RISK ASSESSMENT HANDBOOK
Volume II

A Methodology for Coastal Risk Hazard Diagnosis for the Republic of Kiribati

coastal zone management pty ltd

Kiribati Adaptation Project

KAP II: Component 1.3.2

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About This Document

This document provides guidance on an approach to coastal hazard risk diagnosis and planning (CHRDP) for the Republic of Kiribati. The approach is the most up-to-date method for conducting CHRDP in Kiribati[1] and updates work undertaken in 2008.

This handbook is designed to be applied during training sessions conducted as part of Component 1.3.2 of the KAP II Program.

The approach outlined in this Handbook has been tailored for the specific purpose of CHRDP in Kiribati appropriate to country needs that recognises capacity constraints.

Overview of Approach

The approach to CHRDP presented in this handbook is focussed on identifying the risks that the Republic of Kiribati may face due to climate change. The specific focus is on the risk associated with change in average long-term mean sea levels and wave conditions that lead to permanent inundation and/or transient (storm induced) inundation in coastal areas.

A method to determine the likelihood and consequence of risks associated with **permanent** (from mean sea-level rise) and **transient** inundation (from storms) is presented. The aim is to determine how we can reduce the consequence and/or likelihood of the identified risks. Specifically, the aim is to determine **what** adaption actions should be taken, **when** they should be taken, and **where** they should be focussed.

A brief overview of the approach is outlined below.

To determine **where** adaptation action should be focussed we must analyse how the level of risk varies throughout the coastal zone and the characteristics of the sites that are most greatly exposed to permanent and/or transient inundation. By defining the physical and socio-economic characteristics of a site, we can determine what risks it is exposed to, how the level of risk varies throughout the area, and consequently which risks should be treated first and in what locations.

The 'coastal calculator' is an integral component to the risk assessment process outlined in this Handbook. **Physical characteristics** of the study areas will be defined and incorporated in the coastal calculator to set a level of 'impact' for permanent and transient inundation.

Socio-economic characteristics will be defined through selection of elements that contribute to maintaining socio-economic values in Kiribati. Subsequently, risks will be aligned to the identified elements. A risk rating must be attributed to each risk in each location to determine the level of risk and help prioritise **where** action should by taken first. A risk rating is defined based on a consideration of:

- Consequence of the risk:

[1] The approach presented herein has been updated from its original form (see the Risk Assessment Handbook, Volume I, developed during KAP Phase II, TOR 1.3.2) to align directly with recent training and expertise gained by GoK officials in application of the Coastal Calculator (KAP Component 1.4.0).

  - The type and extent of land use affected and its relative socio-economic value to Kiribati in conjunction with;
  - A review of a consequence scale – which enables prioritisation of consequence based on the overall objectives of the GoK.
- Likelihood of the risk:
  - Past experience – how often has that risk occurred in the region previously; and
  - The controls in place to manage the risk[2], in conjunction with;
  - The likelihood scale.

The output will be an understanding of the **types of risks** faced in Kiribati as a result of the impacts of permanent and transient inundation, under selected climate change scenarios and future timeframes. This provides the platform to determine **what** action should be taken to reduce the identified risks and **when** action should be taken.

Overall, this Handbook is focussed on answering:

- What are the risks?
- What coastal locations are at greatest risk in comparison to others?

In the subsequent Handbook (*Adaptation Handbook*) and training sessions the following questions will be answered:

- What actions can I take to reduce the identified risks? and
- When should actions be implemented?

Risk Management Framework

Risk management is the process of defining and analysing risks to facilitate decision making on the appropriate course of action to minimise these risks. Risk management is increasing advocated as a valuable tool to assist in managing the risks and hazards that may occur as a result of climate change.

