

**DEVELOPMENT OF GUIDELINES FOR INCORPORATING  
INTEGRATED DISASTER RISK MANAGEMENT (IDRM)  
IN AGRICULTURAL PLANNING AND ENVIRONMENTAL  
MANAGEMENT  
ATN/OC - 11718 - GY; GY – T1050**



**GUIDELINE FOR INCORPORATING  
INTEGRATED DISASTER RISK  
MANAGEMENT IN ENVIRONMENTAL  
MANAGEMENT**

**Gary Davidson  
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# COOPERATIVE REPUBLIC OF GUYANA

## *Guideline for Incorporating Integrated Disaster Risk Management in Environmental Management*

### **EXECUTIVE SUMMARY**

This *Guideline* introduces the concept and portrays the practice of Integrated Disaster Risk Management (IDRM) for the environment sector. It flows from a definition of IDRM to the application of IDRM in environmental management.

IDRM as used in this *Guideline* refers to a proactive, comprehensive approach to disaster risk management that includes pre-disaster reduction as well as post-disaster response and recovery; and emphasizes actions taken before a hazard results in a disaster. Such an integrated approach involves the following policy elements: *risk identification, risk reduction (prevention and mitigation), adaptation, financial protection and risk transfer, preparedness and response, and rehabilitation and reconstruction*. IDRM is consistent with the principles of Comprehensive Disaster Management (CDM), the CARICOM-endorsed regional strategy for disaster management in the Caribbean. Climate change considerations, both assessments of increasing risks and approaches to adaptation, are part of IDRM.

Integration can occur vertically within an organization or horizontally amongst organizations, or both. For the purposes of this *Guideline*, integration is focused on actions for environmental management within the environment sector. Cross sector integration is a further step, but outside the scope of this *Guideline*.

The purpose of the *Guideline* is to outline a process for incorporating IDRM planning within the environment sector. The *Guideline* steers readers through a five-step process to implement IDRM through the development of an IDRM plan. The *Guideline* presents an approach and process through which the various segments of the environment sector (departments, agencies, commissions, etc.<sup>1</sup>) can come together and implement IDRM. It is intended for immediate application.

Each step in the five-step process contains a series of sub-steps that lead to the completion of the step. Each step needs to be finalized prior to commencing the next step. The information from the previous step is required to complete the next step.

Each step also contains a management guide with information indicating the:

- Expected output of the step
- Responsibility for ensuring the step is accomplished
- Estimated total time required to complete the step

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<sup>1</sup> Collectively, these are referred to as “agencies”.

Step 1 - Getting Started - encompasses all the preparatory work needed to achieve a practical and implementable IDRM plan. It includes the following sub-steps:

- Identify a political champion
- Build political and staff awareness
- Create an IDRM planning team of representatives from environment sector agencies
- Establish a project work plan and budget
- Get authority to proceed

Step 2 - Identify Risks and Consequences - covers the 'risk identification' component of the definition of IDRM. Step 2 identifies anticipated disaster risks to the environment sector, incorporating the effects of climate change, and scopes the consequences for each of the identified risks. The purpose of this Step, along with Step 3, is to create the risk assessment that is the foundation of any IDRM plan.

Step 3 - Assess and Prioritize Consequences and Risks - completes the risk assessment by further examining the consequences developed in Step 2. The purpose of Step 3 is to assess the consequences, indicate the Region(s) they occur in, and then prioritize the consequences. The result is a comprehensive risk assessment, including a list of national priority consequences for the environment sector in Guyana.

Step 3 includes the following sub-steps:

- Assess the consequences by frequency, damage and IDRM cost
- Prioritize consequences
- Develop a national IDRM priorities list

Step 4 - Prepare a Draft Action Plan for IDRM - gets to the core of the IDRM planning process by identifying the actions that need to be taken to address the high priority consequences of disaster risks for Guyana's environment sector in an integrated manner.

Step 4 requires the following sub-steps:

- Determine the number of priority consequences to be included in the Action Plan
- Outline the actions for each consequence in terms of prevention, mitigation/adaptation, financial risk management, rehabilitation and reconstruction
- Assign responsibility for each action
- Determine the time frame for each action
- Write the Draft Action Plan
- Review the Draft Action Plan with environment sector agencies
- Obtain formal approval for the Action Plan
- Distribute the approved Action Plan to all staff in the environment sector

During Step 4 care must be taken not to create merely a wish list that can never be implemented. Instead, actions should be specific - both in type and geography - and realistic in the Guyanese context.

Among all of the steps in this *Guideline* Step 4 will require the most amount of time. It is essential that all members of the IDRM planning team as well as the other environment

sector agencies have 'bought into' the final document, if its implementation is going to be successful.

Step 5 - Implement IDRM for Environmental Management - is the last step in IDRM planning for the environment sector. It takes the Action Plan for IDRM developed in Step 4 and formulates a detailed implementation strategy. The IDRM planning team gets Step 5 underway by preparing a draft strategy that is then reviewed and revised in one or more working sessions with the environment sector agencies prior to being submitted for formal approval.

Following approval, the IDRM Action Plan has to be integrated into Guyana's budgets as per the implementation strategy. Every five years or so, the Action Plan for IDRM in Environmental Management must be reviewed to absorb new information, adjust priorities if needed and, most likely, revise the initial funding approach.

Step 5 includes the following sub-steps:

- Develop a draft implementation strategy
- Establish draft milestones
- Review draft implementation strategy with environment sector agencies and revise
- Obtain formal approval of the implementation strategy
- Train environment sector staff and stakeholders on Action Plan and implementation strategy
- Integrate implementation strategy into government budgets
- Review Action Plan for IDRM in Environmental Management

Attached to the *Guideline* is a series of Appendices that provide the following information:

- Appendix A provides a summary table of the five steps with their accompanying sub-steps
- Appendix B provides an overall management guide with the output, responsibility and time required for all five steps
- Appendix C provides a Glossary of Terms used in the *Guideline*

## INTRODUCTION

This *Guideline* introduces the concept and portrays the practice of Integrated Disaster Risk Management (IDRM) for the environment sector. It flows from a definition of IDRM to the application of IDRM in environmental management. In this *Guideline* the term environment refers to the natural environment.

### ***Definition of IDRM***

IDRM as used in this *Guideline* refers to a proactive, comprehensive approach to disaster risk management that includes pre-disaster reduction as well as post-disaster response and recovery; and emphasizes actions taken before a hazard results in a disaster. Such an integrated approach involves the following policy elements: *risk identification, risk reduction (prevention and mitigation), adaptation, financial protection and risk transfer, preparedness and response, and rehabilitation and reconstruction*. IDRM is consistent with the principles of Comprehensive Disaster Management (CDM), the CARICOM-endorsed regional strategy for disaster management in the Caribbean. Climate change considerations, both assessments of increasing risks and approaches to adaptation, are part of IDRM.

