付属資料 1: 合同調整委員会(JCC) 議事録(MM)

MINUTES OF DISCUSSIONS BETWEEN CARIBBEAN DISASTER EMERGENCY RESPONSE AGENCY AND TECHNICAL COOPERATION TEAM ON CARIBBEAN DISASTER MANAGEMENT PROJECT PHASE 2

The Joint Coordination Committee Meeting of the Caribbean Disaster Management Project Phase 2 (hereinafter referred to as "Project"), was held on April 30, 2009, on detailed implementation plan of the Project with the attendance of CDERA, Regional Team, National Teams of Pilot States and the Technical Cooperation Team (hereinafter referred to as "the JICA Expert Team") dispatched by JICA.

The Report of this meeting will be available in three (3) weeks. This note is a summary of key follow-up actions to be drawn to the attention of JICA.

Bridgetown, April 30, 2009

Mr. Toshikatsu IMAI Chief Advisor, JICA Expert Team, Japan

Mr. Jeremy COLLYMORE Coordinator, Caribbean Disaster Emergency Response Agency Barbados

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THE ATTACHED DOCUMENT

1. Project Approach

The Project will be implemented basically as presented in the Detailed Implementation Plan of the Project.

2. The Software

The software of WMS, FLO-2D and ArcView to be used by RT should be provided to NT as one of the transfer of knowledge in the 1st year works. The budget for this purpose is not prepared in the 1st year work.

JICA Expert Team will raise the issue in the discussion with JICA Headquarters to amend the budget for this purpose.

3. RT and NT Meeting

Periodical meeting between Regional Team and National Team should be held for smooth implementation of Project activities. But the budget for this purpose is not prepared.

JICA Expert Team will raise the issue in the discussion with JICA Headquarters to amend the budget for this purpose.

4. Training Course in Japan and Caribbean

Two training courses should be held as follows:

- I. JAPAN: A National Team full training course should be conducted on the experiences of the Asia region on CDP and FHM rather than the visit and explanation training course held in Phase 1 in Japan. The details should be discussed in coming October 2009 including the subject and place of training.
- II. CARIBBEAN: This training should be developed to transfer knowledge on WMS, GIS and DIG.
- III. Training in Japan for the Regional Team to continue as is.
- 5. Reporting

Reports should be prepared not only by JICA Expert Team, but also by RT and NT. The details will be discussed later between the members concerned. Minutes of RT and NT meeting shall be shared with CDERA and the JICA Expert Team.

6. Schedule of Flood Survey

The schedule of flood survey should be discussed among RT and JICA Expert and finalized thereafter.



7. Hydrological Database

The project will support the harvesting of existing databases within CIMH and also seek to establish a more comprehensive database within the CIMH.

8. Narrative Text of Budget

Narrative text of budget of the Project for JICA Expert Team should be prepared and submitted to the JCC.

9. Reallocating of Resources

Consideration should be given to allowing the reallocation of resources across budget heads. Some items identified e.g. hydrological database contract does not require full amount of money allocated therefore, some amount can be reallocated to allow for other important activities.

JICA Expert Team will raise the issue in the discussion with JICA Headquarters to amend the budget for this purpose.

10. Realignment of Schedule

The schedule of JICA Experts and RT Members should be realigned to ensure they are consistent with the Pilot States Work Programme to allow for maximization of time and impact.

11. Mobilisation of Short Term Experts

In Phase I the Short Term Experts and the facilitation of research studies were not supported by the CADM Project Budget but by JICA Headquarters directly. Is this the same for Phase II? A discussion will be held with the RT to determine what the research studies should focus on to best assist the project.

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MINUTES OF DISCUSSIONS BETWEEN CARIBBEAN DISASTER EMERGENCY MANAGEMENT AGENCY AND JAPAN INTERNATIONAL COOPERATION AGENCY ON CARIBBEAN DISASTER MANAGEMENT PROJECT PHASE 2

The Joint Coordinating Committee (hereinafter referred to as "the JCC") Meeting, of the Caribbean Disaster Management Project Phase 2 (hereinafter referred to as "the Project"), was held on March 11, 2010, on the progress of the 1st year works and plan of the 2nd year works of the Project with the attendance of the Ministry of Foreign Affairs of the Government of Barbados, Caribbean Disaster Emergency Management Agency (hereinafter referred to as "IICA") Delegation, Regional Team (hereinafter referred to as "RT"), National Teams (hereinafter referred to as "NT") of Pilot States and JICA Expert Team.

As a result of the meeting, CDEMA and JICA Team have agreed with the matters referred to in the document attached here to.

Mr. Toshikatsu IMAI Chief Advisor JICA Expert Team Japan

Bridgetown, March 12, 2010

Ms. Elizabeth RILEY Deputy Executive Director (acting) CDEMA Barbados

Mr. Tadashi IKESHIRO Chief Resident Representative of JICA Dominican Republic Office Chief of JICA Delegation, Japan CDEMA Iner Constitution Disaster Energiency Management Agency



THE ATTACHED DOCUMENT

1. General

The underlying developmental objective of the CADM Phase 2 Project, that is, to strengthen capacity within the Caribbean Region for Flood Hazard Mapping and Community Disaster Planning was reiterated as the guiding principle to govern implementation approaches by all parties.

- 2. Summary of Recommendations Emerging from the Annual Seminar held on March 10, 2010 The meeting considered the summary recommendations emerging from the Annual Seminar held on March 10, 2010 and agreed on the following:
 - a. The opportunity for the engagement of the RT and NT members in the articulation of the 2^{nd} year work plan be capitalized on.
 - b. Modality of Engagement of the Caribbean Side in 2nd Year planning:
 - The following stepwise process was agreed to in principle
 - i. Elaboration of an outline the 2nd year plan by JICA Expert Team
 - Utilization of the draft document at (i) to inform a meeting of JICA Expert Team, RT and NT members. It is proposed that the expected result of the meeting would be to articulate a draft 2nd year plan for consideration by JICA.
 - iii. Preliminary discussion between JICA and JICA Expert Team on the draft 2nd year plan and budget
 - iv. Finalization of the 2nd year plan and budget and submission to JICA by the middle of May, 2010.
 - c. Requested the JICA Expert Team to identify resources to facilitate the meeting at (ii)

Other summary recommendations emerging from the annual seminar held on March 10, 2010 as shown in Annex-1 were noted by all the attendants.

3. Project Progress

The overview of the Project progress and incompleted activities from 1st year have been confirmed by all the attendants.

- Recommendations from CDEMA to JICA JICA requested CDEMA to submit recommendations related to project management aspects in writing to JICA. CDEMA agreed to submit the documents.
- 5. Review of the 1st Year Activities and Plan for the 2nd Year Activities
- (1) General

The need for flexibility in integrating lessons learnt from the 1^{st} year into the 2^{nd} year of implementation was agreed by the JICA delegation.





(2) Proposal plan

Related to the plan for the 2^{nd} year activities, both sides noted the discussion material as shown in ANNEX-2.

(3) Training Course of RT

Plan of training course of RT in the 2^{nd} year activities should be informed to CDEMA at least 6 months in advance by JICA Expert Team.

- (4) Both sides noted that the involvement of RT members in the 1st year activities were limited.
- (5) CDEMA requested JICA to explore about the flexibility of transfer of funds across the budget lines where savings have been realized from the 1st year activities to the 2nd year.
- (6) CDEMA emphasized the importance of availability of adequate information for decision making to the Caribbean side, including the disclosure of budget details to effectively guide project implementation.
- (7) Both sides agreed that sustainability is a key expectation at the national level to facilitate replication of the Project.
- (8) CDEMA noted that the absence of a modality for ongoing participation of RT members in the Project activities is one of the big challenges in collaboration with NT and JICA Expert Team.
- (9) Both sides noted that there was the need of adequate notification for RT and timely reply to JICA Expert Team to facilitate the participation in the project activities.
- (10) More dialogue between the RT and the JICA Expert Team is needed for project implementation so that the extensive experience of the Caribbean can be integrated into the Project.

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Summary Recommendations Emerging from the First Annual Seminar for the Caribbean Disaster Management (CADM) Phase 2 Project March 10, 2010

1. Introduction

The first Annual Seminar for the CADM Phase 2 Project was convened at the Savannah Hotel March 10, 2010. A number of recommendations were made at that meeting in the areas of project governance and technical implementation. The meeting: <u>Agreed</u> that the summary recommendations emerging should be prepared by the CDEMA Secretariat and presented for the consideration of the JCC Meeting March 11, 2010.

Summary Recommendations for Consideration by the JCC Meeting:

- 2. Project Management & General Comments
 - a. Implementation Status: <u>Noted</u> that whilst there has been significant advancement, there has been a delay in the implementation of some project activities.
 - b. Reporting: <u>Requested</u> National Teams to submit reports on national level progress as articulated in the Terms of Reference for the National Teams.
 - c. Annual Seminar: <u>Recommended</u> that representation from Pilot States for future annual seminars to include representatives from each Pilot State in the areas of community based disaster management, Hazard Mapping and Hydrological Modeling.
 - d. Project Communication:
 - i. <u>Recommended</u> that modalities be identified at the level of the JCC to strengthen the sharing of information between NT in the Pilot States and facilitate cross-fertilization through lessons learnt.
 - ii. <u>Noted</u> the role of the RT members in supporting information exchange across the Pilot States.
- 3. The 2nd Year Work Plan and Budget
 - a. Lessons Learnt: <u>Recommended</u> that the lessons learnt during the first year implementation be integrated into the implementation approach for the 2nd year.
 - b. Technical Points related to 2nd year Implementation:
 - i. <u>Recommended</u> that redundancy be built into the flood warning systems to be developed at the national level
 - ii. <u>Recommended</u> that the NT's advance discussions on seamless integration of \mathcal{L} the community level interventions under CADM Phase 2 into the national level disaster management system.



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- iii. <u>Requested</u> the JICA Expert team to articulate a mechanism for linking the Caribbean Water Information System to the hazard mapping component of the project and <u>recommended</u> that one area for consideration is the utilization of the information database to facilitate dissemination of the flood hazard maps to countries.
- iv. Public Awareness/Information/Education: <u>Requested</u> that JICA Expert Team integrate a public awareness/ information/ education component into the 2nd year activities and factored into the budget.
- v. Water Level and Hydrological Gauge Selection and Installation: <u>Recommended</u> a joint discussion be convened by JICA Expert Team between JICA Expert Team, RT and NT members to reach agreement on the national level needs to be addressed under the project.
- vi. Type of Flood Warning System:
 - 1. <u>Noted</u> that the types of flood warning systems required within the pilot catchment areas will vary due to the wide variation in lag time between rainfall peaks and flood peaks.
 - 2. <u>Recommended</u> that a robust discussion is required on this aspect of the project between JICA Expert Team, RT and NT to determine the way forward. <u>Requested</u> JICA Expert Team to facilitate this discussion.

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ANNEX-2

DISCUSSION MATERIAL ON PLAN FOR THE 2ND YEAR ACTIVITIES

General

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The lessons learnt from the first year activities are as follows:

Firstly, the communication between RT, NT and JICA Expert Team through e-mail was not enough for good mutual understanding during the period of absence of JICA Experts in the Caribbean region. Accordingly absence of JICA Experts in the region should be avoided as much as possible.

Secondly, some periodical meeting or occasional meetings are needed to implement the Project smoothly.

Flood Analysis

Due to the delay of land survey, the flood analysis has not been completed. Accordingly the flood analysis should be conducted as a part of the 1st year activities.

Establishment of Early Flood Warning System

According to the proposal by NT regarding the revision of the hydrological gauge type, the following additional activities are necessary:

- Finalization of specifications
- Agreement on the specifications by RT, NT, JICA Expert Team and JICA
- Revise of design
- Manufacturing
- Shop inspections
- Installation of gauges

Assignment Schedule and Man-month of JICA Expert Team JICA Expert Team should consider annual schedule of each Pilot State.

Annual Workshop on Early Flood Warning System

Since the flood warning system establishment is closely related to the national level warning system including other disasters, at the annual workshop, other appropriate national level organizations should be represented.

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MINUTES OF MEETING BETWEEN THE CARIBBEAN DISASTER EMERGENCY MANAGEMENT AGENCY AND THE JAPAN INTERNATIONAL COOPERATION AGENCY ON THE CARIBBEAN DISASTER MANAGEMENT PROJECT PHASE 2

The 3rd Joint Coordination Committee of the Caribbean Disaster Management Project Phase 2 (hereinafter referred to as "the Project") was held on March 16, 2011 on the progress of the 2nd year works and plan of the 3rd year works of the Project with the attendance of the Coordinating Unit of the Caribbean Disaster Emergency Management Agency (hereinafter referred to as "CDEMA"), other organizations of the Regional Team (hereinafter referred to as "RT"), National Teams (hereinafter referred to as "NT") of Pilot States, the Japan International Cooperation Agency (hereinafter referred to as "JICA") and JICA Expert Team (hereinafter referred to as "the Team").

As a result of the meeting, CDEMA and the Team have agreed with the matters referred to in the document attached hereto.

Saint Michael, Barbados, March 17, 2011

The Collaboran Disaster Emergency Mancagement Agency

Ms. Elizabeth RILEY Deputy Executive Director (Ag), CDEMA, Barbados

Mr. Toshikatsu IMA Chief Advisor, JICA Expert Team, Japan

for Mr. Shigeyuki MATSUMOTO Director, Disaster Management Division 2 Water Resources and Disaster Management Group Global Environment Department, JICA Japan





Attachment

1. Year 2 Activity Progress

1-1. Progress of the Project

Both sides reviewed the Project progress and discussed implementation issues emerging and the lessons learnt in the 2nd year activities. Whilst there was significant advancement, both sides confirmed that there was a delay in completion of Flood Hazard Map (hereinafter referred to as "FHM") and establishment of Early Flood Warning System (hereinafter referred to as "EFWS").

1-2. Completion of FHM

CDEMA, CIMH and the Team agreed to continue Flood Analysis and complete draft FHM before the commencement of the 3rd year activities.

1-3. Establishment of EFWS

CDEMA and CIMH agreed to undertake the installation of hydrological gauges (hereinafter referred to as "the Equipment") early in the 3rd year activities and complete the establishment of EFWS in cooperation with the Team.

This activity shall be ranked as the highest priority.

1-4. Contact with Local Company

CDEMA agreed that the Team would get in touch directly with local companies to promote the procedure to install the Equipment. The Team shall send the carbon copies of communication with companies to CDEMA.

2. Year 3 Activity Plan

2-1. Proposed plan

The plan for the 3rd year activities was explained. Both sides approved in principle the outline of the plan taking into consideration the recommendations for amendment emerging from the Year 3 Planning Meeting March 16, 2011. The detailed implementation plan will be determined by further discussions among RT, NT members and the Team and the outcomes of the JICA Experts negotiations with JICA.

2-2. Commencing Time

Both sides agreed that the 3rd year activities should commence at the beginning of June, 2011 according to the original schedule.

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2-3. Terminal Evaluation

Both sides agreed that the terminal evaluation would be implemented for around one month from the beginning of August, 2011 with JICA Evaluation Team visiting all the pilot states. Expected achievement, Relevance, Effectiveness, Efficiency, Impact and Sustainability will be examined by JICA Evaluation Team.

The terminal evaluation will be carried out by several members nominated by both sides.

2-4. Selection of Terminal Evaluation Members

JICA confirmed that CDEMA would nominate two terminal evaluation team members. CDEMA requested JICA to provide correspondence on the terminal evaluation and detailed information such as scope of work of evaluation team members at the earliest opportunity.

Preparation time of evaluation team at least 1 month before the commencement of the terminal evaluation will be required for the evaluation team members.

3. Sustainability Plan

Both sides agreed that the formulation of the sustainability plan should be included as a component of the Year 3 activities. The sustainability plan will reflect the sustainability considerations for the project at the national and regional levels. It was agreed that the plan should be formulated with the initiative of the RT and NT in cooperation with the Team and agreed that a process for the development of the plan would be elaborated in the Year 3 activities.

4. Consensus-building among RT and NT

This Minutes of Meeting signed on March 17, 2011 should be shared among concerned parties of CDEMA side (CDEMA, RT and NT) for consensus-building on the progress of the 2nd year activities, the plan of the 3rd year activities and the sustainability plan.

5. Other Relevant Issues

5-1. Recommendations from CDEMA to JICA

CDEMA will submit recommendations from the Year 3 planning meeting on March 16, 2011 in written documents to JICA by April 15, 2011.

5-2. Coordination with Other Organizations

Both sides agreed that CDEMA and NT shall keep close contact with other organizations which are implementing projects related to CADM, taking the opportunity of the ISDR platform (Regional and National) and other occasions.

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MINUTES OF MEETING BETWEEN THE JAPANESE TERMINAL EVALUATION TEAM AND THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF BARBADOS AND THE CARIBBEN DISASTER EMERGENCY MANAGEMENT AGENCY ON THE JAPANESE TECHNICAL COOPERATION FOR THE CARIBBEAN DISASTER MANAGEMENT PROJECT PHASE 2

Bridgetown, September 1, 2011

宫坂

Mr. Minoru MIYASAKA Team Leader, Terminal Evaluation Team, Japan International Cooperation Agency, Japan

Mr. Charles BURNETT Permanent Secretary, Ministry of Foreign Affairs, Barbados

Mr. Jeremy COLLYMORE Executive Director, Caribbean Disaster Emergency Management Agency

The Terminal Evaluation Team (hereinafter referred to as "the Team"), organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") and headed by Mr. Minoru MIYASAKA, Senior Advisor to Director General of Global Environment Department, JICA from August 25 to September 1, 2011, for the purpose of conducting the terminal evaluation for the technical cooperation project "The Caribbean Disaster Management (CADM) Project Phase 2" (hereinafter referred to as "the Project").

During the stay in the Caribbean states, the Team conducted intensive study of the activities and discussion prospects for achieving the purpose of the Project, prepared the Evaluation Report (hereinafter referred to as "the Report") attached hereto and presented the Report to the Joint Coordination Committee (hereinafter referred to as "the JCC") held on August 31, 2011.

As the result of the discussion in the JCC on the major issues pointed out in the Report, both sides agreed upon the matters referred to in the Report and took note of the recommendations in document attached hereto, to ensure that necessary measures are taken for the achievement of the purpose and the outputs of the Project, as well as the sustainability of the outputs and/or outcomes of the Project.

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Attachment

Terminal Evaluation Report On the Japanese Technical Cooperation For the Caribbean Disaster Management (CADM) Project Phase 2

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Abbreviations

ACP-EU	African, Caribbean & Pacific State – European Union
AusAID	Australian Agency for International Development
CADM2	Caribbean Disaster Management Project Phase 2
CARICOM	Caribbean Community
CBDM	Community-based Disaster Management
CDC	Civil Defense Commission (Guyana)
CDEMA	Caribbean Disaster Emergency Management Agency
CDEMA CU	Caribbean Disaster Emergency Management Agency Coordinating Unit
CDM	Comprehensive Disaster Management
CDM-HIP	Comprehensive Disaster Management Harmonized Implementation Programme
CDMP	Community Disaster Management Plan
CIDA	Canadian International Development Agency
CIMH	Caribbean Institute for Meteorology and Hydrology
DAC	Development Aid Committee
DIG	Disaster Imagination Game
DFID	UK Department for International Development
ECHO	European Community Humanitarian Office
EU	European Union
FEWS	Flood Early Warning System
FHM	Flood Hazard Map
GIS	Geographic Information System
HFA	Hyogo Framework for Action
IDB	Inter-American Development Bank
ISDR	International Strategy for Disaster Reduction
JICA	Japan International Cooperation Agency
JT	JICA Expert Team
NaDMA	National Disaster Management Agency (Grenada)
NDO	National Disaster Organization
NEMO	National Emergency Management Organization (Belize)
NEMO	National Emergency Management Organization (St. Lucia)
NT	National Team (Guyana, St. Lucia, Dominica, Grenada, Belize)
ODM	Office of Disaster Management (Dominica)
OECD	Organization of Economic Cooperation and Development
OECS	Organization of Eastern Caribbean State
PDM	Project Design Matrix
PO	Plan of Operation
PPCR	Pilot Program for Climate Resilience
RD	Record of Discussion
RT	Regional Team (CDEMA, CIMH, UG, UWI)
UG	The University of Guyana
UWI	The University of The West Indies
UNDP	United Nations Development Programme
USAID	United States Agency for International Development

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Introduction

0.1. Objective of the Evaluation

The evaluation activities were performed with the following three objectives:

- (1) To verify the actual result compared to the plan as per the Project Design Matrix (hereinafter referred to as "PDM") as shown in <u>Annex 1</u> and the Plan of Operations (hereinafter referred to as "PO") as shown in <u>Annex 2</u> and to assess the performance of the Project.
- (2) To evaluate the results of the Project from the view point of the five evaluation criteria. , they are;
 - 1) Relevance
 - Are the Objectives of the Project still relevant? (Do they meet with the needs of beneficiaries?)
 - Is the Project consistent with the development policy of the partner country?
 - Is the Project consistent with Japan's foreign and policy and JICA's plan for country-specific program implementation?
- 2) Effectiveness
 - Is the Project purpose specific enough?
 - Has the Project purpose been achieved?
 - Did the achievement result from outputs?
 - Is there any influence of important assumption on attainment of the Project purpose?
- 3) Efficiency
 - Is the output production adequate?
 - Were the activities sufficient to produce the output?
 - Was the input of an adequate quantity and quality performed at the right time to conduct the activities?
 - Does the output justify the invested cost compared to similar project?
- 4) Impact
 - Has the Overall Goal likely been achieved?
 - What are the social, economic, technical, environmental and other effects on individuals, communities, and institutions as a result of the Project?
 - Is there any influence of important assumption on attainment of overall goal?
 - Is there any unexpected positive or negative influence including ripple effects?
- 5) Sustainability
 - Are the Outcomes (activities or effects) of the Project likely to be maintained after the Project period?
 - Institutional/organizational aspect, technical aspect, financial aspect, social/environmental aspect, etc.
- (3) To draw useful Recommendations to the Project and Lessons learned from the Project.
 - Recommendations to the implementing agency and stakeholders of the Project to improve or strengthen the performance and effect.
 - Lessons Learned for planning, implementing and evaluation of future projects

0.2. Members of the Evaluation Committee

The evaluation and the recommendations on the Project were made by the following members of Evaluation Team (hereinafter referred to as "the Team").

Name	Job title	Occupation
Mr. Minoru MIYASAKA	Team Leader	Senior Advisor to the Director General, Water Resources and Disaster Management Group, Global Environment Department, JICA
Mr. HidetomiOl	Community Disaster Management	Advisor, Global Environment Department, JICA

Mr. Akira HAYAKAWA	Evaluation Planning/ Regional Cooperation	Associate Expert, Disaster Management Division 2, Water Resources and Disaster Management Group, Global Environment Department, JICA
IMr. Hirovuki OKUDA	Evaluation and Data Analysis	Tekizaitekisho, LLC

0.3. Schedule of the Study

The Team conducted documentary reviews, data collection, and interviews from August 2 to September 5, 2011. The details are shown in <u>Annex 3.</u>

The List of Interviewees is attached as Annex 4

Chapter 1: Outline of the Project

1.1. Background of the Project

The Caribbean Disaster Management (CADM) Project was implemented under the Caribbean Community (CARICOM)/Japan Technical Cooperation Agreement through the Caribbean Disaster Emergency Management Agency (CDEMA) with the support of the Japan International Cooperation Agency (JICA). The Project was initiated in August 2002 and ended in March 2006.

Although the CADM project has sought to mitigate damages in the CDEMA participating states and made a significant contribution to the implementation of the Comprehensive Disaster Management (CDM) Strategy developed by CDEMA, the Caribbean countries are still put in danger by repeated natural disasters such as hurricanes and their associated strong winds and storm surges, floods, and landslides, as well as volcanic eruptions and earthquakes. In addition to these traditional hazards, recent rises in the sea level brought about by global climate change have occurred. Flooding which is the most commonly occurring hazard in the CDEMA participating states has been a silent development killer, necessitating urgent attention.

Concerning the above situation, the Government of Barbados requested to the Government of Japan the technical cooperation on the Caribbean Disaster Management (CADM) Project Phase 2 (hereinafter referred to as "the Project") in 2006, in order to conduct capacity development for the selected engineers in CDEMA, the Caribbean Institute of Meteorology and Hydrology (CIMH), the University of the West Indies (UWI), the University of Guyana (UG) and other relevant organizations in Belize, Dominica, Grenada, Guyana and St. Lucia where the pilot project will be implemented.

Responding to that, the Government of Japan approved the implementation of the CADM Project Phase 2 in 2007 and JICA dispatched a preparatory study team to design the Project. During the preparatory study, the Record of Discussion (R/D) of the cooperation was signed and exchanged on August 11, 2008 between the Ministry of Foreign Affairs of Barbados, CDEMA and JICA. After that, R/Ds were singed and exchanged between each government of Belize, Dominica, Grenada, Guyana and St. Lucia and JICA. CADM Project Phase 2 was commenced in January 2009 and will be terminated in December 2011.

1.2. Summary of the Project

(1) Super Goal

Disaster damage in the CDEMA participating states is mitigated.

(2) Overall Goal

Disaster damages in the CDEMA participating states are mitigated through enhancement of community resilience to the flood hazard (Similar project is implemented in flood vulnerable areas other than pilot sites of the CDEMA participating states).

(3) Project Purpose

Capacity of CDEMA and five pilot states for managing the flood risk is increased (RT has the capacity to establish Flood

Early Warning System (FEWS) in a flood vulnerable area with use of Flood Hazard Map (FHM) and Community Disaster Management Planning (CDMP) prepared by RT with the cooperation of NT).

(4) Outputs

- 1) FHMs are prepared, CDMPs are prepared and implemented, and FEWSs are established and implemented at the pilot sites.
- 2) Capability of RT to develop FHM and to establish FEWS is upgraded.
- 3) Hydrological database is established and functioning at CIMH (Efficient and effective use of the hydrological database becomes possible for FH mapping and FEWS establishing).

Chapter 2: Methodology of Evaluation

2.1. Methodology of Evaluation

The team conducted the terminal evaluation in accordance with "the JICA New Guideline for Project Evaluation, Ver. 1 (June 2010)", which mainly follows "the Principles for Evaluation of Development Assistance, 1991 "issued by OECD-DAC. As a framework of the evaluation, two types of grid - Result Grid (<u>Annex 10</u>) and Evaluation Grid (<u>Annex 12</u>) - were prepared based on the JICA guideline in reference to the following documents on the Project.

- Draft CDMP for Guyana, Dominica, Grenada and Belize
- Progress Report of CADM2 (May 2011) with Draft Manuals of FHM, CDMP and FEWS attached.
- Draft CADM2 Sustainability Plan (March 2010)
- Interim Report of CADM2 (March 2010)
- · Inception Report of CADM2 (May 2009)
- Detailed Study Mission Report of CADM2 (August 2008)
- Terminal Evaluation Report of CADM (March 2006)

To collect information and data for the grids, specific questionnaires for RT (CDEMA, CIMH, UG, UWI), NT (Guyana, St. Lucia, Dominica, Grenada, Belize) and JT were developed and forward in advance of the evaluation mission. During the mission, the Team conducted interviews with the counterparts based on the questionnaires, and also visited pilot communities. The grids were filled with the findings and information from the interviews, questionnaire survey, relevant reports, and the site visits.

2.2. Criteria of Evaluation

The Team reviewed all the activities and achievements and evaluated the Project based on the following five criteria: (1) Relevance

Relevance of the Project is reviewed to see the validity of the Project purpose and the overall goal in connection with the needs of beneficiaries and policies/priorities of recipients' states and of Japan.

(2) Effectiveness

Effectiveness of the Project is analyzed by evaluating the extent to which the Project has achieved its purpose and contributed to the beneficiaries. It also indicates how effectively the Project is designed to deliver intended results. Achievement of the Project was measured against the Objectively Verifiable Indicators in PDM.

(3) Efficiency

Efficiency of the Project is reviewed focusing on the relations between inputs and outputs in terms of timing, quality and quantity and how efficiently the inputs have been converted into the outputs through activities.

(4) Impact

Impact of the Project is reviewed by positive and negative impacts caused by implementation of the Project, including the extent to which the overall goal has been attained.

(5) Sustainability

Sustainability of the Project is forecasted in institutional, technical, human resource and financial aspects by examining the extent to which the achievement of the Project would be sustained after completion of the Project.

Chapter 3: Performance of the Project

3.1. Results of Inputs

In accordance with PDM, inputs are provided to the Project from both Japanese and CDEMA sides.

(Japanese side)

(1) Dispatch of short-term experts (Annex 5)

The number of experts is 7, working 1,635 days in total for 3 years, which means 54.5 MM: Chief Advisor (12.6MM), Flood Analysis (9.8MM), Flood Hazard Mapping(7.5MM), Community Disaster Management (9.5MM), Hydrological Database/GIS (7.8MM), Installation of Hydrological Gauges (1MM), Coordinator (6.2MM).

(2) Training of counterpart personnel (Annex 6)

The number of personnel attended the training in Japan in 2010 is 9: 4 from RT (CDEMA, CIMH, UG, UWI) and 5 from NT. At CIMH, two trainings were held in 2009 and in 2011, respectively. The former was attended by total 13, and the latter by total 11 personnel.

(3) Provision of Equipment (Annex 7)

Total 17 hydrological gauges were provided to the 5 pilot states. For CIMH, equipment for flood analysis and flood hazard map preparation was procured. The total of procurement costs for 3 years is 8.4 million Yen.

(4) Local Costs (Annex 8)

The total amount of Local Costs, or operation expenses, is 82.6 million Yen for 3 years. Major expenses are transportation & trip (25.6 million Yen), contract with local consultants (20.0 million Yen) and rental car (10.6 million Yen)

(CDEMA side)

(1) Assignment of Counterpart Personnel (Annex 9)

Project Director, Project Manager and Project Secretary are assigned from CDEMA. Together with the 3 from CDEMA, 6 staff members from CIMH and 2 professors from UWI and UG consist of RT. As for NT, one officer under National Emergency Coordinator in each pilot states functions as a focal point for the Project.

(2) Provision of office and facilities for the short-term experts

- 2 experts (Chief Advisor and Coordinator) are housed in CDEMA. The other 5 experts are housed in CIMH.
- 3.2. Achievement of the Project Outputs (Annex 10)

Achievement of the Project outputs as of August 2011 was measured against the indicators described in PDM.

(Output 1) "FHM are prepared, CDMP are prepared and implemented, FEWS are established and implemented at the pilot site".

The indicators of Output 1 are the preparation of FHM, CDMP and FEWS at all the pilot sites. At present, Output 1 has been partially achieved. This is due to the slow progress noted on the following; FHM of St. Lucia and Belize, CDMP of St. Lucia, FEWS of Guyana, St. Lucia and Belize. Details of the ratings which NT gave on the performance of the Project to date are summarized in <u>Annex 11</u>.

(Output 2) "Capacity of RT to develop FHM and to establish FEW is upgraded"

The indicators of Output 2 are the revision of FHM & CDMP manuals, the development of FEWS manuals, and execution of workshops. FHM manual was revised once, and CDMP manual was revised twice from those produced at Phase 1. The 1st draft of FEWS was developed and two workshops were held. According to the indicators, Output 2 is being achieved and the manuals are on the way to finalization. Details of the revision such as what information was added and what information still needs to be included are summarized in <u>Annex 10</u>.

(Output 3) "Hydrological Database is established and functioning at CIMH"

The indictors of Output 3 are the establishment of a hydrological database at CIMH and a data

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collection/management program at the national level. The system is already in operation at CIMH and at the national level. As such, Output 3 is mostly achieved. The details of the current status of these activities and what still needs to be done are summarized in <u>Annex 10</u>. The frequency of data sharing and access are other indicators but the way to count the frequency still needs to be explored and discussed.

3.3. Achievement of the Project Purpose.

Achievement of the Project purpose was measured against the three indicators described in the PDM: 1) preparation of FHM, CDMP and FEWS at more than half of the pilot sites, 2) preparation of a sustainability plan, 3) preparation of an action plan. As for the indicator 1), only the pilot sites of Dominica and Grenada currently have a set of FHM, CDMP and FEWS. These are still works in progress, but at present it is fair to say that FHM, CDMP and FEWS are prepared at two pilot sites. As for the indicator 2), the sustainability and action plans shared at the JCC in March 2011 are still the 1st draft. According to the indicators, the Project still requires some efforts to achieve its purpose with the status above.

3.4. Achievement of the Overall Goal

Achievement of the overall goal was reviewed against the two indicators described in the PDM: among the flood vulnerable areas in CDEMA participating states, FHM as well as CDMP are prepared for more than 10% of the areas. With CADM Phase 1 (3 pilot sites) and Phase 2 (5 pilot sites) of the Project, 8 communities are expected to have FHM and CDMP. According to UWI, in Trinidad & Tobago, 4 FHM were prepared after Phase 1 by the university with its own budget, but other than these 4 FHM, it cannot be confirmed that FHM and CDMP are being prepared in any projects including those financed by donors during the mission. In addition, "flood vulnerable areas" of CDEMA participating states are not comprehensively identified or listed by the NTs.

3.5. Achievement of the Super Goal

During this mission, the Team could not obtain data or information, to evaluate the progress of the Project towards achieving the Super Goal. The sustainability of the Project, however, is regarded by both the RT and NTs as being critical to achieving the Super Goal. If FEWS cannot be sustained, then communities remain at risk and flood damage will not be mitigated.

Chapter 4: Evaluation Result

4.1 Relevance

The relevance of the Project is high.

- Flooding is the common natural hazard in the Caribbean region and targeting flood preparedness and mitigation has been one of the urgent needs of the CDEMA Participating States. Pilot states of CADM Phase 2 continue to be affected by flooding events, Mahaica flooding (Guyana, March 2011), Hurricane Thomas (St. Lucia, October 2010), Flash flooding at Layou Valley and collapse of Matthieu Dam (Dominica, July 2011), Flood in Gouyave (Grenada, April 2011), Hurricane Richard (Belize, 2010).
- The Comprehensive Disaster Management (CDM) Strategy and Programme Framework (2007-2012), a policy document of CDEMA, was prepared with a stronger results focus and programmatic approach following the 2001-2006 CDM Strategy and Framework. Cooperation and intervention of donors has become more reflective of the needs and priorities of the region by alignment of activities with the enhanced CDM framework.
- This enhanced CDM has 4 priority areas (outcomes). Outcome 1 is "Enhanced institutional support for CDM program implementation at national and regional levels", and Outcome 4 is "Enhanced community resilience in CDEMA states/territories to mitigate and respond to the adverse effects of climate change and disasters". CADM Phase 2 is recognized by CDEMA to be effectively contributing to these 2 outcomes, in particular, the Outcome 4.
- · A Monitoring, Evaluation and Reporting Framework was formulated for the enhanced CDM Strategy 2007-2012 and

the CDEMA CU is conducting the monitoring of the CDM implementation. The CDEMA CU holds an annual meeting with member countries and development partners on CDEMA's work program.

- In each pilot state, new national policies and plans on disaster management are being drafted or have already been developed and refer to the flood hazard: Guyana's National Damage Assessment and Need Analysis Plan, St. Lucia's NEMO Five Year Strategic Plan (2011-2016), Dominica's National Emergency Management Plan, Grenada's District and Community Disaster Management Plan, and Belize's Disaster Preparedness and Response (2000).
- As for JICA's aid policy, in the "Outline of the CARICOM and targets of JICA Cooperation to the Region, January 2004", JICA proposed to reinforce cooperation with CARICOM in the fields of natural disaster and environmental conservation. At the U.N. World Conference on Disaster Reduction, (January, 2005, Kobe), Japan also stated its commitment to play an active role in measures to reduce damage from natural disasters through its Official Development Assistance (ODA). CADM Phase 2 is also consistent with Japan's ODA policy.

4.2 Effectiveness

The effectiveness of the Project to date is medium.

- · The Project has the potential to achieve most of its objectives before the termination,
- As described in the above section, Output 1 has been partially achieved. This is due to the slow progress noted on the following; FHM of St. Lucia and Belize, CDMP of St. Lucia, FEWS of Guyana, St. Lucia and Belize.
- As for Guyana's FHM which is already in its 2nd draft, verification and refinement is still required. However, it is not clear who is responsible for the refinement: UWI, CIMH or JT. They expressed an expectation for UWI to make the refinement, but UWI indicated that it was not given the authority to do so. UWI indicated that executing such an activity should come with resources.
- The CDMP is regarded as one of successful activities of this project, with 4 out of 5 pilot sites having almost completed the development of the CDMP. Its operation, however, is yet to be tested and verified through conducting a simulation drill in each community. As for the pilot community of St. Lucia, no CDMP has been developed and the NT indicated its progress was unknown due to the absence of communication from the RT or JT.
- The equipment for FEWS water level gauge and rainfall gauge was installed at 11 stations out of the planned 17; there are still 4 stations in Guyana and 2 stations in Belize to be installed. The Guyana NT indicated that the delay was attributed to the set back in the 1st year because the Project had been originally designed to replicate Phase 1, which was for island countries and Guyana has a different geography. On the other hand, the Project took a collaborative approach, relying on Guyana's sense of ownership, for identifying the site and equipment, and that approach itself is regarded as good even though it caused the delay.
- The good efforts of RT members, in particular Ms. Cherie Pounder and Mr. Shawn Boyce from CIMH, to produce Output 1 are frequently mentioned by all NTs during the interview.
- Output 2 is being achieved based on the indicators. The RT recommended that these three manuals should be integrated into one so that it would be presented as a package. Who takes the responsibility for the maintenance and revision of the manual after the Project termination is still to be clarified and agreed for sustainability.
- Regarding Output 3, CIMH is comfortable to say it is 90% achieved and efforts of Ms. Judy Padmore on database development are highlighted by CIMH. Output 3 is recognized by the RT as one of successful areas of the Project. The frequency of data sharing and access are set as the indicators of Output 3, but the way to verify the frequency still needs to be explored.
- As described in the above chapter, in light of the PDM indicators, the Project requires some efforts to achieve the
 Project purpose. The project purpose is likely to be only partially achieved by the end of project, December 2011. The
 PDM at the beginning of the Project did not include the development of sustainability and action plans as project
 activities although they were set as the indicators for project purpose. The absence of these two activities was
 regarded as an omission by the evaluation team and they were added to the PDM before the terminal evaluation.
- Capacity development of the RT to establish FEWS in a flood vulnerable area with the use of FHM and CDMP is stated as the purpose of the Project. Through the Project, CIMH has become the first Caribbean agency to have set up FEWS, from planning and identifying installation sites in consultation with NTs, to setting up equipment and conducting trainings. The capacity of CIMH to deliver FEWS and develop FHM is significantly increased in



cooperation with UWI. The Project is encouraged by the leadership taken by CIMH. Certain levels of increased institutional capacity are also mentioned by CDEMA, UWI and UG.

- Capacity of the NTs for utilization of the flood hazard maps to support the disaster management and to manage the FEWS including operation and maintenance of the systems has been strengthened through trainings and collaborative activities among the RT and NTs.
- The project purpose is the capacity development of the RT, but it cannot be stressed enough that the goal is to
 mitigate the disaster damage in CDEMA participating nations and communities; therefore, FEWS is the critical result
 of this project which makes direct impact on reduction of disaster losses in communities. The project should fully
 achieve the Output 1, in particular FEWS, by the time of its termination.

4.3 Efficiency

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The efficiency of the Project to date is medium.

- The inputs to the Project are as described in Section 3.1. Actual operation in contrast with the plan of operation is summarized in <u>Annex13</u>. There was a deviation from the activity schedule because of various adjustments which resulted in slow progress in the 1st year. This is, however, a common and normal challenge any project faces during its start-up. Considering CADM Phase 2 is a regional project covering 5 pilots states and requires more time for communication and consultation than a bilateral project, the deviation from the plan of operation is understandable.
- The overall inputs from the JICA expert team their assignment, expertise, number and duration are good, but the
 issue pointed out by all RT is their timing to visit the region. The timing of dispatch of the experts is observed by the RT
 as not necessarily conducive for effective project implementation because its scheduling is preemptive. Activities and
 counterparts are required to fit into their schedule. Their duration and timing should have been better coordinated in
 advance, including when the Project visits the community to hold a meeting and conducts a workshop. Furthermore, it
 was stressed by the RT that JICA experts should have stayed in the Caribbean region, instead of repeated short-term
 visits, for consistency, steadiness and continuity of the project activities.
- The input from the RT, in particular from the team of CIMH, is highly appreciated by the NT and JT. CDEMA's inputs
 are regarded satisfactory as the project manager assigned from CDEMA has many responsibilities within the
 organization. The project manager is generally responsible for the day-to-day management and coordination of the
 project. This is a full time position. In the absence of the requested project funds to support such a position, CDEMA's
 Deputy Executive Director was assigned to the position. This contributed to the satisfactory rating.
- The absence of fulltime staff both in the RT and JT is recognized as the biggest hindrance to efficient implementation of the Project. In contrast, Phase 1 had 6 long-term experts stationed in the region.
- Equipment, training and local costs as summarized in Section 3.1 are effectively utilized to produce intended outputs. It was pointed out, however, that inputs from the RT in Year 1 was short because Phase 2 did not provide enough budget for the RT to travel to pilot states and work with the NT as Phase 1 did. In the 2nd and 3rd years, planning meetings were held as precursors to the JCC, and the issue was remedied.
- As for training, the RT and NT appreciated their opportunities and usefulness, but it is widely mentioned that more training would be necessary, on flood analysis and mapping, hydrology, and on maintenance of equipment. It was also mentioned the period of trainings was short and that it would be better to increase the training period for greater absorption of knowledge and acquisition of skills by trainees.
- As summarized above, in contrast with Phase 1, the CADM Phase 2 has started with very limited resource inputs, budget and human resources, and yet needs to cover more pilots states than Phase 1 including Guyana and Belize which have different geographical features from island countries. The project design of the CADM Phase 2 is clear but its implementation arrangement should have been more discussed and needed extra consideration as a regional project. There was a sense from the RT and JT that the Project was carried out at a cost of stretching individual and institutional efforts rather than arranging a workable system to deliver the intended results.
 - The communication for project coordination among the RT, NT and JT is critical, in particular for a regional project. The structure of the Project is new to the NT as it includes not only government and regional organizations but also communities, universities and JICA. Bringing together wide stakeholders and resource agencies is recognized positive and beneficial, but this structure caused delays in many respects: communication, logistics and information

sharing. Better and efficient communication tools among the RT, NT and JT could have been sought and tried such as opening a web site for postings or web message board where opinions are collected in a timely matter in response to queries.

There are many factors mentioned by the RT and NT that have promoted the Project: collaborative environment of CDEMA and CIMH with JICA, willingness of the five governments of pilots states, commitment of communities, existing capacity of hydrological risk management in CIMH and regional team's collaborative approach.

4.4 Impacts

The impact of the Project to date is medium.

- Progress towards achieving the Overall Goal is modest and the prospect of implementing similar projects in other flood vulnerable areas by the RT and NT is medium. Flood remains a critical priority in the region, but against the PDM indicator which considers flood vulnerable areas in all the 18 CDEMA Participating States, the target in 3 years is a very short timeframe and the Overall Goal may not be realistic.
- Flood vulnerable areas have not been comprehensively listed yet in the region, and currently the RT does not have such a list nor is undertaking an activity to prepare the list. It largely depends on each CDEMA Participating State' efforts to identify these areas. Among the pilot states of the Project, only Grenada and Belize have such a list. Guyana will have identified vulnerable areas in the country by 2013 through a Community Based Disaster Risk Management (CBDRM) Project financed by IDB.
- Implementing similar projects largely depend on how each country articulates its necessity in its national program but
 not all CDEMA states have the same capacity for identifying these areas. Another project may be needed to achieve
 the Overall Goal because in some cases an coordinated intervention that connects concerned agencies such as the
 RT and NT is more efficient than isolated activities at national level.
- There are many ongoing collaborative efforts with donor agencies as summarized in <u>Annex 14</u> on community-based disaster management focusing on flood hazard. The Hyogo Framework for Action (HFA) is a global agenda to guide implementation of disaster risk reduction in all levels of society. Its goal is to build the resilience of nations and communities to disasters and to reduce disaster losses in lives and within social, economic and environmental assets by 2015. The CDM strategy and programme framework, the development of which was led by CDEMA, is consistent with this global agenda. Linking all efforts undertaken in the Caribbean region together is necessary for realizing the Overall Goal.
- In addition to the advancement towards the Overall Goal, another major impact mentioned by the RT and NT is that the Project has fostered a collaborative environment among relevant agencies not only between the RT and NT, but also within the NT of each pilot nation. The list of interviewees in <u>Annex 4</u> for the terminal evaluation indicates the range of varied agencies which have been involved as the NT in each pilot state. Furthermore, in Guyana, for example, CDC has forged a new relation with private telecommunication companies LIME and DIGICEL to realize a signal transmission from gauges.

4.5 Sustainability

The prospect for sustainability of project outputs to date is medium.

The capacity from an institutional viewpoint is relatively high. Policy and strategy at regional level to address disaster management such as CDM framework (2007-2012) and Caribbean Community Regional Programme Framework (2005-2015) have been steadily implemented in the region. In line with the CDM, pilot states have developed or drafted new guiding documentation such as National Disaster Plan and Country Work Program, which encompass flood mitigation and disaster reduction. A conducive institutional environment exists as a framework, in general, but details such as standard operation procedure/regulation to ensure the sustainability at the level of project purpose and outputs are yet to be established. As for Output 1 of the Project, for example, it is still to be agreed and documented as to which agency is responsible for taking over and carrying on each of FHM, CDMP and FEWS after the Project termination. General responsibility and collective ownership is better to be removed by the end of the Project by developing MOU among concerned agencies or written procedures for maintenance of outputs.

- The capacity from a technology viewpoint is relatively medium-high. CIMH is confident in sustaining the database system, flood analysis software and hydrological equipment introduced by the Project. A permanent database manager was also hired on 3rd August 2011 at CIMH. At national level, hydrological equipment was set up only recently in April through July, 2011, and most equipment is still going through the stage of initial adjustments as of August. The water level gauge and rainfall gauge are new types of equipment for the NT; therefore, a little more time would be necessary for the NT to learn to effectively maintain and utilize the introduced equipment.
- The human resource capacity is relatively low. CDEMA indicates human resource is a major constraint to carry on the Project activities in CDEMA as current staff is assigned substantive duties and responsibilities. CDEMA core staff complement is small and other staff are project based. CIMH has a human resource capacity and through hiring and education at vocational courses, CIMH expects its human resource capacity to be continuously built. At national level, Disaster Management Organizations of Caribbean states usually have very limited staff: NEMO in Saint Lucia has 7 staff members and ODM in Dominica has 6 staff members including administration. Therefore, the human resource is also a major challenge for NT. For strengthening the RT and sustaining project activities, CDEMA needs a technical staff member, who can dedicate at least 20% of his/her time for implementation and monitoring of the sustained project activities.
- The capacity from a funding viewpoint is relatively low. CDEMA indicates there are other projects such as by ACP-EU National Disaster Facility and Red Cross, which may work on flood hazard map and FEWS, and that the Project output can be utilized or incorporated by other donor projects. Except for CDEMA, the prospect of funding capacity is indicated low by the RT and NT. While NTs have supported project implementation through allocations from national budgets the scope of input is limited by budget constraints. The NT indicated that they cannot buy spare parts or replace the equipment, due to budget limitation, if the current gauges are vandalized or stolen. The NT also indicated they do not know the incremental costs to maintain or replace the equipment; therefore, the sustainability plan should clarify the financial implication of the Project sustainability for each pilot state.

4.6 Conclusion

- The Caribbean Disaster Management (CADM) Project was implemented from August 2002 to March 2006. The CADM Project Phase 2 has been implemented from January 2009 to December 2011. The CADM projects have been implemented for more than six years in total.
- The overview of the performance and the evaluation over the 5 criteria for the CADM Project Phase 2 indicated that, some parts of the Project activities performed well. However, the purpose of the Project cannot be achieved satisfactorily within the remaining period of 4 months. These conclusions are attributed to;
 - (1) Preparation of FHM and CDMP which are important components of Output 1 have not been completed so far. Establishing FEWS has not been completed due to the delay of hydrological gauge installation.
 - (2) Hydrological gauges which relate to FEWS have not been installed as yet in 2 target countries. The gauges are expected to be installed by the beginning of September, 2011. Considering the proper operation of the equipment requires the data/information after their installation, it would be difficult to achieve the proper utilization of equipment by the end of December, 2011.
 - (3) The preparation of sustainability plan/action plan has not been completed.
- Delay of 3 activities, FHM, CDMP and FEWS, in Output 1 is attributed to: 1) lack of shared vision on final outputs of maps/plans between the RT and NT; 2) lack of clarity on the responsibility for implementation; and 3) modification of the implementation schedule. FEWS is also affected by the delay in the installation of hydrological gauges.
- The Project changed the specification of hydrological gauge in the first year of CADM Project Phase 2 in two
 continental states, so procurement, installation and training for the operation of the equipment was delayed in these
 states. The equipment is expected to be installed at the beginning of September, 2011.
- To achieve the Project purpose as designed, the Project will be extended for another 6 months which is equal to the delayed period of the establishment of FEWS.
- The achievement of overall goal may be fairly hard in the CDEMA Participating States in three years. There is a willingness for FHM in every state but levels of implementation differ. The 3 years after the completion of the CADM Project Phase 2 will be too short a time to achieve the Overall Goal.

- Among the 5 criteria for evaluation, only relevance is evaluated as high and others are as medium.
- "Medium" of effectiveness is simply attributed to the delay of Output 1. When the 3 activities of Output 1 progress further, the effectiveness will be improved.
- Regarding efficiency, the evaluation team would like to highlight the request for a long-term expert who will stay in the Project office for long term. Shuttle style experts hinder the usual job of staff and flexible assignment is highly appreciated by the RT.
- Impact is mentioned in the achievement of the Overall Goal. There are a lot of factors and prerequisite conditions in the Project. However, if the RT designs a good program for community disaster management with other development partners, it may be possible to find a way to achieve the Overall Goal. The evaluation team expects that the RT will prepare such a program in the future.
- The budget issue is strongly highlighted in sustainability as usual. JICA recognizes that a level of capacity is embedded in the staff and the organization as know-how, knowledge and skills. The evaluation team understands that it is a challenge for the RT to implement the RT activities with limited budget and embedded capacity.

Chapter 5: Recommendation and Lessons Learnt

- 5.1. Recommendations to the Project
- (1) Extension of the Project
 - The evaluation team recommends the extension of the Project until the end of June, 2012, due to the delay of installation of hydrological gauges and preparedness for next hurricane season. Required resources will be provided by JICA.
 - 2) Hydrological gauges should be installed as soon as possible.
 - During the extended period of the Project, FEWS process should be completed and FHM and CDMP revisions should be completed.
- (2) Plan of operation for extended period
- 1) The RT and JT should prepare a detailed activity plan for the extension period, based on the plan of operation agreed with the participating states and JICA, and use that information for additional resource requirement.
- (3) Activities regarding Output 1
 - 1) FHM and CDMP should be prepared as soon as possible. FEWS process will continue as planned.
 - Good examples of FHM, CDMP and FEWS should be shared among the RT, NT and JT to enhance the quality of outputs.
 - 3) Responsibilities and time frame should be decided to implement the activities in Output 1.
 - 4) The arrangements for capacity building for NTs haven't been prescribed so far. Effective approaches in that effect are to be discussed as a way forward.
- (4) Sustainability and Action Plans
 - Sustainability and action plans should be completed as soon as possible. The preparatory work should be started soon after the completion of the sustainability and action plans. It is recommended that sustainability and action plans are openly discussed.
 - Sustainability and action plans should include improvement of techniques/skills, human resource development, organization management, targeted period and budget issues. High risk flood areas should be identified by the CDEMA Participating States.
- (5) Monitoring of the progress

CDEMA should assume responsibility for monitoring the progress of activities done by all development partners.

(6) External Fund assistance

The RT is encouraged to mobilize resources to support expansion of CADM Phase 2.

(7) Maintenance of equipment

The NT should formalize arrangements for maintenance of the equipment including through the support of the RT. Maintenance of the equipment is a key factor for sustainability of the outcome of the Project.

(8) Decision Making Process

Decision making process should be streamlined to allow the NTs to operate more effectively in project implementation.

(9) Recommendation to the RT

- 1) CDEMA should encourage greater harmonization among development partners such as UNDP, USAID, CIDA, RED CROSS, and so on, in the area of the community disaster management.
- 2) Human resources for community disaster management should be fostered in CDEMA or other RT organizations as appropriate.

5.2. Lessons learnt from the Project

(1) Regional Cooperation

Regional cooperation projects include complex institutional arrangements and many diverse states, with different natural conditions and climates. This reality as well as, the dynamics of Caribbean culture, should be well considered in the project design and implementation approaches. In that regard, visiting communities before the beginning or the initial stage of a project is important in designing the project or in planning its activities.

Specification of equipment must be surveyed carefully in case of regional cooperation projects. Natural conditions stipulate the specification of equipment in some cases. Budget for traveling cost is also a critical factor in the framework of regional cooperation projects.

(2) Clarifying the responsibility of implementation

Consultation at the design stage is necessary between project partners. Such consultation will permit clarification on critical issues such as the responsibility and the implementation time frame at the project design stage. If the project includes activities from the national level to community level, project design becomes complicated and the responsibilities become unclear.

(3) Important role of long-term expert

In the case of technical cooperation, the existence of a long-term expert is key for smooth implementation of the project and capacity development to counter-parts. Counter-parts generally do not appreciate shuttle style assignment of the expert.

(4) General administration

Flexibility and responsiveness to the needs of the project beneficiaries during project implementation is essential for effectiveness.

(5) Contract arrangement

One year renewal contract arrangements for multi-island regional cooperation projects may require further reflection given the interruption caused to the project implementation.

(6) Capacity building

Learning while doing is an effective approach to institutional capacity building.

(7) Budget

Knowledge of financial resource allocations by all parties accelerates the decision making process and project implementation.

(8) National level lessons learnt

Stronger coordination as well as synergy of activities at the national level is important to the effective project implementation

(9) Frequent information and communication flow

Information Technology Center (ITC) platforms, such as web-based information system, can be considered as a communication and decision-making platform system.

(10) Learning from the past projects

The findings from past projects should be taken into consideration for any subsequent projects. The terminal evaluation of a preceding project should be reviewed.

더 A.1 Project Design Matrix

PROJECT DESIDA MATRIX Project Name Caribbean Disaster Nanogement Project Phase 2 Implementing Agency: Caribbean Dhastet Envergency Response Agency (CDEMA). Curation: From January 1978 to December 2011.

