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IMPLEMENTATION COMPLETION AND RESULTS REPORT

TF016614/ TF016425

ON A

GLOBAL ENVIRONMENT FACILITY - LEAST DEVELOPED COUNTRIES FUND GRANT

AND A

GLOBAL FACILITY FOR DISASTER REDUCTION AND RECOVERY - MANAGING THE AFRICAN, CARIBBEAN AND PACIFIC -EUROPEAN UNION NATURAL DISASTER RISK REDUCTION PROGRAM GRANT

IN THE AMOUNT OF US$ 9.10 MILLION

TO THE

SOLOMON ISLANDS

FOR THE

COMMUNITY RESILIENCE TO CLIMATE AND DISASTER RISK PROJECT (P112613)

October 26, 2020

This ICRR replaces the version published in the Board Operation System on November 5, 2020 and reflects a minor correction to an accidentally enlarged image on p. 51

Urban, Resilience And Land Global Practice
East Asia And Pacific Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective May 28, 2020)

Currency Unit =	Solomon Islands Dollar
SI$8.28 =	US$1
US$ 0.121 =	SI$1

FISCAL YEAR
January 1 – December 31

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ABBREVIATIONS AND ACRONYMS

ACP	African, Caribbean and Pacific (Group of States)	**MYOB**	Mind Your Own Business (Accounting software)
CBDRM	Community-based Disaster Risk Management Plan/Tool (also known as CBVRM)	**NAPA**	National Adaptation Programme of Action
CBDRM/V&A	Community-based Disaster Risk Management/ Vulnerability and Adaptation Plans	**NDC**	National Disaster Council
CCA	Climate Change Adaptation	**NDMO**	National Disaster Management Office
CCDRM	Climate Change and Disaster Risk Management	**NDMP**	National Disaster Management Plan
COVID-19	Coronavirus Disease 2019	**No.**	Number
CPF	Country Partnership Framework	**NPV**	Net Present Value
CRISP	Community Resilience to Climate and Disaster Risk in Solomon Islands Project	**NDS**	National Development Strategy
DO	Development Objective	**ODI**	Overseas Development Institute
DRM	Disaster Risk Management	**OECD**	Organisation for Economic Co-operation and Development
DRR	Disaster Risk Reduction	**OP**	Operational Policy
EIRR	Economic Internal Rate of Return	**PXXXX**	Project Code (World Bank)
ESMF	Environmental and Social Management Framework	**PAD**	Project Appraisal Document
EU	European Union	**PCC**	Project Coordination Committee
FY	Fiscal Year	**PCDF**	Provincial Capacity Development Fund
GDP	Gross Domestic Product	**PCRAFI**	Pacific Catastrophe Risk Assessment and Financing Initiative
GEF	Global Environment Facility	**PDO**	Project Development Objective
GFDRR	Global Facility for Disaster Reduction and Recovery	**PDOI**	Project Development Outcome Indicator
GFS	Gravity Fed Systems (Sub-Projects)	**PHRD**	Japan Policy and Human Resources Development Fund
GIS	Geographic Information System	**PMU**	Project Management Unit
ICR	Implementation Completion and Results Report	**POM**	Project Operations Manual
IRI	Intermediate Results Indicator	**RDP**	Rural Development Program
ISR	Implementation Status and Results Report	**RDP2**	Rural Development Program – Phase II
IRCCNHP	Increasing Resilience to Climate Change and Natural Hazards Project (in Vanuatu)	**RWH**	Rainwater Harvest Systems (Sub-Projects)
ITQ	Invitation to Quote	**SI$**	Solomon Islands Dollar
Km^2	Square kilometers	**SIC**	Sub-Project Implementation Committee
LDCF	Least Developed Countries Fund	**SIG-Connect**	Solomon Islands Government Network
MECDM	Ministry of Environment, Climate Change, Disaster Management, and Meteorology	**SMART**	Specific, Measurable, Achievable, Relevant and Time-Bound (indicators)
M&E	Monitoring and Evaluation	**STEP**	Systematic Tracking of Exchanges in Procurement
MEHRD	Ministry of Education and Human Resources Development	**TF**	Trust Fund
MHMS	Ministry of Health and Medical Services	**TOC**	Theory of Change
MMERE	Ministry of Mines, Energy and Rural Electrification	**US$**	United States Dollar
MTR	Mid-term Review	**%**	Percent

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DATA SHEET

BASIC INFORMATION

Product Information

Project ID	Project Name
P112613	COMMUNITY RESILIENCE TO CLIMATE AND DISASTER RISK IN SOLOMON ISLANDS PROJECT
Country	**Financing Instrument**
Solomon Islands	Investment Project Financing
Original EA Category	**Revised EA Category**
Partial Assessment (B)	Partial Assessment (B)

Organizations

Borrower	Implementing Agency
Solomon Islands	Ministry of Environment, Climate Change, Disaster Management and Meteorology

Project Development Objective (PDO)

Original PDO

To increase the resilience of selected rural communities to the impacts of natural hazards and climate change

PDO as stated in the legal agreement

To increase the capacity of selected rural communities to manage natural hazards and climate change risks

FINANCING

	Original Amount (US$)	Revised Amount (US$)	Actual Disbursed (US$)
World Bank Financing			
TF-16614	7,300,000	7,300,000	7,300,000
TF-16425	1,800,000	1,799,363	1,799,363
Total	**9,100,000**	**9,099,363**	**9,099,363**
Non-World Bank Financing			
Borrower/Recipient	0	0	0
Total	**0**	**0**	**0**
Total Project Cost	**9,100,000**	**9,099,363**	**9,099,363**

KEY DATES

Approval	Effectiveness	MTR Review	Original Closing	Actual Closing
06-Mar-2014	01-Apr-2014	19-Jun-2017	31-May-2019	28-May-2020

RESTRUCTURING AND/OR ADDITIONAL FINANCING

Date(s)	Amount Disbursed (US$M)	Key Revisions
14-May-2018	4.70	Change in Results Framework Change in Components and Cost
07-May-2019	7.29	Change in Loan Closing Date(s)
26-Nov-2019	8.71	Change in Loan Closing Date(s)

KEY RATINGS

Outcome	Bank Performance	M&E Quality
Moderately Satisfactory	Moderately Satisfactory	Modest

RATINGS OF PROJECT PERFORMANCE IN ISRs

No.	Date ISR Archived	DO Rating	IP Rating	Actual Disbursements (US$M)
01	04-Aug-2014	Satisfactory	Satisfactory	0
02	29-Dec-2014	Moderately Satisfactory	Moderately Satisfactory	.47
03	19-Jun-2015	Moderately Satisfactory	Moderately Satisfactory	.47
04	18-Dec-2015	Moderately Satisfactory	Moderately Satisfactory	.56
05	29-Jun-2016	Moderately Satisfactory	Moderately Satisfactory	1.40
06	23-Dec-2016	Moderately Satisfactory	Moderately Satisfactory	2.21
07	28-Jun-2017	Moderately Unsatisfactory	Moderately Unsatisfactory	2.64
08	06-Dec-2017	Moderately Unsatisfactory	Moderately Unsatisfactory	3.67
09	23-May-2018	Moderately Unsatisfactory	Moderately Unsatisfactory	4.70
10	02-Nov-2018	Moderately Satisfactory	Moderately Satisfactory	6.32
11	16-Apr-2019	Moderately Satisfactory	Moderately Satisfactory	7.29
12	06-Nov-2019	Moderately Satisfactory	Moderately Satisfactory	8.71
13	30-May-2020	Moderately Satisfactory	Moderately Satisfactory	9.10

SECTORS AND THEMES

Sectors

Major Sector/Sector	(%)
Public Administration	**100**
Central Government (Central Agencies)	16
Sub-National Government	82
Other Public Administration	2

Themes

Major Theme/ Theme (Level 2)/ Theme (Level 3)	(%)

Finance	**13**
Finance for Development	13
Disaster Risk Finance	13
Urban and Rural Development	**39**
Disaster Risk Management	39
Disaster Response and Recovery	13
Disaster Risk Reduction	13
Disaster Preparedness	13
Environment and Natural Resource Management	**50**
Climate change	50
Mitigation	50

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I. PROJECT CONTEXT AND DEVELOPMENT OBJECTIVES

A. CONTEXT AT APPRAISAL

Context

1. **Country Context.** Solomon Islands is an archipelago with six major mountainous and 991 smaller islands, with a land area of 29,900 square kilometers (km^2) spread over a vast sea area of 1.6 million km^2. The country is divided into nine provinces and one town council (Honiara). At appraisal in 2014, about 80 percent of the population of 550,000 lived in rural areas, and the per capita gross domestic income was equivalent to United States Dollar (US$) 2,350. Solomon Islands emerged from the 1998-2003 civil conflict (known as the 'Tensions') with relatively strong growth (10.5 percent in 2011) based primarily on mining and logging. However, growth slowed to 4.5 percent in 2012 due to lower commodities production (particularly agriculture).

2. **Sectoral Context.** Solomon Islands is located within the cyclone belt and the 'Pacific Ring of Fire'—a region with high volcanic and seismic activity that surrounds the Pacific Ocean Basin. At appraisal, it ranked among the 20 countries with the highest economic risk exposure to two or more hazards, including tropical cyclones, volcanic eruptions, earthquakes, tsunamis, landslides, floods and droughts, with seven major natural disasters occurring over the last three decades. Probabilistic modeling undertaken in 2011 by the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI, P130441) suggested that, over the next 50 years, Solomon Islands was likely to incur average direct annual losses of US$20.5 million or 3 percent of its gross domestic product (GDP), with a 50 percent chance of a major event resulting in more than US$240 million in losses and 1,650 casualties.

3. Climate change is already affecting water and food security, as well as many primary sectors on which the country's economy depends. Sea level rise and storm surges, coupled with periods of extreme rainfall, are exacerbating soil erosion and landslides in areas already vulnerable due to deforestation, and causing frequent floods, impacting settlements and food gardens. In 2009, for example, heavy rain flooded western and eastern parts of Guadalcanal, affecting 52,000 people and incurring a cost of US$3 million. Saltwater intrusion into coastal areas also exacerbated water scarcity and caused food shortages, particularly in the outer islands and lake areas.

4. **Institutional Context.** The Community Resilience to Climate and Disaster Risk Project (CRISP) was approved at a time when the government had committed to an integrated approach to climate change adaptation (CCA) and disaster risk management (DRM), mainstreaming it across sectors, and implementing it in local communities. However, the government lacked sufficient capacity to support this agenda. In 2010, it relocated the National Disaster Management Office (NDMO) along with the Climate Change Division, to the newly expanded Ministry of Environment, Climate Change, Disaster Management, and Meteorology (MECDM). In 2013, the government agreed to develop an integrated DRM/CCA national framework, building on the 2010 National Disaster Risk Management Plan and the 2012-17 National Climate Change Policy to achieve climate-resilient development. However, while the government already had experience in community-level investments—through the Solomon Islands Rural Development Program (RDP; P089297, approved in 2007) and the Provincial Capacity Development Fund (PCDF) at the larger, cross-community level—it lacked experience in applying risk assessments to local planning and translating them into more resilient community investments. CRISP sought to address these gaps.

5. **Intended Contribution to Higher Level Objectives and Rationale for World Bank Support.** CRISP was designed to fulfill the 2011-2020 Solomon Islands National Development Strategy (NDS) objectives to "*support the vulnerable*"

and *"effectively respond to climate change and manage the environment and risks of natural disasters"*. It was aligned with the World Bank Fiscal Years (FY) 2013-17 Country Partnership Strategy (Report Number (No.) 76349-SB), which emphasized economic resilience by, among others, "*greater resilience of rural communities to climate change, natural hazards, and catastrophic disasters*" (Outcome 8 of the Strategy). The project further supported four of the seven National Adaptation Programme of Action (NAPA) priorities and three of the eight global outcomes of the 2010 Global Environment Facility (GEF) "*Revised Programming Strategy on Adaptation to Climate Change for the Least Developed Countries Fund and the Special Climate Change Fund".*[1]

6. CRISP was expected to build on the experience of and use the same Project Management Unit (PMU) as the Increasing Resilience to Climate Change and Natural Hazards Project (IRCCNHP) (P129375), approved in 2012. This US$2.73 million grant, funded by the Japan Policy and Human Resources Development Fund (PHRD), sought to mainstream DRM and CCA, develop risk information, and pilot community-led resilient investments.

Theory of Change (Results Chain)

7. The Project Appraisal Document (PAD) did not include an explicit theory of change (TOC). For the purposes of this evaluation, the TOC depicted in Figure 1 was derived from the PAD project description and results framework. The TOC assumed that by: (1) strengthening government capacity in disaster and climate risk management; and (2) helping selected rural communities implement disaster risk reduction (DRR) and CCA investments—prioritized through participatory Community-based Disaster Risk Management/Vulnerability and Adaptation (CBDRM/V&A) plans—community capacity to manage natural hazards and climate risks would increase.[2]

8. The PAD (Annex 2) also lists three long-term (impact-level) outcomes which the project was expected to contribute to: (1) planning and investment decision making at central and local government levels that considers climate and disaster risks; (2) increased community resilience to the impacts of natural hazards and climate change; and (3) improved community welfare and economic development stimulated through community-led investment activities. These are listed as long-term outcomes in the TOC (Figure 1).

Project Development Objective (PDO)

9. The **project development objective** (PDO) stated in the PAD and Grant Agreement was *to increase the capacity of selected rural communities to manage natural hazards and climate change risks.* This was also the project's Global Environmental Objective.[3]

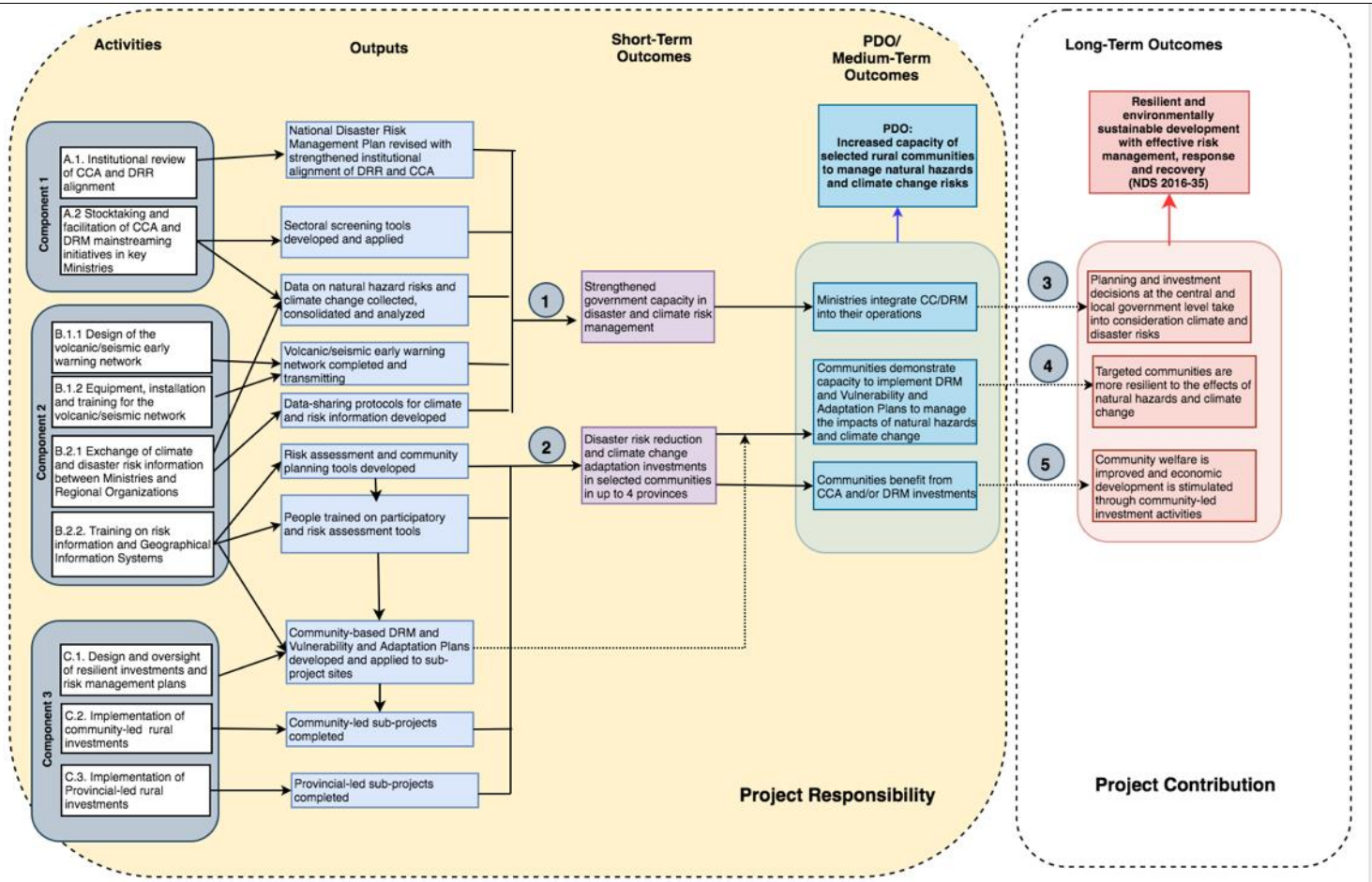
[1] Supported NAPA priorities included: **Priority 5.1** (*Increasing adaptive capacity and resilience in water supply and sanitation, vulnerable human settlements, and education, awareness and information*); **Priority 5.2** (*CCA on low-lying and artificially built-up islands in Malaita and Temotu provinces*); **Priority 5.4** (*Coastal protection*); and **Priority 5.6** (*Improving key infrastructure resilience*). At the global level, the project sought to support the following outcomes of the 2010 GEF Revised Programming Strategy on Adaptation to Climate Change: **Outcome 1.1** (*Mainstreamed adaptation in broader development frameworks*); **Outcome 2.1** (*Increased knowledge and understanding of climate variability and change-induced threats at the country level and in targeted vulnerable areas*); and **Outcome 2.2.** (*Strengthened adaptive capacity to reduce risks to climate-induced economic losses*).

[2] The PAD implies that increased community capacity—specifically, to manage natural hazards and climate risks – would arise from: improved risk knowledge, awareness and planning (acquired through the CBDRM/V&A process); practical experience in risk reduction (acquired through community investments); and enabling policies and government programs supported by the project.

[3] The "original PDO" that appears on the Datasheet (page 1) was incorrectly entered in operations portal. The correct PDO, as reflected in both the PAD and Grant Agreement, is as stated above.

Figure 1: Theory of Change of the Project

Problem statement: Solomon Islands is highly vulnerable to natural hazards and the impacts of climate change, which together result in large economic losses and loss of life. The country has limited capacity to plan for and manage these impacts.



Assumptions: 1 – Government agencies are ready to adopt climate and disaster risk-based planning; 2 – Climate and disaster risk planning tools are used effectively and reflected in the investments; 3 – Climate and disaster risk-based planning and investment decisions are not undermined by political decisions; 4 – Investments prove adequate to the magnitude of climate and natural hazards risks; and 5 – Investments are maintained by communities and provincial governments. Round circle numbers correspond to the assumption numbers.

Key Expected Outcomes and Outcome Indicators

10. The PDO was considered a single objective statement, as the PAD emphasized that management of natural hazards and climate change risks were intrinsically linked in the Solomon Islands' context.

11. Achievement of the PDO was to be measured through three PDO-level indicators (PDOI):

- **PDOI-1**: Number of beneficiaries in target areas that benefit from CCA and/or DRR investments *(target: 79,000, with at least 48 percent female)*
- **PDOI-2:** Percentage of targeted communities that demonstrate capacity to implement CBDRM/V&A plans to manage the impacts of natural hazards and climate change (*target: 70 percent*)
- **PDOI-3:** Number of ministries with annual work plans and budgets that integrate climate change and disaster risk management (CCDRM) measures (*target: 3*)[4]

12. Intermediate result indicators (IRIs) are shown on Table 1 and Annex 1 (Results Framework).

Components

13. The project had four components, all implemented by MECDM. The US$9.10 million financing included a US$7.30 million grant from the Least Developed Countries Fund (LDCF), through the GEF, and a US$1.80 million grant from the African, Caribbean and Pacific - European Union (ACP-EU) Natural Disaster Risk Reduction Program, managed by the Global Facility for Disaster Reduction and Recovery (GFDRR). The project also included an estimated US$ 1.1 million in predominantly in-kind counterpart contributions, mostly for Component C (see also Annex 3, Table 3.2).

14. **Component A: Integration of CCA and DRR in Government Policies and Operations** *(estimated cost US$0.54 million, actual cost US$0.83 million)* supported policy development, capacity building and institutional strengthening aimed at integrating governance and operational processes for CCA and DRR. It included two sub-components: (1) Developing a national integrated CCA and a DRM framework; and (2) Strengthening government capacity for mainstreaming CCA and DRM in sector planning and investments.

15. **Component B: Strengthening of Climate and Disaster Risk Information and Early Warning** *(estimated cost US$1.33 million, actual cost US$1.26 million)* aimed to establish an early warning network for volcanic/seismic hazards and establish a national risk information platform. It included two sub-components: (1) Establishing a volcanic-seismic monitoring network; and (2) Establishing the foundations of a national risk information capability to improve risk management, to assess disaster and climate change effects for sectoral and investment planning.

16. **Component C: Climate Change Adaptation and Disaster Risk Reduction Investments** *(estimated cost US$6.33 million, actual cost US$5.45 million)* aimed to support both structural and non-structural DRR and CCA investments at the community and provincial levels, in collaboration with the RDP and provincial governments, and considering lessons learned from the PHRD-funded pilot investments. It included three sub-components: (1) Risk analysis, design, advisory and supervision services for rural infrastructure investments and disaster/climate risk management plans;

[4] The PAD explicitly states that "*CCA and DRR require a consistent approach, commonly involving the same data to quantify effects, and often leading to the same risk reduction initiatives*" (PAD Annex 2, para.5). Both the World Bank and the Pacific Forum Secretariat promote an integrated approach to managing natural hazards and climate change risks in the Pacific Island region. See World Bank (2012) *Acting Today for Tomorrow: A Policy and Practice Note for Climate and Disaster Resilient Development in the Pacific Islands Region*, and Pacific Forum Secretariat (2016). *A Framework for Resilient Development in the Pacific: An Integrated Approach to Address Climate Change and Disaster Risk Management*

(2) Development and implementation of community-led rural investments through community grants; and (3) Development and implementation of provincial-led rural investments in participating provinces.

17. **Component D: Project Management and Monitoring and Evaluation (M&E)** *(estimated cost US$0.90 million, actual cost US$1.56 million)* aimed to provide efficient and effective management support to the project. It included two sub-components: (1) Project coordination and management; and (2) Project M&E.

B. SIGNIFICANT CHANGES DURING IMPLEMENTATION

18. The project underwent three Level 2 restructurings, on May 14, 2018, May 7, 2019, and November 26, 2019. The latter two restructurings extended the closing date, while the May 2018 restructuring authorized changes to the results framework, components and procurement arrangements, as described in detail below.

Revised PDO and Outcome Targets

19. The PDO remained unchanged throughout project implementation. However, the target number of beneficiaries **(PDOI-1)** was reduced from 79,000 to 53,400 in the May 2018 restructuring. The number of women targeted (at least 48 percent) remained unchanged.

Revised PDO Indicators

20. **PDOI-3** was changed to "*Number of ministries with activities in their annual work programs including resilience measures for climate and disaster risk*", with the same target of three ministries.

Revised Components

21. **Component A** was revised slightly in name and description to: *"Integration of Risk Resilience for the Management of Disaster and Climate Risk into the Recipient's Policy Frameworks and Practices",* with two sub-components: (1) Development of a national cross-sector framework for disaster management and an integrated framework for resilient development; and (2) Strengthening the capacity of the Recipient and processes for mainstreaming risk resilience into selected sectoral work programs and social and livelihood practices.

Other Changes

22. The May 2018 restructuring changed six of the ten IRIs and/or their targets, as summarized in Table 1 below.

23. Procurement of community sub-projects was adjusted to allow the PMU to procure in bulk goods and services only available externally, and pay suppliers directly on behalf of communities, who supplied local materials and labor. This change required revising the Project Operations Manual (POM), but not formally amending the Grant Agreement. Community sub-projects guidelines were further simplified in the revised POM.

24. The LDCF Trust Fund's (TF 016614) closing date was extended twice for a total of 12 months: on May 7, 2019, by six months (from May 31, 2019, to November 28, 2019); and on November 26, 2019, by an additional six months (from November 28, 2019 to May 28, 2020). The GFDRR Trust Fund (TF 16425) closing date was extended once by 22 months, from December 31, 2016, to October 30, 2018.

Table 1: Summary Changes to Intermediate Indicators during the May 2018 Level 2 Restructuring

Original	New/Revised
IRI-1: National Disaster Council (NDC) and NDC Committees operating and effective *(target: work effectively and meet at least once a year)*	**No change**
IRI-2: Integrated National Policy Framework to support mainstreaming resilience across sectors developed, validated and implemented (*target: DRM/CCA mainstreamed satisfactorily in three sectors)*	**Revised:** NDC adopts the Framework for Resilient Development outlined in the 2018 National Disaster Management Plan for integration of disaster and climate risk (*target: Framework adopted)*
IRI-3: Volcanic/Seismic early warning systems installed and operating (*target: 2)*	**Revised target:** 7
IRI-4: Risk management, Geographical Information System (GIS)-based system operating in MECDM (*target: system includes Solomon Islands Government (SIG) graphic and satellite image data)*	**Revised:** MECDM Database for Risk Information System strengthened (*target: database system is strengthened and operational)*
IRI-5: No. of sub-projects completed under community-led DRM/CCA investments (*target: 70)*	**Revised target**: 59
IRI-6: No. of sub-projects completed under provincial government-led DRM/CCA investments *(target: 4)*	**No change**
IRI-7: No. of CBDRM plans developed (*target: 70)*	**Revised target:** 59
IRI-8: Percentage (%) of women involved in village level Sub-project Implementation Committees (*target: 35%)*	**Revised:** % of women involved in decisions during preparation and implementation of community-led projects (*target: 35%)*
IRI-9: Project Coordinating Committee (PCC) meeting at least once a year and providing oversight to project *(target: 5 annual meetings)*	**No change**
IRI-10: Program components managed and monitored effectively *(target: ≥ Satisfactory rating)*	**No change**

Rationale for Changes and Their Implication on the Original Theory of Change

25. Changes made to the project did not materially affect its design, objective or the TOC, but several targets, indicators and procedures were revised after the mid-term review (MTR) to facilitate implementation.

26. The number of target beneficiaries (**PDOI-1**), community-led sub-projects (**IRI-5**) and accompanying CBDRM plans (**IRI-7**) were reduced due to an increased focus on remote and sparsely populated provinces (Temotu, and Rennell and Bellona) considered highly vulnerable to climate and disaster risks.[5] In addition, supplies and technical support mobilization to these sites was expected to result in higher unit costs, requiring a reduced number of community sub-projects (from 70 to 59). The project was still expected to benefit 70 communities, but some water investments in Malaita were combined across several adjacent villages to form provincial-level sub-projects. **IRI-8** was reformulated to reflect early findings that women were engaged in sub-project decisions beyond their membership in Sub-project Implementation Committees (SICs) (see Table 1).

[5] The final choice of communities followed the project's eligibility criteria (as outlined in the POM), which considered: (1) type, severity and frequency of natural hazards; (2) vulnerability; and (3) equity, in terms of population size per number of households served, whether they had other types of assistance, and socio-economic factors, with preference given to more remote communities (not covered by alternative funds). In addition, the PCC considered whether provinces were eligible for the PCDF, and the impact of the 2015-16 drought, which affected, in particular Central Province and the remote provinces of Temotu, and Rennell and Bellona. The list of selected communities and sub-projects was then matched with available budget and implementation capacity.

27. Changes made to **Component A** and **PDOI-3** reflected challenges MECDM encountered in integrating two complex agendas (CCA and DRM) and mainstreaming them into other ministries' programs—particularly budgets—during the project's lifetime. Thus, MECDM decided on a more phased approach to mainstreaming, starting with selected programs in its own divisions and gradually expanding to ministries most impacted by climate-related disasters (such as health, tourism, agriculture and water). By doing so, MECDM expected that lessons learned from its internal mainstreaming, as well as the cabinet-level approval of the 2018 National Disaster Management Plan (NDMP), would provide the right policy incentives for other ministries to incorporate resilience measures. The concept of "*integrated national policy framework to support mainstreaming of resilience across sectors*" stated at appraisal (**IRI-2**) was further clarified and streamlined to "*Framework for Resilient Development*", as envisaged in the 2018 NDMP.

28. Under **Component B**, the project increased the number of volcanic/seismic stations (**IRI-3**) from two to seven in accordance with recommendations of the December 2014 volcanic and seismic needs assessment. The enhanced scope reflected the stations and locations required for a monitoring and warning system covering the entire country. The **IRI-4** modification acknowledged that MECDM already had a risk management system, but that it required further strengthening.

