

REPORT ON OUTCOMES OF THE REGIONAL TRAINING PROGRAM ON ANALYTICAL TOOLS, MONITORING TOOLS AND AN ENVIRONMENTAL AND FISHERIES DATA PORTAL





CRFM Technical & Advisory Document - Number 2019 / 18

Report on Outcomes of the Regional Training Program on Analytical Tools, Monitoring Tools and an Environmental and Fisheries Data Portal

28 October – 01 November 2019, Saint Lucia

The Fishery-Related Ecological and Socio-Economic Assessments of the Impacts of Climate Change and Variability consultancy has been conducted with support from the Regional Track of the Pilot Programme for Climate Resilience (PPCR) in the Caribbean, which is executed by the University of the West Indies, Mona (UWI), through its Mona Office of Research and Innovation (MORI); and co-implemented by the Caribbean Regional Fisheries Mechanism (CRFM) with resources provided by the Climate Investment Fund (CIF) through the Inter-American Development Bank (IDB)”

CRFM Secretariat
Belize, 2019

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Report on Outcomes of the Regional Training Program on Analytical Tools, Monitoring Tools and an Environmental and Fisheries Data Portal

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CONTENTS

| | |
|---|-----------|
| 1. INTRODUCTION | 1 |
| 2. PARTICIPANT PROFILES AND EXPECTATIONS | 3 |
| 3. RESULTS AGAINST GOALS AND OBJECTIVES | 6 |
| 3.1 KNOWLEDGE AND AWARENESS | 6 |
| 3.2 SKILLS | 9 |
| 4. EVALUATION | 12 |
| 5. CONCLUSIONS AND NEXT STEPS | 15 |
| APPENDIX I: PARTICIPANTS' LIST | 16 |
| APPENDIX II: TRAINING AGENDA | 19 |
| APPENDIX III: INSTRUCTIONS AND WORKSHEETS FOR SELECTED EXERCISES..... | 25 |
| <i>Monitoring Cards – Work in Pairs</i> | <i>25</i> |
| <i>Developing a Monitoring Project Concept – Work in Pairs</i> | <i>27</i> |
| <i>Identifying and Selecting Adaptation Options Using Multi-Criteria Decision Analysis (MCDA) – Work in Small Groups.....</i> | <i>29</i> |
| <i>Elevator Pitch Exercise – Individual Exercise</i> | <i>32</i> |

1. INTRODUCTION

This document summarizes the results of a five-day Regional Training Program delivered by ESSA Technologies Ltd. in Rodney Bay, St. Lucia, from October 28 to November 1, 2019. This Training Program formed part of Work Package 2 of the Fishery-Related Ecological and Socio-Economic Impact Assessments and Monitoring System Project.

The *Fishery-Related Ecological and Socio-Economic Impact Assessments and Monitoring System Project* (the Project) is a key assignment under the Caribbean regional track of the Pilot Programme for Climate Resilience (PPCR). The Project aims to improve the information base and its usage for climate-smart fisheries planning and management decision-making, as well as, risk management in the fisheries sector. It kicked off in January 2018 and is now at the stage of disseminating and transferring outputs from research activities. Accordingly, the Project Team from ESSA designed and delivered a Regional Training Workshop in Rodney Bay, St. Lucia, from October 28 to November 1, 2019. This workshop was the Project's second and final major face-to-face activity. It brought together representatives from the Caribbean Regional Fisheries Mechanism (CRFM) Secretariat, representatives from PPCR countries (Dominica, Grenada, Jamaica, Saint Lucia and Saint Vincent & the Grenadines), a representative from Project's Technical Advisory Committee and a representative of the Climate Studies Group at the University of West Indies.

Consistent with the Terms of Reference of the Project, the **aims** of the Regional Training Workshop were as follows:

- To introduce assessment, monitoring and decision-support guidance and tools developed under the Project to enable climate-smart decision-making in fisheries;
- To build knowledge and skills for use of the guidance and tools by fisheries officers from PPCR countries;
- To introduce the fisheries and environment online data portal (<http://portal.crfm.int>) developed under the Project (i.e., the CRFM Portal);
- To build knowledge and skills for the use, management and long-term maintenance of the data portal.

Training comprised one principal modality of engagement (a face-to-face training workshop), with a mix of delivery formats (lectures, individual exercises, group exercises and plenary discussions), the active participation of fourteen individuals and was based on principles of adult education. Appendix I includes a participant list. Throughout the program we strived to create the right conditions for participants to link concepts to their experiences, emphasize practical applications and strategies for action, foster an environment of mutual learning between participants and facilitators and promote continuous reflection. Implementation timelines were as represented in Table 1.

The structure of the document is as follows. We start by describing the pool of participants and their expectations going into the training session. Next, we state specific goals and objectives of the training program and compare them against results achieved. We then summarize the results of evaluations of the program, compiled from a participatory exercise conducted on the last day of training. Finally, we offer our reflections on needs and requirements to ensure sustainability and impact of project results.

| Task | Subtask | Start date | End date |
|------------------------------------|---|------------|------------|
| 1 - Scoping and preparation | | | |
| | a-Internal scoping and development of high level program | 10/06/2019 | 31/07/2019 |
| | b-Recruitment of training participants | 11/07/2019 | 13/09/2019 |
| | c-Learner profiles | 15/09/2019 | 13/10/2019 |
| | d-Development of training program | 30/09/2019 | 18/10/2019 |
| | e-Logistics and planning for the workshop | 25/08/2019 | 27/10/2019 |
| 2-Workshop | | | |
| | a-Delivering five-day workshop | 28/10/2019 | 01/11/2019 |
| | b-Communicating about the workshop | 11/11/2019 | 19/11/2019 |
| 3-Wrap up | | | |
| | a-Revisions to data portal and guidance | 18/11/2019 | 16/12/2019 |
| | b-Write-up on workshop outcomes | 25/11/2019 | 06/12/2019 |
| | c-Follow up with training participants (learning actions) | 06/01/2020 | 10/01/2020 |

Table 1: Implementation schedule

2. PARTICIPANT PROFILES AND EXPECTATIONS

This section provides an overview of participants' characteristics, developed based on responses to an online survey deployed in early October 2019. It also summarizes participants' expectations for the Regional Training Program.

A total of fourteen participants attended the Regional Training Workshop. Of these fourteen only three had been engaged throughout the Project. Given our low familiarity with the skills and backgrounds of most confirmed participants the Project Team deployed an online survey to learn about our audience. Using the contact information provided to us by the CRFM Secretariat we reached out to participants, requesting their response to nine questions. We received twelve completed surveys. What follows are summary highlights of aggregate responses. We developed individual profiles as well and used that information to call out on specific people over the course of the training workshop.

- The group had diverse occupations. It comprised intermediate and senior-level fisheries officers and assistants, data entry clerks and data analysts as well as public relations and outreach officers.
- On average, participants had been in their current position for 7.3 years. The range was under three years to just over thirteen years.
- Perhaps consistent with the relative size and capacities of the agencies represented, responsibilities of many participants ranged from research to fisheries management to policy development (see Figure 1). A minority of participants (two) are solely focused on one responsibility.
- Most participants (ten out of twelve) were either fairly new to their agencies or had achieved seniority (see Figure 2). Prior to the workshop we hypothesized that this mix of institutional experience would be healthy since some participants joining us would have a solid understanding of their operational environment and institutional history and others may have the “fresh eyes” and energy needed to generate momentum for action. In retrospect, this mix of levels of experience was conducive to healthy discussions, as the more experienced participants tended to initiate conversations and sharing of feedback, which then drew out participation by others.

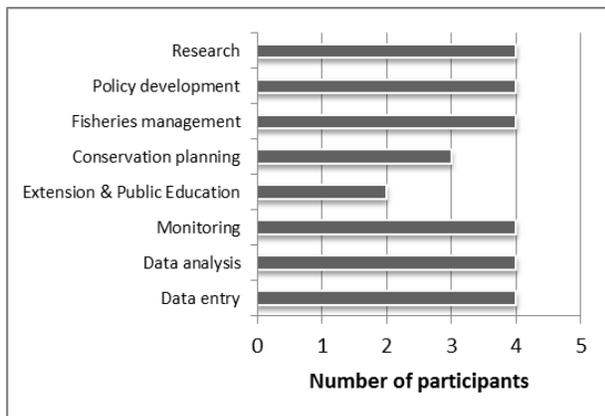


Figure 1: Participants' main responsibilities at work

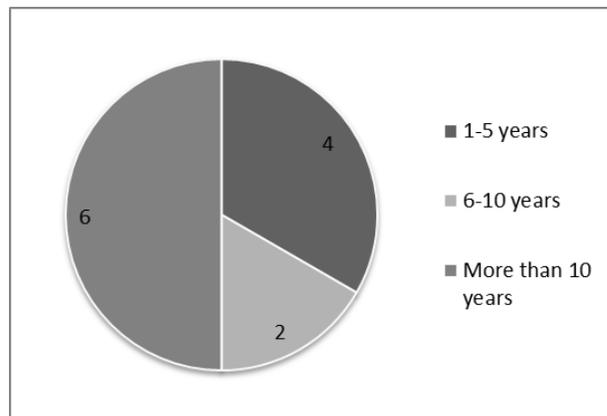


Figure 2: Length of time participants have worked at the agency they represent

- On average, participants had intermediate skills in MS Word and MS Excel and beginner skills in statistical and database software (see Table 2). On average, the group had beginner to intermediate-level skills in science communications to non-technical audiences.