There are five phases in a Risk Assessment (Figure 1)[3]:

- Set the context
- Identify the risks
- Analyse the risks
- Evaluate the risks
- Treat the risks

This handbook covers the first four phases of the risk assessment and explains how to complete each phase based on the information and resources available to GoK officers. The final phase 'Treat the Risk' is not covered in this handbook. Risk assessments use

[2] If the controls in place to manage the risk are effective, then likelihood of the risk occurring would be low, however if they ineffective, likelihood would be increased.
[3] The approach to risk management adopted for CHRDP in Kiribati follows the AU/NZS 4360:2004 standard (can be downloaded from http://www.climatechange.gov.au/impacts/publications/risk-management.html)

the term 'risk treatment' for adaptation – the two terms mean the same thing. 'Treat the Risk' is addressed in the *Adaptation Handbook*.

Document Outline

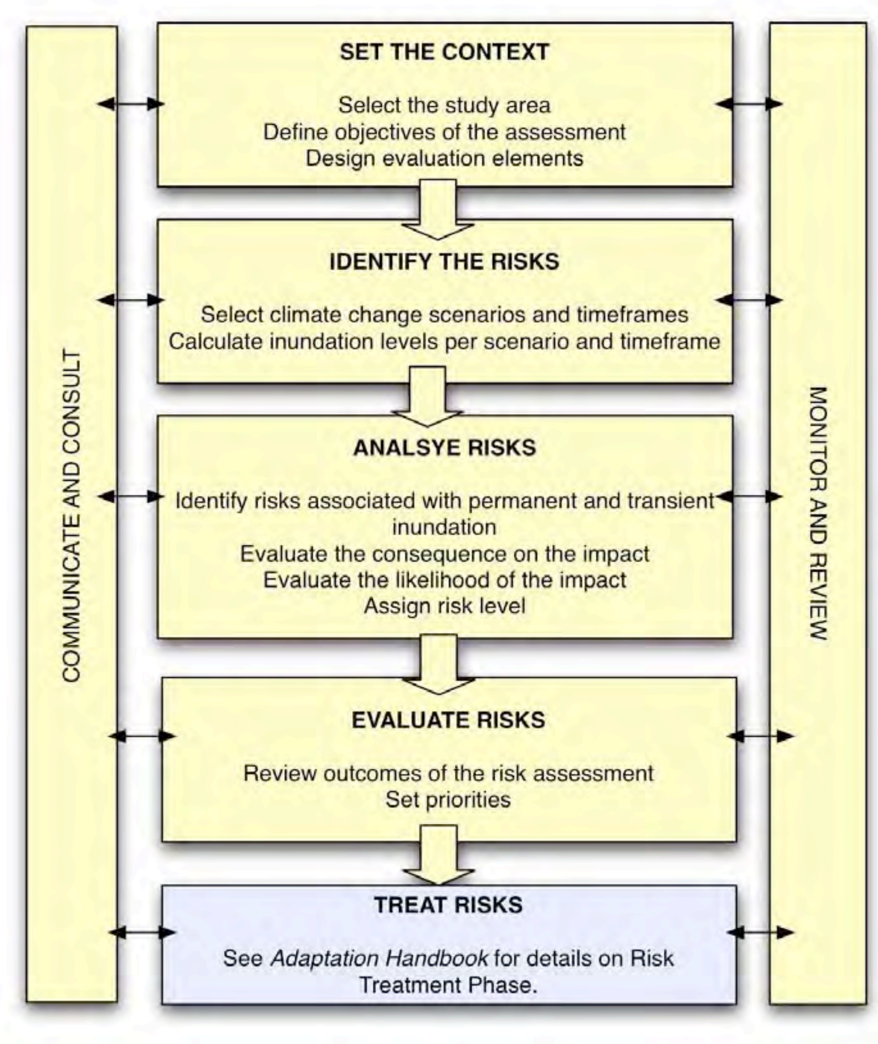

Figure 1: The Risk Assessment Approach

Phase I: Set the Context

At the end of 'Set the Context' phase you will have defined your study area and developed the tools for application in the risk assessment.