29. The project adopted bulk PMU procurement to improve efficiency and accelerate the community sub-projects, which had progressed slowly due to overly complex community procedures, and logistical difficulties faced in securing materials and contractors in remote locations (see para. 89). Communities remained responsible for sub-project implementation, with the cost of PMU-procured supplies deducted from community grants but specified in sub-project financing agreements (to ensure transparency). Communities continued their involvement in procurement planning, bid evaluation, payment invoice approval, and certifying receipt of materials and construction.

30. Project closing date extensions were justified by the need for additional time to complete sub-projects and ensure operational and maintenance agreements with communities, as well as by severe weather during 2019 which disrupted shipping and flights to project locations (see para. 94).

II. OUTCOME

A. RELEVANCE OF PDO

Assessment of Relevance of PDO and Rating

Rating: Substantial

31. The PDO is aligned with the current Country Partnership Framework (CPF) for FY 2018-2023 (Report No. 122600-SB), but less explicitly than at appraisal. Specifically, the PDO remains aligned with the current CPF's Focus Area 3 "*Managing Uneven Development,*" Objective 3.2 "*Improve access to service delivery in underserved communities,*" which emphasizes fragility reduction through more equitable delivery of social infrastructure and services to rural and peri-urban communities. The CPF also emphasizes tackling fragility drivers by, *inter alia*, addressing climate change and disaster risks, but through a mainstreaming approach, e.g., by consolidating the World Bank-supported community-based programs, and incorporating climate resilience into water supply and major transport infrastructure. Thus, although the current CPF does not refer explicitly to the PDO, the project's short-term outcomes (strengthening government capacity in disaster and climate risk management and implementing DRR and CCA investments in vulnerable rural communities) remain aligned with, and relevant to, the CPF.

32. The PDO is highly relevant to the Solomon Islands' long-term NDS (2016-2035), which has, as one of its five objectives, "*a resilient, and environmentally sustainable development, with effective disaster risk management, response and recovery*". Priority 10 under the Medium Term Development Plan (2016-2020) focuses on improved disaster and climate risk management, including: building capacity at all levels to ensure their routine integration into plans and policies; developing community risk management plans; and using assessments to identify (community) projects that directly address climate and disaster hazards. These activities are at the core of the PDO and the project's short-term outcomes.

33. Globally, CRISP's relevance remains high, given its close alignment with all three objectives of the 2018-22 GEF Programming Strategy on Adaptation to Climate Change and four of its six outcome statements.[6] CRISP's relevance is also high considering the country's risk level: Solomon Islands ranks fourth in the World Risk Index 2019,[7] having very high exposure, susceptibility and lack of adaptive capacity to natural disasters. It also ranks 19th in the 2018 Global Climate Risk Index and, in any given year, 10th in the world in terms of disaster risk from tropical cyclones, earthquakes and tsunamis, relative to GDP (3 percent).[8,9] Earthquake and tsunami losses account for 72 percent of this risk, validating the project's investment choice to upgrade the seismic early warning network.

B. ACHIEVEMENT OF PDO (EFFICACY)

Assessment of Achievement of Each Objective/Outcome

34. Even though the PDO is a single objective statement, three implied medium-term outcomes were considered for evaluation purposes, as measured by the three PDOIs:

- **Outcome 1:** Communities in project target areas benefiting from CCA/DRR investments (measured by PDOI-1);
- **Outcome 2:** Communities demonstrating capacity to implement CBDRM/V&A plans to manage the impacts of natural hazards and climate change (measured by PDOI-2);
- **Outcome 3:** Key ministries integrating CCA/DRM into their operations (measured by PDOI-3).

35. A split rating evaluation was applied to PDOI-1 and PDOI-3, since the target (for PDOI-1) and the formulation (for PDOI-3) were changed during the May 2018 restructuring. PDOI-2 remained unchanged.

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[6] They include **Objective 1** (*Reduce Vulnerability and Increase Resilience through Innovation and Technology Transfer for Climate Change Adaptation*); **Objective 2** (*Mainstream Climate Change Adaptation and Resilience for Systemic Impact*); and **Objective 3** (*Foster Enabling Conditions for Effective and Integrated Climate Change Adaptation*). The relevant outcome statements include **Outcome 1.1** (*Technologies and innovative solutions piloted or deployed to reduce climate-related risks and/or enhance resilience)*; **Outcome 2.1** (*Strengthened cross-sectoral mechanisms to mainstream climate adaptation and resilience*); **Outcome 3.1** (*Climate-resilient planning enabled by stronger climate information decision-support services, and other relevant analysis*); and **Outcome 3.2** (*Institutional and human capacities strengthened to identify and implement adaptation measures*). See *https://www.thegef.org/events/gef-climate-change-adaptation-strategy-2018-2022-ldcf-and-sccf*.

[7] Bündnis Entwicklung Hilft and Ruhr Universität Bochum (2019). *WorldRiskReport 2019*. *https://reliefweb.int/sites/reliefweb.int/files/resources/WorldRiskReport-2019_Online_english.pdf*, and Eckstein et al. (2020). *Global Climate Risk Index 2020.* Germanwatch. *https://germanwatch.org/en/17307.*

[8] World Bank (2015) *Country Note: Solomon Islands.* PCRAFI. Washington. DC. *http://pcrafi.spc.int/documents/185*.

[9] Organization for Economic Cooperation and Development (OECD)and World Bank (2016). *Climate and Disaster Resilience Financing in Small Island Developing States.* Washington DC. *https://www.gfdrr.org/sites/default/files/publication/Final_CDRFinSIDs_20170208_webversion.pdf*.

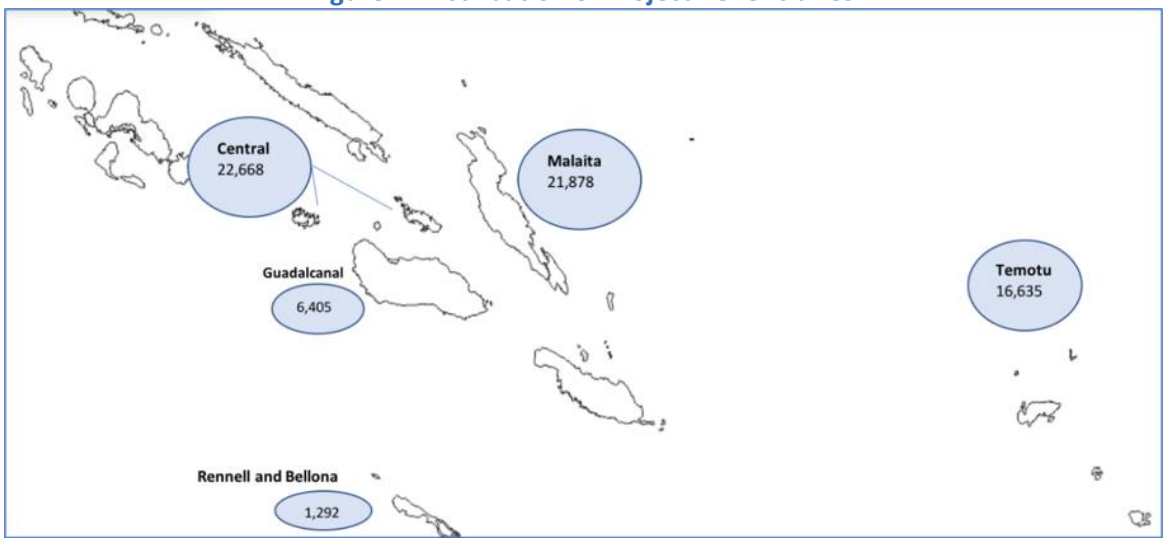
Outcome 1: Communities in project target areas benefiting from CCA/DRR investments

36. According to PMU monitoring records, the project reached 68,878 beneficiaries—87 percent of the original **PDOI-1** target and 129 percent of its revised target. Of these, 33,592 (49 percent) beneficiaries were women, slightly above the 48 percent project target (Table 2). Beneficiaries were spread over five provinces (Guadalcanal, Central, Malaita, Temotu, and Rennell and Bellona), with nearly a quarter located in the last two remote provinces—a significant achievement considering logistical challenges (see Figure 2 and para. 91).

Table 2: Summary of Relevant Indicators, Targets and Actual Values – Outcome 1

Indicators	Baseline	Original Target	Revised Target	Actual Value
PDOI-1: No. of beneficiaries in areas targeted (by the project) benefiting from CCA and/or DRR investments	1,000	79,000	53,400	68,878
% of female beneficiaries	---	48%	48%	49%
IRI-5: No. of sub-projects completed under community-led DRM/CCA investments	Nil	70	59	65
IRI-6: No. of sub-projects completed under provincial government-led DRM/CCA investments	Nil	4	4	5

Figure 2: Distribution of Project Beneficiaries



Map Source: d-maps.com

37. Through its volcanic-seismic monitoring network, CRISP also indirectly benefited around 650,000 people. This national system uses broadband sensors to monitor earthquake tremors across Solomon Islands and as far away as Australia.

38. At the intermediate results level, the 65 community sub-projects fell short of the original **IRI-5** target of 70 but exceeded the revised target of 59, while the number of provincial sub-projects (five) exceeded the **IRI-6** target of four. More than 80 percent of sub-projects involved water, particularly rainwater harvesting, the top priority identified by communities in Malaita, Rennell, and Central Provinces who suffered from water shortages during the dry season. Resilient buildings/evacuation centers, footbridges and shoreline protection works were also financed (see Table 3). The

project also installed safe water systems in two secondary schools and built an elevated dormitory and classroom in two other schools (counted under their respective sub-project types in Table 3).

Table 3: Summary of Community and Provincial Sub-Projects

Types of Sub-Projects	Number	Beneficiaries	Unit Costs (US$)[1]
Community-Level:			
Rainwater Harvest	30	15,527	36,788
Gravity Fed Systems	15	7,505	38,744
Pumped Boreholes/Springs	10	4,435	38,118
Footbridges	2	438	15,472
Resilient Buildings	7	3,978	52,549
Shoreline Protection	1	267	14,726
Sub-Total Community-Level:	*65*	*32,150*	*38,146*
Provincial-Level:			
Rainwater Harvest	2	19,831	138,526
Gravity Fed Systems	2	3,363	98,360
Shoreline Protection	1	13,534	383,510
Sub-Total Provincial-Level:	*5*	*36,728*	*171,456*
Total Sub-Projects	**70**	**68,878**	**47,668**

[1] Average costs per sub-project, including in-kind community contribution (13.8 percent) and RDP2 co-financing for seven of the community sub-projects.

39. Available evidence suggests that the sub-projects helped increase communities' capacity to manage climate and disaster risks, by reducing their potential exposure and/or vulnerability—thus contributing to the PDO.

40. First, the sub-projects were designed with resilient standards that considered *in situ* disaster and climate risks. Water systems considered pre-existing water capacity, rainfall and El Niño Southern Oscillation trends (both historical and expected), and were designed with sufficient storage to operate safely during dry periods: for rainwater catchment systems, an average of 4-5 liters/capita/day (for drinking and cooking); and for gravity-fed systems and pumped boreholes and springs, an average of 20-30 liters/capita/day (for all uses). This represented a three-fold increase from baseline use. Footbridges and buildings were elevated to address flood risks. Shoreline protection works were designed according to maximum breaking wave heights, taking into account cyclone impacts and wave height changes due to sea level rise. Shoreline protection works at Tulagi already demonstrated their impact, protecting the coastal road and foreshore trees during Tropical Cyclone Harold in April 2020.

41. Second, according to the beneficiaries' feedback survey conducted at the end of 2019 (see Annex 6), the sub-projects helped protect them from natural hazards and climate change in multiple ways. For water sub-projects, beneficiaries cited: (1) protection against droughts; (2) access to clean water during floods (compared to previous reliance on muddy or salty spring/well water); and (3) improved personal safety during storms, as they no longer had to venture far to collect water. Recipients from resilient building sub-projects cited intended use as evacuation centers, and temporary shelters for families that lose homes during disasters. Footbridges provided safe access to school children and community members during high tides, storm surges or floods.

42. According to PMU records, 50,661 beneficiaries[10] were given access to safe water, including 26,385 protected from potential water failures during droughts and 1,210 secondary school children able to access, for the first time, safe water year-round; 13,801 benefited from strengthened shoreline protection against storms and sea level rise; 438 benefited from improved access (through footbridges) to schools and markets previously cut off during floods and high tides; and 3,978 gained access to safe buildings, including 224 girl students and 432 primary school students. Disaster evacuation capacity also increased by 928 people.

43. The project also contributed to improving community welfare and economic development (**a longer-term TOC outcome**). Beneficiary survey respondents cited, in particular: (1) improved health and hygiene from cleaner drinking and

[10] The PMU considered all individuals in targeted communities as beneficiaries, since the sub-projects were designed to benefit the entire community. However, the breakdown in para. 42 accounts for those who received the specific resilience benefits mentioned.

cooking water and more water for bathing and sanitation; and (2) significant time savings (on average 83 minutes/person/day) from no longer having to fetch water far from homes. Approximately 55 percent of respondents used this time to supplement their income through increased fishing, garden, food and artifact sales, resulting in incremental household income ranging from Solomon Island Dollars (SI$) 780/year for vegetable sales to SI$5,200/year for fishing—equivalent to 1-8 percent of average household income in target provinces, up to 2-34 percent for those in the poorest quartile, and benefiting about 2,800 households.[11] These livelihood benefits also indirectly contributed to increasing beneficiaries' financial capacity to manage disaster and climate impacts.

Outcome 2: Communities demonstrating capacity to implement CBDRM/V&A plans to manage the impacts of natural hazards and climate change

44. The PAD proposed measuring **PDOI-2** as the "*percentage of targeted communities assessed with CBDRM plan satisfactorily implemented based on a scoring system.*" Satisfactory implementation referred to sub-projects prioritized through CBRM/V&A plans,[12] but the planning process was also expected to result in better community knowledge and awareness (of natural hazards and climate change risks), thereby contributing to the PDO as well.

45. The PAD suggested two methodologies to measure PDOI-2 (see para. 96). However, neither could be applied, the first due to an inherent design flaw, and the second because the project never developed a scoring system to measure community capacity gains (see M&E design). As such, Outcome 2 was assessed by triangulating several proxies: (1) percentage of beneficiaries satisfied with sub-project implementation; (2) percentage of target communities demonstrating capacity to implement their top priority resilient investment (as identified by CBDRM/V&A plans); (3) extent to which CBDRM/V&A plans and sub-projects helped build community capacity to manage disaster and climate risks; and (4) achievement of relevant IRIs (Table 4).

Table 4: Summary of Relevant Indicators, Targets and Actual Values – Outcome 2

Indicators	Baseline	Original Target	Revised Target	Actual Value
PDOI-2: Percentage of target communities demonstrating capacity to implement CBDRM/V&A plans to manage the impacts of natural hazards and climate change	Nil	70%	70%	Substantial (measured by proxy)
IRI-7: No. of CBDRM plans developed	Nil	70	59	70
IRI-8: Percentage of women involved in village-level SICs	Nil	35%	35%	38%

46. Beneficiaries' satisfaction with their sub-projects was high, based on the 2019 survey of 103 beneficiaries from 23 sub-projects (see Annex 6). Of the total respondents, 86 percent reported being Very Satisfied, and 7 percent Satisfied (Figure 3). This high degree of satisfaction was evident in all sub-project types, although for recipients of gravity-fed systems, it was slightly lower—79 percent Very Satisfied.[13] Amongst all water sub-projects recipients, 89 percent felt Very Satisfied with water quality, while 66 percent were Very Satisfied with water quantity (Figure 4), primarily due to a perceived insufficiency (amongst some respondents) of tanks/taps to cater to all users. Respondents also unanimously agreed that sub-projects had been a high priority and fully reflected their needs.

[11] ICR team estimates, based on reported incremental income from time savings in water sub-projects and from marketing in areas served by footbridges and shoreline protection. Average household income is from the 2012/13 Household Income and Expenditure Survey (see Footnote 24).

[12] Plans and sub-projects (not the communities) were expected to manage the impacts of natural hazards and climate change.

[13] Respondents from a single community (Kwa'aneone in Malaita) reported satisfaction levels of 3.8 (between "Indifferent" and "Satisfied") due to a perception that water tanks were insufficient to cater to its total population.

Figure 3: Overall Satisfaction with Sub-Projects

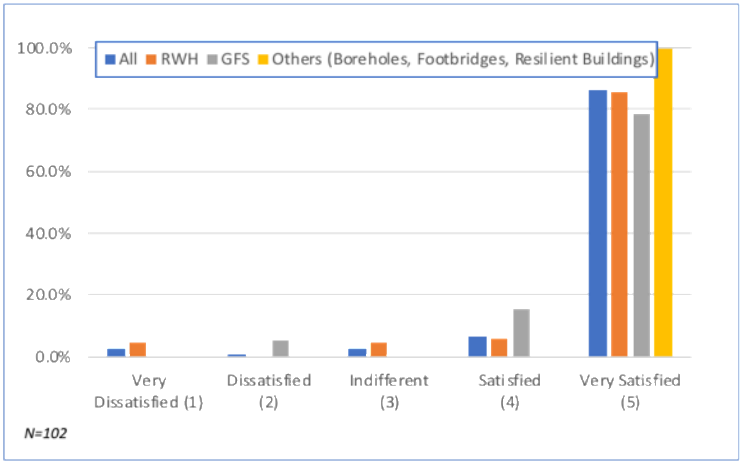
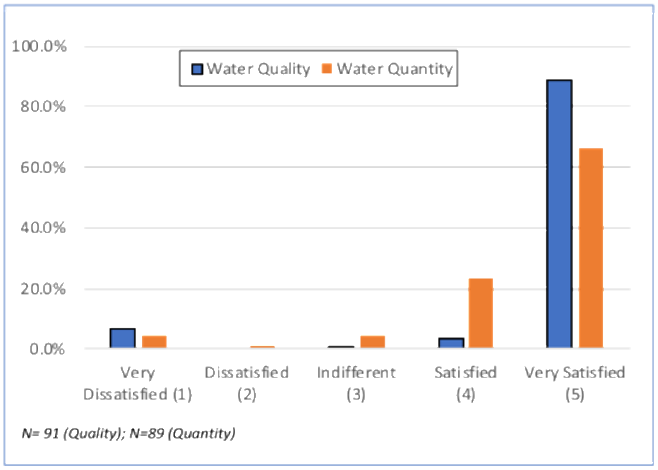


Figure 4: Satisfaction with Water Quality and Quantity



47. In total, 63 of 65 communities (97 percent) implemented their top priority investments—those identified in their CBDRM/V&A plans as addressing "very high" vulnerability, and "extreme risk" of natural hazards and climate change—and demonstrated substantial capacity in doing so, albeit with PMU financial and technical support. The remaining two communities were only able to implement the second highest priority in their CBDRM/V&A plans due to cost constraints.

48. Target communities contributed local materials and labor and, according to the beneficiary survey and site visits, were actively engaged in sub-project planning, implementation and maintenance. Among communities surveyed, 77 percent stated their SICs had worked well, overseeing the work of community groups—such as digging, collecting and transporting local materials—calling for updating meetings, ensuring proper water use and organizing maintenance (including fundraising). About 82 percent of respondents also stated their sub-projects were implemented as expected. Aspects that worked particularly well included community collaboration and instilling of pride and ownership (in some cases involving men, girls, women and the elderly working together); good community organization and clear task allocation (such as work responsibilities by zone and gender, with women contributing food, and men doing the physical work); and youth participation.

49. There is also evidence that the project helped build community capacity to manage disaster and climate risks, both by reducing exposure and/or vulnerability through the sub-projects (as outlined in paras. 40 and 41) and by raising community awareness and knowledge through the CBDRM/V&A process, which involved at least five rounds of community consultations.[14] Beneficiary survey respondents who participated in the consultations reported learning how climate change and disasters affected their lives, including how sea level rise and storm surges were eroding their beaches. They also learned how to keep safe from floods and tsunamis; manage food security and use water wisely during disasters;

[14] The CBDRM/V&A process involved the following steps: (1) **Scoping**, a desktop community selection based on eligibility criteria (see Footnote 5) and consultation with relevant authorities, as well as recommendations from provincial governments approved by the PCC (for provincial sub-projects); (2) **Collection of baseline data** through existing reports, spatial data, household surveys and questionnaires; (3) **Assessment**, through expert site observation, focus group discussions with women, men and youth, and hazard and vulnerability mapping; (4) **Interactive Voice Response analysis** to determine the scale of impact, and community vulnerability and risk levels; and (5) **Response,** a participatory Community Action Plan identifying priority CCA/DRR actions, ranked by type of threat, vulnerability and risk. In addition (6) a **handover ceremony and participatory operation and maintenance plans** were agreed at sub-project completion. See Solomon Islands Government (2015). *SICVRM Training Manual.* Community Resilience to Climate and Disaster Risk in Solomon Islands Project.

and how to build more resilient housing. These responses suggest that some adaptive knowledge acquired through the CBDRM/V&A process transcended what they learned through their sub-projects alone. Several respondents mentioned, however, having forgotten the details of what they learned long ago, highlighting the importance of refresher training.

50. To further complement the efficacy assessment, the beneficiary survey asked respondents a series of questions aimed to capture various dimensions of perceived resilience capacity[15] (see Box 6.1, and Section D, Annex 6). **Adaptive learning** had the highest rating, with 77 percent agreeing, or strongly agreeing, that they "*had learned considerably from how (they) dealt with past disasters (which) is crucial in successfully dealing with future events*." In addition to past events, many respondents mentioned their sub-project experience as contributing to their confidence to deal with future events. About half also agreed or strongly agreed they would have sufficient **adaptive capacity** to handle a future event in the next five years. By contrast, respondents rated their coping, financial and transformational capacity poorly, primarily because they felt they needed substantial time to recover from disasters, had no savings, and very little cash income.

51. In terms of **IRIs**, CRISP met the original target of 70 CBDRM plans **(IRI-7)** and exceeded the revised target of 59 by 19 percent (Table 4). The project completed CBDRM/V&A plans for all 65 targeted communities and standalone vulnerability assessments for the five provincial sites. With 38 percent women representation in SICs, the project exceeded the original **IRI-8** target of 35 percent. Beneficiary survey feedback suggests women were actively involved in all implementation stages (see para. 76) and that the **revised IRI-8** target was also met.

52. In conclusion, the combined evidence presented above indicates that CRISP increased the targeted communities' capacity to manage natural hazards and climate risks (the **PDO**)—both through enhanced knowledge and awareness of risk management, as well as through risk reduction investments. Beneficiaries' resilience perceptions also suggest that CRISP contributed, along with other factors, to strengthening resilience capacity in target communities (the **second long-term TOC outcome**)—particularly in adaptive learning and, to a lesser extent, adaptive capacity. Nonetheless, feedback also indicates that communities will continue to need substantial financial and technical support to manage other climate and disaster risks in the future (see Section IV.D).

53. The above evidence also shows the project's contribution to **LDCF programmatic outcome 2.1** *"Increased knowledge and understanding of climate variability and climate induced threats"* and, to a lesser extent **LDCF programmatic outcome 2.2** "*Strengthened adaptive capacity to reduce risks to climate induced economic losses*" two of the three global outcomes which the project planned to contribute at appraisal (see Footnote 1).

Outcome 3 – Key ministries integrating CCA/DRM into their operations

54. The project helped three ministries—MECDM, Ministry of Health and Medical Services (MHMS), and Ministry of Mines, Energy and Rural Electrification (MMERE)—to incorporate selected climate and disaster risk management activities in their work programs (**revised PDOI-3** target achieved). However, the evidence for mainstreaming in their budgets is less compelling, given the lack of sufficient budgetary breakdown. Therefore, the **original PDOI-3** target can only be considered partially achieved. Table 5 summarizes achievement of relevant PDOI and IRIs.

[15] Using beneficiaries' perceptions of resilience capacity is considered a valid assessment method since adaptive capacity is heavy influenced by psychological factors, such as risk perception, degree of awareness, and personal or cultural values. By contrast, assessing adaptive capacity through objective measures requires extensive data on multiple variables and relies on external judgement, which does not necessarily yield a more accurate result. Beneficiary resilience perceptions, however, can be influenced by past experience (unrelated to the project), making attribution challenging. See Jones, L. and T. Tanner (2015). *Measuring Subjective Resilience*. ODI Working Paper 423. A similar survey of perceived adaptive capacity was used in the Vanuatu IRCCNHP evaluation (P112611; ICR 4558).

Table 5: Summary of Relevant Indicators, Targets and Actual Values – Outcome 3

Indicators	Baseline	Original Target	Revised Target	Actual Value
PDOI-3: *(original)* – No. of ministries with annual work plans and budget that integrate CCDRM measures *(revised)* – No. of ministries with activities in their annual work programs including resilience measures for climate/disaster risk	Nil	3		Three with measures integrated into annual plans (budget allocations unknown)
IRI-1: NDC and NDC Committees operating and effective	Not operational	Committees working effectively and meeting at least once a year		Complied with target
IRI-2: *(original)* – Integrated National Policy Framework to support resilience mainstreaming across sectors developed, validated and implemented *(revised)* – NDC adopts Framework for Resilient Development, outlined in the 2018 NDMP	Separate DRM and CCA strategic plan	DRM/CCA mainstreamed satisfactorily in three sectors	Framework adopted	Mainstreaming starting in three sectors; NDMP adopted
IRI-3 Volcanic/seismic early warning systems installed and operating	Nil	2	7	7
IRI-4: *(original)* – Risk management, GIS-based system operating *(revised)* – Database for Risk Information System strengthened	Limited data	System includes SIG photographic/ satellite data	System strengthened and operational	Database and system strengthened and operational

55. At **MECDM**, the project helped clarify and separate NDMO responsibilities for disaster management (preparedness, response and recovery) from those of the Climate Change Office (climate and disaster resilience). Specifically, the project helped revise the NDMP, approved by the Cabinet on February 16, 2018. The revised plan clarified the functions of the National Disaster Council (NDC) and Provincial Disaster Officers and established six sectoral coordinating committees. CRISP also helped draft an amendment to the NDC Act of 1979[16] to further cement institutional roles. The revised structures were piloted during the December 2016 earthquake and Tropical Cyclone Donna in May 2017 and used during subsequent natural disasters, and more recently during the response to the coronavirus disease 2019 (COVID-19) (thereby meeting **IRI-1**). The NDMO is currently completing the plan's provincial-level roll-out, including establishing community climate and disaster committees.

56. At appraisal, the project envisaged developing an Integrated National Policy Framework to support mainstreaming resilience across sectors (**original IRI-2**), but progress stalled due to lack of readiness by the various ministries to accept a framework they viewed as encroaching on their mandates and increasing their responsibilities. However, the project supported the preparation of a position paper for the framework, the elements of which were included in the new NDMP and noted by the Cabinet in its February 16, 2018 meeting minutes (partially meeting **revised IRI-2**). The project further helped strengthen MECDM's Risk Information Management Database (meeting **revised IRI-4**) by: (1) integrating CBDRM/V&A community and provincial-level assessments; (2) streamlining post-disaster impact assessment data and mapping; and (3) training seven MECDM staff. MECDM is currently using the database for emergency planning and response work (as with Tropical Cyclone Harold in 2020).

57. There is robust evidence that the above activities were integrated into MECDM annual plans (**revised PDOI-3**). Under NDMO activities and outputs, the Solomon Islands 2019 Budget statement lists the "*development and implementation of provincial disaster management plans*" and "*NDMP 2017 fully advocated and understood by users*". Under MECDM's Climate Change Division, the Budget statement lists "*new National Climate Change Resilience Framework draft submitted to Cabinet*" and "*collection and updating of primary data in Geographical Information System".* The 2020

[16] The International Federation of Red Cross is supporting the Act's revision.

Budget statement further specifies seven provincial disaster management plans aligned with the 2018 NDMP, and operational systems for national and provincial emergency committees. However, annual budgets for these activities cannot be assessed, as the Budget statement only provides aggregated totals for a responsible unit.

58. Within **MHMS,** the project: (1) developed a screening tool and guide for risk proofing investments; (2) completed risk maps and a vulnerability index for health facilities in Guadalcanal and Central Provinces; (3) collaborated with the Health Promotion Division and the Rural Water Sanitation and Hygiene Programme on radio awareness programs (focusing on risk and climate resilience in community water use and hygiene); and (4) helped prepare an advisory health risk resilience brochure for 10 provinces, with support from provincial health promotion officers.

59. MHMS incorporated some of these activities into its program: the 2016-2020 National Health Strategic Plan, Outcome Statement 15 specifies that "*Solomon Islands health (system) is prepared for disasters, outbreaks, and emerging population health issues.*" The 2020 Budget statement cites, as MHMS outputs: "*facilitate and coordinate radio health programs*"; "*health information correctly recorded and disseminated*" (in partnership with the Climate Change Division); "*provincial emergency plans developed*"; and "*environmental health (…) targeted to the most at need provinces".* However, as for MECDM, MHMS annual budgets are not broken down sufficiently to permit expenditure monitoring.