- Similarly, the group’s level of experience with GIS tools was low. Four out of twelve respondents reported no knowledge in or experience in using GIS and eight out of twelve had a basic awareness of these tools (see Figure 3). The “hands-on” exercises developed for the Regional Training Workshop took these findings into account.
- The majority of participants preferred learning by doing over other learning methods (Table 3). This is common for adult learners. Our training program included a mix of presentations (with worked examples, as applicable) and practical applications to address these preferences.

| Experience in the following skills | Group average (None=1, Expert=5) |
|---|-------------------------------------|
| Use of MS Word or similar | 3.5 |
| Use of MS Excel or similar | 3.0 |
| Science communications to non-technical audiences | 2.5 |
| Use of MS Access or similar | 1.9 |
| Use of R | 1.8 |
| Use of other statistical software | 1.7 |

Table 2: Participants’ self-rated experience in six core skills

| Preferred learning method | Count |
|---------------------------|-------|
| Listening | 1 |
| Watching demonstrations | 2 |
| Learning by doing | 9 |

Table 3: Participants’ stated preferences on how they like to learn

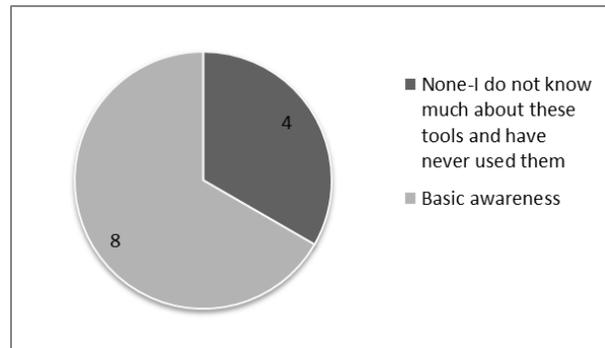


Figure 3: Participants’ self-rated knowledge of and experience in using GIS

In expressing their hopes and expectations for the workshop, participants highlighted their openness and enthusiasm for learning about the tools generated through the project (Box 1). In some cases, they made specific mention of types of tools they were most interested in. Participants also raised the expectation of connecting what was learned with broader developments and needs in the region. Finally, there was one mention of the desire to use the workshop as an opportunity to make friends.

Hopes and Expectations

To learn about tools overall

- Learn about tools and their limitations
- Hoping to learn everything put forward, all that goes into decision-making to be able to make meaningful contributions and move adaptation forward
- Want to be like a sponge and am expecting to learn everything offered
- They are good tools so hope to be able to transfer excitement about them to participants

To learn about specific tools and their application

- Use of R
- Use of analytical tools, develop knowledge of QGIS and its application
- Broader view of information about R and tools
- Better equipped with statistical / analytical knowledge, especially with use of R
- Hope that tools will increase advice available for decision-making, make decision-making easier
- Learn about tools for better data management

- Hoping for a user-friendly portal

To connect what is learned to regional trends and initiatives

- Thinking regionally in the interpretation / consideration of evidence and tools
- Linkages to other databases and things going on in the region
- Hoping that tools link to existing tools and other climate change adaptation projects in fisheries
- What data are required / needed in fisheries and how CSG can facilitate access to those data
- Don't just stay with fisheries messages but go beyond to other sectors (e.g., tourism, coastal zone management)

To build relationships

- Making new friends

Box 1: Participants' stated hopes and expectations for the training workshops

3. RESULTS AGAINST GOALS AND OBJECTIVES

This section compares expected goals and objectives to actual results achieved through the Regional Training Program (the Training Program Agenda is given in Appendix II). It presents two categories of results: (1) knowledge and awareness and (2) skills.

3.1 Knowledge and Awareness

The terms of reference for the Project provided guidance to define the goals and objectives of the Regional Training Workshop. According to our training program, by the end of the program, participants should be able to achieve the following objectives (learning objectives in Table 4):

| Workshop aims | Learning objectives |
|---|---|
| <ul style="list-style-type: none"> To introduce assessment, monitoring and decision-support guidance and tools developed under the Project to enable climate-smart decision-making in fisheries | <ul style="list-style-type: none"> List the main assessment and communications outputs developed under the Project Summarize key components of the climate change adaptation toolkit for Caribbean fisheries developed under the Project (monitoring framework, adaptation strategies decision-support framework, analytical tools) |
| <ul style="list-style-type: none"> To introduce the fisheries and environment online data portal (http://portal.crfm.int) developed under the Project (i.e., the CRFM Portal) | <ul style="list-style-type: none"> Describe the fisheries and environment data portal and its main functions |
| <ul style="list-style-type: none"> To build knowledge and skills for use of the guidance and tools by fisheries officers from PPCR countries | <ul style="list-style-type: none"> Explain new climate change-related concepts introduced through the project (climate-smart fisheries, species distribution modelling, supply-demand models, climate communications) |

Table 4: Link between workshop aims with learning objectives related to knowledge and awareness

Training activities designed to increase knowledge and awareness were as follows (Figure 4):

- **A series of overview presentations generally consisting of about 45 minute-long lectures** – a project overview, an overview of main findings from ecological and socio-economic assessments of climate change on Caribbean fisheries, overview of the climate-smart Caribbean fisheries toolkit, overview of species distribution modelling, overview of market fish supply-demand modelling, overview of the climate-smart fisheries monitoring framework, overview of communications and engagement materials produced under the Project, best practices in communicating climate change and adaptation.
- **Guided demonstration** and navigation of the fisheries and environment data portal.
- **Daily learning reflections** (“newscasts”), whereby participants volunteered to share highlights from the previous day’s training session.
- **An exercise in pairs** whereby participants were tasked to read and report on main features of monitoring cards, as well as provide feedback on the applicability of the monitoring guidance (see Appendix III).

All available evidence indicates that the Regional Training Program met goals and objectives related to knowledge and awareness. Evidence stems from the ESSA Project Team’s assessment of participants’ performance during the training. In particular, we note that:

- Most participants are now familiar with the main outputs of the Project and have identified which of the outputs are most useful to them.

- Most participants can explain basic climate-smart fisheries concepts, including options to adapt, and understand the difference between adaptation and mitigation of greenhouse gases. Confusion between adaptation and mitigation can be common.
- By virtue of participants' backgrounds and occupations, knowledge gained on ecological aspects of assessment and monitoring is likely stronger than for socio-economic aspects.
- Portal administrators are conversant in key terminology pertaining to the portal (e.g., a dataset, a resource, an organization, permissions) and can explain its intended use.



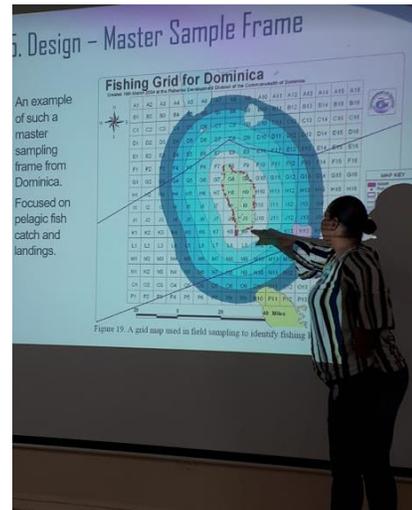
Representatives from Jamaica and the CRFM Secretariat sharing highlights from Day 1 of the training program



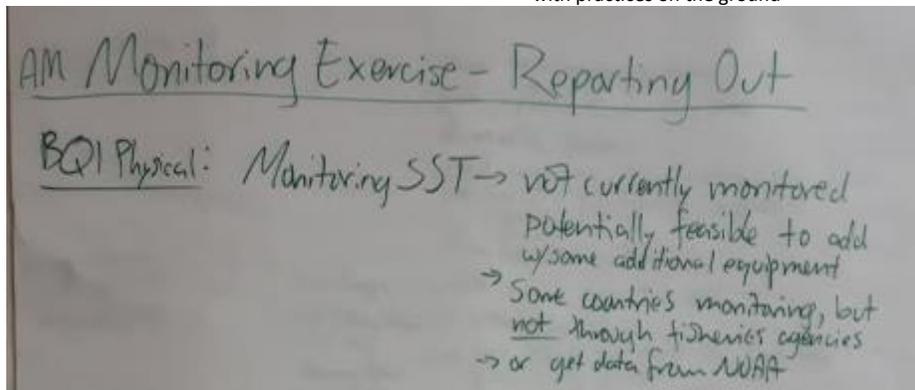
Representatives from Jamaica and Dominica sharing highlights from Day 2 of the training program