Prepared on: 20 Augy 2011			
Narrative Summary	Coljectivery Verificable Indicators	Means of Verification	Important Assumptions
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 Capter inty of RT in several FHIA and in establish FEVICs is upgraded 	2.1 FM manual provided more than once a year reflecting the activities in the publicaties and CDM proming manual is revised reflecting the activities with publications and public states 2.03 FEWS estate standy than usits propries and institution for the alter activities and 2.14 Wirkshold the exterior FEWS only use of Fully and CDMP article activities and 2.24 Wirkshold the exterior FEWS only use of Fully and CDMP article activities and 2.25 FEWS estates and activities and activities and activities and 2.26 Wirkshold the exterior FEWS only use of Fully and CDMP article activities and 2.27 Wirkshold the exterior FEWS only activities and activities and 2.26 Wirkshold the exterior FEWS only activities and activities and activities and 2.27 Wirkshold the exterior for the fully activities and activities and activities and 2.26 Wirkshold the exterior FEWS only activities and activities and activities and 2.27 Wirkshold the exterior for the fully activities and activities and activities and 2.26 Wirkshold the exterior for the fully activities and activities and activities and activities and 2.28 Wirkshold the exterior for the fully activities and activities and activities and 2.27 Wirkshold the exterior for the fully activities and activities and activities and activities and 2.26 Wirkshold the exterior for the fully activities and activitities and activitities and activities and ac	2-1 Revised Manual 2-2 Revised Manual 2-3 Froject Reports 2-4 Project Reports	
 Hydrological distribute is established and functioning an CMM+ (Efficient and effective use of the hydrological distribute hexamilies prescribe for the mapping and FE (v2) establishing). 	3-1 Hydronopical state is established at CMM- S2. Theb based-stratedopical costs collection, microgeneral and sharing program is developed. 3-2 Hydronopical costs is supplication collection, microgeneral activity for program more than 00 times a year. 3-2 The hydronopical data base through the program is accessed by CDEMA member stores more man 2-2 The hydronopical data base through the program is accessed by CDEMA member stores more man.	3-1 Centimotion or CIMH 3-2 Continuation of Web 3-3 Data of CIMH 3-4 Data of CIMH	
 Construction of the construction of point methods and methods and point of state and an experiment of the formation of the first of the point methods and before a first or antistical method of the first of the point methods and before a first or antistical method of the first of the point methods and before a first or antistical method of the first of the point method of the point of the point of the point of the first of the first of the point of the point of the antistical method of the first of the first of the point of the point of the first of the first of the first of the point of the point of the first of the first of the first of the point of the point of the first of the first of the first of the point of the point of the first	Internets Internet Internets Internets Internets Internet Int	(Azereana	Pie-Conditiuns) - Conditiuns - Conditiuns - Projection servection - Projection promodel

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A.2 Plan of Operation

PLAN OF OPERATION FOR ENTIRE PROJECT PERIOD

A second s	FY2009	FY2010	FY2011
Activities	Fee Mar Zar Way San Data Balance Train Dat Date Set 14		
Early Warning Sectement for the Rood Pagent established and implomented at the plat sites			
Processment and institution of hydrological and 1.1 meteomispical observation equipment and start of observation of the physical			
1.2 Development of QS database at the plot sites			
1.3 Flood analysis at the pilot offen		د بند این وی جرب این این بین برای برای این در ا در این این این این این این این این وی این وی این این این	
1.4 Preparation of flood bound maps for each of the plot store showing numbers areas, shifters, evacuation motion etc.			
1.5 Efformation Gallaction on the communities at the pilot inter- for preparing CDM plane			
1.6 Preparation of GDM plans at the print sites		د که ها خو او دور ش به ما ما مه دو دو برد. د ها ما مه دو نو بو ها من خو می بو بو ا	
1.7 Establishments of flood early warring system at the prior site			
1.8 Disaster revolution being of the abit sites based on the CDM plus			
1.9 Indementation of Deaster Imagination Game(DIG) at the place stars			
1.10 Training in Japan of the NTo counterparts about hydrological abcenution and GDM plan.			
Capability of the Regional Team to develop fitted hazard maps and to establish flood sarly warming systems opprafted			
2.1 Revision of the instruct the food fugarit mapping prepared in Phase I based on the result of activities at the old sites			
22 Revision of the regreat for CDM plan prepared in Phase f Second on the restort of activities at the plant sites			
2.3 Preparation of the minimal for flood sorty warning system.			
24. Hold were dops and server as on Read safe warning system			
Training in Japan of the RT and or MT counterparts in fiscal 25 Instant mapping, CDM planning flood winly warning systems and DIG facilitation			
Hydrokenical diatabase is writebly hed and functioning at the CIMH			
3.) Evaluation of the statue of hydrological data collection and management			
32 Development of a web-based data collection, management and decentration anogram			
We used and performance of the source of a second s	an in a fund of more and a sum of a sum		an bar and same an and an address of the same from and a same advantage
3.4 Training on input and descentration of hydrokopost data at the regional and national level		al mar argin at in given and ann a give transformed of the algorization and a new spin control of the second of	

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A.3 Schedule of Evaluation Mission

Date		Mr.Miyasaka / Mr. Oi	Mr. Hayakawa	Mr. Okuda	
2-Aug	Tue			11:20 Tokyo - 11:25 New York (JL006) 13:10 New York - 21:30 Bridgetown (AA651)	
3-Aug	Wed		A CARTER STOL	08:30 Interview with CDEMA (Ms.Riley) 13:00 Interview with CIMH(Dr.Farrell)	
1.5					
1 110	Thu			08:30 Bridetown - 10:30 Gerogetown (LI781) 13:00 Courtesy Call to CDC (Mr.Ramsarup)	
4-Aug	inu			16:30 Interview with UG (Dr.Bynoe)	
	-	NUMBER OF BRIDE REED	CONTRACTOR OF THE	10:00 Interview with CDC (Mr.Craig, NT)	
5-Aug	Fri			14:00 Interview with JICA Guyana Expert (Mr.Yamada)	
6 Aug	Sat	The second second second		Preparation of Evaluation Report	
6-Aug					
7-Aug	Sun	-		Preparation of Evaluation Report Site Visit (Uncer Metaine Communities)	
8-Aug	Mon		-	Site Visit (Upper Mahaica Communities)	
9-Aug	Tue			8:30 Georgetown - 10:30 Bridgetown (LI774)	
10.4	141-1	1-Veries - States		13:30 Bridetown - 14:20 St. Lucia (L1370)	
10-Aug	Wed	-		10:00 Interveiw with NEMO (Ms.French, NT)	
11-Aug	Thu			10:00 Site Visit (Corinth, Gros Islet)	
		S. Conditioned		08:00 Interview with UWI-TT (Prof.Opadeyi)	
12-Aug	Fri			14:00 Interview with OECS Secretariat	
-	-			15:45 Report to JICA Liaison Office	
13-Aug	Sat			10:15 St. Lucia - 11:00 Bridgetown (LI371)	
	0			12:30 Bridgetown - 13:30 Dominica (LI364)	
14-Aug	Sun		-	Preparation of Evaluation Report	
15-Aug	Mon	-		12:20 Interview with ODM (Mr. Isaac, Mr.Corriette)	
16-Aug	Tue		4.000	10:00 Interview Meeting with NT	
	-			14:30 Site Visit (Bath Estate, Roseau Valley)	
				10:00 Site Visit (Layou River)	
17-Aug	Wed		SPECIAL STREET	17:25 Dominica - 18:25 Bridgetown (LI563)	
11111	12			18:55 Bridgetown - 19:50 Grenada (LI787)	
18-Aug	Thu		All and the second	09:00 Interview with NaDMA (Mr. Walters and NT)	
			13:00 Site Visit (Balthazar Village)		
19-Aug	Fri			09:00 Meeting with NaDMA (Mr.Peters)	
	0.1			16:00 Interview with JICA CARICOM Expert (Mr.Yoshida)	
20-Aug	Sat	-3		Preparation of Evaluation Report	
21-Aug	Sun	1 1 - STA		08:25 Grenada - 10:30 San Juan (AA4813)	
				12:25 San Juan - 15:10 Miami (AA841)	
22-Aug	Mon		Tokyo - 14:20 Belize City	10:10 Miami - 10:15 Belize City (AA2103)	
			(AA176)	13:00 Site Visit and Community Meeting(Crooked Tree, Belize Rural)	
23-Aug	Tue		09:00 Interview Meeting wit		
		44-00 Talana	12:30 Site Visit to Big Fall and Isabella Bank		
24-Aug	Wed	11:20 Tokyo	10:00 Site Visit to Banana E		
		- 11:25 NY (JL006)	14:00 Report to JICA Liaiso		
25-Aug	Thu	08:15 NY - 13:00	11:20 Belize City - 15:20 Miami (AA2180)		
		Bridgetown (AA1385)	18:00 Miami - 21:35 Bridgetown (AA2180)		
		09:00 Internal Meeting among Mission Members and Experts			
26-Aug	Fri	13:00 Meeting with CDEMA			
		15:00 Meeting with CIMH			
27-Aug	Sat	Preparation of Evaluation Report and M/M			
28-Aug	Sun	Preparation of Evaluation Report and M/M "			
29-Aug	Mon	11:00 Meeting with Red Cross			
-			ation Report and M/M with CD	EMA and CIMH	
30-Aug	Tue	08:30 Meeting with CIDA			
-			ation Report and M/M with CD	EMA and CIMH	
31-Aug	Wed	09:00 Joint Coordination C	ommittee		
1-Sep	Thu	Signing of M/M			

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		15:10 Bridgetown - 19:05 Miami (AA1078)
2-Sep	Fri	10:15 Miami - 12:25 Santo Domingo (AA1711) Report to JICA Dominican Republic Office
3-Sep	Sat	16:40 Santo Domingo - 20:55 New York (AA1752)
4-Sep	Sun	13:15 New York -
5-Sep	Mon	- 16:25 Tokyo (JL005)

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A.4 List of Interviewees

+	Regional Team (RT)	
-	Caribbean Disaster Emergency Mar	nagement Agency (CDEMA)
	Mr. Jeremy Collymore	Executive Director
_	Ms. Elizabeth Riley(Ag)	Deputy Executive Director
	Caribbean Institute for Meteorology	and Hydrology (CIMH)
	Dr. David Farrell	Principal
	Mr. Shawn Boyce	Chief Hydrologist
	Ms. Cherie Pounder	Hydrologist
	Mr. Marvin Forde	Technical Officer
	Mr. Damian Prescod	Technical Officer
	Ms. Judy Padmore	Technical Officer
	University of the West Indies (UWI)	
	Prof. Jacob Opadeyi	Head, Department of Geometrics Engineering and Land Management Faculty of Engineering
	University of Guyana (UG)	
51.5	Dr. Paulette Bynoe	Director, School of Earth and Environment Sciences
,	National Team (NT)	
-		
-	Guyana Mr. Chabilall Pamearun	Director General Civil Defense Commission (CDC)
	Mr. Chabilall Ramsarup Mr. Kester Craig	Director General, Civil Defense Commission (CDC) Captain, Operation/Training Officer, CDC
	Mr. Carlton Semple Ms. Grace Khan	Manager(EOC), CDC
		Mahaica River Community Leader
	Mr. Kelvin Thorne	Engineer, NDIA, Ministry of Agriculture
	Mr. Sherwood Lowe	University of Guyana
	Mr. Lionel Wordsworth	CEO, National Drainage & Irrigation Authority (NDIA), Ministry of Agriculture
	Mr. Garvin Cummings	Dept. Chief, Hydro-Meteorological Service, Min of Agriculture
-	Ms. Karen Anthony	Guyana Lands & Surveys Commission (GL&SC)
-	Saint Lucia	
	Ms. Dawn French	Director, National Emergency Management Organization (NEMO) Secretariat
	Ms. Claudia Winnette Mr. Fitzgerald John	GIS Specialist Cartographic Technician, Survey and Mapping Section, Ministry of Planning Senior Officer, Water Resources Management, Ministry of Agriculture and Meteorologica
	With the geraid softh	Services
	Ms. Annette Augustine	Sustainable Development
	Mr. Julian Du bois	Deputy Director, NEMO
	Ms. Moetila Eyphine	Physical Planning
	Mr. David Alphonse	Physical Planning, Ministry of Physical Development and Environment
	Mr. Dexter Passale	
	Ms. Lerencia Geulland	Physical Planning (Architectural Section)
		St. Lucia Red Cross
	Ms. Deepa Girderi	Ministry of Tourism
	Ms. Sophia Pierre	Ministry of Tourism
	Ms. Jennifer Gaston	Evacuation Plan
	Mr. Thaddeus Montoute	Community
	Dominica	
	Mr. Nathanael Isaac	National Disaster Coordinator, Office of Disaster Management (ODM)
	Mr. Don Corritte	Program Officer, ODM
	Mr. Greetan Seaman	Manager, G-S Surveys
	Mr. James Gregorie	Road Surveyor, Ministry of Public Works and Public Utilities
	Mr. Donny Bruno	Surveyor, Lands and Surveys Division
	Mr. Marshall Alexander	Weather Forecaster, Dominica Meteorological Services
	Mr. Lindsay George	Owner/Chairman, Krystallion / Bath Estate Development Committee
	Mr. Charles Maclean	Supervisor, Dominica Electricity Services
	Ms. Nicole Seaman Tyson	Hydrologist, Ministry of Public Works and Public Utilities
	Ms. Jacqueline Andre	Forest Officer, Ministry of Forestry

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	Mr. Benedict Peters	National Disaster Coordinator, National Disaster Management Agency (NaDMA)
	Mr. Terence Walden	Deputy National Disaster Coordinator, NaDMA
	Mr. Kem Jones	Community Programme Officer, NaDMA
	Mr. Jason Lyons	Community Programme Officer, NaDMA
	Mr. Brice Taylor	Volunteer, NaDMA/Peace Corps
	Mr. Christopher Greenidge	Engineering/Assistant, NAWASA (National Water and Sewage Authority)
	Ms. Merle Cato	Planning Technician, Physical Planning Unit, Ministry of Works
	Mr. John St. Louis	Senior Engineer, Ministry of Works
	Mr. Kenton Fletcher	NWIS system administration, Ministry of Agriculture
	Mr. Cosmos Charles	Technician, NAWASA
	Belize	
177	Ms. Noreen Fairweather	National Emergency Coordinator, National Emergency Management Organization (NEMO)
	Mr. Dennis S. Gonguez	Chief Meteorologist, National Meteorological Service (NMS)
	Mr. Calvert Budd	District Emergency Coordinator
	Mr. Ellington Cayetano	Hydromet,, NMS
	Mr. Isani Williams	Hydromet, NMS
	Mr. George Guest	Crooked Tree Village Council Chairman
	Mr. Steve Perrilot	Vice Chairman of the Crooked Tree Village Council
3	Japanese Expert Team (JET)	
	Mr. Toshikatsu Imai	Chief Advisor/Flood Early Warning System
	Mr. Noboru Jitsuhiro	Flood Analysis
	Mr. Hideki Araki	Flood Hazard Mapping
	Mr. Osamu Nakazawa	Project Coordinator
4	National Team of CADM Phase 1 Proje	ct
	Mr. Charles Year wood	Barbados
3	Ms. Michelle Forbes	St. Vincent and the Grenadies
5	Development Organization/Project	
	Mr. Earl Arthurs	Preparedness and Contingency Planning Specialist, ACP-EU (CDEMA)
	Mr. Leslie John Walling	Canada Caribbean Disaster Management Fund (CDEMA)
	Ms. Cisne Pascal	CDM-HIP (CDEMA)
	Ms. Joanne Persad	IDB project (CDEMA)
	Mr. David T Popo	Program Officer III, Organization of Eastern Caribbean States (OECS)
	Mr. Cornelius Isaac	Project Coordinator, Organization of Eastern Caribbean States (OECS)
	Ms. Guylaine Greneir	Second Secretary (Development) High Commission of Canada
	Ms. Reynette Royer	Coordinator, Barbados Red Cross Society
6	JICA Office or Expert	
	Mr. Sakae Yamada	Advisor for the Japanese Aid Coordination, Ministry of Foreign Trade and Internationa Cooperation
	Mr. Mizutani Kyohei	Resident Representative, Saint Lucia Liaison Office
	Mr. Tatsuya Morita	Project Formulation Advisor, Dominica Field Office
	Mr. Taku Yoshida	Project Identification Expert, CARICOM
	Mr. Shunsuke Nakamura	Resident Representative, Belize Liaison Office
	Ms. Noriko Takemae	Volunteer Coordinator, Belize Liaison Office

Function	Name	Year			Period			Remarks
			1st dispatch	2nd dispatch	3rd dispatch	4th dispatch	Day	Contribution by Consultant
1 Chief Advisor/Early		181	2009/2/14~2009/4/6	2009/4/26~2009/5/8	2009/9/30~2009/10/29	2010/1/27~2010/3/16	144	1 day
Flood Warning System	IMAI	2 nd	2010/7/11~2010/8/9	2010/9/24~2010/12/14	2011/2/3~2011/3/20		158	60 days
		and and	2011/8-2011/9(37)	2011/11-2011/12(39)			76	
		24						
		total					378	
2 Flood Analysis	Noboru	1 st	2009/2/14~2009/5/14	2009/9/30~2009/12/28			180	
	JITSUHIRO	2 nd	2010/8/22~2010/11/14				84	24 days
The Part of the Pa		310	2011/8-2011/9(30)				30	
		40						
		2 [#]						
		total					294	Since and and
3 Flood Hazard Mapping	Hideki	1 st	2009/2/14~2009/3/15	2009/11/12~2010/2/9			120	
Total In State	ARAKI	2 nd	2010/11/13~2010/12/12	2011/1/24~2011/2/17			55	4 days
		3 rd	2011/8-2011/10(51)				51	
a tol and a		4 th						
The second		5 th						
		total					226	
Community Disaster	Lolita	1 st	2009/3/26~2009/5/26	2009/12/16~2010/3/13			150	
Management	C. GARCIA	2 nd	2010/1/11~2010/2/17	2010/3/1~2010/3/22			60	
The second second		3 rd	2011/9~2011/12(75)				75	
		4 th						
	No. Contraction	5 th						
		total					285	
5 Hydrological	Toru	151	2009/3/16~2009/5/14	2009/9/14~2009/12/27			175	
Database/GIS	KOIKE	2 nd	2011/2/9~2011/3/10				30	
		3 rd	2011/7/6~2011/8/4	2011/11(30)			60	
		total					235	
Installation of	Yosuke	3 rd	2011/6/12~2011/7/11				30	
Hydrological Gauges	INSU	total	30	4			30	
7 Coordinator	Osamu	181	2009/2/7~2009/3/8	2009/8/29~2009/9/12	2010/3/1~2010/3/15		67	7days
	NAKAZAWA	2 nd	2010/6/16~2011/7/15	2011/2/26~2011/3/27			60	
い、単語の		3 rd	2011/6/12~2011/7/11(30)	2011/11~2011/12(30)			60	
		total					187	96days
Number of Experts 7							1 635	

는) of A.5 List of input (Experts)

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거하다 A.6 List of Input (Training)

Name	Organization	Period	Place
Ms. Cherie Pounder	CIMH Hydrological Section, Barbados	14 SEP 2009 - 24 OCT 2009 (9days)	CIMH
Ms. Judy Padmore	CIMH Hydrological Section, Barbados	14 SEP 2009 - 24 OCT 2009 (9days)	CIMH
Mr. Lawrence Pologne	CIMH Meteorological Section, Barbados	7 DEC 2009 - 11 DEC 2009 (5 days)	CIMH
Mr. Ernest Lovell	CIMH Meteorological Section, Barbados	7 DEC 2009 - 11 DEC 2009 (5 days)	CIMH
Mr. Nigel Atherley	CIMH Meteorological Section, Barbados	7 DEC 2009 - 11 DEC 2009 (5 days)	CIMH
Ms. Cherie Pounder	CIMH Hydrological Section, Barbados	7 DEC 2009 - 11 DEC 2009 (5 days)	CIMH
Ms. Judy Padmore	CIMH Hydrological Section, Barbados	7 DEC 2009 - 11 DEC 2009 (5 days)	CIMH
Mr. Megan Cox	CIMH Project Officer of OAS, Barbados	7 DEC 2009 - 11 DEC 2009 (5 days)	CIMH
Ms. Lisa Kirton-Reed	CIMH Applied Meteorology and Climatology, Barbados	7 DEC 2009 - 11 DEC 2009 (5 days)	CIMH
Mr. Anthony Moore	CIMH Applied Meteorology and Climatology, Barbados	7 DEC 2009 - 11 DEC 2009 (5 days)	CIMH
Mr. Ismaila Sangang	Department of Water Resource, Gambia	7 DEC 2009 - 11 DEC 2009 (5 days)	CIMH
Mr. Shem Wellie	Student of Meteorological Course of CIMH, Barbados	7 DEC 2009 - 11 DEC 2009 (5 days)	CIMH
Mr. Andrew Daniel	Student of Meteorological Course of CIMH, Barbados	7 DEC 2009 - 11 DEC 2009 (5 days)	CIMH
Mr. Kem Jones	Community Program Officer, National Disaster Management Agency, Grenada	14 FEB 2010-12 MAR 2010(27 days)	Japan
Mr. Kester Craig	Operations and Training Officer, Civil Defence Commission, Guyana	14 FEB 2010-12 MAR 2010(27 days)	Japan
Mr. Julian Du Bois	Deputy Director, National Emeregency Management Organization, St.Lucia	14 FEB 2010-12 MAR 2010(27 days)	Japan
Mr. Don Corriette	Program officer, Office of Disaster Management, Ministry of Public Utilities, Energy & Port, Dominica	14 FEB 2010-12 MAR 2010(27 days)	Japan
Mr.Kenton Parham	District Energency Coordinator, National Emergency Management organization, Belize	14 FEB 2010-12 MAR 2010(27 days)	Japan
Ms.Cherie Pounder	CIMH Hydrological Section, Barbados	1 FEB 2011-18 FEB 2011(18 days)	Japan
Mr.Ricardo Yearwood	CDEMA Program Officer, Barbados	1 FEB 2011-18 FEB 2011(18 days)	Japan
Dr.Paulette Bynoe	Director, School of Earth and Environment Sciences, University of Guyana, Guyana	1 FEB 2011-18 FEB 2011(18 days)	Japan
Dr.Jacob Opadeyi	Head, Department of Geomatics Engineering and Land Management, Faculty of Engineering, Trinidad and Tobago	1 FEB 2011-18 FEB 2011(18 days)	Japan
Ms. Cherie Pounder	CIMH Hydrological Section	3 MAR 2011 (1 day)	CIMH
Ms. Judy Padmore	CIMH Hydrological Section	3 MAR 2011 (1 day)	CIMH
Ms. Nicole Seaman	Ministry of Public Works, Energy and Ports, Dominica	7 MAR 2011 - 11 MAR 2011 (5 day)	CIMH
Mr. James Gregoire	Ministry of Public Works, Energy and Ports, Dominica	7 MAR 2011 - 11 MAR 2011 (5 day)	CIMH
Ms. Marcia Lawrence	National Water and Sewage Authority, Grenada	7 MAR 2011 - 11 MAR 2011 (5 day)	CIMH
Mr. David Alphonese	Ministry of Physical Development & Environment, St. Lucia	7 MAR 2011 - 11 MAR 2011 (5 day)	CIMH
Ms. Claudia Wynette	Ministry of Physical Development & Environment, St. Lucia	7 MAR 2011 - 11 MAR 2011 (5 day)	CIMH
Mr. Kenton Parham	National Emergency Management Organization, Belize	7 MAR 2011 - 11 MAR 2011 (5 day)	CIMH
Mr. Ellington Cayetano	Meteorological Office, Belize	7 MAR 2011 - 11 MAR 2011 (5 day)	CIMH
Mr. Sherwin Felicien	Civil Defense Commission, Guyana	7 MAR 2011 - 11 MAR 2011 (5 day)	CIMH
Mr. Naseem Nasir	Land and Survey Commission, Guyana	7 MAR 2011 - 11 MAR 2011 (5 dav)	CIMH

how A.7 List of Input (Equipment)

1 PC SONY VAIO 2 PC DELL OPTIPLEX 3 Printer HP Color LJCM 4 Printer HP Color K8600 5 Software ArcView 6 Software ArcView 7 Tranceiver 8 Portable Megaphone 9 Hydrological gauges(1st lot) 10 Hydrological gauges(2nd lot);planned 11 Software FLO-2D Latest		apped in -	Allocation	Procurement	Cost	Amount		Time of delivery	condition	frequency
	VAIO 1	Flood analysis, Flood hazard map preparation	CIMH	Procurement in Barbados		76,241	Ϋ́	October 2009	A	A
	TIPLEX 1	Flood analysis, Flood hazard map preparation	CIMH	Procurement in Barbados		112,225	γſ	October 2009	A	A
	or LJCM 1	Flood analysis, Flood hazard map preparation	CIMH	Procurement in Barbados		62,984	۲۲	November 2009	A	٨
	or K8600 1	Flood analysis, Flood hazard map preparation	CIMH	Procurement in Barbados		46,767	۲	January 2010	٩	A
	cView 1	Flood analysis, Flood hazard map preparation	CIMH	online		661,841	۲	November 2009	A	A
	-0-2D 1	Flood analysis, Flood hazard map preparation	CIMH	online		129,556	۲	December 2009	A	A
	/er 20	CBDRM, Evacuation	5 pilot states	Procurement in Barbados		940,997	۲۲	Nov, Dec., 2009 Jan. 2010	A	B
	aphone 13	CBDRM, Evacuation	5 pilot states	Procurement in Barbados		192,763	۲	November 2009	A	8
	ges(1st lot) 14	EFWS, Data collection	5 pilot states	Procurement from USA		3,773,658	۲	January 2011	A	A
	tuges(2nd 3 ned 3	EFWS, Data collection	2 pilot states	Procurement from USA		2,190,000	ζ	(July 2011)	-	
and the second sec	2D Latest 1	Flood analysis, Flood hazard map preparation	CIMH	online		163,290	አ	(July 2011)	•	
12										
13										
14										
15										

Condition: A = Good, B = Fair, C = Bad Use of Frequency: A = Always, B = Often, C = No Use Note) Cost of tax (IVT:17%) exclusive in the above table.

Costs)
(Local
Input
A.8 List of I
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	ltem	1st Phase (Results)	2nd Phase (Results)	3rd Phase (Contract price) in Operation	Total
(1)	General expense				
	1)Labor cost	1,764,466	2,062,854	2,997,350	6,824,670
	2)Rental car	5,184,952	2,262,704	3,194,880	10,642,536
	3)Operation & maintenance for equipment	0	0		0
	4)Consumable cost	17,642	56,326	384,100	458,068
	5)Transportation & Trip cost	2,631,906	5,369,556	17,596,431	25,597,893
	6)Communication & Excess cost	0	0	0	0
	7)Report production cost	125,372	1,183	2,601,000	2,727,555
	8)Local training cost	600,045	771,645	2,614,020	3,985,710
	9)Local activities	0	99,617	57,372	156,989
(2)	Procurement cost (Project equipment)	2,165,000	4,081,000	2,190,000	8,436,000
(3)	The above delivery cost	0	0	0	0
(4)	Procurement cost (Survey equipment)	0	0	0	0
(5)	The above delivery cost	0	0	0	0
(9)	Procurement cost (Others)	246,000	0	163,920	409,920
(2)	The above delivery cost	0	0	0	0
(8)	Report production cost (Print)	0	0	0	0
(6)	Report production cost (Others)	0	0	0	0
(10)	Contract with local consultants	17,342,000	1,660,000	1,024,500	20,026,500
(11)	Contract with local NGOs	0	0	0	0
(12)	Construction cost	0	783,000	2,600,000	3,383,000
(13)	Conference cost	0	0	0	0
otal (tax	I otal (tax exclusive)	30,077,383	17,147,885	35,423,573	82,648,841

Organization	Function	Name	Position
Reginal Team			
CDEMA	Project Director	Mr.Jeremy Collymore	Executive Director
	Project Manager	Ms.Elizabeth Riley	Deputy Executive Director (Ag)
	Program Officer	Mr.Ricardo Yearwood	Program Officer
	Project Secretary	Ms.Roxanne Boyce	Administrative Secretary
CIMH	RT	Dr.David Farrell	Principal
	RT	Mr.Shawn Boyce	Chief Hydrologist
	RT	Ms.Cherie Pounder	Hydrologist
	RT	Mr.Marvin Forde	Technical Officer
	RT	Ms. Judy Padmore	Hydrologist
	RT	Mr.Damian Prescod	Technical Officer
UWITT	RT/Technical	Prof.Jacob Opadeyi	Head of Dept. of Geometrics Engineering and Land Management Faculty of Engineering
NG	RT/Community	Dr.Paulette Bynoe	Director, PhD. School od Earth and Environment Sciences
National Team			
NEMO	NT/Head	Ms.P.Noreen Fairweather	National Emergency Coordinator
	NT	Mr.Calbert Budd	District Emergency Management Coordinator
NMS	NT	Mr.Dennis S. Gonguez	Chief Meteologist
NEMO	NT	Mr.Kenton Parham	District Emergency Coordinator
Dominica			
MDO	NT/Head	Mr.Nathaniel Isaac	Head, Office of Disaster Management, Ministry of Public Utilities
	NT	Mr.Don Corriette	Program Officer, Office of Disaster Management, Ministry of Public Utilities
Grenada			
NaDMA	NT/Head	Mr. Benedict Peters	National Disater Coordinator
	NT	Mr.Terence Walters	Deputy Coordinator
	NT	Mr.Kem Jones	Program Officer
	NT	Mr.Jason Lyons	Program Officer
NAWASA	NT	Mr.Lauriston Hosten	Manager, Planning and Development Department of NAWASA
Guyana			
CDC	NT/Head	Mr.Chabillal Ramsarup	Director General
	NT	Mr.Francis Abraham	Assistant Director General
	NT	Mr.Kester Craig	Operationsa and Training Officer
A DESCRIPTION OF THE OWNER OF THE	NT	Mr.Carlton Semple	Officer
St. Lucia			
NEMO	NT/Head	Ms.A.L.Dawn French	Director
	NT	Mr.Julian Du Bois	Deputy Director
Met. Services	NT	Mr.Govinda Augustin	Technical Officer
Min. of Agric.& Water Res	IN	Mr.Fitz John	Hvdrologist

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PDM Narrative Summary	Objectively Verifiable Indicators in PDM	Progress as of August2011	Way Forward for Completion
[Super Goal] Disaster damage in CDEMA participating states is mitigated.	Annual number of affected persons in CDEMA participating states will become under a targeted number		1
	 Annual amount of property/business losses in CDEMA member states will become under a targeted amount. 		1
[Overall Goal] Disaster damages in CDEMA participating States are mitigated through enhancement of community resilience to the flood hazard. (Similar project is implemented in flood vulnerable areas other than pilot	 Among the flood vulnerable areas in CDEMA participating states, FHMs are prepared for areas of more than 10%. 	. FHMs are prepared for 8 areas in the phase 1 and phase 2 projects.	 Comprehensive review on the disaster management of CDEMA participating states, if any, is to be referred and analyzed for the sustainability plan. Other donors' activities relating to the CLMA on on on on on on one one
	 Among the flood vulnerable areas in CDEMA participating states, CDMPs are prepared for areas of more than 10%. 	CDMP are prepared for 7 areas in the phase 1 and phase 2 projects.	 Comprehensive review on the disaster management of CDEMA participating states, if any, is to be referred and analyzed for the sustainability plan. Other donors' activities relating to the CDMPs are to be reviewed.
[Project Purpose] Capacity of CDEMA and five pilot states for managing the flood risk is increased. (RT has the capacity to establish FEWS in a flood vulnerable area with use of FHM and CDMP prepared by	 At more than half of the pilot sites, RT-made FHMs and CDMPs are prepared, and FEWSs are prepared. 	 FHMs are prepared in all the five pilot sites. CDMPs are prepared in four pilot sites except for the one in St. Lucia FEWS are provisionally operational at 4 pilot sites; the installation of hydrological gauges is not finished in Guyana and Belize. 	
RT with the cooperation of national disaster management agencies of CDEMA participating states.)	 Concrete sustainability plans of RT and NT for maintaining the technical capacity and organizational system are prepared. 	 A draft sustainability plan was presented by JT and discussed among RTs and NTs in the 2nd year. Followings were suggested at the JCC in Mar 2011 on the sustainability plan: 1) Comprehensive review on the disaster management of CDEMA participating states is necessary, based on which the sustainability plan will be given an appropriate scope and position. 2) The plan will consist of two parts: a minimum plan that can be implemented with their own budget, and an 	 Schedule and activities of preparing the sustainability plan is to be agreed and undertaken by the end of the project.

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		incremental plan that can be implemented when external fund becomes available.	
	 Action plan is prepared for preparation of FHMs, CDMP and FEWS in flood vulnerable area other than the pilot sites. 	 The preparation of action plan has not started yet. 	 Schedule and activities of preparing the action plan is to be agreed and undertaken by the end of the project. Possible financial source is to be discussed with CDEMA and donors:
			Japan Trust Fund (IBD), Japan-CARICOM partnership fund, Japan-Brazil partnership program and Red Cross.
[Outputs] 1. FHMs are prepared, CDMPs are prepared and implemented, FEVSs are established and implanted at the pilot sites.	 FHMs are prepared at all the pilot sites. 	 (See Progress of the Output1) In Guyana, FHM with past flood inundation area was prepared based on information from the community. 	 The FHM can be refined to become the one for Speightstown, Barbados, from Phase 1, which include not only flood map but also dicture of shelter
		 The 2nd draft of FHM for Belize pilot site was prepared In St. Lucia, Dominica and Grenada, FHM (the 1st basic map) was prepared based on the result of rainfall, runoff and flood flow analysis. 	 The 2nd draft was not shared with the NEMO, Belize, yet. FHM with probable flood inundation area by means of flood inundation analysis is finalized.
	CDMPs are prepared at all the pilot sites.	 (See Progress of the Output1) In Guyana, Dominica, Grenada and Belize, the CDMP was developed by the residents of pilot sites. As for St. Lucia, the development of CDMP is still going on. The pilot site of St.Lucia is a newly developed residential town, so the residents don't have a local community. Suggested by JT, NT has agreed to establish a committee in the community and to raise their awareness on disaster as well. 	 Simulation exercise (evacuation drill) is to be conducted in Oct/Nov. The committee is to be established. The CDMP is to be developed together with the NT. Simulation exercise (evacuation drill) is needed to test the functions of the flood preparedness team.
	FEWSs are established at all the pilot sites.	 (See Progress of the Output1) In the 1st year, installation sites were decided according to the flood prediction method based on the data of flood analysis 	 All the survey gauges are to be installed by September (August?) 2011
		 In the 2nd year, specifications were decided based on the hydrological and hydraulic characteristics of the location of hydrological gauges and the location of pilot sites. 	 The maintenance arrangement is to be agreed among NT, CIMH and JT. Division in charge Maintenance Procedure (staff
		In the 3 rd year, the gauges have started to be set. Planned Set Not yet Guyana W 3 - 3	and documentation) 3) Maintenance costs • FEWS is to be completed at all the

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2-4. Workshop for establishing FEWS with use of FHM and CDMP is held more than of FHM and CDMP is held more than once a year. • In the 1 st year, WS was conducted on (5 days) on the basic • V concept of the project. Hydrological database is established and functioning at CIMH 3-1. Hydrological database is established at functioning at CIMH. • In the 1 st year, WS was conducted on (1 day) on the three manuals mentioned above. Hydrological database is established and functioning at CIMH - In the 1 st year, the database server was setup and its operation system was developed at CIMH. • In the 1 st year, the database server was setup and its operation system was developed at CIMH. • In the 1 st year, the database server was setup and its operation system was developed at CIMH. • In the 1 st year, the database server was setup and its operation system was developed at CIMH. • In the 1 st year, the database server was setup and its operation system was developed at CIMH. • In the 1 st year, the database server was setup and its operation system was developed at CIMH. • Two types of web-based hydrological databases are completed and in operation at present. • Two types of web-based hydrological databases are completed and in operation at present. • Two types of web-based hydrological database which has a real-lime linkage with existing web-based									be established for its technical maintenance.
of FHM and CDMP is held more than concept of the project. hydrological database is once a year. Hydrological database is 3-1. Hydrological database is established at functioning at CIMH. CIMH		I		n the 1 st year	, WS we	as conducted	on (5 days) o	n the basic	WS is to be held in the 3 rd year.
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ished and functioning at CIMH. operation system was developed at CIMH. Two types of web-based hydrological databases are completed and in operation at present. opical database becomes of FH mapping and			•	n the 1 st year	r, the dat	tabase server	was setup an	d its	Some revision is to be added if
ent and effective use of the composite database becomes 1) the for FH mapping and	established and functioning at	CIMH.	0	peration sys	tem was	s developed a	t CIMH.		necessary.
comp	CIMH		- -	Two types of	web-bas	sed hydrologic	cal databases	are	_
((Efficient and effective use of the		0	completed an	id in ope	iration at pres	ent.		
	hydrological database becomes		-		he auton	natic dala-upc	dating databas	e which	
	possible for FH mapping and				al-time I	inkage with e:	kisting web-ba	sed	

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FEWS establishing).		 national database (NWIS) of Grenada and Guyana. 2) The other is replacement of current stand-alone database in CIMH. This database is for all CARICOM participating states where web-based database has not been developed. 	
	3-2. Web-based hydrological data collection, management and sharing program is developed.	 The data collection, management and sharing program have been developed for each pilot state. 	 Guidance and training to the CDEMA participating states other than the pilot states will be continuously conducted by CIMH. Replacement of the current database with the developed web-database is to be announced in Nov 2011. The maintenance arrangement is to be agreed.
		 In Guyana, the Project set up NWIS (National Water Information System) in the server of the Hydro-met Department, the Ministry of Agriculture. The set-up ceremony was held on 5 August 2011 The NWIS is automatically uploading the data to the CIMH database. The Project conducted training for NWIS. 	
		 St. Lucia has NWIS and recently it began operation. Dominica operates RinfallDB, Grenada has NWIS, introduced by CARIWIN(CIDA), and the data is in synch with the database of CIMH. Belize operates RainfallDB and the Project conducted training for uploading the data to CIMH 	 The Project will set up a program in the NWIS for automatic upload to the CIMH database. The Project will conduct training for uploading the data to CIMH database
	3-3. Hydrological data is supplied from CDEMA member states through the program more than 50 times a year.	 The existing hydrological data in CIMH has been uploaded into the system. From Belize, data have been uploaded only a few times because a data input training was conducted only recently, in July 2011. Guyana and Grenada have automatic updating system. 	 Notice for CDEMA member countries to utilize the web-database is to be issued by CIMH. The number of updating is to be monitored (including the number through the automatic updating system)
	3-4. The hydrological database through the program is accessed by CDEMA member states more than 50 times a year.	 As the same reason above, the indicator cannot be verified at present. A training on utilization of hydrological data through the database was conducted in Feb 2011, but the actual utilization and access to the database will be verified in Nov 2013 	 The number of access is to be verified with access counter and hearing of related organizations in each sates.

∺ :	Pilot Site	Guyana (Upper Mahaica Community)	St. Lucia (Corinth, Gros Islet)	Dominica (Bath Estate, Roseau Valley)	Grenada (Lower Batthazar Village)	Belize (Crooked Tree)
NT's rating 60%	60% • Firet	Eiret Hazard Man is	50% • Education of community	100% · Mulherable Areas of the	60% • The data that is	 0% The 1st draft is inst a flat
deve deve	deve	developed.	 Evacuation Plan is completed. 	 vuineration and community identified and mapped out. Evacuation routs and plans formulated. 	available has been collected to daft the FHM	map and didn't show any information.
Outstanding The a ba	- The a ba	The first Hazard Map has a bad color contrast and	Evacuation Plan to be printed so that every		There is no FHM at this time. The local consultant is a	 The 2nd draft is not shared yet.
featu featu need . The R evac	featu reed · The F evaci	features; the color scheme features; the color scheme needs to be changed. The FHM should show evacuation route, temporary shelters, etc.	 Evaluation Drill based on the evacuation plan needs to be conducted. 		liaison collecting the data, and it's not sure if all the information recessary has been collected.	
	Guya	University of Guyana Guyana Lands & Surveys	 Survey and Mapping Section, Ministry of 	 Lands and Surveys Division, the Ministry of 	 The Land Use Division, the Ministry of 	Land information center (LIC) & National
FHM Corr	Cor	Commission (GL&SC)	Planning Physical Planning, Ministry of Physical Development and Environment.	Environment, Natural Resources, Physical Planning and Fisheries.	Agriculture, Forestry and Fisheries. • The Physical Planning Unit, the Ministry of Works,	Meteorological Services, Ministry of Natural Resources.
NT's rating 70%	%02		%0	80%	80%	%06
· The Prep	· The Prep	The Community Disaster Preparedness and	There is no CDMP and its progress is unknown.	 Community participation and involvement 	 The community Disaster Preparedness and 	CDMP prepared.
Rest	Resp	Response Pian drafted.		 The CDMP completed. Evacuation drill conducted for the 1st draft plan. 	Response Plan drafted. • Simulation at the pilot site conducted.	
Outstanding • The test	• The tester impl	The Plan still needs to be tested through an evacuation drill and implemented.	CDMP is to be developed and printed.	 Disaster Response Team and Flood Risk Mitigation Team is to review the plan for completion. Evacuation drill needs to be done to practice the revised plan. 	 The NT has to identify if the plan includes all necessary information. 	The plan is yet to be test through simulation exercise.
Responsible • Maha for CDMP's update and revision.	• Maha	Mahaica Community	1	Bath Estate Community with the overview of ODM (Office of Disaster Management)	 NaDMA (National Disaster Management Agency) 	Crooked Tree Village Council

FEWS is	NT's rating	30%	40%	80%	90%	50%
established	Done	· Equipment procured and	· 2 water level gauges and	 I water level gauge and z 	 1 water level gauge and 	 z water level gauge set
and		set-up locations identified.	1 rainfall gauge set on	rainfall gauges set on	2 rainfall gauge set on	on 18-21 April 2011 is
implemented	(set/planned)	- (0/4)	14-18 June 2011.	13-16 April 2011.	4-7 July 2011.	functioning well.
at the pilot site.			. (3/3)	· (3/3)	 The water level gauge 	- (2/4)
					sends signals properly.	
					• (3/4)	
	Outstanding	 3 water level gauges 	The sensors of water level	 The 3 threshold levels of 	One rainfall gauge to be	 The shipment of two
		(pressure type) and 1	gauges need to be	the water level gauge to	set in Belvedere.	gauges to Jamaica
		rainfall gauge yet to be	adjusted. (It sends out	be established for the	There are 2 more solar	caused delay, but is
		set.	many messages at wrong	EWS.	panels to be attached.	supposed to arrive late
		 Once the gauges are set 	times.)	· Two solar panels and one	 NAWASA needs to 	August.
		and installed, the	 Additional solar panel and 	battery to be attached to	obtain the driver	
		maintenance	battery need to be	the gauge.	software to transfer the	
		arrangements will be	attached to keep the	 The calibration of the 	data from the rainfall	
		documented.	minimum voltage.	loggers and modems of	gauge to the computer.	
			The threshold level of the	the rainfall gauges.	(At present, the data	
			rain gauge needs to be	Maintenance procedure	from the logger has not	_
			altered.	not documented and the	been transferred)	
			 Community cell numbers 	development of a check		
			are to be decided	list will help.		
			Maintenance plan should			
			he obtained			
	Responsible	· Hvdro-meteorological	· Water Recolling	Dominica Meteorological	National Water and	· National Meteorological
	for the	Carries Ministry of	Management Ministry of	Contract to maintain the	Service Authority	Service (NIMS)
		OCTAINED AND OF			Sewage Authoury	
-	maintenance	Agriculture	Agriculture, Lands,	rain gauges.	(NAWASA)	
	of the gauges	 (National Drainage & 	Forestry and Fisheries.	 Bath Estate Community to 		
		Irrigation Authority,		check the IT system of		
		Ministry of Aariculture, for	*	water level gauge.		
		concentancy and water				
		gates.)				
				,		

Evaluation Questions	Data and Information	Findings through Questionnaire and Interview
1. Relevance		
	1.1.1 Reference of Disaster Management in the regional policy documents.	 (CDM) The CDM Strategy and Programme Framework (2007-2012) is being implemented with stronger result focus and programmatic approach. This new, enhanced CDM follows the CDM Strategy and Result Framework (2001-2006). The enhanced CDM was adopted by 18 CDEMA participating countries. Their activities and the intervention of development partners can be aligned with the CDM Framework to effectively contribute to its purpose. The enhanced CDM has 4 priority areas (outcomes) and CADMII is particularly contributing to the outcome 1 and outcome 2. Outcome 1: Enhanced institutional support for CDM program implementation
		Outcome 4: Enhanced community resilience to mitgate the effects of climate change and disasters. "Monitoring, Evaluation and Reporting Framework" was formulated for the enhanced CDM (2007-2012). CDEMA Coordinating Unit is conducting the monitoring of CDM implementation CDEMA holds the annual meeting with member countries and donors on CDEMA's work program.
	1.1.2 Reference of Disaster Management in the national	(Guyana) • The National Damage Assessment and Needs Analysis (DANA) Plan, Policy and Framework • Motional Flood Bronnedonce Bronned Ploo
	in each participating country.	 Early Warning System Plan National Disaster Risk Management Policy
		(St. Lucia)
		Disaster Management Act No 30 of 2006 NEMO Every Synthesis Disar (2014, 2014) hand an COM with the official of using the DMP annuable
		 NEMO FIVE THE STRATEGIC FIAN (2011-2010) DASED ON COM WITH THE ENDITS AT USING THE RIND APPROACH. Red Cross Strategic Plan (2011-2016)
		(Dominica)
		 The National Disaster Plan (The National Emergency Management Plan) still in draft
_		 District and Community Events Friedsmin Denig developed in time with CDM, there is indice rocus on model mingation. District and Community Disaster Management Plan developed in 2010
		(Belize)
		 Disaster preparedness and Response (2000)
	1.1.3 Case and damage of recent disasters in the region	(Guyana) Jun 2011 Lethem Flooding / Mar 2011 Mahaica/Mahaicony Flooding. (St Lucia) Aug 2011 Tropical Strom Emily / Oct 2010 Hurricane Thomas (7 dead) (Dominica) 142 Charlesh Elonding at Laway Valley, Collance of Mothian Dam / Oct 2010 Tropical Shrim Thomas
		(Grenada) Apr 2011 Filood in Gouyave (Grenada) Apr 2011 Filood in Gouyave (Belize) 2011 Hurricane Richard / Sep 2011 Tropical Storm Matthew
1.2. Is the counterpart	1.2.1 Mandate, responsibility and	(CDEMA)
organization and target groups	function of Counterpart	In September 2009, CDERA was reorganized as CDEMA. The CDM implementation is an official mandate of CDEMA.
appropriate?	organization (RT,NT)	· As to CDEMA's structure, in June 2011, the Council of CDEMA suggested a new structure, which is to have three arms; 1)

		section is to seek a sustainable financing mechanism. (CIMH)
		There haven't been any structural changes but the responsibility of undertraining the project is added. CIMH has constructed FEVNS from its design to installation and implementation. The project has connected the hydrological
		 UG) The administration of the university is supportive of the project.
		(IVVI)
		Establishment of the UWI Disaster Risk Reduction Center two years ago for research and capacity building. The center has
		a one-year master program. Graduate from the center can work in, for example, the Office of Disaster Preparedness &
		Management in the government of Trinidad & Tobago.
	1.2.2 Needs and expectation of	
	Counterpart organization	· Flood hazard is serious, so the relevance of the Project is high and its community focus is good. But the Project's
	(RT,NT)	geographic scope is short of the need and much more work is to be done.
		¥
		consultation with the RT and NT about its budget and plan, which had to be readjusted later. Consultation should be
		CUEMA requested a personnel that would dedicate to the Project because this Project required lots of communication and
		coordination, but the request was not accommodated and the personnel was not equipped.
		(CIMH)
		_
		mapping conducted by Mr.Araki and Mr. Koike. CIMH is also given an exposure to establish FEWS.
		(nc)
		 The project was not conceptualized to meet the university needs, but gave some exposures to Dr. bynoe, giving her points of official of her provided in the provided of the provided in the provided of the provided provided of the provided prov
		of reterence in the field of her research.
		 The project also increased the capacity of the university in term of its geographical coverage, which was good for the university.
		University.
_	_	(UVVI) A
		 As a result of the project, UWI now has 10 students for MSs engaged in research in flood hazard mapping and flood
		mitigation.
		(Ouyalia) The nectod of 2 more in sheet for Amore considering it non-jood more time to brown what is however a two reinfall
	I.S.I MOFA assistance plan to	
prioritized by the Government	the region and each country	cooperation with CARICOM in the fields of natural disaster and environmental conservation.
of Japan for development		 At the U.N. World Conference on Disaster Reduction, (January, 2005, Kobe), Japan also stated its commitment to play an
assistance?		active role in measures to reduce damage from natural disasters through its Official Development Assistance (ODA).
2. Effectiveness		
2.1. Is output 1 achievable with all	2.1.1 Progress of the output 1	 The indicators of output 1 are the preparation of FHM, CDMP and FEWS at all the pilot sites, and at present output1 is not
activities conducted?		achieved due to the slow progress noted on the following; FHM of St. Lucia, FHM of Grenada, CDMP of St. Lucia, FEWS of
	(See Result Grid)	Guyana and FEWS of Belize.
		-
		or JI. There exist a general expectation on UVVI to make the reinement, but UVVI indicates an authority is not given to do it,

		which also requires resources and time. • CDMP is remarked as a successful point of this project. As for CDMP, its operation is yet to be test and verified to know
		 As for the FEVS, the equipment – water level gauge and rainfall gauge - was set at 11 stations out of planned 17: there are
		still 4 stations in Guyana and 2 stations in Belize to set up. • In Guyana, setting up equipment delays, but it took a collaborative approach relying on their sense of ownership, which is
		regarded good apart from the delay. • Continuous use of equipment is important. There is yet a lack of data transmission; developing data processing system will
		help. Good efforts of RT, in particular of Ms. Cherie Pounder (Flood Analyst/technician) and Mr. Shown Boyce from CIMH to
		produce output 1 are frequently mentioned by all NT. • Not all the pilots cates are at the same lavel and also they are different neonraphically. For island states it's flash flood. For
		Guyana and Belize, it's forest areas and water rises gradually. The verification of outputs, simulation drill, and feedback from the community is yet necessary.
2.2. Is output 2 achievable with all	2.2.1 Progress of the output 2	 The indicators of output 2 are the revision of FHM & CDMP manuals, the development of FEWS manuals, and conducting its
activities conducted?		workshop. Based on the indicators, the outputs are achieved. These manuals, however, are yet to be finalized.
	(See Result Grid)	 The manual could be integrated into one so that they would be presented as a package.
2.3. Is output 3 achievable with all	2.3.1 Progress of the output3	The indictors of output 3 are the database of CIMH and data collection/management program at national level. The system
activities conducted?		
	(See Result Grid)	CIMH indicated that output 3 is 90% achieved in regard to the CIMH's system. Efforts of Ms. Judy Padmore (technical
		officer) on database development are highly mentioned.
		 Unitful 3 is recognized by roles one on the succession areas of the project. The frequency of data sharing and access are other indicators but the way to verify the number still need to be explored.
2.4. Have the above outputs been effective to achieve the project	2.4.1 Progress towards achieving the project purpose	 The indicator of the project purpose is the preparation of the FTIM, CUMP and FEVVS at more than nair of the pilot sules. In Dominica and Grenada, these three are almost completed, so the project purpose is partially achieved at present.
purpose?		 Another indicator is the development of sustainability plan and action plan. The first draft of the sustainability plan was
	(See Result Grid)	discussed in the JCC in March 2011.
		 The development of these two plans is added as project activity, at the terminal evaluation, for the rest of the project period.
	2.4.2 Capacity Development of	(CDEMA)
	the Regional Team	 CDEMA is a project management organization, not necessarily based on technical capacity, but CDEMA's coordinating conscient to doliver a project is increased through the eventions of this project.
		2
		 CIMH has now more sharpened focus/strategy on the development of FEWS, since the beginning of the project, along with budge community of the project included included included included in the second included in the project.
		 Through the project. CIMH has become the first Caribbean agency to introduce FEWS, identifying component and doing
		everything; from communicating and conducting training at the community and setting up equipment.
		 The project is encouraged by the leadership taken by CIMH. CIMH has human resources and its institutional capacity to deliver project optimits is remarkably increased with the understanding of FEWS and by dedicated staff.

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		 Training in IICA was good to understand the disaster management in general
		UG has limited human resources and it necessitates stanificant consideration. Dr. Bynoe is busy and it's difficutt to expect
		(UWI)
		 The project has helped increase the level of knowledge on FHM, but the refinement of FHM is still at an early stage.
	2.4.3 Prospect of the project	(CDEMA) Partially achieved
	purpose to be achieved by the	· Additional period of time is required for a better conclusion of the project. The detay is attributed to the stalling of the 1 st
	project end.	year. FEWS needs to be completed as it is a critical component of the project and for communities.
		(CIMH) Fully achieved
		 As far as CIMH is concerned, the project purpose will be fully achieved.
		(UG) Mostly achieved
		 Not all the pilot sites are at the same level, and also they are different in geography.
		(UWI) Mostly achieved
		· Verification of result and feedback from communities is yet necessary.
		(NT for output1)
		This depends on the progress of implementation of the FEWS and amendment of the Community Disaster Preparedness
		Pian.
		 In St. Lucia. Partially achieved. The evacuation plan will be completed, but FHM will still be halfway done and CDMP won't
		 In Grenada, Mostly achieved. The progress of the FHM is uncertain; at present there is no reporting of the progress from the
		local consultant and the Project
		In Belize, Mostly achieved. Now it is in rainy season and may not be able to put the 1 st level alert of water level gauges.
3. Efficiency		
3.1. Are the quality, quantity and	3.1.1 Overall plan of the Project	The plan is very clear to CDEMA.
timing of inputs are appropriate	(PDM)	 For other member of RT and NT, PDM was circulated but not really registered.
to produce project outputs?		There was a deviation of activities from the PO
	3.1.2 JICA expert team	(CDEMA)
		 Overall inputs from the JICA expert team (assignment, expertise, number, duration and timing) are good.
	(See List of experts)	· Their technical competence is good, but their duration and timing should have been more discussed. Sometimes, the timing
		was difficult to accommodate.
		(CIMH)
		The timing of experts poses a challenge for CIMH because lots of people come and go at CIMH; university visitors, Haward
		University from US, Germany Caribbean Project, etc.
		(NG)
		 The timetable of JT consultants is set first and it's inflexible; it shows when they are available in the region. Then, RT needs
		to adjust their time to accommodate it.
		(IUM))
		· Timing of dispatching experts is not necessarily conducive for the project because it's scheduling is preemptive and activities

			are required to fit into JT's schedule.
	3.1.3 The regional team	•	The input from CDEMA is remarked satisfactory because the officer in charge is too busy with all other duties and the
	-	-	secretary is not a technical officer. Nobody is dedicated to the project in CDEMA. In phase 1, CDEMA had a dedicated
	(See List of Counterparts)		staff, Ms. Andrea.
		•	The input from CIMH is highly remarked, in particular the work of Ms. Cherie Pounder (Hydrologist). CIMH is also very
			positive about its input.
		•	UG indicates UG took an open approach and always managed to find compromises and that, as for the level of involvement,
		•	UWI indicates its input was short as not enough funding for RT to travel to pilot states was available. It was discussed on 13
			April 2010 meeting and in the 3 rd year it improved. Phase 1 funded for RT to travel, but Phase 2 didn't.
			The input from UWI is remarked satisfactory because it hasn't done the refinement of FHM yet.
	3.1.4 The national team	 .•	Efforts of Guyana are remarked by RT in part because RT involved Guyana's NT more than other NTs because of challenges
			Given a faced (see 3.2.4), which required consultation with RT/IT and coordination among relevant stakeholders.
	(See List of Counterparts)	•	There was also a challenge in St. Lucia but it was sorted out via email. Overall working with NT has been smooth.
		•	Sometimes NT is technically weak and NT is also split among other duties and projects.
		•	Phase 2 didn't do the capacity building of NT as much as Phase 1 had done, because the budget is low.
	3.1.5 Equipment, Iraining, and	•	Cost support from the JICA side is good except for the 1" year when there was no budget provision for KI activities. In the
	local costs.		2 ^m and 3 ^m year, there held a planning meeting as a precursor to JCC, and the issue was remedied.
			Training conducted by JICA was good to understand a disaster management in general. Additionally, dedicated sessions are
	(See List of Counterpart		necessary, e.g. training on flood analysis and mapping.
	Training, Equipment and Local	•	Early Warning system and its equipment is visible, which is good because it's easy for community to recognize.
	Costs)		
3.2. Is the project implementation process appropriate?	3.2.1 Monitoring Mechanism	•	All meetings were held in Barbados, but these meeting are better held at the pilot states or the communities.
	3.2.2 Communication for project	ŀ	In the 1 st vear the hudget was set in Tokvo and Caribbean side was not consulted. The 1 st vear of Plan of Operation was
	coordination between RT and		
	JT		5
			Email exchange also has become frequent.
		•	The process to finalize CDMP is not well communicated and is still not clear.
		•	The structure of the project is new, which includes not only governments, but also regional organization, community and the
		_	university. The effects were positive but it caused delayed logistics. Delay of equipment set up and its delay is a logistical
	_		delay.
		•	For example, when JT want NT's opinions, they contact CDEMA, and CDEMA communicate with NT. Then, NT's replies
			come back to CDEMA, through which JT receive NT's opinions. It can take as long as one-month for the turn-around.
		•	Better, efficient communication could have been considered such as JT posting in a web message board and NT typing their
		•	Also, speaking on the phone is sometimes much better than just an email. Email tends not to be heeded or responded.
		•	More communication between JT and KT just on casual basis – such a simple email as "now are you" – could nave neiped RT and NT feel more comfortable when receiving and accommodation JT's schedule.

