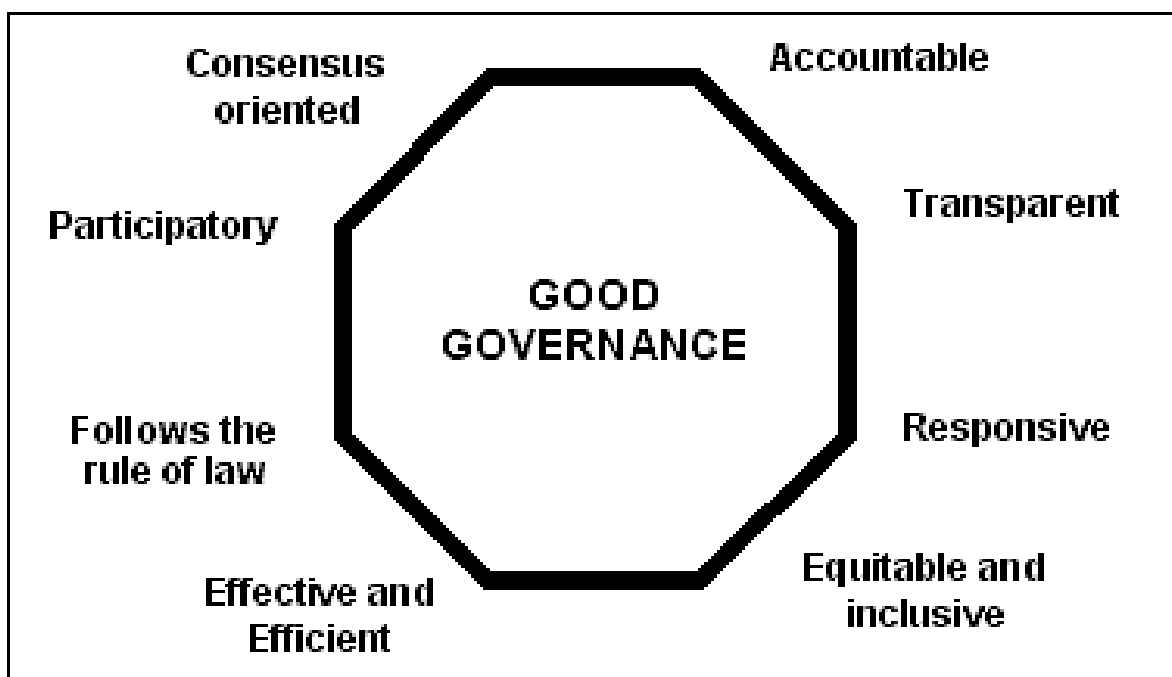# CARIBBEAN ICT RESEARCH PROGRAMME (CIRP)'S FINAL REPORT
Developing Organizational Capacity for Ecosystem Stewardship and Livelihoods in Caribbean Small-Scale Fisheries (StewardFish)

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for
Caribbean ICT Research Programme (CIRP)
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PROJECT TITLE	Developing Organizational Capacity for Ecosystem Stewardship and Livelihoods in Caribbean Small-Scale Fisheries (StewardFish)
Component 1	Developing Organizational capacity for fisheries governance
Outcome 1.1	Fisherfolk have improved their organization capacity to meet objectives that enhance well-being
Output 1.1.2	Information and communication technologies (ICT) used for good governance

Image source: UNDP (2009)

Contents

Acknowledgments

Background

The *Developing Organizational Capacity for Ecosystem Stewardship and Livelihoods in Caribbean Small-Scale Fisheries* (StewardFish) project set out to implement the Caribbean and North Brazil Shelf Large Marine Ecosystems (CLME+) Strategic Action Programme (SAP)[1] within Caribbean Regional Fisheries Mechanism (CRFM) Member States. StewardFish is a project of the Food and Agriculture Organization of the United Nations ("FAO") with Global Environment Facility (GEF) as financing partner.

The project's aim is to empower fisherfolk throughout fisheries value chains to engage in resource management, decision-making processes and sustainable livelihoods, with strengthened institutional support at all levels. Project countries are Antigua and Barbuda, Barbados, Belize, Guyana, Jamaica, Saint Lucia and St. Vincent and the Grenadines.

The project comprises four components, not all of which activities are conducted in all Project countries:
• Component 1: Developing organizational capacity for fisheries governance
• Component 2: Enhancing ecosystem stewardship for fisheries sustainability
• Component 3: Securing sustainable livelihoods for food and nutrition security
• Component 4: Project management, monitoring and evaluation, and communication

The Project's expected outcomes are as follows:
• Outcome 1.1 Fisherfolk have improved their organizational capacity to meet objectives that enhance well-being
• Outcome 1.2 Fisheries-related state agencies have capacity to support fishing industry stewardship
• Outcome 2.1: Increased participatory Ecosystem Approach to Fisheries (EAF) application with focus on healthier habitats and pollution reduction
• Outcome 3.1: Livelihoods throughout fisheries value chains balance development with conservation for food and nutrition security
• Outcome 4.1 Good governance and learning for adaptation institutionalized among fisherfolk organizations

The Project's national executing partners are the Fisheries Division of the Ministry of Agriculture, Lands, Fisheries and Barbuda Affairs, Antigua and Barbuda; the Fisheries Division of the Ministry of Agriculture, Food, Fisheries, Water Resource Management, Barbados; the Fisheries Department of the Ministry of Agriculture and Fisheries, Belize; the Fisheries Department of the Ministry of Agriculture, Guyana; the National Fisheries Authority of the Ministry of Industry, Commerce, Agriculture and Fisheries, Jamaica; the Department of Fisheries of the Ministry of Agriculture, Food Production, Fisheries, Co-operatives and Rural Development, St. Lucia; and the Fisheries Division of the Ministry of Agriculture, Forestry, Fisheries and Rural Transformation, St. Vincent and the Grenadines.