Representatives from Saint Vincent and the Grenadines simulating a newscast as a way to share highlights from Day 3 of the training program



A representative from Dominica provides further information on the monitoring approach used in their country, which helped connect the master sample frame proposed through the Project with practices on the ground



Flipchart notes recording the main points of participants' report to plenary on the main features and applicability of monitoring guidance with respect to sea surface temperatures

Figure 4: Examples of activities to enhance knowledge

3.2 Skills

The terms of reference for the Project were vague as regards to the goals and objectives for skills development. To define related goals and objectives the ESSA Project Team considered what building blocks would be necessary to boost the sustainability of results beyond project end. Accordingly, by the end of the program, participants were expected to be able to achieve the following objectives (learning objectives in Table 5):

| Workshop aims | Learning objectives |
|---|---|
| <ul style="list-style-type: none"> To build knowledge and skills for use of the guidance and tools by fisheries officers from PPCR countries | <ul style="list-style-type: none"> Launch R, apply its basic functions and run code to map habitat suitability for fish species Find, access and use the spatial data on the data portal to inform climate-smart marine planning using QGIS software for overlay analysis Access and navigate the model market supply and demand fish model Undertake a gap analysis between the status of current monitoring practice and approaches proposed in the climate-smart monitoring framework Identify and select adaptation options to address specific national climate change vulnerabilities/risk in the sector using multi-criteria decision analysis Devise a 2-minute call to climate-smart action for use with specified audiences |
| <ul style="list-style-type: none"> To build knowledge and skills for the use, management and long-term maintenance of the data portal | <ul style="list-style-type: none"> Access and navigate around the data portal, including using search functions and entering new information / resources / datasets Use the data portal to add an organization, link a user to an organization, add a group and add a user |

Table 5: Link between workshop aims with learning objectives related to skills

Training activities designed to develop and increase skills were as follows (Figure 5):

- **Guided demonstration** and navigation of the fisheries and environment data portal, with all participants accessing the data portal and running through tasks from their own laptop.
- **Guided demonstration** and navigation of the fisheries market supply-demand models, with all participants accessing the models and running through tasks from their own laptop.
- **Software tutorials (R and QGIS) coupled with practical exercises** worked through individually from participants' own laptops.
- **An exercise in pairs** whereby participants were tasked to develop a project concept for funding on strengthening monitoring for fisheries adaptation in their countries.
- **A group exercise** to select an adaptation option addressing a specific problem, using multi-criteria decision analysis (see Appendix III).
- **An individual exercise** to apply a simple template to structure a targeted communications message (see Appendix III).

All available evidence indicates that the Regional Training Program partly met goals and objectives related to skills. Evidence stems from the ESSA Project Team's assessment of participants' performance during the training and results of the participatory evaluation of the training program (see Section 4). In particular, we note that:

- The greatest success in building skills was in creating capacity to use and maintain the fisheries and environment data portal. Participants successfully accessed training materials and key Project outputs from the portal. Participants' testing and use of the data portal uncovered technical glitches and areas for improvement. The feedback provided on the data portal throughout the five days of training has now been integrated into the final version of the portal user guide. Responsibility for maintenance of the data portal is being transferred to the CRFM Secretariat and at least three individuals are trained in functions pertaining to portal administration.



Group representing “Environment Ministries” work through a multi-criteria decision framework to identify adaptation options that best meet pre-defined criteria



Group representing “Fisheries Departments” engage in heated discussion to rate adaptation options against pre-defined criteria

| | | B | C | D | E | F | G | H | I | |
|----|----|--|---|---|---|---|---------------------------------------|--|----|--|
| 5 | | TYPE OBJECTIVE: To build environmental and livelihood resilience through improved and integrated coastal zone management | | | | | | | | |
| 6 | | 1 | | 2 | | 3 | | 4 | | |
| 7 | | Evaluation Criteria | | | | | | | | |
| 8 | | Adaptation Options | Conservation Goal Increase in total area of critical habitat | Conservation Goal Increase in spatial protection of critical habitat | Societal Goal Generation of employment | Feasibility Goal Compliance with national policy and regulations | Feasibility Goal Community support | Climate-Smart Considerations Goal Relevance to short-term and long-term needs | | |
| 9 | 1 | Reduce landscape stressors on coastal habitats | 10 | 9 | 4 | 8 | 10 | 10 | 10 | |
| 10 | 2 | Protect critical coastal habitats supporting fisheries species | 10 | 9 | 0 | 8 | 9 | 10 | 10 | |
| 11 | 3 | Restore critical coastal habitats supporting fisheries | 6 | 7 | 3 | 5 | 7 | 6 | 6 | |
| 12 | 4 | Use regulations to protect vulnerable fish populations | 6 | 9 | 7 | 9 | 7 | 8 | 8 | |
| 13 | 5 | Protect existing assets (natural) against climate-related impacts | 8 | 8 | 7 | 7 | 7 | 10 | 10 | |
| 14 | 6 | Diversify livelihoods | 7 | 9 | 10 | 7 | 10 | 10 | 10 | |
| 15 | 16 | OVERALL SCORE: | 47 | 51 | 31 | 44 | 50 | 54 | 54 | |

An example of a completed template for multi-criteria decision analysis



Participants working through an overlay analysis using newfound skills in QGIS. Trainers circulate to accommodate participants working at different speeds



Fisheries officer from Jamaica presenting a two-minute pitch on why elected officials should invest in climate-smart fisheries

Figure 5: Examples of activities to develop skills

- Given the diverse composition and skills levels represented within the participant pool we had anticipated that their interests and abilities in different tools (QGIS, R, Excel-based fisheries supply-demand models, adaptation guidance, science communications guidance) would be equally diverse. This turned out to be the case and so levels of skills developed as a result of the training were variable. Nevertheless, the ESSA Project Team considers that the training program succeeded in shifting attitudes toward the use of these tools, which will increase the openness and receptivity of participants toward sharing information from this training as well as seeking future opportunities to reinforce and deepen their knowledge and skills. Throughout the training we provided additional materials and resources participants could consult on their own time.
- Application of the multi-criteria decision analysis framework to guide the identification and selection of appropriate adaptation options was also successful. All groups progressed through the steps during the assigned timeframes and appeared to be engrossed in rich discussions to reach consensus on relevant evaluation criteria and the worth of each potential adaptation option. This decision framework is ideally suited to highlight the explicit trade-offs made with adaptation decision making and is a flexible tool that works with a range of supporting data and evidence.
- Participants are well on their way to translating guidance on climate-smart monitoring offered through the project to enhance their current monitoring efforts, as opportunities arise. During the workshop we provided participants the opportunity to contrast their current monitoring program with the good practice for climate-smart monitoring and develop a project concept to strengthen their programs. Participants reported on their project concepts in a plenary discussion and their concepts indicated that they had successfully applied the guidance to identify opportunities for status and trends and effectiveness monitoring related to fisheries adaptation.
- Although not initially contemplated in the training program, it was a good idea to include a science communications module toward the end of the five days of training. Overall, participants seemed to enjoy the climate communications task we asked of them; the exercise was significantly “lighter” and more relaxed than the R and QGIS tutorials. As well, we received direct feedback from representatives from Saint Vincent and the Grenadines and from Grenada on the usefulness of the communication materials developed by the Project and the additional materials we pointed to.

4. EVALUATION

This section provides an assessment of the quality and relevance of the Regional Training Program, based on participants' evaluation.

Monitoring and evaluation is key part of designing and implementing training and capacity development programs. Evaluating attainment of learning objectives is important and we report on these outcomes in Section 3. At the same time the training program itself (e.g., its quality and relevance), needs to be monitored and evaluated.

The ESSA Project Team incorporated evaluation in the training program by conducting a participatory evaluation on day five of training. We asked participants to individually reflect on what worked well / could have been better and to share their ideas on sticky notes (one idea per sticky note) (Figure 6). Next, we divided participants into two groups – strengths and weaknesses—, asked each group to organize the ideas by theme and to name each of them. Finally, we reflected on the evaluation results in plenary. The following paragraphs report on the results of the participatory evaluation. Table 6 captures responses provided by participants, clustered in themes.



Figure 6: Participants brainstorming on what they liked / didn't like about the Regional Training Workshop

The results of a participatory evaluation of the Regional Training Program indicate that it met participants' expectations. The mix of training formats and resources presented and training in the data portal, R, QGIS were the strongest aspects of the program.