Based on the sweep of this definition, IDRM is the process of integrating specific actions related to risks that simply stated are:

- Identification
- Prevention
- Mitigation
- Adaptation
- Financial management
- Rehabilitation
- Reconstruction

The term “integration” is key to understanding the concept of IDRM. By-in-large, the seven specific components of IDRM are understood in a general manner. They are definitely well studied and presented in the literature on disaster risk management for Guyana<sup>2</sup>. The challenge is to *integrate* these components into a comprehensive integrated disaster risk management system that will reduce the impact of future disasters, while allowing for appropriate disaster response.

Integration can occur vertically within an organization or horizontally amongst organizations, or both. For the purposes of this *Guideline*, integration is focused on IDRM actions for environmental management within the environment sector. Cross sector integration is a further step, but outside the scope of this *Guideline*.

While the concept of integration is envisaged in many instances, both the number of components of IDRM and organizational mandates and operational policies and procedures of various agencies make IDRM a significant challenge. A comprehensive process that

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<sup>2</sup> See the Literature Review and Review of National Plans prepared as part of this project.

reaches into the organizational structures and makes full use of the detailed knowledge of professionals and stakeholders involved in the environment sector is required.

The term IDRM is relatively new in the general disaster management literature. However, a review of international literature completed for this project indicates that similar approaches are used but defined differently. The most common approach is an “additive” one, moving from disaster response (DR) through disaster risk reduction (DRR) to disaster risk management (DRM) and into integrated disaster risk management (IDRM).

The most widespread and historically used approach to disasters is simply disaster response. All disasters require a response and this is what most emergency organizations are trained to do. Whether a drought or fire faces the environment sector, there must be a response. Following the disaster, the environmental community looks to rehabilitation and reconstruction. It is these three components – response, rehabilitation and reconstruction - by which citizens traditionally judge emergency organizations and their political masters. If there is not effective action, changes will be demanded.

However, response, rehabilitation and reconstruction, while visible, are more costly than prevention. It is well known that it costs less to mitigate or adapt to prevent or reduce a risk than to rebuild after a disaster. A common example occurs with infrastructure. The costs of flood proofing a bridge are small compared to building a new one. The same is true with communities affected by disasters. It is better to prevent or adapt than to rebuild.

This knowledge has led to ever increasing efforts to improve disaster risk management. The term refers to the prevention, mitigation, adaptation and financial instruments that reduce or prevent the damage caused by disasters.

When combined, the disaster response cluster of activities and the disaster risk reduction cluster of activities can be integrated, or brought together, to minimize the impact of disaster events. However, this must occur within the organizational structure of the environment sector within government to be implemented in an effective manner.

The placement of climate change adaptation in the continuum varies with the different approaches. Often the term DRM+CCA (Climate Change Adaptation) is used. However, in IDRM climate change impacts are considered as part of risk identification. That is: How will a changing climate alter the risks that the environment sector faces. From that perspective mitigation of and adaptation to climate change are considered within the context of the specific risk.

General definitions of the various terms referred to in this *Guideline* are provided in a “Glossary of Terms” attached as Appendix C.

### ***Purpose and Use of the Guideline***

The purpose of the *Guideline* is to outline a process for incorporating IDRM planning within the environment sector. The *Guideline* refers only to the integration of IDRM activities within the environment sector. This is a start and a challenging one at that. Wider based

integration amongst sectors, as noted, is a later step and can only be contemplated once the sectors themselves have each mainstreamed IDRM.

The *Guideline* steers readers through a five-step process to implement IDRM through the development of an IDRM plan. The *Guideline* presents an approach and process through which the various segments of the environment sector (departments, agencies, commissions, etc.<sup>3</sup>) can come together and implement IDRM.

The *Guideline* is intended for immediate application. There will be future “disasters” and these will be more intense as a result of a changing climate. IDRM presents the most current approach to deal with future disaster events.

The *Guideline* presents a structure for implementing IDRM, not the precise detail. These details will be developed in several stages using the professional knowledge embedded within the various agencies that make up the environment sector and local stakeholders affected.

The *Guideline* presents a step-by-step process and not a checklist of tasks. This is the only practical way to prepare for and implement IDRM. The checklist approach leads to documents that sit on the shelf, because they frequently do not use local knowledge to develop workable solutions. Environmental management has to cope with certain key disaster events, such as floods, fires, pests and drought. However, these manifest themselves differently and have specific consequences in the various Regions of Guyana. The only people who can provide detailed input are the professionals and stakeholders that are intimately familiar with the area. This type of knowledge takes years to accumulate. Only an approach that incorporates this knowledge will be effective and have a chance at being implemented. The *Guideline* strives to build on this knowledge, as this is the key to a successful IDRM approach.

The *Guideline* is structured in a way that guides the various agencies within the environment sector through the development of an IDRM plan. This plan when completed will be robust enough and contain sufficient local knowledge to be effective in reducing the consequences of future disasters. There will be future disasters and, from what is known about the changing climate, they will be more severe. The *Guideline* presents an effective approach for the environment sector to prepare for and reduce the impacts of these extreme events in an integrated manner.

The first step in developing this knowledge and preparing an IDRM plan for the environment sector is a training workshop. This workshop will introduce participants to the concept of IDRM and the approach to preparing an IDRM plan. The participants will become the early adapters both within the environment sector and inside their agencies. Using the *Guideline* they can start the journey towards the preparation of an effective IDRM plan for the environment sector in Guyana. It will not be an easy journey and will take approximately 18 months of concerted effort. IDRM is a significant challenge but it is one

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<sup>3</sup> Collectively, these are referred to as “agencies”.