The *Set the Context* phase involves establishing the baseline for the risk assessment by defining parameters and setting the scope of the assessment. The *Set the Context* phase should be conducted as a collaborative process to ensure shared understanding. Central to this shared understanding is an understanding of how risks will be rated and how the analysis will be approached.

There are three key steps in Setting the Context:

1. Define study area;
2. Set objectives; and
3. Establish evaluation tools for the assessment.

Step 1: Define study area

The first step is to determine assessment scope. This involves defining the extent of the assessment in terms of time and location, and defining the level of detail and scope of the risk management activities to be carried out.

Climate change risk assessments can range from site-specific assessments to national level assessments. The outcomes of the risk assessment vary dependent on the level of assessment. Large-scale assessments are naturally broader and less detailed than smaller scale assessments.

Within the training sessions, the approach to risk assessment will be demonstrated for two scales: Island level, focussed on South Tarawa and Community level, focussed on two selected sites within South Tarawa.

The Island Level assessment will enable prioritisation of areas within South Tawara based on the calculation of relative levels of climate change risk throughout the region. The Community Level assessment can then be targeted at locations identified as having the highest level of relative risk.

Step 2: Set objectives

The second step is to define the **objectives** of the assessment. In this step we ask, 'what are we trying to achieve', and 'how do we describe this?' The aim is to ensure that there is a common understanding of the aims of the assessment.

'What are we trying to achieve' can also be referred to as the 'objectives'. By setting objectives we can measure the impacts and consequences of climate change on our chosen objectives.

The objectives for CHRDP in Kiribati were established during a workshop conducted in May 2008. The objectives include:

- Maintain community integrity.
- Ensure public safety and health.
- Maintain cultural values.
- Preserve the environment and promote sustainability.
- Foster local economy and growth.
- Protect and maintain infrastructure.

These objectives should be reviewed and updated as required to ensure that they are applicable for the broad range of Kiribati stakeholders.

Step 3: Establish evaluation tools

Once we have set our objectives, we need to develop our **evaluation tools**. Risk is determined by analysing the consequence (mwiina) and likelihood (katautau, aki-aaua, kona n riki) of a climate change risk occurring. There are three evaluation tools required to assess risk:

1. Consequence scale.
2. Likelihood scale.
3. Risk matrix.

A consequence scale for CHRDP was developed in May 2009 in consultation with GoK stakeholders (Table 3). The scale can be applied in the risk assessment to consistently rank levels of consequence for different climate change risks.

A likelihood scale and risk matrix for CHRDP was also developed in May 2008 in consultation with GoK stakeholders. The likelihood scale is shown in Table 1 and the risk matrix is presented in Table 2.

These tools ensure that a consistent and transparent approach to risk assessment is achieved.

The aim of the *Set the Context* phase is to develop these tools and gain consensus from relevant stakeholders that the tools are appropriate for the analysis. The tools presented here were validated by GoK stakeholders in June 2008, and will be applied in the risk assessment training. However prior to reapplying these tools in additional risk assessments in the future, it is important to ensure that consultation and validation of the tools is conducted.

Applying these evaluation tools in the risk assessment is described in the *Risk Analysis* section of this handbook (see Page 9).

Table 1: Likelihood scale

	Recurrent Risk	Single Event
Almost certain	Could occur several times per year	More likely than not – probability > 50%
Likely	May arise about once a year	As likely as not – 50/50 chance
Possible	May arise once in ten years	Less likely than not but still appreciable – probability less than 50% but still quite high
Unlikely	May arise once in ten years to 25 years	Unlikely but not negligible – probability low but noticeable greater than zero
Rare	Unlikely during the next 25 years	Negligible – probability low, close to zero

