ISSN: 1995 - 1124

CRFM Technical & Advisory Document Series

Number 2013 / 8
Volume 3

CLIMATE CHANGE ADAPTATION AND DISASTER RISK MANAGEMENT IN FISHERIES AND AQUACULTURE IN THE CARIBBEAN REGION

Volume 3 — Programme Proposals

CRFM Secretariat
Belize

CRFM Technical & Advisory Document - Number 2013 / 8

CLIMATE CHANGE ADAPTATION AND DISASTER RISK MANAGEMENT IN FISHERIES AND AQUACULTURE IN THE CARIBBEAN REGION:

Volume 3 – Programme Proposals

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This publication has been made possible through funding provided by the United Nations Food and Agriculture Organisation (FAO).

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CRFM Secretariat
Belize 2013

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Correct Citation:
CRFM, 2013. McConney, P., J. Charlery, M. Pena. Climate Change Adaptation and Disaster Risk Management in Fisheries and Aquaculture in the Caribbean Region. Volume 3 – Programme Proposals. *CRFM Technical & Advisory Document*, No. 2013/8. 20 p.

ISSN: 1995-1124
ISBN: 978-976-8165-80-0

Published by the Caribbean Regional Fisheries Mechanism Secretariat
Belize and St. Vincent and the Grenadines

SUMMARY

This report is the third of four outputs in this initiative of CRFM and FAO on 'Climate change adaptation and disaster risk management in fisheries and aquaculture in the CARICOM region'. The aim is to develop a programme for funding projects within the strategy and action plan (Volume 2).

This programme proposal is very much a work in progress to be discussed and developed further. The programme proposal requires ownership and leadership to transform the ideas here, or alternatives offered, into action. A key indicator of success is the extent to which the proposed programme (with any changes) is agreed to and implemented by various stakeholders. So that most stakeholders can participate and benefit, the programme covers a wide array of interests and actors consistent with the social-ecological system and livelihood models introduced. The proposal encourages networks for implementation and learning in order to make best use of available capacity. It advocates a multi-level approach with small and large initiatives yielding both short term and longer term successes. It is intended to assist the IP in 'Delivering transformational change 2011 - 2021'. It incorporates obligations and principles in global to regional instruments on climate, disasters, fisheries and aquaculture.

The proposals are set out in the format of the logical framework used by many technical and funding agencies within and beyond the CARICOM region. Limitations are acknowledged in terms of making these proposals ahead of CRFM countries and other interested parties agreeing upon the situation assessment and the strategy and action plan. Suggestions are made on how to mobilise resources for mainstreaming CCA and DRM into fisheries and aquaculture bearing in mind that project financing strategies need to be flexible and that funding criteria and conditions can change at short notice.

ABBREVIATIONS AND ACRONYMS

ACP	African, Caribbean and Pacific Group of States
ASSC / TMAC	Agriculture Sub-Sector Committee / Technical Management Advisory Committee
CANARI	Caribbean Natural Resources Institute
CARICOM	Caribbean Community
CAS	Complex adaptive system
CBO	Community-Based Organization
CCA	Climate Change Adaptation
CCCFP	Caribbean Community Common Fisheries Policy
CCCCC	Caribbean Community Climate Change Centre
CCRF	Code of Conduct for Responsible Fisheries
CCRIF	Caribbean Catastrophe Risk Insurance Facility
CDEMA	Caribbean Disaster and Emergency Management Agency
CDERA	Caribbean Disaster and Emergency Response Agency
CDM	Comprehensive Disaster Management
CEHI	Caribbean Environmental Health Institute
CERMES	Centre for Resource Management and Environmental Studies
CLME	Caribbean Large Marine Ecosystem (Project)
CRFM	Caribbean Regional Fisheries Mechanism
DRM	Disaster Risk Management
EAA	Ecosystem Approach to Aquaculture
EAF	Ecosystem approach to fisheries
EBM	Ecosystem based management
FAO	Food and Agriculture Organization of the United Nations
FMM	FAO Multi-donor Mechanism
GEF	Global Environment Facility
IGO	Inter-governmental organisation
IP	Implementation Plan
IPCC	Intergovernmental Panel on Climate Change
ISDR	International Strategy for Disaster Reduction
NGO	Non-governmental Organization
OECS	Organization of Eastern Caribbean States
SES	Social-ecological system
SGD	St. George's Declaration
TNC	The Nature Conservancy
UNFCCC	United Nations Framework Convention on Climate Change
US	United States
UWI	University of the West Indies
WECAFC	Western Central Atlantic Fishery Commission

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1 INTRODUCTION

The terms of reference (TOR) of this consultancy call for a results-based programme proposal with supporting project concept notes on implementation and resource mobilization. This introduction explains what this means conceptually and in practical terms. We also identify limitations. The sections that follow propose a programme that focuses on the CRFM (the entire Mechanism, not just the Secretariat) taking the lead in association with partner agencies.

1.1 Context

This volume is very much a work in progress to be discussed and developed further. The programme proposal requires ownership and leadership to transform the ideas here, or alternatives offered, into action. A key indicator of success is the extent to which the proposed programme (with any changes) is agreed to and actually implemented by various stakeholders. So that most stakeholders can participate and benefit, the programme covers a wide array of interests and actors consistent with the social-ecological system and livelihood models introduced. The proposal encourages networks for implementation and learning in order to make best use of available capacity. It advocates a multi-level approach with small and large initiatives yielding both short term and longer term results.

1.2 Concepts

Most readers who work with or for donors, IGOs, NGOs, CBOs and some private sector bodies will be familiar with results-based programme planning and management (commonly shortened to RBM) and its components even if by different names. It is favoured by international (e.g. FAO) and regional (e.g. CDEMA) development-oriented organisations. RBM basics have been around for decades (e.g. the logical framework or logframe) but recent approaches (e.g. Outcome Mapping) are even more consistent with complex adaptive systems and resilience thinking. We explain RBM core elements minimally since online resources on its many variations are abundant. Our aims are to illustrate that RBM fits well into how the CARICOM region is set up to address CCA and DRM, and to facilitate readers' understanding of the proposed programme.