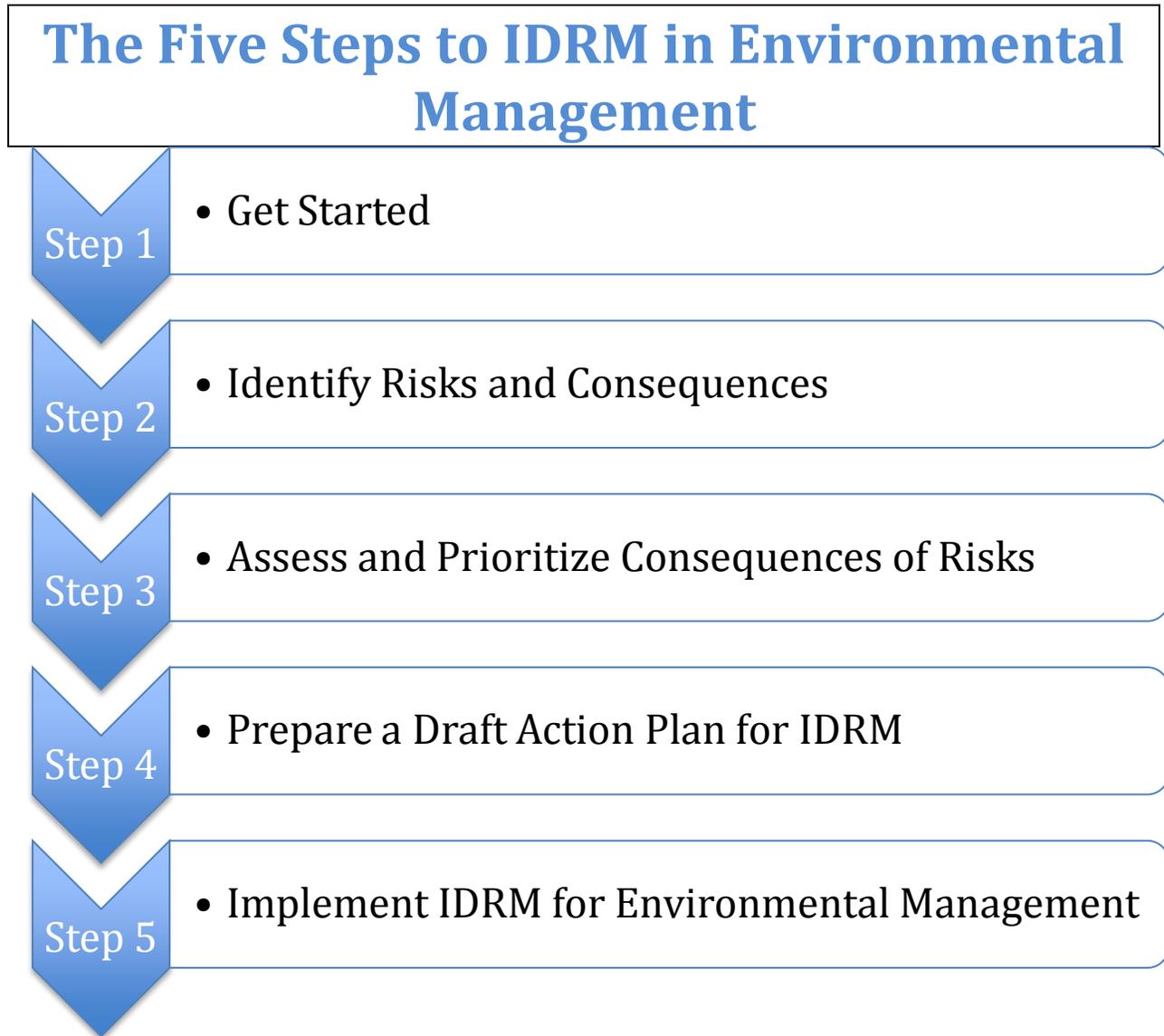
that must be engaged for effective environmental management and reduction of vulnerability in the sector.

The next section of the *Guideline, Five Steps to IDRM*, outlines the five steps that lead to the preparation of an IDRM plan. It presents a detailed road map for employing IDRM in environmental management.

## **FIVE STEPS TO IDRM**

The *Guideline* presents five sequential steps for the introduction of IDRM into environmental management in the environment sector. Each step contains a series of sub-steps that lead to the completion of the step. Each step needs to be finalized prior to commencing the next step. The information from the previous step is required to complete the next step. Figure 1 depicts the five steps to IDRM.

FIGURE 1



Each step also contains a management guide with information indicating the:

- Expected output of the step
- Responsibility for ensuring the step is accomplished
- Estimated total time required to complete the step

Attached to the *Guideline* is a series of Appendices that provide the following information:

- Appendix A provides a summary table of the five steps with their accompanying sub-steps
- Appendix B provides an overall management guide with the output, responsibility and time required for all five steps
- Appendix C provides a Glossary of Terms used in the *Guideline*



## Step 1

- **Get Started**

- 1.1 Identify a political champion
- 1.2 Build political and staff awareness
- 1.3 Create an IDRM planning team of representatives from environment sector agencies
- 1.4 Establish a project work plan and budget
- 1.5 Get authority to proceed

This critical step is often overlooked. Without the five sub-steps completed, the IDRМ plan for the environment sector will probably never get off the ground. The required outputs from Step 1 are:

- Political champion
- Operational project lead
- Functioning IDRМ planning team
- Project work plan and budget
- Approved project

### ***Step 1.1 Identify a political champion***

All projects that require collaboration among various agencies need a political champion, who can cut across organizational mandates and is committed to achieving the project objectives. In this instance, the 'champion' would likely be Guyana's Minister of Natural Resources and the Environment. The Minister should shepherd the IDRМ planning process from the beginning to its successful conclusion and should take responsibility for the implementation of the various components of the IDRМ plan.

### ***Step 1.2 Build political and staff awareness***

Initially, the political champion's task is to communicate the importance of IDRМ for environmental management both among political colleagues and Ministry staff. The Minister shall appoint an eminent civil servant to become the operational project lead. This person is responsible for raising awareness among Ministry staff of the importance of IDRМ planning and for creating 'buy-in' among the various environment sector agencies and non-governmental stakeholders. The operational project lead will have to convince his/her colleagues that IDRМ planning must be considered a Ministry priority among the multiple tasks senior staff perform in order to prevent an even greater drain on resources in the future.

### ***Step 1.3 Create an IDRМ planning team of representatives from environment sector agencies***

The 'operational project lead' will establish an inter-agency team, which is responsible for carrying out the IDRМ planning process. The team's tasks are specified in Steps 2 through 5 of the IDRМ planning process of this *Guideline*. All agencies in the environment sector need to be represented on the IDRМ planning team. Representatives must be familiar with environmental operations in Guyana's 10 Regions. The approximate time within which the project can be completed is 18 months and planning team members have to be given specific time allotments to work on the various stages of this project. IDRМ planning must not be an 'add-on' to their already heavy workload. At this juncture, it is advisable to provide training in both teamwork and IDRМ for the members of the planning team.

The following "agencies" are part of the Ministry of Natural Resources and the Environment (MNRE) and should be considered for inclusion in the IDRМ planning team.

- Environmental Protection Agency
- Guyana Forestry Commission
- Guyana Geology and Mines Commission

- Guyana Lands and Surveys Commission
- Guyana Wildlife Management Authority
- National Parks Commission
- Protected Areas Commission

Prior to finalizing the IDRM planning team, it is important to determine whether any other agencies, such as the Hydromet Service and Guyana Fire Services should be added.

***Step 1.4 Establish a project work plan and budget***

The IDRM planning team will develop a work plan for the project, based on the tasks and estimated time commitments outlined in Steps 2 through 5 of this *Guideline*. An accompanying budget will include costs for team meetings, travel, working sessions with environment sector agencies, etc.

***Step 1.5 Get authority to proceed***

Since IDRM planning requires a sizeable commitment from MNRE staff, the Minister and, if applicable the Government of Guyana, have to give formal approval to the IDRM planning project and allocate the required financial resources.

