessing of Food followed by Feast.
### Appendix 3: Combined Table of Island Vulnerabilities (Talan kai-rootaki ni hootaki)

<table>
<thead>
<tr>
<th>TE KAI-ROOTAKI</th>
<th>AABA AKE A ROOTAKI</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Tarotan te ran ni moel (well water getting brackish)</td>
<td>Nonouti, Abaia, Malana, TUC, Tarawaleta, Aaranu, TabSouth, BTC, Buahati, Onotoa, Beru, Masakei, Kuria, Nikau, Tamana, Arone, Makin, Tabiteuea Meang, Abemama</td>
</tr>
<tr>
<td>- Karakon te tangke ni kana (small number of water catchments)</td>
<td>Abaia (e bonol), Malana, Tarawaleta, Aaranu, TabSouth, Buahati, Onotoa, Beru, Masakei, Kuria, Nikau, Tamana, Arone, Makin, Tabiteuea Meang, Abemama, Nonouti,</td>
</tr>
<tr>
<td>- te maunakataka (prolonged drought)</td>
<td></td>
</tr>
<tr>
<td>- baarekai ranu te mwanibwa (contaminated well water)</td>
<td></td>
</tr>
<tr>
<td>- Te kanaki naka mataniwiwi te abaa (coastal erosion)</td>
<td>Abaia (e bonol), Malana, Tarawaleta, Aaranu, TabSouth, Buahati, Onotoa, Beru, Masakei, Kuria, Nikau, Tamana, Arone, Makin, Tabiteuea Meang, Abemama, Nonouti,</td>
</tr>
<tr>
<td>- labirin taari (sea level rise)</td>
<td></td>
</tr>
<tr>
<td>- Keerikaeakin kai n'amawake (number of fruit trees decreasing)</td>
<td>Nonouti, Abaia, Tarawaleta, Aaranu, TabSouth, Buahati, Onotoa, Beru, Masakei, Kuria, Nikau, Tamana, Arone, Makin, Tabiteuea Meang, Abemama</td>
</tr>
<tr>
<td>- Te manga umunik need for replanting</td>
<td></td>
</tr>
<tr>
<td>Keerikaeakin mara taari (declining marine resources)</td>
<td>Abaia (e bonol), Malana, Tarawaleta, Aaranu, TabSouth, Buahati, Onotoa, Beru, Masakei, Kuria, Nikau, Tamana, Arone, Makin, Tabiteuea Meang, Abemama</td>
</tr>
<tr>
<td>Kai-reken ma buin te aoraki man te babu ao te running ee koa korai (iki atari) (diseases related to dust, stronger light intensity, and water borne)</td>
<td>Aaranu, Masakei, Kuria, Nikau, Tamana, Tabiteuea Meang, Abemama</td>
</tr>
<tr>
<td>Kitanaka mvenga eko a makan ma te aame, rictar taari (abandonment of settlements along coastal areas)</td>
<td>Nonouti, Makin, Tabiteuea Meang, Abemama</td>
</tr>
<tr>
<td>Keerikaeakin mara a ika (fish stock decline)</td>
<td>Nonouti, TUC, TabSouth, Tamana,</td>
</tr>
<tr>
<td>Rakan te kaobebue na ureken te ta ni mawakuri (higher temperatures reducing outdoor activities)</td>
<td>Malana, Aaranu, Buahati, Abemama</td>
</tr>
<tr>
<td>Kitanaka raei, te kawai ituhin te bauke (abandonment of roadside settlements because of dust)</td>
<td>Nonouti, Malana, TUC</td>
</tr>
<tr>
<td>- Te buuni (overcrowding)</td>
<td>TUC, BTC, Makin,</td>
</tr>
<tr>
<td>- Tangirar taalu ni moka (need for settlement areas)</td>
<td></td>
</tr>
<tr>
<td>Te labirin te ura (grave) are saad, muniing</td>
<td>TUC, BTC</td>
</tr>
<tr>
<td>Taakan koei ao meke a rakan te bauke; umakin bongi ni kawai ni te bauke (existing seawalls overrun by high tides, fish papa loss their banks)</td>
<td>Malana, Masakei</td>
</tr>
<tr>
<td>Umuakin bongi ao kootiwee (destruction of causeways and seawalls)</td>
<td>Tarawaleta</td>
</tr>
<tr>
<td>Aki mai mui ngi iranen ne ni Saneawa (fish in ponds not growing well)</td>
<td>Nonouli, Benu</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Solar ao tananala, power house ibukin te Kautira (solar, generator and powerhouse needed)</td>
<td>Abalang</td>
</tr>
<tr>
<td>Karakon te uan ni kai ibukin te amwareke (declining fruits and crops)</td>
<td>Malana</td>
</tr>
<tr>
<td>Akean te ninoume ao mwareen matan son te ort (dying seagrass and reduction in coral and lagoon fish)</td>
<td>Malana</td>
</tr>
<tr>
<td>Te korokai te korakora (uncontrolled unabated tree felling)</td>
<td>TUC</td>
</tr>
<tr>
<td>Te korokai te maang, twifaha ao nakotai (food smell from waste disposal, dead seaweed and human waste)</td>