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	3.2.3 Communication for project coordination between RT and NT	The communication between CDEMA/CIMH and the NT has been strong.
	3.2.4 Actual example of trouble shooting and its solution process.	(CDEMA) (CDEMA) Guyana communities have two types of flood, which are caused by 1) regular heavy rainfall and 2) release from the Guyana communities have two types of flood, which are caused by 1) regular heavy rainfall and 2) release from the conservancy gate. JICA was funding another project where they support the flow canal in conservancy areas. The JT raised that issue and the Guyana NT, CDEMA, CiMH, UWI-TT and the JT met and discussed. It was concluded that the Project would not deal with 2nd type of the flood, but the 1st type of flood would be addressed.
		 Budget was approved for public awareness on disaster management in late 2009. NT is supposed to put together an activity to carry out the awareness raising.
		 Support from JICA HQ was effective. Supports from JICA's regional resources (Caribbean Regional Representation Office in Dominican Republic, SI. Lucia liaison office, Dominica liaison office, JICA Belize office, Guyana Donor Coordination Expert, CARICOM expert, Japanese Embassy) were not noted by the Caribbean side.
	3.2.5 Method and contents of technology transfer from the JT to the RT	Method of one to one training was effective. For CIMH it was extremely good.
3.3. What were the main factors promoted and inhibited project activities?	3.3.1 Effects of the Important Assumptions predicted in PDM and measures taken to mitigate those negative effects.	 Important assumptions described in the PDM as below have been met and not affected project activities. 1) Counterparts are assigned as planned and scheduled. 2) Project budget is allocated as planned and scheduled. 3) Counterparts who received technical transfer continue to stay in CDEMA, the RT and NTs.
	3.3.2 Promoting factors	 Collaborative environment with CDEMA and CIMH Existing capacity of hydrological risk management in CIMH Good relationship with JICA experts who are housed in CIMH Commitment of CDEMA and JICA Willingness of the five governments of pilot states. Regional team's collaborative approach worked well.
	3.3.3 Hindering factors	 Flooding events in Guyana and St. Lucia Absence of dedicated project manager Competing work priorities in the regional team as well as in the national team. Disclosure of the project budget. Bureaucratic approach of JICA, where many approvals are needed and its implementation process is inflexible. Low public awareness. In the phase 1, we made T-shirts in the project. In Phase 2, we even don't have budget to make 1000 copies of FHM to distribute to the community.
4. Impacts	2	

4.1. To what extent the overall goal is likely to be achieved 3 vears after the project end?	4.1.1 Progress towards achieving the Overall goal	 By the Phase 1 (3 pilot sites) and Phase 2 (5 pilot sites) of the Project, 8 communities are expected to have FHM and CDMP. In Trinidad and Tobago, 4 FHM are done by UWI after Phase 1 with its own budget, without donor's financial support.
	(See Result Grid)	
	4.1.2 Prospect of implementing similar project in other flood vulnerable areas	 (CDEMA) It mainly depends on human resources and the national level capacity, and also on how each country articulates its necessity in its national program. Capacity at regional level is also important Flood remains a critical priority in the region, but 3 years is a very short timeframe and the overall goal may not be realistic.
		 (CIMH) Caribbean region has more ongoing projects on disaster management and it's possible to meet 10% for FHM and CDMP, once these flood vulnerable areas are identified. Not all CDEMA participating states has the same capacity for identifying these areas.
		 (UG) It needs an enabling environment to achieve and there are lots of uncertainties. Structured intervention towards achieving the goal can work, whereas in some cases measures at local level are more efficient.
	4.1.3 Indication or Definition of other "flood vulnerable areas"	(CDEMA) • CDEMA doesn't have such a list, and efforts to make the list are not included in the current CDEMA's activities.
_		 Identifying flood vulnerable areas is not CIMH's responsibility. CIMH cannot do it alone. A project should be developed that could achieve the 10% jointly with concerned agencies.
		(Guyana)
		· Guyana is to have identified the vulnerable area.
		(Other countries) Jamaica is to have identified the vulnerable area.
	4.1.4 Ongoing collaborative efforts with donor agencies	· CDEMA organizes a donor conference every year where all donors convene.
	(See Projects with Donors)	
4.2. Other than the prospect of overall goal, what else impacts (positive or negative) the	4.2.1 Influence on poverty, environment and gender.	 (CIMH) It's difficult to quantify the impact of the project on poverty reduction and also it's still too early. Once the FEWS are tested by flooding event, then it may show that FEWS save people's lives.
project has brought about?	4.2.2 Any other positive or negative impacts	 (CDEMA) Relation with other organization is improved; in Guyana, CDC has forged a new relation with telecommunication companies (providers) – LIME and DIGICEL to realize a signal transmission from gauges. At national level, the understanding of NT is strengthened and horizontal communication is developed.
		 (CIMH) The project has increased the teaching capacity of CIMH, which runs class/course for meteorologists and hydrologists. The project also fostered a collaborative environment among relevant agencies.

		Public awareness will continue to increase in some pilot states until the end of the project.
		 The project has helped forge an institutional networking, and this will continue. It has brought all the institutions on the table, having a horizontal collaboration and dialogue.
		 Due to the involvement with the project, UWI is now able to be engaged in other projects on disaster management; OECS's mainstreaming project and UNDP's 3Ri project. UWI was invited to make a presentation on disaster management 12 times since, because JICA project has increased awareness on hazard mapping in the region.
5 Sustainability		
5.1. Is the institution supportive of the project to be sustained after project termination?	5.1.1Regional level	 (CDEMA) Relatively High Institutional capacity is largely limited by human resource constraint. Institutional capacity is largely limited by human resource constraint. (CIMH) High CIMH is using existing, permanent staff and has not using external staff for the project, and so CIMH will retain the project implementing capacity. (UG) Between High and Relatively High The commitment of CDEMA and RT should be sustained. To enhance local ownership, a buy-in can be there and also a sustained public education program or recurrent training. (UWI) Relatively Low General ownership, then it can become sustained. CDEMA's current system cannot ensure the sustained. CDEMA's current system cannot ensure the sustained.
	5.1.2 National leve	 (Guyana) As for FEWS implementation, there is a delay in Guyana, but it took collaborative approach and was good in developing a sense of ownership. Guyana is moving towards legislation, the National Disaster management Act. Once the project is proved operational, CDC will move for procedures and regulations as to who is responsible for what in disaster risk management. (St. Lucia) Institutional capacity is high
		(Dominica) • There is a commitment from the ODM to institutionalize the project and to mainstream it into its operations.
		 (Grenada) Relatively high – The establishment of the NT, the data collection methods established, and the mechanism for community development allows for sustainability of the project. (Belize) High – National Meteorology Service has a structure in place.
5.2. Is the technology introduced by the project appropriate enough to be established on its own?	5.2.1 Regional level	 (CDEMA) High Technical skills at CIMH will be sustained without doubt. Technical skills at CIMH will be sustained without doubt. (CIMH) Relatively High A permanent database manager was hired on 3rd August 2011 at CIMH The database is an open-source and can be updated by, for example, bringing in university students or paying for summer

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	•	intern to update the data.
		 The data, however, also depends on NT activities and inputs, for which the technical capacity is rated "relatively high" and not "minh"
		(UG) High
		(UWI) Relatively High
	5.2.2 National level	(Guyana) ·
		Training will be necessary for the maintenance of the equipment installed.
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		 Access to the support from CIMH is necessary to meet the objective.
		(Dominica)
		The responsibility for the equipment and the management of the data has been assigned to the Dominica Meteorological
		 Services. The overcinity in terms of security and maintenance of the intendity of the site is the reconnectality of the Bath Estate
		Interpretation of the water level gauge, the Morrie Prosner Government school in terms of the rain gauge
		at Morne Prosper.
	_	(Grenada)
		· The technical capacity employed proves that locally the data can be captured, downloaded, stored and shared, once the
		driver software for downloading the data is provide.
		(Belize) (Belize) (Belize)
	5.2.3 Maintenance activity of introduced equipment	
5.3. Is human resource capacity	5.3.1 Regional level	(CDEMA) Relatively Low
enough to sustain the project		Human resources is major constraints
effects/benefits?		(CIMH) Relatively High
		 Through hiring and educating at vocational course/long-term course, CIMH's human resource capacity can remain high.
		 The weakest part of CIMH's human resources is public outreach.
		· Regarding community disaster management, CIMH is a scientific organization and focused on providing information for
		hydrological disaster management.
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		intervention is not a work CIMH can do. So, CIMH isn't to hire a sociologist such as Mr.Lolita and Dr.Bynoe.
		(UG) Between High and Relatively High
		(UWI) Relatively Low
		· For strengthening RT, CDEMA needs a technical staff. Ms Riley is too busy and probably was able to spend less than 5% of
		her time for the project. The technical staff doesn't necessarily work full-time for the project, but should be able to spend
		20% of the time for the project, which means 1 day a week.
		 As for NT, HR capacity is also a challenge. Qualified people are lacking. For example, in NEMO of St, Lucia, half the staff
		is clerical people and only 1 technical staff.
	5.3.2 National fevel	(CDC) – • The EEM annihimment would make assist the CDC staffs work as well as the community's work
		THE FEAT EQUIPTIENT WOUNT TRAVE CASINE THE OOO STATTS WOLL AS WOLL AS THE CONTINUING STATUS

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		The University of Guyana should have been more involved. Train the Trainer training should have been incorporated in the programme.
		(NEMU) / start member: Director, DU, 1 technical officer, 4 administrative staft Human Resource is needed.
		(ODM) 6 staff member: Director, DD, 2 contracted staff. 2 administrative staff.
		 Relatively high – a shared approach is embarked upon both from the expertise of the National Team, MET Office and the Bath Estate Improvement Committee.
		(NaDMA) -
		 Personnel have been identified to install, maintain, and replace equipment.
		(NEMO)
5.4. Is funding stable to sustain	5.4.1 Regional level	 Relatively high – Additional human resources and training needed for high sustainability. (CDFMA) Relatively High
the project benefits?		ACP-EU National Disaster Facility started profiling a flood hazard map at community level. It may involve community plan
•		and FEWS, too.
		· Red Cross also mentioned FEWS and it may become a new feature for Red Cross. Other donors also have expressed
		interest. Climate Change Adaptation.
		(CIMH)
		· The financing to conduct the project activity comes from CIMH budget. CIMH may leverage projects from USAID, IDB and
		Italian project.
		 As for NT, necessary budget for sustainability would be travel costs and per diem. These budgets should be sourced from
		NT or may be provided by some donors.
		(JG) Low
		(UVVI) Relatively Low
		· Funding capacity is a challenge. For example, World Bank is financing to get 1 person for 1 year to work on climate
		change, and such practice is what can work for a project to deliver results.
,	5.4.2 National level	(Guyana)
		 Funding from donors is reducing. The budgets for projects become more dependent on the national budget.
		(St. Lucia)
		 With funding, the project can be replicated.
		(Dominica)
		 Central budget allocation – Government support and other sources of funding may have to be tapped in.
		(Grenada)
		 Recommended long-term Insurance or warranty for the installed equipment.
		 Budget application and allocation needs to be made for maintaining the equipment.
		(Belize)
		 Funding for sustainability will have to be part of the annual recurrent budget for both Hydrometeorology Service and NEMO.
5.5. Are there any other factors	5.5.1 Preparation of the	(CDEMA)
that may affect the	Sustainability Plan	The sustainability plan from Phase 1 is well recognized. The plan should be revised by Caribbean side.
sustainability of project?		 The Phase 2 is not to the extent CDEMA had hoped or expected as the Sustainability Plan taid out.
		 There must be a better system for monitoring for the implementation of Sustainability Plan.
		 Each pilot state has to come up with a plan to sustain the activity, to which RT is to provide in-kind support. Donors such as

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		World Bank and IDB have similar initiative.
		(nc)
		The development of the sustainability plan is important.
MI CORPORT OF THE A	「「「「「「「」」」」」」」」」」」	(IWI)
		· The sustainability plan from Phase 1 simply cannot work and that is why it is not undertaken now. The local consultant from
		Trinidad and Tobago contracted by CDEMA didn't listen to or consider each country's situation and plan. The plan was
		completed in line with the contract.
	いい いちに いち またい あたい	· The procedure and process of developing the sustainability plan was a problem, so the plan was accepted but has hardly
The second second second		been undertaken.
	5.5.2 Follow-up information from	 Mr. Charles Yearwood, a counterpart of the Phase I is in the Drainage Unit, the Ministry of Construction, Barbados.
いたいためのないでは	the Phase I countries.	· Regarding the pilot sites of Phase 1 in the Trinidad & Tobago and St. Vincent, structural measures were taken by the
		government at the pilot sites, where they put stone baskets along the river and the pilot sites haven't experienced any
		flooding since. Phase 1 increased the awareness of the governments on flood hazard.
5.6. Will the super goal be	5.6.1 Information based on the	· The sustainability of project effects is greatly important to achieve the super goal because if FEWS can't be sustained, then
achievable?	prospect of sustainability	communities remain at risk and damage will not be mitigated.
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A.13 Plan of Operation & Actual Operation

Activities	THE SHEW CHIEF	FY2009	2	FY2	010	Var An Pag	FY2011
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PLAN OF OPERATION (Planned and Actual Period of Activities)

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	Programme/Project Name	Implementing Agency Executing Agency	Funding Agency	Duration	Activity	Mentioned by
, 	The Canada Caribbean Disaster Risk Management (CCDRM) Fund		• CIDA		 Small-grant assistance to non-governmental, community, and voluntary organizations for small-scale, local disaster risk reduction projects. A part of CIDA's regional Caribbean Disaster Risk Management Program (CDRMP). 	CDEMA
~	The Comprehensive Disaster Management Harmonized Implementation Programme (CDM-HIP)	(IA) CDEMA in partnership with OECS (The Organization of Easter n Caribbean States)	 CIDA DFID AusAID 	Apr 2008 - Mar 2013 (5 years)	 To support CDM via a harmonized, multi-donor approach, targeting the 2 CDM Outcomes; 1) CDM Outcome 1: Enhanced Institutional support for CDM Program implementation. 2) CDM Outcome 4: Enhanced community resilience in CDEMA states/territories. 	Срема
ri	Pilot Program for Climate Resitience (PPCR)		World Bank	Started Operation in Nov 2008	 Major objectives of PPCR; 1) Pilot and demonstrate approaches for integration of climate risk and resilience into development policies and planning. 2) Strengthen capacities at the national levels to integrate climate resilience into development planning. 	CDEMA
					 Not started yet. Environment. Coordination Unit of the Min. of Environment. Coordination Unit of the Min. of The Regional Disaster Vulnerability Reduction Project to improve the safety of buildings from the CC impacts. Approved and assessment was completed. Still waiting for the disbursement of fund and actual work hasn't started yet. 	Grenada
4	Enhancing Resilience to Reduce Vulnerability in the Caribbean (ERC) Project	(IA) CIMH (EA) UNDP	Government of Italy	Dec 2010 - Dec 2013 (3 years)	 (Output1) Network of real-time decision support centers for early warning created. (Output(2) Strengthened National Disaster Mechanism. Beneficiaries are Barbados and OECS Countries 	CIMH
'n	Disaster-Risk Management Sub-regional Programme	(IA) CDEMA (Caribbean Disaster Emergency Management Agency)	 ACP-EU (African, Caribbean & Pacific States - European Union) National Disaster Facility 	Nov 2009 Nov 2011 (2 years)	 (Major Outputs) 8 community disaster management plans developed. National Disaster Management Plans reviewed and revised in 10 member states. National Evacuation Policy Model developed. 	CDEMA

A.14 Projects with Donors on Flood Hazard Management in Pilot States

					 Capa projec 	Capacity building at community level by community projects and trainings (in Bioche ?)	Dominica
					· Rose	Rose Hill community resilience	Grenada
ö	Community Based Disaster	(IA)	 Inter-American 	2011	• In Gu	In Guyana, the procurement of the services of	Guyana
	Risk Management (CBDRM) Project		Development Bank (IDB)	- 2013 (3 years)	const	consultancy firm to conduct the project is going on.	
7.	Caribbean Community	(IA) International Red Cross	 Canada, US, France, 		· To re:	To research, develop and pilot a Community Based	CARICOM
	Resilience to Disaster Risk	Society Caribbean	Norway Red Cross		Disas	Disaster Risk Reduction methodology for targeted	Expert
	(CCRDR) Project	Regional Office (Trinidad & Tobago)			vulne	vulnerable communities.	
		Guyana Red Cross Society	Canadian Red Cross	Jun 2011	· 15 co	15 communities from Guyana (5 communities per	Guyana
		Dominica Rec Cross Society	· CIDA	- 2013	year,	year, but not yet identified)	
				(3 years)	Buildi the lo	Building community based disaster management at the local level: Hazard Manning, CPR, FTC	Dominica
600	Conservancy Adaptation		World Bank		· It will	It will be installing some water level gauges in the	Guyana
	Project (CAP)		(GEF Special Climate		East	East Demerara Water Conservancy	
			Change Fund)				
6	"Mainstreaming Disaster	(IA) The Environment and	 The Inter-American 	May 2010	It has 4 outputs;	utputs;	IWU
	Risk Management in the	Sustainable	Development Bank (IDB)			An assessment of community-based DRM activities.	
	OECS Countries" Project	Development Unit			2. Metho	Methodology for multi-hazard risk reduction for	
		(ESDU) of OECS (The			comn	communities.	
		Organization of Eastern				Community-based DRM benchmark tool.	
		Caribbean States)			4. Imple	Implementation of the multi-hazard risk reduction	
		Secretariat			meth	methodology in pilot communities.	
,	. Regional Risk Reduction	(IA) UNDP Barbados	. EU		· Haza	Hazard Mapping and Vulnerability Assessment in 11	IMN
Ì					(SIGIL		
÷	 The St. John River Flood Mitigation Project 	The Ministry of Works, Physical Development and	 Caribbean Development Bank 	Dec 2010 - Dec 2011	 A loa feasil 	A loan for the consulting services to undertake a feasibility study and infrastructural designs to	Grenada
		Public Utilities (MWPDPU), Government of Grenada			mitig	mitigate flooding along the St. John River.	
12.	. Greater Grenville Project			3 years	· Infra	Infrastructural development of the Grenville town	
<u>5</u>	Real-time Flood Forecasting	(EA) CARICOM Secretariat	· Japan-CARICOM	Jan 2008 -	· Areć	A real-time flood forecasting tools for flood	CARICOM
	for the Caribbean	(IA) CIMH	Friendship and Cooperation	(3 years)	man.	management and disaster preparedness Dilots states are Bachados Giuvana Jamaica	Expert
4	Rehabilitation of East	(IA) National Drainage and	· JICA	Oct 2009	· Proc	Procurement of equipment which 6 excavators and 2	CARICOM
		Irrigation Agency, Ministry of			ponte	pontoons	Expert
	Conservancy	Agriculture in Guyana			Reh	Rehabilitation of the facilities which are 4 intake structures and 2 relief sluices	
15.	. Strengthening of Disaster		· UNDP	2010-2013	a. Incre	Increase national capacity	Belize
	Preparedness and			(3 years)		Strengthen hazard impact mitigation policies	
	Emergency Response Capacity				c. Strei	Strengthen risk reduction management	
			4	-			

A.15 CBDM Progress Monitoring Form

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Caribbean Region Each country identifies highly vulnerable communities (1) and those where CBDM has been implemented* by 2010 (2); For the remaining communities, implementation schedule for 2011-2015 and beyond is to be prepared according to the priority (4). The result is to be summarized regionally by regional organizations such as CDEMA (5) and globally by ISDR

Region	Region Country (1) Total number of	(1) Total number of	(2) The number of	(3) The number of	(4) Impleme	entation	schedule	for commu	inities of (3	~
,		highly vulnerable communities	communities where CBDM has been	communities where 2011 2012 2013 2014 2015 CBDM is still to be	2011	2012	2013	2014	2015	beyond
			implemented by 2010*	implemented						
Caribbean	Anguilla									
Region	Antigua & Barbuda					1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	June - 1	and the second	- Manual Andrews	
(CDEMA	Bahamas									
member	Barbados									
countries)	Belize					100				
	Cayman Islands						and the			
	Dominica									
	Grenada									
	Guyana									
	Haiti									
	Jamaica									
	Montserrat									
	St. Kitts & Nevis					1000		10 A. 10	AP WAR	
	St. Lucia									
	St.Vincent & Grenadines									
	Trinidad & Tobago									
	Turks & Caicos Islands					18			- un	
	Virgin Islands				No. 1 martin			66 - 270 P	1	E-solores
Regional :	(5) Regional summary by CDEMA									
Global sul	(6) Global summary by ISDR Secretariat									

Barbados	Highly vulnerable communities	Organization	DM Plan	Hazard map	Early warning	In cooperation with:
	Speightstown	•	•	•	•	JICA
	8	•		•		Red Cross
	0	•	•	•	2011	Red Cross
	0	•	2012	2012	2013	CIDA
	ш	•	2013	2013	2014	CIDA
	L	2014	2015	2015	2015	GTZ

Already implemented by 2010

AD)





MINUTES OF MEETING BETWEEN THE CARIBBEAN DISASTER EMERGENCY MANAGEMENT AGENCY AND THE JAPAN INTERNATIONAL COOPERATION AGENCY ON THE CARIBBEAN DISASTER MANAGEMENT PROJECT PHASE 2

The 5th Joint Coordination Committee of the Caribbean Disaster Management Project Phase 2 (hereinafter referred to as "the Project") was held on December 14, 2011 to consider JICA's proposal for the modification of implementation arrangements with the attendance of the Coordinating Unit of the Caribbean Disaster Emergency Management Agency (hereinafter referred to as "CDEMA"), other organizations of the Regional Team (hereinafter referred to as "RT"), National Teams (hereinafter referred to as "NT") of the pilot states, the Japan International Cooperation Agency (hereinafter referred to as "JICA") and the JICA Expert Team (hereinafter referred to as "JT").

As a result of the meeting the Joint Coordination Committee has agreed as per the summary of decisions in the document Annex I, attached hereto.

Saint Michael, Barbados, December 14, 2011

Mr. Jeremy Collymore Executive Director CDEMA, Barbados

Mr. Toshikatsu Imai Chief Advisor, JICA Expert Team, Japan

Witness by



Mr. Fitzgerald John Saint Lucia Date: 14-12-2011

20 Mr. Nigel Lowe

Grenada Date: 14/12/2011

Mr. Taku Yoshida JICA Date: 14/12/2011

Witness By:

12/2011

Mr. Don Corriette Dominica Date: 14 SECEMBER 2011





Attachments

1. Implementation of the Project for the extended period

- a) The JCC welcomed the agreement to the extension of the project and agreed to the need for all to accept their roles and responsibilities to ensure successful implementation;
- b) The JCC considered the proposal for amendment to the implementation protocols offered by JICA;
- c) The results of these deliberations are reflected in Annex I.
- Annex I Summary of the 5th Joint Coordination Committee Meeting Recommendations and Decisions.
- Annex II Modified Project Framework





Annex I SUMMARY OF THE 5TH JOINT COORDINATION COMMITTEE MEETING RECOMMENDATIONS AND DECISIONS

THE 5th MEETING OF JCC:

- Thanked the Government of Japan, thru JICA, for agreeing to the extension of the project until June 30, 2012
- Affirmed the importance of consolidating efforts to institutionalize the results of the Project and the need to engage all of the relevant stakeholders at national and regional level.

The JCC:

- 1. Affirmed satisfaction with existing communication protocols and agreed to retain these;
- Agreed that once regional and national implementation schedules, resource inputs and roles are agreed it is appropriate for the JT to directly engage NDOs or NT focal points in beneficiary states;
- Agreed that the JT, in planning missions to beneficiary states, will engage and consult with the CDEMA CU on the desirability and availability of the RT members to participate and due consideration be taken of their prior obligations;
- Urged that regional partner institutions be reminded and encouraged to facilitate the availability of RT members for country missions;
- 5. Reaffirmed the JT as the primary Government of Japan contact point for project implementation;
- Noted that it is the prerogative of the Government of Japan to arrange field related awareness and review missions in the beneficiary states;
- Endorsed the idea that the institutionalization of the outputs of the Project requires the engagement. of all the requisite stakeholders in the process;
- 8. Recognized that the civil society is an important partner in the transfer of the results of the Project;
- Noted that this is already embraced at the national and regional levels and Agreed to use existing national and regional mechanisms to strengthen this process;
- Further agreed to engage the Civil Society Sub-sector Committee of the CDM governance mechanism in the framing of the process for incorporating the output manuals into the existing manuals;
- 11. Noted that these consultations would be supported by the Project to ensure timely delivery within the extended period;
- 12. Agreed on the need for all to accept responsibility to ensure delivery of the projects outputs;
- Agreed to incorporate the anticipated role of the national civil society and regional mechanisms into the modified project framework;





- Agreed to incorporate the anticipated role of the national civil society and regional mechanisms into the modified project framework;
- 14. Agreed on mechanisms to strengthen training interventions to promote sustainability that will include the JCC members;
- 15. Identified key dates for NT and JT actions to inform timely implementation of the remaining project activities.

End

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Japanese Expert Team (JT)

JT members are responsible for conducting technical transfer to RT members.

echnical Transfer

- Flood hazard map
- Community disaster management plan
- Flood early warning system
 - Hydrological Database
 - Sustainability plan

Regional Team (RT)

RT members are responsible to support NT as the professional team.

CDEMA

Progress Management

- Project Coordination

CIMH

- Flood hazard map
- Flood early warning system - Hydrological Database
 - IMN
- Sustainability plan
- 50
- Community disaster management plan

Collaboration

Collaboration

Regional Civil Society

- Integration of manuals

- Flood early warning system - System Establishment Technical Support

 Community disaster - Flood hazard map

Technical Training

management plan

National Team (NT)

NT members are responsible for conducting the activities of the Project with support of RT

National Disaster Organization (NDO)

Belize, Dominica, Grenada, Guyana, Saint Lucia

National Civil Society

- Community disaster management plan

Technical Support

- Flood early warning system

Progress Management

Pilot Communities

Dominica Grenada Guyana Belize Communication

HIGHNOLK

Saint Lucia

Hook, Handsome Tree (#10) and Floral Garden Communities of Little Biabo, Big Biabo, Grass Crooked Tree Community Bath Estate Community St Cloud Community Corinth Community Newly-added approach





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MINUTES OF MEETING BETWEEN THE CARIBBEAN DISASTER EMERGENCY MANAGEMENT AGENCY AND THE JAPAN INTERNATIONAL COOPERATION AGENCY ON THE CARIBBEAN DISASTER MANAGEMENT PROJECT PHASE 2

The 6th Joint Coordination Committee of the Caribbean Disaster Management Project Phase 2 (hereinafter referred to as "the Project") was held on June 6th, 2012 on the termination of the Project with the attendance of the Coordinating Unit of the Caribbean Disaster Emergency Management Agency (hereinafter referred to as "CDEMA-CU"), other organizations of the Regional Team (hereinafter referred to as "RT"), the National Teams (hereinafter referred to as "NT") of the pilot states, the JICA Expert Team (hereinafter referred to as "the Team"), the Japan International Cooperation Agency (hereinafter referred to as "JICA").

As a result of the meeting, the 6th Joint Coordination Committee has agreed as per the summary of discussions in the document Annex I, attached hereto.

St. Michael, Barbados, June 7th, 2012

Ms. Elizabeth RILEY Deputy Executive Director, CDEMA, Barbados

Mr.^VToshikatsu İmai Chief Advisor, JICA Expert Team, Japan

Witness by:

Mr. Akira Hayakawa Project Consultation Team, JICA, Japan





Attachments

- 1. Achievement of the Project
 - a) The 6th JCC confirmed that there was significant advancement during the extension period and almost all outputs of the Project were completed;
 - b) The 6th JCC offered an opportunity for the CDEMA-CU, the RT and the NT to review the outputs of the Project, to be acquainted with the concept of the sustainability plan, to share and discuss lessons learned and good practices from the Project and to consider suitable interventions to be undertaken after completion of the Project.
- 2. Formulation of the Sustainability Plan
 - a) The 6th JCC welcomed the suggestion by the RT that the sustainability plan seek for long-lasting responsibilities which were generated in the Project and encouraged each party concerned to the Project to fulfill their responsibility and pursue extending and developing their organizational capacity in accordance with the sustainability plan;
 - b) The 6th JCC confirmed that all participants in the 6th JCC, within capacity of each of them, would pursue developing capacity from technical, human resource, financial and institutional aspects to extend the outputs of the Project in the CDEMA member states.
- 3. Termination of the Project
 - a) The 6th JCC agreed to conclude the Project in June 30, 2012.

End

Annex I SUMMARY OF THE 6TH JOINT COORDINATION COMMITTEE MEETING RECOMMENDATIONS AND DECISIONS

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SUMMARY OF THE 6TH JOINT COORDINATION COMMITTEE MEETING RECOMMENDATIONS AND DECISIONS

1. REVIEW OF THE REPORT OF THE FIFTH (5TH) MEETING OF THE JOINT COORDINATION COMMITTEEE (JCC) AND FOLLOW-UP ACTIONS

The JCC:

Report of the 5th Meeting of the JCC:

I. <u>Agreed</u> to have an initial discussion on the draft report of the 5th JCC Meeting subject to the confirmation of the report following deliberations on the draft document by JICA;

Telecommunications Arrangements in Pilot States Under the CADM 2 Project

- II. **Noted** the updates from the National Teams (NTs) on their telecoms status;
- III. <u>**Congratulated**</u> the NTs for their successful negotiation of the arrangements with the telecom providers;
- IV. <u>Requested</u> the NTs to share the agreements with the telecom providers with the CDEMA CU as these will set the context for the discussions the CU is to have with the providers;

Spare Parts for Equipment Installed in Pilot States

- V. **Noted** that in the absence of the specific identification of spare parts from the national level, the matter had been advanced by CIMH and the IDEA Team to identify a critical spare parts list;
- VI. <u>Also noted</u> that the spare parts are on order and <u>thanked</u> IDEA for their commitment to share the delivery schedule with CIMH;
- VII. **Noted** the recommendation from CIMH on the need to articulate a protocol for access of the spare parts and **requested** CDEMA and CIMH to have a discussion on the elaboration of this matter and subsequently share the outcomes with the Pilot States (PSs);

Page





Access to Project Public Relations Products

- VIII. <u>Noted</u> the updates from Guyana, Saint Lucia and Dominica with respect to visibility opportunities undertaken; and
 - IX. Also noted the access point for Saint Lucia's visibility information;
 - X. <u>Further noted</u> the commitment of Dominica to provide the relevant visibility information subsequent to the meeting.

2. CADM PHASE II: SUSTAINABILITY PLAN AND RECOMMENDATIONS EMERGING FROM THE ANNUAL SEMINAR

The JCC:

- I. <u>Agreed</u> in principle with the summary decisions which came forward from the Annual Seminar;
- II. <u>Acknowledged</u> the contribution of the RTs in enhancing capacity of the NTs in flood risk management.
- III. **Urged** the NTs to undertake an annual performance assessment of EWS which would include periodic review of the hazard maps;
- IV. <u>Noted</u> the opportunity for additional information to enhance the update of hazard maps through the Caribbean Satellite Project and availability of the EO1 satellite imagery;
- V. <u>Agreed</u> that the consultant team will review and verify the costs within the document;
- VI. **<u>Recommended</u>** the enhancement of the sustainability matrix in light of the recommendation for the inclusion of an equipment list and indicative supplies;
- VII. **Encouraged** the members of the JCC to review the draft Sustainability Plan and to provide comments by June 14, 2012 for integration;
- VIII. **Noted** the indication that the document will be edited prior to its final submission to JICA; and
 - IX. **Encouraged** the NTs to utilize the Sustainability Plan as a point of
 - reference to identify specific national level gaps.

3. PRESENTATION ON THE FINAL REPORT OF THE CADM PROJECT PHASE II

The JCC:

- I. Thanked Mr. Toshikatsu Imai for his presentation;
- II. Agreed that substantive areas for reflection relate to sections 4 and 8;

2 Page





- III. <u>Encouraged</u> the JCC members to review and provide any particular feedback by June 14, 2012;
- IV. **Noted** the lessons learnt and recommendations as tabled by Dr. Paulette Bynoe and enhanced by other interventions; and
- V. <u>Noted</u> the commitment of the CDEMA CU to collate the lessons learnt and recommendations shared by the PSs in their presentations at the Annual Seminar for submission to the JCC with a general understanding that the consultant team would distil any information they deem relevant from their perspective for inclusion.

4. DISCCUSSION ON THE PROPOSED MEMORANDUM OF UNDERSTANDING AS A PART OF THE SUSTAINABILITY PLAN

The JCC:

- I. **Noted** the proposal of JICA for a Memorandum of Understanding (MOU) governing project sustainability at the national level to be signed off by the NTs of the PSs, witnessed by JICA ;
- II. **Noted** that Pilot States (PS) have indicated no objection to the MOU in principle;
- III. <u>Agreed</u> that the signing of the MOU is a sovereign decision to be made by each of the PSs;
- IV. **<u>Requested</u>** a formal sharing of the proposed MOU with the CDEMA-CU
- V. <u>**Recommended**</u> that there is acknowledgement of the contribution of Regional Team (RT) members within the language of the MOU;
- VI. **<u>Reiterated</u>** the importance of the broad NT review of the MOU prior to signoff; and
- VII. <u>Agreed</u> that the way forward should adhere to the requisite protocols and governance arrangements.

付属資料 2: サステナビリティプラン





SUSTAINABILITY PLAN FOR FLOOD DISASTER MANAGEMENT IN CDEMA PARTICIPATING STATES

Caribbean Disaster Management Project Phase 2

June 2012





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1. BACKGROUND

1.1 The CADM and CADM2 Projects

CADM2 is the abbreviation of the Caribbean Disaster Management Project Phase 2. The Caribbean Disaster Management Project Phase 1 was started in 2002 and ended in 2005. CADM2 is phase 2 of CADM project starting in 2009 and ending in 2012.

Among various natural disasters in the Caribbean region, floods have posed the worst threats to social and economic development stability in the majority of the member states of the Caribbean Disaster Emergency Management Agency (CDEMA) due to the frequency of occurrence and its impact on a large number of low-income people.

In response to the increasing need to avoid and reduce flood disasters, the CADM project was started by CDERA (predecessor of CDEMA) in 2002 and funded by the Japan International Cooperation Agency (JICA).

The overall goal of the CADM project was to mitigate flood damages in CDERA participating states. The project intended to train professionals in flood hazard mapping and flood disaster management planning and to equip the participating countries with flood hazard maps and flood disaster management plans for pilot communities.

At the termination of Phase I of the project in 2005, the continuation of the project was deemed to be necessary both by CDERA and JICA, and the project CADM2 was started in 2009.

1.2 Objectives of CADM and CADM2 Projects

(1) CADM Project

The objectives of the CADM project were to:

- 1) Strengthen and establish a comprehensive system for Flood Hazard Mapping.
- 2) Improve the capability of participating states for Community-based Disaster Management Planning.
- 3) Enhance the capacity of CDERA as a disaster information warehouse/clearing house.
- 4) Enhance recognition of the importance and usefulness of Hazard Maps and Disaster Management plans among the member states.

(2) CADM2 Project

The objective of the CADM2 project is that the capacity of CDEMA and five pilot states (Belize, Dominica, Grenada, Guyana, and Saint Lucia) for managing the flood risk is increased. The project structure is schematically shown in Annex-1.





1.3 Outcomes of the Projects

(1) CADM Project

- 1) Established organization for preparation of hazard maps and community disaster management plans.
- 2) Hazard map and community disaster management plan prepared in each pilot site.
- 3) Enhanced capability within Regional Team member organizations for hazard mapping and community disaster management planning.
- 4) Improved capacity of CDERA as a disaster information warehouse/clearing house.

(2) CADM2 Project

- 1) Flood hazard maps (FHMs) are prepared, Community-based Disaster Management Plans (CBDMPs) are prepared and implemented, and Flood Early Warning System (FEWS) are established at the pilot sites.
- 2) Capacity of RT to develop FHM and to establish FEWS is upgraded.
- 3) Hydrological database is established and functioning at CIMH (Efficient and effective use of the hydrological database becomes possible for flood hazard mapping and FEWS establishment.

1.4 Terminal Evaluation of CADM2 Project

- 1) Among the 5 criteria for evaluation, relevance is only evaluated as high and others as medium.
- 2) "Medium" of effectiveness is simply attributed to the delay of output 1. When 3 activities of output 1 progress well, the effectiveness will be improved.
- 3) Regarding efficiency, the team would like to highlight the request of long-term experts who stay in the project office for the long-term. Shuttle style experts hinder the usual job of staff and flexible assignment is highly appreciated by RT.
- 4) Impact is mentioned in the achievement of the overall goal. There are a lot of factors and prerequisite conditions in the project. However, if the RT makes a good program for community disaster management with cooperation from other donors, it may be possible to find a way to achieve the overall goal. The evaluation team expects that the RT will prepare such a program in the future.
- 5) The budget issue is strongly highlighted in sustainability as usual. JICA expected that capacity is embedded in the staff and the organization as knowhow, knowledge and skills. The Team understands that it is the challenge for the RT to implement RT activities with limited budget and embedded capacity.





1.5 Lessons Learnt from the CADM2 Project

The Regional Team (RT) concluded that the sustainability plan should be further studied from the following aspects:

- 1) Technical capacity
- 2) Human resources capacity
- 3) Institutional capacity
- 4) Funding capacity

2. BASICS OF SUSTAINABILITY PLAN

2.1 Definition of Sustainability

- Sustainability is the long-term responsibility in doing something.
- Sustainability here is the long-term responsibility in the flood disaster management for the present and future generations in the CDEMA participating states.

2.2 General Objectives of the Sustainability Plan

- The sustainability plan should specify specific elements to be included in the Plan for flood hazard management.
- > The sustainability plan should make recommendations on steps, including methodologies, actions, and time schedules for each of the elements recommended.
- The sustainability plan should clearly identify what needs to be conducted at the Regional and National Levels.
- At the regional level, within the Hyogo Action Framework, monitoring the progress of community-based disaster risk reduction at country-level is the responsibility of the international society (see Annex 2).
- The sustainability plan should clearly identify what activities to be conducted in view of availability of technical capacity, human resources, financial resources and the institutional background of the states.





2.3 Specific Objectives

- To expand the activities to promote and deliver FHM, FEWS and CBDMP to flood vulnerable communities in CDEMA Participating States other than the project states.
- To expand the activities to promote and deliver FHM, FEWS and CBDMP to flood vulnerable communities in the pilot states other than the pilot communities in the CADM2 Project.

2.4 The Vision Statement

Under the following policy, the sustainability plan should be formulated:

- To be the foremost promoter of sustainable flood disaster mitigation and preparedness programs for loss reduction at national and local levels in CDEMA Participating States.
- What is most important in implementation of the sustainability plan is to protect the people's lives and properties and to minimize the causalities due to floods in the Caribbean Region. Accordingly the implementation of the sustainability plan should, basically, be conducted by the state responsible for protecting the people.

2.5 The Mission Statement

To enhance and sustain the capacity of CDEMA Participating States to mitigate the impact of floods in their communities, through a collaborative process of coordinated planning and implementation.

2.6 Conceptual Framework of Sustainability Plan

- Among CBDMP, FEWS and FHM, a state should undertake a process to establish CBDMP because CBDMP has utmost importance among the three components of the CADM2 by directly affecting the security of the people and their property. A state then should establish FEWS to incorporate into CBDMP to improve the efficiency of the existing CBDMP and FEWS. Establishing FHM follows CBDMP.
- > Conceptual framework of sustainability plan should consider the following components:
 - technical capacity;
 - human resources capacity;
 - institutional capacity;
 - funding capacity; and





- action plan.
- Four kinds of capacity- technical, human resources, financial and institutional, are the elements that must be taken into consideration to assess the overall capacity of a state to prepare the CBDMP, FEWS and FHM and to formulate an action plan.
- Technical capacity indicates required skills to undertake the necessary tasks. A state can refer to the technical requirements to identify the gap between the desired set of standard skills and their current technical standard.
- Human resources capacity indicates the desired numbers and qualifications of the personnel required to execute the technical requirement. A state should plan and implement training for its nationals to fulfill the gap between the desired and the current standard.
- Financial capacity indicates the funding requirements to prepare CBDMP, FEWS and FHM. It is important that the NDO has consultation with the stakeholders about financial responsibility on incurring expenditure to implement those activities.
- Institutional capacity has paramount importance among four capacity elements. Institutional capacity indicates the requirements to prepare CBDMP, FEWS and FHM, and to sustain them from the perspectives of institutional arrangement. In other words, it is a goal of institutional arrangement from tentative working group to formal legislation depending on a state's technical, human resources and financial capacity. A country, on preparing CBDMP, FEWS and FHM must share a common goal of institutional arrangement with the stakeholders, while presenting the current institutional capacity.
- While considering an action plan in a state, it is important to identify available in-country technologies to implement the CADM2 outputs, namely, CBDMP, FEWS and FHM. In case a state does not have legislation or funding support to start implementing the CADM2 outputs, it should start with forming a tentative working group which mobilizes whatever available technical, personnel, financial and institutional resources for a pilot project experiment.
- Meantime, a state should identify the technical, human resources, financial and institutional gap to fulfill to fully implement the CADM2 outputs. According to the experience from the CADM2, acquisition of a community facilitator and a skilled hydrologist at state level is of utmost necessity in the pilot states.
- Experience and lessons learned from the pilot project must be recorded and referred to when considering the means to fill the capacity gaps which are identified by the state. The NDO will take a leadership role to encourage each stakeholder to extend their capacity to a requirement level. The stakeholders must discuss financial arrangements which allow the initiative to be sustainable and accountable. Participation of development partners is welcomed if available.





From the beginning, the desired institutional arrangement must be shared among the stakeholders so that each stakeholder engaged in each activity has a common goal to formalize the CADM2 outputs to legislation. Legislation of the CADM2 needs to match the state's implementation capacity.

2.7 Basic Needs for New Sustainability Plan

Based on the following basic concept, a new sustainability plan is proposed hereunder:

- The global climate change may worsen the situation in the coming future and economic growth may be progressing. The project activities of preparation of community disaster management plans, establishing flood early warning systems and preparation of flood hazard maps should be continued and the outputs should be reviewed in conformity with the strategy and program framework 2007-2012 of CDEMA.
- Accordingly the sustainability plan should be prepared for the aims of mitigation of the flood hazard in the region. The plan should be prepared in view of the actual situation of the region, not only from the technical and financial situation but also from the availability of human resources in producing the necessary output and in maintenance and operation of the outputs, and in consideration of the institutional situation.
- > The new sustainability plan is being prepared for the general CDEMA Participating States where the detailed information related to the disaster mitigation activities is not fully covered and for the pilot states of CADM2 where the said information is obtained in detail.
- The new sustainability plan is being prepared under the concept that the basic activities for flood disaster mitigation consist of preparation of community-based disaster management plans (CBDMP), establishment of flood early warning system (FEWS), and preparation of flood hazard maps (FHM).
- The technical capacity, human resources, financial resources and the institutional aspects are quite different depending on the state, even in the same region of the Caribbean. Accordingly the sustainability plan should be prepared in consideration of the various situations of states. The details are presented in the following chapter.

3. SUSTAINABILITY PLAN

3.1 Needed Activities for Sustainable Flood Management

3.1.1 Activities at Regional Level

The actual activities for disaster mitigation shall be basically conducted in each state, while the regional stakeholders such as CDEMA-CU, UWI, UG, CIMH, and Civil Society will undertake the flood





mitigation works at regional level. The necessary activities related to disaster mitigation at the regional level are the following;

- 1) CDEMA-CU
- The tasks of CDEMA-CU are monitoring the works of the related activities of disaster mitigation, coordinating the works for necessary information among the various entities, and dissemination of related information.
- At the same time, it is advisable that CDEMA-CU promotes the expansion of the same activities to other states where CADM and CADM2 have not been implemented. In line with this, it is advisable that CDEMA-CU gets an understanding of the overall situation of flood disaster management in CDEMA Participating States.
- ➢ In addition to this, it is advisable that CDEMA-CU encourages the pilot states of CADM2 to present the outputs of CADM2 at the CDM conference.
- A disaster training centre will be established with resources committed from the US Southern Command. This will serve as a training facility for practitioners in the CDEMA Participating States.
- 2) UWI
 - > The tasks of UWI are mainly the education works related to flood disaster mitigation works.
- 3) UG
 - ▶ UG provides academic consultation for NT upon request.
- 4) CIMH
 - The tasks of CIMH are mainly the education and training works related to hydrological and meteorological works including the instruments.
 - CIMH should continue to provide the hydrological training course including the flood analysis and continue the support to states in flood analysis for preparation of FHM until the highly qualified hydrologists are built up in the state.
 - CIMH should give technical advice to the state's hydro-met office for the installation of gauges for establishing the FEWS.
 - CIMH maintains and manages the hydrological database that would be the basic data for hydrological analysis for updating the FEWS and FHM.
- 5) Civil Society
 - The Civil Society Sub-sector committee of the CDM governance mechanism will make an effort to incorporate the output manuals into the existing manuals.





3.1.2 Activities at State Level

Regarding the pilot states of CADM2, it is advisable that the NDO gets an understanding of the overall situation of flood disaster management in flood vulnerable areas in the state, to expand the same activities to other communities. This grasp of the overall situation may greatly contribute to the judgment on necessary input. Activities at state level are deemed to be as follows:

- 1) Technical capacity
 - Preparation of community-based disaster management plan and implementation of drill.
 - Establishing flood early warning system
 - Preparation of flood hazard map
- 2) Human resources capacity
 - To secure personnel qualified for conducting the activities shown in Annex-3
 - To secure community facilitators
- 3) Institutional capacity
 - To articulate the related agencies for conducting the needed activities shown in Annex-4
 - To secure personnel to expand the activities of the CADM2 Project
 - To prepare the legal basis for continuous cooperation of related agencies for the above activities
- 4) Financial capacity
 - When contemplating the level of technical and human resources capacity presently available in a state, it is important to take institutional capacity into consideration as well. A state should decide the amount of funding required to extend and sustain the CADM2 outputs in reference to such a deliberation.

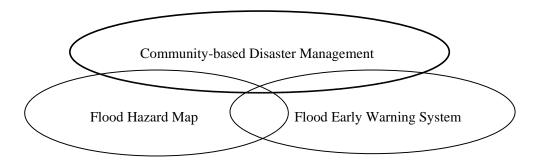
3.1.3 Basic Concept of the Activities at State Level

- > The basic concept of the project is that a flood disaster at the community level be mitigated through community-based disaster management.
- The sustainability of the project must consider sustaining the responsibilities which have been assigned to the organizations and the persons involved.





- > The objectives of the Project could be achieved through implementation of the management plan.
- Accordingly the community-based disaster management (CBDM) includes the planning process and the implementation of the plan.
- ➢ Here, the flood hazard map (FHM) and the flood early warning system (FEWS) are the basic inputs that have interface with and must be integrated into the CBDM.
- Here, the flood hazard map should be verified with the community-based one on the past community's experience and accordingly CBDM and FHM should partly overlap in the activities.
- The FEWS should also be established based on the community's opinion regarding setting the warning levels and accordingly the overlap activities between CBDM and FEWS exist.
- > The FHM should be updated based on the flood record obtained through FEWS monitoring gauges and accordingly the overlap activities between FHM and FEWS exist.



The following are advisable in preparation of CBDMP, FEWS and FHM for expansion of outputs of CADM2:

- > To prepare CBDMP first, from the viewpoint of disaster mitigation expansion, regarding the communities that are not included in the development plan by development partners at present.
- > To establish a technically refined FEWS for the communities that already have CBDMP.
- To prepare a technically refined FHM for the communities that already have CBDMP and FEWS
- Preparation of CBDMP be commissioned to Civil Society and the preparation of High FEWS and FHM be technically supported by CIMH.

Here, a CBDMP should be the topmost priority rather than the FEWS and FHM since without CBDMP, even given FEWS and FHM, the community people will be just as confused as to how and what to do for evacuation from the flood. Then the next one should be FEWS since if the flood takes the community by surprise without warning, the community people will just panic even if the FHM is already disseminated to the residents.





3.1.4 Levels of CBDMP, FEWS and FHM

In the activities of the CBDMP, FEWS and FHM, there are some conceivable levels of activities to be conducted as to the sustainability of the project. The levels are to be decided by each state depending on the physical conditions, technical capacity of the state, availability of human resources, availability of funding resources and the background of the institutions of the state.

1) Technical aspect

- ➤ A high amount of initial investment will be needed to introduce the CADM2 system, and accordingly it might be difficult to continue to conduct the activities only with the national budget without obtaining foreign financing. Accordingly it is advisable that the state aims at preparation and practical use of the CBDMP, FEWS and FHM whatever the levels are.
- In consideration of the above, the sustainability plan is classified into the following levels in the technical aspect:

Level	CBDMP	FEWS	FHM			
5	One	High	High			
4		High	Moderate			
3		Moderate	Moderate			
2a	One	Moderate	Non-IT			
2b		Non-IT	Moderate			
1		Non-IT				

The following are the descriptions of the said levels. Conditions, Roles, Functions and Activities in Each Level of Activities are shown in Annex-4.

(1) CBDMP

Basically there should be one level in CBDMP.

(2) FEWS

Basically there are 3 levels of FHM as follows:

Non-IT FEWS:

• FEWS is established without any IT equipment. A person in the community monitors the flooding conditions of the river, and under certain situations, the person gives the warnings to the community by shouting or door-to-door knocking.

Mod-FEWS:

• FEWS is established with some automatic water level sensors and the detected water-level is made known to the caretaker of the sensor living near the river,





through a cable connected to the caretaker's house and the warning would be transmitted to the downstream target community by cellular phone or some other available device.

• But the sensor is not equipped with a data logger and modem to transmit the information through radio waves to some designated agencies or personnel. Accordingly the threshold values to give the warning could not be updated since there is no data record.

High-FEWS:

- FEWS is established with an automatic water level sensor and the detected waterlevel information is transmitted directly to NDO and/or downstream target community committee by radio waves.
- The devices have a data logger and modem to transmit the information and later on an update of threshold values based on the recorded data could be achieved.

(3) FHM

Basically there are 3 levels of FHM as follows:

Non-IT FHM:

• FHM is prepared with the leadership of a facilitator during the community discussions on the past prominent flood hand-drawn on paper. The experienced facilitator to lead the community participants to the flood map of the past is needed here.

Mod-FHM:

• FHM is prepared with the use of GPS for collection of location data and the flooding depths at sites of the past prominent flood and the collected data is processed with GIS software for drawing the so-called incidental map.

High-FHM:

• FHM is prepared based on the rainfall analysis, runoff calculation and inundation simulation, and accordingly the FHM is prepared for the return period with the use of a computer, software for probability analysis, runoff and inundation simulation and GIS software.

2) Human resources aspect

NDO and related agencies in the Caribbean Region have limitations in personnel size and technical level. Accordingly they need to request the cooperation of CIMH, UWI, and Civil Society for expansion of the activities for CBDMP, FEWS and FHM.





- CIMH has plans to secure the personnel to continue the CADM2 system (FEWS, FHM, HDB) by employing and training the personnel.
- > Civil Society is an important partner for expansion of CBDMP.
- Needed M/M is different depending on the target technical level. Accordingly the following human resources will be needed for each field: Necessary human resources and implementation schedule for each field are shown in Annex-5.

Level	NDO's overall responsibility	CBDMP	FEWS*	FHM	Total
5			5.0	5.5	13.9
4		2.2	5.0	1.5	9.9
3	1.2		3.0	1.5	7.9
2a	1.2	2.2	3.0	0.0	6.4
2b			3.0	1.5	7.9
1			3.0	0.0	6.4

*CIMH support is needed at Level5.

- From the viewpoint of disaster management of communities, preparation of CBDMP is the first priority. In the case of preparation of Moderate or Non-IT FEWS, it is needed to conduct flood warning by manpower, and this influences the necessary cost depending on the understanding and cooperation level of the community and influences the sustainability of the activities. Accordingly the education of the people to be engaged in the warning activities is very important. Therefore, it is necessary for NDO to secure the necessary number of personnel inside the governmental agencies to be engaged in the CBDMP activities in view of the number of flood vulnerable communities.
- 3) Institutional aspect
 - ➢ It is necessary to articulate the mandate of related agencies for introducing and effective operation of the CADM2 system for flood disaster mitigation of communities.
 - Related agencies are national agencies (NDO, Hydro-met, Land and Survey, etc.), Civil Society, community, private company (mobile phone company), CIMH and others. The mandate of the agencies are as shown in Annex-6. In establishing the cooperation of related agencies, it is necessary to articulate the legislation situation related to disaster mitigation in the state, personnel size, budget and commitment of the agencies and to decide the feasible level of the activities.
 - Taking the above into consideration, the sustainability plan in the institutional aspect is classified into the following 6 levels: (Responsibilities in each activity are shown in Annex-6).

Level	FEWS	FHM
5	 Cooperation of NDO、 Hydromet, Land and Survey, Civil Society, Community 	 Technical support to of CIMH Cooperation of NDO, Hydromet and Land and Survey





Level	FEWS	FHM
4	 Cooperation of mobile phone company Cooperation of NDO, Hydrom 	1. Cooperation of NDO, Land and Survey, Civil Society, Community net,
	Land and Survey, Civil Societ Community	у,
3	1. Cooperation of NDO, Hydrom	
	Civil Society, Community	Civil Society, Community
2a	1. Cooperation of NDO, Hydrom	net, 1. Cooperation of NDO, Civil Society,
24	Civil Society, Community	Community
2b	1. Commitment of Community	1. Cooperation of NDO, Land and Survey, Civil Society, Community
1	1. Commitment of Community	1. Cooperation of NDO, Civil Society Community

4) Financial aspect

Initial cost is varies depending on the level in FEWS and FHM and the maintenance cost also varies depending on the level. Accordingly it is necessary to consider the necessary sustainable budget in view of the technical and personnel capacity levels and the institutional level (cooperation of the related agencies).