At the same time, some participants noted key challenges in the training on R and QGIS, including that the sessions felt rushed and that its relevance could have been improved by using personal data. In the plenary debrief the group concluded that it was unrealistic to expect everyone to become proficient in R and QGIS after a few hours of tutorials but that the training modules succeeded in “demystifying” these tools and in showing the relevance of these tools in supporting participants work in data analysis, reporting and providing advice to decision-makers.

| Strengths / achievements | Weaknesses / areas for improvement |
|--|---|
| <p>General comments</p> <p><u>Workshop delivery (formats, resources)</u></p> <ul style="list-style-type: none"> • A very timely and effective training workshop • This was a lot of information and the presenters did a good job • Information was well presented • Commendable job by all presenters • Provision was made for personal support and guidance to guide participants in grey areas • Facilitators were willing to help • I liked the PPT presentations. They were simple and clear • Presentations were engaging • The workshop was detailed • Training approach was successful in targeting an audience of diverse knowledge, experience and skills • The hands on nature of the workshop was very helpful • The sessions were very interactive and hands on • A lot of information was shared which was a good learning experience • Training exercise, facilitation, delivery style was excellent. There was a good balance between lectures, presentations and exercises • Excellent use of different teaching strategies: PPT, practical exercises, group work, discussion • Resources were relevant • Excellent time management • The impact of climate change was clearly worked throughout the workshop <p><u>Strengths of specific modules</u></p> <ul style="list-style-type: none"> • Monitoring session was informative • Adaptation strategies session was delightful • Adaptation session went well <p><u>Results</u></p> <ul style="list-style-type: none"> • All objectives for the workshop were met • The objective of the session was met • Objectives were met • Covered the full range of topics promised • Topics covered were relevant and will assist home country • Successful introduction of the tools developed with resources identified for individuals to explore each tool further after the workshop • Gained valuable information and knowledge about the use of socio-economic tools (partial equilibrium economic modelling) • I acquired knowledge and skills that will better equip me to assist in developing strategies as we mainstream climate change into fisheries <p>Data portal</p> <ul style="list-style-type: none"> • Excellent tool for sharing data and information. A long awaited tool for the region has been delivered. Commitment of countries required to maintain and build on this | <p>Delivery</p> <ul style="list-style-type: none"> • Data portal was not so user friendly • Practical exercises at times were difficult • QGIS training - different data formats and how to import into software - should have been addressed • The exercise to score success in implementing CCA and DRM was constrained by a number of factors and a different approach is needed to adequately assess at the regional level <p>R</p> <ul style="list-style-type: none"> • R was a bit challenging given my limited experience working on data analysis • Training in R very useful but steep learning curve - utility of the software is undisputed • Practical sessions using R and QGIS felt rushed • More time needed for R • More time could be allocated to teach R • Introduction to R was challenging • R session didn't go well • R session didn't go so well • R didn't go well • The R training could be more practical and foundational using personal data • Use of R practicals were lacking <p>Preparation</p> <ul style="list-style-type: none"> • There was a bit of a language barrier (technical jargon, but also our different accents) • More extended involvement of country contacts could boost training benefits <p>Hotel and logistics</p> <ul style="list-style-type: none"> • The room was too cold • Prior arrangement was not made for local participants as it relates to lunch • More varieties in food at breaks |

| Strengths / achievements | Weaknesses / areas for improvement |
|--|------------------------------------|
| <ul style="list-style-type: none"> • I am happy for the CRFM data portal. I will continue to make use of it <p>R and QGIS</p> <ul style="list-style-type: none"> • Intro to R and QGIS was sufficient to get me up and running • Practical sessions in learning how to use R and QGIS were easy to follow • Presenters for R and QGIS were well informed on the use of software. This showed in assistance with errors. • Motivated to use R in analysis of my assigned fishery • I am more motivated to use R to perform data analysis • Even though we still have a way to go in R the presenter did a good try • QGIS was enlightening • Training in QGIS was very relevant – it can be used nationally to influence policymakers and stakeholders • QGIS went well • QGIS is quite interesting <p>Other</p> <ul style="list-style-type: none"> • Learning (social) ambience was comfortable • I built a network | |

Table 6: Participant evaluation of the Regional Training Program

The group also discussed that training benefits would have been even greater had there been more contact with participants prior to training. The implication here is twofold: (1) there perhaps should have been greater continuity in participation of designated fisheries liaison officers (i.e., those who attended the Regional Planning Session in April 2018); and / or (2) instead of a training workshop a capacity development program may have been more appropriate, with face to face training as one modality in a well-rounded program.

5. CONCLUSIONS AND NEXT STEPS

To deliver on the requirements of Work Package 2 (Analytical Tools, Monitoring Tools and an Environmental and Fisheries Data Portal), the ESSA Project Team, in collaboration with the CRFM Secretariat, planned and implemented a five-day training session in Saint Lucia between October 28 and November 1, 2019 to fourteen delegates from seven Caribbean states. The training program factored in participants' professional backgrounds, skill levels in a range of software applications and preferred learning styles. Core aims of training were to introduce the analytical, guidance and data tools developed under the Project and to strengthen knowledge and skills in the use of these tools. Designed based on principles of adult education, the training workshop consisted of a mix of delivery formats, including lectures, demonstrations, individual exercises, exercises in pairs and small groups and practical application of theoretical concepts. By all accounts the training workshop achieved its stated goals and objectives, with participants almost unanimously concluding that the training offered data and information resources, knowledge and tangible skills to support them in their efforts to advance climate change adaptation in fisheries.

To broaden the benefits of the training beyond direct participants and PPCR countries represented, we recommend the following actions:

- Ensure that all training resources (including resources referred to during the training but were not funded by the Project) are appropriately uploaded on the CRFM Portal. This includes video recordings of key training lectures. Note that management of the data portal has been transferred to the CRFM. ESSA will support the CRFM Secretariat on this action item.
- Create a data management and analysis working group (or repurpose an existing one) to support continuous improvement of the CRFM data portal and sharing of knowledge and emerging best practices on analytical approaches that can assist with climate change impact assessment and evaluation of adaptation options.
- Work with Derrick Theophille, Fisheries Data Manager, Dominica, to examine the transferability and applicability of the R code he uses to automate periodic reporting on catch and effort. Work with member countries to build capacity to apply the R code to facilitate consistent reporting across the region.
- Seek to develop a manuscript laying out the monitoring framework for climate-smart fisheries. ESSA is also interested in pursuing this and it could be a joint effort with the CRFM Secretariat. We have determined that the framework developed under this Project would be a great contribution to scholarship and practice on the topic.

APPENDIX I: PARTICIPANTS' LIST

**Denotes that individuals confirmed their participation but were unable to attend due to visa restrictions.

@ Denotes individuals who partially participated in a portion of the training workshop.

| | COUNTRY | PARTICIPANTS' NAMES & DESIGNATION | ADDRESS |
|---|----------|---|--|
| 1 | Dominica | Mr. Kurt HILTON Fisheries Liaison Officer | Fisheries Division Ministry of Agriculture and Fisheries Government Headquarters Kennedy Avenue, Roseau Dominica Email: khiltonflo@gmail.com |
| 2 | | Ms. Sharon CORRIETTE Data Supervisor | Fisheries Division Ministry of Agriculture and Fisheries Government Headquarters Kennedy Avenue, Roseau Dominica Email: corriettes48@gmail.com |
| 3 | Grenada | Mr. Kendal GAY Data Officer | Fisheries Division Ministry of Agriculture, Lands, Forestry, Fisheries and the Environment Melville Street Fisheries Complex St. George's Grenada Email: kendelmark2@hotmail.com |
| 4 | | Ms. Hermione ELCOCK Data Officer | Fisheries Division Ministry of Agriculture, Lands, Forestry, Fisheries and the Environment Melville Street Fisheries Complex St. George's Grenada Email: sisterhums7@gmail.com |
| 5 | Haiti | Mr. Roger CHARLES** Monitoring and Evaluation Officer, Artisanal Fisheries Development Program | Fisheries Department Ministry of Agriculture Route Nationale #1, Damien Haiti Tel.: (509) 4891-1408 Email: roger.charles84@yahoo.fr |
| 6 | | Ms. Yves Lovely JEAN SIMON** | Fisheries Department Ministry of Agriculture Route Nationale #1, Damien Haiti Email: lovelyhenn03@gmail.com |
| 7 | Jamaica | Mr. Junior SQUIRE Senior Fisheries Officer | National Fisheries Authority 2c Newport East, Kingston 11 Jamaica Tel.: (876) 298-5631 Email: jcsquire@micaf.gov.jm oliversquire@yahoo.com |
| 8 | | Mrs. Farrah HANSEL-MURRAY Fisheries Officer | National Fisheries Authority 2c Newport East, Kingston 11 Jamaica |