<td>BTC</td>
</tr>
<tr>
<td>Kati-ben kanto man noo (cargo run out)</td>
<td>Analuka</td>
</tr>
<tr>
<td>Barakakekana tasi (water pollution)</td>
<td>TabSouth</td>
</tr>
<tr>
<td>Te karikirake ibukin kaawa aika Bahuna (village fund raising drives)</td>
<td>BTC</td>
</tr>
<tr>
<td>Te mwehuaka man taabo ni maanga (health-related discomforts caused by living close to waste dumps)</td>
<td>BTC</td>
</tr>
<tr>
<td>Te buraikako isina kororikirake (youth criminal behavior)</td>
<td>BTC</td>
</tr>
<tr>
<td>Te bwanta ni miala (breadfruit disease)</td>
<td>Butaritari</td>
</tr>
<tr>
<td>Ana urubwaji te kimo (problems related with rats)</td>
<td>Butaritari</td>
</tr>
<tr>
<td>Te mange umuniki, karakon te kai (need for replanting)</td>
<td>Butaritari</td>
</tr>
<tr>
<td>Urunka ko kawali (road damage during heavy rains)</td>
<td>Butaritari</td>
</tr>
<tr>
<td>Kaukau ko tolcwazi (opening up of gateways for marine resource recovery)</td>
<td>Onota, Benu</td>
</tr>
<tr>
<td>Te argibuka, bvala alui (storms and bad weather)</td>
<td>Manako, Tanama</td>
</tr>
<tr>
<td>Buekken te tan koobkana ko umuniki (soil and not suitable for agricultural activities)</td>
<td>Tamana</td>
</tr>
<tr>
<td>Invasive marine species</td>
<td>Makin</td>
</tr>
<tr>
<td>[mention man ko alui rats]</td>
<td></td>
</tr>
<tr>
<td>Te betisaka (drifting at sea)</td>
<td>Tabitonen Moang</td>
</tr>
<tr>
<td>Koorbakan ko kaubwai man te ben ao marin mani (decreasing cash from tropa and sea resources)</td>
<td>Tabitonen Moang</td>
</tr>
<tr>
<td>Questions</td>
<td>Number respondents positive</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>1. Goals achieved?</td>
<td>41</td>
</tr>
<tr>
<td>2. Interesting topic</td>
<td></td>
</tr>
<tr>
<td>3. Not very interesting topic</td>
<td></td>
</tr>
<tr>
<td>4. Interesting activities</td>
<td></td>
</tr>
<tr>
<td>5. Items not interesting</td>
<td></td>
</tr>
<tr>
<td>6. Wish to attend similar consultation?</td>
<td></td>
</tr>
<tr>
<td>7. Vulnerability to be supported</td>
<td></td>
</tr>
<tr>
<td>8. Adaptation strategies appropriate to island/village</td>
<td></td>
</tr>
<tr>
<td>9. Things needing improvement</td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---</td>
</tr>
<tr>
<td>causeways [3]; coastal protection [2]; strategies that tell people what to do and how to do them; causeways replaced with bridges; More consultations on CCA; stop gravel and sand mining; four days not enough [1]; presenters not coming [2]; check and firm up participation of guest speakers; government employees and NGOs to be included; reduce outer islands representation; distribution of handouts before sessions or copies presentations are in folders at beginning of consultation [4]; EIA Act need to be improved more; rules and laws must be discussed during consultation processes, the use of Kiribati language is needed when outer island people are involved [4]; handouts must be readable; food [not enough lunch]; sitting allowance considered/accommodation on Tarawa/pit claim to be increased; sitting positions labeled; immediate prioritizing island projects; presentation times too short; such an important consultation like this must be done over a two-week period as issues discussed touch the very existence of outer islands people; conduct of consultation should be lively, questions outside of context should be discouraged; transport arrangement for arrivals; Environmental laws must be properly explained to people to avoid conflict of interest and confusion; time must be properly allocated to resource people and for questioning; everything good [4]; more exercises needed to avoid boredom and stress;</td>
<td>43</td>
</tr>
</tbody>
</table>
Annex 5(a): Consultation Assessment Form
[5 minutes]