60. Within **MMERE's** Geological Survey Division—responsible for seismic and volcanic monitoring—the project helped establish a new national geohazard monitoring network to provide real-time data on earthquakes, tsunamis and volcanos. Specifically, the project: (1) installed and equipped new seismic stations in six provinces (Temotu, Central, Malaita, Isabel, Makira, and Rennell and Bellona) and upgraded the Honiara-Guadalcanal base station[17]; (2) helped establish a monitoring center in Honiara; (3) provided training on operation and maintenance; and (4) installed two automated rain gauge systems within seismic stations, thus contributing to the national multi-hazard early warning system. The seismic system was officially registered with the World-Wide Standard Seismological Network (headed by the United States Geological Survey) and is aligned with the Oceanic Regional Seismic Network, which links seismic networks in the South West Pacific. The seven stations surpassed the original **IRI-3** target of two stations and met its revised target of seven.

61. National budget statements clearly show that MMERE assimilated this assistance, with a new 2020 activity titled "*Seismological and volcanology surveillance and network monitoring in Solomon Islands*". The Geological Survey Division's budget increased from the previous year, from 4.7 percent of MMERE's 2019 recurrent budget to 7.4 percent in 2020. However, fully attributing this increase to the new network costs is not possible due to a lack of budgetary breakdown.

62. The above achievements—in particular strengthened DRM coordination at the national, provincial and community levels; capacity gained in CBDRM and risk-based assessments; community health resilience awareness campaigns; and improved seismic and volcanic early warning—are directly relevant to the **PDO**, as they help build long-term community resilience capacity. In addition, the project contributed, albeit only initially, to the **first TOC's long-term outcome** "*Planning and investment decisions at the central and local government take into consideration climate and disaster risk*". For the reasons provided above, the project's contribution to **LDCF Outcome 1.1.**"*Mainstreaming adaptation in broader development frameworks*" remains incipient.

Justification for Overall Efficacy Rating

Overall rating before restructuring: Modest
Overall rating after restructuring: Substantial

[17] Previously, according to PMU sources, Solomon Islands had three government-owned stations, but they were not operational. It also had seven seismic stations from a separate Taiwanese network.

63. Based on the above evidence, project efficacy is rated **Modest** before restructuring and **Substantial** after restructuring. The *before restructuring rating* is affected by a slight underachievement in the number of beneficiaries relative to the original Outcome 1 target, as well as lack of clarity regarding the extent to which the targeted ministries reflected the assimilated CCDRM activities in their budgets (Outcome 3). The *after restructuring rating* is justified by the solid achievements in the revised Outcome 1 targets, as well as by complementary evidence that the sub-projects incorporated CCA/DRM resilient standards and provided both resilience and development benefits. Achievement of Outcome 2 (which best reflects the PDO) was also significant, based on the evidence of acquired community capacity through participation in the CBDRM/V&A process as well as through their resilient investments. Finally, robust evidence shows assimilation of project-led outputs in the annual work programs of the three ministries (revised Outcome 3).

C. EFFICIENCY

Assessment of Efficiency and Rating

Rating: Substantial

64. Efficiency is rated **Substantial** based on: (1) a comparison of economic internal rates of return (EIRRs) at appraisal and completion stages, showing similar and acceptable EIRRs; (2) an ex-post cost-benefit analysis covering 77 percent of project costs, showing significant and robust net benefits; (3) substantial cost effectiveness of sub-projects; and (4) project implementation efficiency. Although engineering and supervision overheads were relatively high, they contributed to the sub-projects' quality and substantial net benefits. Annex 4 describes, in detail, the assumptions used.

Economic Analysis

65. **Comparison of EIRRs at Appraisal and Completion**. The estimated EIRRs at appraisal and completion were similar, although only a small number of sub-projects could be directly compared. The PAD's economic analysis assumed most community sub-projects would involve retrofitting, strengthening or relocating pre-existing infrastructure vulnerable to disasters. EIRRs varied based on retrofitting costs as a proportion of the structures' replacement value and their economic life (assumed to be half of design standard). At completion, however, only two of the 70 sub-projects—a primary school and a community shoreline protection—involved retrofitting and could be directly compared with appraisal estimates (all others were new investments). Both had a 20-year design standard, with strengthening costs amounting to 37.9 percent and 40.9 percent of replacement value, respectively. The ex-post EIRR was **17.0 percent** for the school (compared to **10.0-17.3 percent** at appraisal for similar assumptions) and **11.6 percent** for the community shoreline protection sub-project (compared to **10.0 percent** at appraisal).

66. **Cost-Benefit Analysis at Completion.** A comprehensive cost-benefit analysis was carried out at completion for all 70 sub-projects, grouped by type. **Economic costs** included all project costs attributed to the sub-projects, including goods and works, as well as grants given directly to SICs; estimated community (in-kind) contributions; RDP2 co-financing (where applicable); and routine and periodic maintenance. Taxes were excluded. **Economic benefits** were derived from detailed interviews in sample sub-projects sites, complemented by beneficiary survey results, expert judgement and secondary data. They included: reported incremental revenues from time savings in water sub-projects; incremental access to markets for footbridges; and rental revenue for evacuation centers. Where possible, non-market benefits were also estimated using established methodologies for avoided damages and losses, and opportunity costs of time saved. For sub-projects that improved access to schools (such as footbridges) or students' performance (such as more resilient schools), the value of incremental education on students' future earning potential was also estimated. Finally, as costs imputed by the PMU to individual sub-projects excluded site preparation and oversight (Component C.1) and project management

(Component D) which were pooled across all sub-projects, a total EIRR was computed considering all sub-project benefits against all Component C and D costs (see Table 6). The analysis is conservative since it does not consider other potential benefits, such as improved early warning due to strengthened geohazard monitoring network.

Table 6: Summary of Project Cost-Benefit Analysis at Completion

	EIRR	NPV (at 6%) in US$'000	% of Total Project Costs	Sensitivity Analysis (EIRRs)		
				+25% Costs	– 25% Benefits	Net Benefits Declining over 10 Years
Total for Components C and D	18.2%	$5,765	77.4%	14.0%	12.9%	4.0%
By Sub-Project Type:						
Rainwater Harvest	55.4%	$4,849	15.1%	43.9%	41.0%	42.6%
Gravity-Fed Systems	40.6%	$2,701	8.6%	32.0%	29.9%	26.0%
Pumped Boreholes/Springs	43.1%	$1,236	3.6%	33.6%	31.2%	27.9%
Footbridges	21.9%	$40	0.3%	16.7%	15.3%	10.7%
Evacuation Centers	18.5%	$218	2.5%	12.4%	10.8%	<0.0%
Shoreline Protection	40.1%	$402	4.4%	27.6%	24.1%	30.1%
Schools	18.8%	$655	2.4%	16.2%	15.4%	14.1%

67. The results (Table 6) confirm the substantial qualitative benefits reported by the survey respondents. The **overall EIRR** for Components C and D was **18.2 percent** at project completion, with a **net present value (NPV) of US$5.8 million** (at 6 percent discount rate), covering **77.4 percent of total project costs**. The cost-benefit analysis excluded national-level components (A and B), as their emphasis on institutional and technical assistance make it difficult to quantify benefits. However, adding costs for these two components would result in an overall project EIRR of 13.7 percent (NPV of US$4.5 million), even in the absence of any related benefits. EIRRs for individual sub-projects ranged from 40.6 percent to 55.4 percent for water sub-projects, and 18.5 to 40.1 percent for other sub-project types, slightly higher than those in comparable projects.[18] EIRR estimates are fairly robust to a 25 percent increase in costs and a 25 percent decrease in benefits, as well as to a scenario where net benefits decline progressively over a 10-year period due to weak maintenance, except in the case of evacuation centers and the project total. The latter reflects primarily the frontloading of project management costs in initial years relative to when benefits started accruing.

68. **Cost-Effectiveness Analysis.** At appraisal, CRISP aimed to reach 79,000 beneficiaries at a cost of US$6.33 million, including sub-project preparation and oversight—an average of US$80 per beneficiary. The completed project was slightly more efficient, reaching 68,878 beneficiaries at a cost of US$5.45 million (US$79/beneficiary), *despite* heavy oversight, amounting to 43 percent of Component C costs (against 25 percent estimated at appraisal). Without counting oversight, sub-project costs were substantially more efficient (US$45/beneficiary) than appraisal estimates (US$60/beneficiary). This is noteworthy given limited suppliers in, and high transportation costs to many of the project's remote locations.

69. Individual sub-projects were generally cost-effective, albeit with variations according to type. Without accounting for community contributions or RDP co-financing, unit costs averaged US$40,496 at completion, 12 percent below the original engineer estimates, with community rainwater harvesting, gravity-fed systems and footbridges being the most efficient, at 17-21 percent below original estimates. Nevertheless, resilient buildings and provincial shoreline protection

[18] The Vanuatu IRCCNHP (P112611) yielded EIRRs at completion of 11-33 percent for water sub-projects, 13 percent for community centers and 42 percent for feeder roads. The Solomon Islands RDP(P089297) yielded 21-39 percent for water sub-projects, 11 percent for community centers sub-projects and 49 percent for footbridges at completion. The Kiribati Adaptation Program – Phase III Project (P112615) yielded EIRRs of 38 percent for small rainwater harvest sub-projects and 10 percent for seawalls. The latter is comparable to the EIRR obtained for the single community shoreline protection funded by CRISP (11.6 percent).

in Tulagi exceeded original estimates by 10 and 6 percent, respectively, due to unforeseen expenses. Compared to similar projects, the costs of evacuation centers (US$245/m^2) were similar to RDP's community halls (US$253/m^2) and lower than Vanuatu's IRCCNHP multipurpose centers (US$647/m^2). Water sub-projects costs are more difficult to compare across projects, as they depend on the system type and number of tanks/taps installed. However, costs per beneficiary averaged US$50 for CRISP, against US$46 for RDP and US$87 for IRCCNHP. Footbridge costs (US$15,472/unit) compare favorably with three footbridges already completed by RDP (US$20,509/unit).

Implementation Efficiency

70. **Aspects of Design and Implementation that Influenced Efficiency**. Sub-project implementation did not begin in earnest until 2017, due to overly complex procedures for community grants that required lengthy acquittal processes (see para. 89). Once the project was restructured and bulk procurement adopted, implementation proceeded smoothly, averaging 11.2 months for all CRISP-led sub-projects. This is comparable to Vanuatu's IRCCNHP (11 months) and shorter than RDP2 (about 17 months).[19] In the beneficiary survey, 55 percent of respondents felt their sub-project was implemented as quickly and efficiently as possible, with respondents from Temotu, in particular, praising the project for respecting the promised time frame given that ships delivering materials only arrived every two to four months (see Annex 6). Some 40 percent, however, felt that faster progress could have been achieved had the PMU done all procurement from the start, avoided split shipments, and deployed more supervisory staff to Temotu (which was eventually done).

71. **Administrative Efficiency**. Project management costs amounted to 17 percent of total costs, higher than estimated at appraisal (10 percent) but lower than under RDP (20 percent) and IRCCNHP (31 percent). This is comparable to similar projects involving community CCA/DRM,[20] and is justifiable given the one-year project extension and fiduciary needs.

72. The project did not carry out a separate GEF incremental or additional cost analysis at appraisal.

D. JUSTIFICATION OF OVERALL OUTCOME RATING

Rating: Moderately Satisfactory

73. The project's overall outcome rating is **Moderately Satisfactory** based on the split rating method, which considered efficacy before and after restructuring. Relevance and efficiency ratings are the same in accordance with ICR guidelines. Calculations are summarized below.

		Before Restructuring	After Restructuring
Relevance of PDO		**SUBSTANTIAL**	
Efficacy (PDO):		**MODEST**	**SUBSTANTIAL**
Efficiency		**SUBSTANTIAL**	
1	Outcome ratings	Moderately Unsatisfactory	Satisfactory
2	Numerical value of outcome ratings*	3	5
3	Disbursement (US$ million)	4.7	4.4
4	Share of disbursement	51.6%	48.4%
5	Weighted value of outcome rating	1.5	2.4
6	**FINAL OUTCOME RATING**	**MODERATELY SATISFACTORY** (1.5+2.4 = 3.9 rounded to 4)	

**Note:* Highly Unsatisfactory (1); Unsatisfactory (2); Moderately Unsatisfactory (3); Moderately Satisfactory (4); Satisfactory (5); Highly Satisfactory (6)

[19] Based on IRCCNHP sub-project records, and a sample of 53 completed RDP sub-projects, per its monitoring tool *http://sirdp.org.sb/*.

[20] Project management costs amounted to 15 percent in the São Tomé and Príncipe Adaptation Project (P111669), and 21 and 12 percent, respectively in Phases II and III of the Kiribati Adaptation Program (P089326 and P112615).

E. OTHER OUTCOMES AND IMPACTS

Gender

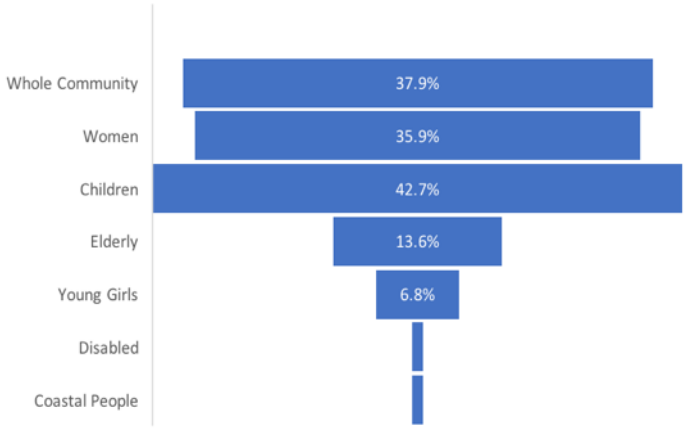
74. CRISP engaged women through SICs, as well as through sub-projects. In addition, women were major sub-project beneficiaries, through livelihood improvements, increased spare time, and enhanced community engagement.

75. With women representing 49 percent of beneficiaries and 38 percent of SIC membership, the project slightly exceeded its gender targets (48 and 35 percent, respectively). However, this masked considerable variations among SICs: two communities sampled reported no female SIC members, while two-thirds had two or more. Women acted primarily as treasurers, secretaries or technical members, with only one SIC chaired by a woman. However, up to 85 percent of survey respondents mentioned active participation of women in SICs, where they voiced their opinions, organized community works, provided information and raised funds. In communities where the SIC's role was replaced by a lead individual (e.g., school principal in Siota or religious teacher in Emua) or where decision making was strongly patrilineal, women's contributions were viewed as more muted.

76. In addition to their role in SICs, women were actively involved in all sub-project stages. According to the beneficiary survey, women "voiced their views strongly" in **sub-project proposal discussions**, particularly to prioritize water and select SIC members. Even in highly patrilineal communities, women were said to have presented their priorities through their husbands and influenced men's decisions. During **implementation**, women helped carry gravel, sand, stones and timber to worksites, and provided food and water to workers, even reportedly helping with digging and land clearing at some sites. Finally, they played key roles in **maintenance** by: cleaning, weeding and beautifying areas around water tanks, taps, footbridges and community halls; preventing children from wasting water or damaging taps; organizing family maintenance groups; and raising funds.

77. Women, along with children, were perceived to be among the major beneficiaries of sub-projects (see Figure 5). For example, they particularly benefited from the installation of water taps close to their homes, as collecting water, often from distant sources, was no longer necessary. Thus, the sub-projects freed up a considerable amount of time, enabling them to: earn incremental sales from gardens or fishing; rest and relax, and experience less family stress (particularly with children and care for the elderly); and engage more in community activities (see para. 43). The project also increased women's personal safety, particularly during droughts and storms, as they no longer had to venture far for water. Notably, 94 percent of women reported being highly satisfied with water quality, against 84 percent of men, possibly reflecting their roles in children's health. At the same time, overall satisfaction with sub-projects was higher for men than for women (90 against 82 percent), possibly reflecting women's higher expectations.[21]

Figure 5: Main Perceived Beneficiaries from the Sub-Projects



Source: Beneficiary Survey. Responses do not add up to 100 percent as most respondents identified more than one group.

[21] This finding was also evident in a separate (unpublished) analysis of 53 completed RDP2 sub-projects, undertaken by the authors.

Institutional Strengthening

78. At the **national level**, the project: (1) funded the NDMP revision (see para. 55), helping to strengthen cross-sectoral and multi-level disaster coordination, which had historically been weak;[22] (2) strengthened MECDM's capacity to centralize natural hazards, vulnerability and socio-economic information in a Risk Information Management Database linked to the Solomon Islands Government Network (SIG-Connect); and (3) improved the national multi-hazard early warning system by funding the country's first geohazard monitoring network (para. 60) and training officers from the Information and Communication Technology Support Unit. Finally, the project built on-the-job capacity for national engineers in shoreline protection and water system design, taking into account disaster risk and climate parameters and cross-experiences from the Philippines, Kiribati and Samoa.

79. At the **community level**, working side-by-side with CRISP's experts and contractors helped build local capacity for social infrastructure. Beneficiaries participating in the CBDRM/V&A consultations also reported learning considerable skills in disaster and climate risk management (see para. 49).

Poverty Reduction and Shared Prosperity

80. The project did not have a specific poverty reduction focus: Malaita, Central, Rennell and Bellona, and Temotu are not among the country's poorest provinces.[23] However, poverty in Solomon Islands is mostly rural, and associated with self-employment and low education levels (World Bank 2015).[17.] The project communities follow this pattern, with 48 percent of beneficiaries surveyed reporting only some primary education. In addition, all project communities were highly vulnerable to climate change and disasters—in particular, the migrant communities in Temotu and in Langa Langa lagoon (Malaita) which lacked access to alternative lands, or land-based natural resources.

81. The project still contributed to poverty reduction in three ways: directly, through increased access to cash income; and, indirectly, through education, and by reducing the risk of asset losses during disasters. The contribution to incremental cash income is estimated to be between SI$320-5,200 (US$39-628) per household per year, benefiting some 2,800 households, and equivalent to 2-34 percent of the bottom quartile of annual household income for project provinces (see para. 43)[24]. The project's impact on students' future income—due to better school infrastructure and water security— is estimated at SI$4,340 (US$524) per year for students transitioning to secondary schools and SI$27,200 (US$3,285) per year for those transitioning to regional universities (see Annex 4). Even though the estimated number of student beneficiaries was small (about 12 a year), the estimated impact on future earnings is as high as 29 percent (secondary schools) and 178 percent (regional universities) of the bottom quartile households' average annual income.

82. According to the beneficiary survey, the project yielded broad-based benefits–particularly towards vulnerable groups such as women, children and the elderly–with little evidence of elite capture. When asked who had benefitted most from the sub-projects, 38 percent of respondents identified the entire community, 36 percent cited women, 43 percent mentioned children, and 14 and 7 percent mentioned the elderly and young girls, respectively. Most respondents cited a combination of these groups (see Figure 5 above).

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[22] GFDRR, World Bank and SOPAC (undated). *Reducing the Risk of Disasters and Climate Variability in the Pacific Islands. Solomon Islands Country Note.* GFDRR. Washington, D.C.

[23] The poorest provinces are Guadalcanal and Makira, according to the World Bank (2015). *Solomon Islands Poverty Profile Based on the 2012/13 Household Income and Expenditure Survey.* Washington, D.C.

[24] Solomon Islands National Statistics Office (2015). *Solomon Islands 2012/13 Household Income and Expenditure Survey. Provincial Analytical Report.* The income for the bottom quartile was weighted by the proportion of beneficiaries across the five project provinces and converted into 2020 values by the 2012=100 Consumer Price Index. Incremental cash income was derived from the economic analysis (see Annex 4).

III. KEY FACTORS THAT AFFECTED IMPLEMENTATION AND OUTCOME

A. KEY FACTORS DURING PREPARATION

83. **Simple design, anchored on lessons learned.** CRISP's design was relatively simple and well anchored on tested activities, procedures and capacity. It relied heavily on the pilot experiences of RDP and the PHDR-funded project, with its components constituting a logical continuation of the PHRD-funded project. It also relied on the PCDF[25] for the design of provincial sub-projects.

84. **Solid institutional and policy assessment.** MECDM was committed to integrating CCA and DRM into a single policy and institutional structure, but had low staff numbers and fragmented capacity, exacerbated by some 17 donor-funded climate adaptation and mitigation projects. To address this and to support resilience mainstreaming, MECDM and the Ministry of Development Planning and Aid Coordination set up a Climate Change Working Group, and the NDMO hired ten Provincial Disaster Officers. Due to lack of space, however, many of them remained in Honiara and became part of the PMU. Thus, implementation arrangements were relatively manageable within the PMU structure, and had solid links to ongoing community, provincial and national efforts.

85. **Focused objective, but flawed logical flow.** The PDO was focused and realistic, but the operational logic had two main flaws: First, it assumed communities would strengthen disaster and climate risk management by implementing various parts of their CBDRM/V&A plans (i.e., through a *process*) modeled on the Samoa and Kiribati experiences.[26] However, this overlooked the fact that in these countries, actual implementation was mostly limited to single priority investments during the projects' lifetime—i.e., communities acquired adaptation capacity primarily through an *output*. Second, the PAD should have established clearer links between national-level activities and the PDO (see para. 95).

86. **Simple results framework, but incomplete monitoring plan.** The results framework was designed to be simple and largely baseline independent. However, two of the PDOIs required a screening tool or scorecard, the development of which was relegated to the implementation phase (see para. 99).

87. **Adequate risk assessment, with flexibility built into fiduciary risk mitigation.** The PAD candidly assessed project risks as substantial and implementing agency's risk as high, due to MECDM's low staff numbers and lack of experience with the World Bank. To mitigate these risks, the PAD offered a solid mitigation plan with practical and stepped-up solutions, including PMU-led bulk procurement in case communities lacked capacity, as well as reinforced financial advice and World Bank procurement and engineering support in the project's first year. All these were eventually needed.

88. **Readiness for implementation.** With the exception of the POM and the two PDOI tools, the project was ready for implementation, as key PMU positions had already been mobilized through PHRD financing by appraisal—including a manager (the Pacific's first female project manager) and key fiduciary staff. However, lack of a clear POM, consistent with the project design's flexible approach, significantly hampered early implementation (see Section III.B below).

[25] This fund is part of a multi-donor supported Provincial Governance Strengthening Programme.

[26] Through the First and Second Samoa Infrastructure Asset Management Projects (P052293 and P075523) and the Kiribati Adaptation Program – Phase 2 (P089326).

B. KEY FACTORS DURING IMPLEMENTATION

Factors within Government and World Bank Control

89. **Complex community procedures… eased by PMU-led bulk procurement at mid-term.** The POM, finalized by October 2015, required SICs to follow overly complex procurement and financial acquittal procedures, resulting in significant delays in community sub-projects until 2017 (see para. 115). Acquittal requirements followed RDP procedures, but with higher levels of complexity,[27] disproportionate to the limited capacity of communities. In addition, many sub-projects involved water tanks, taps and materials which were not available locally and were difficult for isolated communities to procure. At the MTR, MECDM and the World Bank team agreed that the PMU would take the lead in procuring external inputs (see para. 23). The beneficiary survey showed that communities overwhelmingly supported this shift. PMU-managed funds were transparently recorded in sub-project agreements and communities retained control over decision making and some funds for make small payments. Beneficiaries felt this helped build implementation capacity, while giving them flexibility to use the community account to pay for missing or unexpected items (see Annex 6, paras. 43-45).[28]

90. **Creative partnerships and strong MECDM commitment.** The government built creative partnerships with target communities, provincial governments, RDP and project contractors, which project beneficiaries praised (see Annex 6, paras. 32 and 47). In the early stages, for example, the project relied on RDP community helpers and offices to help with sub-projects in remote locations, such as Temotu. The PMU also developed extended term contracts with reliable suppliers to expedite procurement (see para. 112). At the national level, MECDM ownership and the strong support of its Permanent Secretary contributed to successful coordination with MHMS and MMERE (see paras. 58 and 60).

91. **Attention to logistics and quality oversight.** The PMU invested heavily in ensuring sub-project quality and delivery, mobilizing work supervisors, designers, engineers and community surveyors, as well as skilled workers to complete technical components (such as tank bases). Once bulk procurement was adopted, the PMU focused on logistics, ensuring timely delivery of materials, despite infrequent and overloaded ship transport to remote islands. While highly appreciative, beneficiary communities recommended avoiding split shipments going forward (see Annex 6, para. 35).

92. **Financial management complexity.** While PAD efforts to harmonize CRISP's two trust funds were commendable, the PMU had to account for three separate funding sources, as the PHRD-funded project overlapped with CRISP for four years. All three grants funded the same type of expenditures, which led to considerable posting errors in financial accounts, contributing to overdue audits and financial reports (see para. 116). Prior to the MTR, the PMU was also busy implementing 28 PHRD-funded sub-projects, leading to delays in CRISP's Component C activities.

93. **Weak attention to M&E.** Weaknesses persisted in data collection and updating of the results framework until project closure. The tools to measure PDOI-1 and PDOI-3 were envisaged but never fully developed,[29] affecting the consistency with which the two indicators were monitored (see para. 99). This was partially due to insufficient M&E

[27] For example, SICs were required to submit all receipts and invoices and fill in six different templates before the PMU would release the next funding tranche. Source: *CRISP Operations Manual, Annex 4-A, Draft Financial Procedures Manual,* 2015.

[28] Notably, the beneficiary survey revealed some geographical differences. While remote communities (in Temotu) overwhelmingly preferred PMU-led procurement, others (in Central and Malaita Provinces) felt they could handle small amounts of funds to quickly pay for unexpected inputs, and progressively build capacity for more complex transactions (see Annex 6).

[29] A screening tool was developed to assess vulnerabilities in the health sector but was not adequate to monitor the degree of mainstreaming.

capacity, the need for the PMU to focus on an accelerated sub-project schedule after the MTR, and parallel reporting needs of PHRD indicators (which differed substantially from CRISP's).

Factors Outside the Control of Government

94. **Natural disasters.** In 2015-16, an El Niño-caused drought affected Central, Rennell and Bellona, and Temotu provinces and led to the closure of several schools, likely influencing their communities' strong preference for water sub-projects. In addition, 2017 floods in Honiara disrupted PMU functioning and delayed seismic station installation. Several tropical cyclones, high winds and storm surges also occurred from 2018 to 2020, affecting goods transportation and service delivery to remote communities and causing further delays. Lastly, the COVID-19 pandemic limited field visits to beneficiary communities just prior to project closure.

IV. BANK PERFORMANCE, COMPLIANCE ISSUES, AND RISK TO DEVELOPMENT OUTCOME

A. QUALITY OF MONITORING AND EVALUATION (M&E)

Rating: Modest

M&E Design

95. M&E design was mostly sound, with a simple, largely baseline-independent results framework, and a clear PDO.[30] However, significant flaws existed in the measurability of two of the three PDO-level indicators (**PDOI-2** and **PDOI-3**), making it somewhat difficult to assess achievement of the stated objective. In addition, since the PDO only referred to increasing *community* capacity to manage disaster and climate risks, a more logical explanation should have been provided for the inclusion of national-level activities in Components A and B. The PAD correctly argued that strengthening government capacity in disaster and climate risk management was necessary to sustain community capacity. Nonetheless, support for the volcanic-seismic monitoring network, for example, was insufficiently justified in light of the PDO.

96. Of the three PDOIs, **PDOI-2** attempted to measure the PDO to the greatest extent but doing so in practice proved difficult. The PAD proposed measuring it as the "*percentage of targeted communities assessed with a satisfactorily implemented CBDRM plan based on a scoring system*", suggesting two possible methodologies for this purpose: number of communities applying at least 70 percent of CBDRM/V&A recommendations; and/or using a composite scorecard to assess behavioral change. The first methodology was inherently problematic, since, apart from the sub-projects, communities would not have been able to implement other CBDRM/V&A recommendations without alternative funding. The second was in theory measurable, but scorecard development was left until the implementation stage. **PDOI-3** was also problematic, since it assumed a mainstreaming screening tool would be developed during implementation, with ministries' annual work plans and budgets sufficiently detailed to enable screening. However, the government's budget aggregates funding according to broad programs, without sufficient granularity to allow for budgetary screening (although activities can be tracked). By contrast, **PDOI-1** was sound, meeting all SMART (specific, measurable, achievable, relevant and time-bound) requirements.

97. The ten IRIs were largely adequate to capture the contribution of project components and outputs towards outcomes and followed SMART requirements. The results framework provided clear guidance on how to measure IRIs without requiring a baseline. By and large, MECDM and the PMU had the capacity to monitor the IRIs, with the

[30] The project was prepared in 2014, before the Bank's adoption of a TOC, and at a time when there was not yet a consensus on how to clearly measure community climate and disaster resilience.

exception of **IRI-8** (percentage of women in SICs), which required field monitoring. **IRI-4** (risk management, GIS-based system operating in MECDM) initially assumed, incorrectly, that no such system existed, and was subsequently revised.

98. The PAD envisaged the PMU would hire an M&E advisor to establish a practical M&E system, as well as an M&E specialist to evaluate the project at mid-term and completion. They would also train PMU and ministry staff and develop the community capacity scorecard and mainstreaming screening tools for **PDOI-2** and **PDOI-3**. However, since GEF LDCF approval at the time limited project management to a maximum of 10 percent of total project costs, Component D likely lacked sufficient funds to hire both the required fiduciary staff and M&E specialists. No separate baseline survey was planned at appraisal, apart from data collected through the CBDRM/V&A plans.