At the planning and programming stage of RBM, where this proposal is at, a key element is to know the current situation (from the assessment study and many other sources for example) and to have a vision for the future (such as in the climate change Regional Framework and for Comprehensive Disaster Management). The RBM programme is intended to fill the gaps between these as illustrated by the results chain that takes into account the attendant risks and assumptions. An element often overlooked, but critical to such schemes, is that beneficial outcomes and impacts may occur due to entirely external factors. They are part of the uncertainty in the system. Although these benefits cannot be attributed to project activities and interventions they cannot be excluded in measuring the achievement of desired change.

An example would be the benefits to fisheries and aquaculture of an ecosystem approach to ICM or sustainable tourism that originated from a separate initiative. In order to measure success, and keep on track, the results chain features (participatory) monitoring and evaluation using indicators and means of verification. As with strategic planning generally, it may take several results chains to converge upon and accomplish the shared vision. A central tenet of RBM is the emphasis on achieving change rather than merely action. The aim of the IP for the Regional Framework is to deliver transformation. Figure 1.1 summarises these concepts. We advise readers not to get caught up in the definition of terms or small differences among various RBM schemes.

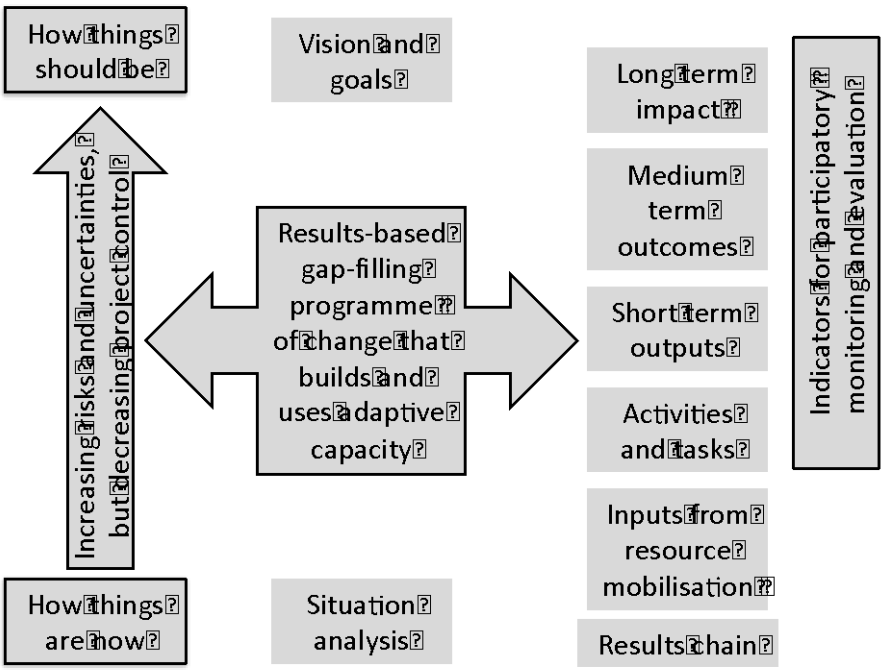

Figure 1.1 Key concepts in results-based management and programming

The results chain is equivalent to a scale of development components comprising several levels similar to the scale and cross-scale analyses of CAS and SES. What is expected at each level should be clear. Figure 1.2 provides some examples.

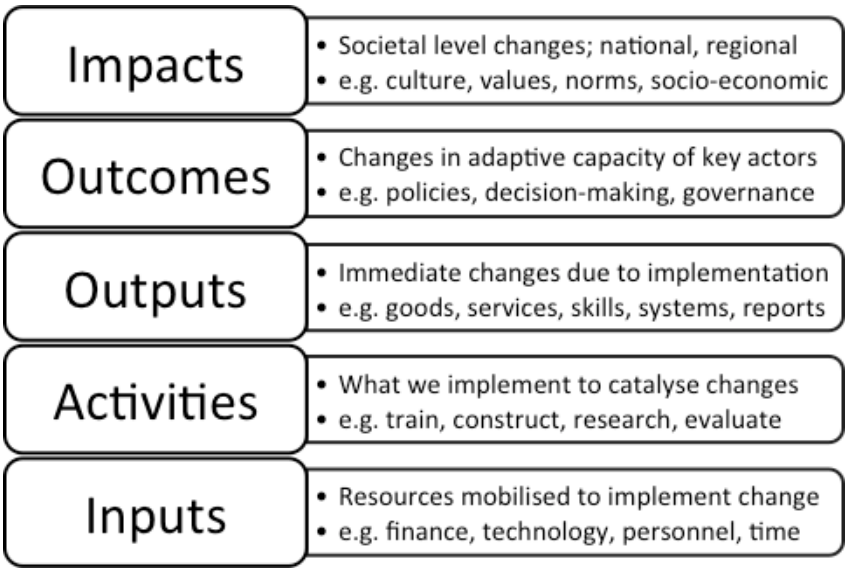

Figure 1.2 Explaining the levels of the results chain

1.3 Approach

There are several ways to set out and summarise programmes for RBM. The most common, used in RBM and other schemes, is the logical framework or logframe that many funding and development institutions require for project proposals. There are fewer variations of the logframe than there are of RBM. There is an abundance of online information on logframes and most readers will be familiar with them. The programme proposal uses the logframe to communicate in a compact form what is intended. Figure 1.3 shows a generic logframe layout.

Results chain hierarchy	Performance indicators	Means of verification	External risks & assumptions
Impact			
Outcomes			
Outputs			
Activities	Resource mobilisation		
Inputs			

Figure 1.3 Logical framework used for programme proposal

Examining the columns from left to right, the results chain statements are in the first column. In order to achieve synergy and linkages these are taken or derived, particularly at the outcome and impact levels, from existing initiatives or recommendations (such as from the four country consultations) to the extent possible. Next are the columns of performance indicators and means of verification. At this stage it is not intended to develop these fully. Suites of indicators are now commonplace. Once the results chain is agreed upon the interested parties can identify and adopt or adapt suitable indicators from systems already in place or planned. For example the CLME project is developing an indicator-based Information Management System (IMS) for the entire Wider Caribbean Region that should incorporate many fisheries metrics. The programme proposal recognizes such opportunities without going into premature detail. The final column contains risks and assumptions. In logframe convention, risks are negative (constraining conditions) and assumptions are positive (enabling conditions), but both are beyond the control of the project. Again, these receive only a light touch at this stage. Some may depend upon which countries and agencies decide to participate in which aspects of the projects given the relationship of risks and assumptions to agency and capacity. Resource mobilisation is summarised at the bottom of each table. This summary means of communication should allow quick and efficient analysis of options with easy editing to reflect final decisions. Explanatory concept notes are added where necessary to provide further information or references to sources.