**STEP 1  
Management Guide**

<b>Output</b>	<b>Political champion; operational project lead; functioning IDRM planning team; project work plan and budget; government approval</b>
<b>Responsibility</b>	<b>Political champion, most likely the Minister of Natural Resources and the Environment</b>
<b>Time required</b>	<b>12 weeks</b>



## Step 2

- Identify Risks and Consequences

- 2.1 Identify anticipated disaster risks to environment sector incorporating the effects of climate change
- 2.2 Scope consequences for each risk identified

Step 2 covers the 'risk identification' component of the definition of IDRM. Incorporated into the identification of risk is the impact of climate change. The purpose of this Step, along with Step 3, is to create the risk assessment that is the foundation of any IDRM plan.

There is considerable general information on climate change for Guyana from several sources. To consider climate change impacts on the environment sector in detail, the IDRM team will want to consult the following 4 documents:

1. UNDP Climate Change Country Profiles – Guyana, by C. McSweeney, M. New and G. Lizcano, not dated.
2. National Development Strategy 2001 - 2010: Annex 5, The Environment
3. National Environmental Summary, UNEP, 2010
4. A Low Carbon Development Strategy: Transforming Guyana's Economy while Combating Climate Change, 2010

These documents provide a wealth of information on the impacts of climate change on the environment sector. A synthesis of these documents indicates that the major climate change impacts that will affect the risk assessment for an IDRM plan are:

- Increase in temperatures, especially in the number of “hot” days and nights
- Sea level rise and tidal impacts on marine and coastal areas
- Increase of periods of drought
- Increase in invasive vectors and diseases
- Increase in wild fires and forest fires
- Loss of biodiversity

All studies conclude that these climate change impacts will affect the natural environment in a negative manner.

Reports on the impact of climate change on the environment sector tend to be generalized across Guyana. The same situation applies to suggested adaptation measures, and impact on biodiversity. However, it is well known that climate change impacts, associated risks and possible responses vary across the country. While general knowledge is helpful to set the context, it does not in fact permit an effective and prioritized response. Step 2 takes this general information and moves it to a detailed, site- specific level where action can occur.

Without this step it is difficult, if not impossible, to implement IDRM. Steps 2 and 3 are critical steps to formulating evidence-based IDRM actions. Both steps are detailed and require the input of localized knowledge as the foundation of effective actions to implement a successful IDRM program.

The building blocks for downscaling general risk information are the existing ten Regions used in Guyana. These are depicted in Figure 2.

Figure 2  
Regions in Guyana



The 10 Regions in Guyana often are referred to by their numbers alone. Figure 3 relates the Region names to their reference numbers.

Figure 3  
Regional Reference Numbers

Reference Number	Geographical Name
1	Barima - Waini
2	Pomeroon - Supenaam
3	Essequibo Islands - West Demerara
4	Demerara - Mahaica
5	Mahaica - Berbice
6	East Berbice - Corentyne
7	Cuyuni - Mazaruni
8	Potaro - Siparuni
9	Upper Takutu - Upper Essequibo
10	Upper Demerara - Berbice

Through the use of regional, site-specific information, IDRM actions for environmental management can become much more targeted and therefore effective. This level of detail can only be provided by staff members in the environment sector, who work in the Regions and possess the type of local knowledge that comes from daily association.

Step 2 provides a guide for gathering risk and consequence information across the Regions. There are two sub-steps required to determine risks and consequences, firstly identifying the risks and secondly scoping the consequences of the risks. Issues of environmental management occur across the entire country from the coast to river systems to the upland forests. During this step the IDRM team will consider various eco-systems within Guyana and their associated risks and consequences.

The *Guideline* provides some examples for illustrative purposes to assist the IDRM team in understanding how the various tables work to identify the range of risks and consequences that will later be prioritized across the environment sector.

The outputs of Step 2 are an inventory of risks and a detailed assessment of the consequences associated with each risk.

***Step 2.1 Identify anticipated disaster risks to environment sector incorporating the effects of climate change***

Climate change impacts (i.e. drought) lead to identifiable potential disaster risks (i.e. fire and pest outbreaks) that have specific consequences (i.e. loss of productive timber in a particular location). Disaster risks and consequences are always place specific. That is, a

specific urban park will flood, not parks in general. Once the assessment has been completed to this level of detail, then appropriate IDRM measures can be suggested.

Table 2.0 shows the general template of the risk / consequence matrix. The IDRM planning team will use this table in both Step 2.1 and Step 2.2. The first task (Step 2.1) is to identify all the anticipated risks to the environment sector using Table 2.1.

As noted, the material included in the tables for Step 2 is for illustrative purposes only. The tables prepared by the IDRM team will be much more extensive and detailed.

**Table 2.0**  
**Risks and Consequences Template**

Region(s)	Risk	Consequence

**Table 2.1**  
**Risks to the Environment**

Region	Risk	Consequence
2, 3 & 8	Flooding	
10	Drought	
5 & 6	Forest fires	
1	Coastal inundation	
6 & 9	Loss of biodiversity	
8	Pest infestation of forests	
1 to 6	Loss of coastal habitat	

***Step 2.2 Scope consequences for each risk identified***

Risks can affect more than one Region and in the case of drought and pest infestation several Regions. This is because general climate change impacts and potential disasters (extreme weather events, sea level rise, increasing temperatures, etc.) may impact large areas. Most work in DRM or climate change stops at a general description of climate change impacts and resulting risks. This level of information is far too general to take effective action.

Step 2.1 is important as it sets the stage for a comprehensive risk analysis that is the foundation of IDRM. However, it is Step 2.2 – “scope the consequences for each risk identified” - that starts the detailed process of creating an IDRM plan that can be implemented.

Each risk identified in Step 2.1 has a series of consequences. These consequences need to be enumerated in a specific manner and this specificity is critical. For example, saying that flooding (the risk) will destroy logging roads and bridges (the consequences) doesn’t help. Consequences need to be documented specifically. Accordingly, the exact roads and bridges need to be identified. This allows for later prioritization of actions to maximize the effectiveness of IDRM efforts.

Step 2.2 fills in the consequence column of the Table 2.0 template for the ten Regions. The IDRM planning team will list specific consequences for each of the identified risks using the template. In Table 2.2 below several examples are provided. The more common risks are shown to affect more than one Region to demonstrate that, while the risks may be the same, the resulting consequences may be different.