StewardFish regional executing partners are Caribbean Natural Resources Institute (CANARI), Caribbean Network of Fisherfolk Organisations (CNFO), and the Caribbean Regional Fisheries Mechanism (CRFM) Secretariat, The University of the West Indies (UWI)-Centre for Resource Management & Environmental Studies (CERMES) and UWI Caribbean ICT Research Programme (CIRP).

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[1] Available at https://www.clmeproject.org/download/sap/?wpdmdl=3026&refresh=60368bd2d93521614187474.
Last viewed 24 February 2021.

Letter of Agreement (LOA)

CIRP's StewardFish engagement fell under Component 1: *Developing organizational capacity for fisheries governance*, Outcome 1.1: *Fisherfolk have improved their organization capacity to meet objectives that enhance well-being*, Output 1.1.2: *Information and communication technologies (ICT) used for good governance*. The associated activities were as follows:

1. Activity 1.1.2.1: Analyse NFO capacity in ICT and share exemplary best practices
2. Activity 1.1.2.3: Develop ICT best practices for NFOs, along with ICT training to meet NFO proficiency standards

The original letter of Agreement (LOA) between the FAO and UWI, through CIRP, was effective 16 August 2019 to 31 May 2020, having been signed on behalf of FAO by the Sub-regional Coordinator for the Caribbean; and on behalf of UWI, St. Augustine Campus by the Pro Vice-Chancellor and Campus Principal.

CIRP's deliverables under the original LOA were as follows:

1(a)   An instrument to conduct a gap analysis of the NFO's use of ICT in governance, using a participatory approach

1(b)   Report, including the methodology, results of the gap analysis and recommendations for improving the use of ICT in governance by NFOs and their members. Among the results and recommendations, will be the identification of local best practices, NFO proficiency standards, and technologically contrained NFOs, noting the minimum requirements of ICT hardware and software that should be provided to them

2(a) Training materials and guidebook for training of NFO board members and other key personnel to achieve ICT proficiency standards for NFOs

2(b) Training plan for training of trainers workshop for two CNFO and five NFO fisherfolk leaders (one each from Antigua and Barbuda, Barbados, Belize, Saint Lucia and St. Vincent and the Grenadines respectively)

2(c) Training of trainers workshop report, including methodology, training materials and outputs

3. Final report

On account of the COVID-19 pandemic, the original LOA was amended effective 8 August 2020 to 31 January 2021, having again being signed on behalf of FAO by the Sub-regional Coordinator for the Caribbean; and on behalf of UWI by the Pro Vice-Chancellor and Campus Principal, St. Augustine. Modifications were necessary to effect an alternate to the face to face training of trainers workshop originally planned to be conducted in Trinidad. The primary LOA modification was a change to online learning materials and delivery methodology for this activity and the development of downstream learning resources for blended delivery. Other key modifications included CIRP's support of trainers through a pilot downstream delivery of two modules of the ICT for Governance course to NFO leads. The modifications are as follows:

1. **Addition** to Activity 1.1.2.1 – further detail to guide consideration and procurement of ICT equipment and services:
   1.1.2.1 (c) Report on considerations for selection of ICT equipment and services, research technical specifications, prices and local support for equipment and services; consultation with NFO

representatives and resources persons; specific recommendations for equipment procurement under StewardFish

2. **Modification** to Activity 1.1.2.3 (a) – change of materials to four online modules & change of delivery date:
1.1.2.3 (a) Four online training modules with assessment exercises and performance monitoring tools as persistent, reusable resources for training of NFO board members and other key personnel to proficiency standards in ICT for Governance.

3. **Modification** to Activity 1.1.2.3 (b) – change of delivery date, addition of Jamaica and clarification of wording:
1.1.2.3 (b) Training plan for training of 7 trainers (from CNFO, Antigua and Barbuda, Barbados, Belize, Saint Lucia, and St. Vincent and the Grenadines, and Jamaica) to deliver training to NFO leads

4. **Modification** to Activity 1.1.2.3 (c) - addition of Jamaica participant; change of workshop delivery mode from face to face to remote; and change of delivery date; with concomitant rephrasing:
1.1.2.3 (c) Training of 7 trainers (from CNFO, Antigua and Barbuda, Barbados, Belize, Saint Lucia, and St. Vincent and the Grenadines, and Jamaica) to deliver training to NFO leads

5. **Modification** to Activity 1.1.2.3 (d) – change of delivery date and adjustment of outputs consistent with new amended format and delivery mode; with concomitant rephrasing:
1.1.2.3 (d) Training of trainers workshop report, including methodology and evaluations