		Initial	Cost (USD	Recurrent Cost* (USD)				
Level	NDO's overall responsibility	CBDMP	FEWS**	FHM	Total	FEWS		
5		6,400	24,000	9,300	40,425	4,800		
4			C 400	24,000	4,500	35,625	4,800	
3	725			8,000	4,500	19,625	31,000	
2a	125	0,400	8,000	0	15,125	31,000		
2b			200	4,500	11,825	14,000		
1			200	0	7,325	14,000		

* per a year, **CIMH support is needed at Level5.

- A CADM system is the disaster mitigation integrated system of CBDMP, FEWS and FHM. In introducing a CADM system, it is necessary to decide the appropriated level of each component in view of the development level of a national disaster mitigation system.
- It is advisable to actively promote to development partners the implementation of flood disaster mitigation projects similar to the CADM system showing the effects of the CADM system.

4. IMPLEMENTATION SCHEDULE (ACTION PLAN)

An action plan should be prepared in consideration of "technical aspect", "human resources aspect", "institutional aspect", and "financial aspect", in view of the present level of the state, the target level, and the budget. The detailed information including the breakdown of the costs are presented in Annex-8 as the Sustainability Plan Matrix attached hereto.





- For the areal expansion of the activities, the necessary financial input from national budget and development partners by use of a monitoring matrix to promote the activities to communities needs to be considered. Progress Monitoring Matrixes of Coverage of Flood Response Committee are shown in Annex-7.
- Among CBDMP, FEWS and FHM, a state should undertake a process to establish CBDMP because CBDMP has utmost importance among the three components of the CADM2 by directly affecting the security of the people and their property. A state should then establish FEWS to incorporate into CBDMP to improve the efficiency of the existing CBDMP. Establishing FHM follows CBDMP and FEWS.

[STEP 1]

- It is important to identify available in-country technologies to implement the CADM2 outputs, namely, CBDMP, FEWS and FHM. In case the state does not have legislation or funding support to start implementing the CADM2 outputs, it should start with forming a tentative working group which mobilizes available technical, personnel, financial and institutional resources for a pilot project experiment.
- From the beginning, the desired goal of institutional arrangement must be shared among the stakeholders so that each stakeholder engaged in each activity has a common goal to formalize the working relations to legislation in the end. Legislation of CADM2 needs to match the state's implementation capacity.

[STEP 2]

- A state should identify the technical, human resource, financial and institutional gaps to fill in order to fully implement the CADM2 outputs. According to the experience from the CADM2, acquisition of a community facilitator and a qualified hydrologist at state level is of utmost necessity in the pilot states.
- NDO should send a hydrologist and GIS expert to CIMH and UWI respectively to undertake training courses provided by regional agencies.
- While developing human resources to fill the capacity gaps, the NDO should consider finding available domestic resources from government agencies and private sectors. If the human resources are not available domestically, the NDO should consider searching for regional human resources.

[STEP 3]

Experience and lessons learned from the pilot project must be recorded and referred to while considering the means to fill the capacity gaps which are identified by the state. The NDO will take a leadership role to encourage each stakeholder to extend their capacity to a requirement level. The Stakeholders must discuss financial arrangements to keep sustainability and accountability of operations to achieve the CADM2 outputs. Participation of development partners is welcomed if available.





[STEP 4]

NDO should review the sustainability plan periodically taking into consideration the economic development of the state, and the impact of global climate change.

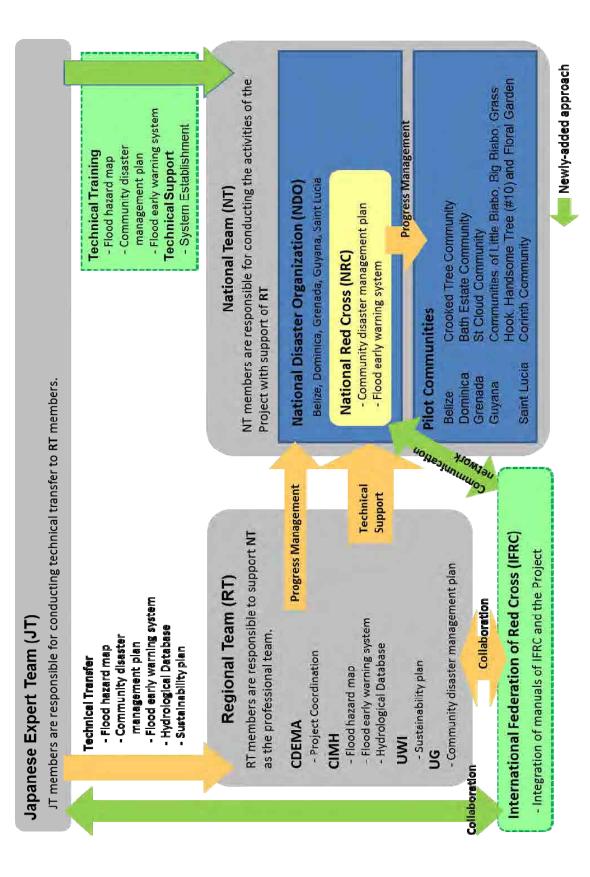
5. RECOMMENDATIONS

- It is a responsibility of the international society to pursue flood disaster risk reduction. In relation to this, it is in the common interest of the development partners in the Caribbean region to expand the CADM2 system region wide.
- In order to expand the CADM2 system, sharing the best practices from the CADM2 on the occasion of a regional conference such as the Caribbean Disaster Management Conference, is the effective approach to disseminate the system established during the project.
- Extending non-structural measures, which were established during the CADM2, to the CDEMA Participating States is the highest priority, given the allocated resources for disaster risk reduction in the Caribbean states. However, a state should consider utilizing structural measures in addition to the non-structural measures to seek the most efficient means to reduce the flood risks.
- From the viewpoint of long-term sustainability of the activities, educational activities at school level would be an important part. Educational activities in flood disaster management in communities should be conducted and the cost of these activities should be included in the national budget in view that the loss at community level may have a great impact on the national development.





Annex-1 Project Structure







Annex-2 CBDM Progress Monitoring Form

Caribbean Region

communities, implementation schedule for 2012-2016 and beyond is to be prepared according to the priority (4). The result is to be summarized regionally by regional organizations such as CDEMA (5) and globally by ISDR Secretariat (6), and shown on their respective web-site for Each state identifies highly vulnerable communities (1) and those where CBDM has been implemented* by 2011 (2); For the remaining information sharing by all including donors.

3)	beyond														11							υ.
ies of (tion of
mmuniti	2016																					Prepara
ile for co	2015					9		1							15							stem and
on schedu	2014																					arning sy
(4) Implementation schedule for communities of (3)	2013							7														f early wa
(4) Imple	2012					1		1	1	1					1							shment of
(3) The number	of communities where CBDM is still to be implemented					264		8	7	5					27							of CBDMP, Establis
(2) The number of	communities where CBDM has been implemented by 2011*					1		1	1	1					1							nization, Preparation
(1) Total number						265		6	8	9					28							nation of CBDM orga
	State	Anguilla	Antigua & Barbuda	Bahamas	Barbados	Belize	Cayman Islands	Dominica	Grenada	Guyana	Haiti	Jamaica	Montserrat	St. Kitts & Nevis	St. Lucia	St. Vincent & Grenadines	Trinidad & Tobago	Turks & Caicos Islands	Virgin Islands	(5) Regional summary by CDEMA	(6) Global summary by ISDR Secretariat	***Implemented" means completion of Formation of CBDM organization, Preparation of CBDMP, Establishment of early warning system and Preparation of
	Region	Caribbean	Region	(CDEMA	member	countries)														(5) Regional	(6) Global su	*"Implement

hazard maps.





Annex-3 Activities to Ensure Human Resources

1. NDO's leadership
2. CBDMP
A community facilitator
(1) Existence of resident community organization with strong leadership to:
(a) Establish CBDMP; and
(b) Integrate FEWS and FHM into the existing CBDMP
(2) Three (3) well-trusted community residents per community to be Community Disaster Response Team, who are capable of understanding FEWS and FHM
(3) Availability of National Trainers for community facilitating
3. FEWS
(1) Telecommunication Provider's cooperation (at Level 4 and higher)
(2) Monitoring personnel or Resident(s) who permanently observe water level of the upstream of the flood- prone rivers (At Level 3 and under)
(3) A hydrology technician to:
(a) plan location of the gauges
(b) maintain the equipment
(4) A hydrologist to analyze hydrological data
4. FHM
(1) 4-5 GPS Technicians
(2) A GIS technician
(3) A hydrologist qualiified in hydrological analysis





Annex-4 Activities to Ensure Institution

1. Overall R	Responsibilities
	1.1 Leading role in NT
	1.2 Coordination of stakeholders(maintenance)
	1.3 Coordination of stakeholders(new community)
	1.4 Addition of new stakeholder
	1.5 Arrange necessary budget measures
2. Commun	ity Disaster Management Plan (CDMP)
	2.1 Maintenance of established Balthazar system
	2.2 Arrange necessary budget for maintenance
	2.3 Application of CADM2 CDMP to other community
	2.4 Arrange necessary general budget for new application
	2.5 Arrange necessary budget for facilitator
3. Flood Ear	rly Warning System (FEWS)
	3.1 Maintenance of existing FEWS
	3.2 Improvement of existing FEWS
	3.3 General upkeep of monitoring stations
	3.4 Correlation analysis
	3.5 Telecommunication setup(existing)
	3.6 Coordination of stakeholders
	3.7 Arrange necessary budget for maintenance/improvement
	3.8 Selection of new target community
	3.9 Development of FEWS for new communities
	3.10 Collection of hydrological data for new communities
	3.11 Collection of geological data for new communities
	3.12 Correlation analysis for new communities
	3.13 Planning of FEWS for new communities
	3.14 Decision of specification of hydrological gauges
	3.15 Selection of installation sites of hydrological gauges
	3.16 Installation of hydrological gauges for new communities
	3.17 Operation & maintenance of new monitoring stations
	3.18 Operation & maintenance budget
	3.19 Monitoring of operation & maintenance works
	3.20 Arrangement of general budget for FEWS
4. Flood Ha	zard Map (FHM)
	4.1 Maintenance & improvement of developed FHM
	4.2 Selection of new target community
	4.3 Planning of FHM for new community
	4.4 Field investigation
	4.5 Preparation of hand drawn map
	4.6 Mapping of field investigation result





	4.7 Arrangement of necessary budget						
5. Hydro	5. Hydrological Database (HD)						
	5.1 General upkeep of existing monitoring stations						
	5.2 Data download						
	5.3 Data sharing						
	5.4 Monitoring of download works						
	5.5 Financial arrangement of data base system						





Annex-5 Conditions, Roles, Functions and Activities in Each Level of Activities

Each intervention is assumed to be made for a new community, while the NT utilizes their current capacity.

(1) CBDMP

- Community organization should exist to 1) establish CBDMP, and 2) integrate FEWS and FHM into the CBDMP.
- The expected costs would be the holding of community workshops to integrate FEWS and FHM in CBDMP, conducting evacuation drills, preparation of public awareness materials such as posters, flyers, and brochures.

(3) High-FEWS

- > Telecommunication equipment should be provided.
- > The gauge sites should be covered in the network system.
- > Automatic gauges for water level and rainfall gauges should be provided and installed.
- > Operation and maintenance of gauges should be conducted.
- Downloaded data on water levels and rainfall should be analyzed for upgrading the warning levels and the relationship between the water level and rainfall in the upstream basin and the water level at the target community.
- The expected costs would be the acquisition of equipment, equipment installation, installation of civil works, maintenance and user's fees.
- > NDO, CIMH and Hydro-met office should cooperate for the acquisition of gauges.
- Participation of community organizations to maintain water level and rainfall gauges at this stage is recommended. Agreement among Hydro-met, NDO and community-based organizations should be sought.

(4) High FHM

- > Hourly rainfall data should exist for the river basin of the target community.
- > Topographical map with necessary contour levels should be available.
- Rainfall probability analysis, runoff analysis and inundation analysis should be conducted.
- > Hydrologist qualified in doing the above analysis should be available.
- For verification of a prepared FHM, an incidental map should be prepared.





- For preparation of the incidental map, a field survey regarding the past flooding information should be conducted. This needs the use of GPS and accordingly a GPS technician with 4-5 sets of GPS and one computer are also needed.
- Expected costs would be for the GPS sets, a computer, GPS technicians, labor costs for conducting the field survey for collecting the past inundation situation, allowances and travel costs for a hydrologist to do the analysis if an in-house hydrologist is not available.
- At this time, a state needs the technical assistance of CIMH. The working agreement should include NDO, Hydro-met office, Land & Survey Dept. and CIMH.

(5) Mod FEWS

- Telecommunication equipment (cellular network & devices or radio communication) should be provided.
- Monitoring site and target community should be covered with the network of cellular phone or radio communication.
- > Automatic gauges for water level and rainfall should be provided and installed.
- A hydrologist should make a plan of the location of the gauges, maintain the gauges and make some hydrological analysis of the data.
- The expected costs would be for the acquisition of the gauges for water level and rainfall, and the installation of gauges including the civil works for installation.
- ➢ Hydro-met should secure the operation and maintenance of gauges and it should be in agreement with NDO.
- (6) Mod FHM
 - For preparation of an incidental map, a field survey regarding the past flooding information should be conducted. This needs the use of GPS and accordingly a GPS technician with 4-5 sets of GPS and one computer are needed.
 - Based on the collected data, the GIS technician prepares the incidental map by use of GIS software. Accordingly a GIS technician should be available.
 - The expected costs would be for 4-5 sets of GPS equipment, labor cost for conducting the field survey, and provision of GIS software.
 - > NDO and Land Survey Dept. should cooperate.

(7) Non-IT FEWS

Monitoring personnel should observe the water-level of the river nearby on 24/7 basis.



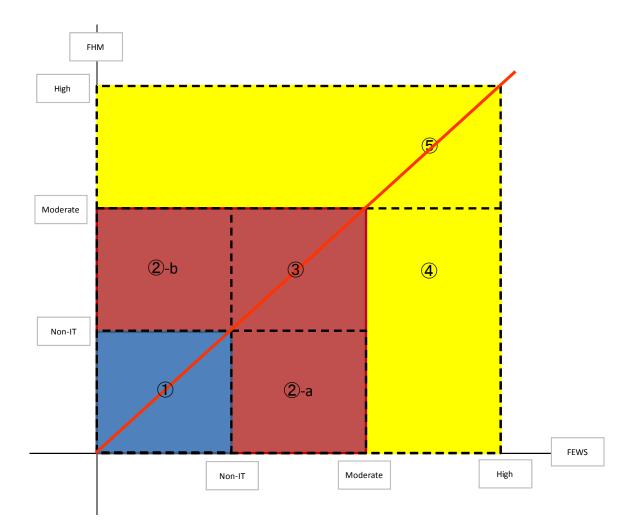


Local offices and entities such as schools, clinics, post offices, community development council, agro/fisheries coop, neighborhood organizations, mother's group and others should cooperate.

(8) Non-IT FHM

> All the activities are included in the activities of CBDMPP.

The above cases are schematically shown in the figure below:







Annex-6 Necessary Human Resources and Implementation Schedule for Each Item

(For Level 5)														
NDO's Overall Responsibility		1	2	3	4	5	6	7	8	9	10	11	12	M/M
	Coordination of stakeholders	\star												0.5
	Public Awareness for Disaster						-							0.5
	Risk Reduction						×							0.5
	To collect and keep the FHM to													
	become the depository of the					\star								0.2
CDDMD	FHM													
CBDMP	Training For Community Disaster													
	Response Team (CDRT)		\star											1.0
	Community facilitating for													
	CBDMP			×										1.0
	Integrating FEWS and FHM in												\star	0.2
	CBDMP													0.2
High-FEWS														
	Telecommunication equipment				\star									1.0
	(Cellular network & modem) Acquisition & installation of													
	Automatic gauge (water level &				\star									2.0
	rainfall)													2.0
	Hydrological analysis of										_			• •
	recorded data										×	×		2.0
	Maintenance of water level /					\star	\star	\star	+	\star	+	+	\star	
	rainfall gauges													
High-FHM (Probability Analysis)														
	Baseline Incidental Mapping							×						1.0
	(Existing Maps (Land & Survey						\star							0.2
	Dept) Needed)													
	Baseline data collection						\star							0.5
	Hourly rainfall data for the river													
	basin where community is							\mathbf{X}						0.5
	located (Hydro-Met) Topographical map with high													
	resolution(Land and Survey						\star							0.2
	Dept)													0.2
	Rainfall probability analysis							4						0.7
								X						0.7
	Run-off analysis							\star						0.7
	Inundation analysis in the target								+					1.0
	community								×					1.0
	GIS Calibration:													
	To calibrate the inundation								$\mathbf{\star}$					0.7
	calculation results with													
	incidental map	l	L		I	I	L	I						





(For Level 4)														
NDO's Overall Responsibility		1	2	3	4	5	6	7	8	9	10	11	12	M/M
	Coordination of stakeholders	×												0.5
	Public Awareness for Disaster Risk Reduction						\star							0.5
	To collect and keep the FHM to become the depository of the FHM					*								0.2
CBDMP														
	Training For Community Disaster Response Team (CDRT)		\star											1.0
	Community facilitating for CBDMP			\star										1.0
	Integrating FEWS and FHM in CBDMP												\star	0.2
High-FEWS														
	Telecommunication equipment (Cellular network & modem)				\star									1.0
	Acquisition & installation of Automatic gauge (water level & rainfall)				*	*								2.0
	Hydrological analysis of downloaded data										★	\star		2.0
	Maintenance of water level / rainfall gauges					\star	\star	\star	\star	\star	★	\star	\star	
Mod-FHM (GPS/GIS)														
	1. Baseline Incidental Mapping (Exsting Maps (Land & Survey Dpt) Needed						★							1.0
	2. GIS Mapping							×						0.5

(For Level 3)														
NDO's Overall Responsibility		1	2	3	4	5	6	7	8	9	10	11	12	M/M
	Coordination of stakeholders	×												0.5
	Public Awareness for Disaster						4							0.5
	Risk Reduction						×							0.5
	To collect and keep the FHM to													
	become the depository of the					X								0.2
	FHM													
CBDMP														
	Training For Community Disaster													1.0
	Response Team (CDRT)		×											1.0
	Community facilitating for			-										1.0
	CBDMP			×										1.0
	Integrating FEWS and FHM in								\checkmark					0.2
	CBDMP													0.2
Mod-FEWS														
	Telecommunication or Cable				4									1.0
	communication equipment				×									1.0
	Acquisition & installation of				+	+								2.0
	automatic gauge				×	×								2.0
	Opeeration of FEWS					*	*	*	*	$\mathbf{\star}$	*	*	*	
Mod-FHM (GPS/GIS)														
	1. Baseline Incidental Mapping													
	(Exsting Maps (Land & Survey						$\mathbf{\star}$							1.0
	Dpt) Needed													
	2. GIS Mapping							*						0.5
	1	I	I			I	I		I	I	I		I	





(For Level 2-a)														
NDO's Overall Responsibility		1	2	3	4	5	6	7	8	9	10	11	12	M/M
	Coordination of stakeholders	×												0.5
	Public Awareness for Disaster Risk Reduction						\star							0.5
	To collect and keep the FHM to become the depository of the FHM					*								0.2
CBDMP														
	Training For Community Disaster Response Team (CDRT)		\star											1.0
	Community facilitating for CBDMP			\star										1.0
	Integrating FEWS and FHM in CBDMP						\star							0.2
Mod-FEWS														
	Telecommunication or Cable communication equipment				\star									1.0
	Acquisition & installation of automatic gauge				★	\star								2.0
	Opeeration of FEWS				\star									
Non-IT FHM														
	(Included in CBDMP)													

(For Level 2-b)														
NDO's Overall Responsibility		1	2	3	4	5	6	7	8	9	10	11	12	M/M
	Coordination of stakeholders	×												0.5
	Public Awareness for Disaster Risk Reduction						\star							0.5
	To collect and keep the FHM to become the depository of the FHM					*								0.2
CBDMP														
	Training For Community Disaster Response Team (CDRT)		\star											1.0
	Community facilitating for CBDMP			\star										1.0
	Integrating FEWS and FHM in CBDMP							\star						0.2
NonIT FEWS														
	Telecommunication or Cable communication equipment				\star									1.0
	Acquisition & installation of automatic gauge				★	\star								2.0
	Opeeration of FEWS					*	*	*	*	*	*	*	*	
Mod-FHM														
	1. Baseline Incidental Mapping (Exisitng Maps (Land & Survey Dept) needed						★							1.0
	2. GIS Mapping							\star						0.5





(For Level 1)														
NDO's Overall Responsibility		1	2	3	4	5	6	7	8	9	10	11	12	M/M
	Coordination of stakeholders	×												0.5
	Public Awareness for Disaster Risk Reduction						\star							0.5
	To collect and keep the FHM to become the depository of the FHM					*								0.2
CBDMP														
	Training For Community Disaster Response Team (CDRT)		\star											1.0
	Community facilitating for CBDMP			★										1.0
	Integrating FEWS and FHM in CBDMP						\star							0.2
NonIT FEWS														
	Telecommunication or Cable communication equipment				★									1.0
	Acquisition & installation of automatic gauge				×	×								2.0
	Opeeration of FEWS					\star								
Non-IT FHM							· · · ·							
	(Included in CBDMP)													





Annex-7 Tasks and Duties of Each Activity

		Age	ncies	relat	ed to	CAI	DM2	
	NDO	Met Services	Survey & Mapping	Community	Red Cross	CIMH	DIGICEL	
1. Overall Responsibilities								
1.1 Leading role in NT	0							
1.2 Coordination of stakeholders(maintenance)	0							
1.3 Coordination of stakeholders(new community)	0							
1.4 Addition of new stakeholder	0							
1.5 Arrange necessary budget measures	0							
2. Community Disaster Management Plan (CDMP)								
2.1 Maintenance of established Balthazar system	0	0	0	0	0			
2.2 Arrange necessary budget for maintenance	0							
2.3 Application of CADM2 CDMP to other community	0	0	0	0	0			
2.4 Arrange necessary general budget for new application	0				0			
2.5 Arrange necessary budget for facilitator	0				0			
3. Flood Early Warning System (FEWS)								
3.1 Maintenance of existing FEWS	0	0		0	0		0	
3.2 Improvement of existing FEWS	0	0		0	0	0	0	
3.3 General upkeep of monitoring stations	0		0					
3.4 Correlation analysis	0	0	0			0		
3.5 Telecommunication setup(existing)	0	0				0	0	
3.6 Coordination of stakeholders	0							
3.7 Arrange necessary budget for maintenance/improvement	0	0						
3.8 Selection of new target community	0		0		0			
3.9 Development of FEWS for new communities	0	0			0		0	
3.10 Collection of hydrological data for new communities	0	0	0					
3.11 Collection of geological data for new communities	0		0		0			
3.12 Correlation analysis for new communities		0	0			0		
3.13 Planning of FEWS for new communities	0	0	0	0	0	0	0	
3.14 Decision of specification of hydrological gauges	0	0				0		
3.15 Selection of installation sites of hydrological gauges	0	0			0	0		
3.16 Installation of hydrological gauges for new communities	0	0			0	0	0	
3.17 Operation & maintenance of new monitoring stations	0	0						
3.18 Operation & maintenance budget	0	0					0	
3.19 Monitoring of operation & maintenance works	0							
3.20 Arrangement of general budget for FEWS	0							
4. Flood Hazard Map (FHM)								
4.1 Maintenance & improvement of developed FHM	0	0	0	0		0		
4.2 Selection of new target community	0		0	0	0			
4.3 Planning of FHM for new community	0	0	0	0	0	0		
4.4 Field investigation	0		0		0			
4.5 Preparation of hand drawn map	0				0			
4.6 Mapping of field investigation result	0		0					
4.7 Arrangement of necessary budget	0							





5. Hydrological Database (HD)						
5.1 General upkeep of existing monitoring stations	0	0		0		
5.2 Data download		0			0	
5.3 Data sharing		0			0	
5.4 Monitoring of download works					0	
5.5 Financial arrangement of data base system	0					





Annex-8 Progress Monitoring Matrix of Coverage of Flood Response Committee

State (Example)

Diale 1	DIALE (LAAIIIPIC)									
Ref #		Flood	Taroet	CBI	CBDMP	FE	FEWS	FHM	IM	
	Risk Level	vulnerable communities	Year	Status*	Partner	Status*	Partner	Status*	Partner	Completed
1	А	A	2011	Completed	JICA	Completed	JICA	Completed	JICA	2012
2	(2012-2015)	В	2015	Completed	Red Cross	Pipelined	Government	Pipelined	CDEMA- HIP	
3		С	2015	Pipelined	World Bank	Pipelined	World Bank	Pipelined	World Bank	
4		D	2015	Completed	Red Cross	Pipelined	Government	Pipelined	diAshi	
5		Е	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
9		F	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
7		G	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
8		Н	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
9		Ι	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
10		J	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
11	В	К	TBD	Completed	Red Cross	TBD	TBD	TBD	TBD	
12	(2015-)	L	TBD	Completed	Red Cross	TBD	TBD	TBD	TBD	
13		Μ	TBD	Completed	Red Cross	TBD	TBD	TBD	TBD	
14		Ν	TBD	Completed	Red Cross	TBD	TBD	TBD	TBD	
15		0	TBD	Completed	Red Cross	TBD	TBD	TBD	TBD	
16		d	TBD	Completed	Red Cross	TBD	TBD	TBD	TBD	
17		δ	TBD	Completed	Red Cross	TBD	TBD	TBD	TBD	
18		R	TBD	Completed	Red Cross	TBD	TBD	TBD	TBD	
19		S	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
20		Т	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
21		N	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
22		Λ	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
23		W	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
24		Х	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
25		Υ	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
26		Ζ	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
* Pipe	lined, Operation	* Pipelined. Operational. Completed. TBD: To		be determined						

* Pipelined, Operational, Completed, TBD: To be determined





Annex-9 Sustainability Plan Matrix

				Resources		
Level	DRR Components	Technical	Human Resources	Financial	Cost (US\$)	Institutional
5	NDO's overall responsibility	 Coordination of stakeholders 	1. NDO's leadership	In-kind (NDO and other NT members)	In-kind	NDO, Telecommunication providers, Hydro-met, Land Survey Dept. community-based organizations and
		2. To collect and keep the FHM to become the depositorv of the FHM		In-kind (NDO)	In-kind	UIVII SOCIETY NDO, community-based organizations and Civil Society
		 Public Awareness for Disaster Risk Reduction 		Printing Costs for posters, brochures, etc	US\$725	NDO
	CBDMP	1. Training For Community Disaster Response Team (CDRT)	Three (3) well-trusted community residents per community to be facilitators, who are capable of understanding FEWS and FHM	Costs for training CDRT	US\$1,500	NDO, community-based organizations and Civil Society
	_	2. Community facilitating	Availability of National Trainers for community facilitating	Costs for community facilitating	US\$3,000	NDO, community-based organizations and Civil Society
	_	3. Integrating FEWS and FHM in CBDMP	1. Existence of resident community organization to:			NDO, Hydro-Met, Community-based Organization and Civil Society
			(1) Establish CBDMP; and	Costs for community workshop to integrate FEWS and FHM in CBDMP	US\$400	
			(2) Integrate FEWS and FHM into the existing CBDMP	Costs for Full Scale evacuation exercise	US\$1,500	
			2. Strong community leadership	In-kind	In-kind	
	High-FEWS (CADM2)	Telecommunication equipment (Cellular network & modem)	Telecommunication Provider's cooperation	 Acquisition and Installation Costs for Equipment 	US\$2,000	For Warning Telecommunication: NDO, Telecommunication providers, Hydro-met, community-based
				2. Maintenance & User's Fees (per year)	US\$2,400	organizations and Civil Society
		Acquisition & installation of Automatic gauge (water level & rainfall)	A hydrologist to:	1. Acquisition Costs for Automatic gauge		NDO, CIMH and Hydro-Met
			(1) plan location of the gauges(2) maintain the equipment	- Water Level - Rainfall	US\$5,400 US\$4,600	
			(3) Analyze hydrological data (CIMH)	2. Installation costs for Automatic gauge	US\$14,000	
				3. Labor costs to source a hydrologist (in-kind)	In-kind	
		Maintenance of water level / rainfall gauges		Maintenance costs of water-level gauges and rainfall gauges (per vear)	US\$2,400	Hydro-met, the NDO and community- based organizations
•	High-FHM (Probability Analysis)	1. Baseline Incidental Mapping	4-5 GPS Technicians in a country	1. 4-5 Sets of GPS devices and a computer in a country	US\$3,500	NDO, Land, Survey Dept., Community Organizations and Civil Society

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	US\$4,800 Dept. and CIMH, UWI Dept. and CIMH, UWI	NDO, Hydro-Met and Land and Survey Dept.	
US\$1,000	US\$4,800		US\$45,225
2. Labor costs for GPS technicians per community work	Allowance and Travel costs for a hydrology expert (Labor Costs are in-kind Cooperation from CIMH & UWI	In-kind (Land and Survey Dept)	
	A hydrologist qualified in hydrological analysis	GIS Technicians	ts for the Level 5 Package
(Existing Maps (Land & Survey Dept) Needed)	 Baseline data collection Hourly rainfall data for the river basin where community is located (Hydro- Met) Topographical map with high resolution(Land and Survey Dept) Rainfall probability analysis Run-off analysis fundation analysis in the target community 	 GIS Calibration: To calibrate the inundation calculation results with 	Estimated Total Costs for the





				Resources		
Level	DRR Components	Technical	Human Resources	Financial (US\$)	Cost (US\$)	Institutional
4	NDO's overall responsibility	 Coordination of stakeholders 	1. NDO's leadership	In-kind (NDO and other NT members)	In-kind	NDO, Telecommunication providers, Hydro-met, Land Survey Dept., community-based organizations and Civil Society
		2. To collect and keep the FHM to become the depository of the FHM		In-kind (NDO)	In-kind	NDO, community-based organizations and Civil Society
		3. Public Awareness for Disaster Risk Reduction		Printing Costs for posters, brochures, etc	US\$725	OQN
	CBDMP	1. Training For Community Disaster Response Team (CDRT)	Three (3) well-trusted community residents per community to be facilitators, who are capable of understanding FEWS and FHM	Costs for training CDRT	US\$1,500	NDO, community-based organizations and Civil Society
		2. Community facilitating	Availability of National Trainers for community facilitating	Costs for community facilitating	US\$3,000	NDO, community-based organizations and Civil Society
		3. Integrating FEWS and FHM in CBDMP	 Existence of resident community organization to: 			NDO, Hydro-Met, Community-based Organization and Civil Society
			(1) Establish CBDMP; and	Costs for community workshop to integrate FEWS and FHM in CBDMP	US\$400	
			(2) Integrate FEWS and FHM into the existing CBDMP	Costs for Full Scale evacuation exercise	US\$1,500	
			2. Strong community leadership	In-kind	In-kind	In-kind
	High-FEWS (CADM2)	Telecommunication equipment (Cellular network & modem)	Telecommunication Provider's cooperation	 Acquisition and Installation Costs for Equipment 	US\$2,000	For Warning Telecommunication: NDO, Telecommunication providers, Hydro-met, community-based
				2. Maintenance & User's Fees (per year)	US\$2,400	organizations and Civil Society
		Acquisition & installation of Automatic gauge (water level & rainfall)	A hydrologist to:	1. Acquisition Costs for Automatic gauge		NDO, CIMH and Hydro-Met
		~	(1) plan location of the gauges	- Water Level	US\$5,400	
			(2) maintain the equipment	- Rainfall	US\$4,600	
			(5) Anaryze nyurological data (CIMIH)	2. Installation costs 107 Automatic gauge	US\$14,000	
				3. Labor costs to source a hydrologist (in-kind)	In-kind	
				Maintenance costs of		
				water-level gauges and rainfall gauges (per year)	US\$2,400	
	Mod-FHM (GPS/GIS)	 Baseline Incidental Mapping 	4-5 GPS Technicians in a country	1. 4-5 Sets of GPS devices and a computer	US\$3,500	NDO, Land, Survey Dept., Community Organizations and Civil Society
	~)		in a country)





				Vesoul ces		
Level	DRR Components	Technical	Human Resources	Financial (US\$) Cost (US\$)	Cost (US\$)	Institutional
		(Existing Maps (Land &		2. Labor costs for GPS		
		Survey Dept) Needed)		technicians per	US\$1,000	
				community work		
		2. GIS Mapping	1 GIS Technician	1. GIS Software (in-kind)	In-kind	In-kind NDO, Land and Survey Dept.
				2. Labor costs for a GIS	In bind	
				technician (in-kind)		
		Estimated Total Costs for t	osts for the Level 4 Package		US\$40,425	





				Resources		
Level	DRR Components	Technical	Human Resources	Financial (US\$)	Cost (US\$)	Institutional
ĸ	NDO's overall responsibility	1. Coordination of stakeholders	1. NDO's leadership	In-kind (NDO and other NT members)	In-kind	NDO, Telecommunication providers, Hydro-met, Land Survey Dept, community-based organizations and Civil Society
		 To collect and keep the FHM to become the depository of the FHM 		In-kind (NDO)	In-kind	NDO, community-based organizations and Civil Society
		3. Public Awareness for Disaster Risk Reduction		Printing Costs for posters, brochures, etc	US\$725	NDO
	CBDMP	1. Training For Community Disaster Response Team (CDRT)	Three (3) well-trusted community residents per community to be facilitators, who are capable of understanding FEWS and FHM	Costs for training CDRT	US\$1,500	NDO, community-based organizations and Civil Society
		acilitatin	Availability of National Trainers for community facilitating	Costs for community facilitating	US\$3,000	NDO, community-based organizations and Civil Society
		3. Integrating FEWS and FHM in CBDMP	 Existence of resident community organization to: 			NDO, Hydro-Met, Community-based Organization and Civil Society
		4. Terrain condition: conducive terrain for community communication within the community	(1) Establish CBDMP, and	Costs for community workshop to integrate FEWS and FHM in CBDMP	US\$400	
			(2) Integrate FEWS and FHM into the existing CBDMP	Costs for Full Scale evacuation exercise	US\$1,500	
			2. Strong community leadership	In-kind	In-kind	Community-based organizations
	Mod-FEWS	1. Telecommunication or Cable communication equipment		1. Acquisition Costs for Equipment		NDOS, Hydro-met and community- based organizations, Civil Society (and Telecommunication providers)
				 In case telecommunication is available: Telecommunication Units & Devices (Cellular Phones & SIM connections) 	US\$800	for warning telecommunication
				(i) Maintenance & User's Fees (per year)	US\$2,400	
				OR (2) Radio Communication Devices	US\$400	
		2 Acquisition & installation of Automatic gauge	A hydrologist to: (1) plan location of the gauges (2) maintain the equipment (3) Analyze hydrological data	1. Acquisition Costs for Automatic gauge		NDO, CIMH and Hydro-Met
			•	- Water Level \$ - Rainfall \$	US\$400 US\$400	
				2. Installation costs for Automatic gauge	US\$6,000	
				3. Labor costs to source a hydrologist (in-kind)	In-kind	

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				Resources		
Level	DRR Components	Technical	Human Resources	Financial (US\$)	Cost (US\$)	Institutional
		3. Operation of FEWS	(1) Mechanical maintenance of	Mechanical maintenance of		NDO and Hydro-Met
			water-level gauges and rainfall	water-level gauges and rainfall	US\$600	
			gauges	gauges per year		
			(4) Monitoring and operational	Four (4) units of Personnel on		NDO and Hydro-Met(Community-
			personnel on site	site on 24/7 basis per year (7		based Organization and Civil Society,
				months a year)		if available)
				OR		
					115 000 000	
				2. Equivalent Allowance or	000,82420	
				Oraunity for restuents (per year)		
				OR		
				3. In-kind cooperation of the		
				residents		
	Mod-FHM	1. Baseline Incidental	4-5 GPS Technicians in a country	1. 4-5 Sets of GPS devices and a	11583 500	NDO, Land, Survey Dept.,
	(GPS/GIS)	Mapping		computer in a country	000,0400	Community Organizations and Civil
		(Existing Maps (Land &		2. Labor costs for GPS	000 13511	Society
		Survey Dept) Needed)		technicians per community work	000,1460	
		2. GIS Mapping	1 GIS Technician	1. GIS Software (in-kind)	In-kind	NDO, Land and Survey Dept.
				2. Labor costs for a GIS	In-kind	
				technician (in-kind)		
		Estimated Total Costs for the Level 3 Package	he Level 3 Package		US\$50,625	
			Q		<i>(</i> .	





				Resources		
Level	DRR Components	Technical	Human Resources	Financial (US\$)	Cost (US\$)	Institutional
2-b	NDO's overall responsibility	1. Coordination of stakeholders	1. NDO's leadership	In-kind (NDO and other NT members)	In-kind	NDO, Land and Survey Dept., Community-based organizations and Civil Society
		2. To collect and keep the FHM to become the depository of the FHM		In-kind (NDO)	In-kind	
		3. Public Awareness for Disaster Risk Reduction		Printing Costs for posters, brochures, etc	US\$725	
	CBDMP	1. Training For Community Disaster Response Team (CDRT)	Three (3) well-trusted community residents per community to be facilitators, who are capable of understanding FEWS and FHM	Costs for training CDRT	US\$1,500	NDO and Community-based Organization, Civil Society and Land Survey Dept.
		2. Community facilitating	Availability of National Trainers for community facilitating	Costs for community facilitating	US\$3,000	
		3. Integrating FEWS and FHM in CBDMP	 Existence of resident community organization to: 			
			(1) Establish CBDMP; and	Costs for		
		 Terrain condition: conducive terrain for community communication within the 		community workshop to integrate FEWS	US\$400	
		community		and FHM in CBDMP		
			(2) Integrate FEWS and FHM into the existing CBDMP	Costs for Full Scale evacuation exercise	US\$1,500	
			2. Strong community leadership	In-kind	In-kind	
	Non-IT FEWS	1. Establishing Standard of	CDRT	Costs for		NDO, Community-based organizations and Civil
		Protocols in Early Warning System within the target community		community facilitation	US\$200	Society
		2. Operation of FEWS	Monitoring personnel or Resident(s)	1. Monitoring		1. Cooperating Local Offices or entities such as
			of the upstream of the flood-prone	bersonner on 2477 basis		ro/fisheries coop, neighborh
			rivers	OR		organizations, mother's group, etc 2. Resident(s) who reside near the upstream of the flood-prone rivers
				2. Equivalent Allowance or Gratuity for	US\$14,000	
				ICSIACIUS		
				3. In-kind		
				residents		

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				Resources		
Level	DRR Components	Technical	Human Resources	Financial (US\$)	Cost (US\$)	Institutional
		3. Terrain condition must be				
		considered: conducive terrain for				
		community communication				
		within the community				
	Mod-FHM	1. Baseline Incidental Mapping	4-5 GPS Technicians in a country	1. 4-5 Sets of GPS		NDO, Land, Survey Dept., Community Organizations
	(GPS/GIS)			devices and a	115 \$3 500	and Civil Society
				computer in a		
				country		
		(Existing Maps (Land & Survey		Labor costs for		
		Dept) Needed)		GPS technicians	115 \$1 000	
				per community	000,1460	
-				work		
		2. GIS Mapping	1 GIS Technician	1. GIS Software	In bind	NDO, Land and Survey Dept.
				(in-kind)		
				2. Labor costs for a		
				GIS technician (in-	In-kind	
				kind)		
		Estimated Total Costs for the Level 2-b Package	vel 2-b Package		US\$25,825	





		T1T		Resources	COLD T-D	T1	
-	DKK COMPONENTS	I ecnnical	Human Kesources	FINANCIAL (UDD)	(¢C) 150)	Insuuuonal	
	NDO's overall responsibility	 Coordination of stakeholders 	1. NDO's leadership	In-kind (NDO and other NT members)	In-kind	NDO, Community-based organizations and Civil Society	
		2. To collect and keep the FHM to become the		In-kind (NDO)	In-kind		
		depository of the FHM					
		3. Public Awareness for Disaster Risk Reduction		Printing Costs for posters, brochures, etc	US\$725		
	CBDMP	1. Training For Community Disaster Response Team (CDRT)	Three (3) well-trusted community residents per community to be facilitators, who are capable of	Costs for training CDRT	US\$1,500	NDO and Community-based Organization, Civil Society and Land Survey Dept.	
		2. Community facilitating	understanding FEWS and FHM Availability of National Trainers for community facilitating	Costs for community facilitating	US\$3,000		
		3. Integrating FEWS and FHM in CBDMP	1. Existence of resident community organization to:				
			(1) Establish CBDMP; and	Costs for community workshop to integrate FEWS and FHM in CBDMP	US\$400		
			(2) Integrate FEWS and FHM into the existing CBDMP	Costs for Full Scale evacuation exercise	US\$1,500		
		4. Terrain condition:	2. Strong community leadership				
		conducive terrain for community communication within the community		In-kind	In-kind		
	Mod-FEWS	1. Telecommunication or Cable communication equipment		1. Acquisition Costs for Equipment		NDOs, Hydro-met and community-based organizations, Civil Society (and Telecommunication providers) for	
		4		(1) In case telecommunication is		warning telecommunication	
				available: Telecommunication Units & Devices (Cellular Phones & SIM	US\$800		
				connections)			
				(i) Maintenance & User's Fees (per	US\$2.400		
			·	year) OR			
				(2) Radio Communication Devices	US\$400		
		2 Acquisition & installation of Automatic gauge	A hydrologist to: (1) plan location of the gauges (2) maintain the equipment (3) Analyze hydrological data	1. Acquisition Costs for Automatic gauge		NDO, CIMH and Hydro-Met	
				- Water Level	US\$400		
			<u> </u>	- Rainfall	US\$400		
				 Installation costs for Automatic gauge 	US\$6,000		
				3. Labor costs to source a hydrologist (in-kind)	In-kind		
	_	_	_	/ / / / was / was			-





				Kesources			-
Level	DRR Components	Technical	Human Resources	Financial (US\$)	Cost (US\$)	Institutional	
		3. Operation of FEWS	(1) Mechanical maintenance of water-	Mechanical maintenance of water-		NDO and Hydro-Met	
			level gauges and rainfall gauges	level gauges and rainfall gauges per	US\$600		
				year			
			(2) Monitoring and operational 1. Four (4) units of Personnel on	1. Four (4) units of Personnel on		NDO and Hydro-Met(Community-based	
			personnel on site	site on 24/7 basis per year (7		Organization and Civil Society, if	
				months a year)		available)	
				OR			
				2. Equivalent Allowance or Gratuity US\$28,000	US\$28,000		
				for residents (per year)			
				OR			
				3. In-kind cooperation of the			
				residents			
	Non-IT FHM	Included in CBDMP	See CBDMP	See CBDMP	U\$\$0	See CBDMP	
		Estimated Total Costs for th	he Level 2-a Package		US\$46,125		
							1





				Resources		
Level	DRR Components	Technical	Human Resources	Financial (US\$)	Cost (US\$)	Institutional
1	NDO's overall responsibility	1. Coordination of stakeholders	1. NDO's leadership	In-kind (NDO and other NT members)	In-kind	NDO, Land and Survey Dept., Community- based organizations and Civil Society
		2. To collect and keep the FHM to become the depository of the FHM		In-kind (NDO)	In-kind	
		3. Public Awareness for Disaster Risk Reduction		Printing Costs for posters, brochures, etc	US\$725	
	CBDMP	 Training For Community Disaster Response Team (CDRT) 	Three (3) well-trusted community residents per community to be facilitators, who are capable of understanding FEWS and FHM	Costs for training CDRT	US\$1,500	NDO and Community-based Organization, Civil Society and Land Survey Dept.
		2. Community facilitating	Availability of National Trainers for community facilitating	Costs for community facilitating	US\$3,000	
		3. Integrating FEWS and FHM in CBDMP	1. Existence of resident community organization to:			
			(1) Establish CBDMP; and	Costs for community		
				workshop to integrate FEWS and FHM in CBDMP	US\$400	
			(2) Integrate FEWS and FHM into the existing CBDMP	Costs for Full Scale evacuation exercise	US\$1,500	
		4. Terrain condition: conducive	2. Strong community leadership			
		terrain for community communication within the community		In-kind	In-kind	
	Non-IT FEWS	1. Establishing Standard of Protocols in Early Warning System within the target community	CDRT	Costs for community facilitation	US\$200	NDO, Community-based organizations and Civil Society
		 Operation of HEWS Terrain condition must be considered: conducive terrain for community communication 	Monitoring personnel or Resident(s) who permanently observe water level of the upstream of the flood-prone rivers	 Monitoring personnel on 24/7 basis (per year) OR 		 Cooperating Local Offices or entities such as school, clinic, post office, community development council, agro/fisheries coop, neighborhood organizations, mother's group,
		within the community		 Equivalent Allowance or Gratuity for residents (per year) 	US\$14,000	etc 2. Resident(s) who reside near the upstream of the flood-prone rivers
				3. In-kind cooperation of the residents		
	Non-IT FHM	Included in CBDMP	See CBDMP	See CBDMP	US\$0	See CBDMP
		Estimated Total Costs for the Level 1 Package	vel 1 Package		US\$21,325	

付属資料 3: パイロット国での NT システム覚書 (MOU)

DRAFT MEMORANDUM OF UNDERSTANDING AMONG NATIONAL TEAM OF BELIZE ON INSTITUTIONALIZATION OF NATIONAL TEAM OF CARIBBEAN DISASTER MANAGEMENT PROJECT PHASE 2

CDEMA (the Caribbean Disaster Emergency Management Agency) implemented the Caribbean Disaster Management Project Phase 2 from January 2009 to June 2012, with the contribution of the regional team comprised of CDEMA, Caribbean Institute for Meteorology and Hydrology, the University of the West Indies, and the University of Guyana. During the project term, the 3 outputs of community-based disaster management planning, establishing flood early warning system, and the flood hazard mapping were developed.

This Memorandum of Understanding (hereinafter referred to as MOU) is to define tasks and responsibilities of each organization in Caribbean Disaster Management Project Phase 2 (hereinafter referred to as CADM2) in order to sustain the established Flood Early Warning System (hereinafter referred to as FEWS) and Community Disaster Management Plan (hereinafter referred to as CDMP), and to maintain the developed Flood Hazard Map (hereinafter referred to as FHM) for the Crooked Tree Community and Hydrological Database.

This MOU also aims to apply the CADM2 initiative to other flood vulnerable areas in Belize in the future.

National Team (hereinafter referred to as NT) and Japan International Cooperation Agency (hereinafter referred to as JICA) have agreed with the matters referred to in the documents attached hereto.

DATE: June xx, 2012 PLACE: Belmopan, Belize Witness Japan International Cooperation Agency For National Emergency Management Organization, Belize

Cosigners:

Rep. of National Meteorological Service (Met Service)

Rep. of Land Information Center (LIC)

Rep. of National Association of Village Council (NAVCO)

Rep. of the Crooked Tree Community

Rep. of Belize Red Cross Society (BRC)

Rep. of Caribbean Institute for Meteorology and Hydrology (CIMH)

Rep. of Belize Telemedia Limited (DIGICELL)

Attached Documents

1. Attachment

2. Progress Monitoring Matrix of Coverage of Flood Disaster Management

Attachment

Overall Responsibilities of National Emergency Management Organization

National Emergency Management Organization (hereinafter referred to as NEMO) has played a leading role in the CADM2 by coordinating with the stakeholders, especially, National Meteorological Service (hereinafter referred to as Met Service), Land Information Center (hereinafter referred to as LIC), National Association of Village Council (hereinafter referred to as NAVCO), the Crooked Tree Community, Belize Red Cross Society (hereinafter referred to as BRC) and Belize Telemedia Limited (hereinafter referred to as DIGICELL). Upon sustaining the system which has been built during the CADM2 Project, NEMO will be responsible for coordinating with the stakeholders related to maintaining and expanding of the system. NEMO will consider holding periodical and emergency NT meeting. If necessary, the NEMO will positively consider adding a new organization or an entity to the system. NEMO will take the leading role in securing necessary budget arrangement for maintaining the established system and expanding of the system to other areas in Belize.

Community Disaster Management Plan (CDMP)

(1) Maintenance of the established Corinth Community Disaster Management System NEMO, BRC, the Crooked Tree Community, Met Service, LIC, NAVCO and DIGICELL have agreed to maintain CDMP as well as FEWS and FHM and in case of necessity, they will refer to CADM2 Community Disaster Management Planning Manual. That is, NEMO will take charge of maintenance and renewal of FEWS, and LIC will take charge of maintenance and renewal of FHM. In order to sustain CDMP at the Crooked Tree Community, NEMO will consult with BRC and the Crooked Tree Community about practical methods such as periodical drill, joint meeting and civic education. NEMO will take the lead in securing necessary budget for sustaining these activities.

(2) Application of CADM2 CDMP to other Communities

NEMO, NAVCO and BRC will collaborate in implementation of CDMP to other communities as indicated in the attached "Progress Monitoring Matrix of Coverage of Flood Disaster Management". In this joint operation, CADM2 Community Disaster Management Planning Manual shall be followed. After going through discussion with NEMO, Met Service will take charge of FEWS, and LIC will take charge of FHM.

In case mobilization of outside facilitator is necessary to carry out whole CDMP program, NEMO and BRC will discuss and formulate budget arrangement.

Flood Early Warning System (FEWS)

(1) Maintenance and improvement of existing FEWS

Established FEWS by CADM2 is a pilot system that is to be maintained and improved by the NEMO, NAVCO, Met Service, the Crooked Tree Community, BRC and DIGICELL. Met Service will frequently check the conditions of the monitoring stations and periodically download the hydrological data from the stations. Met Service will maintain general upkeep of the monitoring stations. If any repair or replacement is required, Met Service will notify NEMO immediately and identify cost effective solutions.

The correlation analysis among the stations should include the use of graphics so that relatively easy comparison can be made. The correlation analysis should be made every year after the rainfall season or just after flood event. The information determined from the analysis should be used to update the flood early warning system. Met Service will conduct the correlation analysis either every year or after major flood events.

If the problem is related to the communication setup at the stations, NEMO will invite DIGICELL, the service provider for consultation and a solution.

DIGICELL will consider providing a special privileged package for CADM2 stations to facilitate transmission of alerts. NEMO and concerned stakeholders are urged to investigate a sustainable mechanism for payment of charges related to use of the transmission facility.

The water depth warning levels usually consist of 3 levels. In many cases, they are the caution level, warning level and the evacuation level. The decision of revising warning levels will be done by NEMO, Met Service and the Crooked Tree Community. If necessary, NEMO will invite Caribbean Institute for Meteorology and Hydrology (hereinafter referred to as CIMH) to participate in the process.

NEMO will be responsible to coordinate with all the stakeholders in keeping CADM2 FEWS operational and in securing necessary budget arrangement.

(2) Development of new FEWS at other communities

While NEMO will take the lead role in the operations, NEMO, Met Service, DIGICELL and BRC will make united efforts in selecting new target community.

NEMO will be responsible in securing necessary budget arrangement.

(3) Collection of Necessary Data and Material about new target community

Met Service will be responsible for collecting hydrological data such as rainfall data and water-level data.

LIC will collect or provide geological data of the river basin and DEM data as much as possible. LIC will provide NEMO and BRC of the collected data.

(4) Methodology of Estimate of Flood Information for new community

The correlation analysis should be made every year after the rainfall season or just after the one flooding event. Then the early flood warning system will be updated. Met Service will conduct correlations analysis. NEMO will consider inviting CIMH to participate in the process if necessary.

(5)Establishing Hydrological Observation Network for New Communities

NEMO will invite all stakeholders including BRC and the representative from the new community and hold meetings in order to establish hydrological observation network. Met Service will install rainfall and water-level gauges in the new river basin. NEMO will consider inviting CIMH to participate in the process if necessary.

(6) Specifications of Rainfall Gauge for new community

Met Service will study specifications of rainfall gauge and decide it. NEMO will consider inviting CIMH to participate in the process if necessary.

(7)Specifications of Water-level Gauge for new community

Met Service will study specifications of rainfall gauge and decide it. NEMO will consider inviting CIMH to participate in the process if necessary.

(8) Selection of Locations of Hydrological Gauges Installation for new communities Met Service in consultation with CIMH will conduct hydrological analysis and decide the locations of installation of hydrological gauges for the network. NEMO will inform of the locations to BRC and the community.

(9) Decision of Warning Levels for New Communities

Met Service will analyze and decide warning levels. NEMO will consider inviting CIMH to participate in the process if necessary. NEMO will share the established warning levels with BRC and the community.

(10) Operation and Maintenance of Gauges for New Communities

Met Service will be responsible for periodical inspection, download the record, exchange the battery and other spare parts of the gauge and analysis of the downloaded records, and necessary cost expenditure. NEMO will monitor the operation and maintenance works. NEMO will consider getting close cooperation from the community for appropriate operation and maintenance of the gauges.

(11) Procedural Part

Met Service will conduct the hydrological analysis jointly with technical assistance of CIMH.

(12) Preparatory Stage

NEMO will hold community hearings to share the needs of the community and planned FEWS. NEMO will invite BRC to the hearings. NEMO will coordinate to establish an optimum FEWS for the community.

(13) Flow of Information

Met Service will estimate the flood water-level at the community and the flood arrival time to the community. NEMO will invite CIMH to participate in the process if necessary.

NEMO will invite all stakeholders to discuss and establish information flow framework based on CADM2 manuals.

Flood Hazard Map (FHM)

(1) Selection of Target Community

NEMO will take the initiative in coordinating Met Service, LIC, the Crooked Tree Community and BRC in selection of new target communities which suffer from habitual floods. BRC will collaborate with NEMO in selecting new target communities.

NEMO in collaboration with BRC has created the attached "Progress Monitoring Matrix of Coverage of Flood Disaster Management" that indicates future target communities.

NEMO noted that this is an important database in conducting flood risk reduction management service. NEMO will review, revise and maintain this matrix in collaboration with all concerned stakeholders from now on.

(2) Maintenance and improvement of developed FHM for Bathe Estate Community

NEMO will take the lead in maintenance and improvement of developed FEWS.

When it will become necessary to improve the existing FHM, NEMO, Met Service, LIC and the Crooked Tree Community will discuss procedure including the scope of work each party will undertake and timeframe for completion of each action. CIMH will consider taking part in the process when invited by NEMO. NEMO will monitor the whole progress.

NEMO will be responsible in securing necessary budget arrangement.

(3) Development of new FHM

NEMO will convene a task force meeting. The task force meeting will consist of NEMO, Met Service, LIC, BRC and the Crooked Tree Community. NEMO will invite CIMH to participate in the meeting if its contribution deemed important.

The task force will decide the kind of FHM, namely FHM through hydrological analysis, FHM of incidental map through field investigation or hand-drawn FHM through finding the capacity by holding community meeting.

In CADM2, FHMs were prepared partly through hydrological analysis and partly through field investigation depending on the availability of necessary map resolution. These are prepared with the support of CIMH. In consideration of the present situation regarding the availability of maps, human resources and financial resources of CDEMA Participating States, incidental maps or hand-drawn maps developed through community meetings are viewed as appropriate. NEMO will be responsible in securing necessary budget arrangement.