1. Are the aims and objectives of the Consultation met? Yes/No.
   If ‘No’, explain in a few words.
   ...........................................................................................................
   ...........................................................................................................

2. Which talk interests you most? .................................................................
   ...........................................................................................................

3. Which topic interests you least? ...............................................................  
   ...........................................................................................................

4. Which activity(ies) interest(s) you most? .............................................
   ...........................................................................................................

5. Which activity interest(s) you least? .....................................................
   ...........................................................................................................

6. Would you be keen to attend a similar consultation if held? ............... 
   ...........................................................................................................

7. Which adaptation strategy(ies) are you interested to be involved in?
   ...........................................................................................................

8. Which adaptation strategy(ies) are important for your Island/Community?
   ...........................................................................................................

9. Which part(s) of the consultation need(s) to be improved and how?
   ...........................................................................................................
Annex 5 (b) Taubwīlan te Maroro
[5 te mīnī] 

1. A teke nanon ana a tā mara a te Mororcō sei? Eng/A aki..
   Ngakana a aki a akawaranakoa tantana.

2. Tera te Mororcō a se rang a kakan-ongora iroum?

3. Tera te Mororcō a se kabotu iroum?

4. Baikara kanoan ke waaki inanon te Mororcō aika kaunga?

5. Baikara kanoan ma waaki inanon te Mororcō aika kabotu?

6. Ko kan ina riki te Mororcō se sekan sei ngakana e a manga hoonaki?

7. Tera te aeka ni waaki ni kamanomano mara te kai-rootaki are ko na ka hoonakain?

8. Baikara aanga ni kamanomano mara te kai-rootaki ake a hoongana ibaki abe/a kaawa?

9. Baikara waaki inanon te Mororcō ake k otaku bwa a riai ni katanaroaaki riki, a o ni kanga?
Appendix 7: Guest Speakers’ Presentations (Papers)

Order of Papers presented during the Consultation.

Day 1:

1. Dr. Ucantsako MacKenzie (Director, USP Kiribati Campus)
   **Paper Title:** The Sun has come closer to my home. (E a kaan riki taai ma mweungau).

2. Tererei M. Rooma (Director, ECD – MELAD)
   **Paper Title:** Climate Change. (Bibitakin kanoan te bong).

3. Tooti Tekinatui (Principal Fisheries Officer, Fisheries – MELAD)
   **Paper Title:** Factors affecting fisheries and marine resources. (Rootakir te Mau (Mari) i taari).

4. Ioane Ubaitoi (Senior Agricultural Officer - MELAD)
   **Paper Title:** The Impact of climate Change and Sea Level Rise on Terrestrial Resources, practical adaptation strategies. (Rootakir marine e ta man bibitakin kanoan te bong ao keenaken tabuiti taari, ara aanga ni kaangarouora na kok kai-rootaki ake a irekereke).