6. **Addition** to Activity 1.1.2.3: documentation
1.1.2.3 (g) Training of trainers workshop report, including methodology and evaluations

7. **Addition** to Activity 1.1.2.3: support for trainers in downstream pilot
1.1.2.3 (h) Codelivery (with participants of Training of Trainers workshop) of training on ICT for Governance to CNFO and NFO leads in 6 countries; and support for trainers in their role in this training

8. **Addition** to Activity 1.1.2.3: arrangements for CNFO Learning Institute to act as the future hub for downstream deliveries
1.1.2.3 (i) Set up and configuration of online training modules on the CNFO's cloud infrastructure in readiness for ongoing delivery through the Leadership Institute

Based on all modifications, the budget for the amended LOA remained the same as that of the original agreement. The final deliverables, as specified in the amended LOA, are as follows:

1. Instrument to conduct a gap analysis of the NFOs use of ICT in governance, using a participatory approach

b) Report, including methodology, results of the gap analysis and recommendations for improving the use of ICT in governance by NFOs and their members

c) Report on considerations for selection of ICT equipment and services and specific recommendations for equipment procurement under StewardFish for CNFO and the NFOs in Antigua and Barbuda, Barbados, Belize, Saint Lucia, and St. Vincent and the Grenadines

d) Four online training modules with assessment exercises and performance monitoring tools as persistent, reusable resources for training of NFO board members and other key personnel to achieve ICT proficiency standards in ICT for Governance

e) Training plan for training of 7 trainers (from CNFO, Antigua and Barbuda, Barbados, Belize, Saint Lucia, and St. Vincent and the Grenadines, and Jamaica) to deliver training to NFO leads

f) Training of 7 trainers to deliver training to NFO leads

g) Training of trainers workshop report, including methodology and evaluations

h) Codelivery (with participants of Training of Trainers workshop) of training on ICT for Governance to CNFO and NFO leads in 6 countries; and support for trainers in their role in this training

i) Set up and configuration of the online training modules on the CNFO's cloud infrastructure for delivery through the Leadership Institute; demonstration and guidance notes

Approach & Methods

CIRP's Deliverables (a) – (c) relate to NFOs use of ICT in governance; while Deliverables (d) – (i) relate to capacity building for NFOs use of ICT in governance. A strategic approach was taken to both sets of deliverables and their associated activities. This called for the use of a variety of methods in each case.

NFOs Use of ICT in Governance
The NFOs Use of ICT in Governance deliverables comprised the instrument/s to conduct the gap analysis, the gap analysis and general recommendations, and a report on the considerations for the selection of ICT equipment and services, with specific recommendations.

Instrument to Conduct Gap Analysis
Three key instruments were produced in support of the gap analysis:

1. Guiding Questions
2. Tabulated Summaries for Fact Checking
3. ICT Competence Self Assessment

Gap Analysis Instrument: Guiding Questions
The Guiding Questions were used in semi-structured interviews which set out to determine NFO governance arrangements and related mandates, operations, challenges, roles, ICT resources and best practices in order to inform a gap analysis and recommendations for improving the use of ICT in governance by NFOs and their members.

These guiding questions were posed in a conversational manner, in an order that flowed naturally at the time of the interview with the respondent. They prompted further questions that ensured that adequate information was available for a full response. Substitutions were made and additional questions posed, according to the activities, operations and circumstances of different NFOs.

Tabulated Summaries for Fact Checking
Tabulated summaries of responses from NFOs on existing provisions for ICT hardware, software, services, artefacts and processes were used to fact check information gathered through interviews.

ICT Competence Self Assessment
This quantitative instrument was used to determine the digital competence of a sample of officers of fisherfolk organizations (FFOs) in Antigua and Barbuda, Barbados, Belize, Saint Lucia and St Vincent and the Grenadines. The gaps in these competences vis a vis reference competencies necessary for the efficient and effective application of ICT for good governance contributed to an understanding of the capacity building needs of FFO officers and partly formed the basis for the development of the train the trainer programme for FFOs.

Gap Analysis and Recommendations
Key reference points for the gap analysis of NFOs' use of ICT in governance were internationally accepted features of *good governance* in general, and the particular requirements specified in the byelaws and constitutions of the CNFO and the NFOs under study. The actual use of ICT in NFO governance was assessed in relation to the reference set, taking account of the governance requirements that could potentially be met through the use of ICTs. In addition to gaps in ICT hardware, software and services necessary for context-appropriate ICTs to work for good governance, the gap analysis also considered gaps in human capacity. An examination of baseline global standards for ICT proficiency yielded a reference point for an assessment of gaps in this area. The methods employed in the gap analysis activities are summarized in Table 1.