**Table 2.2**  
**Environmental Risks & Consequences**

Region(s)	Risk	Consequence
2, 3 & 8	Flooding	<ul style="list-style-type: none"> <li>• River siltation (specify areas)</li> <li>• Damage to national parks (specify location)</li> <li>• Destruction of forest access roads (specify locations)</li> <li>• Stream contamination from runoff (specify areas)</li> <li>• Landslides (specify location)</li> </ul>
5 & 6	Forest fires	<ul style="list-style-type: none"> <li>• Loss of timber production (specify areas and # of hectares)</li> <li>• Threat to Amerindian villages (specify)</li> <li>• Destruction of habitat (specify areas)</li> </ul>
8	Pest infestation of forests	<ul style="list-style-type: none"> <li>• Loss of timber production (specify areas and # of hectares)</li> <li>• Increased frequency of forest fires (specify areas)</li> <li>• Loss of certain tree species (specify)</li> </ul>
1 to 6	Loss of coastal habitat	<ul style="list-style-type: none"> <li>• Destruction of mangrove swamps (specify locations)</li> <li>• Loss of certain fish species (specify)</li> <li>• Destruction of coastal wetlands (specify location and # of hectares)</li> </ul>

**STEP 2**  
**Management Guide**

<b>Output</b>	<b>Inventory of risks and detailed assessment of consequences associated with each risk</b>
<b>Responsibility</b>	<b>IDRM planning team</b>
<b>Time required</b>	<b>2 weeks</b>



## Step 3

- Assess and Prioritize Consequences of Risks

- 3.1 Assess the consequences by frequency, damage and cost
- 3.2 Prioritize consequences
- 3.3 Develop national IDRM priorities list

Step 2 started the risk assessment process in the environment sector by identifying the risks and consequences of current and potential disasters affecting Guyana. It provides the basic building block for implementing IDRM. Step 3 completes the risk assessment by further examining the consequences developed in Step 2. The purpose of Step 3 is to assess the consequences, indicate the Region(s) they occur in, and then prioritize the consequences. The result is a comprehensive risk assessment, including a list of national priority consequences for the environment sector in Guyana.

***Step 3.1 Assess the consequences by frequency, damage and IDRM cost***

This is a fairly complex task and one for which models and approaches vary. Some risk assessment models attempt to create an aura of scientific accuracy by assigning various numerical scores to risks and then totaling these scores. Assessments and ratings of consequences in risk assessment contain professional bias and require value judgments. Park planners value parks, foresters timber production and environmentalists clean rivers. These values influence any assessment approach.

Rather than making risk assessment mathematical, and therefore more complex, it is more productive to simplify the approach and accept that participants hold different values. This *Guideline* employs a straightforward approach and relies on wide spread agency participation and professional judgment to develop appropriate assessments.

During sub-step 3.1 the IDRM planning team assesses all of the consequences identified for the risks anticipated in Step 2.2 (Table 2.2). Table 3.0 below is used as a template to complete this task. For each consequence, a straightforward rating of high (H), medium (M) or low (L) is applied to three key variables – frequency, damage and IDRM cost.

**Table 3.0  
Assessment Template**

<b>Consequence</b>	<b>Frequency (H,M,L)</b>	<b>Damage (H,M,L)</b>	<b>IDRM Cost (H,M,L)</b>

Table 3.1 contains some examples for illustrative purposes. In assessing each of the consequences reference needs to be made to the underlying risk causing each consequence from Step 2.

**Table 3.1**  
**Assessment of Consequences**

Consequence	Frequency (H,M,L)	Damage (H,M,L)	IDRM Cost (H,M,L)
Destruction of forest access roads (specify locations)	H	M	H
Damage to national parks (specify location)	H	L	L
Stream contamination from runoff (specify areas)	H	L	M
Loss of timber production (specify areas and # of hectares)	L	H	M
Threat to Amerindian villages (specify)	L	H	H
Loss of certain tree species (specify)	M	H	M
Destruction of mangrove swamps (specify locations)	L	H	H
Destruction of coastal wetlands (specify location and # of hectares)	L	M	M

***Step 3.2 Prioritize consequences***

The risk assessment process will result in a large number of consequences, which are all considered important and could be dealt with. In Guyana, as elsewhere, human and financial resources are limited. In order to overcome this situation, a priority list is needed, based on the assessment of each consequence.

For example, if a consequence (destruction of buildings in national parks) is likely to occur frequently but the projected damage is low and the estimated IDRM costs are low, the particular consequence may not be rated as a high priority. On the other hand, if a consequence (destruction of forest access roads) has a high frequency of occurring, expected damage is medium and IDRM costs are high, this consequence may be rated as a high priority in spite of the high costs.

As noted previously, setting priorities involves accepting that there are different values at play. Various agencies and professionals have strong feelings as to what should be done and what the top priorities are. To determine the priorities among the identified consequences representatives from all the environment sector agencies are assembled for a priority setting working session.

At this session the IDRM planning team reviews their progress to date and introduces the participants from the environment sector agencies to the dotmocracy process, which is a simple, effective process for establishing priorities in complex situations. It replicates a

simulated voting process that can involve multiple stakeholders. To start, all consequences with their assessment by frequency, damage and IDRM costs are placed on large pieces of flip chart paper and attached to the wall, where the prioritization working session is being held.

Each participant is given 20 coloured adhesive dots. Participants review the list of consequences for a set period of time. Then they “vote” on those consequences by placing their dots beside the consequences they feel have the highest priority. In effect, each participant gets to vote for up to 20 priority consequences, although they may elect to use more than one dot to prioritize a consequence. The votes are then tallied.

This approach, while seeming somewhat simple, is a powerful tool and involves every participant equally. It does, in fact, yield a consensus among the participants on the relative importance of the identified consequences.

***Step 3.3 Develop national IDRM priorities list***

The result of Step 3.2 is a prioritized list of consequences, which the IDRM team places in rank order to arrive at a national priority list for environmental management.

Step 3 accomplishes a critical component of IDRM. It takes all the consequences of projected disaster risks across Guyana and distills them into a ranked national list of consequences. Top priority consequences will form the basis of the IDRM Action Plan to be developed in Step 4. This does not mean that other consequences will not be addressed. IDRM is a dynamic process and, as the top priority items are dealt with, additional consequences can be tackled.

**STEP 3  
Management Guide**

<b>Output</b>	<b>Comprehensive risk assessment - consequences assessed and national priority list established</b>
<b>Responsibility</b>	<b>IDRM planning team and environment sector agencies</b>
<b>Time required</b>	<b>4 weeks</b>



## Step 4

- Prepare a Draft Action Plan for IDRM

- 4.1 Determine number of priority consequences to be included in the Draft Action Plan
- 4.2 Outline actions for each consequence in terms of prevention, mitigation/adaptation, financial risk management, rehabilitation and reconstruction
- 4.3 Assign responsibility for actions
- 4.4 Determine time frame for each action
- 4.5 Write the Draft Action Plan
- 4.6 Review Draft Action Plan with environment sector agencies
- 4.7 Obtain formal approval for Action Plan
- 4.8 Distribute approved Action Plan to all staff in environment sector

Step 4 gets to the core of the IDRM planning process by identifying the actions that need to be taken to address the high priority consequences of disaster risks for Guyana's environment sector in an integrated manner. These actions may deal with the prevention of these consequences, speak to mitigating/adaptation measures, suggest how to manage the financial risks, and propose rehabilitation/reconstruction approaches.

Table 4.0, "Draft Action Plan for IDRM in Environmental Management" below, provides the template for IDRM planning team members to recommend a wide variety of actions needed to breathe life into the prioritized consequences from Step 3. In addition, team members will suggest which agency should be responsible for implementing each action and what the timeframe for implementing the action should be. Once this Table has been completed, the IDRM planning team has achieved the core of their Draft Action Plan for IDRM in Environmental Management.