M&E Implementation

99. M&E implementation had several weaknesses, which the 2018 restructuring partially corrected. The tools proposed at appraisal to measure **PDOI-2** and **PDOI-3** were never fully developed, leading to their inconsistent reporting, as well as on **IRI-2** and **IRI-8** measurements. Progress on **PDOI-2** was initially reported as number of communities implementing sub-projects, subsequently reported as number of communities completing CBRM/V&A plans, and ultimately, as the proportion of communities completing their top priority resilient investment. As no scorecard was developed, community capacity gains were inferred mainly from the beneficiary survey undertaken by the PMU at completion. **PDOI-3** and **IRI-2** were further clarified at restructuring, improving their measurability. The **PDOI-3** correction was particularly beneficial since it removed the need to monitor ministries' budgets against their mainstreamed activities. Other restructuring changes reflected the evolving sectoral and national context, rather than design weaknesses.

100. In part, the above weaknesses reflected the absence of the M&E advisor and specialist planned at appraisal. Instead, MECDM assigned an in-house M&E officer, partially due to budget constraints, but also assuming the officer could replace the intended specialists with World Bank team support. However, the M&E officer later transitioned to other functions, and her absence was acutely felt as the PMU was busy overseeing a large portfolio of CRISP and PHRD sub-projects. Given this, engineers, work supervisors and community helpers became more involved in M&E after the MTR, with the PMU relying on this sporadic feedback to update the results framework during World Bank missions.

101. The CBDRM/V&A process and beneficiary survey strengthened the project's M&E system, with the former collecting key baseline data (e.g., on number of beneficiaries, SIC membership and community vulnerabilities) and the latter collecting valuable beneficiary feedback on perceived achievements. The CBDRM/V&A process involved a sound methodology, tested and applied by trained surveyors and verified across sub-projects (see Footnote 14). However, written plans were often completed and delivered to communities well after initiation of sub-projects, causing some beneficiaries to forget what they had previously learned. The beneficiary survey, although not fully representative due to logistical constraints, was applied to 35 percent of community and 20 percent of provincial sub-projects and yielded reliable and consistent feedback on key project outcomes and processes.

102. The CBDRM/V&A process was incorporated into the MECDM 2020 and the 2016-2035 NDS Medium Term Strategy as "*supporting the development of community risk management plans in all high-risk communities*".

103. A GEF tracking tool was developed at appraisal, but not updated during implementation.

M&E Utilization

104. Despite the weaknesses mentioned above, the government and the World Bank team used M&E findings effectively during the June 2017 MTR to change community procedures and key indicators, contributing to the project's

performance upgrading from Moderately Unsatisfactory to Moderately Satisfactory in November 2018. In particular: (1) communities' feedback on financial reporting and procurement procedures resulted in the adoption of PMU bulk procurement, which substantially increased sub-project speed and efficiency; (2) slower-than-expected implementation, and the government's focus on more remote, vulnerable and sparsely populated communities led to a reduced number of targeted beneficiaries **(PDOI-1),** community sub-projects **(IRI-5)** and CBDRM Plans **(IRI-7);** (3) feedback that some sectoral ministries were resisting DRM and CCA mainstreaming led to scaling back the ambition of Component A, and its related indicators (**PDOI-3** and **IRI-2**); (4) the number of volcanic/seismic stations (**IRI-3**) was increased from two to seven to ensure adequate national coverage; and (5) **IRI-4** was clarified, based on improved information that MECDM already had a risk information system but it needed strengthening (see para. 28).

105. As mentioned, the CBDRM/V&A plans helped the PMU identify communities' top resilience priorities and, thus, determine the sub-project type, design and dimensions. MECDM and the World Bank Team also used the beneficiary survey extensively to triangulate data on project outcomes. The beneficiary survey, economic analysis and lessons learned are further expected to inform preparation of a new integrated development project in rural areas, using elements from both CRISP and RDP.

Justification of Overall Rating of Quality of M&E

106. Overall M&E quality is rated **Modest,** given the significant weaknesses in M&E system design and implementation to measure the project outcomes. This was partially compensated for by the beneficiary survey and CBDRM/V&A data, which enabled a more comprehensive assessment of achievements than would have been possible through the results framework alone.

B. ENVIRONMENTAL, SOCIAL, AND FIDUCIARY COMPLIANCE

Safeguards Compliance

107. CRISP was classified as a Category B-partial assessment project at appraisal, triggering the World Bank Operational Policy (OP) 4.01 (Environmental Assessment), OP 4.04 (Natural Habitats), OP 4.10 (Indigenous Peoples), OP 4.11 (Physical Cultural Resources) and OP 4.12 (Involuntary Resettlement). Since the specific nature and location of sub-projects were not known in advance, the project prepared an Environmental and Social Management Framework (ESMF; Report No. E4329), which included an Indigenous Peoples Participation and Consultation Framework; a Grievance Redress Mechanism; Land Acquisition and Compensation Guidelines; and a Resettlement Policy Framework. The ESMF and related documents were disclosed locally and at the InfoShop on October 29, 2013. As most expected beneficiaries were indigenous peoples' communities, a separate Indigenous Peoples' Plan was not required.

108. The ESMF outlined clear steps and responsibilities to screen sub-projects for significant negative socio-environmental impacts (deemed ineligible) and, for minor, localized and manageable impacts, to include mitigation measures in bidding documents and contracts' codes of practice or, for community-led sub-projects, in their agreements. The mitigation checklist was based on the type of impacts found in RDP sub-projects, and on site-specific measures. Screening procedures allowed sub-projects to be implemented in natural habitats provided benefits outweighed negative impacts and mitigation took place in accordance with OP 4.04. The ESMF also included provisions to avoid impacts on known "taboo" sites or physical cultural resources and included a protocol to manage chance findings.

109. The project complied with applicable environmental and social safeguards and was rated Satisfactory on these aspects throughout implementation. The PMU hired a Social and Environmental Safeguards Officer, who supported sub-project screening and monitoring. For community sub-projects involving land, written voluntary land donation agreements were secured prior the opening of bank accounts by SICs. Environmental and Social Management Plans were

developed for provincial sub-projects, including a Public Environment Report for the Tulagi shoreline protection approved by the Environment and Conservation Division. For seismic station placement, the PMU prepared a Land Acquisition Plan (in accordance with OP 4.12 and the 1996 National Land and Title Act) and mobilized Land Acquisition Officers to manage consultations with provincial governments and customary owners.

110. While most sub-projects did not generate major environmental or social impacts, the Tulagi shoreline protection works resulted in waste and sediments deposited around exposed roots of centenary foreshore trees and needed further landscaping to return the beach to pre-construction conditions. According to the PMU, appropriate mitigating measures were taken prior to project completion. In addition, and unrelated to the project, the provincial government dug a three-meter-wide and 50-meter long area in the seagrass in front of the seawall for road gravel extraction. However, this was halted when the mission and the PMU Safeguards Officer informed the engineers that such extraction was against national regulations and could undermine the integrity of protection works. Land acquisition for seismic stations was satisfactorily addressed in all sites except Savo (Central Province) where the landowner disputed the proposed compensation despite an appeal court judgement and legal advice from the Attorney General against him. Following further consultations with the PMU, an agreement was eventually reached with the landowner.

Fiduciary Compliance

111. **Procurement.** The project complied with its Procurement and Consultant Guidelines (dated January 2011), the Grant Agreement and the project procurement plan (dated September 2015, and revised April 2018, May 2019 and August 2019). There was no evidence of mis-procurement, fraud or corruption, although in 2017, a small amount of building materials was stolen from one of the sub-projects in Temotu and reported to the police. There were also weaknesses in procurement reporting under the Systematic Tracking of Exchanges in Procurement (STEP) system, introduced in 2016, although the PMU maintained adequate procurement records in Excel.

112. The project experienced procurement delays in 2014 and 2015, until an international procurement specialist was recruited to support the national officer in December 2015, and again in 2017, following the resignation of the original procurement officer, who was replaced in December 2017. Procurement of sub-project materials was also slow initially, as the PMU relied on community participation in procurement. After the MTR, the PMU began procuring most goods and services not available locally to the communities, using Invitations to Quote (ITQs) covering several sub-projects and extended term ITQ contracts with prices fixed for a year. This considerably enhanced procurement performance (see paras. 70 and 89).

113. The PMU and the World Bank collaborated well in resolving the above problems (see paras. 123 and 124). The PMU was also proactive in following up on World Bank recommendations, and procurement performance was rated Satisfactory at closure.

114. **Financial Management**. The project complied with its financial covenants, but with significant (two to five months) delays annual audits and Interim Unaudited Financial Reports, which persisted throughout implementation. The 2014-18 audits were unqualified,[31] and no misuse of funds or major internal control issues were reported. However, significant weaknesses and delays in financial processes occurred, as described below.

115. Until 2017, community sub-project progress was severely delayed due to overly complex procedures relative to the communities' financial literacy, as SICs had to acquit past expenditures before subsequent payment tranches were

[31] At the time of this ICR, the 2019 audit (due June 30, 2020) and 2020 audit (due March 2021) had not yet been submitted. It is expected that all outstanding auditor recommendations raised in 2018 will have been addressed.

released (see para. 89).[32] Significant delays (up to six months) also occurred in processing acquittals, leaving communities with a financing gap between tranches. After the MTR, and at the World Bank team's recommendation, the PMU adopted a simplified community acquittal process and direct PMU payments to suppliers. For remote locations, such as Temotu, direct payments were authorized for vehicle and boat rentals, and mobile banking services (*goMoney)* were used to obtain cash through RDP support units. For smaller, community-based expenditures, acquittals were processed within ten days. These changes, along with PMU-led procurement, greatly improved sub-project progress, although the 2018 audit noted US$70,767 of unacquitted advances to SICs (by project closure, the PMU assured this had been resolved).

116. In addition to community acquittals, project audits and ex-post reviews reported several weaknesses in financial records, including: posting errors on the financial system (MYOB accounting software); late acquittals of travel advances; delays and errors in the consultants' tax liability; out-of-date commitments register and project budget; weaknesses in fixed assets register and contract management; and persistent delays in bank reconciliation statements. To address these problems, the PMU reinforced the Financial Officer's team with a finance assistant in 2015 and a short-term financial advisor in 2018. A detailed action plan, agreed with the World Bank team, helped resolve most issues. Thus, financial management, rated Moderately Unsatisfactory for much of the implementation period, was upgraded to Moderately Satisfactory at project closure.

117. **Legal Covenants.** The project complied with all its legal covenants, but with delays in submission of financial reports and the POM.

C. BANK PERFORMANCE

Rating: Moderately Satisfactory

Quality at Entry

118. The **project design quality** was generally adequate and included measures to overcome anticipated implementation challenges, given MECDM's limited capacity at the time. The World Bank appraisal team made a solid assessment of the existing institutional and policy context (see para. 84) and proactively planned for a potential reinforcement of the PMUs fiduciary team, as needs arose. Importantly, given the project's focus, the appraisal team envisaged that the PMU would engage specialized engineers to ensure resilient design standards for the community infrastructure—such as minimum earthquake and wind loads, and minimum flood freeboards—as well as provide on-the-job training to provincial officers and engineers on construction supervision and quality control (thus helping sustain the investments). Overall, this flexible and quality-focus approach helped deal with the geographical spread and remoteness of some of the islands, whilst bringing in solid national, regional and international practices.

119. The World Bank appraisal team drew appropriately on past **lessons learned**, as well as on the Independent Evaluation Group's 2011 "*Adapting to Climate Change*" assessment. For the integrated DRM/CCA approach and resilient community investments, the team drew on the experience of other projects in the region, such as: the Kiribati Adaptation Program – Phase III (P112615); the Samoa Second Infrastructure Asset Management Project (P075523); the Samoa Enhancing the Climate Resilience of Coastal Resources and Communities Project (P126596); and the Vanuatu IRCCNHP

[32] Where the acquittal requirement originated remains unclear, since World Bank community procurement procedures enable disbursements of sub-grants either based on inputs (when sub-projects are few in number, complex and sufficient community capacity exists) or, preferably, based on outputs (verified physical progress of sub-projects), in which case required documentation is kept to a minimum. See World Bank (2012). *Guidance Note for Design and Management of Procurement Responsibilities in Community-Driven Development Projects.*

(P126111). Within Solomon Islands, lessons on community-based planning were drawn from the PHRD, RDP and PCDF programs (see para. 83), while the CBDRM/V&A assessments drew on regional experiences (including from Vanuatu).

120. On the whole, **risk assessment** at appraisal was realistic, with an overall rating of Substantial. Proposed mitigation measures were also adequate, and included training, specialist consultants and international senior advisors to help mitigate technical, fiduciary and project management risks. The risk from natural hazards and extreme weather events was rated High, with mitigation measures, such as community resilience and strengthened preparedness, and sufficient flexibility to enable the project to refocus on recovery if needed.

121. **World Bank team composition** was also adequate, including experienced technical specialists—covering climate and disaster risk management and community resilience—as well as fiduciary and safeguards specialists. The team also had extensive experience working in small island states. While M&E expertise was not brought in, the project was prepared in 2014 when consensus was still lacking on adequate adaptation indicators.

122. Quality at entry had, however, three key weaknesses: (1) insufficient measurability of two PDOIs; (2) weaknesses in logical flow; and (3) relegating POM completion to early implementation, inadvertently resulting in overly complex community procedures inconsistent with the project flexibility intended at appraisal (see paras. 83 and 87).

Quality of Supervision

123. Implementation support missions—including safeguards, financial management and procurement reviews—were held bi-annually [33] and included both field visits and meetings with high-level decision makers. In addition to performance reviews, missions focused on activities needing particular attention (such as seismic network, community sub-projects and bulk procurement) and provided an opportunity to update the results framework. The World Bank team brought in adequate expertise, including technical specialists, procurement, financial management and social and environmental specialists. Other technical staff (e.g., on early warning) or engineers joined the missions on an "as needed" basis. Financial management reviews were comprehensive, with practical and doable advice. An operational officer, for example, helped the PMU organize financial records and resolve community acquittals. In early stages, the team also provided intensive support to the PMU procurement officer, including provision of templates and procurement checklists, a simple (pre-STEP) procurement database and assistance with critical procurement packages. In late 2014, the World Bank team organized a south-south exchange with the Vanuatu Meteorology and Geohazards Department to advise the government on the seismic network and to ensure consistency with Melanesian Volcano Network and Oceania Regional Seismic Network standards. Towards project completion, the World Bank team focused on ensuring sustainable outcomes and proper hand-over to the government.

124. In general, the World Bank team provided clear recommendations and candid advice, downgrading the project to Moderately Unsatisfactory for 1.5 years beginning in mid-2017 until performance improved. Financial and procurement reviews led to several downgrades in fiduciary ratings until problems were solved. The team also gave candid feedback to World Bank management in Implementation Status and Results Reports (ISRs), with realistic ratings.

125. After the MTR, the World Bank team worked proactively with the government to restructure the project and adjust indicators and procedures that had hindered progress. Prior to completion, when travel was restricted due to COVID-19, the team conducted a virtual technical mission, while remaining cognizant of the impacts of COVID-19 and Tropical Cyclone Harold (April 2020) on PMU activities.

[33] One procurement review was missed in 2019 due to staff changes, but this was compensated for by multiple virtual meetings especially in the second half of 2019.

126. According to the government, the World Bank team provided quality support during project implementation. The World Bank Task Team Leader changed once which resulted in some discontinuity, but, overall, the handover was managed well. Training on World Bank procedures during implementation ensured the government continued to view the World Bank as a "trusted partner".

Justification of Overall Rating of Bank Performance

127. Based on the above, and largely due to the M&E and POM weaknesses, the overall World Bank performance is rated as **Moderately Satisfactory.**

D. RISK TO DEVELOPMENT OUTCOME

128. In the absence of continuing support, the risk that the PDO (*Increased capacity of selected rural communities to manage natural hazards and climate change risk)* will not be maintained is substantial, both in likelihood and impact. The beneficiary survey (Annex 6.D) indicated communities felt confident about their adaptive capacity, social capital and adaptive learning. However, they felt less confident in their ability to recover quickly from major disasters, primarily due to low financial capacity, or to cope with longer-term risks that required substantial changes to their ways of life (transformational capacity). The latter is mostly because mechanisms contributing to improved short-term adaptive capacity can get exhausted by increased frequency and/or intensity of disasters, requiring long-term support.

129. To help ensure the sustainability of community investments over the next few years, the PMU prepared clear operational and maintenance plans for each site. The plans included agreed roles and responsibilities, and a stepped-up maintenance strategy, namely: (1) community inputs for routine maintenance; (2) fund-raising through SICs or church committees for more substantial repairs; and, (3) if more funds are required, approaching parliament members or development partners for funding. Beneficiary feedback showed that despite their limited cash resources from semi-subsistence livelihoods, 88 percent of interviewees were optimistic the sub-projects would continue over the next two years due to good quality construction and materials and their own commitment to maintenance. However, they felt the risk would increase if maintenance was neglected within a five-year timeframe, or if major disasters overwhelmed sub-project construction standards (see Annex 6). Nevertheless, even if sub-project maintenance proves weak, the risk to development outcome would be mitigated since communities would retain at least some of their acquired capacity.

130. For national investments, the government (through the revised NDM and mainstreaming) has shown its commitment to improved disaster and climate risk management. Activation of institutional structures for COVID-19 preparedness and Tropical Cyclone Harold is a further demonstration of this ongoing commitment.

131. The government plans to include CCA/DRM activities in a future project focusing on integrated economic development in rural areas, which is likely to provide continued support to communities and provinces over the next five to seven years. This assistance is likely to be expanded to new communities to ensure political stability. However, it would be critical for the government to continue assisting CRISP communities to regularly update and implement their CBDRM/V&A plans—thus helping to sustain their long-term adaptive capacity.

V. LESSONS AND RECOMMENDATIONS

132. **Higher investment in quality design and oversight pays off.** The project invested heavily in engineering design and community oversight, even engaging on-site supervisors in Temotu and skilled labor for water tank base construction. Overhead expenses amounted to 43 percent of Component C costs—well above regular norms—but

beneficiary feedback and the economic analysis showed this investment paid off with strong and robust benefits, as well as perceived sub-project sustainability.

Recommendation: *Community-based operations need to realistically budget for, and invest, in quality technical design and oversight, and resist pressure to artificially set limits on overhead costs.*

133. **Community-driven development can be a major challenge for climate and disaster resilience projects.** This is particularly true in remote communities and those with weak capacity, and when inputs are not locally available. These challenges may also be particularly high for DRM and CCA operations, since the complexity and urgency of interventions communities need to address climate and disaster risks often exceed their capacity—a lesson also emerging from community resilience operations in Vanuatu and Samoa. In the current project, PMU-led bulk procurement, letting communities retain some funds for local purchases, and transparently agreeing on PMU-managed funds in community sub-grant agreements helped overcome these challenges while maintaining strong community ownership. The project also revealed some geographical differences in the degree communities felt they could handle procurement (see Footnote 28), suggesting a need for flexibility in project procedures.

Recommendation: *Climate and disaster resilience projects may need to explore flexible, community-based approaches, where PMUs carry out bulk procurement for major goods and expertise, and communities handle funds for local purchases and operating costs in accordance with their respective capacity. Local committee members participation in simple procurement and training in basic bookkeeping could help build progressive community capacity and help them graduate to higher levels of responsibility.*

134. **Community procedures must be simple and tailored both to project context, and community capacity.** Implementation progress was slow during the project's initial years, due to complex requirements for community procurement and financial reporting. Community acquittal procedures, in particular, were inconsistent with the project's flexible design, local capacity and World Bank's guidance, since communities were asked to account both for sub-project inputs and outputs as a condition for tranche disbursements to their accounts.

Recommendation: *For operations involving multiple sub-projects in isolated communities, tranche payments should be kept to a minimum and preferably be based on completion progress (outputs). Sound financial records could be required for on-site verification and to promote good governance but not be a pre-condition for sub-grant disbursement.*

135. **Measuring outcomes is particularly complex in DRM/CCA projects and requires strong attention during design and implementation.** In CRISP's case, the proposed scorecard to measure community risk management capacity and a screening tool to measure national mainstreaming were never developed, hampering guidance on how outcomes would be measured. Instead, most of the regular monitoring focused on outputs and IRIs. Weaknesses in monitoring outcomes are also a problem in other World Bank climate and disaster resilience projects and relate, in part, to inherent methodological difficulties of measuring outcomes within a project's short timeframe.

Recommendation: *For climate and disaster resilience projects, semi-quantitative metrics for measuring common outcome indicators, such as community adaptive capacity or degree of mainstreaming, should be further developed by World Bank specialists, and applied through specific training and advice suited to the country and project context. In addition, future project teams should consider adopting simple participatory real-time monitoring tools (as currently done under RDP and the Samoa Enhancing Climate Resilience of Coastal Resources and Communities Project).*

136. **Mainstreaming DRM/CCA in sectoral ministries takes time and needs to be measurable.** Given the wide-ranging impacts of climate change and disasters on the country, CRISP included a focus on institutional change aimed at

incorporating climate and disaster risk into key sectors. However, this type of mainstreaming requires time and considerable political influence and has to be clearly traceable through planning and budgeting processes. These weaknesses were recognized during project implementation, leading to the adoption of a more modest mid-term target.

Recommendation: *Mainstreaming climate and disaster risk and resilience should preferably be implemented through a government agency responsible for development and budgetary processes, with input from technical ministries as needed. It also requires outcome or activity-based budgeting at a sufficiently detailed level to permit monitoring.*

ANNEX 1. RESULTS FRAMEWORK AND KEY OUTPUTS

A. RESULTS INDICATORS

A.1 PDO Indicators

Objective/Outcome: Number of beneficiaries in areas targeted under the program that benefit from CCA and/or DRR

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of beneficiaries in areas targeted under the program that benefit from CCA and/or DRR investments (with a target of at least 48% of the total beneficiaries being female)	Number	1000.00 01-Jun-2014	79000.00 11-Oct-2019	53400.00 30-May-2018	68878.00 28-May-2020

Comments (achievements against targets):
The indicator is as defined in the PAD. The revised target of 53,400 beneficiaries - across all the islands and/or communities who benefited from the project financed investment - was exceeded by almost 29 percent.

The information was from bi-annual project reports submitted by the PMU

The ICR team confirmed that the numbers are direct beneficiaries.

Objective/Outcome: Percentage of targeted communities which demonstrate capacity to implement CBDRM/V&A plans

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Percentage of targeted communities which demonstrate capacity to implement CBDRM/V&A plans to manage the impact of natural hazards and climate change.	Percentage	0.00 01-Jun-2014	72.00 11-Oct-2019		97.00 28-May-2020

Comments (achievements against targets):
The indicator captured the percentage of targeted communities which implemented “very high” priorities identified under their respective CBDRM/V&A plans. In total 63 targeted communities had their number one priority implemented through their sub-projects. Only two communities did not have their first priority implemented as the costs exceeded the project budget.

Target was 70% and this was exceeded.

The information was from bi-annual project reports and/or updates submitted by the PMU, the last being on May 28,2020.

Objective/Outcome: Number of ministries with activities in their annual work programs including resilience measures

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of ministries with	Number	0.00	3.00		3.00

activities in their annual work programs including resilience measures for climate and disaster risk		01-Jun-2014	11-Oct-2019		28-May-2020

Comments (achievements against targets):
The indicator due to the way the information is published in the national budget statement, the indicator was changed during the May 2018 restructuring to focus on the work plan activities and not the budget (The original indicator was Number of ministries with annual work programs and budgets that integrate CCDRM measures)

The target original target of three Ministries was retained and was fully achieved.

The information was from bi-annual project reports submitted by the PMU

The ICR team confirmed that these three Ministries had climate and disaster resilience related activities.

A.2 Intermediate Results Indicators

Component: Component A – Integration of climate change adaptation and disaster risk reduction in government policies and operations

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
The NDC and the NDC Committees are operating and are effective	Text	Committees exists in NDRMP but not operational	various committees established and operating		The NDC and the NDC Committees are operating and are effective

		01-Jun-2014	18-Oct-2019		28-May-2020

Comments (achievements against targets):
The indicator is as defined in the PAD. The NDC continued to meet and provide project management oversight throughout the project.

The revised target is fully achieved.

The information was from bi-annual project reports submitted by the PMU.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
National Disaster Council adopts the Framework for Resilient Development outlined in the 2017 NDM Plan for integration of climate and disaster risk	Text	Separate DRM and CCA strategies/ plans 01-Jun-2014	Adoption of Resilient development plan and NDM plan 18-Oct-2019	National Disaster Council adopts the Framework for Resilient Development outlined in the 2017 NDM Plan for integration of climate and disaster risk 30-May-2018	National Disaster Council adopts the Framework for Resilient Development outlined in the 2017 NDM Plan for integration of climate and disaster risk 28-May-2020

Comments (achievements against targets):
The original indicator (Integrated National Policy Framework to support mainstreaming of resilience across sectors developed, validated and implemented (*target: DRM/CCA mainstreamed satisfactorily in 3 sectors*) as defined in the PAD was revised in May 2018 restructuring due to the difficulty of assessing validation and the focus of the a lot of the project supported activity on the NDC. During the MTR, it was also clear that the different agencies in the government have to contribute to the finalization of the integrated framework for resilience development aligned with the timing of the national

development plan and hence, the target was revised for the integrated framework for resilience development to inform the disaster and climate resilient actions and policies.

Target is achieved through the adoption of the NDM Plan

The revision of the NDM Plan was completed, approved by the Cabinet in April 2018 and is being implemented in the provinces. For the integrated framework for resilience development, the draft continues to inform ongoing reform discussions on governance arrangements for DRR and CCA in Solomon Islands.

The information was from bi-annual project reports submitted by the PMU

Component: Component B – Strengthening of climate and disaster risk information and communication

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Volcano/Seismic early warning systems are installed and operating.	Number	0.00 01-Jun-2014	2.00 02-Jun-2014	7.00 30-May-2019	7.00 28-May-2020

Comments (achievements against targets):

The indicator is as defined in the PAD. The target was revised at restructuring to the number of stations across all the islands which needed investments either because they were damaged by recent disasters and/or there was no coverage in remote and highly active volcanic islands. The result captures the number of volcanic stations funded by the project.

The revised target is achieved with 7 stations being installed and operating. In addition, the stations transmit the data in real-time allowing for timely early warning in case of earthquakes or volcanic eruption.

The information was from bi-annual project reports and updates submitted by the PMU.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
MECDM data base for Risk Information Management system strengthened	Text	Some data is being assembled into MapInfo 01-Jun-2014	Data bases for climate and disaster established 02-Jun-2014	Risk information data base system is strengthened and operational	MECDM data base for Risk Information Management system strengthened and operational 28-May-2020

Comments (achievements against targets):

The indicator as defined in PAD was revised from "Risk management, GIS-based system operating in MECDM (*target: system includes SIG graphic and satellite image data)* during the restructuring in May 2018 to focus on strengthening as the government had already established a GIS system. The revised target of strengthening of MECDM data base for Risk Information Management system is fully achieved

The database for climate and risk information management systems in MECDM have been strengthened and the NDMO and the Climate Division are now connected to the database. The national climate change adaptation and disaster risk management data portal is now available and fully operational. The government continues to upload climate and disaster risk data into the portal to be able to undertake risk analysis.

The information was from bi-annual project reports and updates submitted by the PMU.

Component: Component C – Climate change adaptation and disaster risk reduction investments

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion

Number of subprojects completed under the community-led DRR/CCA investments	Number	0.00 01-Jun-2014	70.00 02-Jun-2014	59.00 30-May-2019	65.00 28-May-2020

Comments (achievements against targets):
The indicator is as defined in the PAD. The May 2018 restructuring revised the target based on the government's assessment of the potential funds and time needed for the support (based on the then completed sub-projects).

In the end 65 community-led investments across multiple islands were financed by the project. The target was exceeded by 10 percent.

The information was from bi-annual project reports and updates submitted by the PMU.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of sub-projects completed under Provincial Government led DRM/CCA investments.	Number	0.00 01-Jun-2014	4.00 11-Oct-2019		5.00 28-May-2020

Comments (achievements against targets):
The indicator is as defined in the PAD.

The target of 4 provincial-led investments was exceeded by the project.

The information was from bi-annual project reports and updates submitted by the PMU.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Number of Community Based Disaster Risk Management (CBDRM) Plans developed.	Number	0.00 01-Jun-2014	70.00 02-Jun-2014	59.00 30-May-2018	70.00 28-May-2020

Comments (achievements against targets):

The indicator is as defined in the PAD.

In total, the project completed CBDRM plans for all 65 targeted communities, and standalone vulnerability assessments for all 5 provincial sites. The target was exceeded by 18 percent in October 2019.

The information was from bi-annual project reports and updates submitted by the PMU.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Percentage of women involved in decisions during preparation and implementation of community-led projects	Percentage	0.00 01-Jun-2014	35.00 02-Jun-2014	35.00	38.00 11-Oct-2019

Comments (achievements against targets):

The target as defined in the PAD (% of women involved in village level Sub Implementation Committees (SIC)) was revised during the May 2018 restructuring to reflect the role of women having a role in the SIC not just through its formal mechanisms but more broadly throughout the project cycle - from selection of the sub-projects, their preparation as well as implementation.

The information was from bi-annual project reports and updates submitted by the PMU.