Table 1 Methods Used to Analyze Gaps in NFOs' Use of ICT in Governance

Information Sought	Methods
1. Essential governance functions of NFOs	Desk research on constitutions and by-laws
2. NFO governance functions that would benefit from ICTs	Expert analysis of NFO governance functions vis-à-vis ICT capabilities
3. Essential ICT hardware, software and services necessary for context-appropriate ICTs to work for good governance	Expert analysis of NFO governance functions that would benefit from ICTs vis-à-vis ICT capabilities
4. Organizational and operational context for discharge of NFO governance functions	Desk research and guiding questions for consultations
5. NFOs' use of ICT for governance, including best practice	Semi-structured interviews and focus groups based on Guiding Questions followed by further details provided on request, as necessary; and finally fact checking of narrative
6. NFOs' access to essential ICT hardware, software and services necessary for context-appropriate ICTs to work for good governance	Insights gained from semi-structured interviews, supplemented by individual interviews with key informants to fact check tabulated summaries using a specially prepared instrument
7. Triangulated insights into NFO capacity to use ICT for good governance.	Insights gained from semi-structured interviews and focus groups based on Guiding Questions, reference ICT self-assessments by NFO leads, the specially prepared instrument, and other consultations with NFO representatives

Considerations for Selection of ICT Equipment & Services and Specific Recommendations

The methods used to formulate the recommendations to improve the use of ICT in NFO governance are summarized in Table 2. The findings of the gap analysis featured strongly in both the establishment of baseline ICT hardware, software and services, along with key enabling artefacts & processes, for good governance; and the specification of competence necessary to use ICT to execute essential governance functions of NFOs. Semi-structured interviews and focus groups were used to gather data directly from potential beneficiaries; and resident expert knowledge supplemented desk research in all aspects of the undertaking.

Table 2 Methods Used to Formulate Recommendations to Improve the Use of ICT in NFO Governance

Information Sought	Methods
1. Baseline ICT hardware, software and services, as well as key enabling artefacts & processes, for good governance	Study findings: essential governance functions of NFOs extracted from constitutions and by-laws in gap analysis exercise
	Semi-structured interviews and focus groups based on Guiding Questions (gap analysis instrument)
	Desk research and expert knowledge: software and hardware necessary to execute core governance functions
2. Competence necessary to use ICT to execute essential governance functions of NFOs	Study findings: ICTs necessary to execute core governance functions
	Desk research on ICT proficiency standards
	Study findings: considerations for selecting ICT proficiency standards
	Study findings: reference ICT self-assessments by NFO leads

Capacity Building for NFOs Use of ICT in Governance

CIRP's approach to the capacity building activities under StewardFish were guided by two fundamental principles: **fitness for purpose** and **sustainability**. To meet both criteria, CIRP focused squarely on contextual matters. These were captured in the gap analysis in areas such as: the essential governance functions of NFOs, those functions that would benefit from ICTs, the essential ICT hardware, software and services necessary for context-appropriate ICTs to work for good governance, NFO's access to essential ICT, the organizational and operational context for discharge of NFO governance functions, NFOs' actual use of ICT for governance, and triangulated insights into NFO capacity to use ICT for good governance.

CIRP considered the findings of the gap analysis in relation to standard approaches to capacity building, generally classified as formal and non-formal learning. The highly structured, tightly progressive nature of formal learning, as elaborated from various sources in Table 3, cannot be accommodated by the diverse, and in some cases low level, of formal educational attainment of NFO board members. Yet the critical dependence of NFO performance on established norms based on a uniform set of knowledge, skills and attitudes towards good governance, calls for more than non-formal learning. CIRP therefore borrowed from the features of formal and non-formal learning: in the first place to specify a standard curriculum with associated learning outcomes; and in the second place to enable the universality and flexibility of access along with a less rigid assessment methodology.

Table 3 Comparative Features of Formal and Non-Formal Learning from Selected Sources

	Formal	Non-Formal
Definition	• Is institutionalized, intentional and planned through public and recognized private organizations • Is recognized by relevant national educational authorities • Consists mostly of initial education. • Also comprises vocational education, special needs education and some parts of adult education	• Is Institutionalized, intentional and planned by an education provider. • Is an addition, alternative and/or complement to formal education. • Is often provided to guarantee the right of access to education for all. • Caters for learners of all ages • Does not necessarily apply a continuous pathway-structure; may be short and/or low intensity • Is typically provided as short courses, workshops or seminars. • Provides qualifications that are not recognized as formal qualifications by the relevant national educational authorities. • Cover programmes contributing to adult and youth literacy and education for out-of-school children & programmes on life skills, work skills, and social or cultural development.
		Is any organized, systematic educational activity, carried on outside the framework of the formal system
Curriculum	• Systematic, organized education model • Structured & administered according to a given set of laws and norms • Rigid curriculum as regards objectives, content and methodology	• Flexible curricula and methodology • Capable of adapting to the needs and interests of students
		• Learning outcomes rarely documented • Activities seldom structured by conventional rhythms or curriculum
Progressive hierarchy	Follows hierarchy comprising primary, secondary and tertiary levels	No hierarchy. Activities follow on, one after the other
	Spans from lower primary school to upper reaches of university	
Aimed at	National needs	Personal growth
	Education in preparation for life	Education in and through life
Timing	Long cycle, more than a year	Short cycle
	Participant usually enters once and leaves once	Participant performs recurrent learning based on individual role
		Part time