**Table 4.0**  
**Draft Action Plan for IDRM in Environmental Management**

Consequence in order of priority	Prevention action(s)	Mitigation/adaptation action(s)	Financial risk mgt. action(s)	Rehab./re-construction action(s)	Agency responsible	T F *

\* TF = Time Frame

During Step 4 care must be taken not to create merely a wish list that can never be implemented. Instead, actions should be specific - both in type and geography - and realistic in the Guyanese context.

Among all of the steps in this *Guideline* Step 4 will require the most amount of time. It is essential that all members of the IDRM planning team as well as the other environment sector agencies have 'bought into' the final document, if its implementation is going to be successful.

At the completion of Step 4 the following output will be achieved:

- Approved and distributed Action Plan for IDRM in Environmental Management

#### ***Step 4.1 Determine number of priority consequences to be included in the Draft Action Plan***

During Step 4.1 the IDRM planning team selects the top 10 to 15 priority consequences to form the basis of the IDRM plan. It is tempting to use all the consequences that have resulted from Step 3, but there will be too many. There is a saying in management circles: “If you have too many priorities, you have no priorities”. Therefore, only the top 10 to 15 priorities will be chosen. These priority consequences are then inserted into the first column of Table 4.0.

#### ***Step 4.2 Outline actions for each consequence in terms of prevention, mitigation/adaptation, financial risk management, rehabilitation and reconstruction***

While all of the steps in this *Guideline* are important to achieving a successful Action Plan for IDRM in Environmental Management, sub-step 4.2 is crucial. It will be the basis for any action needed to manage the consequences of current and future disaster risks for the environment sector in Guyana. The IDRM planning team will identify one or more actions to be taken to deal with each priority consequence and insert these actions into the appropriate columns in Table 4.0.

Not all of the priority consequences will trigger recommended actions in every one of these areas, e.g. it is not possible to take preventative action for every consequence or mitigate or adapt to each consequence. As a case in point, there may be no way to prevent stream contamination from runoff during a flood event. However, an adaptation action may be to work with farmers to reduce fertilizer application rates. To manage financial implications caused by the destruction of mangrove swamps, a national restoration fund could be established. Rehabilitation and reconstruction actions may be needed when forest access roads are washed out by flooding. In the environment sector, as most components are public, most of the financial costs are borne by government.

#### ***Step 4.3 and 4.4 Assign responsibility for actions and determine time frame for each action***

The final step in Table 4.0 is for the IDRM planning team to think about which government agency is most appropriate to be responsible for which recommended action. In some cases it may be a government ministry, in others a private/public partnership, yet others may require an infusion of resources from outside the country. Having inserted the appropriate agency into Table 4.0, the IDRM planning team assigns a time frame for each of the actions to be completed.

The time frame is a fairly general estimate, i.e. short term, medium term and long term. The following time frames are suggested:

- Short term                    1 to 5 years
- Medium term                6 to 15 years
- Long term                    15 plus years

These time frames will be refined during the development of the implementation strategy in Step 5.

Table 4.1 below gives an example of a fictitious list of priority consequences followed by recommended actions in the various columns, the agency or agencies responsible and an estimated time frame for each of the actions.

**Table 4.1**  
**Draft Action Plan for IDRM in Environmental Management**

<b>Consequence in Priority Order</b>	<b>Prevention Action(s)</b>	<b>Mitigation Adaption Action(s)</b>	<b>Financial Risk Management Action(s)</b>	<b>Rehabilitation Reconstruction Action(s)</b>	<b>Agency Responsible</b>	<b>Time Frame</b>
Loss of timber production from fire	Early detection of forest fires	Enhanced fire fighting capacity	Not applicable	Replanting or natural regeneration	Guyana Forestry Commission	Long term
Threat to Amerindian villages	Early warning and creation of buffer areas	Relocation of village to safer area	Establish insurance program(s)	Rebuild village in same location	CDC	Short term
Destruction of mangrove swamps	Prohibition of logging and enforcement	Not applicable	Establish national mangrove restoration fund	Mangrove restoration program	Ministry of Agriculture (Mangrove Restoration Project)	Medium term
Destruction of coastal wetlands	Prohibit development on wetlands	Continuous rehabilitation	Not applicable	Not applicable	MNR&E	Medium term
Destruction of forest access roads	Build higher and better roads	Improve road drainage	Not applicable	Rebuild road	Forestry Commission and Public Works	Short term
Damage to national parks	Not applicable	Flood proof park buildings	Private fundraising (naming rights)	Rebuild buildings, equipment and restore park en	National Parks Commission	Short term
Stream contamination from runoff	Not applicable	Reduce fertilizer use	Not applicable	Clean up stream	EPA	Short term
Loss of certain tree species	Spray for pests	Replant to different species	Allow rapid harvesting	Not applicable	Forestry Commission	Long term

#### ***Step 4.5 Write Draft Action Plan***

No document can be written 'by committee' and the Draft IDRM Action Plan is no exception. In Step 4.5, the IDRM team delegates the initial writing of the Draft Action Plan to two or three of individuals. The document will be based on the results achieved through the team's completion of Table 4.0. In addition, there should be a rationale for why each action has been recommended. This rationale can be drawn from the discussions among team members and environment sector agencies during Step 3, which has established a

national list of priority consequences. The IDRM planning team will take sufficient time to polish the document until every team member is satisfied with the result.

***Step 4.6 Review Draft Action Plan with environment sector agencies***

The draft Action Plan for IDRM developed by the IDRM planning team must be reviewed by and discussed with all of the environment sector agencies. Again, following the distribution of the draft document to the agencies, extensive working sessions should be arranged for fulsome discussion and input. It may be necessary to schedule more than one or two rounds of discussion.

Once the IDRM planning team is assured that there is consensus on any revised document, the Action Plan for IDRM in Environmental Management will be ready for submission to the Minister and/or the Government of Guyana. Consensus does not mean that each individual person or agency agrees with every word in the document, but it must mean that they "can live with it".

***Step 4.7 Obtain formal approval for Action Plan***

The finalized Action Plan for IDRM in Environmental Management has to be approved formally, before implementation can begin in Step 5. It is likely that the Action Plan will be approved by the Government of Guyana on the recommendation of the Minister of Natural Resources and the Environment, who has been involved as the 'champion' of the project all along. While the project still has a way to go towards implementation, approval of the consensus document is a substantial achievement.

***Step 4.8 Distribute approved Action Plan to all staff in environment sector***

Once the Action Plan has been approved, it should be distributed to all environment sector staff for information. The IDRM planning team may want to hold a series of information sessions to familiarize staff with the document to answer questions and discuss the implications of recommended actions, thus ensuring their 'buy-in', which will become important during the implementation stage in Step 5.