Table 2: Risk Matrix, consequence vs likelihood

	Consequence				
Likelihood	**Not bad**	**Bad**	**Plenty bad**	**Very bad**	**Catastrophic**
Almost certain	Low	Medium	High	Extreme	Extreme
Likely	Low	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	High
Unlikely	Low	Low	Medium	Medium	High
Rare	Low	Low	Low	Low	Medium

Table 3: Consequence Scale for application in CHRDP

	Objectives					
	Community Integrity	Public Safety and Public Health	Culture	Environment & Sustainability	Local Economy & Growth	Infrastructure Protection
Catastrophic (Te katoki ni buakaka)	Permanent relocation to another country	Numerous fatalities. Disease outbreak untreatable.	Total loss of identity and loss of culture	Total loss of land	Total Loss of revenue. No economic activity. Total loss of skilled population.	Total permanent infrastructure loss
Very Bad (E rangi ni buakaka)	Large number of displaced for significant duration. Community only partially functioning.	Some loss of life. Extensive injuries requiring extended medical treatment. Treatable disease outbreak requiring extensive external medical assistance (international)	Severe loss of traditional practice	Severe permanent damage to the environment	Severe impact on revenue capacity. Severe loss of skilled population	Severe damage that requires external assistance and resources
Plenty Bad (E Buakaka tau)	Significant number displaced for short periods. Community functioning with difficulty	Numerous injuries requiring medical treatment. Treatable disease outbreak requiring some external medical assistance (international)	Serious loss of traditional practise	Severe impact on environment with long-term effects.	Serious impact on revenue capacity. Serious loss of skilled population	Significant damage requiring external assistance
Bad (E Buakaka)	Minor temporary displacement. Some community disruption. Small number displaced for a short time.	Medical treatment for injuries required. Treatable disease outbreak requiring medical assistance from Gov't of Kiribati	Some loss of traditional practise	Serious impact on environment but with no long-term effects	Some impact on revenue capacity. Some loss of skilled population	Significant damage.
Not Bad (E Aki Buakaka)	Little disruption to community	No injuries requiring medical treatment. Treatable disease outbreak can be controlled by local community	No loss of traditional practice	Limited impact on the environment, recovery occurs without management efforts.	No Impact on revenue capacity. No loss of skilled population	Some damage

Phase II: Risk Identification

At the end of the Risk Identification phase we will have information on the impact of climate change in our study area.

To complete Risk Identification we need to undertake three Steps:

1. Select climate change scenarios and timeframes for application in the assessment.
2. Predict future coastal change for each scenario and timeframe.
3. Visualize future coastal change.

Step 1: Climate Change Scenarios and Timeframes

The Intergovernmental Panel on Climate Change (IPCC) produces climate change scenarios. The scenarios are projections of climate change based on alternate development trajectories. The IPCC focuses on six climate change scenarios[4].

Future climate change scenarios for application in CHRDP in Kiribati were previously determined through a workshop process with GoK representatives in 2008. Three climate change scenarios to represent Low (Te-tibu), Intermediate (Tibu-toru) and High (Tibu-mwamwanu) cases were selected (IPCC B2, A2 and A1FI scenarios).

In completing a climate change risk assessment we need to select a time in the future for which to analyse climate risk, for example, 10 years from now or 100 years from now. The impact of climate change will vary over time and therefore the risk of climate change will also vary. By selecting a number of different timeframes we can analyse the impact and/or risk of climate change to our objectives over time, which will help us determine when actions should best be taken.

[4] Descriptions of the six IPCC climate change scenarios are provided in Appendix 1.

The timeframes for predictions of future change in Kiribati were previously selected by GoK Stakeholders. The timeframes were based on generational timeframes[5] on the basis that these would be easiest to explain to communities. You may wish to apply different timeframes based on the questions you want answered in your assessment. However, for the purposes of training, the timeframes in the table below will be applied to generate levels of inundation in the Community level assessment, while the longest timeframe (2060-2084) will be applied in the strategic Island-scale risk assessment.