	Full-time; usually does not permit parallel activities	Time is not a pre-established factor but is contingent upon the student's work pace
Contents	Input-centred – standardized curriculum of knowledge (mostly cognitive) Static content Largely academic, comprising academic disciplines that are separate from one another	Output-centred – not standardized but related to needs of participants Practical, related to participants' environment
Entry requirements	Based on previous knowledge	Based on the clientele, formal requirements usually not essential
Delivery system	Institution-based, at 'schools"	Takes place at a variety of settings
	Teacher-centred, focusing on teaching rather than learning	Learner-centred, focusing on sharing, exploring, analyzing and judging
Results	Creates dependent learners, learning stops when teacher is not there	Creates self-reliant, independent and continuing learners
Staff	Material is presented by teachers	Staff are facilitators, rather than teachers
	Control is vested in recognized authorities	Comprises professional learning facilitators or volunteers
Sequence	Sequential learning	Typically non-sequential
Participation	Compulsory	Usually voluntary
Evaluation	Learning is usually evaluated	Learning is not usually evaluated

Colour	Source
	UNESCO Institute for Statistics. International standard classification of education: ISCED 2011. Montreal: UNESCO Institute for Statistics, 2012.[2]
	Coombs, Philip H., and Manzoor Ahmed. "Attacking Rural Poverty: How Nonformal Education Can Help. A Research Report for the World Bank Prepared by the International Council for Educational Development." (1974).
	Dib, Claudio Zaki. "Formal, non-formal and informal education: concepts/applicability." In AIP conference proceedings, vol. 173, no. 1, pp. 300-315. American Institute of Physics, 1988.
	Rogers, Alan. (2005) Non-formal education: flexible schooling or participatory education? Springer US.
	Bowyer, Jonathan, and T. Geudens. "Bridges for recognition." Promoting recognition of youth work across Europe. Brussels: SALTO-YOUTH Inclusion Resource Centre (2005).
	Bridging In-school and Out-of-school Learning: Formal, Non-Formal, and Informal Education. (p. 174), by Eshach, H. (2007). Journal of Science Education and Technology, 16(2), 171-190.[3]

The capacity building for NFOs use of ICT in governance entailed the development of ICT for governance training materials, their delivery to trainers and downstream learners, and the setup of all facilities for future deliveries past the lifetime of the StewardFish Project.

ICT4G Training Materials Development

CIRP's ICT for governance (ICT4G) curriculum drew on standardized ICT proficiency standards that establish the minimum expectations for all persons to function in contemporary society. After a comparative analysis of several such standards from various countries and regions around the world, the UNESCO Digital Literacy Global Framework (DLGF)[4] was selected as the base specification for the ICT4G proficiency standard. The language and specific reference points of the framework were localized for the Caribbean; and career-related competences localized for FFO governance. The localized framework, used as the basis for the specification of the ICT4G curriculum, is shown in Table 4.

The ICT4G course was designed to introduce CNFO and NFO fisherfolk leaders to the role that ICT can play in enabling and enhancing good governance in FFO organizations at every level; and to identify key required competences. Within the localized DLGF, the scope of the ICT4G course was guided by the gap analysis which found that information management and record-keeping, meeting management, and advocacy and engagement are high priorities for NFOs. These tasks also stand to benefit significantly from the appropriate use of ICT. The coverage of the localized DLGF competences are shown in Table 5 by ICT4G Module Introduction to ICT4G; Information Management & Record-keeping; Meeting Management and Advocacy & Engagement.

The compelling resource constraints of the NFOs under study, alongside the compelling case for the flexibility to access learning content on demand outside the constraints of a physical venue motivated a blended learning delivery model. This model integrates facilitated face-to-face sessions, self-paced online and offline learning methods that allow for remote access independent of continuous, high-bandwidth Internet service. Recognizing the high availability of smartphones among board members, CIRP developed the ICT4G course materials for blended learning delivery.

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[4] UNESCO-UIS. Information Paper No. 51. A Global Framework of Reference on Digital Literacy Skills for Indicator 4.4.2 (2018).

Table 4 UNESCO Digital Literacy Global Framework (DLGF) Competences, Localized for FFO Governance

Competence Area	Competences
1. Information and data literacy	1.1 Browsing, searching and filtering data, information and digital content
	1.2 Evaluating data, information and digital content
	1.3 Managing data, information and digital content
2. Communication and collaboration	2.1 Interacting through digital technologies
	2.2 Sharing through digital technologies
	2.4 Collaborating through digital technologies
	2.5 Netiquette
3. Digital content creation	3.1 Developing digital content
4. ICT Safety	4.2 Protecting personal data and privacy
5. Problem Solving	5.2 Identifying needs and technological responses
	5.3 Creatively using digital technologies
6. Good Governance	6.1 Understanding individual digital competences and organizational digital capabilities required for good governance
	6.2 Identifying and using digital tools and technologies for good governance
	6.3 Understanding, analyzing and evaluating data, information and digital content to support good governance

Table 5 ICT4G Coverage of FFO Governance- Localized DLGF Competences by Module

Competence Area	Competences	Module 1	Module 2	Module 3	Module 4
1. Information and data literacy	1.1 Browsing, searching and filtering data, information and digital content		✓	✓	✓
	1.2 Evaluating data, information and digital content				✓
	1.3 Managing data, information and digital content		✓	✓	✓
2. Communication and collaboration	2.1 Interacting through digital technologies			✓	✓
	2.2 Sharing through digital technologies			✓	
	2.4 Collaborating through digital technologies			✓	
	2.5 Netiquette			✓	
3. Digital content creation	3.1 Developing digital content		✓	✓	✓
4. ICT Safety	4.2 Protecting personal data and privacy		✓	✓	✓
5. Problem Solving	5.2 Identifying needs and technological responses		✓	✓	✓
	5.3 Creatively using digital technologies				
6. Good Governance	6.1 Understanding individual digital competences and organizational digital capabilities required for good governance		✓	✓	✓
	6.2 Identifying and using digital tools and technologies for good governance		✓	✓	✓
	6.3 Understanding, analyzing and evaluating data, information and digital content to support good governance	✓		✓	✓

ICT4G Training Delivery

The delivery of the ICT4G course assumed that smart phones, tablets and laptops would be the primary access channels for learners. These devices enable considerable interactivity and dialogue in the modular *e*Learning courseware that allows for active learner interaction and engagement, even while disconnected.