Component: Component D - Project management and monitoring & evaluation

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
The PCC is meeting at least once per year and provides oversight on the project.	Text	0 01-Jun-2014	The PCC continues to meet 11-Oct-2019		The PCC continues to meet 28-May-2020

Comments (achievements against targets):
Target achieved: The PCC met at least 7 times (once annually) from project implementation start in 2014 to May 2020 to provide project oversight. Source of Information: CRISP Technical Mission Report: May 2020.

Indicator Name	Unit of Measure	Baseline	Original Target	Formally Revised Target	Actual Achieved at Completion
Program components are managed and monitored effectively.	Text	Nil	Project management, implementation and evaluation is satisfatory		Program components are managed and monitored effectively but project closed at

		11-Oct-2019	18-Oct-2019		Moderately Satisfactory 28-May-2020

Comments (achievements against targets):
Project implementation improved throughout the project.

Target was not achieved as the project closed at Moderately Satisfactory although project implementation improved throughout the project.

The information was from bi-annual project reports and updates submitted by the PMU.

B. KEY OUTPUTS BY COMPONENT

Objective/Outcome 1. Increased Capacity of Selected Rural Communities to Manage Natural Hazards and Climate Change Risks	
Outcome Indicators	1. Number of beneficiaries in areas targeted under the program that benefit from CCA and/or DRR investments 2. Percentage of target communities which demonstrate capacity to implement CBDRM/V&A plans to manage the impact of natural hazards and climate change 3. Number of ministries with activities in their annual work programs including resilience measures for climate and disaster risk
Intermediate Results Indicators	1. NDC and NDC Committees operational and effective 2. NDC adopts the Framework for Resilient Development outlined in the NDMP 2017 for integration of disaster and climate risk 3. Volcanic/seismic early warning systems installed and operating 4. MECDM Database for Risk Information System strengthened 5. Number of sub-projects completed under community-led DRM/CCA investments 6. Number of sub-projects completed under provincial government-led DRM/CCA investments 7. Number of CBDRM plans developed 8. Percentage of women involved in decisions during preparation and implementation of community-led projects 9. PCC meeting at least once per year and providing oversight on the project 10. Program components managed and monitored effectively
Key Outputs by Component (linked to the achievement of the Objective/Outcome 1, as per the TOC)	1.1. National Disaster Risk Management Plan revised with strengthened institutional alignment of DRR and CCA

	1.2. Sectoral screening tools developed and applied 2.1. Data on natural hazard risks and climate change collected, consolidated and analyzed 2.2. Volcanic/seismic early warning system completed and transmitting 2.3. Data sharing protocols for climate and risk information developed 2.4 Risk assessment and community planning tools developed 2.5 People trained on participatory and risk assessment tools 3.1. Community-based DRM and V&A plans developed and applied to sub-project sites 3.2. Community-led sub-projects completed 3.3. Provincial-led sub-projects completed

ANNEX 2. BANK LENDING AND IMPLEMENTATION SUPPORT/SUPERVISION

A. TASK TEAM MEMBERS

Name	Role
Preparation	
Denis Jean-Jacques Jordy	Task Team Leader
Annette Gaye Leith	Operations Officer
Stephen Paul Hartung	Financial Management Specialist
Suzanne Paisley	Community Resilience Specialist
Anil H. Somani	Social Specialist
Ly Thi Dieu Vu	Social Specialist
Jinan Shi	Senior Procurement Specialist
Stephen Hartung	Financial Management Specialist
Nathan Hale	Program Assistant
Janet Funa	Team Assistant
Tevi Maltali Obed	Disaster Risk Management Specialist
Habiba Gitay	Senior Climate Change Specialist
Michael Bonte-Grapentin	Disaster Risk Management Specialist
Marjorie Mpundu	Senior Counsel
Richard Croad	Environment, Water and Climate Change Specialist
Supervision/ICR	
Tevi Maltali Obed	Task Team Leader
Andy Chandra Firdana, Rene SD. Manuel, Zhentu Liu, Saskai Mohammad Amin, Jinan Shi	Procurement Specialists/Procurement Team Members
Stephen Paul Hartung, Ha Thuy Tran	Financial Management Specialists
Annette Gaye Leith	Country Resident Representative
Habiba Gitay	ICR Co-Author; Senior Climate Change Specialist
Sofia Bettencourt	ICR Co-Author; Adaptation/DRM Specialist
Keiko Saito	DRM and Early Warning System Specialist
Cindy Robles	DRM and Gender Specialist
Katherine Baker	Operations Analyst
Janet Funa	Team Assistant
Nathan Hale	Team Assistant
Simone Lillian Esler	Engineer and DRM Specialist
Wolfhart Pohl, Felix Peter Taaffe	Environmental Safeguards Specialist
Joyce Onguglo	Social Safeguards Specialist
Richard Croad	Water Resources & Coastal Resilience Specialist
Linda Manele	Team Assistant
Jennifer Appo	Team Assistant
Dodi Doiwa	Operations and Financial Management Analyst

B. STAFF TIME AND COST

Stage of Project Cycle	Staff Time and Cost	
	No. of staff weeks	US$ (including travel and consultant costs)
Preparation		
FY09	3.900	32,185.31
FY10	9.100	75,089.88
FY11	7.925	94,694.09
FY12	.400	34,407.13
FY13	3.775	18,982.21
FY14	12.285	122,859.33
FY15	12.519	36,309.40
Total	**49.90**	**414,527.35**
Supervision/ICR		
FY15	.550	46,836.79
FY16	31.895	108,755.30
FY17	24.933	104,801.33
FY18	27.426	124,604.38
FY19	31.688	175,769.09
FY20	12.650	68,620.23
Total	**129.14**	**629,387.12**

ANNEX 3. PROJECT COST BY COMPONENT

Table 3.1: Project Costs by Component

Components	Amount at Approval (US$'000)	Actual Amount at Project Closing (US$'000)	Percentage of actual to originally approved
A – **Integration of CCA and DRR in Government Policies and Operations**	**537**	**825**	154
A.1. Development of a national integrated CCA/DRM framework	182	758	
A.2. Strengthening capacity for mainstreaming CCA/DRM	355	67	
B – **Strengthening Climate and Disaster Risk Information and Early Warning**	**1,331**	**1,259**	95
B.1. Establishment of a volcanic-seismic monitoring network	589	808	
B.2. Establishment of foundations of a national risk information capability	743	451	
C – Climate Change Adaptation and Disaster Risk Reduction Investments	**6,327**	**5,453**	86
C.1. Design of, advisory and supervision services	1,571	2,327	
C.2. Development and implementation of community-led projects	2,912	2,013	
C.3. Development and implementation of provincial-led projects	1,845	1,113	
D – Project Management	**904**	**1,563**	173
D.1. Project coordination and management	715	1,464	
D.2. Project monitoring and evaluation	189	99	
Total	**9,100**	**9,100**	**100**

Table 3.2: Project Costs by Financing Source

Financing Source	Amount at Approval (US$'000)	Actual Amount at Project Closing (US$'000)	Percentage of Approval
Recipient (Government of Solomon Islands, in-kind)	1,100	N/A[34]	N/A
GEF/LDCF – TF16614	7,300	7,300	100
GFDRR/EU-ACP– TF16425	1,800	1,800	100
TOTAL	**10,200**	**9,100**	

[34] The government and community contributions were not formally tracked during implementation. However, community contributions were estimated at 16 percent of the total sub-project costs, an in-kind value of about US$317,900. In addition, the project collaborated closely with two parallel projects, the US$2.73 million, PHRD-funded Increasing Resilience to Climate Change and Natural Hazards Project (P129375) and the US$46.9 million RDP2 (P149282, approved in 2014), funded by the International Development Association, International Fund for Agriculture Development and Australian Aid Program.

ANNEX 4. EFFICIENCY ANALYSIS

1. The efficiency analysis carried out at ICR stage involved three steps:

(1) A **comparison between the ex-ante** (appraisal stage) and **ex-post** (ICR stage) economic analysis;
(2) **A cost-benefit analysis**, applied to 77.4 percent of final project costs and, in more detail, to the various sub-projects at the community and provincial levels.
(3) **A cost-effectiveness** analysis to assess sub-project efficiency.

A. COMPARISON WITH APPRAISAL ESTIMATES

2. The PAD included only a simplified framework for economic analysis, assuming that most community sub-projects would involve retrofitting, strengthening or relocating infrastructure that was vulnerable to disasters. The projected EIRRs, based on damages averted, were estimated to vary with the economic life of the structures, as well as with the cost of retrofitting as a proportion of damage cost (original replacement value). The economic life was assumed to be half of the structures' design standard duration.

3. At completion, however, only two of the 70 sub-projects involved retrofitting or strengthening existing structures: (1) a primary school in Mona, Nendo Island (Temotu), where the project funded the flood/storm resilience mark-up (school elevated onto concrete pillars), and RDP2 co-financed the main three-classroom building; and (2) shoreline protection in Anuta, an outlier island in Temotu, where the project reinforced a traditional stonewall with masonry grout. All other sub-projects were new investments and are, therefore, not directly comparable to appraisal estimates.

4. The completion stage EIRRs—17.0 percent for the reinforced school and 11.6 percent for the shoreline protection— are close to, if slightly higher than, corresponding appraisal estimates: between 17.3 and 10.0 percent for a structure with 30-40 percent retrofitting costs (comparable to the school) and 10.0 percent for a structure with 40 percent retrofitting costs (comparable to the community shoreline protection). Both structures were designed to last 20 years, which according to appraisal estimates would correspond to an economic life of 10 years. Reinforcement costs for the school and community shoreline protection amounted to 37.9 and 40.9 percent of the structures' original costs, respectively. Table 4.1 provides a comparison of EIRRs (in red). Assumptions used to estimate costs and benefits of the two sub-projects are summarized in Table 4.2 and described further in paragraphs 19-20 below.

Table 4.1: Comparison of Ex-ante and Ex-Post EIRRs for Retrofitting/Strengthening Community Sub-Projects

Appraisal Estimated EIRRs						*Completion EIRRs*		
Retrofit Costs as % Replacement Cost	Economic Life (Years)					Sub-Project	Retrofit as % of Replacement Cost	EIRRs
	10	25	50	100	150			
10%	64.7%	62.6%	56.8%	50.6%	47.2%			
20%	30.2%	31.2%	28.4%	25.3%	23.6%	School reinforcement	37.9%	17.0%
30%	17.3%	20.7%	18.9%	16.9%	15.7%	Shoreline protection	40.9%	11.6%
40%	10.0%	15.2%	14.2%	12.7%	11.8%	*(community)*		
50%	5.1%	11.7%	11.3%	10.1%	9.4%			

Table 4.2: Summary of Assumptions Used in Ex-Post Economic Analysis for Retrofitting/Strengthening Sub-Projects

Items	Assumptions Used			Source
Costs:				
	Site 1	Site 2	Unit	
Type of Sub-Project	Community Coastal Protection	Primary School		
Reinforcement Costs	Actual (final) costs of sub-project + community in-kind contribution (costed)			
Life Time of Structure	20	20	Years	Project Lead Engineer
Periodic Maintenance Costs	5%	10%	$ of investment costs	Project Lead Engineer
	4	5	Every_years	
Annual Operation and Maintenance Costs	3%	5%	Per year	Project Lead Engineer
Estimated dimensions of baseline structure (m3)	1,313	135	m3/m2	Sub-Project Design/RDP II records
Estimated Replacement Cost: rock armor materials (per m3)	200			As per Tulagi costed design
labor (per m3)	27			
Estimated Replacement cost of baseline structure	SI$297,938	SI$233,400	per unit	Per above
Reinforcement costs (including community contribution)	SI$121,935	SI$88,415		PMU Records
Reinforcement Costs as % of Baseline Structure Costs	40.9%	37.9%		Per above
Benefits:				
1. Avoided Damage due to Storm Surge/Cyclones	Site 1	Site 2		
Situation without project	Traditional stonewall, ungrouted; minor innundation/wave damage to houses during strong cyclones; periodic stonewall repairs	Standard 3 classroom primary school, not elevated; assume partial destruction during strong cyclones		Project Lead Engineer; RDP II records
Situation with project	Masonry grouted; most innundation prevented; less frequent repairs needed to seawall	School elevated on concrete columns; assume cyclone resistant		Project Lead Engineer; ICR assumptions
Protected Assets	Traditional houses	Primary school		Project Lead Engineer; RDP II records
Type of housing	Low-lying, traditional, thatched roofs	Block building, timber framed, iron roof		Project Lead Engineer; RDP II records
Total houses at risk (protected by sub-project)	25	1 (School)		PMU Records
Location of houses	20-30 meters from stonewall	50-60 m from shore, 30-40 m altitude		Project Lead Engineer; Google Earth
Damage to fully destroyed houses during 2014 floods	SI$109,095/house *(Guadalcanal, of which 92% traditional houses)* 1/			World Bank (2014) 2/
Damage to minimally damaged houses 2014 floods	SI$4,724/house			World Bank (2014) 2/
% of replacement value (minimally damaged houses)	4.3%			Per above
Damage to partially damaged houses 2014 floods	SI$28,427/house			
% of replacement value (partially damaged houses)	26.1%			
Estimated Value of Traditional Houses in Temotu:				
Extrapolated value of traditional houses Guadalcanal (2020)	SI$121,335			Extrapolated by CPI (2010=100) according to WBI
Average Annual Expenditures per HH in housing/utilities Guadalcanal	SI$9,743			SINSO (2015) 3/
Average Annual Expenditures per HH in housing/utilities Temotu	SI$5,603			SINSO (2015) 3/
Ratio Annual Expenditures per HH Guadalcanal/Temotu	1.74			Per above
Extrapolated Unit Value of Traditional Houses in Temotu	SI$69,775			Per above
Assume cyclone flooding/storm surge inflicts comparable minimal damage	4.3% of replacement value of traditional houses in Temotu	4.3% of replacement (baseline) value of school		ICR assumption
Estimated damages avoided during a major flood/storm event (per unit)	SI$3,000 (per house)	SI$10,036 (for school)		Per above
Estimated damages avoided during a major flood/storm event (all units)	SI$75,008 (all houses)	SI$10,036 (for school)		Per above
Frequency of cyclones in Solomon Islands	31 over last 30 years (approximately 1 x year)			Maru, Shibata and Ito (2018) 4/
Frequency of cyclones Category 2 and higher (>150 km/h on average)	1 every 4 years			Maru, Shibata and Ito (2018) 4/
Estimated annualized damage avoided from storm surges	**SI$18,752**	**SI$2,509**		**Per above**
2. Avoided Damage due to Tsunamis				
Situation without project	Major destruction of stonewall	Total destruction (100% replacement value)		ICR assumption based on location
Situation with project	Major destruction (no difference)	Partial destruction (26.1% of replacement value)		ICR assumption based on location
Damage without project	Same as with project	SI$233,400		Per above
Damage with project	Same as without project	SI$60,917		Per above
Avoided damage during major tsunami	SI$0	SI$172,483		Per above
Frequency of tsunamis in Solomon Islands	9 over last 30 years			wordData.info 5/
Frequency of tsunamis with significant wave heights (> 7 meters)	3 over last 30 years (1 in 10 years)			worldData.info 5/
Estimated annualized damage avoided from major tsunamis	**SI$0**	**SI$17,248**		**Per above**
3. Time Savings from Avoided Stonewall Repairs				
Time spent on stonewall repairs per HH per storm event	5 person-days	Included in replacement costs of school		ICR assumption
Opportunity cost of time	SI$2/hour			ICR assumption (see main text)
Opportunity cost of time per HH per storm event	SI$80			Per above
Opportunity cost of time per event (all households)	SI$2000			Per above
Annualized time savings from avoided house/stonewall repairs (all HH)	**SI$500**			**Per above**
Other, non-quantified Benefits	Avoided major damage to houses and assets Potential loss of lives due to stonewall failure			
Benefit Stream (number of years)	20, starting upon completion of investment			
Discount Rate (for Net Present Value)	6%			

1/ Assumed to represent house replacement value
2/ World Bank (2014). Rapid Assessment of the Macro and Sectoral Impacts of Flash Floods in the Solomon Islands, April 2014. Government of Solomon Islands and World Bank
3/ Solomon Islands National Statistics Office (2015). Solomon Islands 2012/13 Household Income and Expenditure Survey. Provincial Analytical Report.
4/ Maru, E., T. Shibata and K. Ito (2018). Statistical Analysis of Tropical Cyclones in the Solomon Islands. Atmosphere 2018, 9: 227; doi:10.3390/atmos9060227.
5/ https://www.worlddata.info/oceania/solomon-islands/tsunamis.php

B. COST-BENEFIT ANALYSIS

5. A comprehensive cost-benefit analysis was carried out at the completion stage for each sub-project type, as well as for the aggregated sub-projects, whereby the summed benefits were accounted against total costs of Components C (CCA and DRM Investments) and D *(Project Management and Monitoring and Evaluation),* with taxes excluded. The aggregated analysis included 78.6 percent of final project costs. The assumptions used are detailed in Tables 4.2 (for the two reinforced sub-projects above), 4.3 (for water sub-projects), 4.4 (for community evacuation centers), 4.5 (for footbridges), 4.6 (for provincial-level shoreline protection), and 4.7 (for schools). Although CRISP only contributed specific inputs to its four assisted schools—a rainwater system, a pumped borehole and a girl's dormitory for three secondary schools, and the aforementioned elevation of a primary school[35]—their benefits were considered sufficiently distinct to merit a separate cost-benefit analysis.

6. The assumptions used were derived from detailed interviews with key respondents at a sample of sub-project sites, complemented by results from the beneficiary survey, feedback from project experts, project records and secondary data. The sub-projects visited in Guadalcanal, Malaita, and Central Province for the economic analysis included: 13 percent of all rainwater harvest sites supported by the project; 6 percent of gravity-fed systems; 11 percent of pumped boreholes/springs; 50 percent of footbridges; 20 percent of evacuation centers; 50 percent of the shoreline protection; and 75 percent of schools. Sub-project complexity and expected variation within a sub-project type were considered when choosing sites to visit. For example, rainwater harvest systems were expected to have more homogeneous benefits than shoreline protection or schools, justifying a smaller sample. The ICR team was unable to visit Temotu or Rennell and Bellona due to logistical constraints.

7. **Costs.** Economic costs included project **investment costs** imputed by the PMU to sub-projects, comprising: (1) supply, transport and installation of materials and works procured directly by the PMU, as well as funds provided directly to the SICs; (2) community contributions (consisting of costed in-kind labor and local materials); and (3) RDP2 contributions for the seven sub-projects that were co-financed and led by RDP2. The economic analysis of individual sub-project types did not include engineering and community helpers' overhead costs, or costs of the CBDRM/V&A planning process, as the PMU had aggregated and separately accounted these against sub-component C.1. However, these costs were included, along with all project management costs, in the aggregated cost-benefit analysis (see para. 21 below). **Periodic and annual maintenance costs**, specific to sub-project types, were also considered, with periodic maintenance ranging from 1 percent of investment costs for rainwater harvest systems (RWH), to as much as 10 percent for boreholes and buildings, every five years. Expected structure **lifetimes** (assuming full maintenance costs) were 15 years for RWH and footbridges; 25 years for gravity fed systems (GFS) and pumped boreholes and springs; 20 years for buildings; and 50 years for provincial shoreline protection. **Taxes**, as applied to the project, were excluded, comprising: 7.5 percent for works contracts (including borehole drilling); 10 percent for services and domestic goods; 40 percent for domestic consultants (based on their pay scale) and 20 percent for international consultants. The project was exempted from duties levied on imported materials.

8. **Benefits.** Project benefits were estimated based on the principle of incrementality (benefits with project minus benefits without project) and were assumed to start the year after investment for the duration of the structures' expected life**.**

[35] On PMU records as well as in Table 2, these sub-projects are listed under rainwater harvest, gravity-fed systems, and, for the two last schools, under resilient buildings, reflecting the type of assistance provided by CRISP. Only in the economic analysis (Tables 3 and 4.8) are they separated under "schools".

9. **Benefits from water sub-projects** were derived from: (1) the value of time saved; and (2) health costs avoided, in accordance with WaterAid's methodology.[36] Time saved by not having to collect water was the average reported by beneficiaries in project's beneficiary survey: 95 minutes per household per day for RWH schemes; 50 minutes for GFS; and 59 minutes for pumped boreholes and springs. A significant proportion of beneficiaries (50-54 percent, depending on type of scheme) reported using this extra time to fish, farm, or make food or handicrafts (e.g., shell money) to sell in local markets. For these households, the value of time saved was derived from the reported market value of the incremental production sold. Field interviews revealed five different types of incremental income, from fishing, garden sales, vegetable sales, shell money, and ring cake sales, which yielded an estimated average value of time saved of SI$3,000/household/year for all water sub-project types (see Table 4.3).

10. For the remainder of households that did not report sales, the value of time saved was estimated at a shadow wage rate of SI$2 per hour. Only one adult per household was assumed to benefit from time saved. Both of these assumptions are highly conservative, considering that: (1) a small sample of beneficiaries interviewed during the ICR mission stated their willingness to accept wages in lieu of time freed by the project at more than SI$6/hour; and (2) children (particularly girls) were also involved in water gathering. However, while the Solomon Islands official minimum wage is SI$8/hour, it was adjusted from a previous (long-prevailing) rate of SI$4/hour only in 2019 and may over-estimate marginal productivity in subsistence communities. At the end, the ICR team decided to use the same shadow wage rate as estimated for the RDP ICR (Report No. ICR00003499). Based on these conservative assumptions, the estimated value of time saved by households that did not report market sales ranged from SI$640-S$1,160/household/year, depending on the type of water scheme.

11. Health costs avoided were estimated based on the reported incidence of water-borne diseases. The without project scenario considered (based on field interviews) that children had to visit clinics for water-borne illnesses at least 2-3 times per year.[37] Under the project, this incidence was reported to decrease by at least half. Treatment costs were valued at SI$33.5 per illness, the costs to the government of a standard diarrhea treatment (a course of Septrin/Panadol/dehydration sachet). Based on these assumptions, the value of health costs avoided was estimated at SI$126/household/year.

12. Other water sub-project benefits that were not quantified included: (1) the opportunity value of children's time, particularly girls, who typically accompanied their parents to collect water; (2) health costs avoided for adults and the elderly; (3) increased well-being from being able to wash more often and with cleaner water; and (4) increased safety, as a result of not having to walk or paddle long distances in search of water.

13. **Community evacuation centers.** Quantified benefits included: (1) the value of household assets saved during emergencies; and (2) the value of the centers' ancillary uses. Based on site interviews, the value of assets potentially saved by the centers was estimated at 20 percent of an average household asset value of SI$1,000. Evacuations were assumed to occur once every 12 years, based on reported historical events. This yielded a modest annualized benefit estimated at SI$2,242 for a total 928 m^2 of sheltering capacity. The valuation did not consider the value of potential lives saved, as it was not clear whether other, smaller shelters existed in the project communities.

[36] Redhouse, D., P. Roberts and R. Tukai (undated). *Everyone's a Winner: Economic Valuation of Water Projects*. WaterAID Discussion Paper. *https://www.google.com/search?client=safari&rls=en&q=Everyone%E2%80%99s+a+Winner:++Economic+Valuation+of+Water+Projects&ie=UTF-8&oe=UTF-8*.

[37] Several respondents reported much higher prevalence, on the order of one to two illnesses a month.

Table 4.3: Summary of Assumptions Used in Economic Analysis – Water Sub-Projects

(RWH - Rainwater Harvest Systems; GFS - Gravity Fed Systems; PBS - Pumped Boreholes or Springs)

Items	Assumptions Used				Source
Costs:					
Investment Costs	Actual (final) costs of sub-projects + Community in-kind contribution (costed) + RDP II co-financing (if any)				PMU Records
	RWH	GFS	PBS	Unit	
Life Time of Structures	15	25	25	Years	Project Lead Engineer
Periodic Maintenance Costs	1%	5%	10%	of investment costs	Project Lead Engineer
	5	5	5-10 *(used 5)*	Every _ years	Project Lead Engineer
Annual Operation and Maintenance Costs	SI$3	SI$4-5 *(used 4.5)*	SI$8.56-9.58 *(used 9.07)*	Cost/month/Household	Project Lead Engineer
Benefits:					
1. Value of Time Saved *Applied to HH without incremental sales:*					
	RWH	GFS	PBS	Unit	
V = [(T1/Q1) – (T2/Q2)] x W x Q1, where:					Water Aid
T1 = time spent collecting water without project	98	54	75	Minutes/day	Beneficiary Survey (RWH/GFS); Sample Survey (PBS)
T2 = time spent with project	4	4	16	Minutes/day	Beneficiary Survey (RWH/GFS); Sample Survey (PBS)
T1-T2 = average time saved due to water SP	95	50	59	Minutes/day	
Q1= quantity used without project	Same 1/	40	Same 2/	l/HH/day	Site interviews
Q2 = quantity used with project	Same 1/	120	Same 2/	l/HH/day	Site interviews
W = opportunity cost of labor, estimated as follows:	SI$0.033	SI$0.033	SI$0.033	per minute	Project Assumption
Unskilled wage rate (minimum wage) Solomon Islands			S$8/hour		Solomon Islands Government
As households are not earning wages, opportunity cost assumed to be 1/4 of wage rate (see main text)			S$2/hour (S$0.033/minute)		Project Assumption
# People/HH to whom time savings applies			1 adult		Project Assumption
	RWH	GFS	PBS	Unit	
V = Value of time saved per HH	SI$3.17	SI$1.76	SI$1.97	Per day/HH	Per above
Average Annual Value of Time per HH	**SI$1,156.8**	**SI$640.8**	**SI$717.8**	**Per Year/HH**	Per above
% of HH not reporting incremental sales	46.0%	47.4%	50.0%		Beneficiary Survey
2. Value of Incremental Sales *Applied only to % of HH reporting incremental sales due to time saved:*					
$V_I = V_W - V_{WO}$, where:					Water Aid
Types of Incremental Income Reported In Site Surveys	**Ringcake Sales**	**Garden Sales**	**Vegetable Sales**	**Shell Money**	**Fishing**
V_W =Value earned with project per HH	SI$120/day	SI$300/week	SI$50/week	SI$300/month	SI$500/week
V_{WO} =Value earned without project per HH	SI$100/day	SI$150/week	SI$20/week	SI$50/month	SI$300/week
V_I = Incremental income earned (due to time saved) per HH	SI$20/day	SI$150/week	SI$30/week	SI$250/month	SI$200/week
Frequency of sales/year	50% (182.5 days)	50% (26 weeks)	50% (26 weeks)	50% (6)	50% (26 weeks)
Average Annual Incremental Income per HH (Market Sales)	SI$3,650	SI$3,900	SI$780	SI$1,500	SI$5,200
Average for all Types of Sales Reported (per HH per Year)	**SI$3,006**				
	RWH	GFS	PBS		
% of HH reporting incremental sales	54.0%	52.6%	50.0%		Beneficiary Survey
3. Value of Improved Health *Applied to all beneficiary HHs*					
3.1. Value of Health Costs Avoided (children)					
V = L x CL, where					Water Aid
L = number of illnesses avoided					
CI – treatment cost per household per illness					
Incidence of water-related diseases without project (requiring visit to clinic)		2-3 x Year/child			Site Interviews (conservative answers)
Incidence of water-related diseases with project		50% of without project incidence			Project Assumption
Number of children affected/HH		3			Based on average HH size of 5.7 for all water sub-projects
L=number of illnesses avoided/HH/Year		3.75			Per above
CL= treatment cost/HH/Illness (SI$)		SI$33.5			Based on standard treatment cost for diarrhea in project areas
V = Value of Health Costs Avoided/HH/Year (SI$)		**SI$125.6**			Per above
	RWH	GFS	PBS		
Total Number of Households Considered in Analysis	2,538	1,228	588		
% of Total Project Households for Sub-Project Type	40% 3/	80% 4/	80% 4/		
Benefit Stream (number of years)	15	25	25		
Starting		1 year after investment			
Other, non-quantified Benefits		Time saved from adult illnesses; well-being from improved cleaningless; increased safety for women, children and elderly			
Discount Rate (for Net Present Value)		10%			

1/ RWH water is used for essential needs (drinking and cooking) which is assumed unchanged with and without the project at 4 liters/person/day
2/ No changes in quantity reported
3/ Assuming 4-5 HH/tank installed, and excluding HH which rely primarily on pre-existing tanks and absentee HH (working in Honiara but returning for vacation).
4/ Excludes 20% assumed to be absentee households

Table 4.4: Summary of Assumptions Used in Economic Analysis – Community Evacuation Centers Sub-Projects

Items	Assumptions Used	Source
Costs:		
Investment Costs	Actual (final) costs of sub-projects + Community in-kind contribution (costed)	PMU Records
Life Time of Structure	20 years	Project Lead Engineer
Periodic Maintenance Costs	10% of investment costs, every 5 years	Project Lead Engineer
Annual Operation and Maintenance Costs	5% of investment costs/year (includes caretaker costs, repairs)	Project Lead Engineer
Benefits:		
1. Value of Household Assets Saved (during disasters)		
Sheltering capacity of centers	1 m2/person	NDMO standard
Total area of project evacuation centers	928 m2 (5 community centers)	Project Lead Engineer
Total sheltering capacity (Number of people)	928	as per above
Average household size	6.9	Site Interviews
Total sheltering capacity (Number of households)	134	Per above
Estimated value of household assets	SI$1000	Per above
% of household asset value potentially saved in shelters	20%	Site Interviews
Estimated savings of household assets in shelters/HH/evacuation	SI$200	Per above
Number of historical evacuations (1972-2019)	4	Site Interviews
Periodicity of historical evacuations	1 per 12 years	Per above
Annualized value of assets saved per HH	SI$16.7	Per above
Annualized value of assets saved according to shelter capacity	**SI$2,242**	**Per above**
2. Ancillary Uses of Centers:		
As a playschool for children:		
Total number of beneficiary households in centers' communities	396	PMU records
% of mothers leaving children at the centers	2/3	ICR assumption based on site interviews
Estimated number of mothers benefiting	264	Per above
Hours saved per day/mother	3	ICR assumption based on site interviews
Opportunity value of hour saved	SI$2	ICR assumption (see main text)
Value of hours saved per day/mother	SI$6	Per above
Estimated days of playschool benefits/year	200	Normal school calendar in Solomon Islands (40 weeks x 5 days/week)
Value of hours saved per year/mother	SI$1,200	Per above
Total value of hours saved per year	**SI$316,800**	**Per above**
As a rental venue:		
Reported Rental Value per Event (Venue)	SI$2,500	Sample survey
Food provision per Event	SI$2,500	Sample survey
Estimated rental events per year per center	5	50% of reported frequency based on sample survey
Total number of centers	5	PMU records
Annual Income from Use of Centers as Rental Venues	**S$125,000**	**Per above**
Other, non-quantified Benefits	Value of lives saved	
Benefit Stream (number of years)	20, starting 1 year after investment	
Discount Rate (for Net Present Value)	10%	

14. The value of the centers' ancillary uses was based on two reported uses of the centers: as rental venues and as kindergartens. In the first instance, the centers were assumed to be rented on average five times a year for local events, festivities or workshops (half of what beneficiaries expected, a conservative assumption). In the second instance, the centers were assumed to benefit two-thirds of mothers, by enabling them to leave their children at the kindergarten for an average of three hours per day for 200 days a year (the normal school calendar in Solomon Islands). Aggregated benefits were estimated at SI$88,000 per center per year (see Table 4.4).