	GC*	GGC*	GGGC
GoK defined date range	2012-2036	2036-2060	2060-2084

***Note:** *GC: Grand Children; GGC: Great Grand Children; GGGC: Great Great Grand Children)*

Step 2: Predictions of future Coastal Change

The physical impact of sea level rise and inundation will be determined for each of the climate change scenarios and timeframes by applying the **coastal calculator** developed by the New Zealand National Institute of Water and Atmospheric Research (NIWA) through KAP II.

The coastal calculator is a tool that incorporates Kiribati environmental data to generate projections of permanent and transient storm-induced inundation as a result of climate change.

The output of the coastal calculator is a height that signifies the level of inundation under each selected climate change scenario and timeframe.

It is important to note that the coastal calculator applies set timeframes according to IPCC terminology. The

[5] These timeframes were selected by GoK stakeholders during a CHRDP workshop conducted in June 2008.

timeframes within the coastal calculator that align to the generational timeframes are shown in the Table below.

	GC*	GGC*	GGGC
GoK defined date range	2012-2036	2036-2060	2060-2084
Coastal Calculator range	2030-2039	2050-2059	2070-2079

Step 3: Visualising future Coastal Change

To complete the risk assessment, we must be able to assess the impact of climate change in our study area. To do this, we need to visualise the level of inundation (the output of Step 2).

To visualise the inundation, the inundation height value (output from Step 2) can be mapped showing the area of land that would be inundated under each climate change scenario.

Methods to develop inundation maps are presented in the *Risk Assessment Technical Handbook,* developed as a component of KAP II (Component 1.3.2)[6].

For the purposes of the current training program, Google Earth will be used to visualise the projected inundation levels using mapping data provided by the GoK. This will ensure that GoK officials without access to mapping programs can visualise future coastal change and conduct the risk assessment.

[6] A copy of the Technical Handbook is available upon request.

Phase III: Risk Analysis

THE RISK ANALYSIS PROCESS IS BY NATURE SUBJECTIVE. SO, IT IS IMPORTANT TO ENSURE THAT ALL RELEVANT STAKEHOLDERS ARE INVOLVED IN MAKING DECISIONS THROUGH THE PROCESS. THIS RESULTS IN TRANSPARENCY AND ALSO INCREASED OWNERSHIP OVER THE OUTCOMES OF THE RISK ASSESSMENT.

At the end of the *Risk Analysis* Phase you will have assigned risk levels to the identified risks within your study area.

The *Risk Analysis* phase entails six steps:

1. Separating the study area into compartments (*only if incorporating a spatial element within the assessment*).
2. Determining the climate change risks to which the area is exposed (using output from Risk Identification - Phase II)[7].
3. Reviewing the controls that are currently in place to manage the identified risk.
4. Assigning a consequence level to each identified risk, using the consequence scale (output from Setting the Context - Phase I).
5. Assigning a likelihood rating to each identified risk, using your likelihood scale (output from Setting the Context - Phase I).
6. Assigning a risk rating to each of identified risk, using your risk matrix (output from Setting the Context - Phase I).

Step 1: Separate study area into compartments

The aim of the risk assessment conducted for the purposes of CHRDP in Kiribati is not only to determine the risks, but to also determine **where** the risks are highest[8].

Therefore, the first step in the Risk Analysis is to break the study area into compartments. There are two approaches for compartmentalising the study area depending upon the scale of assessment.

For the purposes of the current study, two scales of assessment are being conducted: **Island scale**, incorporating South Tarawa, and **community scale**, two locations within South Tarawa.

In the Island scale assessment, village boundaries will be used to separate the study area into compartments. In the community scale assessment, the attributes of the coastal zone will be used to separate the study area into compartments (see Appendix 3 for further details).

Step 2: Determine the climate change risks to which the area is exposed

The link between climate change and risk is shown in Figure 2.