**STEP 4  
Management Guide**

<b>Output</b>	<b>Approved and distributed Action Plan for IDRM in Environmental Management</b>
<b>Responsibility</b>	<b>IDRM planning team; environment sector agencies; Minister of Natural Resources and the Environment; Government of Guyana</b>
<b>Time required</b>	<b>30 weeks</b>



## Step 5

- Implement IDRMM for Environmental Management

- 5.1 Develop draft implementation strategy
- 5.2 Establish draft milestones
- 5.3 Review draft implementation strategy and milestones with environment sector agencies and revise
- 5.4 Obtain formal approval of implementation strategy
- 5.5 Train environment sector staff and stakeholders on IDRMM Action Plan and implementation strategy
- 5.6 Integrate implementation strategy into government budgets
- 5.7 Review Action Plan for IDRMM in Environmental Management

The IDRМ planning process has reached its final step. Step 5 takes the Action Plan for IDRМ developed in Step 4 and formulates a detailed implementation strategy. The IDRМ planning team gets Step 5 underway by preparing a draft strategy that is then reviewed and revised in one or more working sessions with the environment sector agencies prior to being submitted for formal approval.

Following approval, the IDRМ Action Plan has to be integrated into Guyana's budgets as per the implementation strategy. Every five years or so, the Action Plan for IDRМ in Environmental Management must be reviewed to absorb new information, adjust priorities if needed and, most likely, revise the initial funding approach.

The expected outputs of Step 5 are an approved implementation strategy including milestones to be achieved, a firm start date and appropriate budget allocations.

### ***Step 5.1 Develop draft implementation strategy***

Implementing the actions recommended in the approved Action Plan for IDRМ in Environmental Management will require collaboration among a number of agencies within the environment sector and with other governmental organizations. However, not all of the actions are the responsibility of government alone. There is a role for the private sector and for NGOs. For example, using the illustrative actions suggested in Table 4.1, private fundraising may be used for national parks by selling naming rights in urban parks.

Each of the priority consequences selected in Step 4 may have recommended a number of actions to be taken. At this point, each of these actions becomes a project onto itself with certain tasks to be accomplished in a certain order. As they say: "The devil is in the details".

The IDRМ planning team must develop detailed project outlines for each of these actions, including an assessment of funding opportunities and detailed timelines (in number of months or years), and list the governmental and/or non-governmental agencies as well as private sector representatives to be involved in project implementation. In a way, these project outlines constitute 'mini-implementation strategies' to get each project done.

The IDRМ planning team may want to recommend some actions that promise relatively quick results. Short-term success in a few projects will ease the implementation of medium and long-term projects.

### ***Step 5.2 Establish draft milestones***

Milestones monitor the time it is supposed to take to implement an action. The Action Plan for IDRМ in Environmental Management contains a series of approved actions to manage and reduce the risks of future disasters. Some of these actions will be "stand alone" while others will be interconnected.

To monitor the variety of activities necessary to carry out the actions recommended in the IDRМ Action Plan, the IDRМ planning team needs to establish a series of milestones for each activity. At this stage they will be estimates, as detailed project planning still needs to be carried out by the agencies that will undertake the activities. However, these general

milestones will act as a guide for monitoring the implementation of the Action Plan for IDRM in Environmental Management over the coming years.

***Step 5.3 Review draft implementation strategy with environment sector agencies and revise***

The IDRM planning team has been tasked with the responsibility to prepare a draft implementation strategy and accompanying milestones for the proposed actions. It is now time for representatives of the various environment sector agencies to hold one or more working sessions to review and discuss the implementation strategy and milestones.

The material is quite detailed and should be circulated well in advance of the first working session. While some may suggest that comments be dealt with by e-mail, a working session with face-to-face discussion is far more effective. Meeting together to discuss the draft implementation strategy not only improves the strategy, but also helps to build consensus and a network for implementation of the IDRM strategy over the coming years. As implementation unfolds, inter-agency networks will be important for long-term success.

Following the working session(s) the IDRM planning team will prepare a final IDRM implementation strategy and accompanying milestones based on the consensus established through the meetings with the environment sector agencies.

***Step 5.4 Obtain formal approval of implementation strategy***

The planning component of the IDRM planning team's work has been completed. The next step is shepherding the implementation strategy towards formal approval. This is a task where the 'champion' will have a large role, just as in obtaining formal approval for the Action Plan for IDRM in Environmental Management.

Approval processes can take some time. However, the training on the IDRM implementation strategy suggested in Step 5.5 below can still move forward pending formal approval.

***Step 5.5 Train environment sector staff and stakeholders on Action Plan and implementation strategy***

Over the 18 months it has taken to develop the IDRM Action Plan and implementation strategy those most actively involved have been the IDRM planning team and representatives of the various environment sector agencies. It is now time to bring in the remaining staff of these agencies as well as stakeholders outside of government.

Implementation of IDRM is a task in which everyone needs to participate. The wider the understanding and buy-in, the more likely is success. People can't participate if they don't understand. Leaving implementation up to a few people will ensure that the IDRM effort grinds to a halt fairly quickly.

To counter this, staff across all agencies as well as non-governmental stakeholders will be introduced to the IDRM Action Plan and implementation strategy through a series of information sessions held by the IDRM planning team. This ensures broad understanding

of the IDRM goals, planning process and results. Then, more targeted training sessions can be provided to staff, who will be involved in detailed implementation of the various recommended actions.

The broad-based information and detailed training will bring the IDRM efforts to life. They won't guarantee success but will give IDRM in environmental management a fighting chance.

***Step 5.6 Integrate implementation strategy into government budgets***

All the actions recommended in the IDRM Action Plan and implementation strategy will not fall within the jurisdiction of the environment sector agencies. Other ministries will be involved and, in some cases, multiple ministries and agencies and/or the private sector will need to cooperate to implement the IDRM Action Plan. This is the nature of integration; it involves crossing administrative boundaries.

Most of the actions will require budget allocations and often parts will be implemented through cooperative budget allocations. At this stage, the appropriate ministers will need to be involved. Again the champion's role is critical to accomplish this step.

***Step 5.7 Review Action Plan for IDRM in Environmental Management***

This step may seem strange given that the plan and implementation strategy have just been approved and everyone involved has worked hard and deserves a rest. This sub-step merely notes that no plan lasts forever, that new information becomes available and priorities shift. To remain as a dynamic document the IDRM Action Plan will need to establish a review schedule. At this juncture a five-year review period is suggested.