ADAPT[5], the open source framework and authoring tool, was used to design the highly modular *e*Learning objects that combine text and graphic components on a scrolling page to create a rich, interactive and responsive learner experience. Responsive design enables course deployment on any device: *mobile phones, tablets and desktops*. The stand-alone mobile edition of the course was generated as an Android mobile app that is particularly useful for learners who do not have consistent Internet connectivity.

Engagement of learners in an overtly social and networked learning experience that emphasizes the connections that develop among the participants, materials, and learning, is key to success as online learning can be an isolating experience that leads to high attrition rates. Interactive face-to-face sessions scheduled on a regular (*or opportunistic*) basis, between learners and trained facilitators, is an important component of the blended learning model. It helps to mitigate the typically high attrition rates associated with exclusively online learning.

Learner interaction data is the "glue" that integrates the various components in this distributed learning architecture. The courseware was designed to capture and record learner interaction data. A learning analytics feature enables facilitators and course administrators to track student progress and record in-course assessment performance. The ICT4G course includes the following built-in interactive exercises:

- Mini-surveys
- Hands-on exercises
- End-of-module quizzes
- End-of-module reflection questions

Google Classroom was used as the Learning Management System (LMS) because it provides a "social media" learner experience in contrast to more conventional LMSs, such as Moodle, used in formal learning. This social character, together with features that mimic a real-world classroom metaphor, enables managed student-to-student and student-to-facilitator interactions that encourage a community spirit within cohorts, and promotes peer to peer learning. This and other ICT tools were strategically employed in ICT4G course delivery. For example:

Google Classroom (http://classroom.google.com or mobile app)
used as the LMS to manage the virtual workshop session(s) and provides for:
- *Content*: Distribution of workshop materials: presentations, instructional videos and other resources

- *Connections*: Links to access the web and mobile editions of the ICT4G course as well as other online ICT tools such as Sli.do

- *Communications*: Facilitates interactions between the workshop facilitators and participants; as well as peer dialogue among participants

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[5] https://www.adaptlearning.org/

- *Exercises*: facilitates hands-on assignments through directed working sessions on the various modules in the ICT4G course; mini-questionnaires; daily check-ins and user feedback

Sli.do (http://sli.do)
This polling platform was used to facilitate interactivity and participant feedback during both the training of trainers workshop and the pilot ICT4G workshop as follows:

- Word cloud poll: *Write down up to 3 words to describe what governance means to you and your FFO. Place each word on a separate line*

- Ideation: *How do you believe this ICT4G course should be promoted to your FFO constituents? Suggest your own idea or vote for an existing idea*

Google Drive (http://drive.google.com)
This cloud-based shared drive platform was used to store electronic records (i.e. files, documents, spreadsheets and databases). Google Drive is integrated with Google Classroom and used to create a "Classroom" folder for each class (workshop), where all content published in the classroom is stored. Google Drive is used primarily for the hands on exercises in Module 2: Information Management & Record-Keeping.

Google Calendar (http://calendar.google.com)
Google Calendar is a very convenient productivity tool for organizing schedules and coordinating activities. It is integrated with Google Classroom and was used to create a "Calendar" for each Class. The calendar was used primarily for exercises in Module 3: Meeting Management, and otherwise used to publish assignments and quizzes.

ICT4G Online Course (http://courses.coi-csod.org/SFICT4G or mobile App)
The ICT4G online course was built for flexible deployment as a web and mobile-edition, providing fully responsive content that can be accessed from a range of devices (desktop computers, tablets, mobile phones):

- **Web Application**: The ICT4G *e*Learning online course is published as standard html5/CSS content that can be deployed on any standard web server

- **Mobile Application**: The ICT4G *e*Learning course is also delivered as a mobile application (Android apk only). The apk file can be distributed for download and manual installation on android devices (mobile phones & tablets) or installed in the Google Play store for ease of installation.