To determine climate change risks, we must identify the climate variables of interest to our assessment, how these variables may change in the future, and the impacts that result from these changes. Once we have identified the

[7] This step could also be completed as the last step in the Risk Identification phase. However, for the purposes of this training manual and ease of explanation during the training session, the identification of risks occurs in Risk Analysis phase.

[8] If the assessment was focussed on a identify risks at a strategic level, without wanting information on **where** the risks occur, the assessment could be conducted without breaking the study area into compartments. An example of this approach will be conducted during the training session.

impacts, we can determine the risks that may be associated with climate change.

It should be stressed that this risk assessment process assesses risk on the present-day socio-economic and environmental conditions only. No consideration is given to development trends that will influence the potential future status of the coastal compartments.

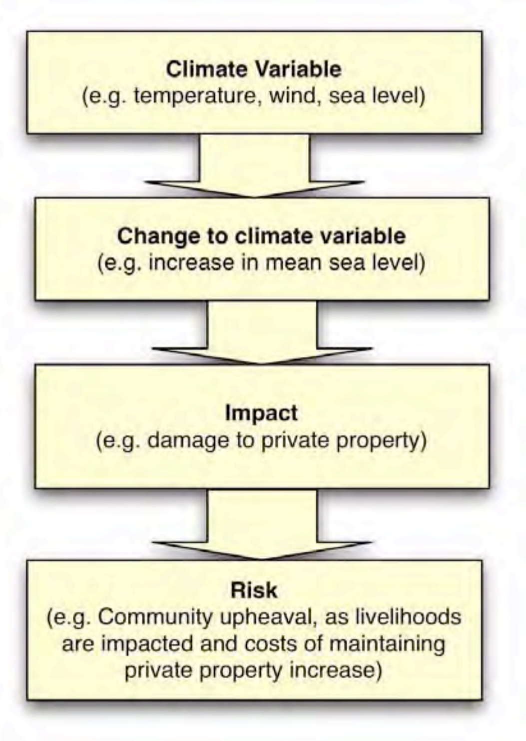

Figure 2: Link between climate change and risk

The climate variables of interest and how they change over time were analysed using the coastal calculator, during the Risk Identification phase (Phase II). In addition the output from Phase II provides information on the impact of climate change (inundation) in our study area. Impacts can be broken into two key categories:

- Socio-economic impact; and
- Environmental impact.

Socio-economic impacts can be identified through proxy indicators of socio-economic wellbeing, for example, housing, shops, and industrial development. Similarly, environmental impacts can be identified through proxy indicators of environmental wellbeing, such as mangrove habitat.

Therefore, by identifying elements that are indicative of socio-economic and environmental wellbeing, we can start to determine the potential risks, based on what is currently located there.

A list of elements that contribute to socio-economic and environmental wellbeing in Kiribati is shown in Table 4. The impacts of climate change and the associated risks are aligned to these elements are also shown in Table 4. This table is a tool for identifying climate change risks in our study area.

To determine climate change risks in our study area, we apply the output from the Risk Identification phase (Phase II) – the visual tools indicating levels of inundation. Then examine the study area, or compartment, and identify the elements that are impacted by inundation. Finally, record the climate change risks that are associated with the impacted elements in the assessment table. See Table 5 for example[9].

Step 3: Review controls in place to manage the risks

For many of the identified risks, there is likely to be a set of controls in place to manage these risks. Controls may include policies, plans, and/or infrastructure (i.e. defence structures). When we analyse risk, we must consider the risk in light of the current controls in place to manage the risk, because this will influence the risk

[9] The table shown in this example is for a strategic risk assessment that incorporates a spatial element. Further, the example includes only one scenario and one timeframe for assessment. Different results tables would be required depending upon the focus of the assessment. In this study the large-scale (Island level) assessment is only completed for one timeframe and one scenario. This is because the intended outcome of the assessment is an understanding of relative risk. If the purpose of the assessment was to examine risk over time, then an alternate results table would be required.

prioritisation rating as we move through the analysis.