5. Moreni Tiberiano (Director, Meteorological Office - MICIT)
   **Paper Title:** Roles of the Meteorological Service and needs. (Ana niwakiri Aribitin taari kanoan boong ao kaananaona).

Day 2:

6. Tebutonga Ercata (Commissioner of Lands – MELAD)
   **Paper Title:** Lands Adaptation Strategies. (Kabonganaan rai te aba ma aontano).

7. Montaak Buregoun (Outer Islands Senior Project Officer - MISA)
   **Paper Title:** Island Councils Priorities. (Aia Kairikirake Kauna)

8. Kantuna Kainara (KAP II Coordinator)
   **Paper Title:** What is Kiribati Adaptation Project? (E tei ibukin tera te KAP ao riki KAP II?).

9. Dr. Temakei Tebano (KAP II National Consultant)
   **Paper Title:** Are traditional navigation skills and knowledge still useful today? (A bong boongana naba nabakura ni boraan ibukin bukara n taari aikei?)
10. Dr. Ternakei Tebano (KAP II National Consultant)

**Paper Title:** Links between systems. (A irerereke boota ni maiu ao reita ni maiu ni kabane naanga aika mwaiiti).

**Day 3:**

11. Tuni Keiekicki (Senior Economist, NEPO - MFEP)

**Paper Title:** National Economic Planning Office – NEPO. (Kairirukasan Kaubwain Abara).

12. Dr. Komeri Onorio (Director, Th'EcOCare Group - NGO)


13. Dr. Kambati Uriam (Principal, Tangintebu Theological College)

**Paper Title:** Ecoizing Our Faith. (Ara Onimaki ae Ootabwanin).

14. Reonate Willie (Senior Officer, Mineral Unit - MFMRD)

**Paper Title:** Impact of climate change and sea level rise on our coastal areas. (Rootakina mataniwiki abara ni irerereke na bibitakin kanoan te bong).
9 References


<table>
<thead>
<tr>
<th>Island</th>
<th>Vulnerabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makin Island</td>
<td>Coastal erosion on Makin village</td>
</tr>
<tr>
<td></td>
<td>Seawater seeping in to bwabwai pits</td>
</tr>
<tr>
<td></td>
<td>Declining resources</td>
</tr>
<tr>
<td></td>
<td>Drought affecting plants, also affecting corals, brackish water</td>
</tr>
<tr>
<td></td>
<td>Overcrowding, habitable, areas getting scarce related to erosion</td>
</tr>
<tr>
<td></td>
<td>Invasive organism seen at lagoon</td>
</tr>
<tr>
<td></td>
<td>No planning for dwellings and well/reservoir locations.</td>
</tr>
</tbody>
</table>

**APPENDIX 6: Individual Island Vulnerabilities and Problems Listing**

- Makin Island
  - Korakoran kanakin te aba (Makin) ni katoa riri ki
  - Rietan taari (rimnakon taari inanone te manonuye)
  - Karakon marin tari (ika, te kereboki)
  - Karakon kain anwa rake (te her, te mai etc)
  - Te mwaatata (aoraki, ma te kai nako ai taki anwa ao riki a rota te an i tari), Tarikan te ran
  - Te ihe tatu — uasukele te tano ae e riki man te kana kana
  - Norakin te aeka ni man ae e rangi n rawata inanone te namo
  - Korakoran te angbusa ke te engi mainiku angin te tari (each month)
  - Angimaan (once in two years)
  - Akean te bakoinee rau bokin te tabo ni maa e te mwambwa (e a rang ni buakaka te ran ni mool)