(4) Field investigation for new FHM

Field investigation needs to be conducted in order to develop new FHM. The goals are to collect the data on the locations and the inundation depths at locations in inundated area in the past target flood. This may include the need for surveyed river cross-sections. A GPS will be required to accurately collect geospatial information. Met Service and LIC will provide the GPS equipment. In case of using hand-drawn map, BRC will take the lead and share the result with NEMO.

(5) Mapping of field investigation results

Mapping of field investigation results needs GIS technology for preparation of FHM. LIC will plot field investigation results on a map using a GIS approach.

Hydrological Database

Met Service will conduct data download periodically from the existing hydrological stations at Isabella Bank (water level gauge), Big Falls (water level gauge), Banana Banks (water level gauge) and Sta. Familia (water level and rain gauge). Data will be shared with CIMH. CIMH will monitor the frequency of data download by Met Service.

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Progress Monitoring Matrix of Coverage of Flood Disaster Management (Draft)

TBN: To be named - Where does the GoS implement the projects? - Where is HIP fund used? - Where has RC been operational?

DRAFT MEMORANDUM OF UNDERSTANDING AMONG NATIONAL TEAM OF DOMINIA ON INSTITUTIONALIZATION OF NATIONAL TEAM OF CARIBBEAN DISASTER MANAGEMENT PROJECT PHASE 2

CDEMA (the Caribbean Disaster Emergency Management Agency) implemented the Caribbean Disaster Management Project Phase 2 from January 2009 to June 2012, with the contribution of the regional team comprised of CDEMA, Caribbean Institute for Meteorology and Hydrology, the University of the West Indies, and the University of Guyana. During the project term, the 3 outputs of community-based disaster management planning, establishing flood early warning system, and the flood hazard mapping were developed.

This Memorandum of Understanding (hereinafter referred to as MOU) is to define tasks and responsibilities of each organization in Caribbean Disaster Management Project Phase 2 (hereinafter referred to as CADM2) in order to sustain the established Flood Early Warning System (hereinafter referred to as FEWS) and Community Disaster Management Plan (hereinafter referred to as CDMP), and to maintain the developed Flood Hazard Map (hereinafter referred to as FHM) for Bath Estate Community and Hydrological Database.

This MOU also aims to apply the CADM2 initiative to other flood vulnerable areas in Dominica in the future.

National Team (hereinafter referred to as NT) have agreed with the matters referred to in the documents attached hereto.

DATE: , 2012 PLACE: Roseau, Dominica Witness Japan International Cooperation Agency For Office of Disaster Management, Dominica

Cosigners:

Rep. of Meteorological Services

Rep. of Dominica Lands and Surveys Division

Rep. of Bath Estate Community

Rep. of Dominica Red Cross Society

Rep. of Caribbean Institute for Meteorology and Hydrology (CIMH)

Rep. of LIME/DIGICEL

Attached Documents

1. Attachment

2. Progress Monitoring Matrix of Coverage of Flood Disaster Management

Attachment

Office of Disaster Management's Overall Responsibilities

Office of Disaster Management (hereinafter referred to as ODM) has played a leading role in the CADM2 by coordinating with the stakeholders, especially, the Meteorological Services, the Lands and Survey Division, the Bath Estate Community, Dominica Red Cross Society and LIM/DIGICEL. Upon sustaining the system which has been built during the CADM2, ODM will be responsible for coordinating with the stakeholders related to maintaining and expanding the system. ODM will consider holding periodical and emergency NT meeting. If necessary, the ODM will positively consider adding a new organization or an entity to the system. ODM will take the leading role in securing necessary budget arrangement for maintaining the established system and expanding of the system to other areas in Dominica.

Community Disaster Management Plan (CDMP)

(1) Maintenance of the established Bath Estate Community Disaster Management System

ODM, Dominica Red Cross Society, Bath Estate Community, Meteorological Services and the Lands and Surveys Division have agreed to maintain CDMP as well as FEWS and FHM and in case of necessity, they will refer to CADM2 Community Disaster Management Planning Manual. That is, ODM will take charge of maintenance and renewal of FEWS, and Lands and Surveys Division will take charge of maintenance and renewal of FHM. In order to sustain CDMP at Bathe Estate Community, ODM will consult with Dominica Red Cross Society and Bath Estate Community about practical methods such as periodical drill, joint meeting and civic education. ODM will take the lead in securing necessary budget for sustaining these activities.

(2) Application of CADM2 CDMP to other Communities

ODM and Dominica Red Cross Society will collaborate in implementation of CDMP to other communities as indicated attached "Progress Monitoring Matrix of Coverage of Flood Disaster Management". In this joint operation, CADM2 Community Disaster Management Planning Manual shall be followed. After going through discussion with ODM, Meteorological Services will take charge of FEWS, and Lands and Surveys Division will take charge of FHM.

In case mobilization of outside facilitator is necessary to carry out whole CDMP program, ODM and Dominica Red Cross will discuss and formulate budget arrangement.

Flood Early Warning System (FEWS)

(1) Maintenance and improvement of existing FEWS

Established FEWS by CADM2 is a pilot system that is to be maintained and improved by the ODM, LIME/DIGICEL, Meteorological Services and Bathe Estate Community and Dominica Red Cross Society. Meteorological Services will frequently check the conditions of the monitoring stations and periodically download the hydrological data from the stations. Meteorological Services will maintain general upkeep of the monitoring stations. If any repair or replacement is required, Meteorological Services will notify ODM immediately and identify cost effective solutions.

The correlation analysis among the stations should include the use of graphics so that relatively easy comparison can be made. The correlation analysis should be made every year after the rainfall season or just after flood event. The information determined from the analysis should be used to update the flood early warning system. Meteorological Services will conduct the correlation analysis either every year or after major flood events.

If the problem is related to the communication setup at the stations, ODM will invite LIME/DIGICEL, the service provider for consultation and a solution.

LIME/DIGICEL will consider providing a special low rate post-paid package for CADM2 stations to facilitate transmission of alerts. ODM and concerned stakeholders are urged to investigate a sustainable mechanism for payment of charges related to use of the transmission facility.

The water depth warning levels usually consist of 3 levels. In many cases, they are the caution level, warning level and the evacuation level. The decision of revising warning levels will be done by ODM, Meteorological Services and Bath Estate Community. If necessary, ODM will invite Caribbean Institute for Meteorology and Hydrology (hereinafter referred to as CIMH) to participate in the process.

ODM will be responsible to coordinate with all the stakeholders for keeping CADM2 FEWS operational and in securing necessary budget arrangement.

(2) Development of new FEWS at other communities

While ODM will take the lead role in the operations, ODM, Meteorological Services, Lands and Surveys Division and Dominica Red Cross Society will make united efforts in selecting new target community. ODM will be responsible in securing necessary budget arrangement.

(3) Collection of Necessary Data and Material about new target community

Meteorological Services will be responsible for collecting hydrological data such as rainfall data and water-level data.

Lands and Surveys Division will collect or provide geological data of the river basin and DEM data

as much as possible. Lands and Surveys Division will provide ODM and Dominica Red Cross Society of the collected data.

(4) Methodology of Estimate of Flood Information for new community

The correlation analysis should be made every year after the rainfall season or just after the one flooding event. Then the early flood warning system will be updated. Meteorological Services will conduct correlations analysis. ODM will consider inviting CIMH to participate in the process if necessary.

(5)Establishing Hydrological Observation Network for New Communities

ODM will invite all stakeholders including Dominica Red Cross Society and the representative from the new community and hold meetings in order to establish hydrological observation network. Meteorological Services will install rainfall and water-level gauges in the new river basin. ODM will consider inviting CIMH to participate in the process if necessary.

(6) Specifications of Rainfall Gauge for new community

Meteorological Services will study specifications of rainfall gauge and decide it. ODM will consider inviting CIMH to participate in the process if necessary.

(7)Specifications of Water-level Gauge for new community

Meteorological Services will study specifications of rainfall gauge and decide it. ODM will consider inviting CIMH to participate in the process if necessary.

(8) Selection of Locations of Hydrological Gauges Installation for new communities

Meteorological Services in consultation with CIMH will conduct hydrological analysis and decide the locations of installation of hydrological gauges for the network. ODM will inform of the locations to Dominica Red Cross Society and the community.

(9) Decision of Warning Levels for New Communities

Meteorological Services will analyze and decide warning levels. ODM will consider inviting CIMH to participate in the process if necessary. ODM will share the established warning levels with Dominica Red Cross Society and the community.

(10) Operation and Maintenance of Gauges for New Communities

Meteorological Services will be responsible for periodical inspection, download the record, exchange the battery and other spare parts of the gauge and analysis of the downloaded records,

and necessary cost expenditure. ODM will monitor the operation and maintenance works. ODM will consider getting close cooperation from the community for appropriate operation and maintenance of the gauges.

(11) Procedural Part

Meteorological Services will conduct the hydrological analysis jointly with Lands and Surveys Division and CIMH.

(12) Preparatory Stage

ODM will hold community hearings to share the needs of the community and planned FEWS. ODM will invite Dominica Red Cross Society to the hearings. ODM will coordinate to establish an optimum FEWS for the community.

(13) Flow of Information

Meteorological Services will estimate the flood water-level at the community and the flood arrival time to the community. ODM will invite CIMH to participate in the process if necessary.

ODM will invite all stakeholders to discuss and establish information flow framework based on CADM2 manuals.

Flood Hazard Map (FHM)

(1) Selection of Target Community

ODM will take the initiative in coordinating Lands and Surveys Division, Bathe Estate Community and Dominica Red Cross Society in selection of new target communities which suffer from habitual floods. Dominica Red Cross Society will collaborate with ODM in selecting new target communities.

ODM in collaboration with Dominica Red Cross has created the attached "Progress Monitoring Matrix of Coverage of Flood Disaster Management" that indicates future target communities. ODM noted that this is an important database in conducting flood risk reduction management service. ODM will review, revise and maintain this matrix in collaboration with all concerned stakeholders from now on.

(2) Maintenance and improvement of developed FHM for Bathe Estate CommunityODM will take the lead in maintenance and improvement of developed FEWS.When it will become necessary to improve the existing FHM, ODM, Meteorological Services,

Lands and Surveys Division and Bathe Estate Community will discuss procedure including the scope of work each party will undertake and timeframe for completion of each action. CIMH will consider taking part in the process when invited by ODM. ODM will monitor the whole progress. ODM will be responsible in securing necessary budget arrangement.

(3) Development of new FHM

ODM will convene a task force meeting. The task force meeting will consist of ODM, Meteorological Services, Lands and Surveys Division, Dominica Red Cross Society and Bathe Estate Community. ODM will invite CIMH to participate in the meeting if its contribution deemed important.

The task force will decide the kind of FHM (FHM through hydrological analysis, FHM of incidental map through field investigation or hand-drawn FHM) through finding the capacity by holding community meeting.

In CADM2, FHMs were prepared partly through hydrological analysis and partly through field investigation depending on the availability of necessary map resolution. These are prepared with the support of CIMH. In consideration of the present situation regarding the availability of maps, human resources and financial resources of CDEMA Participating States, incidental maps or hand-drawn maps developed through community meetings are viewed as appropriate. ODM will be responsible in securing necessary budget arrangement.

(4) Field investigation for new FHM

Field investigation needs to be conducted in order to develop new FHM. The goals are to collect the data on the locations and the inundation depths at locations in inundated area in the past target flood. This may include the need for surveyed river cross-sections. A GPS will be required to accurately collect geospatial information. ODM and Lands and Surveys Division will provide the GPS equipment. In case of using hand-drawn map, Dominica Red Cross Society will take the lead and share the result with ODM.

(5) Mapping of field investigation results

Mapping of field investigation results needs GIS technology for preparation of FHM. Lands and Surveys Division will plot field investigation results on a map using a GIS approach.

Hydrological Database

Meteorological Services will conduct data download periodically from the existing hydrological

stations at Freshwater Lake, Morne Prosper and Palm Grove. Data will be shared with CIMH. CIMH will monitor the frequency of data download by Meteorological Services.

Country: Dominica							
Tasks & Duties related to CADM2				es rela	ted to		//2
Number of staff for CADM2	2	1	1			3	
	ODM	Meteorological Service	Lands & Surveys	Bath Estate Communit	Red Corss	CIMH	DIGICEL/LIME
1. Overall Responsibilities	~						
1.1 Leading role in NT	0						
1.2 Coordination of stakeholders(maintenance)	00						
1.3 Coordination of stakeholders(new community)	00						
1.4 Addition of new stakeholder	00						
1.5 Arrange necessary budget measures	0						
2. Community Disaster Management Plan (CDMP)							
2.1 Maintenance of establsihed Balthazar system	0	0	0	0	0		
2.2 Arrange necessary budget for maintenance	ŏ						
2.3 Application of CADM2 CDMP to other community	Õ	0	0	0	0		
2.4 Arrange necessary general budget for new application	Õ		-		Õ		
2.5 Arrange necessary budget for facilitator	Õ				Õ		
3. Flood Early Warning System (FEWS)							
3.1 Maintenance of existing FEWS	0	0		0	0		0
3.2 Improvement of existing FEWS	0	0	_	0	0	0	0
3.3 General upkeep of mintoring stations	0	-	0			_	
3.4 Correlation analysis	0	0	0			0	
3.5 Telecommuniation setup(existing)	0	0				0	0
3.6 Coordination of stakeholders	0	~					
3.7 Arrange necessary budget for maintenance/improvement	0	0	~		0		
3.8 Selection of new target community	0	0	0		0		0
3.9 Development of FEWS for new communities 3.10 Collection of hydrological data for new communities	0	0	0		0		0
3.11 Collection of geological data for new communities	0	0	0		0		
3.12 Correlation analysis for new communities		0	0			0	
3.13 Planning of FEWS for new committies	0	Ő	ŏ	0	0	ŏ	0
3.14 Decision of specification of hydrological gauges	0	Õ				Õ	Ŭ
3.15 Selection of iinstallation sites of hydrological gauges	ŏ	ŏ			0	ŏ	
3.16 Installation of hydrological gauges for new communities	Õ	Õ			Õ	Õ	0
3.17 Operation & maintenance of new monitoring stations	Õ	Õ					
3.18 Operation & maintenance budget	Õ	Õ					0
3.19 Monitoring of operation & manitenance works	0						
3.20 Arrangement of general budget for FEWS	0						
4. Flood Hazard Map (FHM)		~	~	~		~	
4.1 Manintenance & improvement of developed FHM	0	0	0	0	~	0	
4.2 Selection of new target community	00	\sim	0	00	0	0	
4.3 Planning of FHM for new community 4.4 Field investigation	00	0	00		00	0	
4.4 Field Investigation 4.5 Preparation of hand drawn map	00				0		
4.6 Mapping of field investigation result	0		0				
4.7 Arrangement of necessary budget	0						
5. Hydrological Database (HD)							
5.1 General upkeep of existing monitoring stations	0	0			0		
5.2 Data download		Õ				0	
5.3 Data sharing		0				0	
5.4 Monitoring of dawnload works						0	
5.5 Financial arrangement of data base system	0						

CoL	Country: Dominica		Ē				เสเเสกิดเมตาเ			
	Risk	Flood vulnerable	Tarnet Vear	CBDMP		FHM		FEWS		Completed in
	Level	communities/Project (Term)	iaiger ica	Status	Partner	Status	Partner	Status Incomplete	Partner	
~	(2012- 2015)	Bath Estate	2011	Completed	JICA	Completed	JICA	Protocols and MOU to be finalized	JICA	2012
2		LAYOU	2012-13	Tender	CDB	Tender	CDB	Tender	CDB	
ю		ANTRIM	2012-13	Concept/feasibility	TBD	Concept/feasibility	Fire service/Red Cross/Local Gov't	TBD	TBD	
4		PICHELIEN	2012-13	Concept/feasibility	TBD	Concept/feasibility	Fire service/Red Cross/Local Gov't	TBD	TBD	
5		BOIRI RIVER	2012-13	Concept/feasibility	TBD	Concept/feasibility	Fire service/Red Cross/Local Gov't	TBD	TBD	
9		Mahaut/Massacre	2012-13	Concept/feasibility	TBD	Concept/feasibility	Hydromet/Fire/ Red Cross/Local Gov't	TBD	Hydromet/TBD	
7		Portsmouth	2012-13	Concept/feasibility	TBD	Concept/feasibility	Hydromet/Fire/ Red Cross/Local Gov't	TBD	Hydromet/TBD	
8		Canefield	2012-13	Concept/feasibility	TBD	Concept/feasibility	Hydromet/Fire/ Red Cross/Local Gov't	TBD	Hydromet/TBD	
o		San Sauviere	2012-15	Concept/feasibility	TBD	Concept/feasibility	Hydromet/Fire/ Red Cross/Local Gov't	TBD	Hydromet/TBD	
10		TBD								
11	(2015-	TBD								
12	2018)	TBD								
13		TBD								
14		TBD								
15		TBD								
Pip. Opé	Pipelined Operational	Remarks: No.2 Layou/Red Cross has prepared an evacuation route map for the community.	ed Cross has prer	bared an evacuation rou	ute map for the corr	imunity.				

Progress Monitoring Matrix of Coverage of Flood Disaster Management

Operational Completed TBD

DRAFT MEMORANDUM OF UNDERSTANDING AMONG NATIONAL TEAM OF GRENADA ON INSTITUTIONALIZATION OF NATIONAL TEAM OF CARIBBEAN DISASTER MANAGEMENT PROJECT PHASE 2

CDEMA (the Caribbean Disaster Emergency Management Agency) implemented the Caribbean Disaster Management Project Phase 2 from January 2009 to June 2012, with the contribution of the regional team comprised of CDEMA, Caribbean Institute for Meteorology and Hydrology, the University of the West Indies, and the University of Guyana. During the project term, the 3 outputs of community-based disaster management planning, establishing flood early warning system, and the flood hazard mapping were developed.

This Memorandum of Understanding (hereinafter referred to as MOU) is to define tasks and responsibilities of each organization in Caribbean Disaster Management Project Phase 2 (hereinafter referred to as CADM2) in order to sustain the established Flood Early Warning System (hereinafter referred to as FEWS) and Community Disaster Management Plan (hereinafter referred to as CDMP), and to maintain the developed Flood Hazard Map (hereinafter referred to as FHM) for Balthazar Village and Hydrological Database.

This MOU also aims to apply the CADM2 initiative to other flood vulnerable areas in Grenada in the future.

National Team (hereinafter referred to as NT) have agreed with the matters referred to in the documents attached hereto.

DATE: June xx, 2012 PLACE: St. George's, Grenada Witness Japan International Cooperation Agency For National Disaster Management Agency, Grenada

Cosigners:

Rep. of National Water and Sewerage Authority (NAWASA)

Rep. of Land Use Division, Ministry of Agriculture (Land Use)

Rep. of Physical Planning

Rep. of Ministry of works

Rep. of Balthazar Village Community

Rep. of Grenada Red Cross Society (GRC)

Rep. of Caribbean Institute for Meteorology and Hydrology (CIMH)

Rep. of DIGICEL

Attached Documents

1. Attachment

2. Progress Monitoring Matrix of Coverage of Flood Disaster Management

Attachment

Overall Responsibilities of National Disaster Management Agency

National Disaster Management Agency (hereinafter referred to as NaDMA) has played a leading role in the CADM2 by coordinating with the stakeholders, especially, National Water and Sewerage Authority (hereinafter referred to as NAWASA), Grenada Land Use Division (hereinafter referred to as Land Use), Balthazar Village Community, Grenada Red Cross Society (hereinafter referred to as GRC) and DIGICEL. Upon sustaining the system which has been built during theCADM2, NaDMA will be responsible for coordinating with the stakeholders related to maintaining and expanding the system. NaDMA will consider holding periodical and emergency NT meeting. If necessary, the NaDMA will positively consider adding a new organization or an entity to the system. NaDMA will take the leading role in securing necessary budget arrangement for maintaining the established system and expanding of the system to other areas in Grenada.

Community Disaster Management Plan (CDMP)

(1) Maintenance of the established Balthazar Village Disaster Management System

NaDMA, GRC, Balthazar Village Community, NAWASA and Land Use have agreed to maintain CDMP as well as FEWS and FHM and in case of necessity, they will refer to CADM2 Community Disaster Management Planning Manual. That is, NAWASA will take charge of maintenance and renewal of FEWS, and Land Use will take charge of maintenance and renewal of FHM. In order to sustain CDMP at Balthazar Village Community, NaDMA will consult with GRC and Balthazar Village Community about practical methods such as periodical drill, joint meeting and civic education. NaDMA will take the lead in securing necessary budget for sustaining these activities.

(2) Application of CADM2 CDMP to other Communities

NaDMA and GRCy will collaborate in implementation of CDMP to other communities as indicated attached "Progress Monitoring Matrix of Coverage of Flood Disaster Management". In this joint operation, CADM2 Community Disaster Management Planning Manual shall be followed as far as possibly can. After going through discussion with NaDMA, NAWASA will take charge of FEWS, and Land Use and Physical Planning will take charge of FHM.

In case mobilization of outside facilitator is necessary to carry out whole CDMP program, NaDMA and GRC will discuss and formulate budget arrangement.

Flood Early Warning System (FEWS)

(1) Maintenance and improvement of existing FEWS

Established FEWS by CADM2 is a pilot system that is to be maintained and improved by the NaDMA, DIGICEL, NAWASA and Balthazar Village Community and GRC. NAWASA will frequently check the conditions of the monitoring stations and periodically download the hydrological data from the stations. NAWASA will maintain general upkeep of the monitoring stations. If any repair or replacement is required, NAWSA will notify NaDMA immediately and identify cost effective solutions.

The correlation analysis among the stations should include the use of graphics so that relatively easy comparison can be made. The correlation analysis should be made every year after the rainfall season or just after flood event. The information determined from the analysis should be used to update the flood early warning system. Land Use will conduct the correlation analysis either every year or after major flood events.

If the problem is related to the communication setup at the stations, NaDMA will invite DIGICEL, the service provider for consultation and a solution.

DIGICEL will consider providing a special low rate post-paid package for CADM2 stations to facilitate transmission of alerts. NaDMA and concerned stakeholders are urged to investigate a sustainable mechanism for payment of charges related to use of the transmission facility.

The water depth warning levels usually consist of 3 levels. In many cases, they are the caution level, warning level and the evacuation level. The decision of revising warning levels will be done by NaDMA, NAWASA and Balthazar Village Community If necessary, NaDMA will invite Caribbean Institute for Meteorology and Hydrology (hereinafter referred to as CIMH) to participate in the process.

NaDMA will be responsible to coordinate with all the stakeholders for keeping CADM2 FEWS operational and in securing necessary budget arrangement.

(2) Development of new FEWS at other communities

While NaDMA will take the lead role in the operations, NaDMA, NAWASA, Ministry of Works and GRC will make united efforts in selecting new target community.

NaDMA will be responsible in securing necessary budget arrangement.

(3) Collection of Necessary Data and Material about new target community

NAWASA will be responsible for collecting hydrological data such as rainfall data and water-level data.

Land Use will collect or provide geological data of the river basin and DEM data as much as possible. Land Use will provide NaDMA and GRC of the collected data.

(4) Methodology of Estimate of Flood Information for new community

The correlation analysis should be made every year after the rainfall season or just after the one flooding event. Then the early flood warning system will be updated. Land Use will conduct correlations analysis. NaDMA will consider inviting CIMH to participate in the process if necessary.

(5)Establishing Hydrological Observation Network for New Communities

NaDMA will invite all stakeholders including GRC and the representative from the new community and hold meetings in order to establish hydrological observation network. NAWASA will install rainfall and water-level gauges in the new river basin. NaDMA will consider inviting CIMH to participate in the process if necessary.

(6) Specifications of Rainfall Gauge for new community

NAWASA will study specifications of rainfall gauge and decide it. NaDMA will consider inviting CIMH to participate in the process if necessary.

(7)Specifications of Water-level Gauge for new community

NAWASA will study specifications of rainfall gauge and decide it. NaDMA will consider inviting CIMH to participate in the process if necessary.

(8) Selection of Locations of Hydrological Gauges Installation for new communities NAWASA in consultation with CIMH will conduct hydrological analysis and decide the locations of installation of hydrological gauges for the network. NaDMA will inform of the locations to GRC and the community.

(9) Decision of Warning Levels for New Communities

NAWASA will analyze and decide warning levels. NaDMA will consider inviting CIMH to participate in the process if necessary. NaDMA will share the established warning levels with GRC and the community.

(10) Operation and Maintenance of Gauges for New Communities

NAWASA will be responsible for periodical inspection, download the record, exchange the battery and other spare parts of the gauge and analysis of the downloaded records, and necessary cost expenditure. NaDMA will monitor the operation and maintenance works. NaDMA will consider getting close cooperation from the community for appropriate operation and maintenance of the gauges.

(11) Procedural Part

Land Use will conduct the hydrological analysis jointly with CIMH.

(12) Preparatory Stage

NaDMA will hold community hearings to share the needs of the community and planned FEWS. NaDMA will invite GRC to the hearings. NaDMA will coordinate to establish an optimum FEWS for the community.

(13) Flow of Information

NAWASA will estimate the flood water-level at the community and the flood arrival time to the community. NaDMA will invite CIMH to participate in the process if necessary.

NaDMA will invite all stakeholders to discuss and establish information flow framework based on CADM2 manuals.

Flood Hazard Map (FHM)

(1) Selection of Target Community

NaDMA will take the initiative in coordinating with Land Use, Physical Planning, Balthazar Village Community and GRC in selection of new target communities which suffer from habitual floods. GRC will collaborate with NaDMA in selecting new target communities.

NaDMA in collaboration with GRC has created the attached "Progress Monitoring Matrix of Coverage of Flood Disaster Management" that indicates future target communities.

NaDMA noted that this is an important database in conducting flood risk reduction management service. NaDMA will review, revise and maintain this matrix in collaboration with all concerned stakeholders from now on.

(2) Maintenance and improvement of developed FHM for Balthazar Village Community

NaDMA will take the lead in maintenance and improvement of developed FEWS.

When it will become necessary to improve the existing FHM, NaDMA, NAWASA, Physical Planning and Balthazar Village Community will discuss procedure including the scope of work each party will undertake and timeframe for completion of each action. CIMH will consider taking part in the process when invited by NaDMA. NaDMA will monitor the whole progress.

NaDMA will be responsible in securing necessary budget arrangement.

(3) Development of new FHM

NaDMA will convene a task force meeting. The task force meeting will consist of NaDMA, NAWASA, Land Use, Physical Planning, GRC and Balthazar Village community. NaDMA will invite CIMH to participate in the meeting if its contribution deemed important.

The task force will decide the kind of FHM; FHM through hydrological analysis, FHM of incidental map through field investigation or hand-drawn FHM, through finding the capacity by holding community meeting.

In CADM2, FHMs were prepared partly through hydrological analysis and partly through field investigation depending on the availability of necessary map resolution. These are prepared with the support of CIMH. In consideration of the present situation regarding the availability of maps, human resources and financial resources of CDEMA Participating States, incidental maps or hand-drawn maps developed through community meetings are viewed as appropriate. NaDMA will be responsible in securing necessary budget arrangement.

(4) Field investigation for new FHM

Field investigation needs to be conducted in order to develop new FHM. The goals are to collect the data on the locations and the inundation depths at locations in inundated area in the past target flood. This may include the need for surveyed river cross-sections. A GPS will be required to accurately collect geospatial information. NaDMA, Land Use or Physical Planning will provide the GPS equipment. In case of using hand-drawn map, GRC will take the lead and share the result with NaDMA.

(5) Mapping of field investigation results

Mapping of field investigation results needs GIS technology for preparation of FHM. Land Use and Physical Planning will plot field investigation results on a map using a GIS approach.

Hydrological Database

NAWASA will conduct data download periodically from the existing hydrological stations at Grand Etang, Morne Longue and Castaign Bridge. Data will be lodged at Land Use which will be shared with CIMH. CIMH will monitor the frequency of data download by NAWASA.

Country: Grenada	1						04.54	10	
Tasks & Duties related to CADM2	2	2		gencie		ted to	CADI		
Number of staff for CADM2	3	3	2	ן די	1	m		3	
	NaDMA	NAWASA	Land Use	Physical Planning	Ministry of Works	Balthazar Community	Red Corss	CIMH	DIGICEL
1. Overall Responsibilities	_								
1.1 Leading role in NT	0								
1.2 Coordination of stakeholders(maintenance)	0								
1.3 Coordination of stakeholders(new community)	0								
1.4 Addition of new stakeholder	0								
1.5 Arrange necessary budget measures	0								
2. Community Disaster Management Plan (CDMP)									
2.1 Maintenance of established Balthazar system	0	0	0			0	0		
2.2 Arrange necessary budget for maintenance	ŏ								
2.3 Application of CADM2 CDMP to other community	Õ	0	0			0	0		
2.4 Arrange necessary general budget for new application	ŏ						ŏ		
2.5 Arrange necessary budget for facilitator	Õ						Õ		
3. Flood Early Warning System (FEWS)									
3.1 Maintenance of existing FEWS	0	0				0	0		0
3.2 Improvement of existing FEWS	0	0				0	0	0	0
3.3 General upkeep of mintoring stations	0		0						
3.4 Correlation analysis	0		0					0	
3.5 Telecommuniation setup(existing)	0	0						0	0
3.6 Coordination of stakeholders	0								
3.7 Arrange necessary budget for maintenance/improvement	0	0					_		
3.8 Selection of new target community	0	_	0	0	_		0		_
3.9 Development of FEWS for new communities	0	0	~		0		0		0
3.10 Collection of hydrological data for new communities	0	0	0	~			~		
3.11 Collection of geological data for new communities	0		0	0			0	0	
3.12 Correlation analysis for new communities	~	~		~	~	~	~	00	0
3.13 Planning of FEWS for new commnities 3.14 Decision of specification of hydrological gauges	0	0	0	0	0	0	0	00	0
3.15 Selection of iinstallation sites of hydrological gauges	0	0					~	00	
3.16 Installation of hydrological gauges for new communities	0	0					0	00	0
3.17 Operation & maintenance of new monitoring stations	0	0					0	0	0
3.18 Operation & maintenance budget	0	ŏ							0
3.19 Monitoring of operation & manitenance works	ŏ								
3.20 Arrangement of general budget for FEWS	ŏ								
4. Flood Hazard Map (FHM)									
4.1 Manintenance & improvement of developed FHM	0	0		0		0		0	
4.2 Selection of new target community	0	_	0	0		0	0	~	
4.3 Planning of FHM for new community	0	0	0	0		0	0	0	
4.4 Field investigation	0		0	0			0		
4.5 Preparation of hand drawn map	00		~	~		<u> </u>	0	1	
4.6 Mapping of field investigation result	0		0	0					
4.7 Arrangement of necessary budget	0								
5. Hydrological Database (HD)									
5.1 General upkeep of existing monitoring stations	0	0				-	0		
5.2 Data download	Ŭ	ŏ					Ŭ	0	
5.3 Data sharing		ŏ	0					0	
5.4 Monitoring of dawnload works								ŏ	
5.5 Financial arrangement of data base system	0							-	

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Flood vulnerable Target Year Status Balthazar village 2011 completed Down of Grenville TBD Completed Town of Grenville TBD Completed Town of Grenville TBD Completed Town of St. George TBD Lance Bridge Morne Rouge TBD Completed TBD TBD TBD		Status	completed	TBD	TBD	TBD	TBD	TBD	TBD	TBD													
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Flood vulnerable mmunities/Project (Term) Target Year Balthazar village 2011 Town of Grenville 2011 Town of Grenville TBD Town of St. George TBD Norne Rouge TBD Morne Rouge TBD Nesterhall TBD TBD TBD	CBD		completed	(Engineering Drainage Study completed)	TBD	(Construction of the Lance Bridge, Hubble Bridge and Revetment Wall along the Little River that flows through the Lance)	TBD	(Engineering Drainage Study completed)	(Engineering Drainage Study completed)	TBD													ement Plan
Itry: Grenada Risk Flood vulnerable Level communities/Project (Term) A Balthazar village (2012- Town of Grenville 2015) Town of St. George Town of St. George Town of St. George Image: Town of St. George Town of St. George River road Town of Victoria Morne Rouge Westerhall TBD TBD C015 TBD C015 TBD C01 TBD C1 TBD	H N	larget Year	2011	TBD	TBD	TBD	TBD	TBD	DBT	TBD													ing system se Disaster Manad
Htry: Grent Risk A (2012- 2015) B (2015- 2018) C C C C		communities/Project (Term)	Balthazar village	Town of Grenville	Town of St. George	Town of Gouyave	Town of Victoria	Morne Rouge	River road	Westerhall	TBD	TBD	TBD	FHM-Flood hazard map FEWS-Flood early warning system CBDMP-Community Base Disaster Management Plan									
	Risk	Level	A								[·	<u>18 (2018-</u>	v	20	Pipelined Operational Completed

Progress Monitoring Matrix of Coverage of Flood Disaster Management

DRAFT MEMORANDUM OF UNDERSTANDING AMONG NATIONAL TEAM OF GUYANA ON INSTITUTIONALIZATION OF NATIONAL TEAM OF CARIBBEAN DISASTER MANAGEMENT PROJECT PHASE 2

CDEMA (the Caribbean Disaster Emergency Management Agency) implemented the Caribbean Disaster Management Project Phase 2 from January 2009 to June 2012, with the contribution of the regional team comprised of CDEMA, Caribbean Institute for Meteorology and Hydrology, the University of the West Indies, and the University of Guyana. During the project term, the 3 outputs of community-based disaster management planning, establishing flood early warning system, and the flood hazard mapping were developed.

This Memorandum of Understanding (hereinafter referred to as MOU) is to define tasks and responsibilities of each organization in Caribbean Disaster Management Project Phase 2 (hereinafter referred to as CADM2) in order to sustain the established Flood Early Warning System (hereinafter referred to as FEWS) and Community Disaster Management Plan (hereinafter referred to as CDMP), and to maintain the developed Flood Hazard Map (hereinafter referred to as FHM) for Upper Mahaica Communities and Hydrological Database.

This MOU also aims to apply the CADM2 initiative to other flood vulnerable areas in Guyana in the future.

National Team (hereinafter referred to as NT) have agreed with the matters referred to in the documents attached hereto.

DATE: June xx, 2012 PLACE: Georgetown, Guyana WitnessForJapan International Cooperation AgencyCivil Defence Commission, GUYANA

Cosigners:

Rep. of Hydrometeorological Service

Rep. of Guyana Lands and Surveys Commission

Rep. of Upper Mahica Community

Rep. of Guyana Red Cross Society

Rep. of Caribbean Institute for Meteorology and Hydrology (CIMH)

Rep. of Guyana Telephone & Telegraph Company (GT&T)

Attached Documents

1.Attachment

2. Progress Monitoring Matrix of Coverage of Flood Disaster Management

Attachment

Overall Responsibilities of Civil Defence Commission

Civil Defence Commission (hereinafter referred to as CDC) has played a leading role in the CADM2 by coordinating with the stakeholders, especially, the Hydrolometerological Service, the Guyana Lands and Survey Commission, the Upper Mahaica Community, the Guyana Red Cross Society and GT&T. Upon sustaining the system which has been built during the CADM2, CDC will be responsible for coordinating with the stakeholders related to maintaining and expanding the system. CDC will consider holding periodical and emergency NT meeting. If necessary, the CDC will positively consider adding a new organization or an entity to the system. CDC will take the leading role in securing necessary budget arrangement for maintaining the established system and expanding of the system to other areas in Guyana.

Community Disaster Management Plan (CDMP)

(1) Maintenance of the established Upper Mahaica Community Disaster Management System CDC, Guyana Red Cross Society, Upper Mahaica Community, Hydrometeorological Service and the Guyana Lands and Surveys Commission have agreed to maintain CDMP as well as FEWS and FHM and in case of necessity, they will refer to CADM2 Community Disaster Management Planning Manual. That is, Hydrometeorological Service will take charge of maintenance and renewal of FEWS, and Guyana Lands and Survey Commission will take charge of maintenance and renewal of FHM. In order to sustain CDMP at Upper Mahaica Community, CDC will consult with Guyana Red Cross Society and Upper Mahaica Community about practical methods such as periodical drill, joint meeting and civic education. CDC will take the lead in securing necessary budget for sustaining these activities.

(2) Application of CADM2 CDMP to other Communities

CDC and Guyana Red Cross society will collaborate in implementation of CADM2 CDMP to other communities as indicated attached "Progress Monitoring Matrix of Coverage of Flood Disaster Management". In this joint operation, CADM2 Community Disaster Management Planning Manual shall be followed. After going through discussion with CDC, Hydrometeorological Services will take charge of FEWS, and Guyana Lands and Survey Commission will take charge of FHM.

In case mobilization of outside facilitator is necessary to carry out whole CDMP program, CDC and Guyana Red Cross will discuss and formulate budget arrangement.

Flood Early Warning System (FEWS)

(1) Maintenance and improvement of existing FEWS

Established FEWS by CADM2 is a pilot system that is to be maintained and improved by the CDC, GT&T, Hydrometeorological Service and the Upper Mahaica Community and Guyana Red Cross Society. Hydrometeorological Service will frequently check the conditions of the monitoring stations and periodically download the hydrological data from the stations. Hydrometeorological Service will maintain general upkeep of the monitoring stations. If any repair or replacement is required, Hydrometeorological Service will notify CDC immediately and identify cost effective solutions.

The correlation analysis among the stations should include the use of graphics so that relatively easy comparison can be made. The correlation analysis should be made every year after the rainfall season or just after flood event. The information determined from the analysis should be used to update the flood early warning system. Hydrometeorological Service will conduct the correlation analysis either every year or after major flood events.

If the problem is related to the communication setup at the stations, CDC will invite GT&T, the service provider for consultation and a solution.

GT&T will consider providing a special low rate post-paid package for CADM2 stations to facilitate transmission of alerts. CDC and concerned stakeholders are urged to investigate a sustainable mechanism for payment of charges related to use of the transmission facility.

The water depth warning levels usually consist of 3 levels. In many cases, they are the caution level, warning level and the evacuation level. The decision of revising warning levels will be done by CDC, Hydrometeorological Service and the Upper Mahica Community. If necessary, CDC will invite Caribbean Institute for Meteorology and Hydrology (hereinafter referred to as CIMH) to participate in the process.

CDC will be responsible to coordinate with all the stakeholders for keeping CADM2 FEWS operational and in securing necessary budget arrangement.

(2) Development of new FEWS at other communities

While CDC will take the lead role in the operations, CDC, Hydrometeorological Service and Guyana Red Cross Society will make united efforts in selecting new target community. CDC will be responsible in securing necessary budget arrangement.

(3) Collection of Necessary Data and Material about new target community

Hydrometeorological Service will be responsible for collecting hydrological data such as rainfall data and water-level data.

Guyana Lands and Surveys Commission will collect or provide geological data of the river basin and

DEM data as much as possible. Guyana Lands and Surveys Commission will provide CDC and Guyana Red Cross Society of the collected data.

(4) Methodology of Estimate of Flood Information for new community

The correlation analysis should be made every year after the rainfall season or just after the one flooding event. Then the early flood warning system will be updated. Hydrometeorological Service will conduct correlations analysis. CDC will consider inviting CIMH to participate in the process if necessary.

(5)Establishing Hydrological Observation Network for New Communities

CDC will invite all stakeholders including Guyana Red Cross Society and the representative from the new community and hold meetings in order to establish hydrological observation network. Hydrometeorological Service will install rainfall and water-level gauges in the new river basin. CDC will consider inviting CIMH to participate in the process if necessary.

(6) Specifications of Rainfall Gauge for new community

Hydrometeorological Service will study specifications of rainfall gauge and decide it. CDC will consider inviting CIMH to participate in the process if necessary.

(7)Specifications of Water-level Gauge for new community

Hydrometeorological Service will study specifications of rainfall gauge and decide it. CDC will consider inviting CIMH to participate in the process if necessary.

(8) Selection of Locations of Hydrological Gauges Installation for new communities

Hydrometeorological Service in consultation with CIMH will conduct hydrological analysis and decide the locations of installation of hydrological gauges for the network. CDC will inform of the locations to Guyana Red Cross Society and the community.

(9) Decision of Warning Levels for New Communities

Hydrometeorological Service will analyze and decide warning levels. CDC will consider inviting CIMH to participate in the process if necessary. CDC will share the established warning levels with Guyana Red Cross Society and the community.

(10) Operation and Maintenance of Gauges for New Communities

Hydrometeorological Service will be responsible for periodical inspection, download the record, exchange the battery and other spare parts of the gauge and analysis of the downloaded records,

and necessary cost expenditure. CDC will monitor the operation and maintenance works. CDC will consider getting close cooperation from the community for appropriate operation and maintenance of the gauges.

(11) Procedural Part

Hydrometeorological Service will conduct the hydrological analysis jointly with CIMH.

(12) Preparatory Stage

CDC will hold community hearings to share the needs of the community and planned FEWS. CDC will invite Guyana Red Cross Society to the hearings. CDC will coordinate to establish an optimum FEWS for the community.

(13) Flow of Information

Hydrometeorological Service will estimate the flood water-level at the community and the flood arrival time to the community. CDC will invite CIMH to participate in the process if necessary. CDC will invite all stakeholders to discuss and establish information flow framework based on CADM2 manuals.

Flood Hazard Map (FHM)

(1) Selection of Target Community

CDC will take the initiative in coordinating Guyana Lands and Surveys Commission, the Upper Mahaica Community and Guyana Red Cross Society in selection of new target communities which suffer from habitual floods. Guyana Red Cross Society will collaborate with CDC in selecting new target communities.

CDC in collaboration with Guyana Red Cross has created the attached "Progress Monitoring Matrix of Coverage of Flood Disaster Management" that indicates future target communities.

CDC noted that this is an important database in conducting flood risk reduction management service. CDC will review, revise and maintain this matrix in collaboration with all concerned stakeholders from now on.

(2) Maintenance and improvement of developed FHM for Upper Mahaica CommunityCDC will take the lead in maintenance and improvement of developed FEWS.When it will become necessary to improve the existing FHM, CDC, Hydrometeorological Service,Guyana Lands and Surveys Commission and the Upper Mahaica Community will discuss procedure

including the scope of work each party will undertake and timeframe for completion of each action. CIMH will consider taking part in the process when invited by CDC. CDC will monitor the whole progress. CDC will be responsible in securing necessary budget arrangement.

(3) Development of new FHM

CDC will convene a task force meeting. The task force meeting will consist of CDC, Hydrometeorological Service, Guyana Lands and Surveys Commission, Guyana Red Cross Society, University of Guyana and the Upper Mahaica Community. CDC will invite CIMH to participate in the meeting if its contribution deemed important.

The task force will decide the kind of FHM (FHM through hydrological analysis, FHM of incidental map through field investigation or hand-drawn FHM) through finding the capacity by holding community meeting.

In CADM2, FHMs were prepared partly through hydrological analysis and partly through field investigation depending on the availability of necessary map resolution. These are prepared with the support of CIMH. In consideration of the present situation regarding the availability of maps, human resources and financial resources of CDEMA Participating States, incidental maps or hand-drawn maps developed through community meetings are viewed as appropriate. CDC will be responsible in securing necessary budget arrangement.

(4) Field investigation for new FHM

Field investigation needs to be conducted in order to develop new FHM. The goals are to collect the data on the locations and the inundation depths at locations in inundated area in the past target flood. This may include the need for surveyed river cross-sections. A GPS will be required to accurately collect geospatial information. Either CDC or Guyana Lands and Surveys Commission will provide the GPS equipment. In case of using hand-drawn map, Guyana Red Cross Society will take the lead and share the result with CDC.

(5) Mapping of field investigation results

Mapping of field investigation results needs GIS technology for preparation of FHM. Guyana Lands and Surveys Commission will plot field investigation results on a map using a GIS approach.

Hydrological Database

Hydrometeorological Service will conduct data download periodically from the existing hydrological stations at St. Cuthbert's Mission, Maduni Gate and the Biaboo Health Center. Data

will be shared with CIMH. CIMH will monitor the frequency of data download by Hydrometeorological Service.

Country: Guyana	1	٨	aonai	o rela	todto	<u> </u>	10	
Tasks & Duties related to CADM2 Number of staff for CADM2	4	<u>A</u>		es rela	ted to		vi∠	
	4 CDC	" Hydro-Met	Survey & Mapping ■	Upper Mahaica Commu	Red Corss	3 CIMH	DIGICEL	
1. Overall Responsiblities				<u> </u>				
1.1 Leading role in NT	0							
1.2 Coordination of stakeholders(maintenance)	0							
1.3 Coordination of stakeholders(new community)	0							
1.4 Addition of new stakeholder	0							
1.5 Arrange necessary budget measures	0							
2. Community Disaster Management Plan (CDMP)		~	~	~	~		+	
2.1 Maintenance of established Balthazar system	0	0	0	0	0			
2.2 Arrange necessary budget for maintenance	0	0	0	~	0			
2.3 Application of CADM2 CDMP to other community	00	0	0	0	0			
2.4 Arrange necessary general budget for new application 2.5 Arrange necessary budget for facilitator	00				00			
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3. Flood Early Warning System (FEWS)								
3.1 Maintenance of existing FEWS	0	0		0	0		0	
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3.8 Selection of new target community	Õ		0		0			
3.9 Development of FEWS for new communities	Õ	0			Õ		0	
3.10 Collection of hydrological data for new communities	Ō	Õ	0					
3.11 Collection of geological data for new communities	Ō	-	Õ		0			
3.12 Correlation analysis for new communities		0	0			0		
3.13 Planning of FEWS for new commnities	0	0	0	0	0	0	0	
3.14 Decision of specification of hydrological gauges	0	0				0		
3.15 Selection of iinstallation sites of hydrological gauges	0	0			0	0		
3.16 Installation of hydrological gauges for new communities	0	0			0	0	0	
3.17 Operation & maintenance of new monitoring stations	0	0						
3.18 Operation & maintenance budget	0	0					0	
3.19 Monitoring of operation & manitenance works	0							
3.20 Arrangement of general budget for FEWS	0							
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4. Flood Hazard Map (FHM)		~	~	~		~	$\left \right $	
4.1 Manintenance & improvement of developed FHM	0	0	0	0	~	0	+	
4.2 Selection of new target community	0	~	0	0	0	~	+	
4.3 Planning of FHM for new community	00	0	00	0	00	0	+	
4.4 Field investigation 4.5 Preparation of hand drawn map	0		0		0		+	
4.5 Preparation of hand drawn map 4.6 Mapping of field investigation result	0		0				+	
4.7 Arrangement of necessary budget	0						+	
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5. Hydrological Database (HD)							+	
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0	2015)	Mara, Berbice River	TBD	Completed	Ministry of Local Government, CDC, Canadian Red Cross	TBD	TBD	TBD	TBD	
Э		Baracara, Canje Creek	TBD	Completed	Ministry of Local Government, CDC, Canadian Red Cross	TBD	TBD	TBD	TBD	
4		Perth, Mahaicony River	TBD	Completed	Ministry of Local Government, CDC, Canadian Red Cross	TBD	TBD	TBD	TBD	
5		Broken WaterLand, Upper Mahaica	TBD	Completed	Ministry of Local Government, CDC, Canadian Red Cross	TBD	TBD	TBD	TBD	
9		Straathcampbell-Chance, Mahaicony River	TBD	Completed	Ministry of Local Government, CDC, Canadian Red Cross	TBD	TBD	TBD	TBD	
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Completed TBD (To Be Determined)

DRAFT MEMORANDUM OF UNDERSTANDING AMONG CADM2 STAKEHOLDERS OF SAINT LUCIA OF

CARIBBEAN DISASTER MANAGEMENT PROJECT PHASE 2

CDEMA (the Caribbean Disaster Emergency Management Agency) implemented the Caribbean Disaster Management Project Phase 2 from January 2009 to June 2012, with the contribution of the regional team comprised of CDEMA, Caribbean Institute for Meteorology and Hydrology, the University of the West Indies, and the University of Guyana. During the project term, the 3 outputs of community-based disaster management planning, establishing flood early warning system, and the flood hazard mapping were developed.

This Memorandum of Understanding (hereinafter referred to as MOU) is to define tasks and responsibilities of each organization in Caribbean Disaster Management Project Phase 2 (hereinafter referred to as CADM2) in order to sustain the established Flood Early Warning System (hereinafter referred to as FEWS) and Community Disaster Management Plan (hereinafter referred to as CDMP), and to maintain the developed Flood Hazard Map (hereinafter referred to as FHM) for Corinth Community and Hydrological Database.

This MOU also aims to apply the CADM2 initiative to other flood vulnerable areas in Saint Lucia in the future.

CADM2 stakeholders have agreed with the matters referred to in the documents attached hereto.

DATE: June xx, 2012 PLACE: Castries, Saint Lucia

Witness Japan International Cooperation Agency For National Emergency Management Organization, Saint Lucia Cosigners:

Rep. of Water Resources Management Authority (WARMA)

Rep. of Saint Lucia Meteorological Services, Ministry of Infrastructure (Met Services)

Rep. of Survey and Mapping Section, Ministry of Planning (Survey & Mapping Section)

Rep. of the Corinth Community

Rep. of Saint Lucia Red Cross Society (SLRC)

Rep. of Caribbean Institute for Meteorology and Hydrology (CIMH)

Rep. of DIGICEL Saint Lucia Limited (DIGICEL)

Attached Documents

- 1. Attachment
- 2. Progress Monitoring Matrix of Coverage of Flood Disaster Management

Attachment

Overall Responsibilities of National Emergency Management Organization

National Emergency Management Organization (hereinafter referred to as NEMO) has played a leading role in the CADM2 by coordinating with the stakeholders, especially, the Water Resources Management Authority (hereinafter referred to as WARMA), Saint Lucia Meteorological Services, Ministry of Infrastructure (hereinafter referred to as Met Services), Survey and Mapping Section, Ministry of Planning (hereinafter referred to as Survey & Mapping Section), the Corinth Community, Saint Lucia Red Cross Society (hereinafter referred to as SLRC) and DIGICEL Saint Lucia Limited (hereinafter referred to as DIGICEL). Upon sustaining the system which has been built during the CADM2 Project, NEMO will be responsible for coordinating with the stakeholders related to maintaining and expanding of the system. NEMO will consider holding periodical and emergency NT meeting. If necessary, the NEMO will positively consider adding a new organization or an entity to the system. NEMO will take the leading role in securing necessary budget arrangement for maintaining the established system and expanding of the system to other areas in Saint Lucia.

Community Disaster Management Plan (CDMP)

(1) Maintenance of the established Corinth Community Disaster Management System

NEMO, SLRC, the Corinth Community, Met Services and Survey & Mapping Section have agreed to maintain CDMP as well as FEWS and FHM and in case of necessity, they will refer to CADM2 Community Disaster Management Planning Manual. That is, NEMO will take charge of maintenance and renewal of FEWS, and Survey and Mapping Section will take charge of maintenance and renewal of FHM. In order to sustain CDMP at Corinth Community, NEMO will consult with SLRC and the Corinth Community about practical methods such as periodical drill, joint meeting and civic education. NEMO will take the lead in securing necessary budget for sustaining these activities.

(2) Application of CADM2 CDMP to other Communities

NEMO and SLRC will collaborate in implementation of CDMP to other communities as indicated in the attached "Progress Monitoring Matrix of Coverage of Flood Disaster Management". In this joint operation, CADM2 Community Disaster Management Planning Manual shall be followed. After going through discussion with NEMO, WARMA will take charge of FEWS, and Survey & Mapping Section will take charge of FHM.

In case mobilization of outside facilitator is necessary to carry out whole CDMP program, NEMO and SLRC will discuss and formulate budget arrangement.

Flood Early Warning System (FEWS)

(1) Maintenance and improvement of existing FEWS

Established FEWS by CADM2 is a pilot system that is to be maintained and improved by the NEMO, DIGICEL, WARMA, Met Services, the Corinth Community and SLRC. WARMA will frequently check the conditions of the monitoring stations and periodically download the hydrological data from the stations. WARMA will maintain general upkeep of the monitoring stations. If any repair or replacement is required, WARMA will notify NEMO immediately and identify cost effective solutions.

The correlation analysis among the stations should include the use of graphics so that relatively easy comparison can be made. The correlation analysis should be made every year after the rainfall season or just after flood event. The information determined from the analysis should be used to update the flood early warning system. WARMA will conduct the correlation analysis either every year or after major flood events.

If the problem is related to the communication setup at the stations, NEMO will invite DIGICEL, the service provider for consultation and a solution.

DIGICEL will consider providing a special privileged package for CADM2 stations to facilitate transmission of alerts. NEMO and concerned stakeholders are urged to investigate a sustainable mechanism for payment of charges related to use of the transmission facility.

The water depth warning levels usually consist of 3 levels. In many cases, they are the caution level, warning level and the evacuation level. The decision of revising warning levels will be done by NEMO, WARMA and the Corinth Community. If necessary, NEMO will invite Caribbean Institute for Meteorology and Hydrology (herein after referred to as CIMH) to participate in the process.

NEMO will be responsible to coordinate with all the stakeholders in keeping CADM2 FEWS operational and in securing necessary budget arrangement.

(2) Development of new FEWS at other communities

While NEMO will take the lead role in the operations, NEMO, WARMA, DIGICEL, Met Services and SLRC will make united efforts in selecting new target community.

NEMO will be responsible in securing necessary budget arrangement.

(3) Collection of Necessary Data and Material about new target community

WARMA will be responsible for collecting hydrological data such as rainfall data and water-level data.

Survey & Mapping Section will collect or provide geological data of the river basin and DEM data as much as possible. Survey & Mapping Section will provide NEMO and SLRC of the collected data.

(4) Methodology of Estimate of Flood Information for new community

The correlation analysis should be made every year after the rainfall season or just after the one flooding event. Then the early flood warning system will be updated. WARMA will conduct correlations analysis. NEMO will consider inviting CIMH to participate in the process if necessary.

(5)Establishing Hydrological Observation Network for New Communities

NEMO will invite all stakeholders including SLRC Society and the representative from the new community and hold meetings in order to establish hydrological observation network. WARMA will install rainfall and water-level gauges in the new river basin. NEMO will consider inviting CIMH to participate in the process if necessary.

(6) Specifications of Rainfall Gauge for new community

WARMA will study specifications of rainfall gauge and decide it. NEMO will consider inviting CIMH to participate in the process if necessary.

(7)Specifications of Water-level Gauge for new community

WARMA will study specifications of rainfall gauge and decide it. NEMO will consider inviting CIMH to participate in the process if necessary.

(8) Selection of Locations of Hydrological Gauges Installation for new communities

WARMA in consultation with CIMH will conduct hydrological analysis and decide the locations of installation of hydrological gauges for the network. NEMO will inform of the locations to SLRC and the community.

(9) Decision of Warning Levels for New Communities

WARMA will analyze and decide warning levels. NEMO will consider inviting CIMH to participate in the process if necessary. NEMO will share the established warning levels with SLRC and the community.

(10) Operation and Maintenance of Gauges for New Communities

WARMA will be responsible for periodical inspection, download the record, exchange the battery and other spare parts of the gauge and analysis of the downloaded records, and necessary cost expenditure. NEMO will monitor the operation and maintenance works. NEMO will consider getting close cooperation from the community for appropriate operation and

maintenance of the gauges.

(11) Procedural Part

WARMA will conduct the hydrological analysis jointly with technical assistance of CIMH.