Set up for Future Deliveries
All teaching resources necessary to run future cycles of the ICT4G course have been set up for all countries included in CIRP's StewardFish LOA: Antigua and Barbuda, Barbados, Belize, Jamaica, Saint Lucia and St. Vincent and the Grenadines. Google Classrooms have been created for all countries and comprehensive guidance notes, in excess of a hundred pages, has been produced. The classrooms are configured as follows:

Name: ICT for Governance Classroom
Description: This is the home for learner-facilitator engagement through your ICT4G class journey. You can access a number of general ICT4G course resources, including links to the Wed edition and Android editions of the course, as well as resources specific to your class.
Section: <country or CNFO>
Room: CNFO Leadership Institute
Subject: ICT4G 2021

A Gmail account has been created specifically for the CNFO to manage the ICT4G Google classrooms. The credentials are as follows, with the password shared independently with the CNFO Admirative Officer
Name: Nadine Nembhard
Email address: ict4gcourse@gmail.com
Recovery email: kim.mallalieu@sta.uwi.edu

Access to the classrooms is as follows:

Antigua and Barbuda
Invite link: https://classroom.google.com/c/MjE1NzY3NjQxOTcz?cjc=jf3npkm
Class code: jf3npkm

Barbados
Invite link: https://classroom.google.com/c/MjE1NzY3ODMzNjkx?cjc=blztrpf
Class code: blztrpf

Belize
Invite link: https://classroom.google.com/c/MjE1NzY3ODMzNzYz?cjc=qzcfcfq
Class code: qzcfcfq

CNFO
Invite link: https://classroom.google.com/c/MjE1NzY3ODMzODQz?cjc=jwurv6v
Class code: jwurv6v

Jamaica
Invite link: https://classroom.google.com/c/MjE1NzY3ODMzOTI2?cjc=tooizqx
Class code: tooizqx

Saint Lucia
Invite link: https://classroom.google.com/c/MjE1NzcxOTYyNjI2?cjc=djbizqv
Class code: djbizqv

St. Vincent and the Grenadines
Invite link: https://classroom.google.com/c/MTg1MjkxMjg1MjA5?cjc=znrb4sn
Class code: znrb4sn

Monitoring and Reporting

CIRP's progress under the StewardFish project was monitored by the Regional Project Steering Committee (RPSC). From September 2019 to date, five RPSC meetings have been held in which all partners provided

updates on progress made towards the respective LOA outputs. In addition to the RPSC meetings, 15 Regional Partner (RP) Check-in meetings have been held under the StewardFish Project to date. Partners chair these meetings in rotation, share updates on progress and discuss matters of interest to the project.

In addition to the RPSC and RP Check-in meetings, progress was also monitored through three interim progress reports submitted to the Regional Project Coordinator. The reports were revised according to the direction and recommendations of the Regional Project Coordinator until such time as they met his satisfaction.

The deliverables required for coverage within each interim progress report are specified in CIRP's LOA.

Deliverables

CIRP completed all of its StewardFish deliverables. Appendices 1, 2 and 3 provide a sample of persons who contributed essential inputs into, and otherwise participated in, the related activities.

Repository of Interim Reports and Other Key Outputs

Table 6 identifies the interim reports through which each deliverable was recorded and submitted in accordance with the amended LOA. The reports may be accessed from https://www.dropbox.com/sh/9avziq8dhmdwn0t/AAA6CU1DCdXBZIzr_Q3pxMCZa?dl=0, via the path: *StewardFish Outputs > Component 1_Developing organisational capacity for fisheries governance*, in the folders indicated in in the rightmost column of Table 6.

Table 6 CIRP's Final StewardFish Deliverables as per Amended LOA

Submission Report	Deliverables	Folder
First Interim Progress Report	a) Instrument to conduct a gap analysis of the NFOs use of ICT in governance, using a participatory approach	1.1.2.1
	b) Report, including methodology, results of the gap analysis and recommendations for improving the use of ICT in governance by NFOs and their members	
Companion to First Interim Progress Report	c) Report on considerations for selection of ICT equipment and services and specific recommendations for equipment procurement under StewardFish for CNFO and the NFOs in Antigua and Barbuda, Barbados, Belize, Saint Lucia, and St. Vincent and the Grenadines	1.1.2.2
Second Interim Progress Report	d) Four online training modules with assessment exercises and performance monitoring tools as persistent, reusable resources for training of NFO board members and other key personnel to achieve ICT proficiency standards in ICT for Governance • Mobile app • Web App	1.1.2.3 & subfolders: Mobile App & WebApp
	e) Training plan for training of 7 trainers (from CNFO, Antigua and Barbuda, Barbados, Belize, Saint Lucia, and St. Vincent	

		and the Grenadines, and Jamaica) to deliver training to NFO leads	
	f)	Training of 7 trainers to deliver training to NFO leads	
Third Interim Progress Report and Companion document: *Guidance Notes for ICT4G Google Classrooms*	g)	Training of trainers workshop report, including methodology and evaluations	
	h)	Codelivery (with participants of Training of Trainers workshop) of training on ICT for Governance to CNFO and NFO leads in 6 countries; and support for trainers in their role in this training	
	i)	Set up and configuration of the online training modules on the CNFO's cloud infrastructure for delivery through the Leadership Institute; demonstration and guidance notes	

NFOs Use of ICT in Governance

The gap analysis was expressed in terms of:
1. Overarching gaps
2. Governance framework
3. Key governance tasks
   - Information management
   - Meeting management
   - Advocacy and engagement
4. Facilities
5. Capacity

The gap analysis closed with recommendations regarding a governance framework, information management and record-keeping, meeting management, financial management, advocacy and engagement. Recommendations were also outlined for ICT provisions, safety, proficiency and capacity building. ICT provisions were further elaborated according to ICTs for governance functions and for governance architecture, key Hardware and software facilities and storage. ICT capacity building was further elaborated according to pedagogical considerations, the blended learning model and the architectural design for scalable elearning. The gap analysis closed by outlining a recommended strategy and specific recommendations for training and procurement under the StewardFish Project.