46-A
<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breadfruit disease (rot)</td>
<td>Katokan aorakin te bozta-ni-mai</td>
</tr>
<tr>
<td>Damage caused by rats</td>
<td>Buokan ao keaerereken ana urubwai te kimoa (rai)</td>
</tr>
<tr>
<td>Coconut tree replanting</td>
<td>Tangiran riki karaoni te manga umunikte nii</td>
</tr>
<tr>
<td>Road maintenance needed to be done with heavy plants. Current condition of road is bad.</td>
<td>Katelmatoan nolein te kawai n tuan bawai ni mwakuri aika a na kena ni karaoni te uruaki. N te tai asi ao e a manga uruaki naba ara kawai.</td>
</tr>
<tr>
<td>Warm weather from sunlight</td>
<td>Korakoram te kaoluone man te rimhga</td>
</tr>
<tr>
<td>Brackish water</td>
<td>Tarikan te ran,</td>
</tr>
<tr>
<td>Rising sea level and erosion</td>
<td>Riien te ane kana in te aba</td>
</tr>
<tr>
<td>Less outdoor activities</td>
<td>Lareereken te talinimwakuri</td>
</tr>
<tr>
<td>Context</td>
<td>Translation</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Marakei</td>
<td>Tangiran kaaro te boro i mataniwin te aba</td>
</tr>
<tr>
<td></td>
<td>Kateen te solar pump</td>
</tr>
<tr>
<td>Keeraken te bawti o buan kai n amwaraake i mataniwin te aba</td>
<td></td>
</tr>
<tr>
<td>Tarikan te mimbo, man korekore te riringa</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N o riego o i n kakaotia n tiaki rina</td>
</tr>
<tr>
<td></td>
<td>Wells getting brackish because of drought</td>
</tr>
<tr>
<td></td>
<td>Unexpected searches and bad weather</td>
</tr>
<tr>
<td></td>
<td>Overflow of fish ponds from high tides</td>
</tr>
<tr>
<td></td>
<td>Declining marine resources caused by changes in current direction and sea level rise</td>
</tr>
<tr>
<td></td>
<td>Fruit trees and plants affected by sea level rise</td>
</tr>
<tr>
<td></td>
<td>Disease caused by contaminated water and dust</td>
</tr>
<tr>
<td></td>
<td>Passage way blocked, caused by wave action</td>
</tr>
<tr>
<td></td>
<td>Water catchments provided on outer islands</td>
</tr>
<tr>
<td></td>
<td>Installation of solar pumps in villages affected by brackish water</td>
</tr>
<tr>
<td>Area</td>
<td>Issues</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Abalanga</td>
<td>Water tank for each village, Sea wall (Tebunginako, Koinawa, Etena)</td>
</tr>
<tr>
<td></td>
<td>Replanting the coconut tree, Solar pump (for Government and Council staff)</td>
</tr>
<tr>
<td></td>
<td>Generator (power house for government and council staff and office)</td>
</tr>
<tr>
<td>Tarawaia</td>
<td>Kanakin te aba, Koaakin buri i Kainaba ao Nabeina</td>
</tr>
<tr>
<td></td>
<td>Tarikai te ran, Rotakin maen kali namwarake, Rotakin maeni taari</td>
</tr>
<tr>
<td></td>
<td>Rotakin tano totaivei, Akean kano ani te tangke ni karau</td>
</tr>
<tr>
<td>Tarawaicainaneo (TUC)</td>
<td>Kanakin maaniwin te aba, Te ihera</td>
</tr>
<tr>
<td></td>
<td>Korakoran te koro-kai, Uererekon te ran/taiki/baro/keka</td>
</tr>
<tr>
<td></td>
<td>Kerikakin maeni taari, Korakoran te bubu man te ka a ko te kawai</td>
</tr>
<tr>
<td></td>
<td>Te riko tama, tano ao atibu</td>
</tr>
</tbody>
</table>