(12) Preparatory Stage

NEMO will hold community hearings to share the needs of the community and planned FEWS. NEMO will invite SLRC to the hearings. NEMO will coordinate to establish an optimum FEWS for the community.

(13) Flow of Information

WARMA will estimate the flood water-level at the community and the flood arrival time to the community. NEMO will invite CIMH to participate in the process if necessary.

NEMO will invite all stakeholders to discuss and establish information flow framework based on CADM2 manuals.

Flood Hazard Map (FHM)

(1) Selection of Target Community

NEMO will take the initiative in coordinating WARMA, Survey & Mapping Section, the Corinth Community and SLRC in selection of new target communities which suffer from habitual floods. SLRC will collaborate with NEMO in selecting new target communities.

NEMO in collaboration with SLRC has created the attached "Progress Monitoring Matrix of Coverage of Flood Disaster Management" that indicates future target communities.

NEMO noted that this is an important database in conducting flood risk reduction management service. NEMO will review, revise and maintain this matrix in collaboration with all concerned stakeholders from now on.

(2) Maintenance and improvement of developed FHM for Bathe Estate Community

NEMO will take the lead in maintenance and improvement of developed FEWS.

When it will become necessary to improve the existing FHM, NEMO, WARMA, Survey & Mapping Section and the Corinth Community will discuss procedure including the scope of work each party will undertake and timeframe for completion of each action. CIMH will consider taking part in the process when invited by NEMO. NEMO will monitor the whole progress.

NEMO will be responsible in securing necessary budget arrangement.

(3) Development of new FHM

NEMO will convene a task force meeting. The task force meeting will consist of NEMO, WARMA, Survey & Mapping Section, SLRC and the Corinth Community. NEMO will invite CIMH to participate in the meeting if its contribution deemed important.

The task force will decide the kind of FHM (FHM through hydrological analysis, FHM of incidental map through field investigation or hand-drawn FHM) through finding the capacity by holding community meeting.

In CADM2, FHMs were prepared partly through hydrological analysis and partly through field investigation depending on the availability of necessary map resolution. These are prepared with the support of CIMH. In consideration of the present situation regarding the availability of maps, human resources and financial resources of CDEMA Participating States, incidental maps or hand-drawn maps developed through community meetings are viewed as appropriate. NEMO will be responsible in securing necessary budget arrangement.

(4) Field investigation for new FHM

Field investigation needs to be conducted in order to develop new FHM. The goals are to collect the data on the locations and the inundation depths at locations in inundated area in the past target flood. This may include the need for surveyed river cross-sections. A GPS will be required to accurately collect geospatial information. WARMA and Survey & Mapping Section will provide the GPS equipment. In case of using hand-drawn map, SLRC will take the lead and share the result with NEMO.

(5) Mapping of field investigation results

Mapping of field investigation results needs GIS technology for preparation of FHM. Survey & Mapping Section will plot field investigation results on a map using a GIS approach.

Hydrological Database

WARMA will conduct data download periodically from the existing hydrological stations at Corinth, Plateau and Grand Riviere. Data will be shared with CIMH. CIMH will monitor the frequency of data download by WARMA.

Country: St. Lucia							
Tasks & Duties related to CADM2				es rela	ted to	CADN	//2
Number of staff for CADM2	3	2	2			3	
	NEMO	Met Services	Survey & Mapping	Corinth Community	Red Corss	CIMH	DIGICEL
1. Overall Responsiblities							
1.1 Leading role in NT	0						
1.2 Coordination of stakeholders(maintenance) 1.3 Coordination of stakeholders(new community) 1.4 Addition of stakeholders(new community) 1.4 Addition of stakeholders(new community)	000						
1.4 Addition of new stakeholder	00						
1.5 Arrange necessary budget measures	0						
2. Community Disaster Management Plan (CDMP)							
2.1 Maintenance of established Balthazar system	0	0	0	0	0		
2.2 Arrange necessary budget for maintenance	0	0	0	0	0		
2.3 Application of CADM2 CDMP to other community	0	0	0	0	0		
2.4 Arrange necessary general budget for new application	0		0	0	0		
2.5 Arrange necessary budget for facilitator	0				ŏ		
2.5 Altalige necessary budget for facilitator	0				0		
3. Flood Early Warning System (FEWS)							
3.1 Maintenance of existing FEWS	0	0		0	0		0
3.2 Improvement of existing FEWS	ŏ	ŏ		ŏ	Õ	0	Õ
3.3 General upkeep of mintoring stations	ŏ	- Ŭ	0		- v		- Ŭ
3.4 Correlation analysis	Õ	0	ŏ			0	
3.5 Telecommuniation setup(existing)	Õ	Õ				ŏ	0
3.6 Coordination of stakeholders	ŏ	- Ŭ					- Ŭ
3.7 Arrange necessary budget for maintenance/improvement	ŏ	0					
3.8 Selection of new target community	ŏ	Ŭ	0		0		
3.9 Development of FEWS for new communities	Õ	0			Õ		0
3.10 Collection of hydrological data for new communities	Õ	Õ	0		Ŭ		- -
3.11 Collection of geological data for new communities	Õ	-	Ō		0		
3.12 Correlation analysis for new communities		0	0			0	
3.13 Planning of FEWS for new commnities	0	Ō	Õ	0	0	Ō	0
3.14 Decision of specification of hydrological gauges	Õ	Õ	-			Ō	
3.15 Selection of iinstallation sites of hydrological gauges	Õ	Õ			0	Ō	
3.16 Installation of hydrological gauges for new communities	Ō	Ō			Ō	Ō	0
3.17 Operation & maintenance of new monitoring stations	0	0					
3.18 Operation & maintenance budget	Ō	Ō					0
3.19 Monitoring of operation & manitenance works	0						
3.20 Arrangement of general budget for FEWS	0						
4. Flood Hazard Map (FHM) 4.1 Manintenance & improvement of developed FHM	0	0	0	0		0	
4.2 Selection of new target community	ŏ		ŏ	ŏ	0		
4.3 Planning of FHM for new community	ŏ	0	ŏ	õ	ŏ	0	
4.4 Field investigation	ŏ		ŏ		ŏ		
4.5 Preparation of hand drawn map	ŏ		- Ŭ		ŏ		
4.6 Mapping of field investigation result	ŏ		0	1			
4.7 Arrangement of necessary budget	Õ		-				
5. Hydrological Database (HD)							
5.1 General upkeep of existing monitoring stations	0	0			0		
5.2 Data download		0				0	
5.3 Data sharing		0				0	
5.4 Monitoring of dawnload works						0	
5.5 Financial arrangement of data base system	0						

	Toract Voor	CB	CBDMP	<u>ت</u>	FHM	Ë	FEWS	Completed
	Iaigei reai	Status	Partner	Status	Partner	Status	Partner	Compresent
Corinth	2011	Completed	JICA	Completed	AJICA	Completed	AJICA	2012
New Development (Soufriere)	2015	Completed	SLU Red Cross	Pipelined	GoS	Pipelined	CDEMA-HIP	
Dennery	2015	Pipelined	World Bank	Pipelined	World Bank	Pipelined	World Bank	
Cul de Sac / Bexon	2015	Completed	SLU Red Cross	Pipelined	Sog	Pipelined	AUSAID	
Beausejour (GI)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Marisule	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Castries City	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Canaries Ctrl	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Bruceville (VF)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Tamazo (Den)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Richfond	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Hewanorra Airport	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Praslin	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Malgretoute (M)	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Entry to Gros Islet Town	TBD	TBD	TBD	TBD	TBD	TBD	TBD	
Bougise	TBD	Completed	SLU Red Cross	TBD	TBD	TBD	TBD	
De Baues	TBD	Completed	SLU Red Cross	TBD	TBD	TBD	TBD	
Forester	TBD	Completed	SLU Red Cross	TBD	TBD	TBD	TBD	
Fond St. Jaque	TBD	Completed	SLU Red Cross	TBD	TBD	TBD	TBD	
La Ressource	TBD	Completed	SLU Red Cross	TBD	TBD	TBD	TBD	
Derisseaux	TBD	Completed	SLU Red Cross	TBD	TBD	TBD	TBD	
Bel Air	TBD	Completed	SLU Red Cross	TBD	TBD	TBD	TBD	
La Croix	TBD	Operational	SLU Red Cross	TBD	TBD	TBD	TBD	
Marigot	TBD	Operational	SLU Red Cross	TBD	TBD	TBD	TBD	
La Boune	TBD	Operational	SLU Red Cross	TBD	TBD	TBD	TBD	
St. Joseph	TBD	Operational	SLU Red Cross	TBD	TBD	TBD	TBD	
Barr De Chaussee	TBD	Operational	SLU Red Cross	TBD	TBD	TBD	TBD	
Plateau	TBD	Operational	SLU Red Cross	TBD	TBD	TBD	TBD	
	Corinth New Development (Soufriere) Dennery Cul de Sac / Bexon Beausejour (Gl) Marisule Castries City Canaries Citrl Bruceville (VF) Tamazo (Den) Richfond Hewanorra Airport Praslin Malgretoute (M) Entry to Gros Islet Town Beues Forester De Baues Forester La Resource Derisseaux Bel Air La Croix Marigot La Boune St. Joseph Barr De Chaussee Plateau	Corinth2011New Development (Soufriere)2015Dennery2015Dennery2015Dennery2015Dennery2015Dennery2015Dennery2015Dennery2015Dennery2015Dennery2015Dennery2015Dennery2015Dennery2015Dennery2015Dennery2015Denseljour (Gl)TBDNarisuleTBDCanaries CtrlTBDDenceville (VF)TBDTamazo (Den)TBDNalgretouteTBDHewanorra AirportTBDNalgretouteTBDPrasilinTBDMalgretouteTBDDenseeTBDDenseeTBDDenseeuxTBDLa ResourceTBDLa RouneTBDSt. JosephTBDSt. JosephTBDPlateauTBDSt. JosephTBDPlateauTBDPlateauTBDSt. JosephTBDPlateauTBDPlateauTBDSt. JosephTBDPlateauTBDSt. JosephTBDDenseeTBDSt. JosephTBDSt. JosephTBDSt. JosephTBDPlateauTBDSt. JosephTBDSt. JosephTBDSt. JosephTBDSt. Joseph <t< td=""><td>2011 2015 2015 2015 2015 2015 2015 2015 2015 2015 2016 2015 2017 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180</td><td>2011 Completed 2015 TBD 1BD Completed 1BD Completed 1BD Completed 1BD Completed 1BD Operational 1BD Operational 1BD Operational 1BD <td< td=""><td>2011 Completed JICA 2015 Completed SLU Red Cross 2015 Completed SLU Red Cross 2015 Completed SLU Red Cross 2016 TBD TBD 2017 TBD TBD 2018 TBD TBD 2019 TBD TBD 2019 TBD TBD 2019 TBD TBD 1BD Completed SLU Red Cross 1BD TBD TBD 1BD Completed</td><td>2011Completed$JICA$Completed2015Completed$SLU Red Cross$Pipelined2015Completed$SLU Red Cross$Pipelined2015Completed$SLU Red Cross$Pipelined2015Completed$SLU Red Cross$Pipelined2015Completed$SLU Red Cross$Pipelined2015TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBD$1BD$TBDTBDTBD$1BD$TBDTBDTBD$1BD$TBDTBDTBD$1BD$TBDTBD$1BD$TBDTBD$1BD$TBDTBD$1BD$TBDTBD$1BD$TBDTBD$1BD$TBD$1BD$TBD$1BD$TBD$1BD$TBD$1BD$TBD$1BD$TBD$1BD$TBD$1BD$TBD$1BD$TBD$1BD$TBD1</td><td></td><td>2011 Completed JICA JICA Completed JICA JICA</td></td<></td></t<>	2011 2015 2015 2015 2015 2015 2015 2015 2015 2015 2016 2015 2017 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180 180	2011 Completed 2015 TBD 1BD Completed 1BD Completed 1BD Completed 1BD Completed 1BD Operational 1BD Operational 1BD Operational 1BD <td< td=""><td>2011 Completed JICA 2015 Completed SLU Red Cross 2015 Completed SLU Red Cross 2015 Completed SLU Red Cross 2016 TBD TBD 2017 TBD TBD 2018 TBD TBD 2019 TBD TBD 2019 TBD TBD 2019 TBD TBD 1BD Completed SLU Red Cross 1BD TBD TBD 1BD Completed</td><td>2011Completed$JICA$Completed2015Completed$SLU Red Cross$Pipelined2015Completed$SLU Red Cross$Pipelined2015Completed$SLU Red Cross$Pipelined2015Completed$SLU Red Cross$Pipelined2015Completed$SLU Red Cross$Pipelined2015TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBDTBD$1BD$TBDTBDTBD$1BD$TBDTBDTBD$1BD$TBDTBDTBD$1BD$TBDTBDTBD$1BD$TBDTBD$1BD$TBDTBD$1BD$TBDTBD$1BD$TBDTBD$1BD$TBDTBD$1BD$TBD$1BD$TBD$1BD$TBD$1BD$TBD$1BD$TBD$1BD$TBD$1BD$TBD$1BD$TBD$1BD$TBD$1BD$TBD1</td><td></td><td>2011 Completed JICA JICA Completed JICA JICA</td></td<>	2011 Completed JICA 2015 Completed SLU Red Cross 2015 Completed SLU Red Cross 2015 Completed SLU Red Cross 2016 TBD TBD 2017 TBD TBD 2018 TBD TBD 2019 TBD TBD 2019 TBD TBD 2019 TBD TBD 1BD Completed SLU Red Cross 1BD TBD TBD 1BD Completed	2011Completed $JICA$ Completed 2015 Completed $SLU Red Cross$ Pipelined 2015 TBDTBDTBDTBD $1BD$ TBDTBDTBD $1BD$ TBDTBDTBD $1BD$ TBDTBDTBD $1BD$ TBDTBDTBD $1BD$ TBDTBD $1BD$ TBDTBD $1BD$ TBDTBD $1BD$ TBDTBD $1BD$ TBDTBD $1BD$ TBD 1		2011 Completed JICA JICA Completed JICA JICA

Progress Monitoring Matrix of Coverage of Flood Response Committee

Pipelined Operational Completed TBD: To be determined

付属資料 4: パイロット国の洪水早期警戒体制

FLOOD EARLY WARNING SYSTEM FOR CROOKED TREE OF THE BELIZE RIVER IN BELIZE

1. Target Community

The target community for establishing early flood warning system is Crooked Tree located in the river basin of the Belize River. The location of the community is shown in Fig.-1.

2. Locations of Hydrological Gauges

The locations of hydrological gauges for early flood warning system are as follows:

- St. Familia (water-level)
- Banana Banks (water-level)
- Isabella Bank (water-level and rainfall)
- Big Falls (water-level)

Their locations are shown in Fig.-1.

3. Water-level Forecast

The correlation between water-level at Banana Bank and Crooked Tree is shown in Fig.2,

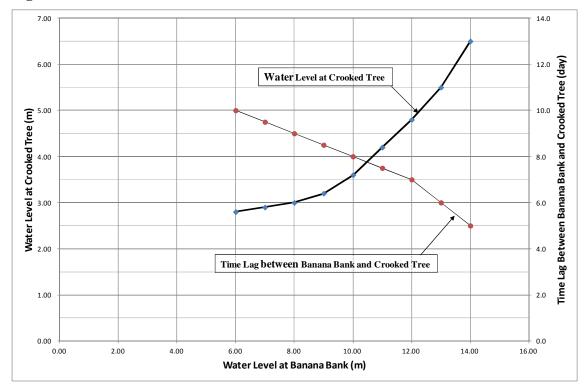


Fig. -2 Correlations between Water-level at Banana Banks and Crooked Tree

Based on the above figure, the estimated flood water-level at Crooked Tree will be informed to the residents of Crooked Tree.

As shown in the above figure, the time lag between Banana Bank and Crooked Tree is more than 2 days in many cases and the residents of Crooked Tree have rather enough time to do some actions against coming flood.

This relationship should be updated based on the newly recorded data by newly installed hydrological gauges.

4. Flood Warning Levels

Based on the opinions of the residents of Crooked Tree, the flood warning levels are set as follows:

Warning Level	Local Indicator
Level 1	1 foot below the surface level of the causeway
Level 2	The surface level of the causeway
Level 3	1 foot above the surface level of the causeway

The above indicators are converted to the elevation above mean sea level as follows:

Warning Level	Water-level (foot)
Level 1	17.74 feet
Level 2	18.04 feet
Level 3	18.35 feet

These values should be updated based on the actual experience in the future.

Based on the local indicators of the flood warning shown above, the threshold values at Banana Bank should be programmed.

5. Flood Warning Communication System

Flood warning communication system in Belize is established as shown in Fig.-3 and 4.

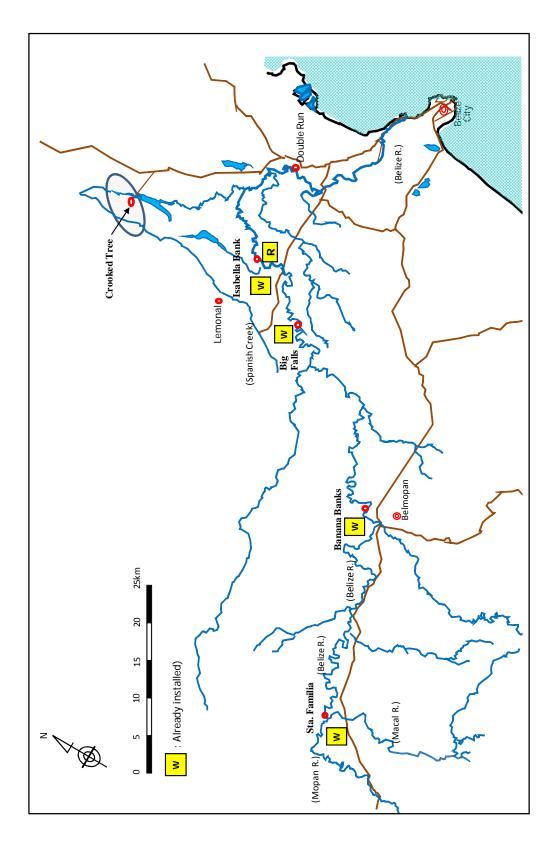
6. Flood Warning Image

In addition to the estimated flood water-level at Crooked Tree, the estimated flood inundation map is also transmitted to the flood preparedness team of Crooked Tree with the steps as shown in Fig.-6.

A sample of estimated flood prone area to be transmitted to the community is as shown in Fig.-5.

The shown flood prone area is tentatively prepared based on the relationship shown in Fig.-2 and the provisional DEM Data of Crooked Tree area. But these are still not final one and these should be updated every year based on the newly recorded data to be obtained with the newly installed hydrological gauges in the river basin.

Fig.-1 The Locations of Target Community and Hydrological Gauges



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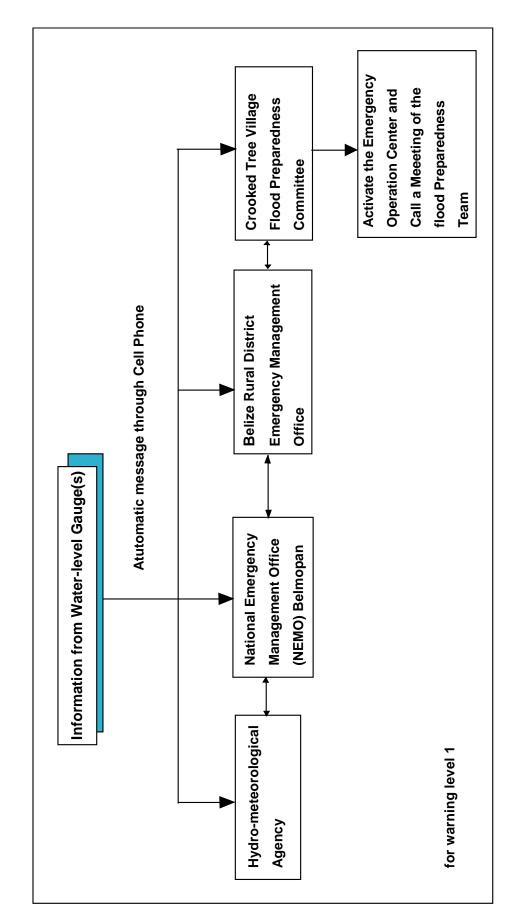
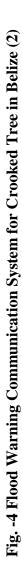
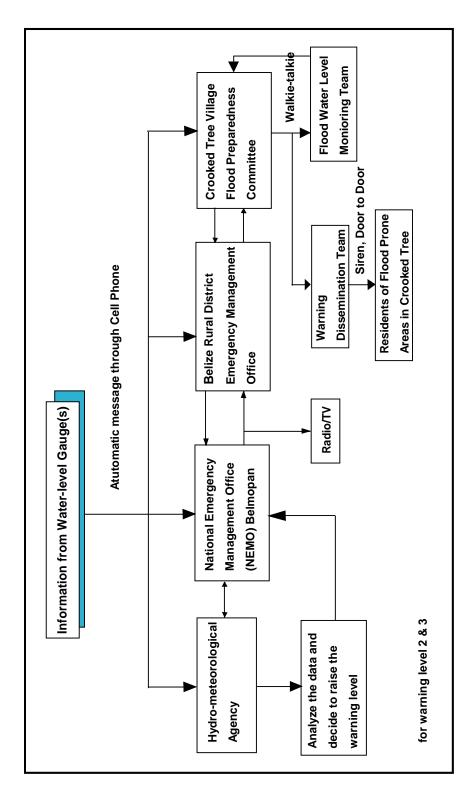


Fig. -3 Flood Warning Communication System for Crooked Tree in Belize (1)

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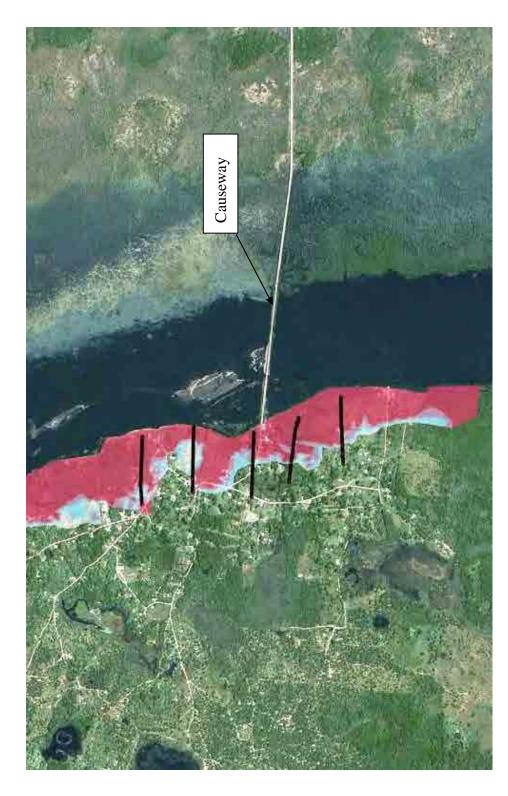
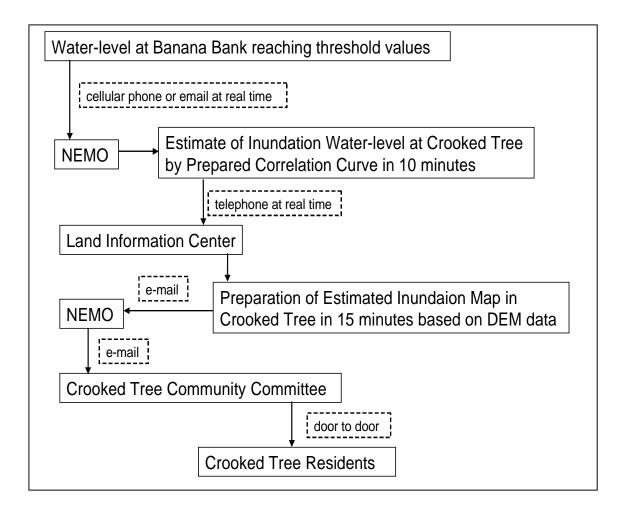


Fig. 5 Sample of Estimated Flood Prone Area of Crooked Tree

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Fig. 6 Communication Flow on Estimated Flood Prone Area at Crooked Tree



FLOOD EARLY WARNING SYSTEM FOR CORINTH OF THE ROSEAU RIVER BASIN IN DOMINICA

1. Target Community

The target community for establishing flood early warning system is Corinth located in the river basin of the Roseau River. The location of the community is shown in Fig. 1.

2. Locations of Hydrological Gauges

The locations of hydrological gauges for flood early warning system are as follows:

Laudat (rainfall) Morne Prosper (rainfall) Confluence of the Roseau and Claire Rivers (water-level)

Their locations are shown in Fig.-1.

3. Flood Warning Levels

Based on the opinions of the residents of Corinth, the flood warning levels are set as follows:

Warning Level	Local Indicator
Level 1	Top of the piers of Emsall Bridge
Level 2	Surface of the Emsall Bridge

These warning water-levels are converted to the water-level at the confluence of the Roseau and the Claire Rivers as follows:

Warning Level	Water-level at the Confluence of the			
	Roseau and the Claire Rivers			
Level 1	64.12 m			
Level 2	64.50 m			

These values are tentatively obtained through hydraulic calculation. These should be updated based on the actual experience in the coming future.

The flood traveling time from the confluence of the Roseau and Claire Rivers to the Emsall Bridge located just upstream side of the Corinth Community is estimated at about 7 minutes. These should be, of course, improved based on the actual experience in the future.

4. Rainfall Warning Levels

Rainfall warning levels should be decided based on the actual record to be newly obtained from the installed rainfall gauges in the river basin corresponding to the water-level warning levels presented in the above.

According to the provisional hydrological analysis, the 2-hour rainfall peak and the peak water-level at the confluence of the Roseau and the Claire Rivers is around 2 hours.

5. Warning Communication System for Corinth

Warning Communication System for Corinth of the Roseau River is established as shown in Fig.-2 and 3.

Fig.-1 The Locations of Target Community and Hydrological Gauges

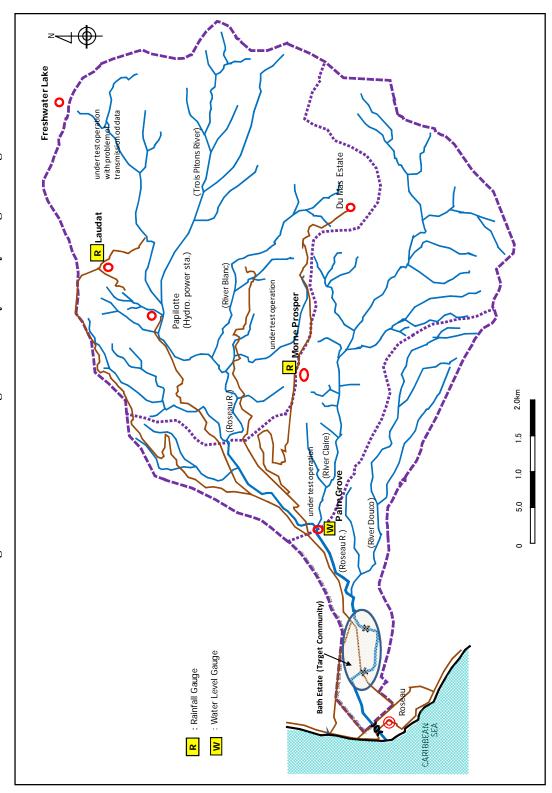
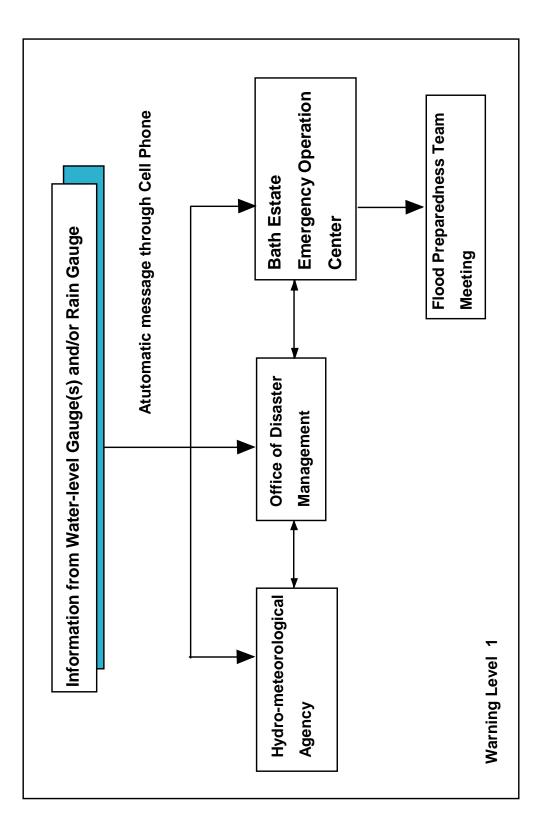


Fig.-2 Flood Warning Communication System for Corinth in Dominica



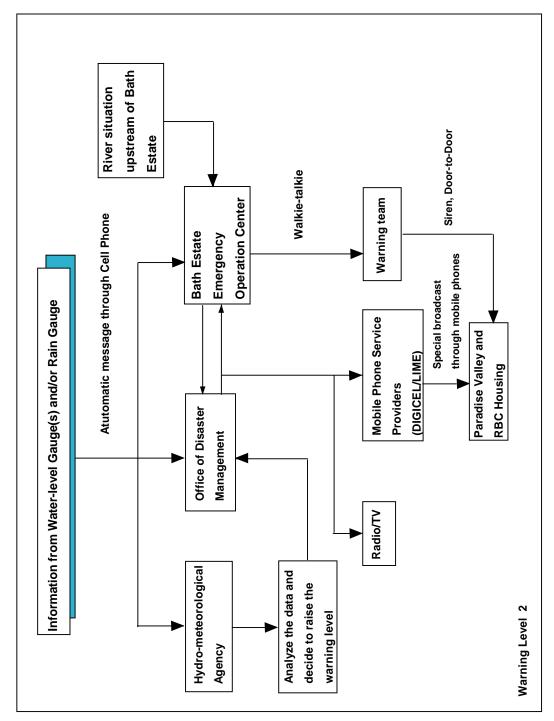


Fig.-3 Flood Warning Communication System for Corinth in Dominica

FLOOD EARLY WARNING SYSTEM FOR BATHAZAR OF THE GREAT RIVER IN GRENADA

1. Target Community

The target community for establishing flood early warning system is Bathazar located in the river basin of the Great River. The location of the community is shown in Fig.1.

2. Locations of Hydrological Gauges

The locations of hydrological gauges for flood early warning system are shown in Fig.1.

The locations of hydrological gauges for early flood warning system are as follows:

Morne Longue (rainfall gauge) Grand Etang (rainfall gauge) Castaign Bridge (water-level gauge)

The locations are shown in Fig. -1.

3. Flood Warning Levels

Based on the opinions of the residents of Bathazar, the flood warning levels are set as follows:

Warning Level	Local Indicator					
Level 1	2 feet above normal river water level					
Level 2	2 feet below the river bank.					
Level 3	1 foot below the river bank					

The above local indicators are converted to the water-level at Castaigne Bridge site based on the non-uniform flow calculation as follows:

Warning Level	Water-level at Castaigne Bridge
Level 1	99.0 m
Level 2	110.5 m
Level 3	111.5 m

These values should be updated based on the actual experience in the coming future.

The flood traveling time from Castaign Bridge site to the community site is estimated at about 20 minutes.

4. Warning Rainfall Amount

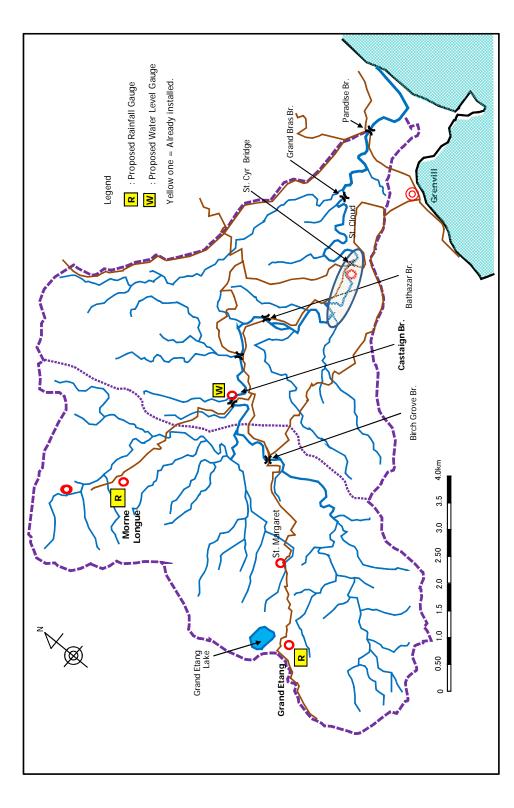
Warning rainfall amount corresponding to the local indicators of water-level will be analyzed based on the rainfall record collected by the newly installed rainfall gauges in the river basin.

According to the flood analysis results, though the rainfall record is not that recorded rainfall in the river basin, the time lag is estimated at about 45 minutes from the peak rainfall to the peak water-level at the Castaign Bridge site.

5. Flood Warning Communication System

The flood warning communication system for Bathazar Community is established as shown in Fig. 2:

Fig. 1 The River Basin of the Great River and the Locations of Hydrological Gauges



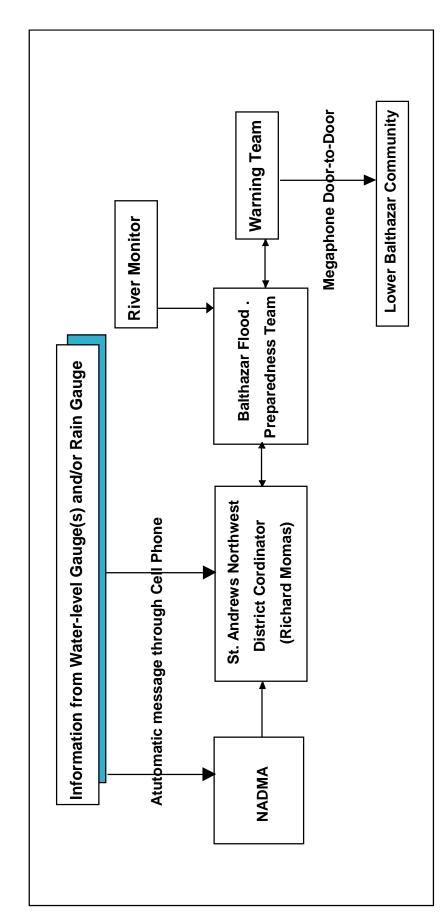


Fig. 2 Flood Warning Communication Flow for Bathazar Community of the Great River

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FLOOD EARLY WARNING SYSTEM FOR BIABOO OF THE MAHAICA RIVER IN GUYANA

1. Target Community

The target community of Biaboo is located in the Mahaica River basin. The river basin of the Mahaica River is as shown in Fig.-1. The location of the target community Biaboo is also shown in Fig. -1

2. Locations of Hydrological Gauges

The locations of hydrological gauges for flood early warning system are also shown in Fig.-1. The locations of hydrological gauges installed are as follows:

- St. Cuthbert (rainfall gauge and water-level gauge)
- Lama Gate (water-level gauge)
- Biaboo community (water-level gauge)

The locations are shown in Fig.-1.

3. Flood Warning Levels

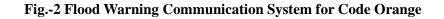
Based on the opinions of the residents of Biaboo, flood warning levels are set as follows:

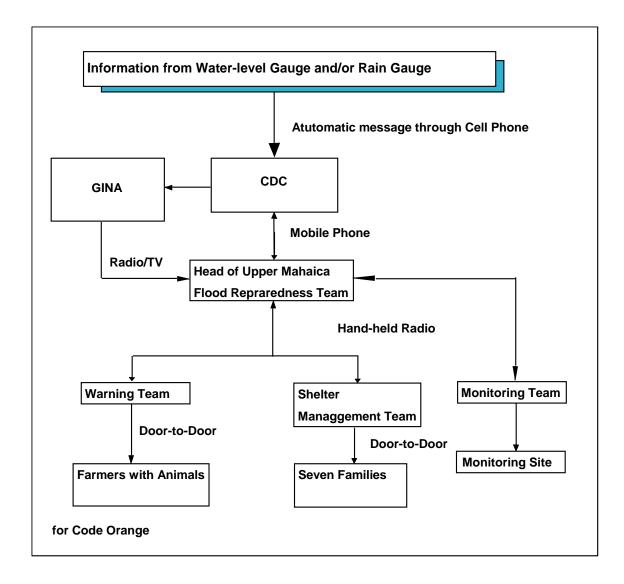
Warming Level	Local Indicator
Code Orange	2 feet below the river bank
Code Red	8 inches below the river bank

The gauges threshold values based on the above local indicators will be programmed after compilation of the data recorded by the newly installed hydrological gauges since the final installation of the gauges was in April, 2012.

4. Flood Warning Communication System

Flood warning communication system for Biaboo is established as shown in Fig.-2 and 3.





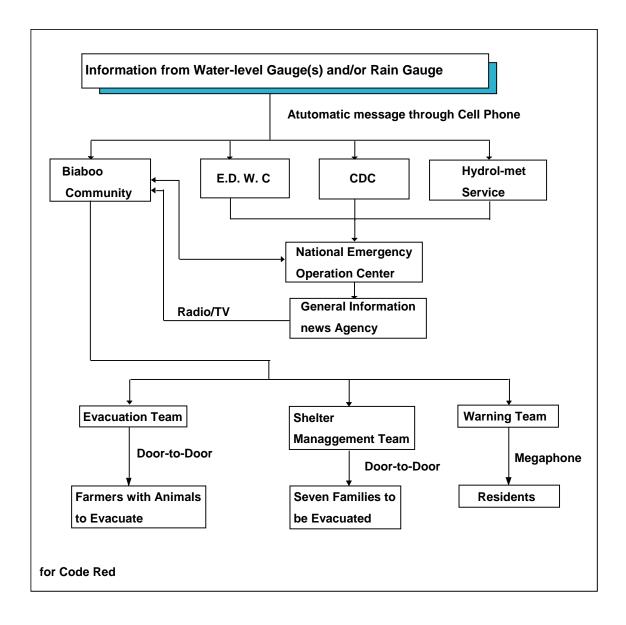


Fig.-3 Flood Warning Communication System for Code Red

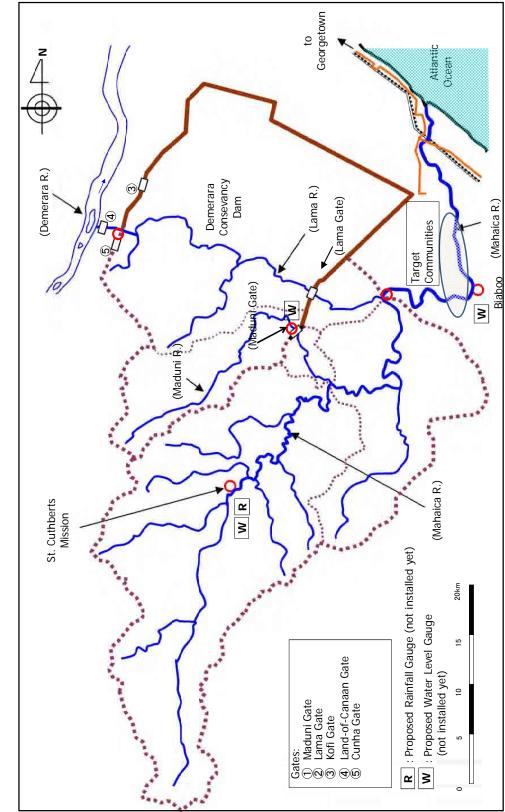


Fig. -1 Location of River Basin, the Target Community and the Hydrological Gauges

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FLOOD EARLY WARNING SYSTEM FOR CORINTH OF THE BOIS D'ORANGE RIVER IN ST. LUCIA

1. Target Community

The target community for establishing early flood warning system is Corinth located in the river basin of the Bois d'Orange River. The location of the community is shown in Fig.1.

2. Locations of Hydrological Gauges

The locations of hydrological gauges for early flood warning system are shown in Fig.1.

The locations of hydrological gauges for flood early warning system are as follows:

- Plateau (rainfall gauge)
- Grand Riviere (water-level gauge)
- Upper Corinth Bridge (water-level gauge)

Their locations are shown in Fig.-1.

3. Flood Warning Levels

Based on the opinions of the residents of Corinth, the flood warning levels are set as follows:

Warning Level	Local Indicator
Level 1	River bank elevation
Level 2	20 cm above the river bank

These are converted to the water-level at Upper Corinth and Grande Riviere as follows:

Warning Level	Upper Corinth	Grande Riviere		
Level 1	18.80 m	42.04 m		
Level 2	19.44 m	42.14 m		

These are obtained through the hydraulic calculation and accordingly these values should be updated based on the hydrological data to be obtained with newly installed hydrological gauges in coming future.

4. Warning Rainfall Amount

The rainfall warning levels should be decided in accordance with the water-level warning levels presented in the above, based on the actual rainfall record and water-level record to be obtained with the newly installed hydrological gauges.

According to the provisional flood analysis on the Bios d'Orange River, the time difference between 75 minutes rainfall in the basin and the peak discharge at Upper Corinth would be about 90 minutes.

5. Flood Warning Communication System

Flood warning communication system for Corinth is established as shown in Fig.-2.



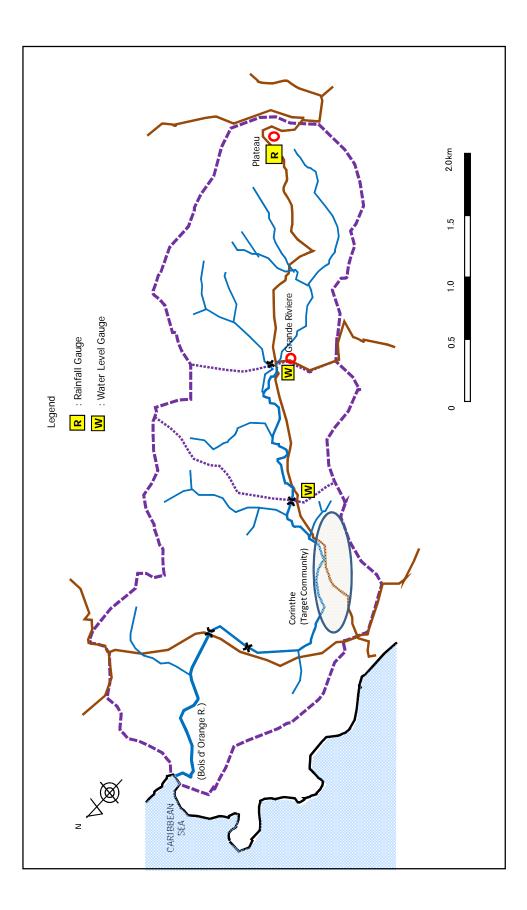
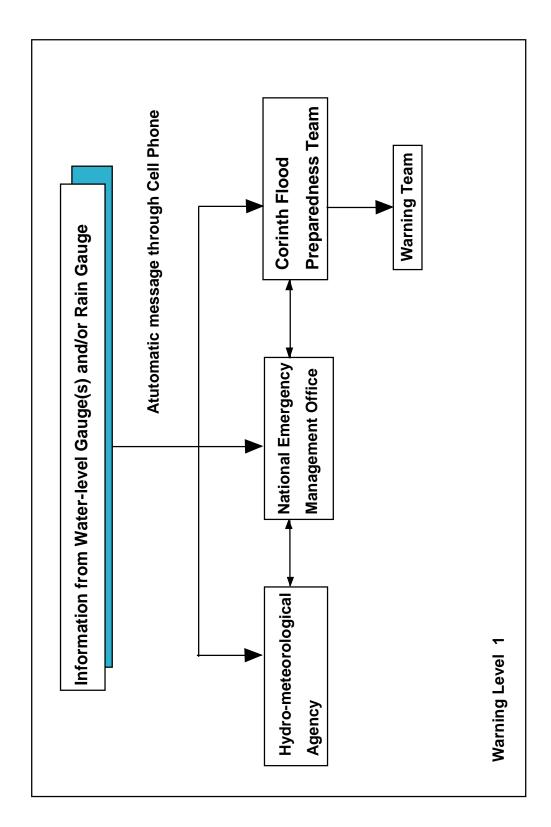


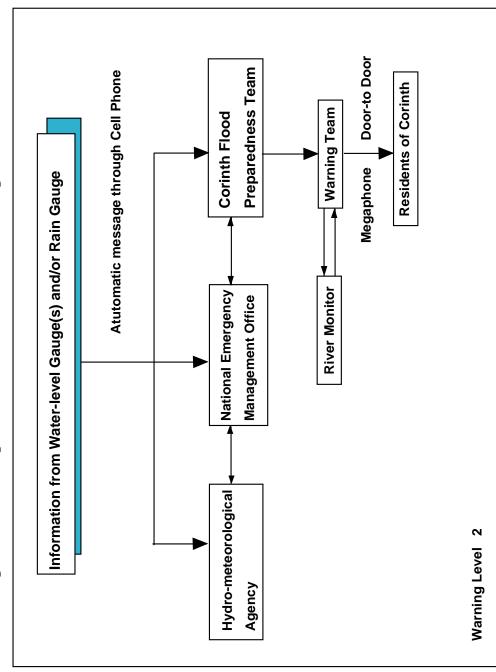


Fig. 2 Flood Warning Communication Flow for Corinth of Bois d'Orange River in St. Lucia (1)



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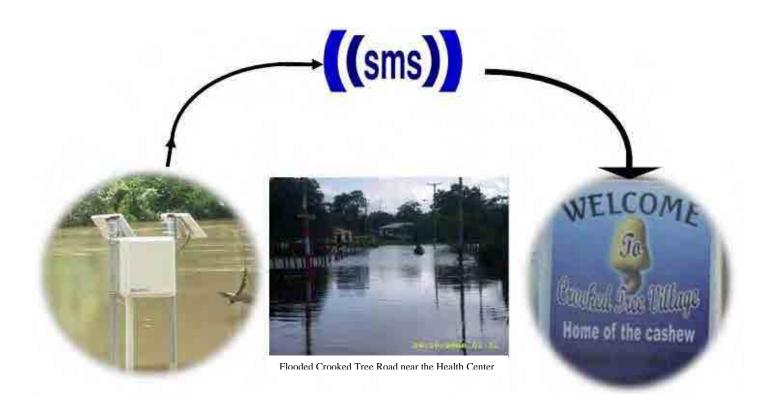
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付属資料 5: パイロット国のコミュニティ防災計画





FLOOD PREPAREDNESS PLAN CROOKED TREE VILLAGE, BELIZE RURAL





May 2012



Crooked Tree Village





Crooked Tree Flood Preparedness Plan

I. Introduction

Founded in the early 18th century, Crooked Tree may be the oldest village in <u>Belize</u>. Until the 3½mile causeway from the Northern Highway was constructed in 1983, the only access to Crooked Tree was by boat through the Northern Lagoon. In 2009, another causeway was built West of Crooked Tree towards Blackburn area. This causeway straddles the Western Lagoon and provides access to the farming area in Blackburn.

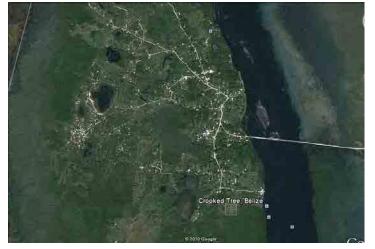
The latest census shows that Crooked Tree population is 985 from 248 families, mostly of Creole descent, who were farming and fishing the area. These families are spread over six areas of Crooked Tree, to wit:

- a. Stains
- c. Crooked Tree Area
- e. Crawford Banks Area
- b. Breadnut Hill
- d. Pine Ridge
- f. Waterfront Area

A Village Council oversees the administration and development activities within Crooked tree. The Village Council is also the *de facto* organization leading the Village Emergency Committee, which is tasked to manage all emergencies within Crooked Tree. It is also responsible for immediate response and restoration of basic services after a disaster.

The Emergency Committee is composed of 10 Sub-committees with team leaders and members who are tasked to perform the functions of emergency first responders. In addition, village volunteers complement the village committee in flood disaster response and, through the JICA Project, flood preparedness activities.

II. Crooked Tree Disaster Context



Crooked Tree is surrounded by Northern Lagoon to the East, Southern Lagoon to the South and Western Lagoon to the West. Because of this setting, Crooked Tree becomes an island cut off from the rest of Belize when the flood water coming from Belize River inundates the Lagoons. The Northern Lagoon is a natural basin that catches flood water from Spanish Creek and Black Creek.









Un-documented disasters in Crooked Tree are still remembered by some. The earliest remembered is the 1931 Hurricane (un-named Hurricane) that destroyed almost all of Belize City, including Crooked Tree. Later Hurricanes and floods are as follows:

Year	Disaster Cause	Major Effects
1961	Hurricane Hattie	Blown Roofs and uprooted trees
1978	Hurricane Greta	Damaging Flood occurred and affected Crooked Tree. The ground floor of the old Baptist Church was inundated.
October 2000	Hurricane Keith	Crooked Tree Bridge and Causeway was under 14-16 feet of water on October 6, 2000
May 2008	Hurricane Arthur	A tornado took place, ripping roofs from at least five homes - leaving the zinc sheeting curled up - and uprooting huge trees over an area about 10 feet wide and for a span of about 50 yards
October 2008	Tropical Depression #16	TD#16 dropped an estimated 19 inches of rain in western Belize. In Crooked Tree, the causeway was under 6-7 feet of water, some houses were under 2-4 ft of water. Flood lasted 3 months.

The flood boundaries and depth of flood at different points during the October 2008 flood are shown in Figure 1. This map is the basis of the flood evacuation procedures.









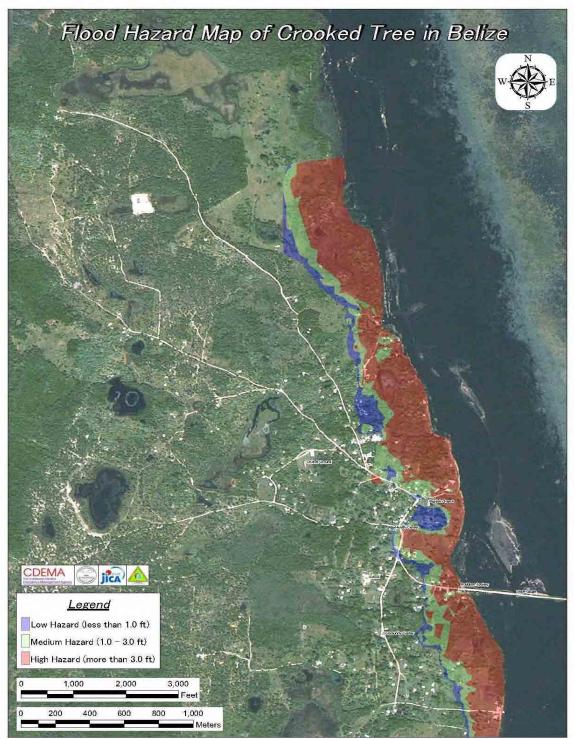


Figure 1. Map of 2008 Flood in Crooked Tree









Flood Risk

There are 32 houses located in flood prone areas of which about half experienced flooding inside and outside their houses Of these, three (3) families plan to move to public safe shelters within Crooked Tree. The rest of those who are exposed to flooding either have their houses raised on posts/pillars that render them safe from the rising water or have a second house built as flood proof or could move with relatives and friends located in high areas of the village. A few choose to move outside the village.

III.Flood Risk Management

To reduce the impacts of flood, a warning and communication system and evacuation procedures were developed for Crooked Tree.

A. Early warning and communication system

The Crooked Tree Early Warning and Communication System will be supported by four (4) water level gauges that have been installed in Santa Familia, Big Falls, Banana Banks and Isabella Banks . A rain gauge was also installed. The water level gauges will send warning signals (SMS or text messages) to pre-programmed telephone (mobile phones) numbers in Crooked Tree and the national authorities (NEMO, Hydrometerological agency and others deemed as part of the early warning system). These warning signals correspond to three warning levels.

Warning Level 1 : Flood is possible but the condition does not pose any imminent danger to the residents. The water level in the northern Lagoon reaches 12 inches below the lowest portion of the causeway (between the two bridges)

Warning Level 2: it is very likely that the flood may take place. The water level in the northern Lagoon reaches the causeway level at the lowest portion of the causeway (between the two bridges)

Warning Level 3: Flood is very dangerous for the people. The water level in the northern Lagoon reaches 20 inches above the lowest portion of the causeway (between the two bridges)

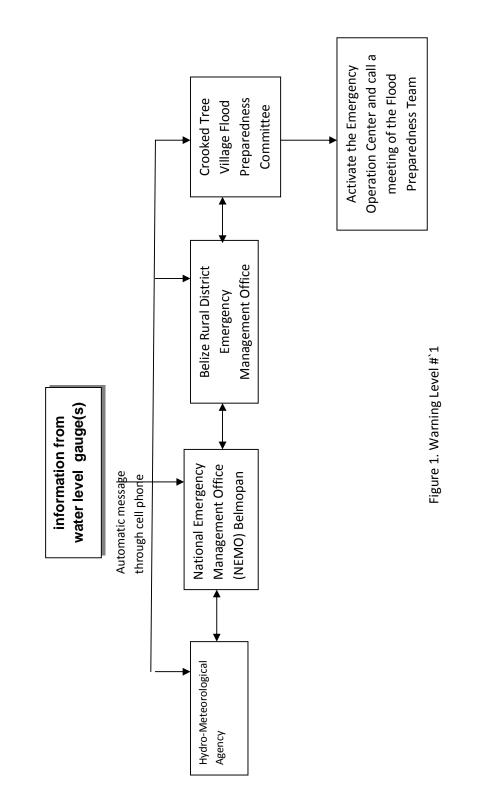








A.1 The warning and communication flow diagram for Crooked Tree

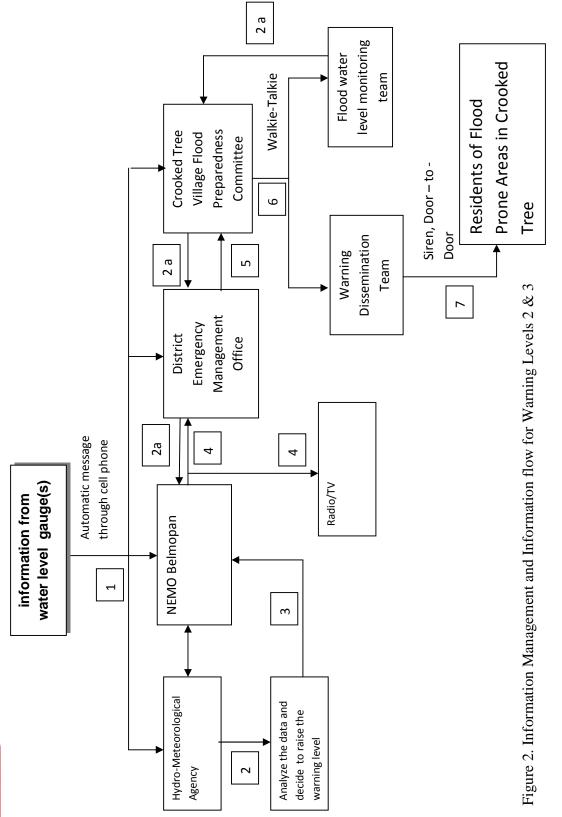




Crooked Tree Wildie Council











data from the gauges go simultaneously to NEMO. Hydro-met office, District Emergency Management Office and	u Tree Village Council. This triggers observation of the water level in Northern Lagoon. = Hydro-met office analyses the data from the water level gauges and input from the Northern Lagoon	= Water level data at Northern Lagoon is sent to the Hydro-met office through the Village council to the District Office to NEMO	= Hydromet Office recommends to NEMO the raising of warning level based on its analysis of data	= NEMO incorporates the recommendation of Hydromet Office and the observation of the water level in Northern Lagoon and upgrades the warning level to 2 or 3, whichever applies. Gives this warning information simultaneously	to the radio/Tv and the Belize Rural District Emergency Management Office	Belize Rural District Emergency Management Office sends the warning to Crooked Tree Village Council	= Crooked Tree EOC alerts the warning dissemination team to disseminate the warning to the residents of flood-prone areas of Crooked Tree	= Warning /team delivers the warning message directly to residents. Door-to-door warning dissemination will be done by cluster. One person would be responsible for one cluster, i.e. one for Stains, one for Breadnut Hill, one for Crooked Tree Area, one for Pine Ridge, one for Crawford Banks Area and another one for Waterfront Area.	Public Announcement shall be done by using one truck-mounted loud speaker and another vehicle with the warning team member using a megaphone.	Contact from the contac
Č.	CTOORED Tree Vill 2 = Hydro-1	$\begin{bmatrix} 2a \end{bmatrix} = Water lev to NEMO$	3 = Hydrom	4 = NEMO Lagoon	to the rad	5 Belize R	6 = Crooked areas of	7 = Warning by cluste Crooked	Public A team me	and the second







A.2 The Emergency Operation Center

This would be activated when Warning Level #1 is received and will continue in operation until the end of the flood event.