15. **Footbridges.** Benefits from footbridges were estimated based on: (1) the reported value of incremental market sales; and (2) the value of incremental education for school children. In both cases, footbridge construction facilitated access, and, consequently, increased market/school openings during the flood/storm season. The incremental value of market sales was based on reported average sales per household, and the difference in number of market days with and without the project. The value of incremental education considered future income earning differentials between students who dropped out of primary school and those who went on to acquire at least some secondary school education. Interviews with the school principal at one of the sites revealed that the transition rate to secondary school had been only 16 percent, but was expected to double with footbridge access, due to less absenteeism and school day closures during the flood season. The impact on future earnings was assumed to occur eight years after graduation (at age 20) and result in an income differential of SI$4,363/year—the difference between the median reported basic income for manual labor and an entry level trades job, as reported by the Solomon Islands Remuneration Report.[38] Table 4.5 outlines the detailed assumptions used.

16. **Provincial-level Coastal Protection Works.** The Tulagi shoreline protection protects a 260-meter stretch of the island's ring road, which, in the project's absence, was expected to be cut off, requiring a costly rerouting further inland. The works also protect a provincial rest house and sports ground. Should the road succumb to erosion, overland flooding was expected to also affect Tulagi's main market and a nearby shop during spring tides. Given these parameters, sub-project benefits were based on: (1) avoided costs of rerouting the stretch of road at high risk of erosion; (2) avoided loss of assets protected by the works; and (3) avoided inundation losses due to overland flooding during high tides and storms. Avoided costs of rerouting the road were based on the reported replacement value for similar two-lane roads in Auki, Gizo and Noro/Munda in 2018 (US$855-900 per linear meter) and the cost of a culvert and short span bridge required to reroute the road further inland to its most likely place, as reported by provincial authorities and the project's lead engineer. Based on historical erosion rates, and projected sea level rise,[39] the road would be lost within an estimated five-year period, in the absence of the project intervention. The alternative stretch of road is 608 meters (versus 260 meters for the protected coastal stretch) and would cost an estimated SI$5.9 million. Thus, coastal protection was estimated to yield an annualized benefit of SI$1.18 million during the five years following the investment. Avoided damages and losses to the provincial rest house were estimated based on the building's replacement (SI$2 million) and rental value (SI$162,000/year), annualized over the five years of probable road loss. To estimate avoided inundation losses, it was assumed that the Tulagi market and surrounding shop would, in the project's absence, suffer overland flooding for two days a month during high tides, following the erosion of the road. Based on the average reported sales at the market and shop, and number of operating days, estimated avoided inundation losses were SI$123,945 a year (see Table 4.6).

[38] Strategic Pay (2016). *Solomon Islands Remuneration Report 2016. https://www.solomonchamber.com.sb/media/1319/solomon-islands-remuneration-report-2016-3.pdf.*

[39] *Tulagi Main Design Report*, Internal Project Document.

Table 4.5: Summary of Assumptions Used in Economic Analysis – Footbridges Sub-Projects

Items	Assumptions Used	Source
Costs:		
Investment Costs	Actual (final) costs of sub-projects + Community in-kind contribution (costed)	PMU Records
Life Time of Structure	15 years	Project Lead Engineer
Periodic Maintenance Costs	----	Project Lead Engineer
Annual Operation and Maintenance Costs	2-3% per year	Project Lead Engineer
Benefits:		
1. Value of Incremental Marketing *(in Rara, Central Islands)*	*Access to market during flood season now enabled by foot bridge*	
Market days without project	No market during flood season (6 months); Occasional sales during wet season	Site interviews
Market days with project	Once a week, benefiting also neighboring village	Site interviews
Incremental market days	26 *(once a week, during 6 months flood season)*	Site interviews
Average sales per HH per market day	SI$30	Site interviews
Average annual sales per HH	SI$780	Per above
Number of HH benefiting	40	Site interviews
Annual Value of Incremental Marketing due to Foot Bridge	**SI$31,200**	**Per above**
Benefits above extrapolated to second foot bridge sub-project by number of HH		
2. Value of Incremental Education on Future Earning Potential *(in Rara)*	*Access to primary school during flood season enabled by foot bridge*	
Access to primary school - without project	Restricted during flood season, causing absenteeism/poor performance	
Access to primary school - with project	Accessible year round	
Students graduating to secondary school without project	2-3/year (used 2.5)	Site interviews with teacher
Students graduating to secondary school with project	5/year	Site interviews with teacher
Incremental number of students graduating	2.5/year	Per above
Age at which students start secondary school	12	MEHRD PAR 2017 1/
Age at which earnings assumed to start	20	Project assumption
Median reported basic annual income for O2 level - manual labor 2 job	SI$20,805 *(assumed earnings for primary school drop outs)*	Solomon Islands Remuneration Report 2016 2/
Median reported basic annual income for O3 level trades 1 job	SI$25,168 *(assumed earnings for secondary school education)*	Solomon Islands Remuneration Report 2016 2/
Incremental annual income at age 20 per student	SI$4,363	
Years after investment when earnings start	10 3/	Project assumption 3/
Annual Value of Incremental Education	**SI$10,908**	**Per above**
Benefits above extrapolated to second foot bridge sub-project by number of HH		
Other, non-quantified Benefits	Preventable deaths and injuries from improved access to health clinic; Improved marketing, access to early warning and information due to access to telecommunications signal	
Benefit Stream (number of years)	20, starting 1 year after investment	
Discount Rate (for Net Present Value)	10%	

1/ Solomon Islands Ministry of Education and Human Resources Development (2017) Performance Assessment Report 2017

2/ - Strategic Pay (2016) Solomon Islands Remuneration Report 2016. https://www.solomonchamber.com.sb/media/1319/solomon-islands-remuneration-report-2016-3.pdf

3/ - Students graduate from primary school (year 6) at age 11. It is assumed the first cohort of beneficiary students graduates one year after investment. Subsequent cohorts graduate with a year's lag.

Table 4.6: Summary of Assumptions Used in Economic Analysis – Provincial Shoreline Protection

Items	Assumptions Used	Source
Costs:		
Investment Costs	Actual (final) costs of sub-project	PMU Records
Life Time of Structure	50 years	Project Lead Engineer
Periodic Maintenance Costs	5% of investment costs, after 4 years	Project Lead Engineer
Annual Operation and Maintenance Costs	3%	Project Lead Engineer
Benefits:		
1. Avoided Cost of Rerouting the Road *(due to Coastal Erosion)*		
Length of coastal protection works	240 m	PMU Records
Length of coastal road protected by sub-project	260 m	PMU Records
Erosion rate over last 30 years	15-20 m inland	Design Report, based on historical maps
Estimated erosion rate by 2050 with sea level rise	28 m	Design report estimates of SLR incremental wave increase
Average distance of road from shore	4-6 m	Design report
Estimated time frame to lose the road to erosion (without project)	5 years	Per above
Estimated length of most viable substitute road (without project)	608 m	Project Lead Engineer, based on Google Earth estimates of most likely rerouting
Average cost per linear meter of road rehabilitation (similar conditions)	US$855-900	Actual costs of similar roads in Auki, Gizo, and Noro/Munda (2018)
Estimated cost per linear meter in SI$ (2018)	SI$6,976	WBI official exchange rate (2018)
Estimated cost per linear meter in SI$ (2020)	SI$7,468	WBI Consumer Prince Index (2010=100)
Total estimated costs of rerouting the road (within 5 years, w/o project)	SI$4,540,211	Per above
Estimated cost of box culvert and short span bridge (for rerouted road)	30% of road costs (on top)	Project Lead Engineer
Total estimated costs of rerouting the road with/culvert and bridge	SI$5,902,274	Per above
Period to which avoided cost applies	5 years (starting year after investment)	Estimated time to lose road to erosion (w/o project)
Annualized avoided costs of rerouting the road	**SI$1,180,455**	**Per above**
2. Avoided Loss of Assets		
Type of asset at risk	Provincial Rest House	Project engineers
Estimated building replacement value	SI$2 million	Provincial officers
Estimated loss of rental value (without project)		
Rental per night per room	SI$300	Provincial officers
Number of rooms at full occupancy	6	Provincial officers
Estimated occupancy rate	Half of the rooms, 180 days/year	Project assumption
Estimated loss of rental value	SI$162,000	Per above
Duration of loss (assuming building is rebuilt elsewhere)	1 year of income loss	Project assumption, assuming building rebuilt elsewhere after 1 year
Building replacement value + 1 year of rental loss	SI$2,162,000	Per above
Period to which avoided loss applies	5 years (starting year after investment)	Estimated time building would be lost to erosion (w/o project)
Annualized avoided loss of assets	**SI$432,400**	**Per above**
3. Avoided Innundation Losses due to Overland Flooding during high tides/storms		
Assets at risk:	Market, and 1 shop	Site visit
Frequency of high tides	2 x month	https://oceanservice.noaa.gov/education/tutorial_tides/tides05_lunarday.html
Estimated time when innundation would become a problem (without project)	Within 5 years, after loss of road	Per above
Estimated number of days/year of innundation	24	Per above
Estimated Innundation Losses to Market (without project):		
Average sales per day per market seller	SI$100	Site interviews
Number of sellers operating	50	Site interviews
Average sales per market day	SI$5,000	Site interviews
Number of days operating per year	290	Based on 6 days/week operation, minus 11 holidays/year
Average sales/day	SI$3,973	Per above
Estimated annual losses due to innundation/year (by year 5)	SI$95,342	Days of innundation x average sales/day
Estimated Innundation Losses to Shop (without project):		
Average sales per day shop is open	SI$1,500	Site interviews
Number of days operating per year	290	Based on 6 days/week operation, minus 11 holidays/year
Average sales/day	S$1,192	Site interviews
Estimated annual losses due to innundation/year (by year 5)	SI$28,603	Days of innundation x average sales/day
Annual Avoided Innundation Losses	**S$123,945**	**Per above**
Avoided innundation losses assumed to increase progressively to this level by year 5 (as the road would increasingly erode during this period, without the project)		
Other, non-quantified Benefits	Safe access to school for 250 students (who would have to walk an additional 15 minutes through unsafe path)	
	Protection of sporting facility	
	Ammenity/tourism value of century old tree coastal road	
	Avoided compensation of affected landowners in the event of road rerouting	
Benefit Stream (number of years)	30, starting 1 year after investment	
Discount Rate (for Net Present Value)	10%	

17. **Schools.** The benefits of school sub-projects were derived from the specific sub-project outputs, feedback from detailed site interviews and data from the Ministry of Education and Human Resources Development (MEHRD). Estimated benefits included: (1) saved travel costs to fetch water at the nearest public tap; (2) avoided health costs; and (3) value of incremental education on future income. The value of time saved—for schools provided with improved water sources—was not costed, as it would presumably translate into improved student performance and thus be captured under incremental education benefits. The analysis also did not compute the value of increased hygiene (particularly important for female students) and improved safety from floods and droughts. The benefits outlined below apply to three secondary schools where the project financed water supply (two schools) and a girls' dormitory (third school). Benefits to the fourth, reinforced primary school are described separately in paragraph 19 below.

18. Saved travel costs were estimated for one of the schools where, in the project's absence, the school would have to organize boat trips to the nearest public tap during the dry season (at a cost of SI$140/trip, twice a week). Benefits from avoided health costs only applied to the second school, where the installation of a pumped borehole improved the quality of drinking and bathing water, resulting in an estimated 40 avoided instances of illnesses a year, according to the school nurse. The value of incremental education was estimated for all three schools based on the difference in transition rates from secondary to tertiary education (as reported by school principals and MEHRD), as well as the resulting estimated future income differential. With the project, the number of students transitioning to higher (university) education was assumed to increase modestly by 2-3 students a year. In the two water-supplied secondary schools, this is due to expected improvements in student performance due to lower absenteeism and school day closures. In the without-project scenario, non-transitioning students would normally go on to technical schools, resulting in an income earning differential six years later of about SI$24,900 per year per student, compared to those transitioning to university in the with-project scenario (equivalent to the difference in base salary between a Technical Support/Entry Level Specialist and a First Level Specialist/Supervisor).[40] For the third school, where the project built a new girls' dormitory, incremental benefits result from a planned expansion in student admissions, as well as from the fact that it is a top school where graduates are more likely to qualify for admission to regional universities. As such, the difference in future income was assumed to equal that of a University of South Pacific graduate vis-à-vis a graduate from the Solomon Islands National University, or an estimated SI$29,500 a year per student. The detailed assumptions are described in Table 4.7.

19. **Reinforced sub-projects.** The two reinforced sub-projects (see Table 4.1) had limited incremental benefits. The community shoreline protection sub-project simply reinforced an existing traditional seawall with grouted masonry. In this Temotu community, houses are located above the maximum water level and are naturally at low risk of inundation, suffering only minimal damage during Tropical Cyclone Pam in 2015. The traditional seawall, in place for generations, was periodically rebuilt if any damage occurred due to heavy winds and waves. As such, reinforcement benefits were computed based on: (1) avoided damages to the houses during strong cyclones; and (2) value of time saved in reconstructing the seawall and houses after major storms. To estimate avoided damages to traditional houses, the analysis relied on the only known publication of traditional housing values, the 2014 assessment of flash flood impacts in Guadalcanal.[41] This report estimates the average replacement value of fully destroyed houses in Guadalcanal as SI$109,095 (in 2014 value) and the estimated damage to minimally damaged houses at about 4.3 percent of their replacement value. About 92 percent of this stock were traditional houses. To extrapolate this value to Temotu, the

[40] Strategic Pay (2016). *Solomon Islands Remuneration Report 2016. https://www.solomonchamber.com.sb/media/1319/solomon-islands-remuneration-report-2016-3.pdf.*

[41] World Bank (2014). Rapid Assessment of the Macro and Sectoral Impacts of Flash Floods in the Solomon Islands. Government of Solomon Islands and World Bank/GFDRR.

Table 4.7: Summary of Assumptions Used in Economic Analysis – Schools Sub-Projects

Items	Assumptions Used				Source
Costs:					
Investment Costs	Actual (final) costs of sub-projects + School contribution + RDP II co-financing (if applicable)				PMU Records
	Site 1	Site 2	Site 3	Unit	Project Lead Engineer
Type of Sub-Project	Water Supply	Water Supply	Resilient Building		
Sub-Type	RWH	Borehole and RWH	Girls' Dormitory		
Life Time of Structures	15	25 (Borehole); 15 (RHW)	20	Years	Project Lead Engineer
Periodic Maintenance Costs	1%	10% (Boreholes); 1% (RWH)	10%	% of investment costs	Project Lead Engineer
	5	5 (Boreholes and RWH)	5	Every _ years	Project Lead Engineer
Annual Operation and Maintenance Costs	0.81% (RWH) 1/	SI$60,000 (Borehole); 0.81% (RWH) 1/	5%	Reported annual O&M cost (Borehole); % of investment cost (RWH, Dormitory)	Project Lead Engineer
Benefits:					
	Site 1	Site 2	Site 3		
	Water Supply	Water Supply	Resilient Building		PMU Records
Situation without project	Existing old RWH tanks but insufficient during dry season (10 weeks) requiring boat trips to surrounding village taps to fill school tanks. Loss of class time	Old river pump and tank used for student bathing, washing, sanitation, but polluted and silted. Old RWH tanks insufficient	Overcrowding in existing girls dormitories, forcing a reduction in admissions to a top secondary school; unsafe to floods		Site Interviews
Situation with project	11 new RWH tanks installed (8 from project, 3 from school)	1 new pumped borehole with 2 tanks	New girls dormitory, flood resistant (elevated)		Site Interviews
1. Value of Time Saved					
	Site 1	Site 2	Site 3		
	Water Supply	Water Supply	Resilient Building		
	Subassumed under value of incremental education 2/		Not applicable		
2. Value of Saved Travel/Operating Costs					
Site 1:	Site 1	Site 2	Site 3	Unit	
Cost of boat fuel to fetch water during dry season	SI$140	Not applicable	Not applicable	Per trip	Site Interviews
Trips during dry season	2			Per week	Site Interviews
Duration of dry season	10			Number of weeks	Site Interviews
Site 2:					
Additional electricity costs of operating river pump		SI$5,000		Per month	Site Interviews
Annual value of saved travel costs	**SI$2,800**	**SI$60,000**		**Per year**	
3. Value of Improved Health					
3.1. Value of Health Costs Avoided (children)					
V = L x CL, where					Water Aid
L = number of illnesses avoided					
CI – treatment cost per household per illness	Site 1	Site 2	Site 3	Unit	
Incidence of water-related illnesses without project (requiring visit to clinic)	No difference since water quality comparable	100	Not applicable	Per year (all students)	Site Interviews
Incidence of water-related illnesses with project		60		Per year (all students)	Site Interviews
L=number of illnesses avoided/HH/Year		40		Per year (all students)	Site Interviews
CL= treatment cost		SI$33.5		Per illness	Based on standard treatment cost for diarrhea in project areas
V = Annual value of Health Costs Avoided		**SI$1,340**		Per year (all students)	Per above
4. Value of Incremental Student Performance and Future Earning Potential					
For Sites 1 and 2 only:	Site 1	Site 2	Site 3	Unit	
Number of Year 12 Students	40	53		Per year	Interviews with School Principals
Form 6 (Year 12) Transition Rate without project	5%	73%		% of students who pass Form 6 exam (year 12 to 13)	Interview with School Principal (Site 1) and MEHRD (Site 2)
Form 6 (Year 12) Transition Rate with project	12.5%	78%		% of students who pass Form 6 exam (year 12 to 13)	Interview with School Principal (Site 1) and MEHRD (Site 2)
For Site 3 only:					
Number of Year 13 Students per year without project			17	Per year	Interviews with School Principal
Expected Number of Year 13 Students with project			20	Per year, increasing over a period of 3 years	Interviews with School Principal
Transition Rate to high level University without project			73.5%	% of students who have GPA > 3.5	Interviews with School Principal
Transition Rate to high level University with project			73.5%	Assumed the same with project	
Incremental number of students transitioning/year	3.0	2.65	2.205 4/		
Earning potential without project:					
Continuing Education	Technical school		Solomon Island National University	Assumed follow-up education if failed	Project Assumption
Future job earning level	T1/T2 (Technical Support or Entry Level Specialist)		T3/L3 (First Level Specialist or Supervisor I)	Assumed JobWisee Levels	Solomon Islands Remuneration Report 2016 5/
Expected Base Salary	SI$44,347		SI$69,257	Annual Future Base Salary/Student	Solomon Islands Remuneration Report 2016 5/
Earning potential with project:					
Continuing Education	Grade 13 and University		University of South Pacific	Assumed follow-up education after transition	Project Assumption
Future Job Earning Level	T3/L3 (First Level Specialist or Supervisor I)		T4/L5 (Mid-Level Specialist/Team Leader)	Assumed JobWisee Levels	Solomon Islands Remuneration Report 2016 5/
Expected Base Salary	SI$69,257		US$98,748	Annual Future Base Salary/Student	Solomon Islands Remuneration Report 2016 5/
Estimated Salary Increment per Student	SI$24,910		SI$29,491	Per year per student	Solomon Islands Remuneration Report 2016 5/
Incremental Annual Value of Future Earnings	**SI$74,729**	**SI$66,010**	**SI$65,054 4/**	**Per year, per student cohort 3/**	
Years after investment when expected earnings start	6 3/		5		
Benefit Stream (number of years)	15	25	20		As per life time of structures
Starting	1 year after investment				
Other, non-quantified Benefits	Increased attractiveness of school due to improved water supply Increased resilience to drougths		Increased student safety/hygene Increased resilience to floods		
Discount Rate (for Net Present Value)	0.1				

1/ Derived from annual operation and maintenance costs from all RWH sub-projects
2/ Time saved per student averages 3.5 minutes/day for Site 1 and 13.1 minutes/day for Site 2. However, these benefits were assumed to translate into better student performance and be captured under future earning differentials, above.
3/ Assumes 1 year of grade 13, plus 4 years of University before incremental earnings start. For Site 3, it assumes 4 years of University before earnings
4/ With gradual increase in benefits (0.7 incremental students in first year, 1.5 on second year, and 2.2 on third year). Subsequent cohorts of students graduate with a year's lag.
5/ - Strategic Pay (2016) Solomon Islands Remuneration Report 2016
Note: Sites 1 and 2 assumed to benefit from improved student performance (% transition rate). Site 3 assumed to benefit from increased student admissions (with no change to transition rate).

analysis compared average annual expenditures in housing and utilities for Guadalcanal with those for Temotu, based on the 2012/13 Household Income and Expenditure Survey,[42] and converted to 2020 values by the Consumer Price Index, providing an estimated replacement value for traditional houses in Temotu of SI$69,775. Strong cyclones (Category 2 and above, and more than 150 kilometers an hour on average) affect Solomon Islands once every four years, based on past 30-year records.[43] It was assumed this would inflict minimal damage to community houses (equivalent to 4.3 percent of their replacement value). Based on this, annualized damage avoided from storm surges was estimated at SI$18,752 (SI$750/house). Time saved by not having to reconstruct damaged houses and the seawall was estimated at five person-days per household per event or, based on an opportunity cost of SI$2/hour, SI$500 for the 25 households on an annualized basis (see Table 4.2). The above assumptions are considered realistic, if conservative (see Table 4.7).

20. Similar assumptions were used to estimate incremental benefits of the second sub-project (a primary school), based on the value of damages avoided. In this case, CRISP financed school elevation to increase its resilience to storm surges and tsunamis. In the without-project scenario, it was assumed the school would suffer minimal damage during storm surges (equivalent to 4.3 percent of its replacement value) and be totally destroyed during a tsunami. In the with-project scenario, no damages were assumed during a storm surge, but the school would still likely suffer partial destruction during a tsunami, given its location (distance of 50-60 meters from the shore and 30-40 meters altitude). Partial damage was estimated at 26.1 percent of replacement value based on the 2014 flash floods assessment. Replacement value was assumed to be equivalent to school baseline costs, as funded solely by RDP2 and the community (SI$288,400)—i.e., without the reinforcement funded by CRISP. The periodicity of strong cyclones was considered, as per above, to be once every four years, whereas tsunami periodicity was derived from historical records for the past 30 years[44] (once every 10 years). Based on these assumptions, annualized losses avoided due to cyclones were estimated at SI$3,100 and those due to tsunami risk at SI$21,300 (see Table 4.7).

21. **Aggregated analysis for all sub-projects.** To carry out the total cost benefit analysis for the project, the benefits of all 70 sub-projects were aggregated and phased according to their completion date. Aggregated costs included: all reported expenditures for Components C and D; community contributions and RDP2 co-financing; and all maintenance costs related to the sub-projects. Taxes were excluded. Hence, the aggregated analysis included all of the sub-project planning, design, engineering and project management costs not previously been accounted for against the costs and benefits of individual sub-projects (see para. 7)—covering 77.4 percent of total project costs.

22. **Results.** Table 4.8 below summarizes the results of the cost-benefit analysis. The estimated aggregated EIRR is 18.2 percent with an NPV of US$5.8 million equivalent at a 6 percent discount rate.[45] Baseline EIRRs for the various types of sub-projects ranged from 18.5 percent for evacuation centers, to between 40.6 and 55.4 percent for water sub-projects, revealing considerable net benefits. The EIRR for shoreline protection (42.0 percent) reflects the relatively

[42] Solomon Islands National Statistics Office (2015). *Solomon Islands 2012/13 Household Income and Expenditure Survey. Provincial Analytical Report.*

[43] Maru, E., T. Shibata and K. Ito (2018). *Statistical Analysis of Tropical Cyclones in the Solomon Islands.* Atmosphere 2018, 9: 227; doi:10.3390/atmos9060227.

[44] Source: *WorldData.info. https://www.worlddata.info/oceania/solomon-islands/tsunamis.php*.

[45] World Bank guidance on economic analysis recommends a social discount rate equivalent to about twice the rate of GDP growth. Real GDP growth from 2015 to 2020 is projected by the IMF/World Bank to average 2.98 percent. Per capita real GDP growth during the same period is projected to average 0.67 percent. See World Bank (2016). *Discounting Costs and Benefits in Economic Analysis of World Bank Projects*. Unpublished.

high benefit-cost ratio of the provincial sub-project at Tulagi, as the community reconstruction sub-project yielded a substantially lower value (11.6 percent). EIRRs for sub-project types are generally higher than the aggregated EIRR because overhead costs were excluded, whereas they were included in the latter estimate. It also reflects the frontloading of project management costs in the initial years (2014-17), while sub-project benefits did not begin in earnest until 2018-19. The aggregated EIRR also includes project management costs that covered the national institutional and risk management components (Components A and B) and is therefore considered to be conservative. A separate cost benefit analysis could not be undertaken for the two national components, since they involved mostly institutional strengthening and technical assistance, the benefits of which are difficult to quantify. However, a simulation using the totality of project costs against the aggregated sub-project benefits continued to yield positive benefits (EIRR 13.7 percent) even in the absence of quantified benefits from Components A and B.

23. **Sensitivity analysis.** The sensitivity analysis summarized on Table 4.8 shows net benefits to be robust to a 25 percent increase in costs or 25 percent decrease in benefits. Under a third scenario, assuming net benefits decline progressively over a period of ten years, the aggregated results, as well as those of evacuation centers and reinforced sub-projects, decline below the social discount rate, highlighting the importance of sub-project maintenance.

Table 4.8: Summary of Assumptions Used in Economic Analysis – Community Evacuation Centers Sub-Projects

	EIRR	NPV (at 6%) in US$'000	% of Total Project Costs	Sensitivity Analysis (EIRRs)		
				+25% Costs	– 25% Benefits	Net Benefits Declining Over 10 years
Aggregated Results *(Components C and D)*	18.2%	$5,764	77.4%	14.0%	12.9%	4.0%
By Sub-Project Type:						
Rainwater Harvest	55.4%	$4,849	15.1%	43.9%	41.0%	42.6%
Gravity-Fed Systems	40.6%	$2,701	8.6%	32.0%	29.9%	26.0%
Pumped Boreholes/Springs	43.1%	$1,236	3.6%	33.6%	31.2%	27.9%
Footbridges	21.9%	$40	0.3%	16.7%	15.3%	10.7%
Evacuation Centers	18.5%	$218	2.5%	12.4%	10.8%	<0.0%
Shoreline Protection:						
- Total Shoreline Protection	40.1%	$402	4.4%	27.6%	24.1%	30.1%
- Provincial Sub-Project	42.0%	$417		26.0%	26.0%	32.2%
- Community reinforcement	11.6%	$6		7.0%	5.7%	<0.0%
Schools:						
- Total Schools	18.8%	$655	2.4%	16.2%	15.4%	14.1%
- Water Supplied Schools	25.0%	$616		21.8%	20.9%	20.9%
- Girls Dormitory	13.1%	$158		10.9%	10.3%	7.0%
- Reinforced Primary School	17.0%	$9		11.1%	11.8%	<0.0%

C. COST EFFECTIVENESS ANALYSIS

24. In addition to the cost-benefit analysis described above, project efficiency was assessed through the following comparisons:

(1) Cost per beneficiary at appraisal vis-à-vis completion (for all sub-projects);
(2) Original engineer's estimate of sub-project costs (by type) with actual costs at completion;
(3) Actual sub-project unit costs compared with those of other similar projects;

(4) Time taken to complete sub-projects, compared with that of other similar projects;
(5) Administrative efficiency, in terms of the share of final project costs allocated to project management and overheads.