| | COUNTRY | PARTICIPANTS' NAMES & DESIGNATION | ADDRESS |
|----|------------------------------|--|---|
| | | | Tel.: (876) 577-1503 Email: fkhansel@micaf.gov.jm farrah.hansel@yahoo.com |
| 9 | Saint Lucia | Ma. Allena JOSEPH@ Fisheries Biologist | Department of Fisheries 5 th Floor, Sir Stanislaus James Building Castries, Saint Lucia Tel. (758) 468-4139 / 725-2080 Email: Allena.joseph@govt.lc |
| 10 | | Ms. Patricia HUBERT-MEDAR Fisheries Assistant | Department of Fisheries 5 th Floor, Sir Stanislaus James Building Castries, Saint Lucia Tel. (758) 468-4631 / 725-1877 Email: patricia.medar@govt.lc |
| 11 | St. Vincent & the Grenadines | Mrs. Nyasha ANTROBUS-CYRUS Fisheries Officer | Fisheries Division Bay Street, Kingstown St. Vincent & the Grenadines Tel.: (784) 456-2738 Email: fishdiv@gov.vc nyashaantrobust@gmail.com |
| 12 | | Mr. Lorenzo GEORGE Fisheries Officer | Fisheries Division Bay Street, Kingstown St. Vincent & the Grenadines Tel.: (784) 456-2738 Email: fishdiv@gov.vc nashsvg@yahoo.com |
| 13 | Trinidad & Tobago | Ms. Elizabeth MOHAMMED Senior Fisheries Officer | Fisheries Division Ministry of Agriculture, Land and Fisheries #35 Cipriani Boulevard Newtown, Port of Spain Trinidad and Tobago Tel: (868) 623-8525/ 6028; 625-9358 Fax: (868) 623 8542 Email: emohammed.2fdtt@gmail.com ; emohammed@gov.tt |
| 14 | Climate Studies Group | Mr. Alrick BROWN | Faculty of Science and Technology University of the West Indies Email: alrickab@gmail.com |
| 15 | CRFM Secretariat | Dr. Susan SINGH-RENTON Deputy Executive Director | CRFM Secretariat Top Floor, Corea's Building Halifax Street, Kingstown Tel.: (784) 457-3474 Email: susan.singhrenton@crfm.net susan.singhrenton@crfm.int |
| 16 | | Ms. June MASTERS Statistics and Information Analyst | CRFM Secretariat Top Floor, Corea's Building Halifax Street, Kingstown Tel.: (784) 457-3474 Email: june.masters@crfm.net |
| 17 | ESSA Technologies | Ms. Jimena EYZAGUIRRE Team Leader and Senior | ESSA Technologies Ltd. Ottawa, Canada |

| | COUNTRY | PARTICIPANTS' NAMES & DESIGNATION | ADDRESS |
|----|---------------|---|---|
| | Ltd. (Canada) | Climate Adaptation Specialist | (613) 798-1300 x 5 jevzaguirre@essa.com |
| 18 | | Mr. Tim Webb Database Design and Development Expert | ESSA Technologies Ltd. Vancouver, Canada (250) 720-3063 twebb@essa.com |
| 19 | | Dr Natascia Tamburello Marine Systems Ecologist | ESSA Technologies Ltd. Vancouver, Canada (604) 677-9561 ntamburello@essa.com |
| 20 | | Mr. Hugh Stimson Technology Integrator | ESSA Technologies Ltd. Vancouver, Canada (604) 637-9594 hstimson@essa.com |

APPENDIX II: TRAINING AGENDA

Agenda

October 28, 2019 to November 1, 2019
Ixora Room, Bay Gardens Hotel & Inn, Rodney Bay, Saint Lucia

Workshop Goals

- To introduce assessment, monitoring and decision-support guidance and tools developed under the Project to enable climate-smart decision-making in fisheries;
- To build knowledge and skills for use of the guidance and tools by fisheries officers from PPCR countries;
- To introduce the fisheries and environment online data portal developed under the Project;
- To build knowledge and skills for the use, management and long-term maintenance of the data portal.

Day 1: Monday, October 28, 2019

| Time | Activity |
|-----------------|--|
| 8:00am –8:30am | Registration |
| 8:30am-9:00am | Introductions and Opening Remarks <ul style="list-style-type: none"> Participant introductions Welcome and opening remarks (<i>CRFM Secretariat-To Be Confirmed, Susan Singh-Renton</i>) |
| 9:00am-9:45am | Workshop Overview and Expectations <ul style="list-style-type: none"> Overview of workshop aims and objectives, agenda for the five days, ground rules and introduction to approach to help summarize main learnings (“newscast headlines”) (<i>Project Team Leader, Jimena Eyzaguirre</i>) Participant learning expectations and existing knowledge & competencies |
| 9:45am-10:00am | Project Overview -“Fishery-Related Ecological and Socio-economic Assessments of the Impacts of Climate Change and Variability and Development of an Associated Monitoring System” <ul style="list-style-type: none"> Objectives, main activities and outputs (<i>Project Team Leader, Jimena Eyzaguirre</i>) |
| 10:00am-10:15am | <i>Coffee Break</i> |
| 10:15am-11:00am | Overview of Main Findings from Ecological and Socio-economic Assessments of Climate Change on Caribbean Fisheries (Work Package 1) <ul style="list-style-type: none"> Presentation (<i>Project Team Leader, Jimena Eyzaguirre</i>) and Qs & As |
| 11:00am-12:00pm | Overview of Climate Smart Caribbean Fisheries Toolkit (Work Package 2) <ul style="list-style-type: none"> Presentation (<i>Marine Ecologist, Natascia Tamburello</i>) |
| 12:00pm-1:00pm | <i>Lunch</i> |
| 1:00pm-1:10pm | The Fisheries and Environment Data Portal – Vision <ul style="list-style-type: none"> Vision and motivations for a regional data portal (<i>CRFM Secretariat-To Be Confirmed, Susan Singh-Renton</i>) |
| 1:10pm-4:30pm | The Fisheries and Environment Data Portal – User Training <ul style="list-style-type: none"> Overview of the data portal, navigation and main user functions (<i>Technology Integrator, Hugh Stimson</i>) |
| 3:00pm-3:15pm | <i>Coffee Break</i> |
| 3:15pm-4:30pm | The Fisheries and Environment Data Portal – User Training <ul style="list-style-type: none"> Accessing and using the data portal – practical demonstrations and participant applications (<i>Technology Integrator, Hugh Stimson; Database Design and Development Expert, Tim Webb</i>) Guided installation of QGIS and R (for use during the week) |
| 4:30pm-6:00pm | BONUS: Climate Extremes in the Marine Environment <ul style="list-style-type: none"> Presentation on research commissioned by the Climate Studies Group (Mona) on climate extremes as relevant to fisheries (Dr Paulette Bynoe) Qs & As |
| 6:00pm | <i>Adjourn</i> |

Day 2: Tuesday, October 29, 2019

| Time | Activity | | |
|---|---|---|---|
| 8:00am –8:30am | Registration | | |
| 8:30am-9:00am | Welcome and Learning Reflections <ul style="list-style-type: none"> Review agenda for Day 2 (<i>Project Team Leader, Jimena Eyzaguirre</i>) Newscast – round up of lessons from Day 1 (1-2 volunteers) | | |
| 9:00am-10:15am | Overview of Species Distribution Modelling (SDM) <ul style="list-style-type: none"> Presentation on SDM as part of ecological modelling of climate change impacts, theoretical foundations of SDM and purpose, data sources (<i>Marine Ecologist, Natascia Tamburello</i>) | | |
| 10:15am-10:30am | <i>Coffee Break</i> | | |
| 10:30am-12:00pm | Implementing SDM in “R” <ul style="list-style-type: none"> R tutorial Practical application of SDM (BioMod2) of specific species using R (<i>Marine Ecologist, Natascia Tamburello</i>) | | |
| 12:00pm-1:00pm | <i>Lunch</i> | | |
| 1:00pm-2:15pm | <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> Overview of Market Fish Supply-Demand Modelling <ul style="list-style-type: none"> Basic concepts in welfare economics Overview of Excel-based models and representation of climate change impacts on the fisheries sector (components, data inputs, outputs, limitations) (<i>Project Team Leader, Jimena Eyzaguirre</i>) </td> <td style="width: 50%; vertical-align: top;"> The Fisheries and Environment Data Portal – Administrator Training (Selected Participants) <ul style="list-style-type: none"> Overview of basic administrator and maintenance tasks (groups, users, mark up & editing, back up) Small group discussion on how to expand the use and scope of the data portal after the project ends (<i>Technology Integrator, Hugh Stimson; Database Design and Development Expert, Tim Webb</i>) </td> </tr> </table> | Overview of Market Fish Supply-Demand Modelling <ul style="list-style-type: none"> Basic concepts in welfare economics Overview of Excel-based models and representation of climate change impacts on the fisheries sector (components, data inputs, outputs, limitations) (<i>Project Team Leader, Jimena Eyzaguirre</i>) | The Fisheries and Environment Data Portal – Administrator Training (Selected Participants) <ul style="list-style-type: none"> Overview of basic administrator and maintenance tasks (groups, users, mark up & editing, back up) Small group discussion on how to expand the use and scope of the data portal after the project ends (<i>Technology Integrator, Hugh Stimson; Database Design and Development Expert, Tim Webb</i>) |
| Overview of Market Fish Supply-Demand Modelling <ul style="list-style-type: none"> Basic concepts in welfare economics Overview of Excel-based models and representation of climate change impacts on the fisheries sector (components, data inputs, outputs, limitations) (<i>Project Team Leader, Jimena Eyzaguirre</i>) | The Fisheries and Environment Data Portal – Administrator Training (Selected Participants) <ul style="list-style-type: none"> Overview of basic administrator and maintenance tasks (groups, users, mark up & editing, back up) Small group discussion on how to expand the use and scope of the data portal after the project ends (<i>Technology Integrator, Hugh Stimson; Database Design and Development Expert, Tim Webb</i>) | | |
| 2:15pm-2:30pm | <i>Coffee Break</i> | | |
| 2:30pm-3:45pm | <table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> Practicing Using the Market Fish Supply-Demand Model <ul style="list-style-type: none"> Practical exercises (sensitivity analysis, combined effect of two climate change impacts) Guided discussion on model uses (<i>Project Team Leader, Jimena Eyzaguirre</i>) </td> <td style="width: 50%; vertical-align: top;"> The Fisheries and Environment Data Portal – Administrator Training (cont...) <ul style="list-style-type: none"> Continued from above </td> </tr> </table> | Practicing Using the Market Fish Supply-Demand Model <ul style="list-style-type: none"> Practical exercises (sensitivity analysis, combined effect of two climate change impacts) Guided discussion on model uses (<i>Project Team Leader, Jimena Eyzaguirre</i>) | The Fisheries and Environment Data Portal – Administrator Training (cont...) <ul style="list-style-type: none"> Continued from above |
| Practicing Using the Market Fish Supply-Demand Model <ul style="list-style-type: none"> Practical exercises (sensitivity analysis, combined effect of two climate change impacts) Guided discussion on model uses (<i>Project Team Leader, Jimena Eyzaguirre</i>) | The Fisheries and Environment Data Portal – Administrator Training (cont...) <ul style="list-style-type: none"> Continued from above | | |
| 3:45pm-4:00pm | Preview of Day 3 | | |
| 4:00pm | <i>Adjourn</i> | | |