This undertaking covers 17 countries, four topic areas (aquaculture, fisheries, CCA and DRM) and three jurisdictional levels (local, national and regional) that set the scope of proposed programmes. Although collaboration and integration are central themes, all of the programmes will not cover all of these dimensions. It would be inappropriate to set out which countries and agencies should participate in which programmes although we may recommend arrangements that seem beneficial. Participation

is left for expressions of interest and negotiation at the regional workshop and beyond. For the topic areas and levels each proposal is accompanied by a small matrix that sets out the thinking at this stage (Figure 1.4). The cells are shaded to reflect the scope. It provides an additional scheme for determining the overall coverage of the programme to ensure that it is as equitable as parties deem necessary.

Within the programme most local initiatives can be scaled up and regional initiatives can be scaled down. The suggestion of level is mainly to indicate where capacity and results are most congruent for greatest impact in the shortest period. Although some proposals are predominantly either CCA or DRM, most are integrated in keeping with the model and aim of increasing convergence. Proposals are selected from the recommended measures listed in the assessment study.

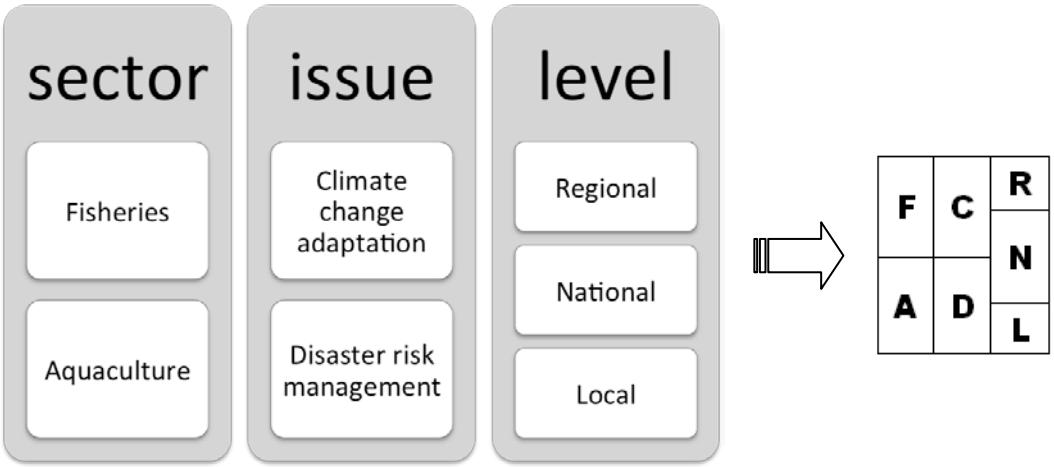

Figure 1.4 Scope matrix and miniature

2 LIMITATIONS

The following limitations are acknowledged at this preliminary stage in programme proposal creation.

- Countries will need to consider and negotiate participation in proposals taking into account their capacity (at all levels) to fully engage and benefit simultaneous with other initiatives
- Some countries may be overwhelmed by current and planned initiatives, necessitating their engagement on an incremental and phased basis carefully planned to fill gaps, not to duplicate
- The number of relevant initiatives by a host of Caribbean and extra-regional agencies appears to be increasing without much pattern, so environmental scans will be necessary before starts
- Some very relevant initiatives (e.g. PPCR, FAO ADRM, ACP Fish II) have deliverables with similar timing as this one, so the need to take these into account will be urgent in 2013
- Sources of funding and other resource mobilisation change strategic directions and criteria for assistance without notice, so close attention must be paid to these threats or opportunities
- Participants in the four country consultations made it clear that their core constraints lay mainly in problematic governance institutional arrangements not specific to CCA and DRM
- Configuration and content of proposals change with the number and capacities of participants, so considerable revision will need to be done once countries and agencies express interest

The above limitations are not confined to this initiative, but affect almost any with an undefined long term planning horizon. A ten year timeline is suggested, but what is practical may depend more on planning, programming and electoral cycles in the CRFM countries and some funding agencies.

3 RESOURCE MOBILISATION

One view of resource mobilisation is that it is "a management process that involves identifying people who share the same values as your organization, and taking steps to manage that relationship"[1]. This perspective, going beyond fund-raising and project financing, is particularly pertinent to this programme proposal which is expected to rely on partnerships and networks to a large extent, consistent with SES and resilience. The same authors go on to describe resource mobilisation as a process that involves three integrated concepts guided by a number of principles. The concepts are:

- organizational management and development
- communicating and prospecting
- relationship building

The main partners in this initiative (FAO, CRFM, CCCCC and CDEMA), as major intergovernmental organisations have resource mobilisation strategies for their programmes of works, as will the major funding sources (e.g. USAID, GIZ, GEF) and big international NGOs (e.g. TNC, WWF, CI). Some regional NGOs (e.g. CANARI) will be in a similar position. Many government authorities and smaller NGOs or CBOs may not have thought strategically about resource mobilisation, but they can. For example, the Grenada Fisheries Division has partnered with NGOs such as SusGren Inc, Agency for Rural Transformation and the Grenada Fund for Conservation to mobilise resources not easily available to a government unit to undertake coastal and marine activities. The University of the West Indies, University of Guyana, University of Belize, St. George's University and others all engage in outreach and partnerships with a variety of agencies. Several have taken place in fisheries and aquaculture. Private sector partnerships are also on the increase. In general, partnerships are mutually beneficial, not only financially, but for capacity development and leveraging additional resources.

All of the above-mentioned specific agencies and categories of organisation are relevant to resource mobilisation for this programme proposal. The CCCCC database, brought up to date, can be consulted to determine where funds and technical assistance are flowing and with what criteria and conditions. We have previously noted several sources of funding and programmes already in place that can be tapped into for fisheries and aquaculture under the right circumstances. Apart from the initiatives of the four partner agencies (FAO, CRFM, CCCCC and CDEMA), among many these others include:

- Canada Caribbean Disaster Risk Management (CCDRM) Fund
- Caribbean Challenge championed by The Nature Conservancy
- JICA Master Plan for Sustainable Use of Fisheries Resources for Coastal Community Development in the Caribbean
- Pilot Program for Climate Resilience of the Strategic Climate Fund
- USAID's Climate and Development Strategy

[1]Venture for Fund Raising. 2009. Resource Mobilization: A Practical Guide for Research and Community-Based Organizations. 2nd edition. Venture for Fund Raising: Manila.