- coastal erosion
- damage to bridges at Kainaba and Nabeina
- brackish water
- declining fruit trees
- declining
- damages to causeways
- lack of water catchments
- coastal erosion
- overcrowding
- tree cutting
- water shortage/brackish water/contamination
- declining marine resources
- dust from exhaust and road aggregate mining
<table>
<thead>
<tr>
<th>Location</th>
<th>Issue</th>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Betio (BTC)</td>
<td>Urban dilapidation (rula) / planning</td>
<td>Slackness and ineffective proper town planning</td>
</tr>
<tr>
<td></td>
<td>Squatters issue</td>
<td>Squatters</td>
</tr>
<tr>
<td></td>
<td>Landfill problem</td>
<td>Landfill problem</td>
</tr>
<tr>
<td></td>
<td>Water lens contamination</td>
<td>Water lens contamination</td>
</tr>
<tr>
<td></td>
<td>Overcrowding</td>
<td>Overcrowding</td>
</tr>
<tr>
<td></td>
<td>Youth delinquency - unlawful behavior</td>
<td>Youth delinquency</td>
</tr>
<tr>
<td></td>
<td>Lagoon contamination</td>
<td>Water contamination</td>
</tr>
<tr>
<td></td>
<td>Fish stock fluctuation</td>
<td>Declining fish stocks</td>
</tr>
<tr>
<td></td>
<td>Rotten sea-weed on beach, reef and mudflat</td>
<td>Seaweed washed to beach</td>
</tr>
<tr>
<td>Malana</td>
<td>Kanakinakon matanwin te aba man te angibuaka</td>
<td>Erosion of coastline from bad weather</td>
</tr>
<tr>
<td></td>
<td>Taenskon te bono ke neel in rakan lubutia tani</td>
<td>Fish ponds flooded with high tides</td>
</tr>
<tr>
<td></td>
<td>Uhrakin boono ni keeraken te lubutia/angibuaka</td>
<td>Sea walls damaged by high tide and bad weather</td>
</tr>
<tr>
<td></td>
<td>Keeraken tarikan te ran</td>
<td>Brackish water</td>
</tr>
<tr>
<td></td>
<td>Rakam namakin te kahuehue</td>
<td>Increasing temperature felt</td>
</tr>
<tr>
<td></td>
<td>Karakon taa to anawauke</td>
<td>Fruit tree declining</td>
</tr>
<tr>
<td></td>
<td>Kerakoru te bubu man te mwan teretere</td>
<td>Dust caused by drought</td>
</tr>
<tr>
<td></td>
<td>Akean marina on te ora tari n aron te bun, noio; karakon tika</td>
<td>Declining and reduction in marine resources</td>
</tr>
<tr>
<td></td>
<td>Akean te nimroona</td>
<td>No seagrass and seaweed</td>
</tr>
<tr>
<td></td>
<td>Mwanwaen mariaonteens (eg. Nguo)</td>
<td>Shifting locations of marine benthic grow-out areas</td>
</tr>
</tbody>
</table>

46-E
<table>
<thead>
<tr>
<th>Kuria</th>
<th>Tarikan te ran</th>
<th>Brackish water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kanakinakon mataniwin te aba</td>
<td>Karakon askakin ikka</td>
<td>Coastal erosion</td>
</tr>
<tr>
<td>Karakon askakin ikka</td>
<td>Rotakin maean kaai na amwarake</td>
<td>Reduction in fish variety</td>
</tr>
<tr>
<td>Rictan iabutia taari</td>
<td>E korokone te mwaishakeke</td>
<td>Affected fruit trees</td>
</tr>
<tr>
<td>E korokone te mwaishakeke</td>
<td>Korokone te bubu a e a karika te aoraki</td>
<td>Sea level rise</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drought</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dust causing disease</td>
</tr>
<tr>
<td>Aranuka</td>
<td>E moana a tarika te ran ni mooi</td>
<td>Water beginning to become brackish</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fish getting fewer</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fruit trees affected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ground getting hotter, lot of dust causing disease</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coastal erosion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drought, no rain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Head ache and sore eyes more frequent</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dehydration from warmer days and nights</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Asemana
Tarikan te ran
Rotakin ao mauren kai n amwarake n aron te nii
Brackish water
Plants and trees like coconut are dying

Ikelenakin te bubu / niwatit te bubu man aki babakan te kanu
Keerikaakin mwaita te ika, marin taari nako, og. ikabuti
Inhaling of dust caused by drought
Marine fish and resources declining