B. Plan for Temporary Movement of At-risk Residents

B.1 Public Safe shelters

Three safe shelters have been designated as the evacuation center: Government building located in the school compound, The House of Nazarene and the Community Center (also designated as hurricane shelter). These are located within walking distance of families assigned to each place. The evacuation team will take care of the orderly evacuation ensuring that the residents follow these procedures and proceed to the designated safe shelters.

The at-risk residents assigned designated safe shelters are:

At-risk People*	Designated Safe shelters
Violet Moulton Family (4 members)	Government Building in School compound
Pearlene Tillet Family (9 members)	House of Nazarene
Lawrence Bonner Family (5 members)	Community Center

* Complete list of families to be moved to temporary shelter is in Annex A.









B.2 Private Houses

Other at-risk residents will, by tradition, move to flood-safe houses within and without Crooked Tree Village. Private homes within Crooked Tree have been identified, to wit:

Private Houses (owner)	Families to be accommodated
Ms. Becky Crawford	Webb Family of Crooked Tree Lodge (4 members)
Sherolyn Webster	Verla Jex and Family (3 members)
Green House near the Y owned by Yvette Tillet	Kevin Tillet and Yvette Tillet and Family (7 members)
	Suzette Codd's Family (5 members
Delvarene Wade	Ronald Jones
Carleta Wade	Julia Tillet's Family (4 members)
Yvette Gillette	George Tillet's Family (6 members)
Maurice Gillett	Calbert Gillett's Family (6 members)
Ms Maxine (Verna Samuel's Mother)	Verna Samuel
2 nd house of the Seely's located in safe area	Randy and Rema Seely's Family (6 members)
2 nd house of Mr David Crawford located in safe area	David Crawford and Family (2 members)
Steve Tillet, jr. Family (6 members)	Ms Molly (in the same compound as Steve's house)
Leon Tillet	Gwendolyn Tillet
Howell Longsworth Compound	









B.3 Special Assistance

Residents with special needs shall be prioritized during the temporary movement of people. These residents are:

Name	Condition	Special Need
Mr Ronald Jones	Difficulty in walking	Need transportation to go to his relatives in higher ground
Mr. David Crawford and /wife	Aged	Need assistance to go to safe shelter
Ms GwendolynTtillet	Aged	Need assistance to go to son's house in the same compound

The routes to be taken by at- risk people are shown in Figure 2. The map also shows the location of safe houses and the location of families to move to temporary shelter. The numbers match. For example, family #1 will proceed to safe house #1 and so on. The legend shows which are the safe houses and which are in danger of flooding.









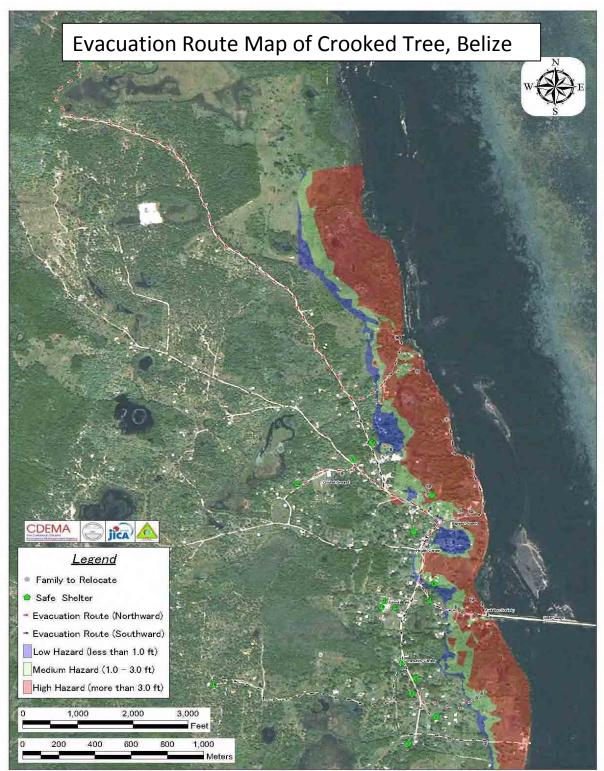


Figure 2. Evacuation Route Map showing the location of safe houses and houses prone to flood









C. Procedure for temporary movement of at-risk residents

Stage	Situation	Actions
Level 1 Warning: Alert Stage	First text message received from water level gauges. The water level at the Northern Lagoon reaches 12 inches below the lowest point of the causeway (between the two bridges)	Village Emergency Committee Chairman Activates the Disaster Preparedness Team and assumes the role of Incident Commander and Leader of the Flood Preparedness Team
		Public Information Team reminds families about "getting ready" – to organize things to be taken to temporary shelter.
Level 2 Warning: Preparation Stage :	Second text message received from water level gauges. The water level at the Northern	Warning Dissemination Team announces Level 2 and reminds people of actions to be taken.
	Lagoon reaches causeway level at the lowest point of the causeway (between the two bridges)	People -Ensure safety of the house: test all locks-Ensure basic needs are safely packed especially baby needs and medicine and needs of residents that require special attentionSafety Team: Move Priority People who need special assistanceTransportation Team to provide transportation assistanceShelter Manager to check and coordinate with church leaders at the House of Nazarene, the Government bldg in the school compound and prepare the unoccupied houses in Longsworth Compound and the Community Center









Emergency Management Agency		
Level 3: All at risk residents are required to move to temporary shelter	Third text message received from the water level gauges. The water level at the Northern Lagoon reaches 20 inches above the lowest causeway level (between the two bridges) Incident Commander and Disaster Preparedness Team decide for movement of all at-risk residents to safe shelter	 Warning Team: Announces repeatedly warning and instruction for at risk residents to move to temporary shelter People Lock the house, carry the emergency kit* and proceed to the designated pick up point or proceed directly to the designated safe shelter Register upon arrival at the safe shelter Manage the family members and ensure that nobody strays from the safe shelter Wait for the "Safe To Go Home" announcement Shelter Manager and Safety Team coordinate about total number of expected residents in each shelter.

* Emergency kit content shown in Annex B



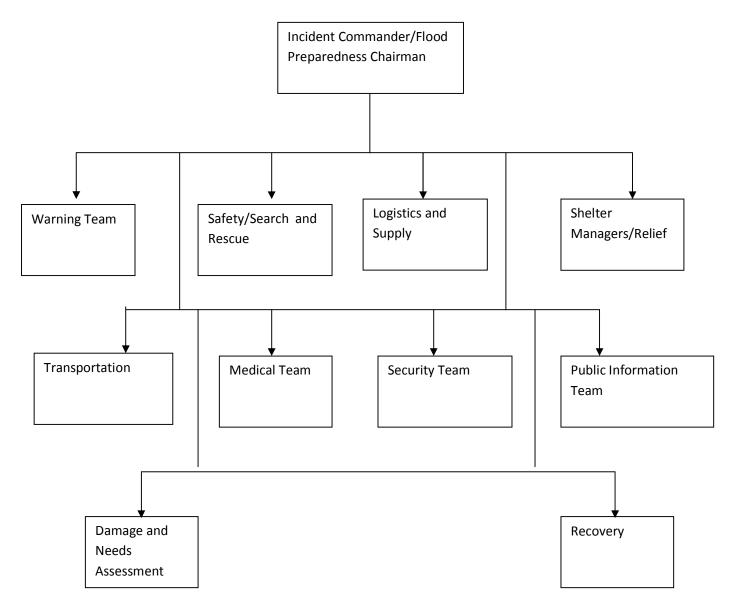






D. Crooked Tree Village Emergency Committee

The Flood risk reduction plan shall be implemented by a group of people who reside within Crooked Tree and who are given specific roles. The plan shall be implemented by the disaster preparedness team whose team leaders are listed in Annex C and Roles and Responsibilities are listed in Annex D. The organizational Structure of the Emergency Committee is found below.











List of Families prone to Flooding

Crawford Bank Road				
1	David Crawford*	81	М	Aged
2	Cecelia Crawford*	71	F	Aged
3	Amybell Crawford	41	F	
4		13		
5		7	М	
6	Lilanie Swasey	3	F	
7	Deon Crawford	42		
8	Inamae Crawford	33		
9	Moesha Crawford	11		
10	Shane Crawford	10	F	
11	Shawn Crawford	10	М	
12	Deon Crawford, Jr	9	М	
13	Nicole Crawford	6	F	
14	Whitney Crawford	5	F	
15	Cody Crawford	2	М	
16	Mordant Tillett	72	М	
17	Natele Tillett	46	F	*
18	Mick Webb*	41		
19	Angela Webb*	30		
20	Cory Webb*	4		
21	Zach Webb*	2		
22	Felicia Quilter	39		
23	Calvin Quilter	13		
24	Malcolm Quilter	10		
25	Melvin Quilter	6		
Bread Nut Hill				
26	Hilda Flowers	72	F	
27	Leonard Williams	79	М	
28	Maisie Williams	75	F	
29	Walter Flowers, Jr		М	
30	Vero Lauriano	38	F	
31	Eric Lauriano	37	М	
32	Joanna Lauriano	17	F	









The Calibbian Deaster Emergency Management Agency					JICA
	33	Jasmine Lauriano	13	F	
	34	Jonathan Lauriano	8	М	
	35	Sonia Wade	60	F	
	36	Timothy Jex	20	М	
	37	Pearlene Tillett*	58	F	
	38	Susan Tillett*	22	F	
	39	Caresa Tillett*	17	F	
	40	Elizabeth Tillett*	21	F	
	41	Rogah Tillett*	38	М	
	42	Ashton Tillett*	9	М	
	43	Amesha Tillett*	4	F	
	44	Symon Tillett*	2	М	
	45	Rogah Tillett, Jr*	1	М	
	46	Verla Jex*	48	F	*
	47	Janine Tillett*	25	F	
	48	Alex Jex			
Crooked Tree Area					
	49	Kevin Tillett*	44	М	
	50	Yvette Banner*	39	F	
	51	Diandra Tillett*	17	F	
	52	Tromeisha Tillett*	12	F	
	53	Keagan Tillett*	9	М	
	54	Kristan Tillett*	9	M	
	55	Kameron Tillett*	7	М	
	56	Aldamee Jex	33	M	
	57	Carolee Gillett	13	F	
	58	Shaniah Jex	3	F	
	59	George Guest	59	M	*
	60	Shirley Guest		F	
	61	Nadia Lewis*	23		
	62	Suezette Codd*	46		*
	63	Lennisha Gillett*	12		
	64	Jada Lewis*	1		
	65	Brandon Lewis*	21		
	66	Violet Moulton*	42		
	67	Elsa Moulton*	23		
	68	Roy Moulton*	20		
	69	Shiney Moulton*	18		
	70	Norris Wade	42		
	70		42		









Emergency Management Agency					
	71	Maria Wade	43		
	72	Kedor Neal	13		
	73	Jonathan Wade	11		
	74	Nathalia Wade	8		
	75	Nona Wade	3		
	76	Curtis Wade	14		
	77	Hessie Codd	65		*
	78	Shakira Codd	28		
	79	Rodwell Conorque	28		
	80	Zion Conorque	4		
	81	Icelma Crawford			plus 3 children
	82	Marlon A Longsworth	35		
	83	Patricia Longworth	35		
		Marlon A Longsworth,			
	84	jr	13		
	85	Jasmine Longsworth	10		
	86	Ismael Longsworth	7		
	87	Britney Longsworth	5		
	88	Ronald Jones*	60		
	89	Margaret Jones			
	90	Julia Tillett*	40		
	91	Lincoln Tillett*	19		
	92	Jerome Tillett*	14		
	93	Peter Tillett*	41		
	94	Godwin Westby	76		*
	95	Hilda Westby	68		
	96	Shane Westby	31		
	97	Daren Westby	17		
	98	Gwennie Tillet*	77	*	Aged
Pine Ridge Area					
	99	Calvert Gillette	64		
1	100	Lolita Gillette	64		
1	101	Steve Tillett , Sr.*	49		
1	102	Ardith Tillett*	42		
	103	Steve Tillett , Jr.*	20		
	104	Sherisha Tillett*	18		
1	105	Jair Tillett*	12		
	106	Sashia Tillett*	9		
Stain					
	107	George Tillett*	46	*	
	108	Dynnamay Lightburn*	40		
					1









109	Davina Lightburn*	17		
110	Daniella Lightburn*	12		
111	Damion Tillett*	8		
112	Denna Tillett*	3		
113	Calbert Gillett*	58	*	
114	Janice Gillett*	60		
115	Kathie Gillett*	23		
116	Randy Gillett*	25		
117	Elric Gillett*	21		
118	Loreta Gillett*	16		
119	Nigel Tillett	44		
120	Marilyn Tillett	39		
121	Kelsey Tillett	11		
122	Nyvon Tillett	6		
123	Mahlon Tillett	4		
124	Denvor Gillett			
125	Norma Gillett			
126	Verna Samuels*			
River Waterfront				
127	Randy Seely*	44		
128	Rema Seely*	39		
129	Ryan Seely*	16		
130	Ryanna Seely*	9		
131	Rahema Seely*	8		
132	Renea Seely*	3		
133	Vera Bruce			

*People who need to move to safe shelters









Annex B

Evacuation (Survival Kit)

General Items	For Babies	For People with special needs
Non-perishable food	Baby food/milk formula	Medicine
Flashlight with batteries	medicine	Wheel chair or as needed
Battery operated radio (with batteries)	Change of diapers	Sleeping mattress
Clothes	Baby clothes, blankets and comfort items	
Medicine		
Important documents		
Mats/sleeping bags		
Drinking water		
Personal hygiene kit (toothbrush and tooth paste, toilet paper, soap)		
Emergency contact list (relatives and doctor)		









Annex C

Members of the Crooked Tree Village Emergency Committee

Chairman - Village Chairman - George Guest

Warning Team: Team Leader – Paul Quiros

Lagoon Water Level Monitors: To be named

Warning Dissemination: George Reynolds

Safety/Search and Rescue: Team Leader – Albert Wade

Members: to be named ; volunteers

Transportation Team: Team Leader – James Dawson

Members: Jerry Jex and Calvert Gillette

Shelter Manager/Relief: Team Leader – Arlene Tillett Brown

Members: Ava Tillet and Doreen Gillett

Security: Team Leader – Rose Kelly/Florence (Becky) Crawford

Public Information and Education: Team Leader – Steven Perriot

Members: Sherolyn Webster

Medical Team: Team Leader – Antonette Hope-Tillett

Logistics and Supply: Team Leader - Rudy Crawford and Mildred Crawford

Members: Verla Jex; Vero Laureano; Judith Quiroz

Damage and Needs Assessment: Eldon Wade









Annex D

Roles and Responsibilities of Crooked Tree Emergency Committee

Incident Commander/ Disaster Preparedness Team Head

- 1. Establish Emergency Operation Center to command and direct village committee according to their responsibilities.
- 2. Cooperate with NEMO
- 3. Cooperate with related organizations
- 4. Command and conduct warning and evacuation, search and rescue
- 5. Activate the Team upon receipt of hazardous information that may affect the community
- 6. Lead the decision-making actions with the participation of the Team members
- 7. Keep in constant communication with the Team members and to keep updated information about the situation

Warning and Communication

- 1. Monitor the flood level of the Northern Lagoon and report to the EOC
- 2. Disseminate warning signals in the area during flood emergency situation to heighten more awareness of vulnerable population to move from the danger zone to pre-identified safe places.
- 3. Maintain warning equipment such as Siren (megaphones) and hand-held radios
- 4. Maintain communication with the EOC regarding the hazard situation

Search and Rescue

- 1. Search missing residents and take them to the designated safe shelter
- 2. Coordinate with relief team and shelter managers for an organized search and rescue effort
- 3. Update the Shelter Manager and the EOC









Safety (Evacuation)

- 1. Organize temporary movement from at-risk area to the designated safe shelter.
- 2. Ensure that all people have been moved to safe shelter during emergency situation
- 3. Coordinate with the shelter managers regarding the movement of people
- 4. Coordinate with the medical team when medical attention is required
- 5. Update the EOC on movement and the number of people who moved to temporary shelters from time to time to ensure timely and appropriate reception in the designated safe shelters.

Security

- 1. Secure the vacated areas and the properties of the residents during their absence from home
- 2. Maintain peace and order both in vacated areas and in safe shelters
- 3. Monitor suspicious looking persons and apprehend them when necessary for security reasons.
- 4. Ensure that no one is left behind in the at-risk areas once safety team declares completion of movement of residents to safe shelters.

Shelter Management /Relief Team

- 1. Prepare safe shelters according to plan
- 2. Coordinate with other teams such as the evacuation team and the medical team
- 3. Ensure that everyone is safe in the shelter
- 4. Organize the residents occupying the shelters and engage them into important pursuits







Transportation



- 1. Ensure vehicles are available to move people and in good working condition.
- 2. Transport people in order of priority in coordination with the safety team
- 3. Ensure that all women, children, adult and disabled are given special support for their safety while in the process of moving them to the safe shelters.

Medical/Health Team

- 1. Provide first aid to those who are injured during movement of people
- 2. Provide medical attention to the sick and those who are in need of medical care

Public Information and Communication

- 1. Serve as link between and among the other teams to provide information on the emergency situation
- 2. Develop and disseminate information on flood preparedness in a timely manner
- 3. Design and execute awareness-raising campaign on flood preparedness









Important Contact Numbers

Name	Office/Designation	Contact Number
Calvert Budd	District Emergency Coordinator	Cell: +501-602-8632
George Guest	Crooked Tree Village Council Chairman	Cell: +501-607-8096 Landline: +501-225-7046
Eldon Wade	Team Leader: Damage and Needs Assessment	
Arlene Tillett Brown	Team Leader: Shelter Management	Cell: +501-661-1689
James Dawson	Team Leader: Transportation	
Florence (Becky) Crawford	Team Leader: Security	Cell:+501-662-3230
Mildred Crawford	Team Leader: Logistics & Supply	Cell: +501-665-8140
Steven Perriot	TeamLeader:PublicInformation&Communication	
Albert Wade	Team Leader: Safety/Search & Rescue	
Antonette Hope/Tillett	Team Leader: Medical Team	
Paul Quiros	Team Leader: Warning Team	









FLOOD WARNING AND EVACUATION PLAN LOWER BATH ESTATE



April 2012









I. Introduction

In late 1990s, the Commonwealth of Dominica through the Office of Disaster Management started focus on community based disaster preparedness training as a means of empowering communities in the prevention and mitigation of disasters. It is in this context that the Bath Estate Development Committee, with support from the Office of Disaster Management, initiated the preparation of Evacuation and Community Warning Plan. The Plan is a collaboration among the residents of flood prone areas of Lower Bath Estate.

II. Bath Estate Flood Disaster Context

Bath Estate is situated in the valley of Roseau River to the NE of the Botanical Gardens. It is surrounded by mountains from which Roseau River flows unhampered. Bath Estate was formerly an agricultural estate that produced limes. When lime infestation occurred, production was affected and the area was converted into a housing area under various schemes. Bath Estate is classified as an urban area and is part of the capital City of Roseau. Residents of Bath Estate are mostly employed in Roseau City or surrounding areas. Economic activity in Bath Estate is vibrant with shops, restaurants and other services that cater to the needs of the residents.

The Roseau Primary School is located at Bath Estate.

The Lower Bath Estate was constructed in late 1977, as a housing scheme, and the people who live there are working middle class people. This was followed by another housing scheme supported by the Royal Bank of Canada in 1979. Low-income housing scheme in a place now called Paradise Valley was developed in 1994. The latest housing scheme located west of the soccer field was constructed as blocks of apartments.

A concrete wall separates the RBC housing from Paradise Valley. There is a storm drain constructed on the periphery of the row of houses on the north side of the street separating the two rows of houses in Paradise Valley.

Bath Estate has a total population of ______ of which a total of ______ residents of Lower Bath Estate are prone to flooding.









Hazards brought to Bath Estate by Roseau River

Flood

Roseau River borders Bath Estate . This River is known to rush through the river channel with raging force during the passage of hurricanes. In August 2007 during Hurricane Dean, the river overflowed at Elmshall Bridge and flooded a few houses in RBC housing and most of the houses in Paradise Valley. The overflow was due in part to the artificial dam brought by blocking of water channel by logs and big debris brought by the river water and in part by the huge volume of water that was brought by the hurricane.



As the flood water flowed towards the lower portion of Bath Estate, the wall separating the RBC housing from Paradise Valley collapsed from the force of flood water, same flood water passing through and overflowing the storm drain. The overflow flooded the houses.

The flood hazard map shows the extent of flooding experienced. The flood came very quickly with no warning and also receded very quickly. The flood event lasted for a maximum of 10 hours.

In August 2009, Bath Estate again experienced flooding, although not as severe as that experienced in 2007.

The map below shows the houses in RBC housing and Paradise Valley which suffered from the flood event of August 2007.





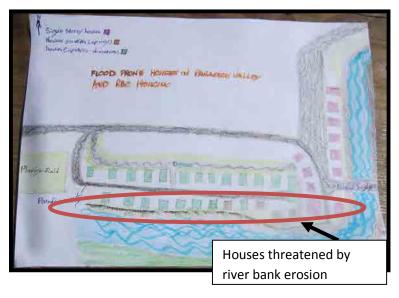






River Bank Erosion

The raging waters also erode the river bank such that the river bank is progressively undermined creating another threat to the houses located at the river bank. Some of the houses on the river bank are almost teetering on the brink of the river bank. This poses another threat from the Roseau River.











The new development (the block of apartments near the entrance to Bath Estate) is located at the bend of the river flowing out to town. This location is also prone to flooding and, in fact, has already experienced flood events from the time of its construction.

The resultant flood hazard map (based on 100-year flood) of Lower Bath Estate is shown below.



III.Flood Risk Management

To reduce the impacts of flash flood, an evacuation plan and a warning and communication system were developed for Paradise Valley and RBC Housing.

A. Early warning and communication system

There are two warning levels designed for Bath Estate preceded by an Alert Stage, following that used by the Government of Dominica.

Alert Stage : The Flood Preparedness Team is alerted when information is received that there is an approaching hurricane, tropical storm or presence of weather system that will produce heavy rains.





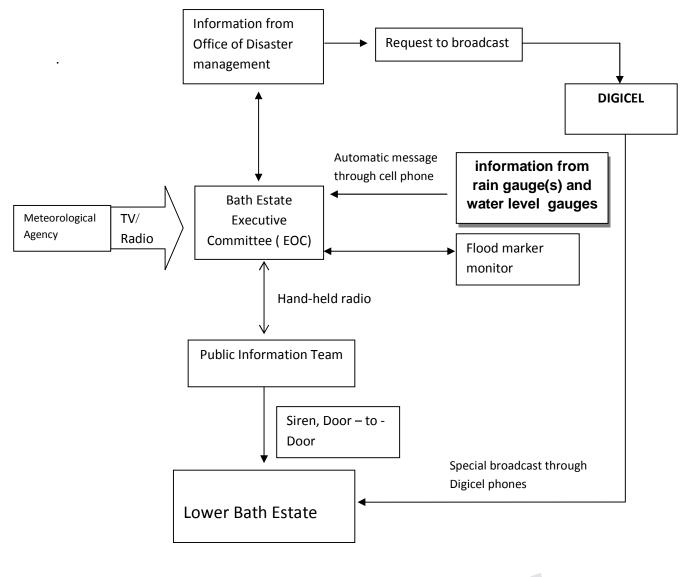




Warning Level 1 (Preparation Stage): When the Roseau River water level upstream of Bath Estate has reached the first established critical level that might pose a threat to the residents of Lower Bath Estate. In Bath Estate, the Roseau River water level reaches the top of the pier of the Elmsall Bridge.

Warning Level 2 (Mandatory Evacuation Stage): Flood is absolutely dangerous for the people. In Bath Estate, the Roseau River water level overflows the Elmsall Bridge and has reached the top of the bridge and starts to overflow.

The warning and communication flow diagram for Lower Bath Estate.









B. Evacuation Plan

Two safe places have been designated as the evacuation center: The Bath Estate Community Resource Center and the Roseau Elementary School. Both are located within walking distance of Paradise Valley, RBC Housing and the apartment block.

The at-risk residents are assigned designated evacuation center:

At-risk People	Designated Evacuation Center
Residents of House nos. 60, 61, 62, 63, 64,	Bath Estate Community Resource Center
65, 66, 67, 68, 69, 70, 71, 72 and 73 in	
Paradise Valley	
Residents of house nos. 55, 56, 57, 58, 59,	Bath Estate Community Resource Center
74,75,76,77,78 and 79 in Paradise Valley	
Residents of house nos 11, 12, 13, 14, 15,	Bath Estate Community Resource Center
16, 17, 18, 19, 20, 21, 22, 23 in RBC	
Housing	
Residents with special needs for priority	Bath Estate Community Resource Center
evacuation	
Residents of the apartment block located	Roseau Elementary School
near the entrance to Bath Estate (from	
town)	

The evacuation team will take care of the orderly evacuation ensuring that the residents follow the evacuation procedures and proceed to the designated evacuation center. The evacuation route map is shown in the following page.

Residents with special needs shall be prioritized during evacuation.



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Evacuation Route Map









B . Evacuation Procedure

Alert Stage	A forecast of storm, hurricane or heavy rains to affect Dominica	Flood preparedness Team: Head of Disaster Preparedness Team Activates the Paradise Valley-RBC Housing Disaster Preparedness Team and assumes the role of Incident Commander and Leader of the Disaster Preparedness Team . Review the plan and give assignments to the
		members of the team. Flood Marker Monitoring Team: Start to monitor the flood water level at Roseau River near the Elmsall Bridge.
		Information Team: Inform the residents of the situation and advise them to be on the alert.
		Medical Team: Alert the Fire Service and the hospital of the situation and request them to stand by for possible assistance.
		Alert Transportation team of possible need for vehicle.
		Residents: Upon receipt of the information from the Team
		-Ensure safety of the house: Test all locks -Ensure valuable objects and Documents that will be carried when evacuating are packed in evacuation kits









First text message received by designated recipients from water level gauge and rain gauge Local Indicator: When river water reaches the top of the pier of the Elmsall Bridge but water is not overflowing the bridge	Flood Preparedness Team: Leader of the Flood Preparedness Team: Alert the Fire Department to be on stand-by in case assistance will be needed. Warning Dissemination and Information Team: - Disseminate the warning to all residents of Paradise Valley and RBC Housing - Voluntary evacuation of residents is announced. Evacuation Team/Transportation Team: - Proceed to the flood prone
	Team:
	 area and help those who need assistance proceed to the evacuation shelters. Evacuate the sick, the elderly, the physically and mentally challenged and the babies.
	 Inform medical team of any medical assistance needed at this time Shelter Team: Proceed to Shelters to receive the first wave of evacuees.









		Security Team:	
		- Proceed to the flood prone area and start patrolling the area.	
		Residents:	
		-Ensure basic needs are safely packed especially baby needs and medicine and needs of residents that require special attention	
Warning Level 2: Mandatory Evacuation Stage	Local Indicator: flood water reaches the top of the Elmsall bridge and starts to overflow.	Incident Commander and Disaster Preparedness Team decide for total evacuation	
_		Warning and Information Team:	
		- Disseminate level 3 warning.	
		Evacuation Team: Assist the residents to evacuate.	
		Residents:	
		- Lock the house, carry the evacuation kit* and proceed to the designated pick up point or proceed directly to the designated evacuation shelter.	
		- Register upon arrival at the evacuation center	
		- Manage the family members and ensure that nobody strays from the evacuation center	
		- Wait for the "all clear signal"	









		Relief Team: coordinate the feeding of evacuees
Step down Level	Rain stops and the flash flood ends	Team Leader announces "all clear signal" Shelter Manager prepares the evacuees to leave the shelter Evacuation team/Transportation Team: Helps the most vulnerable to return home. Team to re-assemble to assess the extent of damage and identify needs.



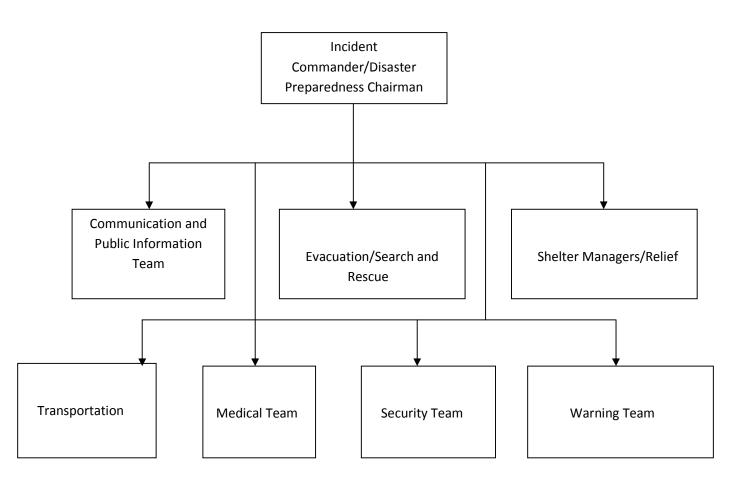






C. Disaster Preparedness Structure

The disaster risk reduction plan shall be implemented by a group of people who reside in Paradise Valley and RBC Housing and who are given specific roles. The plan shall be implemented by the disaster preparedness team which is organized as follows:





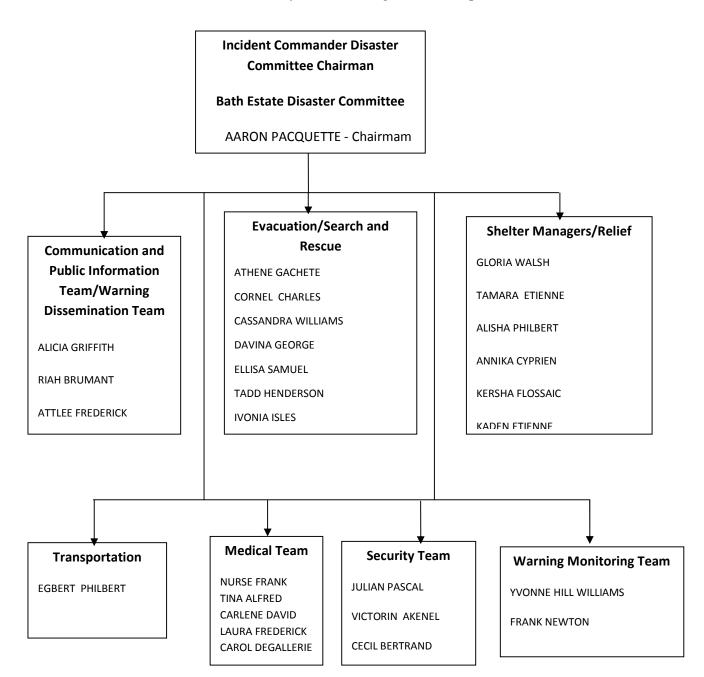






Annex A

Members of the Paradise Valley-RBC Housing Disaster Preparedness Team











Roles and Responsibilities of Disaster Preparedness Team

Incident Commander/ Disaster Preparedness Team Head

- 1. Establishes Emergency Operation Center to command and direct village committee according to their responsibilities.
- 2. Cooperates with ODM
- 3. Cooperates with related organizations
- 4. Commands and conducts warning and evacuation, search and rescue
- 5. Activates the Team upon receipt of hazardous information that may affect the community
- 6. Leads the decision-making actions with the participation of the Team members
- 7. Provides facilities
- 8. Keeps in constant communication with the Team members and to keep updated information about the situation
- 9. Coordinate with the hospital and the Fire Service to transport sick people to the hospital

Warning Monitor

- 1. Monitor the local indicators (flood marker)
- 2. Maintains communication contact with the EOC regarding the flood situation

Evacuation /Search and Rescue

- 1. Organizes evacuation movement from at-risk area to the designated evacuation center.
- 2. Ensures that all people have been evacuated during emergency situations
- 3. Updates the EOC on evacuation movement and the number of transported evacuees from time to time to ensure timely and appropriate reception in the designated safe evacuation centers.
- 4. Searches for unaccounted evacuees and takes them to the designated safe shelter
- 5. Coordinates with the relief team and the evacuation team for an organized search and rescue effort









Security

- 1. Secures the vacated areas and the properties of the potential evacuees while in transit to the designated safe evacuation centers.
- 2. Maintains peace and order both in vacated areas and in the evacuation centers.
- 3. Monitors suspicious looking persons and apprehend them when necessary for security reasons.
- 4. Ensures that no one is left behind in the at-risk areas once the evacuation team declares completion of evacuation target.

Shelter Management /Relief Team

- 1. Prepares safe evacuation centers according to the evacuation plan.
- 2. Ensures that everyone is safe in the shelter
- 3. Organizes the evacuees and engages the evacuees into important pursuits
- 4. Manages and distributes relief items to those in need during and immediately after the flood.

Transportation

- 1. Ensures evacuation support vehicles are available and in good working condition.
- 2. Transports people in order of priority in coordination with the evacuation team
- 3. Ensures that all would be evacuees particularly the women, children, adult and disabled are given special support for their safety while in the process of evacuating.
- 4. Coordinates with the EOC regarding transporting the sick people

Medical/Health Team

- 1. Provides first aid to those who are injured during evacuation
- 2. Provides medical attention to the sick and those who are in need of medical care

Public Information and Communication









- 1. Serves as link between and among the other teams and the residents to provide information on the emergency situation
- 2. Develops and disseminates information on disaster preparedness in a timely manner
- 3. Designs and executes awareness-raising campaign on disaster preparedness









Annex C

Evacuation (Survival Kit)

General Items	For Babies	For People with special needs	
Non-perishable food	Baby food/milk formula	Medicine	
Flashlight with batteries	medicine	Wheel chair or as needed	
Battery operated radio (with batteries)	Change of diapers	Sleeping mattress	
Clothes	Baby clothes, blankets and comfort items		
Medicine			
Important documents			
Mats/sleeping bags			
Drinking water			
Hygiene kit (toothbrush and tooth paste, toilet paper, soap)			
Emergency contact list (relatives and doctor)			









At Risk Population Directory (To be updated)

Address/location	Name of family members	age	Position in family	Contact telephone numbers	Special description
74 Paradise Valley Down Stairs	Triston Lewis	20	son	2654528	
74 Paradise Valley upstairs	Anousheu alie	28	mother	6123758	
74 Paradise Valley up stairs	Sagdro moutoussamy	31	father	6123758	
77 Paradise Valley	Anthea Hector	40	mother	6131366	
77 Paradise Valley	Tamara morancie,	19	daughter		
77 Paradise Valley	Jermiah Morancie	13	Son		
77 Paradise Valley	Karen hector	31	daughter	2769185	
4	Trudy hector	11	g/daughter		
	Jadelle white	14	g/son		
	Malik Roberts	4	g/son		









Rakim Roberts	5	g/son		
Richie Rene	10	g/son		
Raelina Roberts	3	g/daughter		
Collin degalary	26	son	4406874	
Shirley shillingord	70	mother		Difficultly in walking
Fredericka frank	adult	mother	4406731	
Maury frank	Adult	father		
Jamie frank	4	Daughter		
Rae frank	7	Daughter		
Xiomarre shillingford	2	Adopted daughter		
Prince blaize	10	Son		
Mary blaize	42	mother	6144950	
Jilly blaize	13	Daughter		
Tammy bellot	28	Sister		
Lenny bellot	27	son	2763185	
Nigel martin	28	Son		
Helen martin	51	Mother		
	RobertsRichie ReneRaelina RobertsCollin degalaryShirley shillingordFredericka frankMaury frankJamie frankRae frankXiomarre shillingfordPrince blaizeMary blaizeJilly blaizeJilly blaizeLenny bellotNigel martin	Roberts10Richie Rene10Raelina Roberts3Collin degalary26Shirley shillingord70Fredericka frankadultMaury frankAdultJamie frank4Rae frank7Xiomarre shillingford2Mary blaize10Mary blaize13Tammy bellot28Nigel martin28	RobertsImage: Constraint of the section o	RobertsImage: Constraint of the seriesRaelina Roberts3g/daughterRaelina Roberts3g/daughterCollin degalary26son4406874Shirley shillingord26son4406874Shirley shillingord70mother4406731Fredericka frankadult adultmother4406731Maury frankAdultfatherImage: Constraint of the seriesJamie frank4DaughterImage: Constraint of the seriesRae frank7DaughterImage: Constraint of the seriesXiomarre shillingford2Adopted daughterImage: Constraint of the seriesPrince blaize10SonImage: Constraint of the seriesJilly blaize13DaughterImage: Constraint of the seriesJilly blaize13DaughterImage: Constraint of the seriesLenny bellot27son2763185Nigel martin28SonImage: Constraint of the seriesNigel martin28SonImage: Constraint of the series<









	Dawyne	21	Son	
	bellot		501	
72 Paradise Valley up stairs	Julien joseph	30	Son	
	Achille eli grove	15	Son	
	a/ rosebud eli	49	mother	6138187
70 Paradise Valley	Gordon Mondasie	60	Head of family	4486764
71 Pardise Valley	Lucille smith		Head of family	4485678
18 RBC Housing	Catherine Christmas	60t	In-law	4488750
	Julien Pascal	60t	husband	4488750
	Mews Pascal	60t	wife	4488750
19 RBC Housing	Dora Williams	73	Head/mother	448-8442
	Mavlyn Joseph	36	daughter	448-8422
	Steve Joseph	33	Son-in law	448-8422
	Stasha Joseph	11	g/daughter	
	Sarita joseph	9	g/daughter	
	Macy Joseph	7	g/daughter	
	Adela Isaac	10	Adopted	
	Joan rhyner	45	daughter	448-8422
20 RBC Housing	Catherine	53	wife	448-8053









Emergency Manogriment Agency					
	graham				
	Albert graham	63	husband	448-8053	
	Francilia graham	19	daughter	448-8053	
	Bethany moriss	5	g/daughter		
15 RBC Housing	Merina blanc	74	Head of family	6123046	
	Kirshena Joseph	18	g/daughter	612-3046	
	Ellyana Glasgow	10	g/daughter	612-3046	
15 Paradise Valley	Aylssa Milton	15 mths	g/daughter		Baby
	Fortune Milton	15mths	g/son		Baby
	Gloria Anthony	37	daughter	612-3046	
	Gerald Browne	42	son	612-3046	Mentally ill
55 Paradise Valley upstairs	Renolia larocque	24	Head of family	277-2714	
	Fitz Charles	20	brother	2252696/3151914	
55 Paradise Valley downstairs	Andy john	24	cousin		
56 Paradise Valley	Clarita Cuffy	69	Head of home	4487829	









Emergency Management Agencey					
	Amelia Simon	47	daughter	2776609	
	Sharie Douglas	27	daughter	4487829	
	Aminah Simon	24	g/Daughter	2650580	
	Raenelle Roberts	7	Adopted	2776609	
	J'Len Bellot	1	Great g/son	2650580	Baby
58 Paradise Valley	Maria Edwards	46	Head of the home	2774456	
•	Mikayah Antonio	11	son	2774456	
	Jaida Toussaint	7	g/daughter	2774456	
57 Paradise Valley Upstairs	Clyma Dublin	49	head	2775339	
	Nelson Stanford	49	head	2358089	
57 Paradise Valley downstairs	Mithere Piere	11	Tenant	2775339	
17 RBC Housing	Roslyn Fontaine	43	wife	2953601	
E	Earl Fontaine	40	husband	2769247	
	Earlyn Fontaine	14	daughter	2753601	
	Ella Laurent	64	mother	2753601	Elderly









Emergency Management Agency				
	Brian Dominique	41	Cousin	615-0490
	Pontiana Bruno	43	mother	2776290
	Yannel Bruno	18	daughter	
	Yipman Bruno	13	son	
59 Paradise Valley downstairs	Andrea philbert	48	wife	2776246
	Egbert philbert	50	husband	2779996
	Alisha Philbert	18	daughter	2254530
	Lester Philbert	22	son	2776746
	Josian Fritz	16	niece	2776246
	Tahj Irish	6	G/son	2776246
59 Paradise Valley Upstairs	Lisa Philbert	24	Head of house	2771710
	Marcus Jon Baptiste	23	boyfriend	2771710
60 Paradise Valley Downstairs	Avril Shillingford	40	Head of home	2765804
	Kaderah Jackson	3	daughter	2765804
	Kadijah Jackson	14	daughter	2767502









Emergency Management Agency					
60 Paradise	Tarisha		Head of	2775280	
Valley Upstairs	Thomas		home		
, and j opstand	111011100				
60 Paradise	Mr and Mrs		Husband	2769963	
Valley Upstairs	Oweye		and wife		
	Oweye				
(2)					
66 Paradise	Erica	57	Head of	4485384	
		57		4403304	
Valley Upstairs	Ambrose		home		
			(mother)		
	Sherma Vidal	38	daughter	4485384	
(5 D. 1'	Calar (50	11. 1	27(120)	
65 Paradise	Sebastian	52	husband	2761206	
Valley upstairs	Toussaint				
68 Paradise	Frank	50	father	4481906	
Valley	Newton			6120061	
63 Paradise	Judith	60+	Mother	4486854	Difficulty
Valley upstairs	Nicholls				in walking
2 1					U
63 Paradise	Lora Labad		daughter	4486854	
Valley Down			U U		
stairs					
stalls					
64 Paradise	Giselle	24	g/daughter	2760441	
		24	g/uauginer	2700441	
Valley	Gabriel				
	Dhillin Cimon	15	~/~~ ~	4481684	
	Phillip Simon	15	g/son	4401004	
	Marlyn	40+	Daughter	4481684	
	•	40+	Dauginei	4401004	
	Gabriel				
	Desime	20	dou abter	1101601	
	Desiree	30+	daughter	4481684	
	Gabriel				
		<u></u>	II 1 2	4401604	
	Catherine	60+	Head of	4481684	
	Faustian		home		
61 Paradise	Sherhany	14	daughter	2767791	









		1		
Valley Upstairs	Soanes			
	JuniorSoanes	20+	father	2767791
62 Paradise	Davina Jon	40+	mother	2654410
Valley Down	Baptist			
stairs				
	Renaldo	13	son	2775100
	Reilly			
	Kimran Burk	24	son	2654410
	Hugo Rielly	22	son	2774777
65 Paradise	Nigel Rivere	38	father	2454734
Valley Down				
stairs				
	Nicky Rivere	2	son	2454734
	Matlida	29	mom	2454278
L	1			









Important Contact Numbers

Name	Office/Designation	Contact Number
	Office of Disaster	
	Management	
	Meteorological Agency	
	Digicel	
	Princess Margaret Hospital	
	Ambulance Service	
Mr Aaron Pacquette		









FLOOD WARNING AND EVACUATION PLAN

BALTHAZAR VILLAGE

ST. ANDREWS, GRENVILLE



May 2012



Community at Lower Balthazar Village





FLOOD PREPAREDNESS PLAN LOWER BALTHAZAR VILLAGE

I. Introduction

Balthazar Village is bounded on the South by the Great River which floods very frequently. There is a short bridge called Leste Bridge which overflows and inundates the houses nearby.



Like a typical housing estate, there are different makes of houses.. wood framed and concrete. What is interesting to note is that there are houses which are on pillars (long and short pillars) while there also remain houses that are constructed close to the ground.

Geographically, Balthazar Village is divided into Upper Balthazar and Lower Balthazar.

Lower Balthazar is closer to the Great River and to the Leste Bridge, thus making Lower Balthazar more prone to flooding. Upper Balthazar is on the uphill section of Balthazar Village.

The section of Balthazar Village that gets flooded is shown in the accompanying map. The houses which are at risk of flood water entering the house are marked in blue.

II. Flood Context

Flash Flood and Associated Hazardhen the Great River rushes down from the mountains, flood water inundates Lower Balthazar Village at a speed that the water comes and goes in an hour or so. There are two main points where the Great River overflows: the Leste Bridge and the stretch of the River by going down by the cricket playing field.

Flash Flood occurs during the passage of a hurricane or when it rains non-stop for a few days. The longest flash flood experienced lasted for one day. Flash flood follows the road and the drains that intersect the road near the community center. Past flash floods did not inundate the community center.







Flash flood is a main concern. However, as a result of the raging flash flood, the river bank, at certain points of the Great River, suffer river bank erosion. Progressive river bank erosion will compromise the cricket playing field.

a. Flood History

Flash flood in Balthazar Village were associated with continuous heavy rain and also associated with hurricanes. There are three most remembered flash floods in recent years. These are

Date	Cause of flood
2007	Continuous rains
2005	Hurricane Emily
2004	Hurricane Ivan

b. Flood Risk

Risk assessment shows that 12 houses and the occupants are directly at risk from flash flood from the Great River. The list of occupants who are at risk are attached as Annex A. The other names in the list are located in areas that are affected by flood but the risk is lower because their houses are on pillars and are above the historical flood water.

Further assessment identified other elements of value and which are also at risk. These are:





- 1. Pets like dogs and rabbits
- 2. Kept animals with economic value such as pigs, sheep, goats, chicken
- 3. Construction materials and building and gardening tools

III. Flood Risk Management

a. Early Warning System

Early Evacuation is one of the risk reduction options. Early Evacuation is triggered by Early Warning and Communication System.

There are four warning levels designed for Balthazar Village As agreed during the planning meeting.

Alert Stage : Flood is possible but the condition does not pose any imminent danger to the residents. The Incident Commander convenes the flood preparedness team and activates the emergency operation center. Information should be disseminated to the residents so that they could prepare for evacuation. NO warning is given to the residents.

Warning Level 1 (Warning Stage): The River is starting to rise rapidly. People who are doing some activities in the River are in grave danger Incident Commander mobilizes the flood preparedness team.

Warning Level 2 (**Preparatory Stage**): The river is rising rapidly and poses danger to the community. Flood Preparedness Team advises people to prepare to evacuate in case the river becomes more dangerous. Some people may choose to evacuate although not required at this point.

Warning Level 3 (**Evacuation Stage**): Flood is absolutely dangerous for the people. Everyone who is at risk to flooding should move to safe shelter.

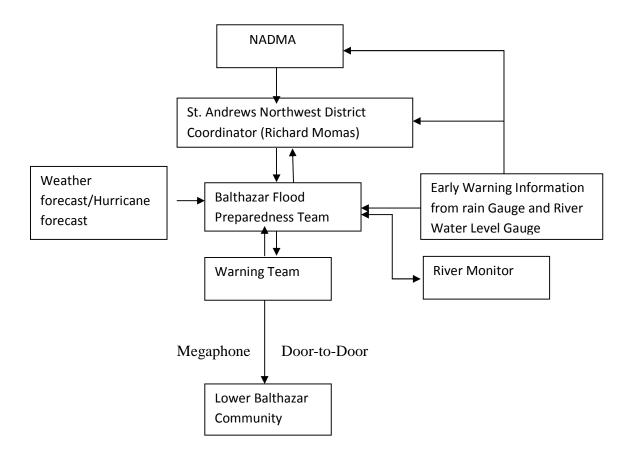
Level	Situation
1	A forecast of hurricane likely to affect Grenada or
Alert	continuous intense rainfall





entent Agency	
2	When river water reaches 2 feet above normal river
Warning Stage	water level . First text message is received from the water level gauge.
3	When river water reaches 2 feet below the river
5	bank. Second text message is received from the
Preparatory Stage	water level gauge
4	When the river water reaches 1 ft below the river
Evacuation Stage	bank. Third text message is received from the water level gauge.

b. Early Warning and Communication System of Balthazar Village







c. Early Evacuation Plan

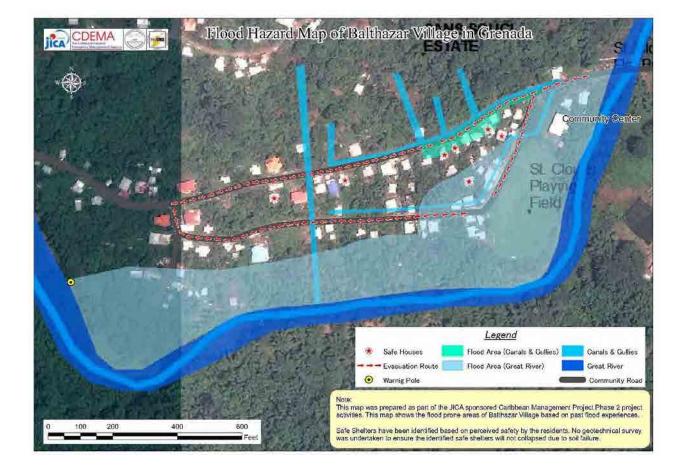
Based on current practices, the at-risk population have identified the safe places within Balthazar Village where they could go during the passage of the flash flood. The designated places for each of the at-risk population is shown below.

Family	Safe Place
Eden Dowden and Ann Charles Family + 2	Nelson Dumont and Cynthia James House (upstairs section)
Therese George and family (has one baby)	Ms. Cynthia James' house (upstairs section)
Lindann Bescome and family (+4)	Uncle Alan's House
Steven Roche (deaf old man)	Nesta Lawrence's House
Yvette Bascombe + 8 members of the family (has one baby)	Lynette King's House
Lisa and Family - with two children	Gordon Bascombe
Joseph Dumont	Yolande House
Mrs Fortune and Family	Yolande House
Annette (2 nd house from the corner)	Annette's mother
Portia Bascombe	Ms Audrey Wickham
	Mr Martin Bascombe
Silla Grey	Cynthia James' house (upstairs section)





The evacuation route to be taken by the at-risk residents is shown below. The red arrows show the direction of movement.



d. Evacuation Procedures

Among the at-risk population, those who are prioritized for evacuation have been identified as those who have difficulty walking, senior citizens, deaf and old, who are ill at the time of flash flood, pregnant and lactating mothers, and babies and children.

The procedures to be followed at different levels are as follows:





Stage	Situation	Actions
Level 1: Alert Stage	A forecast of hurricane likely to affect Grenada or continuos intense rainfall upstream of Balthazar Village or experienced at the village.	The Leader activates the Balthazar Village Flood Preparedness Team and identifies an Emergency Operation Center. The Team advises the at-risk residents to: -Ensure safety of the house: test all locks -Ensure valuable objects and documents that will be carried when evacuating are packed in evacuation kits (See Evauation Kit Annex) Team leader assigns monitoring team to monitor the river water level
Level 2 :Warning Stage :	First text message from the water level gauge received by the Flood Preparedness Team When river water reaches 2 ft above normal river water level	 The Flood Preparedness Team: Warning and Evacuation Team start working Evacuation Team: Advise the people who are in the river, either fishing or washing clothes to immediately leave the river and move to higher grounds Monitoring Team: Continue monitor the condition of the Great River at the designated monitoring station.