Day 3: Wednesday, October 30, 2019

| Time | Activity |
|-----------------|--|
| 8:00am –8:30am | Registration |
| 8:30am-9:00am | Welcome and Learning Reflections <ul style="list-style-type: none"> Review agenda for Day 3 (<i>Project Team Leader, Jimena Eyzaguirre</i>) Newscast – round up of lessons from Day 1 (1-2 volunteers) |
| 9:00am-10:00am | Overview of Climate-Smart Fisheries Monitoring Framework <ul style="list-style-type: none"> Presentation covering introduction to monitoring, concept of key performance indicators, approach to developing monitoring framework, introduction to ecological and socio-economic indicators and sampling approach (<i>Marine Ecologist, Natascia Tamburello and Project Team Leader, Jimena Eyzaguirre</i>) |
| 10:15am-10:30am | <i>Coffee Break</i> |
| 10:30am-11:15am | Monitoring Cards – Exercise in Pairs <ul style="list-style-type: none"> Select monitoring card, prepare summary (what, why, how), feedback on relevance, barriers and opportunities for implementation, prepare flipcharts (<i>Project Team Leader, Jimena Eyzaguirre</i>) |
| 11:15am-12:00pm | Monitoring Cards – Plenary Presentation and Debrief <ul style="list-style-type: none"> Pairs report back, 3 minutes each Debrief (<i>Marine Ecologist, Natascia Tamburello</i>) |
| 12:00pm-1:00pm | <i>Lunch</i> |
| 1:00pm-1:30pm | Financing Climate-Smart Monitoring Activities <ul style="list-style-type: none"> Presentation on opportunities for financing adaptation monitoring, spotlight on the Climate Technology Centre & Network (<i>Project Team Leader, Jimena Eyzaguirre</i>) |
| 1:30pm-2:15pm | Developing a Monitoring Project Concept - Exercise in Pairs <ul style="list-style-type: none"> Problem statement, past work, technology barriers, proposed monitoring activity (objectives, activities, products) and timeframe (<i>Project Team Leader, Jimena Eyzaguirre</i>) |
| 2:15pm-2:30pm | <i>Coffee Break</i> |
| 2:30pm-3:45pm | Developing a Monitoring Project Concept – Plenary Brainstorm <ul style="list-style-type: none"> Silent generation and sorting of ideas on gender & other co-benefits; barriers and enablers to implementation; implementation partners, role of fisheries and environment data portal Debrief (<i>Project Team Leader, Jimena Eyzaguirre</i>) |
| 3:45pm-4:00pm | Preview of Day 4 |
| 4:00pm | <i>Adjourn</i> |

Day 4: Thursday, October 31, 2019

| Time | Activity |
|----------------|---|
| 8:00am –8:30am | Registration |
| 8:30am-9:00am | Welcome and Learning Reflections <ul style="list-style-type: none"> Review agenda for Day 4 (<i>Project Team Leader, Jimena Eyzaguirre</i>) |

| | |
|-----------------|--|
| | <ul style="list-style-type: none"> • Newscast – round up of lessons from Day 1 (1-2 volunteers) |
| 9:00am-10:00am | <p>Sectoral Adaptation Planning</p> <ul style="list-style-type: none"> • Introduction to guidance on adaptation decision-making (<i>Marine Ecologist, Natascia Tamburello</i>) • Lessons learned on sectoral adaptation planning (<i>Representative from Saint Lucia – To Be Confirmed</i>) |
| 10:00am-10:15am | <i>Coffee Break</i> |
| 10:15am-11:45am | <p>Identifying and Selecting Adaptation Option – Exercise in Small Groups</p> <ul style="list-style-type: none"> • Based on case example, articulate adaptation objective, identify possible adaptation options and prioritize based on multi-attribute criteria (<i>Project Team Leader, Jimena Eyzaguirre</i>) |
| 11:45am-12:15pm | <p>Debrief on the Selection Process</p> <ul style="list-style-type: none"> • Plenary debrief (<i>Marine Ecologist, Natascia Tamburello</i>) |
| 12:15pm-1:00pm | <i>Lunch</i> |
| 1:00pm-2:45pm | <p>Evaluating the 2013 Regional Disaster Risk Management and Adaptation Strategy for the Caribbean Fisheries and Aquaculture Sector-World Café</p> <ul style="list-style-type: none"> • Accomplishments resulting from the 2013 Strategy and vision for renewal (<i>CRFM Secretariat-To Be Confirmed, Susan Singh-Renton</i>) • Five rounds of 15-minute World Café discussions (progress, lessons, gaps) • Report key messages in plenary (<i>Project Team Leader, Jimena Eyzaguirre</i>) |
| 2:45pm-3:00pm | <i>Coffee Break</i> |
| 3:00pm-4:00pm | <p>Introduction to Science Communications and Behavioural Change</p> <ul style="list-style-type: none"> • Overview of communications and engagement materials produced under the Project (<i>Project Team Leader, Jimena Eyzaguirre</i>) • Best practices in communicating climate change and adaptation (<i>Marine Ecologist & Science Communication Specialist, Natascia Tamburello</i>) • Exercise in pairs – elevator pitch |
| 4:00pm | <i>Adjourn</i> |

Day 5: Friday, November 1, 2019

| Time | Activity |
|-----------------|---|
| 8:00am –8:30am | Registration |
| 8:30am-9:00am | Welcome and Learning Reflections <ul style="list-style-type: none"> Review agenda for Day 5 (<i>Project Team Leader, Jimena Eyzaguirre</i>) Newscast – round up of lessons from Day 1 (1-2 volunteers) |
| 9:00am-9:10am | Introduction to Spatial Planning <ul style="list-style-type: none"> Overview of marine spatial planning and climate change (<i>Marine Ecologist, Natascia Tamburello</i>) |
| 9:10-10:10am | Introduction to Geographic Information Systems (GIS) <ul style="list-style-type: none"> Overview of basic concepts and tasks (projections, data types, attribute tables, data creation) (<i>Technology Integrator, Hugh Stimson</i>) Practice with QGIS (basic functions, interface, opening a project file, adding point data) (<i>Technology Integrator, Hugh Stimson</i>) |
| 10:10am-10:25am | <i>Coffee Break</i> |
| 10:25am-12:00pm | Working with Climate and Other Data in QGIS <ul style="list-style-type: none"> Implementing overlap analysis using climate change and other data layers to guide decisions on siting of spatial marine adaptation measures (<i>Technology Integrator, Hugh Stimson; Marine Ecologist, Natascia Tamburello</i>) |
| 12:00pm-1:00pm | <i>Lunch</i> |
| 1:00pm-1:45pm | Going Further in Using Spatial Data for Adaptation Planning <ul style="list-style-type: none"> Plenary discussion on further uses of QGIS and data portal for adaptation planning Overview of advanced analytical approaches and data sources (<i>Marine Ecologist, Natascia Tamburello</i>) |
| 1:45pm-3:00pm | Participatory Evaluation of the Training Program <ul style="list-style-type: none"> Overview of training objectives and approaches (Jimena Eyzaguirre, Project Team Leader) Individual silent generation – what went well, what didn't Clustering of major themes Plenary presentation |
| 3:00pm-3:15pm | <i>Coffee Break</i> |
| 3:15pm-3:45pm | Knowledge Use and Transfer <ul style="list-style-type: none"> Individual reflection on concrete ways participants will apply new knowledge and skills (<i>Project Team Leader, Jimena Eyzaguirre</i>) |
| 3:45-4:00pm | Closing Remarks <ul style="list-style-type: none"> Closing remarks, acknowledgements Participants fill out evaluation forms |
| 4:00pm | <i>Adjourn</i> |

APPENDIX III: Instructions and worksheets for selected exercises

Monitoring Cards – Work in Pairs

Monitoring cards refer to the nine resources in Chapter 4 of CRFM (2019) *Reports on Analytical Tools and Monitoring Guidance: Sequel to the CRFM Research Paper Collection Volume 9*.