Korakora kenakin matawitan te aha, tarake ma tanrio
Coastal erosion on lagoon and ocean sides

Buan, bwaken nii tao 5-6 te rimaan mai tanake/tanrio
Erosion causing loss of 5- rows of coconut trees

Korakora te kabebue
Mweebuka iroundu tan maeka, riki irakin teari masao koraka riki
(Wave riki sia auti nako nuukascaba)
Warmer days and nights
Dwellings close to coastline need to move further inland

Aoraki aika okioki, fluoe, aaimata
Frequent diseases such as fluoe and sore eyes

Nonouti
E rang ni bukaka ao ni beseakereke/tarika te ran
Drinking water dirty and contaminated

E a rang ri kanaka te aha, a rotaki kain amwarake/aati ni maeka
Serious coastal erosion, fruit trees affected, dwellings affected

Keerikaakin kai n amwarake
Kii makan ranakin te kavei ibukin ikelenakin te bubu
Fruit trees declining
Dwellings moved away from road side to avoid dust

Usareken mwaita te ika, were, ibe, etc. marin tari eg ibo, were etc
Decline in marine resource, worm, tridacna, and more

Aki macurain ika inaon nii ni beseana
Pond fish not healthy

46-45
<table>
<thead>
<tr>
<th>Malagasy</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kain amwareke n aron (i) te nii (ii) te mai (iii) te berovu</td>
<td>Fruit trees like coconut, breadfruit and fig dying</td>
</tr>
<tr>
<td>Mwanibwa ni mool, Mataniwina te aba</td>
<td>Wells becoming brackish, coastal erosion</td>
</tr>
<tr>
<td>Araf aika uareke (akoika ni korokoran kabuebeni tsai)</td>
<td>Children are sick from warmer days and nights</td>
</tr>
<tr>
<td>Anti ni maeka ake n uakaan ma mataniwina taari</td>
<td>Dwellings along coastal areas affected</td>
</tr>
<tr>
<td>Taapakawa (akona ni beinako ni korokoran te ara)</td>
<td>Fishermen drift at sea due to strong current</td>
</tr>
<tr>
<td>Muanan kaubwai ake iai ngkoa ao ake a ngkai (te ibo, were)</td>
<td>Declining or loss of marine resources such as worm and tridacna</td>
</tr>
<tr>
<td>Uareweken te kaubwai man te beii</td>
<td>Revenue from copra diminishing</td>
</tr>
</tbody>
</table>