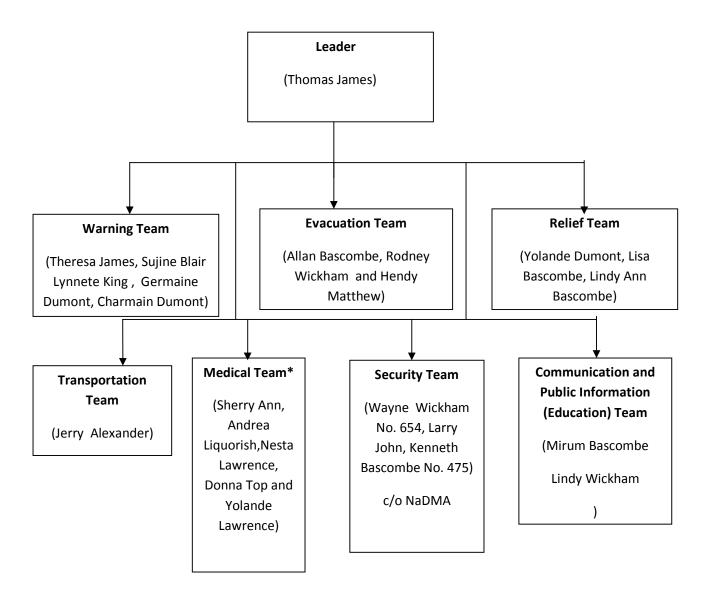
Emergency Management Agency		
Level 3: Preparation Stage	 Second text message is received from the water level gauges When river water reaches 2 feet below the riverbank but not overflowing 	 Warning Team: Announces preparation stage and advises residents to prepare to evacuate. Evacuation Team: Evacuate the residents who are prioritized for safe movement
Level 4: Mandatory Evacuation	Third text message is received from the water level gauges. When river water reaches 1 foot below the riverbank but not overflowing but expected to overflow.	The team action Warning Team: - Warn the people to evacuate Evacuation Team: - Assist those who need to evacuate and ensure that everyone who is at risk to flood moves to safety Residents Actions:
		Lock the house, carry the evacuation kit* and proceed to the designated safe place Manage the family members and ensure that nobody strays from the safe house during the flash flood Wait for the "all clear signal"





c. Flood Preparedness Structure

The Flood risk management plan shall be implemented by a group of people who reside at Balthazar Village with the majority residing in the flood prone area of Lower Balthazar and who are given specific roles (Annex B). The plan shall be implemented by the disaster preparedness team which is organized as follows:



• Additional Team members: Yolande Dumont, Terisha Fortune, Tesra Fortune, Denise Williams, Ann Charles, Andrea Lawrence, Rennet Lawrence, Rosalie Lawrence





No.	Name	Age	Special Information
1	Eden Dowden	69	438-5129
2.	Ann Charles	44	419-0809 (Head of Family)
3.	Christine Dowden	16	
4.	Kelsey Dowden	12	
	Lindyann Bascombe	30	416-7247 (Head of Family)
6.	Shakimma Bascombe	10	
7.	Latisha Bascombe	8	
8.	Duren Bascombe	4	
9.	Juydon Bascombe	2	
10.	Bat	41	Head of Family)
11.	Lisa Bascombe	28	
12	Paul Bascombe	6	
13	Alisha Bascombe	1 yr	
14	Dailia Bascombe	25	416-0908 (Head of Family)
15.	Muntari Bascombe	2	
16.	Leslie Bascombe		
17.	Sujine Blair	33	537-4261 (Head of Family)
18.	Matthew Blair	28	(Presently in Caricou working)
19.	Jevon Blair	13	
20.	Theresa George	60	
21.	Noland George	26	
22.	Nolana George	23	





Emergen	cy Management Agency		JICA
23	Sally Ann George	29	538-5866 (Head of the Family)
24.	Lydnis George	22	
25.	Lois George	20	
26	Anthony George	4	
27	Kennick George	3	
28	Tony	1.5	
29	Yvette Bascombe	53	Head of the Family
30	Kenneth Bascombe	29	438-3685
31	Floyd Bascombe	26	
32	Karen Bascombe	23	
33	Mirium Bascombe	21	
34	John Bascombe	19	
35	Dave Bascombe	18	
36.	Tamara Bascombe	1 yr	
		4 mos	
37.	Jean Dumont	73	
38	Angela Dumont	52	442-6238
39	Yolande Dumont	39	442-6238/403-3777 (Head of the Family)
40.	Anil Dumont	13	
41	Wavel Dumont	10	
42	Shania Dumont	6	
43	Joseph Dumont	60	Leaving alone
44	Kendel Panchoo		
45	Steven Roche	73	Deaf and old
46	Kechon Charles	25	Can host other families





	cy Management Agency		(Head of the Family)
47	Kenrick Charles	20	
48	Kenisha Charles	21	
49	Mary Charles	20	
50	Dorothy Sylvester	49	
51	Shannel Sylvester	16	
52	Theresa James	47	438-5969 (Head of the Family)
53	Kelon Lawrence	31	
54	Lenon Lawrence	23	
55	Lenhdon Lawrence	22	
56	Che's Lawrence	19	
57	Abbie James	13	
58	Keston James	10	
59	Lynette King	48	Can host other families
60	Sullivan Date	43	
61	Lindy Wickham	30	
62	Lily King	11	
63	Jamal Gittens	10	
64	Lyndon Beegs	2	
65	Audrey Wickham	78	
66	Stephen Wickham	43	
67	Andrew Wickham	50	
68	Donna Wickham	44	
69	Laurel John	30	
70	Larry John	29	
71	Rondell Wicham	25	





	cy Management Agency		
72	Donell Wickham	22	
73	Kavon Wickham	20	
74	Lauren Wickham	18	
75	Anika Wickham	13	
76	Lorn Wickham	10	
77	Leona John	7	
78	Latoya John	5	
79	Nelson Dumont	76	Can host other families in the upstairs section of the house
80	Cynthia James	72	417-7412
81	Marva Lawrence	40	
82	Renate Lawrence	22	(Travelled to the USA)
83	Christopher Henry	25	
84	Shumari Lawrence	2	
85	Tannel Nelson	4	
86	Shaquille Simon	13	
87	Ronnie Williams		
88	Nadine Williams		
89	Jonnie Williams		
90	Naudia Lashington		
91	Nesta Lawrence	44	536-8118 (Head of the Family)
92	Nisa Lawrence	26	
93	Andrea Lawrence	23	
94	Donell Lawrence	20	
95	Abbie Lawrence	8	
96	Ashant Lawrence	7	





-	(Managoriori rigorio)		
97	Patricia Gibson	49	438-5094/457-4914 (Head of the Family)
00	Deviche Cilean		
98	Ranisha Gibson	5	
99	Nyiesha Gibson	8	
100	Dwight Bernard	23	
101	Aiden Gibson	50	
102	Kade Bernard	13	
103	Cardell Bernard	19	
104	Cardill Bernard	19	





Roles and Responsibilities of Disaster Prevention Team

Flood Preparedness Team Head

- 1. Establishes Emergency Operation Center to command activates the Team upon receipt of information on floods that may affect the community
- 2. Coordinates with NaDMA and the District Coordinator
- 3. Leads the decision-making actions on when to evacuate residents with the participation of the Team members
- 4. Keeps in constant communication with the Team members and to keep updated information about the situation

Responsibilities of each Team

• Warning and Communication

- 1. Provides warning to residents of Lower Balthazar using the agreed warning communication to heighten more awareness of vulnerable population to move from the danger zone to pre-identified safe places.
- 2. Monitors the water level using the bamboo pole flood marker

• Evacuation

1. Ensures that all families who will be affected by flood have evacuated from atrisk area to the designated safe houses, giving priority to people with special needs.

• Security

- 1. Secures the vacated areas and the properties of the evacuees during emergency.
- 2. Maintains peace and order.
- 3. Monitors suspicious looking persons and apprehend them when necessary for security reasons.
- 4. Ensures that no one is left behind in the at-risk areas once evacuation team declares completion of evacuation target.





• Transportation

- 1. Ensures evacuation support vehicles are available and in good working condition.
- 2. Transports people in order of priority in coordination with the evacuation team

• Medical/Health Team

- 1. Provides first aid to those who are injured during evacuation
- 2. Provides medical attention to the sick and those who are in need of medical care

• Relief Team

1. Coordinates the distribution of immediate assistance to victims of flood disaster

• Public Information and Communication Team

- 1. Conducts awareness raising activities in Balthazar Village so that all residents are aware of the Balthazar Village Evacuation Procedures and Early Warning System
- 2. Communicates to the residents the meaning of Warning Levels and the appropriate action according to the Plan
- 3. Monitors the hazard situation that might affect Balthazar Village by listening to the Radio and TV announcements and informing the Leader and the other members of the Team
- 4. Liaises with NADMA on possible training courses for the community





List of Contact Persons

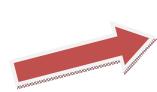
NaDMA		
District Coordinator		
Hospital		
Police Station Grenville		
Fire Station		
Thomas James	(Village Disaster Committee	438-5969
	Leader)	417-7412 (mother's number)
Theresa James	Warning Team Leader	438-5969/535-0715
Sujine Blair	Warning Team member	438-4896/438-5129
Ann Charles	Evacuation Team Leader	438-5129
Kelon Lawrence	Evacuation Team Member	438-5969/534-8877
Yolande Dumont	Relief Team Leader	442-6238
Jerry Alexander	Transportation Team	
Nurse Sherry Ann	Medical Team Leader	
Nesta Lawrence	Medical Team Member	536-8118
Wayne Wickham	Security Team Leader	442-9225/404-9488
Kenneth Bascombe	Security Team	438-3685
Mirum Bascombe	Public Information and Education Team Leader	414-6507/438-3685

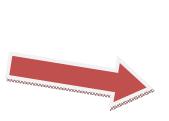




FLOOD PREPARENESS PLAN Upper Mahaica (Little Biaboo and Big Biaboo) Guyana













May 2012

Community of Little Biaboo Big Biaboo





FLOOD PREPAREDNESS PLAN LITTLE BIABOO AND BIG BIABOO

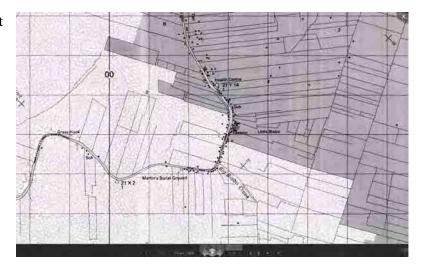
I. Introduction

The villages of Little Biaboo and Big Biaboo are located on the right and left bank of the <u>Mahaica</u> River. Little Baiboo is about 7.5 miles from the beginning of the De Hoop Branch Road. Comparatively, Little Biaboo is the largest village in the Mahaica Creek, with a population of 300 persons and about 75 families. There are approximately 25 elderly and 10 disabled persons. Big Biaboo, on the other hand, has a total population of 81 persons, three of who are handicapped and six are elderly. The residential houses are located on the river bank of the <u>Mahaica</u> River close to the East Demerara Water Conservancy.

The location of Biaboo (Little Biaboo and Big Baiboo) is shown in the map below. Grass Hook is an extended part of the community of Upper Mahaica River. Houses are clustered along the river bank. Little Biaboo, the larger of the two Biaboos has a health center with a resident nurse, a school which offers from nursery school to secondary level and a community office which was constructed with international funding.

The school was used in the past as the shelter for the residents who needed to evacuate. It is solar-powered and is big enough to accommodate the families who choose to stay at the school.

The residents are farmers who make a living from cash crops, rice cultivation and animal husbandry. Irrigation canals help the farmers raise their



crops. However these same canals, if not locked during the heavy rains also become the source of inland inundation.





II. Flood Context

a. Flood

Upper Mahaica community experiences slow rising flood that stays for long duration affecting the farm lands, even after the flood water had receded.

Floods in Upper Mahaica are associated with continuous heavy rains. From the residents' living memory, floods occur every year and sometimes occurring three times a year. The annual flooding lasts for an average of two months spoiling the crops and threatening the animals. In some years, animals died and the farm recovery was very slow. The residential houses, based on the residents' worst experience, suffer between 2 to 3 feet of water while the farmlands, which are situated lower than the residential areas, suffer from an average of 5 feet of flood water.

The flood of 2005 lasted from December 2005 to January 2006 (total of two months). In this 2005 flood, over 2000 acres of rice was damaged and about Gy\$3 Billion worth of cash crops.



Figure 1. Flood Incident Map of Little Biaboo and Big Biaboo

The 2008-2009 flood was worse than the others experienced in previous years. The water reached about 3-4 ft and about 7 feet in the agricultural land. Flood Incident map of 2008 is shown in Figure 1.

b. Flood Risk

Risk assessment done in March 2011 shows that 8 houses (5 at Little Baiboo and 3 at Big Biaboo), the occupants and their movable and fixed assets, are directly at risk from flooding from the Mahaica River. Farmers, and their farm lots, have also been identified to be at risk. The list of occupants who are at risk is attached as Annex A. The other names in the list are located in areas that are affected by the flood but the risk is lower because their houses are on pillars and are above the historical flood water.

Further assessment identified other valuable assets and which are also at risk. These are:





- 1. Ruminants such as cows, goats and sheep
- 2. Other kept animals with economic value such as chicken, ducks and turkey
- 3. Crops (cash crops and annual crops)

III. Flood Risk Management

a. Early Warning System

Early Evacuation is one of the risk reduction options. Early Evacuation is triggered by Early Warning and Communication System.

There are three Phases leading to warning for evacuation designed for Upper Mahaica community, following that used by the Government of Guyana and implemented by the Civil Defense Commission (CDC).

Code Yellow – Advisory Phase : Possibility of flooding conditions affecting the community within a 72-hour window exists

Code Orange – Watch Phase: it is very likely that the flood may take place. The possibility of flooding exists within 25-48 hour window.

Code red –**Warning Phase**: Flood threat increases and the probability of a flood occurring is greater than 80%. Code Red is activated within 12-24 hour window.

During the warning phase, evacuation of all at-risk residents is advised.





b. Early Warning and Communication System of Upper Mahaica Community

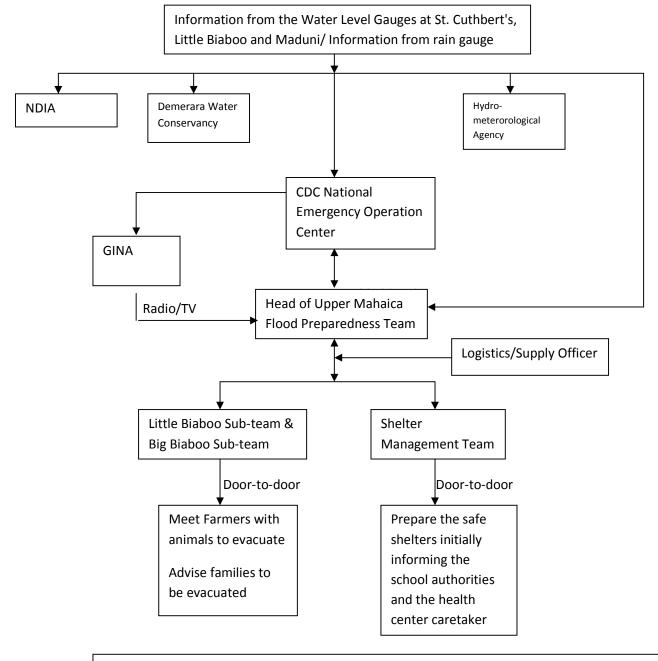
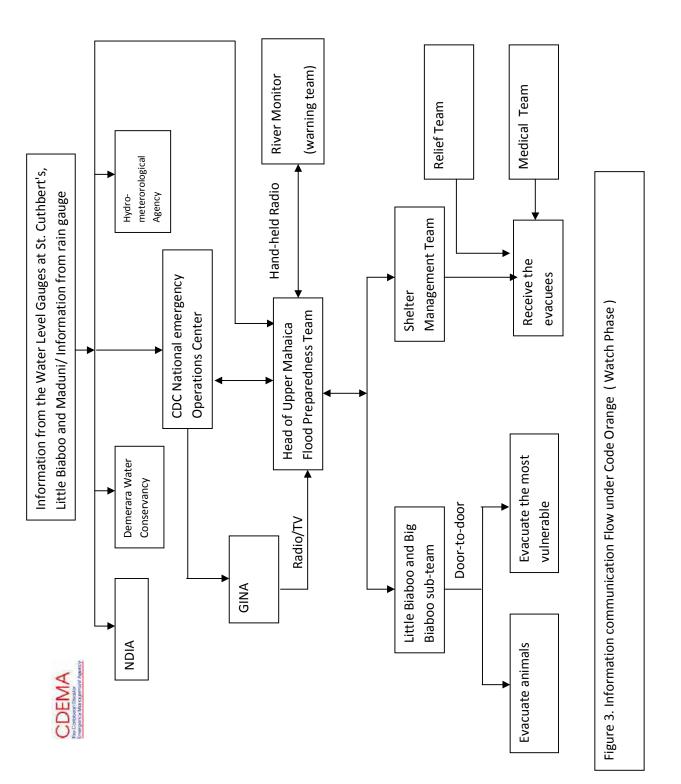


Figure 2. Information communication Flow under Code Yellow – Advisory Phase





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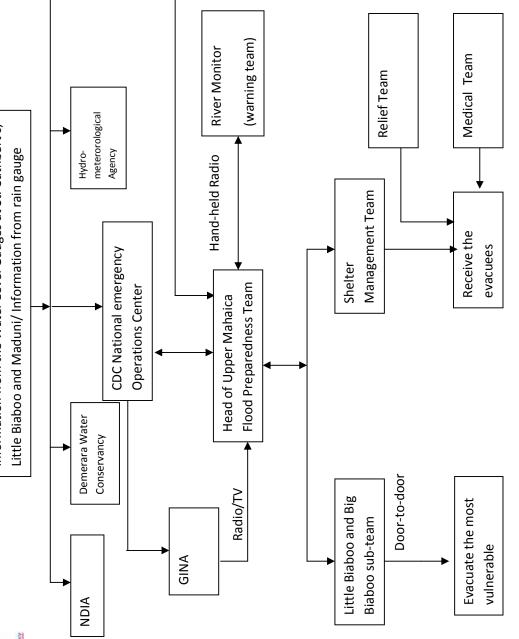


Figure 4. Information communication Flow under Code Red (Warning Phase)





c. Early Evacuation Plan

Based on current practices, the at-risk population have identified the safe places outside Little Biaboo and Big Biaboo where they could go during the flood. There are also designated places for the animals. The designated places for each of the at-risk population and for the animals are shown below.

Family	Safe Place

For emergency when the conservancy releases water and the flood water rises very quickly, 2 stages of evacuation will be implemented. Families from Big Biaboo (3 families) will proceed to the Health Center and the families of Little Biaboo (5 families) will proceed to the school. The other flood-prone families will proceed to the second flood of their houses.

After a day or two, CDC will assist the families, who want to leave the safe shelters, to proceed to their relatives outside the village

Families who will move out of their homes	Safe place
Little Biaboo	
Prampo Chaibraj +3	Highdam
Ram Gobin (Casieman) +3 + Golim +1	Highdam
Popo and family	Highdam
Devindra Tulsieram	Mahaica
Balram Tulsieram + family	Unity
Big Biaboo	
Chitawattie Ramcharitar + son	Sister at Enmore
Hamchandra Ramcharitar (Hemo)	West Coast
Diawanthy Durga (Chandra) + 5	Health Center
Animals	Big Biaboo Backland





d. Evacuation Procedures

Among the at-risk population, those who are prioritized for evacuation have been identified as those who have difficulty walking, senior citizens, disabled, who are ill at the time of flood, pregnant and lactating mothers, and babies and children.

The procedures to be followed at different warning levels are as follows:

Stage	Situation	Actions
Code Yellow: Advisory Stage		CDC informs the community
49-72 hours before possible flood	Notable increase in river levels and intense rainfall.	leader about the possibility of release of water from the conservancy and flooding
	Water level at the Eastern Demerara Conservancy reaches the critical level resulting to possible release of water should rain <u>persist</u> and levels continue to rise	Farmers are advised by Ministry of Agriculture to identify safe areas for animals and to start rounding up the animals
	CDC informs the Flood Preparedness Team of the situation at the water level	Team Leader establishes the Emergency Operation Center.
	gauge in St. Cuthberts	Flood Preparedness Team Leader calls a meeting of the Team leaders alerting the Shelter Manager and the Evacuation Team to advise the famers of potential evacuation of animals.
		Evacuation procedures are reviewed and availability of team members is established.
Code Orange: Watch Stage	Flood threat increases with potential to occur within the next 25-48 hours	The Flood Preparedness Team: Warning Team
	River water level reaches 2 feet below the river bank in Big Biaboo	- alert the residents to prepare for possible overflow of the Upper Mahaica River and initiate preparedness actions
	Second information is received from <u>CDC</u> regarding the situation at St. Cuthberts.	- Monitor the condition of the Upper Mahaica River at the designated monitoring station.
		Evacuation Team





		
		-Starts evacuation of animals to designated safe areas upon the advise of the Ministry of Agriculture.
		Upon receipt of Code Orange, evacuate the most vulnerable with assistance from the evacuation team
		Shelter Manager
		- Inform the relatives who will host some of the evacuees especially the elderly and the disabled to prepare and receive them.
		-Remind those who need to evacuate to prepare the evacuation kit**
		The rest of the at-risk residents should:
		-Ensure safety of the house -Ensure valuable objects and appliances are elevated to be protected from flood water -Ensure basic needs especially baby needs and medicine and needs of residents that require special attention are stocked preparing for the long duration of flood
Code Red: Warning Phase 12-24 hours (Mandatory evacuation)	River water level reaches 8 inches below the river bank in Big Biaboo.	Upon receipt of Code Red, evacuate all with assistance from the evacuation team.
	The threat of flood is increased prompting the officials to activate the evacuation plan.	Warning Team intensifies the dissemination of evacuation warning to the residents
	Police force implements security plan	Evacuation Team and Shelter Manager work together to ensure all 9 families from Little Baiaboo and Big Baiaboo
	Ministry of Education orders all schools to close and send the students home.	evacuate before the flood enters their houses rendering it more difficult to move.





	CDC sends the third information from St. Cuthberts	Other Team Members stay at the Emergency Operation Center to assist in evacuation and providing the needed assistance.
Closing Down Phase	CDC announces it is now safe to return home and orders the closing down of the Emergency Operation Center	Evacuees return home organized and managed by the evacuation team and the shelter manager under the leadership of the Flood Preparedness Team Leader. The response operation is ordered terminated with the closing down of the operation of the Emergency Operation Center.

*Agreed Protection Procedures shown as Annex B

** Content of Evacuation Kit shown as Annex C







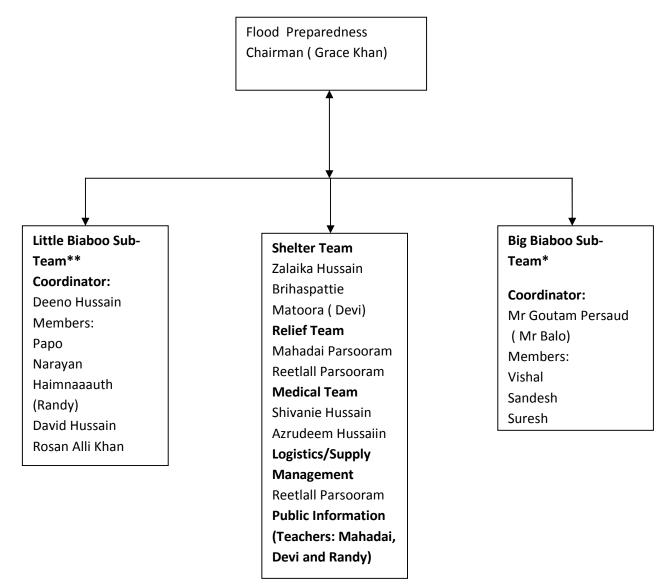
Figure 5. Evacuation Route Map





e. Flood Preparedness Structure

The Flood risk management plan shall be implemented by a group of people who reside at Little Biaboo, Big Biaboo, and Grass Hook who are given specific roles (Annex D). The plan shall be implemented by the disaster preparedness team which is organized as follows:



*Responsible for Monitoring the River level and reporting to the Chairperson, Warning the residents of Big Biaboo and evacuating the animals and transporting the at-risk families in Big Biaboo to the Health Center

** Responsible for warning the residents of Little Biaboo, evacuating the animals and transporting the at-risk families to the School.





Annex A

No.	Name	Age	Special Information
	BIG BAIABOO		
1	Omawattie	55	Head of the family
2.	Ruth	19	
3.	Sunny Rambarran	74	
4.	Christopher Modray	16	
5.	Gotam Persaud	49	Head of the family
6.	Bobby Persaud	42	
7.	Meriadai	18	
8.	Ramkaran	73	Living alone
9.	Harrylall Ramkaran	54	Head of the family
10.	Rookminee	51	
11.	Gopaul Roshan	2	
12	Nankumar Ramkaran	54	Head of the family
13	Tarwattie	43	
14	Randy	12	
15.	Mooldeo Tillick	41	Head of the family
16.	Drupatie Tillick	37	
17.	Dashkarran Tillick	18	
18.	Homiwattie Tillick	15	
19.	Krishan Tillick	12	
20.	Kishan Tillick	10	
21.	Omkar Tillick	10	
22.	Ramcharran Autar	61	Handicap





Emergen	w Management Agency		
23	Suckdeo	59	
24.	Gagdeshar	35	
25.	Celeshoar	49	Handicap
26	Jageo	35	Head of the family
27	Joylin	31	
28	Keme	9	
29	Zebida	7	
30	Ramesh Ramdess	44	Head of the Family
31	Rupa Ramdess	36	
32	Danesh Ramdass	22	
33	Anjalee Ramdass	20	
34	Hariram Ramkhellawan	64	Head of the family
35	Lackrajie Ramkhellawan	63	
36.	Tataram Ramkhellawan	32	
37.	Abinash	14	
38	Haripaul Bhagwandeo	42	Head of the family
39	Jasmattie	43	
40.	Chatterpaul	19	
41	Rohanie	18	
42	Hero Heralall	25	Head of the family
43	Alexa	22	
44	Rachel	2	
45	Rebecca	4 months	
46	Heralall		Living alone
47	Diawanty Durga	40	Head of the family
48	Shani	16	
L	l	I	





Emorge	ncy Management Agency		
49	Shaboo	15	
50	Pollie	13	
51	Sewehand	12	
52	Nirmala	9	
53	Savita	8	
54	Pitambar Pooran	43	Head of the family
55	Phulmat Durga	48	
56	Vivakand	20	
57	Hardai	11	
58	Padmine	6	
59	Rambarran Roopnarine	50	Head of the family
60	Hemwantie	41	
61	Pooran	20	
62	Eshawer	16	
63	Chabiraj	12	
64	Kaymattie	8	
65	Pratima	6	
66	Gogdeshar Tilllick	36	Head of the family
67	Ramcharran	62	Handicap
68	Sheliq	60	
69	Celeshoar	50	Handicap
70	Dewan Ramdass	41	Head of the family
71	Dolly	33	
72	Dinesh	16	
73	Devi	19	
74	Pravesh	10	





CONSTRAINT, STORE	cy Management Agency		
75	Pooran	64	Head of the family
76	Deowantie	59	
77	Hamchandra Ramcharitar	42	Living alone
78	Chitrawattie Ramcharitar	52	Head of the family
79	Soowresh	22	
80	Heera Parsram	58	Living alone
81	Slackie	41	Living alone
82	Deochand Ramcharitar	46	Head of the family
83	Ramcharitar	83	
84	Nanda	39	
85	Yankaran	15	
86	Devica Gurdat	38	Head of the family
87	Sandesh	16	
88	Sudesh	15	
89	Ramlesh	13	
90	Parsuram Khelawan	74	Living alone
91	Jairam Khelawan	50	Living alone
92	Lildhar Makhanlall	43	Head of the family
93	Ormilla	39	
94	Narendra	20	
95	Navendra	10	
96	Sunita	14	
97	Totaram Balskun	54	Head of the family
98	Ramdeo	49	
99	Sewkumar	31	
100	Vishal	4	





Emerger	Ney Management Agency			
101	Dainel	3		
102	Harrylall Mahadeo	63	Head of the family	
103	Hansrani	53		
104	Ravendra	29		
105	Raywattie	23		
106	Ranie	20		
107	Mahesh	19		
108	Balram Pooram	41	Head of the family	
109	Padmuttie	34		
110	Sujit	18		
111	Chandrautie	14		
112	Toranie	12		
113	Ramnarie Ramotar	47	Head of the family	
114	Lalita	36		
115	Phagoni	86		
116	Amal Dass	54	Head of the family	
117	Seeta	50		
118	Dasrat Dass	35	Head of the family	
119	Natasha	30		
120	Omadai	6		





	ancy Management Agency		
	GRASS HOOK		
1	Mr. Premdass	78	Head of the family
2	Mrs. Baby	71	
3	Badranauth	31	
4	Navin	15	
5	Sugrim Sarju	53	Head of the family
6	Sunita	46	
7	Subrian	21	
8	Parmanand	27	
9	Rajesh Bissondyal	36	Head of the family
10	Indera	29	
11	Karishma	11	
12	Ajay	10	
13	Kajol	9	
14	Diaram	57	Leaving alone
15	Chabiraj Ramdeen	58	Head of the family
16	Inderdai	50	
17	Suresh	26	
18	Rajesh	27	
19	Navesh	21	
20	Kuldeo Indar	44	Head of the family
21	Carmen	38	
22	Tularam	16	
23	Ghargee	17	





Emerge	ney Management Agency		
	LITTLE BAIABOO		
1	Lakeram Raghunauth	32	Head of the family
2	Premkumarie Ganpat	28	
3	Davianie Raghunauth	7	
4	Saskia Raghunauth	3	
5	Suriypaul Ganpat	56	Head of the family
6	Khaimrajee Ganpat	51	
7	Gagat Narine Ganpat	31	
8	Mahesh Ganpat	17	
9	Chaitram Haimnauth	48	Head of the family
10	Rajkoomarie Haimnauth	44	
11	Narayan Haimnauth	18	
12	Geetram Haimnauth	25	Head of the family
13	Gaintree Sewsankar	21	
14	Devendra Haimhanauth	2	
15	Hema Haimhanauth	5 months	
16	Haimnauth	72	Elderly living alone (2)
17	Parbati	69	
18	Seednauth Haimnauth	51	Head of the family
19	Handai Haimnauth	49	
20	Gangaram Haimnauth	27	
21	Taranauth	67	Elderly living alone (2)
22	Rattee	64	
23	Sertrohan taranauth	37	Head of the family
24	Devika Latchman	36	
25	Anand Taranauth	16	





Emorge	incy Management Agency		
26	Ramnarine Taranauth	18	
27	Kawall John	49	Head of the family
28	Maywattie John	41	
29	Sanjay John	22	
30	Doodnauth John	20	
31	Ramdularie	71	Disabled
32	Porandeo John	41	
33	Johnnie Persaud	66	Head of the family
34	Dhanawantie Persaud	63	
35	Harrypaul Persaud	40	Head of the family
36	Indermsthe Persaud	37	
37	Dhanpaul Persaud	16	
38	Rajin Persaud	15	
39	Sumeeta Devi Persaud	12	
40	Parasram Ganpat	59	Living alone
41	Dasmattee Haricharan	59	Living alone
42	Dhanrajee Budhu	66	Living alone
43	Bhagwandat Matoora	43	Head of the family
44	Kamaldeo Sam	47	
45	Rohani Sam	37	
46	Brihaspattie Matoora	17	
47	Maheshwar Matoora	15	
48	Haimraj Matoora	14	
49	Yasmin Matoora	12	
50	Lilowtie Matoora	10	
51	Rampaul Matoora	6	





ney Management Agency		
Chandradial Autaram		Living alone
Bhowal Autaram	40	Head of the family
Gaitree Magesar	28	
Davekumar Autaram	7	
Sowaru Autaram	71	Head of the family
Donoodmattie Autaram	61	
Thakoomatieram Autaram	45	
Bissondyal Samaroo	31	Head of the family
Nafeeza Khan	23	
Deno Hussain	49	Head of the family
Kamiza Hussain	41	
Aleena Hussain	18	
Rosan Alli Khan	59	Head of the family 656-8967
Grace Khan	55	
Razia Khan	30	
Shamir Hussain	80	Head of the family 618-3767
Zelaika Hussain	77	
Jagatram Ramcharitar	29	Head of the family 610-1105
Nafeeza Soodoo	25	
Gomat Ramcharitar	3	
Deodharry Shibsahai	48	Head of the family 621-7332
Fazeena Shibsahai	47	
Rayon Shibsahai	26	
Trevor Giahan	36	
Dhanmattie	29	
Cindy	7	
	Chandradial AutaramBhowal AutaramGaitree MagesarDavekumar AutaramSowaru AutaramDonoodmattie AutaramDonoodmattie AutaramBissondyal SamarooBissondyal SamarooNafeeza KhanDeno HussainAleena HussainAleena HussainGrace KhanGrace KhanShamir HussainZelaika HussainJagatram RamcharitarNafeeza SoodooGomat RamcharitarDeodharry ShibsahaiFazeena ShibsahaiTrevor GiahanDhanmattie	Chandradial AutaramBhowal Autaram40Gaitree Magesar28Davekumar Autaram7Sowaru Autaram71Donoodmattie Autaram61Thakoomatieram Autaram45Bissondyal Samaroo31Nafeeza Khan23Deno Hussain49Kamiza Hussain41Aleena Hussain18Rosan Alli Khan59Grace Khan55Razia Khan30Shamir Hussain80Zelaika Hussain77Jagatram Ramcharitar29Nafeeza Soodoo25Gomat Ramcharitar3Deodharry Shibsahai48Fazeena Shibsahai47Rayon Shibsahai26Trevor Giahan36Dhanmattie29





Emerger	cy Management Agency		
78	Celiena	6	
79	Tina	5	
80	Suraj	2	
81	Parbattie Itwaru	59	Living alone
82	Balram Tulsiram	46	Head of the Family
83	Bandawattie	37	
84	Karina	4	
85	Roopchand	3	
86	Arjoon	2	
87	Tackur Barry	25	Head of the family
88	Mahadai	18	
89	Wazir Mohamed	46	Head of the family 666-4035
90	Ameer	16	
91	Fameena	9	
92	Bibi Kamrool	69	Head of the family
93	Nazeer Mohamed	37	
94	Kayume Mohamed	41	Head of the family
95	Powbattie	37	
96	Sahfeek	5	
97	Shafeeza	3	
98	Shaheeda	1	
99			
100	Mohamed Shalim	69	Head of the family
101	Najran	61	
102	Abdul Rojameer Shalim	39	Head of the family
103	Salma	11	





Emergen	beon Disaster cy Management Agency		
104	Devindra Tulsiram	20	Living alone
105	Bhagwar Persaud	46	Head of the family
106	Salima Shariff	46	
107	Mirzaad	22	
108	Kamal Persaud	53	Living alone
109	Khemraj Persaud	36	Head of the family 688-0535
110	Bibi Bachus	32	
111	Chandanie	10	
112	Tulsidai	9	
113	Deodat Persaud	63	Head of the family
114	Parbattie	59	
115	Rikraj Persaud	33	Head of the family 626-1889
116	Debbie	31	
117	Randy	8	
118	Reya	5	
119	Ryan	3	
120	Neeranjalall Bissondyal	35	Head of the family
121	Nanda	31	
122	Keisha	13	
123	Trisha	11	
124	Jagatnarine Udai	31	Head of the family
125	Pulmattie	20	
126	Avendra	1	
127	Mahadeo Udai	67	Head of the family
128	Sahodire	62	
129	Reeetlall Parsooram	50	Head of the family 621-5341





Emergenc	V Management Agency		
130	Meendai	42	
131	Mahadai	19	649-7245
132	Lachmin	13	
133	Ramdass	78	
	Parsooram Udai	74	Living alone
134	Chaitram Ramdass	35	Head of the family 628-7932
135	Lillawattie	35	
136	Kumar	13	
137	Tolosram	12	
138	Shiram	4	
139	Satnarine Udai	36	Head of the family
140	Bhagwantie	33	
141	Muneshwar	12	
142	Lilodar	10	
143	Dhruvesh	7	
144	Kenny	1	
145	Elvis Hussain	48	Head of the family
146	Eva	44	
147	Sharmaine	25	
148	Daniel	20	
149	David	17	
150	Shahabaddin Khan	28	Head of Family
151	Shamdai	22	
152	Aamdai	7	
153	Azad Hussain	51	Head of the family 638-2100
154	Rohanie	49	





Emergen	been Dispiter Nanagement Agency		
155	Shivanie	22	641-6497
156	Azhrudeen	19	
157	Araf	16	
158	Shafeena	11	
159	Shafeek	6	
160	Azif Hussain	30	Head of the family
161	Shannielle	26	
162	Antonio	6	
163	Adil	2	
164	Kamalodeen Hussain	27	Head of the family
165	Gomattie	22	
166	Anmaria	6	
167	Ramesh Bipat		Head of the family 653-3812
168	Zahaida		
169	Kaliam Hussain	56	Head of the family
170	Mahadai	57	
171	Zaheer	16	
172	Dennis Bermner	38	Head of the family
173	Foyyaadh	12	
174	Reyad	9	
175	Sadyah	7	
176	Latif Soman	54	Head of the family
177	Badora	12	
178	Fazal Hussain	53	Head of the family
179	Zulika	50	
180	Zaleal Hussain	57	Head of the family





Emargan	cy Management Agency		
	Khatoon	51	
181	Fizal Kasim	30	Head of the family 642-4100
182	Shafrana Kasim	27	657-6180
183	Ridhwan	7	
184	Saahirah	6	
185	Naeem Hussain	27	Head of the family
186	Jenny	17	
187	Altab Hussain	54	Head of the family
189	Ijaz	21	
190	Narisa	16	
191	Ameer Hoosain	21	Head of the family
192	Sharda	17	
193	Alladeen Hoosain	49	Head of the family
194	Yasmin	45	
195	Mohamed Hoosain	90	
196	Shamsshundar Ramrup	30	Head of the family
197	Dirya	23	
198	Sarita	2	
199	Satwantie Ramrup	52	
200	Mala	31	
201	Videsh	21	
202	Hookadebi Chaitu	65	Head of the family
203	Bhagwattie	53	
204	Gopaul	17	
205	Satish Sookram	30	Head of the family
206	Rafina	24	





207Saeed6208Shaahid4209Mohanlall Sukhram57Living alone210Zameer Hoosain23Head of the family211Latchmin25212Shivraj9213Vickash7214Annalisa5215Hanoraj Maniram38216Lelawattie39217Doodnauth15218Wakanand11219Ramkedar Maniram75220Ramrattie69221Roopnarine Maniram4141Head of the family	
209Mohanlall Sukhram57Living alone210Zameer Hoosain23Head of the family211Latchmin25212Shivraj9213Vickash7214Annalisa5215Hanoraj Maniram38216Lelawattie39217Doodnauth15218Wakanand11219Ramkedar Maniram75220Ramrattie69	
210Zameer Hoosain23Head of the family211Latchmin25212Shivraj9213Vickash7214Annalisa5215Hanoraj Maniram38Head of the family216Lelawattie39217Doodnauth15218Wakanand11219Ramkedar Maniram75Head of the family220Ramrattie69	
211Latchmin25212Shivraj9213Vickash7214Annalisa5215Hanoraj Maniram38216Lelawattie39217Doodnauth15218Wakanand11219Ramkedar Maniram75220Ramrattie69	
212Shivraj9213Vickash7214Annalisa5215Hanoraj Maniram38216Lelawattie39217Doodnauth15218Wakanand11219Ramkedar Maniram75220Ramrattie69	
213Vickash7214Annalisa5215Hanoraj Maniram38Head of the family216Lelawattie39217Doodnauth15218Wakanand11219Ramkedar Maniram75Head of the family220Ramrattie69	
214Annalisa5215Hanoraj Maniram38Head of the family216Lelawattie391000217Doodnauth1511218Wakanand1111219Ramkedar Maniram75Head of the family220Ramrattie6911	
215Hanoraj Maniram38Head of the family216Lelawattie39217Doodnauth15218Wakanand11219Ramkedar Maniram75Head of the family220Ramrattie69	
216Lelawattie39217Doodnauth15218Wakanand11219Ramkedar Maniram75Head of the family220Ramrattie69	
217Doodnauth15218Wakanand11219Ramkedar Maniram75Head of the family220Ramrattie69	
218Wakanand11219Ramkedar Maniram75Head of the family220Ramrattie69	
219Ramkedar Maniram75Head of the family220Ramrattie69	
220 Ramrattie 69	
221 Roopnarine Maniram 41 Head of the family	
222Fazeela31	
223 Haresh 14	
224Michael12	
225 Andrew 10	
226Samuel PhillipHead of the family	
227 Patsy	
228 Christine	
229Rasheed alli67Head of the family	
230 Jaitoon 63	
231Surwan autar25Head of the family	
232Joy Autar24	





beon Disaster v Management Agency		
Khemraj Ghanchand	39	Head of the family
Reshma	34	
Reema	16	
Odesh	15	
Safraz Hussain	30	Living alone
Airzad Shaffe	18	Head of the family
Kumarie	18	
Yadeo Mangal	55	Head of the family
Hardai	49	
Kormal	28	
Tulsidai	10	
Darshanie	8	Disabled
Doodnauth Mangal	47	Head of the family
Rajmattie	42	
Amarnauth	19	
Yogaishaw Singh	45	Head of the family
Natasha	36	
Shandil	15	
Chandroutie	14	
Karashme	11	
Heeral Patesar	49	Living alone
Deochand Mulchand	45	Head of the family
Sandish	20	
Mohani	18	
Rohani	5 months	
Deonauth Gurdath	36	Head of the family
	Construct NameKhemraj GhanchandReshmaReemaOdeshSafraz HussainAirzad ShaffeKumarieYadeo MangalHardaiKormalTulsidaiDarshanieDoodnauth MangalRajmattieAmarnauthYogaishaw SinghShandilChandroutieKarashmeHeeral PatesarDeochand MulchandSandishMohaniRohaniRohaniRohani	eventual laterKhemraj Ghanchand39Reshma34Reshma34Reema16Odesh15Safraz Hussain30Airzad Shaffe18Kumarie18Yadeo Mangal55Hardai49Kormal28Tulsidai10Darshanie8Doodnauth Mangal47Rajmattie42Amarnauth19Yogaishaw Singh45Natasha36Shandil15Chandroutie14Karashme11Heeral Patesar49Deochand Mulchand45Sandish20Mohani18Rohani5 months





Linesignit	cy Management Agency		
259	Rajmattie	31	
260	Narendra	24	
261	Chandika	16	
262	Bissondyal Singh	42	Head of the family
263	Divindra	13	
264	Dharmindra	10	
265	Praimraj Patesar	45	Head of the family
266	Lakshme	32	
267	Chandanee	13	
268	Ramnaresh	11	
269	Parmanand Parooram	46	Head of the family
270	Parbattie	45	
271	Mohini	27	
272	Harischandra	16	
273	Chaitram	11	
274	Nancoomar tulsi	48	Head of the family
275	Lalita	44	
276	Doodmattie	14	
277	Vidyawattie	10	
278	Leila Singh Pataysar	57	Head of the family
279	Haywattie	51	
280	Ramgobin	41	Head of the family
281	Jasmattie	30	
282	Nandranie	14	
283	Khemraj	9	
284	Lakeram Chabiraj	51	Head of the family
L			





	And and full states and full state		
285	Roopram	22	
286	Ganesh	20	
287	Homwattie Devi Chabiraj	48	Head of the family
288	Mahesh	20	
289	Chandnie	19 months	
290	Harryram		Head of the family
291	Nalini		
292	Motilall	59	Living alone
293	Sylvan		Head of the family
294	Golin		





Procedures for protecting the different elements at risk

Elderly and Disabled having special needs

- Ensure that the elderly and persons with special needs are taken to a safe place, which is warm and dry with ready access to toilet and bath, before the flood occurs. This safe place could be with relatives whose house is located in flood-safe area, a temporary shelter or a safe place inside the house.
- 2. Organize volunteers to monitor the health conditions of the elderly and persons with special needs.
- 3. Monitor and ensure the hygiene requirements are met.

Children and Babies

- 1. Supervise and keep the children in flood-safe place away from flood water to avoid contracting water-borne diseases
- 2. Ensure the availability of safe drinking water
- 3. Before the flood, educate the children in "living with flood" how to behave during flooding situation

Animals

- 1. Before the flood occurs, take the animals who cannot survive in water, to higher grounds away from flood.
- 2. Organize volunteers to gather feeds, take feeds to animals and ensure that animals are safe and animal waste is disposed of properly to avoid contaminating the environment
- 3. For animals that will remain in flooded area, ensure that the waste is disposed of and not thrown in the flood water to avoid water-bourne disease .





Content of Evacuation Kit (Survival Kit)

General Items	For Babies	For People with special needs
Non-perishable food good for four days	Baby food/milk formula	Medicine
Flashlight with batteries	medicine	Wheel chair or as needed
Battery operated radio (with batteries)	Change of diapers	Sleeping mattress
Clothes	Baby clothes, blankets and comfort items	Diapers, if needed
Medicine	Safe drinking water good for four days	
Important documents and precious assets		
Mats/sleeping bags		
Drinking water		
Hygiene kit (toothbrush and tooth paste, toilet paper, soap)		
Emergency contact list (relatives and doctor)		





Roles and Responsibilities of Flood Preparedness Team

Flood Preparedness Team Head

- 1. Establishes Emergency Operation Center to command activates the Team upon receipt of information on floods that may affect the community
- 2. Coordinates with CDC
- 3. Leads the decision-making actions on when to evacuate residents with the participation of the Team members
- 4. Keeps in constant communication with the Team members and to keep updated information about the situation

Responsibilities of each Team

- Warning and Communication
 - 1. Provides warning to residents of Upper Mahaica specifically Little Biaboo, Big Biaboo and Grass Hook using the agreed warning communication to heighten more awareness of vulnerable population to move from the danger zone to preidentified safe places.
 - 2. Monitors the water level in Upper Mahaica River
- Evacuation /Search and Rescue
 - 1. Ensures that all families who will be affected by flood have evacuated from atrisk area to the designated safe houses, giving priority to people with special needs.
 - 2. Ensures that the animals are evacuated on time and that these animals stay in the agreed safe location

• Security

- 1. Secures the vacated areas and the properties of the evacuees for the duration of the flood and while the evacuees are away from home.
- 2. Ensures that no animal is left behind in flood-prone areas and secures the safety of animals at the designated safe area
- 3. Maintains peace and order and ensures the safety of residents for the duration of the flood





• Transportation

- 1. Ensures evacuation support vehicles are available and in good working condition.
- 2. Transports people in order of priority in coordination with the evacuation team

• Medical/Health Team

- 1. Provides medical attention to the sick and those who are in need of medical care
- 2. Monitors the health and hygiene requirements of the at-risk population

• Relief Team

- 1. Coordinates the distribution of immediate assistance to victims of flood disaster
- 2. Coordinates the feeding of animals at safe areas, making sure that feeds are available

• Shelter Management /Relief Team

- 1. Prepares safe evacuation centers according to evacuation plan.
- 1. Ensures that everyone is safe in the shelter
- 2. Organizes the evacuees and engages the evacuees into important activities while in the shelter

• Public Information and Communication Team

- 1. Conducts awareness raising activities in Upper Mahaica Village s such as Little Biaboo, Big Biaboo and Grass Hook so that all residents are aware of the Upper Mahaica Flood Protection Procedures and Early Warning System
- 2. Communicates to the residents the meaning of Warning Levels and the appropriate action according to the Plan
- 3. Educates the residents on the proper behavior during the flood and how to "live with flood".





List of Contact Persons





The second s	







Warning Communication and Evacuation Procedures

Corinthe Housing Development



May 2012

Gros Islet Disaster Committee

And

Residents of Corinthe Housing Development





Warning Communication and Evacuation Procedure Corinthe Housing Development Gros Islet, St. Lucia

I. Introduction

The National Emergency Management Organisation, together with the Gros Islet Disaster Committee and the community at Corinthe Housing Development, produced this plan to evacuate the residents and visitors in times of flash flood.

Corinthe is a rapidly growing community, located in Gros Islet, a district in the north of Saint Lucia. Lime, the communication company is the biggest company located in the area. Within the Corinthe area a housing development called Corinthe Housing Development, with an estimated 50 families, is located. The area is bounded on the West by Corinthe River, sometimes referred to as the Grand Riviere River. Corinthe Road bounds the community to the East.

This plan serves as a guide on what to do when there is a threat of flash flood in the housing development.

II. Flood Context

a. Flood History

Floods can be caused by continuous heavy rain or rain that accompanies hurricanes. The Corinthe River is not the only source of flood water. Water can also rush down to the housing area from the gullies uphill of the Corinthe Road and spills into Flamboyant Park, choking the drainage canals. When this happens, water overflows and invades the housing area.

The area has experienced flooding in recent years. The following shows the flood history of Corinthe Housing Development.

Date	Cause of Flood	Effect
April 2011	Heavy rain	Minimal flooding
October 30, 2010	Rain brought by Hurricane Tomas	Damaging flood
October 2008	Heavy rain brought by Hurricane Omar	Damaging flood





b. Flood Risk

There are two kinds of houses built in the housing area: bungalows, elevated houses on pillars and one storey apartments. Some of the owners of elevated houses constructed downstairs apartments. These apartments are rented to tenants although the apartments are prone to flooding.

Five bungalow houses are located in flood-prone area of the housing development and nine upstairs/downstairs houses are affected by flood.

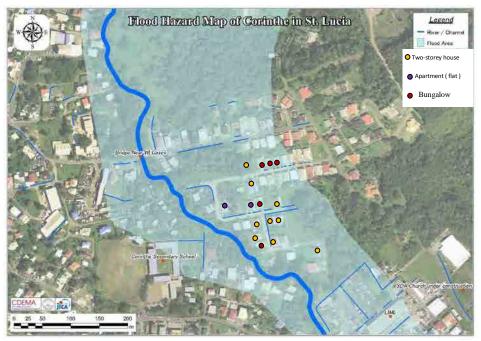


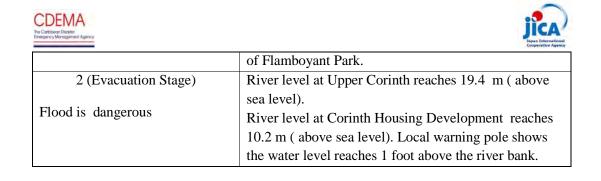
Figure 1. Flood Hazard Map of Corinthe Housing Development

III. Flood Risk Management

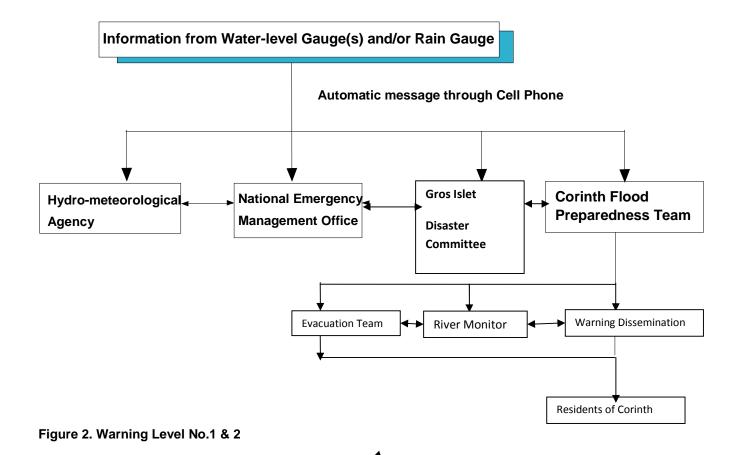
a. Early Warning System

Early Evacuation is one of the risk reduction options. Early Evacuation is triggered by Early Warning and Communication System.

Warning Level	River conditions
1 (Alert Stage)Flood is possible but the condition does not pose imminent danger to the residents	River level at Upper Corinth reaches 18.8 m (above sea level). River level in Corinth Housing Development reaches 10.0 m (above sea level). River water level reaches the river bank at the bottom



b. Early Warning Communication Flow







c. Early Evacuation Plan

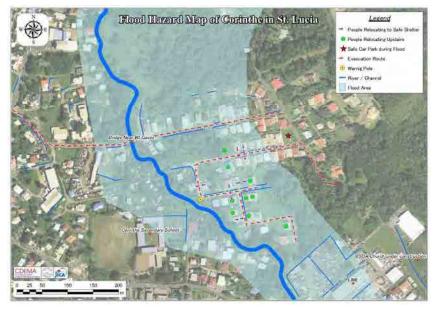
Family (Names and location)	Safe Place (name of host families and location)
Flamboyant Drive	
1. Patrick Noel and Family	Claudia Winnett
2. Therese Charles and Family	Nigel Bailey
3. House under renovation	Nurse's house (Suzanne Jolie?)
4. New house with downstairs house developed into two apartments	Upstairs house
5. Jonash and Family (renters)	No identified safe place
Flamboyant Park	
 Darille Jervis &Lyla Rierre (renters of downstairs apartment) 	Eileen Francis (Upstairs house- landlord)
2. Vivian Smith (bungalow)	Eileen Francis
3. Mary Rose (downstairs tenant of Marge Jn Baptiste)	Mother in Flamboyant Drive (elevated house)
4. Dorine Headen (bungalow)	Marge Jn Baptiste
5. Downstairs tenants	Michelle and Ron Blanchard
6. William Wilson and Family	Joseph "Rick" Fata
7. Apartment tenant next to William	Joseph " Rick" Fata
8. Downstairs Tenants	Jermaine Alexander
9. Rick Fata's downstair's tenants	Upstairs section of rented house belonging to Rick Fata
10. Mr Paul Esnar (landlord)	Upstairs tenants Martha and Ingrid
11. Mr Joe Leonce and Wife (house owner)	Upstairs section of house
12. Mr Auguste Wilcott and family (house owner)	Upstairs section of house
13. Apartment tenants of My Wayne	Mr Wayne's "Pop" house





The evacuation route to be taken by the at-risk residents is shown below. The red arrows show the direction of movement of cars which are taken out of the flood-prone area when there is a possibility of flood. The arrows also show the at-risk families who will move to other houses in the area for safety.

The map also shows the location of people (tenants and owners alike) who will move upstairs to safety.



d. Evacuation Procedures

Warning Level	River conditions	Actions to be taken by Residents and the Flood Preparedness Team
1 (Alert Stage) Flood is possible but the condition does not pose imminent danger to the residents	River level at Upper Corinth reaches 18.8 m. River level in Corinth Housing Development reaches 10.0 m.	Gros Islet Disaster Committee: a. Activate the Corinth Flood Preparedness Team
		 Flood Preparedness Team will: a. Alert the residents of the situation and remind them to prepare to evacuate if the situation gets worse b. River monitors proceed





		Cooperation Agency
		to the river to observe the water level and report to the other members of the team and to the Coordinator/Leader of Corinth Flood Preparedness Team. C. Coordinate with Fire Rescue Department At risk residents: a. Prepare to evacuate b. Move cars to safe area C. Ensure that the most vulnerable (babies, sick, elderly and disadvantaged) are prioritized for evacuation.
2 (Evacuation Stage) Flood is absolutely dangerous	River level at Upper Corinth reaches 19.4 m River level at Corinth Housing Development reaches 10.2 m.	 Flood Preparedness Team Members will: a. Announce the evacuation warning using megaphones b. Assist the at-risk residents to move to safe shelter. At-risk residents should move to safe shelter (upper section of the house or next door neighbor which is safe from flood)





c. Flood Preparedness Structure

The Flood risk management plan shall be implemented by a group of people who reside at the pilot site and who are given specific roles (Annex B). The plan shall be implemented by the disaster preparedness team which is organized as follows:

Members of the Corinth Flood Preparedness Team

Gros Islet Disaster Committee - Jennifer Gaston

Thaddeus Montaut

Team Leader/Coordinator - Claudia Winnette

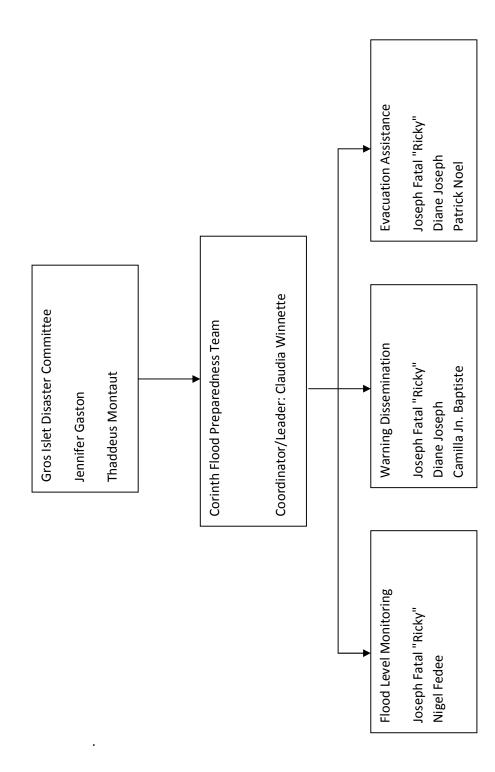
Flood Marker Monitor - Nigel Fedee

Warning Dissemination- Joseph Fata "Rick" Diane Joseph Camilla Jn Baptiste Patick Noel Evacuation Assistance - Joseph Fata "Rick", Diane Joseph, Patrick Noel





ORGANIZATIONAL STRUCTURE OF FLOOD PREPAREDNESS IN CORINTH



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Roles and Responsibilities of Disaster Prevention Team

Flood Preparedness Team Coordinator

- 1. Activates the Team upon receipt of information on floods that may affect the community
- 2. Coordinates with NEMO and Gros Islet Disaster Committee
- 3. Leads the decision-making actions on when to evacuate residents with the participation of the Team members
- 4. Keeps in constant communication with the Team members and to keep updated information about the situation

Responsibilities of each Team

• Warning and Communication

- 1. Provides warning to residents of Corinth Housing Development and Corinth Road using the agreed warning communication to heighten more awareness of vulnerable population to move from the danger zone to pre-identified safe places.
- 2. Monitors the water level using the flood marker

• Evacuation

1. Ensures that all families who will be affected by flood have evacuated from atrisk area to the designated safe houses, giving priority to people with special needs.





List of Contact Persons

NEMO		
Gros Islet Disaster		
Committee		
Jennifer Gaston		
Thaddeus Montaut		
Angela		
Fire Rescue		
Claudia Winnett	(Corinthe Disaster Committee Leader)	
Joseph "ricky" Fatal	Member	
Patrick Noel	Member	450-1688
Camilla Jn. Baptiste	Member	450-4583