25. **Cost per beneficiary.** At appraisal, the project envisaged reaching 79,000 beneficiaries at a cost of US$6.33 million, including sub-project preparation and oversight – or an average of US$80 per beneficiary. At completion, the project had reached 68,878 beneficiaries at a cost of US$5.45 million, or US$79/beneficiary, a slightly more efficient outcome.[46] However, some 43 percent of these costs were due to the project's choice to invest in community planning, oversight and technical design (Component C.1), which were considerably higher than the 25 percent estimated at appraisal. Without these overheads, the cost per beneficiary was significantly more efficient at completion (US$45/beneficiary) than estimated at appraisal (US$60/beneficiary).

26. **Sub-project unit costs.** Individual sub-projects were generally cost-effective in the aggregate, averaging US$40,496 per unit at completion, 11.9 percent lower than the original average engineering estimate of US$45,973/unit (see Table 4.9). Community Rainwater Harvesting Systems, Gravity-Fed Systems, and Footbridges were the most cost effective, coming up at 78.8-83.0 percent of their original estimates.[47] By contrast, resilient buildings and the provincial shoreline protection exceeded the original engineering estimates by 9.5 and 5.8 percent, due to unexpected expenses (e.g. a landslide at the Dende community hall).

Table 4.9: Comparison of Engineer's Original Estimates with Actual Sub-Project Unit Costs, by Type (US$)

Type of Sub-Project	Original Engineer's Estimated Average Unit Cost	Actual Cost at Completion	Deviation (Actual/Original)
Community Sub-Projects (All)	**$36,166**	**$30,422**	**84.1%**
Rainwater Harvest Systems	$41,659	$32,819	78.8%
Gravity-Fed Systems	$39,287	$32,148	81.8%
Pumped Springs	$12,884	$12,143	94.3%
Pumped Boreholes	$33,804	$31,992	94.6%
Footbridges	$16,908	$14,041	83.0%
Resilient Buildings	$32,767	$35,876	109.5%
Shoreline Protection Reinforcement	$15,097	$10,741	71.1%
Provincial Sub-Projects (All)	**$173,461**	**$171,456**	98.8%
Rainwater Harvest Systems	$154,589	$138,526	89.6%
Gravity-Fed Systems	$97,904	$98,360	100.5%
Shoreline Protection	$362,319	$383,510	105.8%
Total Sub-Projects	**$45,973**	**$40,496**	**88.1%**

Source: PMU records and Project Lead Engineer. For accurate comparison with engineer's estimates, sub-project unit costs shown do not include community contribution or RDP co-financing (which were accounted for in the cost-benefit analysis and in Table 2).

[46] This compares to US$74/beneficiary for the first phase of the Solomon Islands RDP (P112613), and US$139/beneficiary for the Vanuatu IRCCNHP (P112611), both at ICR stages.

[47] The community shoreline protection reinforcement final cost was 71.1 percent of the original engineering estimate, but this was influenced by the community refusing gabion boxes to reconstruct their stonewall.

27. **Sub-project unit costs compared with other projects.** Evacuation center costs (US$245/m2) were similar to those of Solomon Islands RDP's community halls (US$253/m2) and lower than Vanuatu's IRCCNHP multipurpose centers (US$647/m2). Water sub-project costs are difficult to compare across projects, as they depend on the type of system and number of tanks/taps installed. However, costs per beneficiary for water sub-projects averaged US$50 for CRISP, against US$46 for RDP and US$87 for IRCCNHP. The cost of footbridges (US$15,472/unit) compare favorably with three footbridges already completed by RDP (US$20,509/unit).

28. **Time to completion.** Completion times averaged 11.2 months for CRISP-led sub-projects, comparable to Vanuatu's IRCCNHP (11 months) and less than a sample of RDP2 sub-projects (17 months).[48] The comparison with Vanuatu is more relevant due to the PMU's use of similar bulk procurement procedures. Notably, in the CRISP beneficiary survey, 55 percent of respondents felt their sub-project could not have been implemented more quickly, or efficiently, with respondents from Temotu, for example, praising the project for respecting the promised time frame, particularly when ships bringing materials only came every two to four months (see Annex 6). Some 40 percent felt the sub-projects could have been completed more quickly if the PMU had done all the procurement from the start, avoided split shipments and deployed more supervision staff in Temotu (which was eventually done).

29. **Administrative efficiency.** Project management costs amounted to 17 percent of total project costs, higher than estimated at appraisal (10 percent) but lower than under the first phase of RDP (20 percent) and Vanuatu IRCCNHP (31 percent). This is in line with other similar projects involving community-based CCA/DRM, such as the São Tomé and Príncipe Adaptation Project (15 percent), and Phases II and III of the Kiribati Adaptation Program (21 and 12 percent, respectively).

[48] Based on project records for IRCCNHP, and on an analysis of a sample of 53 completed RDP2 sub-projects, as per its monitoring tool http://sirdp.org.sb/.

ANNEX 5. BORROWER, CO-FINANCIER AND OTHER PARTNER/STAKEHOLDER COMMENTS

1. The draft ICR was shared with the Government on June 29, 2020 for feedback. The project outcomes were also presented jointly with the PHRD-funded project findings during the CRISP Project official closing ceremony on May 28, 2020. Around 60 participants from respective government ministries (Ministry of Finance and Treasury, Ministry of Provincial Government & MECDM) attended as well as civil society groups, community representatives and donor partners.

2. In his official remarks, the Minister of MECDM Honorable Dr. Culwick Togomana thanked the World Bank and the financiers for supporting the government's resilience development aspiration. Below is an excerpt from the Minister's speech,

> *"… I wish to thank the World Bank for providing guidance and technical oversight to the project. It has been a challenging but a successful partnership. My appreciation also goes to the Government of Japan, the European Union and the Global Environment Facility LDC Fund for proving the necessary resources to implement these projects. These two trust fund projects are climate and disaster risk resilience projects. I believe we have achieved the objectives of these projects in that we have built the capacity and resiliency of our communities and its people to the impacts of climate change and disaster risks. I believe more than 79,000 people who are the beneficiaries will be the living witness to show the success story of these projects. Not only that but we have built the national capacity in our early warning and communication systems. The projects have also built the capacity of all those involve implementing the project, which I believe is a positive outcome of the project"*

3. Four representatives from Guadalcanal province also expressed their gratitude and thanked the project for supporting their water supply systems and community evacuation shelters.

4. The Executive Summary of the Government's Completion Report was shared with the Bank team in September 2020 and is presented below.

Executive Summary - Government's Completion Report

1. Introduction

The CRISP Project was designed to support the government of Solomon Islands address key priorities identified its National Adaptation Program of Action (NAPA) and reflecting its vulnerability.

The CRISP Project higher development objective was to contribute to resilient and sustainable economic and social development in the Solomon Islands. It is aligned with the Government's strategic documents to respond to extreme vulnerability to the effects of climate change and natural hazards and reflected in the SIG's National Development Strategy 2016-2035 (NDS Objective 4). It is also aligned to World Bank's Country Partnership Strategy (CPS) for Solomon Islands FY2013-17 (Outcome 8), the National Adaptation Program of Action (NAPA 5.1, 5.2, 5.4 & 5.6), the Climate Change Policy (CCP) and the National Disaster Management Plan (NDMP) 2018.

The project was funded through grants from the GEF under the Least Developed Countries Fund (LDCF) and a grant from

the Global Facility for Disaster Reduction and Recovery (GFDRR)/EU- Asian, Caribbean and Pacific (ACP) Natural Disaster Risk Reduction Program. SIG in kind contributions were estimated at USD 1.1 million.

2. Implementation and Outcomes

CRISP's PDO and Global Environmental Objective: "Increase the capacity of selected rural communities to manage natural hazards and climate change risks". CRISP achieved this objective through three components that strengthened government institutional and operational capacity in managing climate and disaster risks, strengthened government risk information and the national early warning systems for volcano and earthquake threats; and implemented DRR and CCA investments in selected provinces and communities in five vulnerable provinces (Temotu, Malaita, Guadalcanal, Rennell and Bellona, Central).

More than 322,082 people benefitted nationally through institutional strengthening activities: National-level activities and investments supported included as the NDMP 2018, the national seismic volcanic network, and the MECDM Risk Information Management System. These activities and investments improved government capacity to manage disasters across sectors and quickly respond to affected communities, which must evacuate prior to a cyclone, flood, tsunami, or volcanic eruption.

The NDMP 2018 strengthened disaster management arrangements and processes. CRISP funded the NDMP 2010 review that resulted in NDMP 2018, which details national, provincial and community arrangements for disaster management, benefits the entire country and is being used to prepare for and respond to COVID-19.

Targeted communities demonstrated capacity to implement Community Based Disaster Risk Management (CBDRM) and Vulnerability & Assessment plans to manage the impact of natural hazards and climate change: 68 of 70 sub-projects implemented were identified by communities as their number one priority in CBDRM/V&A plans. CRISP's 68,878 community and provincial-level beneficiaries exceeded the revised target of 53,000 and reached 87 percent of the original target of 79,000.

Resilience is mainstreamed across government three ministries: Ministry of Environment Climate Change, Disaster Management (MECDM), Ministry of Health and Medical Services (MHMS), Ministry of Mines Energy and Rural Electrification (MMERE) included climate and disaster risk resilience measures in their annual work programs, exceeding the original target of three ministries. Before project closure, MHMS mainstreamed DRR and CCA into their work programs and undertook risk mapping of health facilities, MECDM established the foundations for a resilient framework.

National Disaster Committee (NDC) and NDC Committees strengthened: The NDC meets regularly, with several working committees activated since SIG enforced its COVID-19 operations. At project closure, the NDC and its Committees were managing disasters more efficiently since the NDMP 2018 rollout. The clarity of new disaster arrangements and processes has been instructive in the development of a new pandemic bill.

Framework for Resilient Development for integrating disaster and climate risk drafted: The Council adopted this framework, through Cabinet approval of NDMP in February 2018. This enabled the Climate Change Division to take the lead in managing climate change and disaster risk reduction work, with NDMO focusing on disaster management.

Volcanic/Seismic early warning system installed: At project closure, the national volcanic/seismic monitoring network was installed and operational with six remote stations in the provinces of Temotu, Central, Malaita, Isabel, Makira,

Rennell and Bellona and a base station in Honiara, Guadalcanal. Solomon Islands now owns its own seismic network to monitor earthquakes, volcanoes, tsunamis and any illegal nuclear testing that my take place within its waters. At project closure, MMERE had taken responsibility for operational and maintenance costs of the national seismic volcanic tsunami monitoring network. The Information and Communication Technology Support Unit integrated transmission of seismic volcanic data, taking over the network's operational transmission costs.

Risk Information Management System strengthened: This system, completed in 2018, has enabled MECDM to bring natural hazards, vulnerability and socio-economic information together into one coordinated and centralized GIS database system. It is connected through a reliable secure internet connection (SIG-Connect) capable of transmitting map information. System data is used to, *inter alia*, inform decisions and plan around disaster and climate risk resilience and disaster management. The geo-spatial services offered by MECDM has been sought and used by other Government ministries including the Ministry of Health and Medical Services, Ministry of Rural Development, and the Ministry of Fisheries and Marine Resources. Other development partners such as the United Nations Development Programme are also utilizing this specialized service.

Sixty-five (65) sub-projects were completed under community-led disaster risk reduction and climate change adaptation investments benefitting 32,150 beneficiaries at project closure: Of these beneficiaries, 14,791 were female. Structural, community-led investments included: 55 water-related investments; seven multipurpose buildings used for community shelter, meetings, kindergartens and income-generating activities; two footbridges; and one coastal protection sub-projects. Eighty six percent (86 percent) of beneficiaries interviewed were highly satisfied with the sub-projects, while 89 percent were very satisfied with water quality.

Five (5) Sub-projects completed under provincial government-led DRM/CCA investments benefitting 36,728 beneficiaries: At project closure, one shoreline protection and four water supply provincial -led investments were completed.

Structural investment outcomes included improved:

- **access to safe clean drinking and cooking water** through water bore hole systems, gravity fed water systems, rainwater tanks, and pumped water springs;
- **community capacity** to collect and store water during flooding, droughts and high tide seasons through resilient water systems;
- **health from water-borne diseases**, such as diarrhea and skin diseases, through better water access;
- **protection of roads and infrastructure** from storm surges and sea level rise through better shoreline protection;
- **access for school children, the elderly, pregnant women and communities** using footbridges across high-risk streams;
- **evacuation access** to buildings in tsunami-affected communities;
- **access to safe spaces** for community meetings, shelter and income-generating opportunities through multipurpose community halls;
- **income-generating activities** through the provision of water infrastructure, ensuring families spend less time collecting water (55 percent reported using the extra time to their supplement income); and cooperation with the project's community participation module.

CBDRM plans: 65 community plans were developed, resulting in 65 community sub-projects funded under CRISP. Some CBDRM plan priorities were soft measures implemented by communities, such as awareness raising.

Involvement of women during preparation and implementation of community-led projects: 80 percent of women were involved in decision making during CBDRM consultations. Women across all 65 communities consistently ranked water as their number one priority, resulting in CRISP investments dominated by 55 water projects. Communities considered education and confidence levels when selecting women to participate in and lead committees. Some 38 percent of SIC members were women, a high number given that CRISP works in patrilineal communities, and the majority of rural women lack literacy skills and, thus, fear engaging with technical sub-project committees.

Gender: The CBDRM used a gender-inclusive process for project selection. Sub-project assessment, design, construction, and operations and management were also gender inclusive. At least 49 percent of beneficiaries were women.

Program components managed and monitored effectively: At project closure, all component activities were successfully completed, with documentation closure progressing with a grace period extension.

Capacity building of local staff: CRISP expanded staff capacity, resulting in three local staff securing scholarships for further studies in Australia and New Zealand. At project closure, six CRISP local and one international staff were employed by different organisations as managers, and the Project Coordinator is a short-term adviser to a local women's organisation. Community capacity was also built to manage sub-project investments.

Environmental safeguards: All sub-projects, including seismic network sites, were vigorously screened using CRISP environmental safeguard screening templates. CRISP had an Environmental Safeguards Management Plan.

Lessons Learned

- Building resilient communities requires hard work, flexibility, cooperation, sufficient funds, and commitment from government, sectors, communities, PMUs and donors.
- Community-driven development is challenging to implement in its traditional form due to evolving culture in rural communities, where people expect to get paid for their work.
- Bulk procurement of goods from Honiara accelerates work and provides better financial documentation for acquittals.
- Mainstreaming CCA and DRR in ministries must include budgets for structural investments.
- Institutional and policy work requires more time and sufficient budgets.
- Project development indicators/targets must consider local context especially regarding soft measures.
- Reaching remote rural communities is challenging and requires sufficient budgeting.
- Working within existing structures is beneficial.
- Champions ensure work progresses well in ministries, provinces and communities.
- The majority of provinces and communities expressed appreciation for CRISP.
- People are continuing to seek CRISP support.
- Communities felt project selection was not influenced by politicians.
- Strong teamwork from the World Bank, MECDM, provinces, communities, and CRISP PMU and partners ensured the project's success. The World Bank team listened to MECDM and the PMU and worked collaboratively to ensure decisions were in the government's best interest.
- Good work relationships with suppliers ensured timely availability of goods.
- Emergency equipment and technical support were expensive.
- CRISP made an impact at the national, provincial and community levels through investments.

- CRISP was a challenging and complex project, with a very small staff. In addition to infrastructure components, CRISP advanced institutional work and emergency information systems at the national level. Complex projects require budgeting for more staff.
- Bad weather is the biggest obstacle to completing work within scheduled timeframes.

Recommendations

- A CRISP Phase 2 is required and must include a component that continues work with Phase 1 communities. Communities are new to the concept of resilience and need time to adapt and integrate resilience into their work plans through PCDF. However, during project work, engineers and communities are focused on completing works, and quality time is not spent on operations and management training.
- A hybrid community model that includes skilled/unskilled labour and bulk procurement is recommended.
- Original budgets during design should include budget lines for operations and management trainings and CBDRM refresher trainings.
- Infrastructure budgets should not have restrictive ceilings, as seeking approval for sub-projects exceeding the ceilings is time consuming and results in delays.
- A provincial-led approach should continue, working closely with the PCDF.
- Work under Component B should be considered for expansion.
- Community infrastructure through CBDRM selection is recommended, ensuring neutral project selection (based on risks) and helping communities better understand resilience.
- Soft measures should go hand-in-hand with structural investments to ensure resilience works better with other sectors.

CRISP

COMMUNITY RESILIENCE TO CLIMATE AND DISASTER RISKS IN SOLOMON ISLANDS PROJECT

MINISTRY OF
ENVIRONMENT, CLIMATE CHANGE, DISASTER Management & METEOROLOGY (MECDM)
P.O.BOX 21, VAVAYA RIDGE, HONIARA. SOLOMON ISLANDS. TEL: 20243

ANNEX 6. BENEFICIARY SURVEY

1. The CRISP PMU carried out a beneficiary survey between July 2019 and March 2020, which included 103 respondents from 23 community sub-projects in the provinces of Temotu, Guadalcanal, Central Islands and Malaita, as well as one provincial sub-project in Temotu. In total, the survey covered 35 percent of community sub-projects (total 65) and 0.3 percent of community beneficiaries (total 32,150), as well as 20 percent of provincial sub-projects (total 5) and 0.01 percent of their beneficiaries (36,728). Because of limited time and resources, the survey was not designed to cover a representative sample, but rather to provide an indication of the perceived project impact and processes followed. Nevertheless, an attempt was made to cover as many provinces and sub-project types as possible. Amongst the five project provinces, only Rennell and Bellona was not covered, and all sub-project types, with the exception of shoreline protection, were included (see Table 6.2). Temotu, Central Islands and Malaita were well represented, covering 50, 53 and 32 percent of total sub-projects, respectively. Guadalcanal was less represented (13 percent) because many of its sub-projects were RDP2-led, with CRISP financing just resilience top-ups. Further surveys could not be carried out due to COVID-19 related travel restrictions.

2. In each sub-project site, between one and seven key beneficiaries (a median of four) were interviewed. As such, some sites were over-represented in individual answers, while some were under-represented. To account for this, both individual as well as site-level responses were analyzed. In the site-level approach, individual responses were averaged across a given site so all sites would count equally toward the final results. In practice, results were similar, and the individual responses are reported herein as they better reflect the variation in individual beneficiaries' perceptions. The analysis is based on the February 19, 2020, PMU questionnaire coding.

A. CHARACTERISTICS OF RESPONDENTS

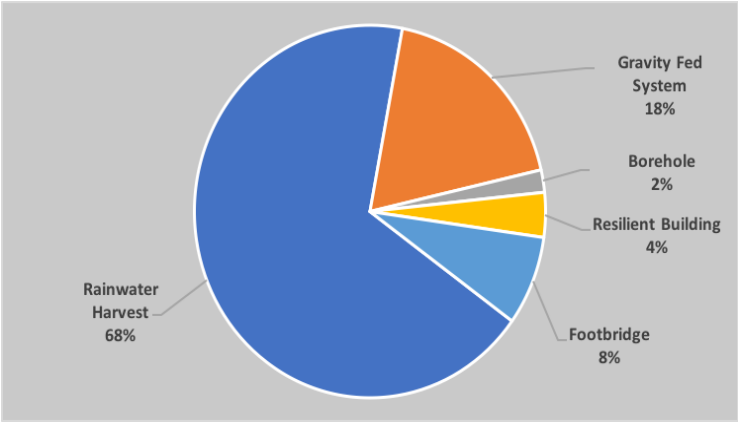
3. **Sex.** Of the 103 respondents, 52 (50.5 percent) were female and 51 (49.5 percent) male.

4. **Age and Education.** Average age of respondents was 40 years old, with 11 percent younger than 20, 20 percent between 21-30 years old, 24 percent between 31-40 years old, 24 percent between 41-50 years old, and 21 percent above 50. Most respondents had some level of primary (41 percent) or secondary (45 percent) education, but 8 percent had no education and 6 percent had some form of higher education, most commonly a professional diploma.

5. **Household Characteristics**. Median household size was five and ranged from two to 16 (in Malaita). Only one respondent (1 percent) reported coming from a female-headed household, but 3 percent had disabled, and 39 percent elderly members in their households.

6. **Type of Sub-Projects.** Two-thirds of respondents (68 percent) benefited from rainwater harvest systems (RWH), 18 percent from gravity-fed systems (GFS), 8 percent from footbridges, 4 percent from resilient buildings, and 2 percent from pumped boreholes (Figure 6.1). Compared to total project beneficiaries, RWH and footbridge respondents were over-represented, while those from resilient buildings and boreholes were slightly under-represented (Table 6.2).

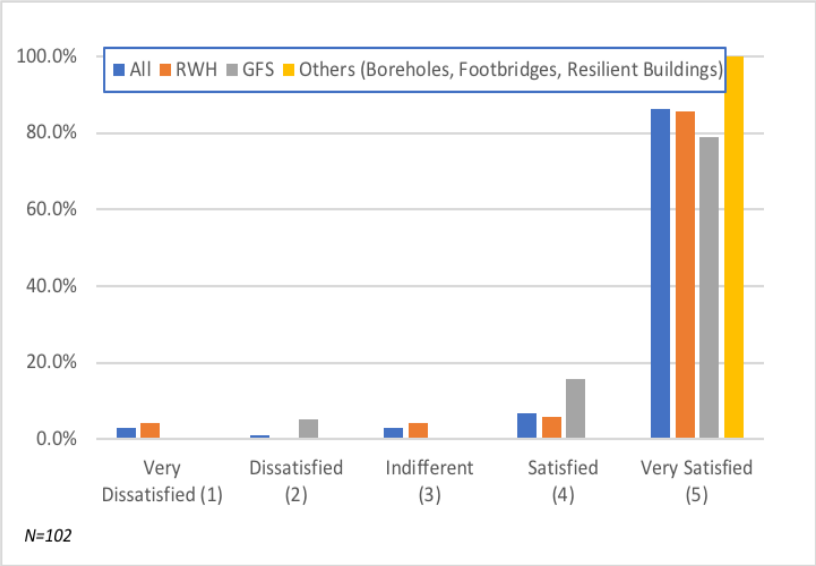
Figure 6.1: Surveyed Beneficiaries by Sub-Project Type



7. **Vulnerability to Extreme Events.** Cyclones, storm surges and heavy rainfall were the most commonly reported extreme events, contaminating wells and springs, destroying traditional houses and assets, and affecting livelihood sources (such as crops and coastal fisheries). Temotu beneficiaries also reported earthquakes and a major tsunami in 2013, requiring evacuations and sheltering in higher areas for up to a week, and destroying homes, gardens and sources of traditional materials (such as firewood, sago palm trees, and gravel). Volcanic eruptions were also reported in Temotu, contaminating water sources (including rooftops and tanks) with ash. In Temotu, as well, upstream logging exacerbated the effects of heavy rains and muddied traditional water sources. Several respondents mentioned relying on swamp taro and rice donations during disasters, and difficulties recovering due to limited access to cash employment.

8. In Guadalcanal, cyclones and storm surges had major impacts on contamination of water sources and gardens, and soil and beach erosion. Flash floods and landslides also required quick evacuations of entire villages. Central Islands and Malaita respondents received tsunami warnings, but few had ever experienced a tsunami during their lifetime. They reported mostly cyclones, floods, landslides, droughts and storm surges or king tides, with particular impacts on water supply and coastal infrastructure (such as footpaths, bridges and housing). Several respondents stressed the impact of salt intrusion on water wells and gardens.

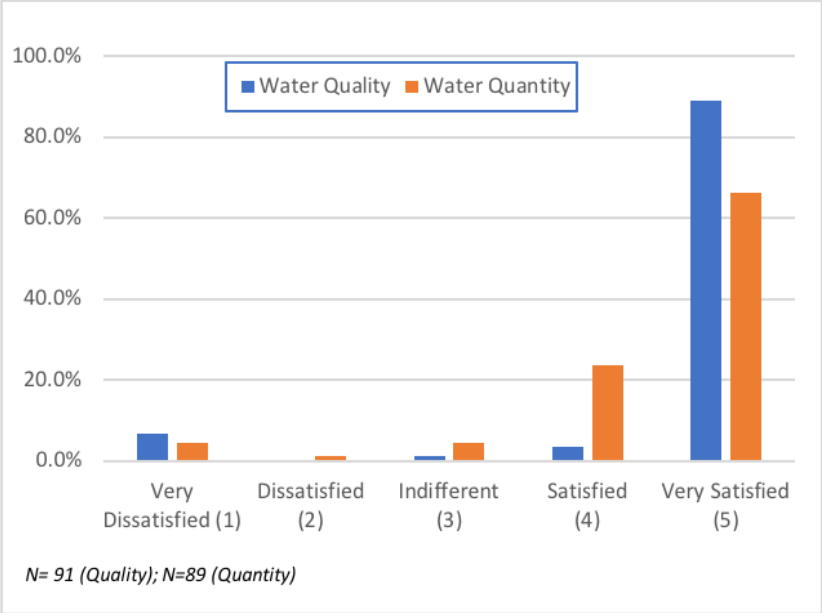
Figure 6.2: Overall Satisfaction with Sub-Projects



B. SATISFACTION WITH SUB-PROJECTS

9. **Overall Satisfaction.** Survey respondents revealed a high level of satisfaction with CRISP community sub-projects. A total of 102 respondents rated their degree of satisfaction with their community sub-projects from 1 (Very Dissatisfied) to 5 (Very Satisfied). Up to 93 percent of respondents reported being Very Satisfied (86 percent) or Satisfied (7 percent). Only four respondents (4 percent) reported being Very Dissatisfied (3 percent) or Dissatisfied (1 percent). This high degree of satisfaction held across sub-project types and locations, although recipients of GFS had slightly lower levels of satisfaction than others (Figure 6.2). The only exception was the community of Kwa'aneone in Malaita, which had an average satisfaction of 3.8, primarily due to the perception that water tanks were insufficient to cater to the entire community. Other respondents with lower satisfaction levels similarly mentioned having to share water tanks and/or taps with other families, or

Figure 6.3: Satisfaction with Water Quality and Quantity



lack of access to sanitation (which was not envisaged under the project). Without exception, beneficiaries of other sub-project types (boreholes, footpaths and community halls) reported being Very Satisfied, although the samples were small (between two and eight answers each).

10. **Satisfaction with Water Quality and Quantity.** Among recipients of water sub-projects (RWH, GFS and boreholes) 89 percent were Very Satisfied and 3 percent were Satisfied with water quality. Satisfaction with water quantity was lower (66 percent Very Satisfied and 24 percent Satisfied), primarily due to a perceived insufficient number of taps/tanks relative to the number of families. However, responses were still predominately positive (Figure 6.3).

C. PERCEIVED BENEFITS OF SUB-PROJECTS

11. **Protection Against Disasters and Climate Change.** Recipients were asked how they believed the sub-projects would help protect them from disasters and climate change. The identified three major benefits from **water sub-projects**, namely: (1) *protection against droughts*, by collecting and storing clean rainfall water to help during droughts or dry periods (lasting up to three weeks); (2) *access to clean water during floods,* instead of relying on springs or wells that became muddy or salty, as in the past; and (3) *improved safety during cyclones or periods of heavy rains/wind,* as they were now able to access clean water close to home (when previously they had to venture far to collect water). Recipients of **resilient buildings** mentioned their potential use as *safe community shelters* during cyclones, floods or tsunamis, but also as potential places to *temporarily host families* who lose their traditional houses. **Footpaths** provided *safe access* to the community and/or school during high tides, storm surges or floods.

12. **Other Benefits.** Respondents also reported significant development benefits. For **water sub-projects**, these included: (1) *improved health and hygiene* from cleaner drinking and cooking water, as well as from more water available for bathing and sanitation; (2) *significant time savings,* due to no longer having to fetch water; and (3) *improved security*, by not having to paddle and/or walk long distances through unsafe areas.

13. **Time saved**, by not having to collect water from distant sources, averaged **92 minutes** across all respondents, and **83 minutes** across all sub-projects. Up to 55 percent of respondents mentioned using this time for *incremental income-generating activities,* including fishing, marketing garden products, feeding pigs, selling flowers, food, and coconut oil, and making shell money. About 10 percent of respondents reported using this time for *studying* (students) or *preparing classes* (teachers). A few respondents also reported using this extra time to *dive for sea cucumber and clam shells* (in Emua, Temotu) and *cut timber* (which may inadvertently put more pressure on these resources).

14. The new water sources reportedly resulted in significant life changes. In addition to more time for income generation and studying, respondents reported: more time to complete household tasks (such as cooking earlier for children, so they could go to school); more time to engage in community programs, sports and church activities; less family stress, and more time to relax (especially for women and young girls) and rest (particularly from paddling in search of water); not having to worry about elders and children accessing water while adults are away working in the gardens; not being dehydrated during dry weather; more time to engage in new skills; and being able to ensure children have proper showers before school. One respondent cited increased community pride in beautification efforts around water taps. Beneficiaries from a school-based rainwater harvesting sub-project mentioned no longer having to cancel classes during prolonged dry periods.