Resources provided with the gap analysis include but are not limited to:
1. Gap Analysis Instrument: Guiding Questions
2. Gap Analysis Instrument: Tabulated Summaries for Fact Checking
3. ICT Competence Self Assessment
4. Competence Areas and Competences of the DigComp 2.0 Specification
5. Sample Checklist to Fill Gaps in NFOs' use of ICT for Governance

Capacity Building for NFOs Use of ICT in Governance

All workshop outputs are stored in the Google Classroom container (ICT4G Trainers Workshop: StewardFish | Class code o6rt5zj), including presentations, session recordings, instructional videos, participant exercise outputs and comments; and the Web and mobile editions of the course have been provided in the StewardFish repository.

To access the Web edition of the ICT4G course:

1. Open the folder "WebApp" to display a subfolder SFICT4G which contains the ICT4G online course as standard html5/css content

2. Upload this folder to the <Document Root> of any standard web server (eg. the htdocs directory on Apache web servers)

3. Point your browser to http://<Name_of_web_server>/SFICT4G to access the course

To access the mobile edition of the ICT4G course:

1. Open the folder "MobileApp" to display the file SFICT4G.apk which is the mobile app installation file for android devices only.

2. *Manual Installation*: Download and manually install the apk files on your mobile device (Android) using package installer. Since you are not installing from the Google Play store, you will have to authorize your device to install the App from an external source using the package installer.

3. *Google Play Store*: Install both apk files in your Google Play store account. This will make it much more convenient for your users to install the Apps on their mobile devices.

4. The mobile app can be retrieved from Google Play here:
   ➢ https://play.google.com/store/apps/details?id=org.csod.ICT4G

Key Findings and Recommendations

Under StewardFish activities CIRP found that, to varying degrees across all countries, a barrier to good governance is the lack of a framework for the systematic embedding of ICT into routine operations. Such a framework would include but not be limited to: basic ICT policy and strategy; documented procedures, guidelines, guidance notes, checklists and templates; key data and its requirements specification; digital literacy proficiency standards, learning resources, capacity development provisions and code of conduct; and underlying information and communications strategies and plans. The absence of such a framework as well as weaknesses in underlying governance processes and organizational arrangements percolate up to weaknesses in the application of ICT for governance. Among other things, this is characterized by a weak information management chain. CIRP's reports elaborate both general and specific recommendations including remediation strategies and other actions.

All FFOs under consideration have been found to suffer from resource constraints, in some cases crippling. This amplifies the need for operational and resource efficiencies derived from streamlined processes, structured documentation, standardization, sharing of resources and context-appropriate competence. CIRP has recommended an overarching strategy for cloud based infrastructure, centralized information assets and standardization as a context-sensitive response strategy. A minimum configuration of ICT hardware, software and services is recommended for NFOS and for the CNFO. CIRP recommends diligent review of the comprehensive set of recommendations and guidelines provided on all aspects of ICT for governance, including but not limited to the management, care and operations of ICT hardware, software, services, artefacts and processes.

The Caribbean Network of Fisherfolk Organizations (CNFO) plays a critical role in strengthening the proposition of, and provisions for ICT for NFO governance. Despite the considerable challenges of a multi-country constituency, widespread resource constraints and conflicting schedules, the CNFO with the support of enduring agencies such as the UWI's Centre for Resource Management & Environmental Studies (CERMES) and Caribbean Natural Resources Institute (CANARI) has made considerable progress and continues to demonstrate a strong commitment to systematic development of its member NFOs.

CIRP therefore recommends that the CNFO play a central role as an ICT resource repository, advocate and mentor; and that, through its Leadership Institute, it promotes and facilitates the delivery of the ICT for Governance course for NFO board members in its member countries. Though the course may be delivered through mixed-mode, comprising asynchronous mobile learning and synchronous reinforcement, the resources may be lifted and used for full face to face delivery where resources allow. The CNFO is also urged to periodically assess the content of the ICT4G course in collaboration with its members, to ensure that it remains entirely fit for purpose.

In-country trainers, selected on the basis of their existing portfolios which include NFO training and mentoring, are also urged to deliver their first cycle of downstream delivery as close as possible to their planned schedules, and to seek the assistance of CIRP in any and all ways for these deliveries. They are additionally urged to periodically assess the content of the ICT4G course in collaboration with the CNFO and its local FFOs, to ensure that it remains entirely fit for purpose.

CIRP strongly recommends that within a basic ICT for governance framework, which it deems to be a strategic imperative, the ICT4G course is adopted as an on-boarding requirement for all NFO board members. With this in place, the CNFO and its members are encouraged to consider the development of additional modules to cover all outstanding aspects of the UNESCO Digital Literacy Global Framework and the use of the assessment tool developed specifically for the gap analysis exercise.

An assessment of the ICT4G course in relation to new and emerging resources created and delivered by CERMES and CANARI is also highly recommended. Synergies are essential for efficiency, coherence and impact.

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Appendix 3 Workshop Participants

ICT4G Training of Trainers Participants

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ICT4G Piot Participants

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