46-H
<table>
<thead>
<tr>
<th>Tabiteuea Maiaki</th>
<th>Karako kai n amwarape man kabuebuen taai (lack of food); Taabo aika n kanaki taabo aika aiki (bibitaki)</th>
<th>Fruit trees declining in numbers due to increasing temperature; lots of eroded and accreted areas – physical changes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kanaki nako te aba (land erosion) a mwanemwae nako ke mweingting man butin te atra.</td>
<td>Land erosion due to changing current direction.</td>
</tr>
<tr>
<td></td>
<td>Marin te a ika (not enough marine resources)</td>
<td>Declining and diminishing marine resources.</td>
</tr>
<tr>
<td></td>
<td>Te ren e a riki nake n tarka (water salinity)</td>
<td>Brackish water.</td>
</tr>
<tr>
<td></td>
<td>(otan tari) kangoa man tari</td>
<td>Sunlight too bright for eyes.</td>
</tr>
<tr>
<td></td>
<td>Te bubu (bad air) mautakatake cause te aaraki</td>
<td>Lots of dust and dryness causing lots of diseases.</td>
</tr>
<tr>
<td></td>
<td>Sea pollution from kereboki, bwaia, poisoning fish</td>
<td>Water pollution and poisoning from sea cucumber gutting.</td>
</tr>
<tr>
<td></td>
<td>Te ran, o riki nake n tarka</td>
<td>Water getting saltier.</td>
</tr>
<tr>
<td></td>
<td>Kanaki nako te aba</td>
<td>Coastal erosion.</td>
</tr>
<tr>
<td></td>
<td>Marin te a aka – o kaaikatake</td>
<td>Declining marine resources.</td>
</tr>
<tr>
<td></td>
<td>Mautakatake</td>
<td>Drought.</td>
</tr>
<tr>
<td></td>
<td>Mato kai n amwarape</td>
<td>Dying fruit trees.</td>
</tr>
<tr>
<td></td>
<td>Barekerafan te aari</td>
<td>Polluted sea water.</td>
</tr>
<tr>
<td>Onotoa</td>
<td>Kaukan te tunga (Temao, Otoae)</td>
<td>Opening up of causeways at Temao-Otoae</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>----------------------------------------------------------------</td>
<td>----------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Cmaakin taabon akawa</td>
<td>Destruction of fishing grounds</td>
</tr>
<tr>
<td></td>
<td>Kanakin te aba</td>
<td>Land erosion</td>
</tr>
<tr>
<td></td>
<td>Rotakin maun kai n amwarake (global warming)</td>
<td>Plants and trees affected by warming</td>
</tr>
<tr>
<td></td>
<td>Tarikan te ran ni mooi</td>
<td>Brackish water</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beru</td>
<td>Rootakin te ran ni moi, eg. E rang a raroa te mam, Taboaki Meang, Teteitio, Nuka, Amiman ao Tabiang.</td>
<td>Drinking water affected, too far from village</td>
</tr>
<tr>
<td></td>
<td>Rotakin kai n amwarake, mai, nii, kaina, bwaybwaya, etc. ibukin korakorae te kabuebue ao nisam teari.</td>
<td>Fruit trees affected by warmer temperature</td>
</tr>
<tr>
<td></td>
<td>Marin taa i rota, maten ika nte nama a hehehe a o ni koro n te bike</td>
<td>Declining marine resources, fish dying and floating</td>
</tr>
<tr>
<td></td>
<td>Kairamaoran kaukan kotolewel Kairi, Kairama</td>
<td>Need for opening up of causeway</td>
</tr>
<tr>
<td></td>
<td>Rootaki nei ni baneawa, taoro nte tibuti</td>
<td>Fish ponds flooded and becoming more saltier</td>
</tr>
<tr>
<td></td>
<td>Kanakin saa tabua aertang korakorae n tabo alka Aitaat ao Venete</td>
<td>Erosion at Aitaat and Venete</td>
</tr>
</tbody>
</table>

46-1
Nikuna
Coastal erosion
Wells affected, water becoming brackish
Widespread of diseases caused by dust
Declining and dying trees and plants
Diminishing fish stocks
Diminishing revenue from marine and terrestrial resources
Shortage of time for outdoor activities eg. Working in bwalwai pits
Increasing sea level

Tamana
Bad weather causing damage to dwellings
Coastal and land erosion and wave action
Saline water
Declining marine resources
Road dust causing lots of diseases
Poor soil quality for planting purposes

Kanakin matanin te aba
Reotaki mwanibwa (takanan te ran)
Kai bulin ao eweewen ma okiokin aoraki n aekaia nako man te korakoron te bubi
Buam ao maeen kaai n amwarake ao aroka tabeua
Rikiraken karakon mwaalim lika ao buam lika tableua
Rikiraken uarekeko ao aki taari te karoke niwande ai taari ao aonoea
Rikiraken uarekeko te tai ni mwaalim i finiinoky te auti eg. N te rau, baakonikai, etc.
Rikiraken tabutin taari

Te ang buaka - ana urubwai nakon Auti ni meaka
Te kanakinako (matanin te aba) man ana urubwai te nao
Te tarika (climate change) te ran
Uarekeken mariai tari
Buam maron te kawal - e a karika te aoraki ao mean te bali aekakina
Aki maweeze sin te tao ibukin unikakan kai n amwarake ao kaai riki tableua especially te nil

46-X
Aronae  
Kanakin mataniwin te aba  
Rotakin kai n amwarake man kabusbuen taari  
Coastal erosion  
Higher temperatures affecting  
fruit trees