**STEP 5  
Management Guide**

<b>Output</b>	<b>Approved implementation strategy; key milestones, including start date; appropriate budget allocations</b>
<b>Responsibility</b>	<b>IDRM planning team; environment sector agencies; political champion; Government of Guyana</b>
<b>Time required</b>	<b>16 weeks to the final implementation strategy (Step 5.3); additional time will be required for the approval of the implementation strategy and budget allocations, depending on Guyana's governmental and budget cycles</b>

## APPENDIX A

### THE FIVE STEPS TO IDRM AND ASSOCIATED SUB-STEPS

IDRM STEP	ASSOCIATED SUB-STEPS
<b>STEP 1 – Get Started</b>	<b>1.1 Identify a political champion</b> <b>1.2 Build political and staff awareness</b> <b>1.3 Create an IDRM planning team of representatives from environment sector agencies</b> <b>1.4 Establish project work plan and budget</b> <b>1.5 Get authority to proceed</b>
<b>STEP 2 – Identify Risks and Consequences</b>	<b>2.1 Identify anticipated disaster risks to environment sector incorporating the effects of climate change</b> <b>2.2 Scope consequences for each risk identified</b>
<b>STEP 3 – Assess and Prioritize Consequences of Risks</b>	<b>3.1 Assess the consequences by frequency, damage and cost</b> <b>3.2 Prioritize consequences</b> <b>3.3 Develop national IDRM priorities list</b>
<b>STEP 4 – Prepare a Draft Action Plan for IDRM</b>	<b>4.1 Determine number of priority consequences to be included in Action Plan</b> <b>4.2 Outline actions for each consequence in terms of prevention, mitigation/adaption, financial risk management, rehabilitation and reconstruction</b> <b>4.3 Assign responsibility for actions</b> <b>4.4 Determine time frame for each action</b> <b>4.5 Write the Draft Action Plan</b> <b>4.6 Review Draft Action Plan with environment sector agencies</b> <b>4.7 Obtain formal approval for Action Plan</b> <b>4.8 Distribute approved Action Plan to all staff in environment sector</b>
<b>STEP 5 – Implement IDRM for Environmental Management</b>	<b>5.1 Develop draft implementation strategy</b> <b>5.2 Establish draft milestones</b> <b>5.3 Review draft implementation strategy and milestones with environment sector agencies and revise</b> <b>5.4 Obtain formal approval of implementation strategy</b> <b>5.5 Train environment sector staff and stakeholders on Action Plan and implementation strategy</b> <b>5.6 Integrate implementation strategy into government budgets</b> <b>5.7 Review Action Plan for IDRM in Environmental Management</b>

**APPENDIX “B”  
IDRM PLAN – MANAGEMENT GUIDE**

<b>STEP</b>	<b>OUTPUT</b>	<b>RESPONSIBILITY</b>	<b>TIME</b>
<b>1</b>	<b>Political champion; operational project lead; functioning IDRM planning team; project work plan and budget; government approval</b>	<b>Political champion, most likely the Minister of Natural Resources and the Environment</b>	<b>12 weeks</b>
<b>2</b>	<b>Inventory of risks and detailed assessment of consequences associated with each risk</b>	<b>IDRM planning team</b>	<b>2 weeks</b>
<b>3</b>	<b>Comprehensive risk assessment – consequences assessed and national priority list established</b>	<b>IDRM planning team and environment sector agencies</b>	<b>4 weeks</b>
<b>4</b>	<b>Approved and distributed Action Plan for IDRM in Environmental Management</b>	<b>IDRM planning team; environment sector agencies; Minister of Natural Resources and the Environment; Government of Guyana</b>	<b>30 weeks</b>
<b>5</b>	<b>Approved implementation strategy; key milestones, including start date; appropriate budget allocations</b>	<b>IDRM planning team; environment sector agencies; political champion; Government of Guyana</b>	<b>16 weeks *</b>

\* Additional time will be required for the approval of the implementation strategy and budget allocations, depending on Guyana’s governmental and budget cycles.

## **APPENDIX "C"**

### **GLOSSARY OF TERMS**

**Action Plan** as in "Action Plan for IDRM in Environmental Management" includes the following components: national list of priority consequences; specific prevention, mitigation/adaptation, financial risk management, rehabilitation/reconstruction actions, where applicable; agency responsible; and estimated time frame

**Adaptation** refers to the adjustment in natural or human systems in response to actual or expected consequences of risks, which moderates harm

**Climate Change** refers to a change in climate that can be identified by changes in the mean and/or variability of its properties and that persists for an extended period typically decades or longer, whether due to natural variability or as a result of human activity

**Climate Change Impact** refers to a result of climate change, which increases or intensifies the effects of natural disasters. Generally acknowledged impacts are: sea level rise, rising temperatures and extreme weather events

**Consequence** refers to the specific damage resulting from a risk. For example flooding has the consequence of a specific bridge being washed out

**Disaster** refers to a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses, which exceed the ability of the affected community or society to cope

**Disaster Response (DR)** refers to any activity taken to alleviate the effects of a disaster

**Disaster Risk Management (DRM)** refers to the concept and practice of altering the consequences of natural disasters by actions taken in advance to lessen the risk

**Disaster Risk Reduction (DRR)** refers to the concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events

**Dotmocracy** refers to a workshop technique that is used to prioritize issues or actions involving all group members equally

**Financial Management**, in the context of IDRM, refers to any action to compensate for or insure against damages that may occur from natural disasters

**Integrated Disaster Risk Management (IDRM)** refers to a proactive, comprehensive approach to disaster risk management that includes pre-disaster reduction as well as post-disaster response and recovery; and emphasizes actions taken before a hazard results in a disaster. Such an integrated approach involves the following policy elements: *risk identification, risk reduction (prevention and mitigation), adaptation, financial protection and risk transfer, preparedness and response, and rehabilitation and reconstruction*. IDRM is consistent with the principles of Comprehensive Disaster Management (CDM), the CARICOM-endorsed regional strategy for disaster management in the Caribbean. Climate change considerations, both assessments of increasing risks and approaches to adaptation, are part of IDRM

**Integration** refers to coordination amongst various components of disaster risk management to improve effectiveness. Integration can occur within organizations or across organizations

**Mainstreaming** refers to the integration of policies and measures that incorporate climate change into development planning and sectoral decision-making

**Milestone** refers to a goal established to monitor the time required to implement a recommended action

**Mitigation** in the context of this *Guideline* refers to an action taken to reduce the consequence of a risk arising from a natural disaster

**Prevention** refers to an action or work that results in the consequence of a risk ceasing to occur

**Rehabilitation** refers to activities that restore the functionality of buildings or infrastructure partially destroyed in a natural disaster

**Reconstruction** refers to activities, which replace buildings or infrastructure completely destroyed in a natural disaster

**Risk Assessment** refers to a technique used to evaluate and prioritize risks associated with various forms of disasters. There are numerous approaches to risk assessment, some of which appear highly technical and seem to produce precise measures of risk. This negates the fact that, at its base, perception of risk involves a value judgment that varies with individuals. The *Guideline* uses a straightforward assessment process that can be employed at both a governmental and community level. Risks are identified and their consequences are evaluated by frequency (high, medium, low), extent of damage (high, medium, low) and IDRM cost (high, medium, low)

**Sea level rise** refers to an increase in the mean sea level at a specific location

**Stakeholder**, in the context of this *Guideline*, refers to an organization or individual within the environment sector that is not part of government. Examples are: environmental organizations, research institutes, NGOs and environmentalists