As noted under limitations above, criteria and conditions change rapidly and often unpredictably in the donor world. Such changes are often beyond the influence of potential beneficiaries and are not related to the merits of the assistance sought. Relationships are critical in resource mobilisation.

Chapter 3 of the IP considers financing and should be consulted for specifics related to the private sector, national governments, regional organisations and international financing institutions. It says that currently over 20 global climate change funds exist. The situation is similar for disaster risk management. If CRFM is to take the lead in championing the fisheries and aquaculture aspects of the modified IP, and the proposals to be outlined shortly, then relationships with FAO, CCCCC and CDEMA are critical. CCCCC is especially adept at obtaining and passing on funds for implementing its programmes of work. Implementing agencies will need to pay special attention to fund flexibility.

For effective resource mobilisation, an alliance or consortium comprising the four major agencies may be necessary. The CRFM (presumed lead agency) is already set up to deal with member state engagement at all stages of the policy and planning cycles. The Caribbean Fisheries Forum can accommodate all of the agencies and NGO partners at the technical level while the Ministerial Council provides a conduit to the entire policy level apparatus of CARICOM. New alliances will also be needed at the national level among the several governmental agencies, NGOs, civil society groups and private sector firms. Fisheries advisory committees, where they exist, could be involved.

It is highly recommended that, in keeping with the concepts that underpin this initiative and the proposals below, adaptive management be a cornerstone of the approach to design and execution. In country consultations the participants noted that inflexible donor conditions, budgets and schedules were serious constraints, particularly at the community level where adjustments constantly had to be made in order to ensure the best outputs and to achieve expected outcomes.

Resource mobilization must therefore include partnerships for participatory monitoring and evaluation (PM&E), action learning groups, learning networks and the like in order to institutionalize adaptation. In some cases there will be a need for pre-investment in developing the capacities of community partners especially to undertake the roles required of them in adaptive management. The proposals below, selected mainly from the measures at the end of the assessment study, anticipate this design. The majority of the measures are not included in the proposals. During the country consultations it was often stressed that there were existing resources potentially available to undertake much more than at present, but the inadequacies of institutional arrangements were constraints. Hence most of the proposals focus first on this aspect rather than technical fixes to the issues in climate and disasters.

4 PROPOSALS

Each of the proposals follows a similar pattern. The working title and scope matrix form the heading. Below is a brief explanation of the rationale. More information on context and the gap being filled is in the assessment study. Next is the logframe followed by explanatory concept notes where necessary. Some proposals are more complete than others. All proposals require further negotiated development.

Although there is considerable overlap the proposals are presented in the order of primarily regional followed by national and local. Each higher level is expected to link to those below, so regional proposals will have national components and so on. The reverse is true to a lesser extent. Local proposals may aggregate through a learning network to provide national lessons or capacity, or be replicated at the regional level, but such scaling up is not warranted in every case.

4.1 Regional

Following are proposals for the regional level meaning that even though many aspects may be implemented nationally or even locally there is a need for strong regional leadership in order to coordinate and make best use of economies of scale, scaling up and replication. Although CRFM, through its Secretariat, may be the most obvious lead agency this arrangement is not necessary. The CRFM was originally conceptualised as a network in which various countries or agencies would take the lead on initiatives where they had comparative advantage such as interest, experience or capacity.

4.1.1 Develop a protocol that specifically addresses integrating CCA and DRM into the CCCFP and national fisheries and aquaculture	F	C	R
			N
	A	D	L

Although the Regional Framework and IP led by CCCCC and the Enhanced CDM Framework led by CDEMA are key policy documents there is also need for CRFM to have stronger policy than exists at present in the CCCFP. Therefore, as provided for, it is proposed that a brief protocol be developed to mainstream CCA and DRM in national fisheries and aquaculture planning and management. This would reflect political and technical will and become an asset for mobilising resources particularly at the regional or sub-regional levels that some donors prefer for economies of scale and reduced risk.

Results chain hierarchy	**Performance indicators**	**Means of verification**	**External risks & assumptions**
Impact Long term political will enhances the resilience of fisheries, aquaculture	- Fisheries, aquaculture plans increase adaptive capacity and reduce vulnerability to disasters	- CCCCC, CDEMA, CRFM, etc. reports on adaptation and disasters	Prepared plans are actively utilised in a full policy cycle
Outcome CARICOM / CRFM key enabling policy for institutionalising CCA and DRM into fisheries and aquaculture	- 6 countries formulate FMPs and aquaculture plans with CCA and DRM integrated within 12 months of protocol	- CRFM web pages on country profiles - CDEMA web site	Countries follow through with plan preparation
Outputs Protocol to the CCCFP on CCA, DRM, FMPs	- Protocol completed within 6 months of CCCFP entry into force	- CRFM web site	Countries agree to cooperate
Activities - Approval by CRFM Ministerial Council - Review and approval by CRFM Forum - Consultancy to prepare draft protocol - Disseminate IP with strategic action plan - Communication to inform about proposal	**Resource mobilisation** - This may be done without external resources and the output achieved in 6 months with US$20,000 - Simple communication products (e.g. flyer and slides) to be used by fisheries authorities and fisherfolk organisations (US$15,000). Newspaper articles and in-kind costs are not included. - Consultancy (one person x US$500/day x 10 days) - Meetings for review and approval are covered by CRFM regular budget		Learning from the CCCFP protracted process prompts more efficient and effective approach
Inputs - Funding for activities			CARICOM Heads of Government

Results chain hierarchy	Performance indicators	Means of verification	External risks & assumptions
estimated US$20,000 - Consultant expertise - Modified CCCCC IP - Approved CCCFP			approve the CCCFP

4.1.2 Disseminate CDEMA CCA2DRR tools (e.g. G tool) and supporting material to stakeholders, select preferred tools and create learning networks to develop active communities of practice within CRFM	F	C	R
	A	D	N
			L

During the country consultations it was clear that the several tools available for CCA2DRR and the integration into fisheries and aquaculture were little known by many or shared by the few who were familiar with them. The CDEMA tools are examples. This constraint on knowledge mobilisation is a serious hindrance to achieving several other desirable impacts. More than just a selection of tools there needs to be an active community of users communicating with each other and interested parties in order to create a critical mass of capacity that is learning and adaptive.