Therefore, for each identified risk, record the existing controls in place to manage the risk (see Table 5 for example).

Step 4: Assign a consequence level to each identified risk

The next step is to review the risks you have recorded. Then by applying the consequence scale (see Table 3) use your judgement to determine the consequence level for the identified risk.

For example, if there are a significant number of houses impacted by permanent inundation, review the consequence scale and read the ratings for different levels of consequence against each of your objectives to determine what level of consequence should be assigned.

Complete this step for each identified risk.

Step 5: Assign likelihood rating to each identified risk

The aim of this step is to assign a likelihood rating to each of the identified climate change risks. Likelihood is determined by considering:

- Past experience;
- History of occurrence; and
- Controls in place.

Apply your judgement and experience to assign a likelihood rating based on the five-point likelihood scale (see Table 1).

Step 6: Assign risk rating

In the final step, a risk rating is assigned by applying the risk matrix (see Table 2). To do this, review the consequence and likelihood ratings assigned in the previous steps and select the appropriate risk rating following the matrix.

The output is a risk rating for each risk.

Table 4: Climate change risks linked to socio-economic and environmental elements

Element	Impact	Risk
Land	Loss of private land	Displacement of population and increased pressure on available land. Increased illegal residence (squatters)
	Loss of government land	Increased pressure to provide services to the community, for example government housing.
	Loss of industrial/commercial land	Decline in GDP Increased unemployment
	Loss of cultural land	Loss of traditional practice and/or loss of cultural identity
Development	Damage to private property	Community upheaval, as livelihoods are impacted and costs of maintaining private property increase
	Damage to government property (hospital, schools, government housing)	Health and educational decline due to increased pressure on government to maintain service provision. Increased maintenance costs
	Damage to cultural facilities	Loss of traditional practice and/or loss of cultural identity.
	Damage to industrial/commercial property	Loss of income as service delivery is impacted and costs to service and repair buildings increase
Primary Infrastructure	Damage and/or loss of major transport facilities – airport, ports	Loss of GDP – through impact on tourism and export/imports. Isolation of communities – impact on ability to travel to outer islands and other countries. Inability to bring in commodities – potential health implications for local populace. Increased cost for maintenance and repair of major transport facilities.
	Damage and interruption to secondary transport facilities – main roads	Isolation of communities. Increase costs for maintenance and repair of transport routes.
Water Resources	Salinisation of ground water lens	Decline in available drinking water. Increased incidence of human health problems.
	Damage to services: gas mains, water mains, sewerage, lighting	Increased maintenance and repair costs.
Agricultural resources	Loss of agricultural land	Decline in productivity and GDP.
	Damage to crops	Loss of fresh produce. Decline in productivity.
Mangroves	Loss of mangrove habitat	Increase coastal instability. Loss of ecosystem values.

Table 5: Example risk analysis

Compartment No.	Identified Risks	Existing Controls	Consequence	Likelihood	Risk
1:	Community upheaval, as livelihoods are impacted and costs of maintaining private property increase	Insurance mechanisms (?)	Plenty Bad	Possible	Medium
	Increased maintenance costs	Annual budget reviews (?)	Bad	Almost Certain	Medium
	Increase coastal instability.	Mangrove rehabilitation projects (?)	Bad	Likely	Medium

Phase IV : Risk Evaluation

At the end of the Risk Evaluation phase you will have verified your risk ratings and completed risk prioritisation.

During this Phase, we apply the information generated through Risk Identification (Phase II) and Risk Analysis (Phase III) to undertake Risk Evaluation. The following Steps will be undertaken:

1. Evaluate consistency in risk allocation.
2. Assign an overall risk rating per compartment - *only for spatial based assessments:*
3. Produce risk maps - *only for spatial based assessments:*

Step 1: Consistency in Risk Allocation

The aim of this step is to ensure that the ranking of risks throughout the study area has been consistent, and to ensure that there are no anomalies in the assessment. To do this, review the combinations of likelihood and consequence across the study area and/or within compartments.