Monitoring Cards – Work in Pairs [1 hour]

- **Purpose:** Become familiar with monitoring cards and consider implementation issues
- **Steps:**
 - Get your assigned monitoring card
 - Read the monitoring card
 - Synthesize key points contained in the monitoring card (what, why, how) and provide feedback on the relevance & feasibility of implementing the guidance
 - Hand in 1 completed template to trainers
 - Prepare to report back in plenary (relevance, feasibility)



NOTE TAKER: _____

GROUP MEMBERS: _____

BIG QUESTION: _____

(1) What specifically is proposed for monitoring? What are the indicators proposed?

(2) Why is this important to monitor to support “climate-smart” fisheries in the Caribbean?

(3) How would it be monitored and when?

(4) How relevant and feasible is the monitoring guidance for you (your country / regional context)? Please explain.

(5) What are the most significant barriers that currently hinder implementation of this monitoring guidance?

(6) What specific changes or opportunities could be most helpful for improving the current situation and overcoming the barriers noted above?



Monitoring Concept – Work in Pairs [1 hour]

- **Purpose:** Make a case for financing climate-smart fisheries monitoring
- **Steps:**
 - Read the template
 - Brainstorm on ways to frame monitoring as key to fisheries sector / national adaptation
 - Focusing on a specific project idea, complete the template
 - Reflect on implementation barriers, implementation partners and role of CRFM fisheries and data portal

NOTE TAKER
GROUP MEMBERS
TITLE OF THE MONITORING CONCEPT

(1) Briefly summarize the purpose
Include a brief description of the current status of work in the country, context, the specific challenge to address, climate change, and the monitoring activities being proposed. Explain the utility and value of national program adaptation processes.

(2) What is the problem?
Summarize the problem related to the negative impacts of climate change in the country. Explain how the problem affects the fisheries.

NOTE TAKER: _____

GROUP MEMBERS: _____

TITLE OF THE MONITORING CONCEPT: _____

(1) Briefly summarize the request

Include a brief description of the current status of needs in the country / region; the specific challenge in the context of climate change, and the monitoring solution/ desired outcome identified. Explain the solution will add value to national / regional adaptation processes.

(2) What is the problem?

Summarize the problem related to the negative impacts of climate change in the country / region that the request aims to address.

(3) What has been done or is currently being done to address the problem?

(4) What are the technology barriers that hinder national / regional efforts described above and how will investments in monitoring complement these efforts?

Technology barriers are “any equipment, techniques, practical knowledge and skills needed for reducing greenhouse gas emissions and adapting to climate change” (Special Report on Technology Transfer, IPCC, 2000)

**(5) What is the scope of the monitoring activities for which you seek assistance?
What is the overall objective, groups of activities, outputs and timelines?**

The monitoring solution proposed should clearly contribute to adaptation to climate change as described in the problem statement and contribute to overcome the specific technology barriers.

Additional notes:

Identifying and Selecting Adaptation Options Using Multi-Criteria Decision Analysis (MCDA) – Work in Small Groups

What follows are instructions to select among adaptation options using an approach called multi-criteria decision analysis. This section also includes a fictional scenario as a basis for applying the MCDA. Participants split up into three groups, with each group assigned a different departmental mandate.



EXERCISE – Applying MCDA

- We will be **applying the basic steps of MCDA** to an imaginary scenario to choose among several adaptation options in a structured way.
- To begin, **download & read** the exercise scenario from the portal.

MCDA Step 1: Objective

Define an objective based on the **scenario** AND your **assigned department's mandate**.

- Department of Environment:
in charge of management coastal habitats
- Department of Fisheries:
in charge of managing fisheries
- Department of Sustainable Development:
in charge of social and community development.

TIME LIMIT: 10 minutes

MCDA Step 2: Criteria

Define evaluation criteria from the list provided in the handouts.

Pick at least **ONE** criterion from **EACH CLASS**:

- Conservation Goals
- Societal Goals
- Feasibility
- Climate-Smart Considerations

TIME LIMIT: 20 minutes

Table 1. Example criteria for prioritizing among potential climate change adaptation options (adapted from USAID, 2009; Bates et al., 2014; Bhatnagar et al., 2016).

| Overarching Evaluation Consideration | Evaluation Criteria | Evaluation Sub-Criteria |
|--|--|---|
| Conservation Goals <i>How well do the adaptation help achieve specific conservation goals and objectives?</i> | Conservation of critical habitats supporting fisheries production | Improvement in productivity of critical habitat Increase in total area of critical habitat Increase in spatial protection of critical habitat |
| | Biodiversity | Reduction in illegal harvests Reduction in harvest of vulnerable species Diversification of fisheries harvests |
| | Climate change mitigation potential | Improvement of carbon storage (e.g., via marine vegetation) Reduction of carbon emissions from the sector |
| | Continuation of employment | Continuation of employment |
| | Contribution to economic diversification | Contribution to co-benefits to other economic sectors occurring in the same area (e.g., tourism) |
| Societal Goals <i>How well do the adaptation help achieve social, cultural, and economic goals and/or provide co-benefits to other sectors?</i> | Equity and benefits sharing | Contribution to co-benefits to other economic sectors occurring in the same area (e.g., tourism) Contribution to necessary basic climate impacts |
| | Safety and well-being | Reduces risks to personnel safety Improves food quality and security |
| | Physical assets | Reduces risks to coastal infrastructure Alignment with existing adaptation strategies |
| | Legal and institutional frameworks | Compliance with national policy and regulations Regulatory complexity (e.g., level of jurisdictional overlap, need for multiple permitting or regulatory reform process) Access complexity (e.g., land ownership, access, right of way) |
| Feasibility <i>How applicable or realistic is it to implement such adaptation?</i> | Institutional support | Community support Local implementation partners |
| | Capacity | Access to expertise needed for implementation Access to sufficient personnel for implementation, refinement, and monitoring |
| | Cost | Implementation costs Long-term operating costs Cost-sharing opportunities |
| | Implementation Risk | Data needs Technical feasibility Lack of local buy-in |
| | Climate-Smart Considerations <i>How robust are the adaptation actions? Relative to climate change impacts and likelihood other than those they are intended to address?</i> | Linkage to impacts and vulnerability |
| Time horizons | Alignment between timing of benefits and timing of anticipated climate impacts | |
| Resilience to other climate impacts not targeted by the final action | Resilience to other climate impacts not targeted by the final action | |
| Resilience to changes in fish distributions | Resilience to changes in fish distributions | |
| Resilience to multiple climate scenarios | Resilience to multiple climate scenarios | |
| Resilience to variability in fishing or capacity over time | Resilience to variability in fishing or capacity over time | |
| Resilience to uncertainty | Resilience to uncertainty | |

MCDA Step 3: List The Options

Select actions from options in the handouts and shown on this slide OR propose your own action(s) in the same class.



2.1 Habitat Management Actions

- 2.1.1 Reduce Landscape Stressors on Coastal Habitats
- 2.1.2 Protect Critical Coastal Habitats Supporting Fisheries Species
- 2.1.3 Restore Critical Coastal Habitats Supporting Fisheries Species
- 2.1.4 Managed Realignment of Coastal Vegetation



2.2 Harvest Management Actions

- 2.2.1 Use Regulations to Protect Vulnerable Fish Populations
- 2.2.2 Adjust Assessments and Harvest Control Rules to Account for Climate Vulnerability
- 2.2.3 Diversify Catches to Relieve Pressure on Vulnerable Populations
- 2.2.4 Precautionary Management of Emerging Fisheries
- 2.2.5 Adjust Management Areas to Reflect Changes in Species Distributions



2.3 Sustainable Livelihoods and Economic Diversification Actions

- 2.3.1 Protect Existing Assets Against Climate-Related Impacts
- 2.3.2 Improve Safety at Sea
- 2.3.3 Facilitate Access to New Assets in Times of Need
- 2.3.4 Enhance Post-Harvest Handling, Processing, and Marketing
- 2.3.5 Diversify Livelihoods

TIME LIMIT: 20 minutes

MCDA Step 4: Rate the Options

- Use the EXCEL spreadsheet template on the web portal to **score your options**.
- Score each criterion for each option on this scale:



- The template will automatically colour-code and sum up your scores.