Results chain hierarchy	Performance indicators	Means of verification	External risks & assumptions
Impact Tools and techniques enhance the resilience of fisheries, aquaculture	- Increased adaptive capacity and reduced vulnerability to disasters attributable to fisheries, aquaculture CCA2DRR tools and techniques	- CCCCC, CDEMA, CRFM, etc. reports on adaptation and disasters	Tools, techniques selected and used prove to be useful in practice over the (adaptive) long term
Outcome Suite of CCA2DRR tools actively used in all aspects and levels of fisheries, aquaculture	- Countries, communities and private sector use CCA2DRR tools widely in fisheries, aquaculture in 6 countries	- CRFM web pages with plans prepared using the tools	Countries follow through with active use of the suite
Outputs - Network community of practice using tools - Suite of preferred CCA2DRR tools	- CCA2DRR tools ready for use within 6 months - CCA2DRR tools on CRFM,CNFO websites - Virtual community exists for CCA2DRR in fisheries, aquaculture	- CRFM mailing list statistics show activity - CRFM web site and communication products - CNFO web site and communication products	Agreement is possible on a suite of tools rather than independent efforts
Activities - Consolidation of users into a community of practice for CCA2DRR - Creation of a learning network to test the tools and share learning - Selection of preferred tools after review	**Resource mobilisation** - This may be done with modest external resources and outputs achieved in 12 months with US$150,000 - Maximum use can be made of ICT and networks of country leaders to be cost-effective regionally and create a virtual community with minor travel costs - CDEMA and other CCA2DRR products are easily available electronically. Minor printing US$5,000		Improvements in communication among CRFM countries and among the stakeholders within them are possible

Results chain hierarchy	Performance indicators	Means of verification	External risks & assumptions
- Link benchmarking B-tool with the G-tool - Communication to inform stakeholders on CCA2DRR tools, with emphasis on reaching the most vulnerable	- Communication can utilise existing platforms but some IT support and web services may be required in some places. US$10,000 - Testing of the tools will be done in collaboration with the several ongoing CCA and DRM projects as part of normal implementation, so funds required mainly for standardised PM&E reporting, learning and building the community of practice. US$15,000. - Some tools may require small purpose-designed test cases achievable through small grants to NGOs and CBOs. US$70,000. - Integrate B-tool with G-tool and refine through testing. US$50,000		
Inputs - Funding for activities estimated US$100,000 - Expertise of leading CCA2DRR thinkers in the Caribbean, globally - Communications network functional - CDEMA and other CCA2DRR products for evaluation, testing			Countries in CRFM are genuinely interested in mainstreaming CCA2DRR

4.1.3 Increase the content related to climate and disasters in fisheries and aquaculture related university courses and research

F	C	R
A	D	N
		L

Limited human capital and capacity is a constraint in most SIDS. The CRFM has agreements such as memoranda of understanding with tertiary educational institutions, among which the UWI is the largest in the region. The CRFM and UWI are working on a research agenda to assist the latter in meeting the demands of the CARICOM region. Increasing the content related to climate and disasters in fisheries and aquaculture courses and research (natural science, social science and interdisciplinary) will assist in capacity development. It is an investment in the future as well as the present.

Results chain hierarchy	Performance indicators	Means of verification	External risks & assumptions
Impact Enhanced resilience of fisheries, aquaculture and related systems due to tertiary education	- Graduates contribute to increased regional adaptive capacity and reduced vulnerability	- Ad hoc UWI reports on accomplishments of graduates in the region	Course content is adaptable to the market demands
Outcome Integrated suite of UWI and other university courses and research is demand-driven to meet needs in CCA/DRM	- Application and matriculation for courses remains high beyond 2 years	- UWI and other tertiary calendars of courses - UWI theses library	Lag time between design and delivery is short enough to still satisfy the market
Outputs - Modified degree and non-degree courses	- Courses established and research approved by the 2014 Caribbean Fisheries	- UWI course prospectus and enrolment annual statistics digest	Faculty can be allocated to offer the courses on

Results chain hierarchy	Performance indicators	Means of verification	External risks & assumptions
- Functioning research agenda setting process	Forum - Training modules developed, established and on curriculum of at least one regional university by 2015	- Reports of the Forum	campuses and open university
Activities - Scholarships for initial support of students who test these new products - Creation of short and online and non-degree courses or segments - Global search for similar work elsewhere - Determine interest and potential for involving other universities (e.g. in Belize, Guyana, Suriname) - Curriculum review and reform at multiple levels across all science - Forums to better link demand to educational supply for CCA/DRM	**Resource mobilisation** - This may be done with regional resources and the outputs achieved in 18 months with US$200,000 - Course, research and curriculum market analysis and development by survey and promotion and outreach to new funding partners. US$50,000 - Curriculum consultancy (50 person-days x US$500/day) totals US$25,000 - Online and other meetings for course, research development and review. US$25,000 - Scholarships for initial students US$100,000		Scan and market analysis provide evidence upon which to proceed
Inputs - Funding for activities estimated US$200,000 - Allocation of UWI staff to the proposal - Curriculum consultant - New partnerships with donor agencies to build, fund courses, research			The proposal fits as well with the UWI strategic plan as it first appears and is given priority

4.1.4 Determine data sharing required between fisheries stock assessment and climate models; and initiate data exchanges	F	C	R
			N
	A	D	L

Data and research to assess the impacts of climate variability and change on fisheries and fish stocks has been suggested by authors within and outside the Caribbean[2]. Although it is unlikely to be cost-effective or useful to try to use or develop fine scale models it will be useful to have improved broad understanding of how climate and fisheries are linked, and how and why these links change. Direct and indirect pathways, and fish versus fisheries, need to be differentiated. For example, reduced catch

[2]E.g. Mahon (2002), Singh-Renton (2002), Bell and others (2011)

can result in higher ex-vessel market prices that benefit the harvest sector, but threaten food security. A closer connection through communication between downscaled climate modelling and fisheries modelling is advocated in order to potentially improve the quality of information for decision-making.