If your assessment does not have a spatial element (i.e. the study area was not broken into compartments) the final output of the risk assessment is a risk rating per risk.

This risk rating would be applied to help inform risk treatment – where the highest risks would be treated as a priority. Further details on the Risk Treatment phase (Phase IV) will be covered in the *Adaptation Handbook.*

Step 2: Establish Risk Ratings per Compartment

If your assessment contained a spatial element (i.e. the study area was broken into compartments), this step is conducted to assign an overall risk rating per compartment.

The objective of the risk assessment is to prioritise areas based on the level of risk. Therefore, an overall risk rating is required per compartment, to guide subsequent activities.

The overall risk rating is assigned based on a consideration of the level or risk for each of the identified risks in the compartment, and also on the number and type of risks.

As per the Risk Analysis phase (Phase III), the assignment of an overall risk rating is a subjective process. Therefore, it is important that final risk prioritisation rankings are gained through consensus.

The final output is a risk rating per compartment.

Step 3: Production of Risk Maps

If your assessment contained a spatial element (i.e. the study area was broken into compartments), the final output of the risk assessment is a risk prioritisation value for each compartment.

This risk prioritisation value can be mapped and used to inform CHRDP.

Summary

This Handbook has outlined an approach to risk identification and analysis, to inform CHRDP in Kiribati. The outputs will enable prioritisation of coastal areas for further analysis and inform the selection of adaptation options to treat identified risks.

Methods to inform the selection and implementation of adaptation options will be presented in the Adaptation Handbook.

Appendix 1: IPCC Climate Change Scenarios

Scenario	Description of emission	Approximate carbon dioxide stabilisation scenario
A1FI	High end of the scenarios range	Does not stablise
A1B	Intermediate case (middle- of-the-road scenario)	750ppm
A1T	Intermediate/low case	650 ppm
A2	High case	Does not stabilise
B1	Low end of the scenario range	550ppm
B2	Intermediate/low case	650ppm

Appendix 2: Compartmentalisation of Study Areas

There are two approaches to separating the study areas into compartments, depending upon the scale of your assessment.

1. Boundaries based on coastal geomorphology (small scale assessments)
2. Boundaries not based on coastal geomorphology (large scale assessments)

Each is discussed below.

Boundaries based on coastal geomorphology

The coastal zone is not uniform. This means that the coastal form will change as you move along the coastline.

When considering climate changes, particularly changes associated with modified mean sea level and wave action, the attributes of the coast are important in providing information on the level of potential climate change impact. For example, different coastal types may be more or less sensitive to inundation.

It is important to understand the different sensitivities of the coastal zone, because having this information will ensure that the Risk Identification phase of our risk assessment (Phase II) is completed with increased certainty.

Therefore, during the risk assessment training we will spend some time in the field looking at different coastal forms and discussing their sensitivity to inundation. This information may[10] be applied to separate small-scale study sites into compartments.

The aim is to gather increased detail in the Risk Identification phase (Phase II) by ensuring that the attributes of the coastal zone are considered in the development of projected inundation levels.

Boundaries not based coastal geomorphology

In large scale assessments it is not always possible to gather the detailed coastal field based information that would be required to separate the study area based on coastal geomorphology. Further, in large scale assessments, the highly variable nature of the coast line would make the division of the study area too detailed, resulting in increased work load. Therefore, in preliminary, larger scale assessments (Island level), nominal boundaries are applied to separate the study area into compartments.

Non coastal geomorphology based boundaries may include, but are not limited to:

- Census boundaries.
- Village boundaries.
- Equal land area per compartment.

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[10] The ability to separate compartments based on coastal attributes will be discussed further during the field visit prior to determining if this approach will be adopted for the Community scale assessment.