TIME LIMIT: 20 minutes

ADAPTATION PRIORITIZATION CASE STUDY

Consider this Fishing Community...

In this community, hurricanes occur occasionally, causing loss and damage to vessels, the landing site, and other assets. Air and sea temperatures are increasing, as is the frequency of intense rainstorms.

Most households are involved in fishing and bring their catch to a nearby landing site for sale without the use of refrigeration. Some households are also involved in small-scale farming.

There's a small marine protected area nearby that encompasses coral reef and seagrass habitat, but these habitats have become degraded in recent years. The park is still in good enough condition to attract ecotourism. However, decreasing fish populations outside the park have led to illegal fishing inside the protected area that is depleting fish populations. Fisherfolk report that it's getting harder and harder to catch reef fish in traditional near-shore fishing grounds around the protected area.

The lack of refrigeration makes fish trading and processing sensitive to increasing temperatures. Households that generate their income from diverse sources like farming and fishing have a greater adaptive capacity than households relying only on a single source of income. Households with access to transportation and family in other areas have a greater adaptive capacity to evacuate in the case of hurricanes or landslides.

New leadership in the fisheries cooperative has brought more opportunities for climate change adaptation and disaster risk reduction (DRR). The new president has brokered a partnership with a locally-based university researcher and community members are considering applying for small DRR grants. Many community members are part of the cooperative and actively involved in its initiatives.

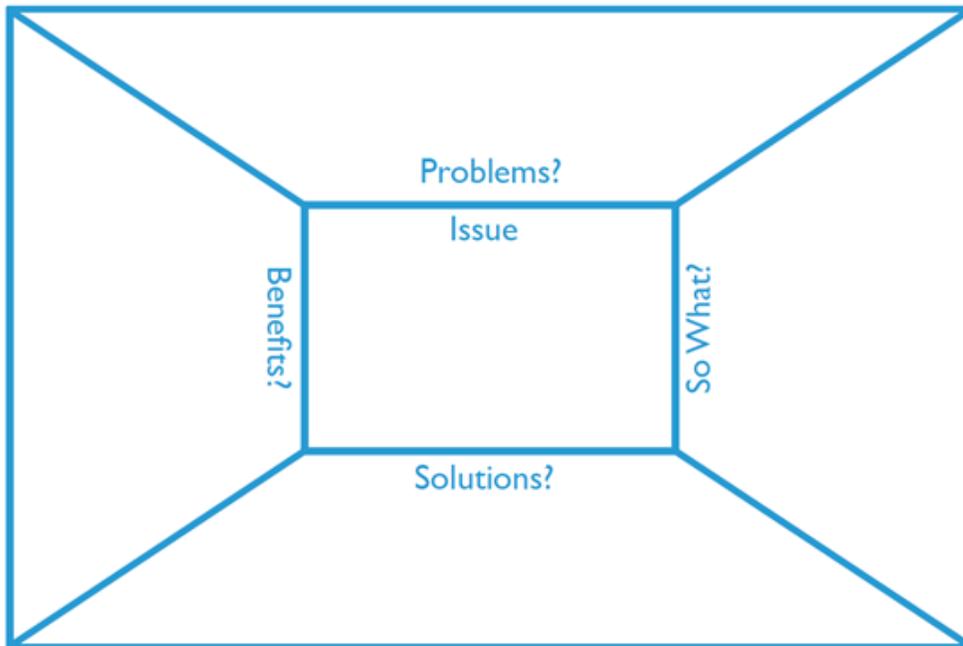
Elevator Pitch Exercise – Individual Exercise



EXERCISE – Elevator Pitch

- Choose a **specific audience** and a **key message from this week**.
- Use the Story Box handout to write a simple **elevator pitch under 2 minutes!**

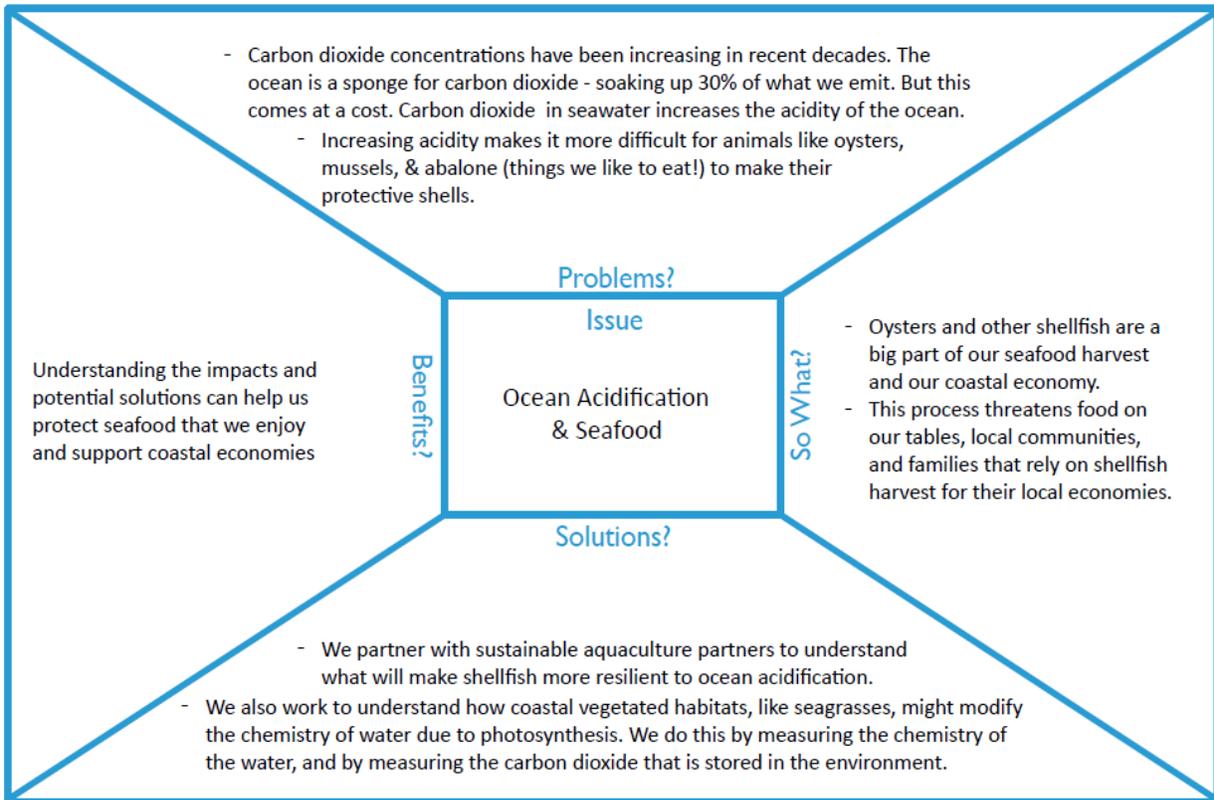
Audience:



THE STORY BOX - A Worked Example from the COMPASS Story Box Workbook

Audience: Radio Program

21



Tessa Hill is an Associate Professor in the Department of Earth and Planetary Sciences at Bodega Marine Laboratory, and Associate Director of Academic Programs at the Coastal and Marine Sciences Institute at the University of California at Davis. She worked on her Message Box at a COMPASS training in preparation for an interview on NPR's Science Friday later that week (you can [listen to it here](#)³). The box above is her fourth iteration, illustrating how many people find it valuable to work and rework their messages to make them clear and memorable. Listen for the points that she outlined in her Message Box, and note how she doesn't read from her Box, but uses her messages in her conversation with radio host Ira Flatow. She also uses metaphors to help the audience understand her points, and does a demonstration!

The CRFM is an inter-governmental organization whose mission is to “Promote and facilitate the responsible utilization of the region’s fisheries and other aquatic resources for the economic and social benefits of the current and future population of the region”. The CRFM consists of three bodies – the Ministerial Council, the Caribbean Fisheries Forum and the CRFM Secretariat.

CRFM members are Anguilla, Antigua and Barbuda, The Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Montserrat, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago and the Turks and Caicos Islands.

CRFM

Headquarters

secretariat@crfm.int

Tel: (501) 223-4443 - Fax: (501) 223-4446
Belize City - Belize

Eastern Caribbean Office

crfmsvg@crfm.int

Tel: (784) 457-3474 - Fax: (784) 457-3475
Kingstown - St. Vincent & the Grenadines

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