Results chain hierarchy	**Performance indicators**	**Means of verification**	**External risks & assumptions**
Impact Enhance resilience of fisheries systems due to ecosystem modelling	- Climate linked models build adaptive capacity	- CRFM and WECAFC reports on resilience	Improved linkages achieved between advice and policy
Outcome Climate-linked models of fisheries ecosystems improve regional decision-making	- Advice provided at the CRFM Forum and other bodies such as WECAFC is based on these models	- CRFM and WECAFC reports on policy advice	Countries follow through with using the models and sharing data
Outputs Climate-linked models of fisheries ecosystems	- At least 6 fisheries managers are trained in using outputs from climate-linked fisheries integrated models	- CRFM Annual Scientific Meeting and species working group reports - (Revised) fisheries management plans	Technical issues can be overcome
Activities - Advice offered by CRFM and WECAFC - Develop appropriate climate and ecosystem-based fisheries models - Consultancy to build linked data system - Determine overlap in data needs and uses of climate and fisheries predictive models	**Resource mobilisation** - This may be done with external resources and the output achieved in 12 months with US$100,000 - Consultancy (100 person-days x US$500 / day) US$50,000 - Data acquisition, communication, pilot assessments US$50,000 - Meetings for review, approval and advice are covered by CRFM regular budget		Technical issues can be overcome
Inputs - Funding for activities estimated US$100,000 - Consultant expertise - Fisheries and climate modelling expertise			Experts agree that such modelling is cost-effective

4.1.5 Develop post harvest processing and marketing capacity to use underutilised, unfamiliar, altered season or more abundant species	F	C	R
	A	D	N
			L

Climate change and increasing variability is expected to result in shifts in species distribution, life cycles and migration. Species not previously of commercial interest may become potential targets. It may be easier for the harvest sector to adapt to these changes than the processing establishments, fish

vendors and consumers in postharvest. Attention must be paid to making these components of the seafood value chain adaptive as well. Some of the adaptation may be accomplished through TCDC.

<table>
<tr><th>Results chain hierarchy</th><th>Performance indicators</th><th>Means of verification</th><th>External risks & assumptions</th></tr>
<tr><td>Impact
Food security enhanced through postharvest sector adaptation</td><td>New local seafood items are in good supply with sufficient demand</td><td>Annual economic statistics on seafood</td><td>Initiative is sustained long enough to be institutionalised</td></tr>
<tr><td>Outcome
Postharvest enterprises acquire new adaptive capacity through TCDC</td><td>New techniques are in use in at least 4 countries within 12 months</td><td>Reports of the fisheries and marketing authority</td><td>Postharvest sector is receptive to the new techniques and marketing</td></tr>
<tr><td>Outputs
- Marketing strategies for new seafood items
- Processing techniques adaptive to variability</td><td>- Marketing strategies for at least 3 seafood items ready for industry
- Processing techniques adopted by post harvest in at least 4 countries within 9 months</td><td>Reports of the fisheries and marketing authority</td><td>Seafood trade does not undermine this activity</td></tr>
<tr><td>Activities
- Develop appropriate processing techniques including for quality assurance monitoring
- Develop marketing strategies for products
- TCDC arrangements for mobilising expertise
- Determination of the priority processing adaptation needed
- Assessment of likely changes in landings</td><td colspan="2" rowspan="2">Resource mobilisation
- This may be done with international resources and the outputs achieved in 24 months with US$300,000
- Develop appropriate processing techniques and develop marketing strategies US$ 100,000
- Product development and marketing consultancy to visit about 5 countries with range of species landed (100 person-days x US$200 / day) totals US$20,000
- Harvest and market analysis and new product development with marketing trials. US$50,000
- Purchase of raw material, processing trials and development of HACCP systems. US$130,000</td><td>Suitable postharvest consultant available via TCDC</td></tr>
<tr><td>Inputs
- Funding for activities estimated US$300,000
- Postharvest consultant
- Information on fish harvest and markets</td><td>Changes in landings are not totally unpredictable</td></tr>
</table>

4.2 National

The following are proposed primarily for the national level bearing in mind that there should be vertical and horizontal links to the regional and local levels plus among the countries participating.

4.2.1 Mainstream CCA and DRM into national ecosystem-based, livelihood-centred management plans for fisheries, aquaculture	F	C	R
	A	D	N
			L

Government and non-government fisheries stakeholders in the four country consultations were very insistent that climate and disaster plans driven into the sectors would be unsuccessful. They said that national plans for fisheries and aquaculture needed to be ecosystem-based and comprehensive with livelihoods (sustainable and alternative) as their focus. Such strong sentiments were in stark contrast to the abundant evidence that CFRAMP and then CRFM efforts to institutionalise fisheries management planning (including aquaculture in some cases) were not successful over the past two decades. The renewed interest in this combined with the resources available to address climate change and disasters compared to fisheries and aquaculture may provide new incentives and vigour. Success in this is key to the attainment of other goals. This proposal concerns mainly Strategy 1 in the IP.

Results chain hierarchy	**Performance indicators**	**Means of verification**	**External risks & assumptions**
Impact Livelihoods and well being improve and are sustained due in part to proper EAF/A planning	- Fisheries, aquaculture EAF management plans improve livelihoods	- Poverty and livelihood assessments, census data	Prepared / approved plans are actively utilised in a full policy cycle to address core areas
Outcome CRFM institutionalises CCA and DRM into fisheries , aquaculture management planning	- At least 2 rounds of the full policy cycle are completed based on the agreed duration (e.g. 3y)	- Reports of the CRFM Fisheries Forum and Ministerial Council	Countries follow through with plans
Outputs Fisheries, aquaculture management plans are based on ecosystem and livelihood approaches	- Countries formulate FMPs and aquaculture plans with CCA and DRM integrated within 12 months of start	- CRFM web site country profiles	Stakeholders accept EBM, livelihoods as the core of plans
Activities - Review, approval by multiple stakeholders and key policy-makers - Consultancies to help revise / prepare draft F&AMPs - Communication to inform about proposal	**Resource mobilisation** - This may be done with minimal external resources except funding (US$1,275,000) and outputs achieved in 18 months - There is sufficient expertise in the CARICOM region for this not to require external assistance unless primarily to reduce the delivery period - Allocate on average about US$75,000 for each of 17 CRFM countries (amount will vary with size)		National and local institutional arrangements are adequate for plans
Inputs - Funding for activities estimate: US$1,275,000 - Consultant expertise - FMP success stories - National experts, data	- Full use can be made of existing knowledge from various sources with no new primary data collection necessary. Most funds to consult and communicate. - FAO regional TCP is the most likely source		CARICOM Heads of Government approve the CCCFP and its CCA / DRM protocol (proposed)

4.2.2 Undertake gender analyses in fisheries and aquaculture to demonstrate usefulness in policy, planning, management	F	C	R
	A	D	N
			L

As noted in the assessment (Volume 1), gender requires more attention in projects and regular programming. Clear evidence exists of gender differences connected to climate and disasters. To ignore gender is to compromise interventions. Participants in the country consultations called for community level gender analyses to guide their work. Several approaches are possible. The one proposed is participatory action research making use of students and civil society organisations.

Results chain hierarchy	**Performance indicators**	**Means of verification**	**External risks & assumptions**
Impact Improved well-being and social relations due to attention to gender	- Sensitivity to gender issues increase beyond the project period	- Directed community level research projects	Gender remains on the front burner
Outcome Gender sensitive policy and practices become mainstreamed	- Both men and women are involved in activities on an equitable basis	- Reports of agencies and NGOs working in the community	Communities carry through with plans that incorporate gender
Outputs Community profiles and guidelines for work that are gender sensitive	- Groups communicate regularly on matters pertaining to gender	- Reports of agencies and NGOs working in the community	Gender analyses are accepted as useful
Activities - Gender analysis used to inform interventions - Attention to youth, the elderly, disadvantaged - Community and national fisheries and aquaculture plans made (more) gender aware - Training in gender analysis for planning	**Resource mobilisation** - This may be done with funding of on average US$10,000 per community per year over a period of 2 years and using about 10 communities to pilot, so total cost is US$200,000 - There is sufficient expertise in the CARICOM region for this not to require external assistance - Several NGOs and the UWI campuses may wish to participate including providing in-kind support		Community is willing to take gender as a serious matter in planning
Inputs - Funding for activities around US$10,000 per community over 2 years - Consultant expertise - National FMPs, plans			National fisheries and aquaculture plans are available

4.2.3 Intensify boat registration and licensing, vessel monitoring, safety at sea training and such preparatory measures	F	C	R
	A	D	N
			L

Fisheries authorities and disaster agencies have noted that damage assessment and recovery efforts are hampered by inadequate pre-disaster data on the people and property in small-scale fisheries. Seeking information post-disaster is fraught with problems. More important, preventive measures are needed to reduce vulnerability, particularly to rough sea events. Vessel monitoring systems and other means of monitoring, control and surveillance coupled with vessel registration and licensing systems should be normal components of fisheries management. In many countries there is sufficient in-house capacity to make a difference, but resources cannot normally be dedicated to these matters as priority. Depending upon administrative arrangements, number of interested countries and their capacity, this proposal may be further disaggregated into several separate proposals phased to suit the situation.

Results chain hierarchy	**Performance indicators**	**Means of verification**	**External risks & assumptions**
Impact Lives saved; action is more effective and efficient after disasters	- Loss of life reduced by relative percentage to be determined by country	- Fisheries authority and disaster management agency records	New skills and systems are put to the test before they fall into disuse
Outcome Improved database aids capacity for safety of fishers and their vessels	- Fisher organisations are better able to ensure the safety of their members - Data are good and used	- Reports of authorities and fisher organisations	Persons trained use new knowledge in disaster situations
Outputs Improved database, new or improved vessel monitoring system, well-trained fishers	- Fisheries databases near 100% of actual people and property - 50% of fishers trained - VMS fully functional	- Reports of authorities and fisher organisations	Authorities have adequate computer systems in place
Activities - Fisheries registration drive to get livelihood data for quick retrieval - Evaluate registration systems in current use (e.g. CRFM LRS) - Safety at sea training - Small vessel VMS test or system upgrade	**Resource mobilisation** - This may be done with funding of on average US$150,000 per country per year each for 10 pilot countries, so total cost is US$1,500,000 - Cost per country will vary considerably with size of industry and distribution of fishing locations - External expertise may be required for the VMS - Lessons may be drawn from Grenada's experience		Fishers forego days at sea to be trained
Inputs - Funding for activities around US$150,000 per country for 1 year each - Expertise of trained fishers as self-help trial - Small vessel VMS - Fisheries officers and fisher organisations			- Trained fishers are available to assist - Small vessel VMS is affordable and practically feasible

4.3 Local

The following are proposed primarily for the local level bearing in mind that there should be vertical and horizontal links to the regional and national levels plus among the participating locations within and across boundaries. Given the low capacities often observed at the local level, ideally most of these proposals will have close oversight from agencies with capacity and shared interests.

4.3.1 Strengthen CCA and DRM linkages especially at local level in order to encourage synergistic interventions, messages	F	C	R
			N
	A	D	L

A clear message from the country consultations was that more needed to be done at the local level to integrate and harmonise the various CCA and DRM initiatives with each other and with fisheries and aquaculture activity. This proposal seeks a bottom-up approach to this by strengthening community-level institutions for self-organisation in keeping with complex adaptive system and resilience thinking. This will only be successful if there is an enabling policy environment that encourages this.

Results chain hierarchy	**Performance indicators**	**Means of verification**	**External risks & assumptions**
Impact Livelihoods and well-being improve and are sustained due in part to integrated interventions	- Metrics for quality of life and social capital	- Directed community level research projects	Fisheries or aquaculture remain aspects of local socio-economy
Outcome Communities integrate CCA and DRM into fisheries, aquaculture	- Improved coping and adaptation strategies	- Reports of authorities after hazard impacts	Communities follow through with plans
Outputs Community groups set up to coordinate inputs based on their priorities within national systems	-Groups communicating regularly and planning strategically with little outside assistance in partnership with local disaster committees - At least 10% in fishers using insurance to help reduce disaster risks	- Reports of community and national agencies - Reports of insurance companies and fisher organisations	Stakeholders accept responsibilities and long term outlook
Activities - Community group mobilisation around learning-by-doing and mentoring / coaching - Leadership, insurance and pension, training - Vulnerability capacity assessment training - Gender analysis to inform interventions - Community fisheries	**Resource mobilisation** - This may be done with funding of on average US$30,000 per community per year over a period of 5 years and using about 10 communities to pilot, so total cost is US$1,500,000 - There is sufficient expertise in the CARICOM region for this not to require external assistance - Lessons may be drawn from projects e.g. AWE		Community conflict is sufficiently low to make progress

Results chain hierarchy	Performance indicators	Means of verification	External risks & assumptions
and aquaculture plans integrating CCA, DRM and EAF			
Inputs - Funding for activities around US$150,000 per community over 5 years - Consultant expertise - National FMPs, plans			National fisheries and aquaculture plans are available

4.3.2 Document what coping strategies are or have been used for climate variability and disasters to inform interventions	F	C	R
			N
	A	D	L

The literature on climate and disasters warns that people, including the poor, who have dealt with hazards, sometimes repeatedly, develop coping strategies. These strategies may or may not be compatible with longer term adaptation and management. To be unaware of such strategies while planning or making community interventions adds to uncertainty of outcomes and risk of failure. In particular, there is a high risk of interventions causing erosion of social institutions and their capital.

Results chain hierarchy	Performance indicators	Means of verification	External risks & assumptions
Impact Livelihoods sustained or improved by better informed interventions	- Metrics for quality of life and social capital	- Directed community level research projects	Events occur that make use of the new knowledge
Outcome Intervention plans are enhanced by knowledge of coping strategies	- Improved interventions that take coping into account	- Project and programme reports	Communities use the information in plans
Outputs Accessible information on coping strategies used by fisheries and fish farm communities	- Better known coping and adaptation strategies	- Reports of community and national agencies	Research results are communicated in a suitable manner
Activities -Guidelines for taking coping into account - Use CDEMA toolkit, OECS Toolkit, Hazard Mitigation Policy etc. - Use of several forms of multimedia - Social science studies on coping strategies to inform interventions - Dissemination of information by change	**Resource mobilisation** - This may be done with funding of on average US$20,000 per community per year using about 10 communities to pilot, so total cost is US$200,000 - There is sufficient expertise in the CARICOM region for this not to require external assistance		Coping strategies can be determined

Results chain hierarchy	Performance indicators	Means of verification	External risks & assumptions
agents in communities			
Inputs - Funding for activities around US$20,000 per community per year - Researcher expertise			Availability of social science researchers

4.3.3 Develop and implement education/awareness specifically for fisherfolk and fish farmers on climate and disasters

F	C	R
A	D	N
		L

It was noted in the assessment that sufficient information on climate change adaption and disaster risk management was not reaching persons involved in fisheries and aquaculture. It is not that information does not exist, but the messages, pathways and products need to be more strategic. Interventions such as mainstreaming, disaster management and fisheries management planning will fail unless there are informed stakeholders able to participate meaningfully. Gaps in communication can be addressed along with various learning-by-doing projects in order to give information more currency and value.

Results chain hierarchy	Performance indicators	Means of verification	External risks & assumptions
Impact Livelihoods and well-being improved through better communication	- Metrics for quality of life and social capital	- KAP time series of surveys at index sites	Other factors do not simultaneously erode social capital
Outcome Closer knit community networks add to social capital in livelihoods	- Improved adaptation strategies through better communication	- Reports of community and national agencies	Communities effectively use communication
Outputs Community groups set up to communicate and are also better informed	- Groups communicating regularly and sharing information strategically	- Reports of community and national agencies	Communication strategy can be integrated with learning-by-doing
Activities - Community groups targeted communication in local language - Establish partnerships with national, regional entities to help sustain - Train to communicate - Involve governmental and NGO information units at all stages - Production of material for communications - Communication	**Resource mobilisation** - This may be done with funding of on average US$20,000 per community per year using about 10 communities to pilot, so total cost is US$200,000 - There is sufficient expertise in the CARICOM region for this not to require external assistance		Community conflict is sufficiently low to make progress

Results chain hierarchy	Performance indicators	Means of verification	External risks & assumptions
capacity assessment of agencies and locations - Integrated CCA / DRM communication strategy for target communities			
Inputs - Funding for activities around US$20,000 per community per year - Consultant expertise - CCA / DRM resource materials and guideline for communication - National FMPs, plans			National fisheries and aquaculture plans are available

4.4 Summary

The programme proposal is summarised below noting that activities may be substantially modified and few require sequential implementation. There may be cost savings if some are implemented simultaneously. The entire period for implementation is not specified as it is unclear when the programme would start. For synchronisation with the IP, extension beyond 2021 is not expected.

Proposal working title	Estimated cost (USD)	Estimated duration
REGIONAL		
Develop a protocol that specifically addresses integrating CCA and DRM into the CCCFP and national fisheries and aquaculture	20,000	6 months
Disseminate CDEMA CCA2DRR tools (e.g. G tool) and supporting material to stakeholders, select preferred tools and create learning networks to develop active communities of practice within CRFM	100,000	12 months
Increase the content related to climate and disasters in fisheries and aquaculture related university courses and research	200,000	18 months
Determine data sharing required between fisheries stock assessment and climate models; and initiate data exchanges	100,000	12 months
Develop post harvest processing and marketing capacity to use underutilised, unfamiliar, altered season or more abundant species	300,000	24 months
NATIONAL		
Mainstream CCA and DRM into national ecosystem-based, livelihood-centred management plans for fisheries, aquaculture	1,275,000	18 months
Undertake gender analyses in fisheries and aquaculture to demonstrate usefulness in policy, planning, management	200,000	24 months
Intensify boat registration and licensing, vessel monitoring, safety at sea training and such preparatory measures	1,500,000	12 months
LOCAL		
Strengthen CCA and DRM linkages especially at local level in order to encourage synergistic interventions, messages	1,500,000	60 months
Document what coping strategies are or have been used for climate variability and disasters to inform interventions	200,000	12 months
Develop and implement education / awareness specifically for fisherfolk	200,000	12 months

Proposal working title	Estimated cost (USD)	Estimated duration
and fish farmers on climate and disasters		
TOTALS (roughly sum funds and time; activities may not be sequential)	5,595,000	5 years

The summary estimate of nearly 6 million US dollars to finance the programme proposal over around 5 years is very rough. See the sections on limitations and the detailed proposals for considerations that apply. In many cases it is stated that there is capacity in the region to undertake the activities. While this is so, often that capacity is over-subscribed and may not be available. In such cases external assistance, most likely at a higher cost, will be required. Funding agencies may impose other criteria and conditions including the use of external consultants.