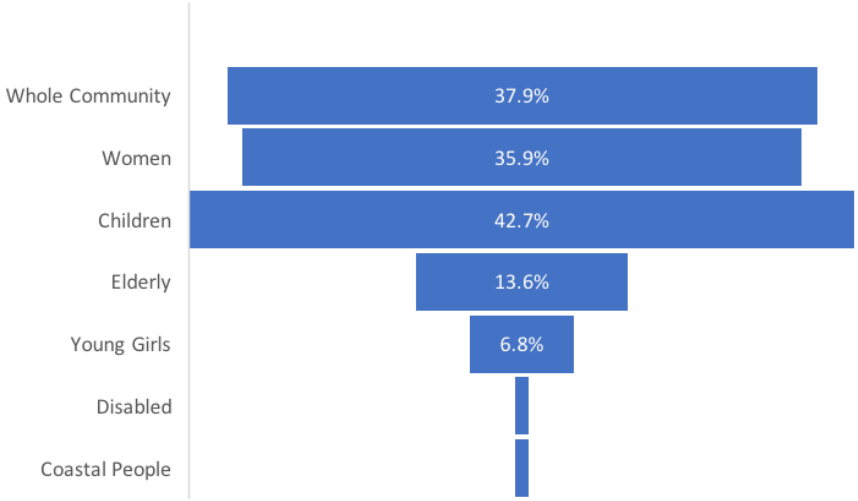
15. Beneficiaries of **community halls/resilient building**s planned to use them for public meetings, as well as to accommodate visitors and rent them out for workshops (in addition to their use as evacuation centers during disasters)**.** **Footbridges** facilitated access to the main road and increased marketing of products, in addition to improving education by avoiding school closures during high tides or floods.

16. **Distribution of Benefits**. The sub-projects appear to have yielded broad-based benefits, particularly for the most vulnerable members of the community.

17. Asked who had benefited the most from the sub-projects, 38 percent of respondents identified the whole community, 36 percent cited women and 43 percent mentioned children **(Figure 6.4).** Most often, they cited a combination of the above groups.

18. Women were seen major beneficiaries since they were responsible for collecting water, cooking and washing, and previously had to walk or paddle long distances to collect water. School children were also considered key beneficiaries, as they were now able to take showers before school, had more time to study and were safer from crocodiles and dirty stream water. For footpath beneficiaries, children were now able to reach and attend school even during high tides or floods. Other beneficiary groups included the elderly (cited by 14 percent of respondents), who benefited significantly from new water sources as they could be left at home with sufficient water, rather than having to wait thirstily until water was fetched for them (often several hours) or risk going out themselves. Together with children, they also accrued health benefits from bathing more frequently and in cleaner water. Young girls, who frequently helped women fetch water and did significant shares of household work (even at the expense of foregoing school) were also viewed as significant beneficiaries by 7 percent of respondents. Many respondents (38 percent) also viewed the whole community as benefiting equally. Apart from one respondent who identified "coastal people" as the main beneficiaries, there was no stated evidence of elite capture of project benefits.

Figure 6.4: Who Benefited the Most from the Sub-Projects?



Percentages show proportion of the respondents identifying a given group. Most respondents identified more than one group as a beneficiary – hence the totals do not add up to 100 percent%.

D. RESILIENCE PERCEPTIONS

19. Measuring resilience in DRM and adaptation projects is extremely challenging. In the absence of rigorous control groups, attributing resilience changes to a specific project is difficult: a project's short timescale may be insufficient to reflect changes in assets and capacities, or to experience disasters that allow impacts to be measured; successful adaptation and resilience building are difficult concepts for beneficiaries to grasp; and there may not be a single indicator that correctly captures the multifaceted dimensions of resilience.[49]

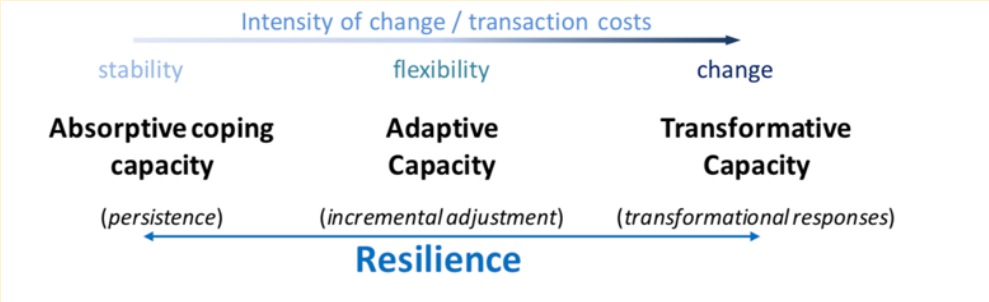
20. The beneficiary survey, therefore, attempted to capture multiple dimensions of resilience, namely the perceived ability of beneficiaries to cope with, recover from, adapt and transform when confronted with climate and disaster events, as well as to access financial and social capital, and adaptive learning (see Box 6.1). It used a set of questions adapted from Jones and Tanner (2015) evaluation of subjective resilience.[50]

[49] *Gregorowski, 2016* – internal paper produced for DFID on BRACED lesson learning.
[50] *Jones, L. and T. Tanner (2015) "Measuring Subjective Resilience". ODI Working Paper 423.*

Box 6.1: The Multiple Dimensions of Community Resilience

Community resilience is typically multi-dimensional. Amongst the most relevant dimensions for the CRISP context are:

- **Resilience capacity** (coping, adaptive and/or transformational): The ability of communities to actively develop and implement strategies and responses to vulnerability conditions (Béné et al. 2016[51]). In turn, resilience capacity can be sub-divided into **coping, adaptive, or transformative capacity**, depending on the shock's intensity and the type of response needed.Coping capacity generally focuses on short-term disaster recovery, whereas longer-term climate change may require building transformative capacity, such as displacing communities to higher grounds.



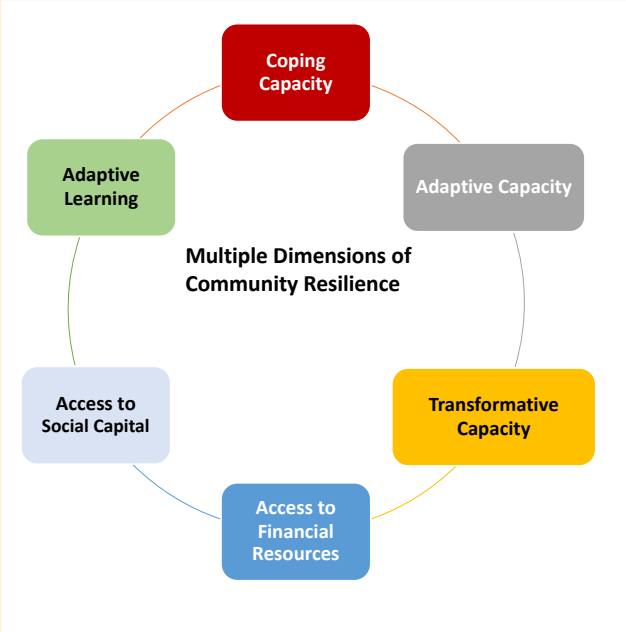
Source: Béné et al. (2012)[52]

- **Adaptive learning:** The dynamic process of learning from past events and experiences to anticipate and adapt to future changes.[53]

- **Social capital**: The degree of access, reliance and trust on family, friends, community, and supra-community social networks for support during disasters and climate events (for example, mutual help in rebuilding damaged homes, or in sheltering those displaced).[54]

- **Financial capacity**: Access to own capital, remittances, revolving funds, gifts or other financial help to recover from disasters or prepare better for future events (e.g. roofs reinforcement).

  Another dimension of community resilience, access to early warning information, was not captured by the survey.



[51] Béné, Christophe, et al. 2016. *Is resilience a useful concept in the context of food security and nutrition programmes? Some conceptual and practical considerations*. Food Sec. (2016) 8: 123-138.

[52] Béné, Christophe, Rachel Godfrey Wood, Andrew Newsham and Mark Davies (2012) *Resilience: New Utopia or New Tyranny.* IDS Working Paper 2012 (45).

[53] Tschakert, Petra and Kathleen Ann Dietrich (2010). *Anticipatory Learning for Climate Change Adaptation and Resilience.* Ecology and Society, Vol. 15(2): 11.

[54] Aldrich, Daniel and Michelle Meyer. 2014. *Social Capital and Community Resilience*. American Behavioral Scientist 1-16. *https://www.researchgate.net/publication/281601274_Social_Capital_and_Community_Resilience*

21. Results are summarized in Figures 6.5 and 6.6.

Figure 6.5: Perceptions of Resilience Dimensions

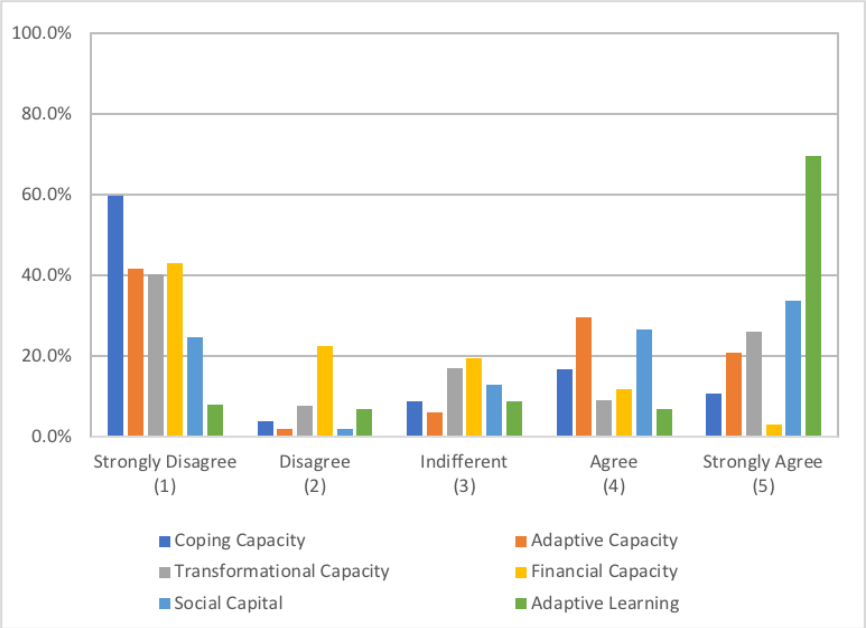
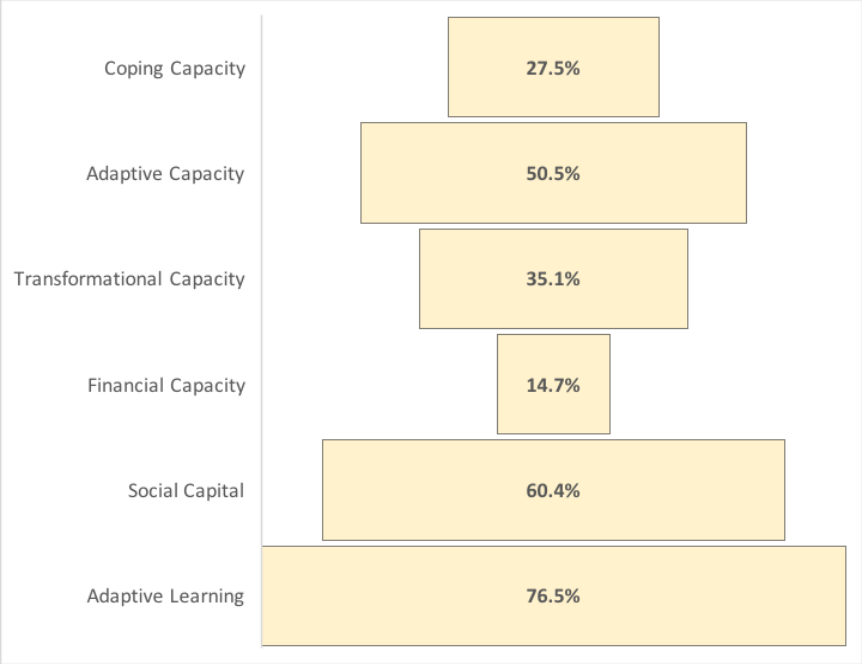


Figure 6.6: Proportion of Respondents Agreeing/Strongly Agreeing



22. **Adaptive learning** had the highest rating of all resilience attributes, with 76.5 percent of respondents agreeing, or strongly agreeing, that their *"households had learned considerably from how we have dealt with past disasters. This knowledge is crucial in successfully dealing with future events*". Respondents mentioned they had acquired extensive experience on how to handle past disasters and felt confident they could deal successfully with future events. Many referred to CRISP-acquired awareness and sub-projects as contributing factors to their increased confidence in being able to deal with future events. Some respondents specifically mentioned that they had learned from events that happened in other places (cross-learning). Others mentioned early warnings and experience with past disasters could help reduce risk. Those who felt less confident cited the unpredictability of disasters, lack of adequate experience with past disasters, or lack of resources to deal with future events.

23. **Social capital** had the second highest rating, with 60.4 percent of respondents agreeing that "*if a major disaster was to occur in my area tomorrow, my household would be able to draw upon the support of family and friends to fully recover from the (disaster) threats*". Relying on support from family and friends was viewed as possible and even customary if they lived in town and were working, but not if they lived in the same village (as they too would be affected). Many respondents mentioned this assistance may be insufficient, as friends and family also struggle with financial needs, or they could only count on them for small contributions (e.g., rice, but not building materials). Alternative sources of assistance included local authorities, the church or the provincial government (for school repairs). About a quarter of the respondents, however, mentioned not being

able to count on family or friends' support, as they all lived in the same village and/or may be unwilling or unable to help. Two respondents mentioned feeling too shy to ask.

24. **Adaptive capacity** had the third highest rating, with 50.5 percent of respondents agreeing, or strongly agreeing, that "*if a major disaster was to occur in my area in the next five years, my household would be able to cope/adapt successfully*". Positive responses mimicked those given for adaptive learning with many stating that their past disaster experience enabled them to adapt better to future events, or that their sub-project (e.g., community hall) would give them shelter and time to recover. One respondent mentioned they now knew how to build houses with foundations strong enough to withstand cyclones, flooding and even earthquakes and tsunamis, and to store food in times of disaster. Others mentioned having raised their floors, using stronger posts and relying on multiple gardens to diminish their risk. Several mentioned planning to rely on donors' assistance or on the government. Amongst those less positive, they mentioned increased scarcity of natural resources and locally available building materials, lack of cash income, being elderly and disaster unpredictability. Some also mentioned having to relocate given that their community was low-lying.

25. **Transformational capacity**. Respondents were asked whether they agreed with the statement that "*if a major disaster was to occur in my area in the next five years, and my community ceased to exist, my household would be able to cope/adapt successfully, even if it required us to completely change our ways of life"* as a proxy for transformational capacity. About a third (35.1 percent) agreed or strongly agreed. Several mentioned their willingness to relocate to safer places (such as higher grounds or moving inland) and doing their best to adapt, although recovering would not be easy. Many stressed their desire to survive and that they would endeavor to adapt in any way possible to the new environment and lifestyle, given sufficient time. Some went further saying that "*if we want to live, then relocation is a must*" and others even expressed optimism or mentioned already having plans to relocate the community to a safer place. Still others mentioned that they were originally from different villages and could adapt by returning home. Respondents who disagreed mentioned their lack of savings and limited resources to start all over, lack of faith that the government would help them, having to abandon their gardens and property, losing mutual support of the community (to build back after disasters), being too old to move, concerns about the length of time to rebuild their homes or for natural resources and crops to grow in a new place, and difficulties adjusting to new ways of living.

26. **Coping capacity** was rated second lowest among all resilient attributes, with only 27.5 percent of respondents agreeing that *"if a major disaster was to occur in my area tomorrow, my household would be able to fully recover from the damage caused by the event within six months."* This was mainly due to the way the question was formulated and their perception that six months was too short a period of time to recover from a disaster (they mentioned needing one to two years for full recovery). Many cited the fact that local building materials (like wood and sago) tended to also be destroyed during disasters and took a long time to grow back. In addition, they noted lack of funds to purchase these materials from unaffected villages. They also mentioned time required for root and food crops to recover (three to six months). Responses suggest that rapid income generating activities (such as cash-for-works) and the ability to generate and manage savings, through, for example, increased market sales generated by freeing up time previously spent fetching water, will be critical to strengthening coping capacity.

27. **Financial capacity** was rated lowest of all resilient attributes, with only 14.7 percent of respondents agreeing that "*if a major disaster was to occur in my area tomorrow, my household would have access to sufficient financial resources to ensure that we fully recover.*" Most respondents said that they had no savings and very little money, barely sufficient to cover their daily needs, and many cited obligations to relatives and school fees as additional financial pressures. Some remarked on the geographical isolation of their villages, lack of cash earning opportunities, and poor infrastructure to help bring goods to markets. Many reported asking church groups, non-governmental organizations or members of parliament for help after disasters and remarked on slow assistance from the government in the past (mostly offering in-kind support,

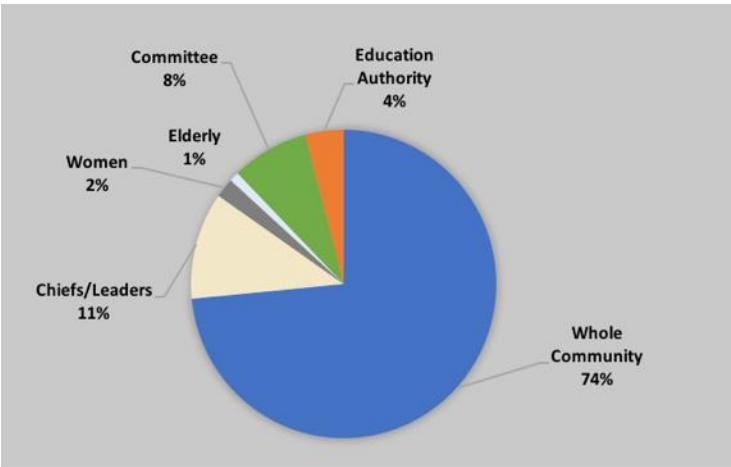
such as food or materials). These results again point to the importance of ancillary income-generating benefits of sub-projects, as well as the need for future interventions to generate rapid income to disaster-affected communities (such as cash-for-works or cash transfers).

28. **Attribution.** The survey sought to investigate the degree to which the above perceptions were due to CRISP assistance. However, this question was misunderstood by many respondents as meaning their perceived *rating* of the project (which was 83 percent on average, based on 93 responses). Attribution is particularly challenging, since beneficiaries' resilience perceptions are also largely influenced by past disaster and coping experiences, as well as by other assistance programs. However, based on the frequency of sub-project references, it can be said that CRISP contributed to strengthened resilience, in particular to adaptive learning and, to a somewhat lesser extent, stated adaptative capacity.

E. PERCEIVED RELEVANCE, EFFICIENCY AND SUSTAINABILITY

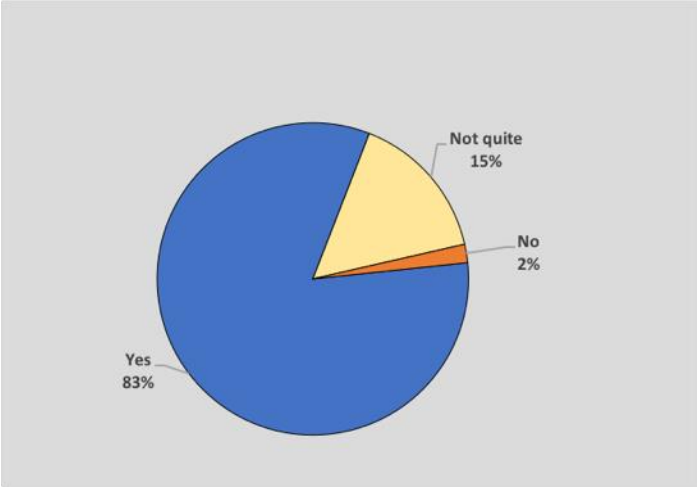
29. **Perceived Relevance.** Beneficiaries were unanimous (100 percent) that their sub-projects had been a high priority for their household and community, and fully reflected their needs. Illustrating this relevance, beneficiaries in the remote Santa Cruz Islands (Temotu Province) mentioned that prior to CRISP's intervention, they had to rely on old tanks and dirty well water as their provincial water system had broken down over a decade ago. One community (Mbola) mentioned that they had to cancel their plans for a community hall and select rainwater tanks instead, due to land disputes, but this had been an informed and deliberate choice. With two exceptions, all 65 community sub-projects reflected the number one priority identified by communities in their CBDRM/V&A planning processes.

Figure 6.7: Who Proposed the Sub-Projects



30. **Sub-Project Proponents.** The majority (74 percent) of respondents stated that the entire community had proposed the sub-project (Figure 6.7). The next most common proponents were chiefs or village leaders (11 percent) and village committees (8 percent). For schools, the most common proponent was the Education Authority (4 percent).

Figure 6.8: Was the Sub-Project Carried out as Expected?



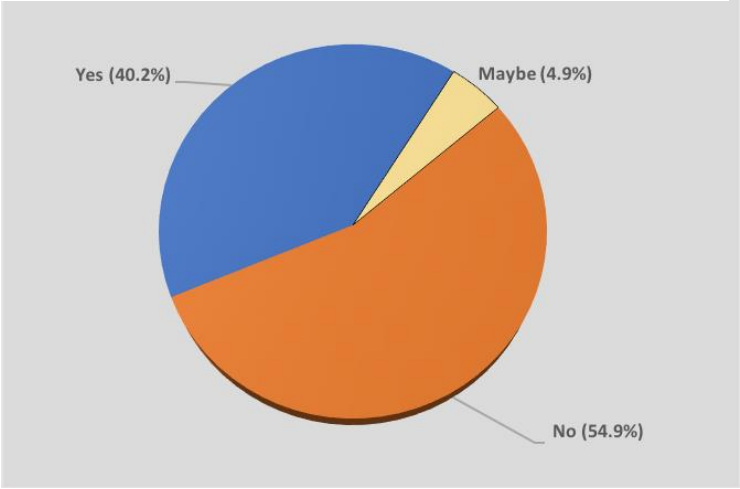
31. **Meeting Expectations.** A substantial proportion of respondents (82 percent) stated that their sub-projects had been carried out as expected. An additional 16 percent mentioned some problems and only 2 percent felt the sub-projects did not conform to expectations (Figure 6.8). Aspects that seemed to have *worked well* at their level included: community collaboration and the pride and ownership it instilled, such as men, girls, women, and even the elderly working together; good community organization and clear task allocation (such as work responsibilities by zone, and provision of food for workers); and youth participation.

32. Respondents also identified many **implementation aspects where they thought the project had performed well:** bulk procurement by the PMU; CRISP project supervisors and engineers to oversee installations; good collaboration between SICs and CRISP engineers, as well as with contractors; and the engagement of skilled labor for tasks (such as building tank structures) beyond the communities' capacity. Several respondents praised the speed at which the sub-projects were completed (in some cases three weeks) and many mentioned completion on time and according to their expectations.

33. Relatively few **respondents felt their expectations were not, or only incompletely, met,** citing: difficulties in providing the agreed community contribution of sand, gravel or timber (a problem for recent settlers in Santa Cruz Islands who, with little access to these resources, felt they would have to purchase it from other landowners); difficulties with inter-community collaboration—an issue particularly in mixed culture communities, or in provincial sub-projects involving several dispersed settlements; local conflicts, such as underperforming committees, suspicions vis-à-vis committee members, land disputes or disagreements over sub-project location; and logistical problems due to geographical isolation and, in particular, having to transport materials from ships' ports of call to the community (in Temotu). Some respondents felt project staff should have visited more often and provided rations to local workers (however, this was part of the agreed community contribution).

34. **Perceived Efficiency.** Slightly more than half (55 percent) of respondents said the project could not have been implemented any faster or more efficiently (Figure 6.9). In Temotu, for example, respondents praised the fact that CRISP had reached their community (as they did not have many other projects) and managed to ship the materials despite the fact that ships only came every two to four months and were frequently overloaded. Many respondents also expressed appreciation for adherence to the promised time frame. In Balo, Guadalcanal, for example, one respondent mentioned the borehole was completed in only four months. Several praised the project's change towards PMU-purchased bulk procurement, as well hiring skilled workers to complete the technical components (such as constructing the tank bases).

Figure 6.9: Could the Sub-Project Have Been Implemented Faster and More Efficiently?



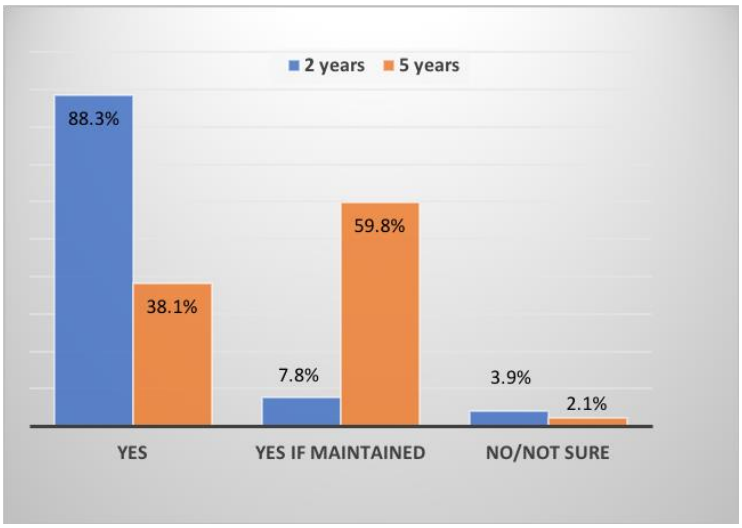
35. Respondents who felt the project could have been more efficient said the PMU should have handled all procurement from the start and deployed more supervision staff in Temotu (CRISP subsequently deployed two more staff). The split shipment of materials to Temotu was also viewed as having caused delays, as were difficulties in meeting community contributions (see above). One respondent suggested scheduling the arrival of materials shortly after the community training, so the information would be fresh in their minds and their energy levels still high. A few respondents also felt works could have been completed quicker if the project had paid them or issued rations. In Dende (Central Province) one respondent mentioned the works could have been done faster if they had excavators to scrape the hillside. Some respondents felt contractors should have focused fully on completing their site before moving to another, such as with the Tahti footbridge in Central Province and Toa'ae RWH in Malaita. Some internal issues that hampered efficiency were community disagreements over the location and distribution of tap water, weak organization and uneven contributions. One respondent suggested dividing the larger community into smaller groups to improve efficiency.

36. **Community Recommendations (for Implementation Elsewhere).** Respondents were asked what could be done differently if implemented elsewhere. Their suggestions are summarized on Table 6.1 below. Several respondents emphasized they were happy with CRISP's approach—with communities working together with the PMU, clear work activities, PMU-purchased procurement, and good engineering and skilled worker support—and this should be extended to other communities. In their words the project should "*continue to work well with people".*

Table 6.1. Beneficiaries Recommendations: How could CRISP be done differently in another site?

GENERAL RECOMMENDATIONS	TECHNICAL RECOMMENDATIONS
• Have more staff in the field to oversee village committees (e.g., three staff based in Temotu) • Carry out training closer to materials arrival times • Ship materials in a single shipment • Inform community in advance when ship is loaded so they are ready to receive materials and avoid losses • Avoid creating new committees and work with existing ones (e.g., church committees which have a lot of influence) • More awareness/training (e.g., for school children) • Contractors should be community members whenever possible. • Ensure quick disbursement of funds to community to prevent suspicion of misuse by committees • PMU to continue to purchase all materials, with the community doing the work • Continue to hire skilled labor for technical components • Ensure clear delegation of roles and responsibilities to community groups • Ensure contractors pay community labor • Include sanitation	• More training on water management (RWH) • Review design of taps when they are too low • Use steel/cement post to catch more water (RWH) • Include borehole for showers to save tank water for drinking/cooking (RWH) • Cover tanks well and/or build fences to secure them and prevent children from tampering (RWH) • Need more tanks (families closer to tanks treat them as their property), e.g., five families per tank (RWH) • Provide adequate tools for the sub-project (e.g., excavator for community hall)

Figure 6.10: Will the Sub-Projects Continue in 2 and 5 Years



37. **Perceived Sustainability.** When asked whether they believed their sub-project would continue to operate as planned in two years, 88 percent of respondents gave an unconditional yes, 8 percent agreed with caveats and 4 percent disagreed or were not sure (Figure 6.10). Given a five-year time horizon, respondents were more conservative, with 60 percent agreeing only if the system was properly maintained.

38. Among reasons for optimism, respondents cited: good quality materials and construction (e.g., tanks and foundation that can withstand strong winds and, in the case of footbridges, use of vasa timber and deck height sufficient to withstand floods); faith that individual families, the community and/or water committees take responsibility maintenance; the fact that materials were still new; and good spirit of collaboration in their communities.

39. Those mentioning the need for maintenance during the stated period were mostly optimistic the community could undertake these efforts, through committees or user groups (or zone users for RHW tanks). They mentioned that taps and tanks should be safeguarded from children and drunks, and that tanks needed to be regularly cleaned.

40. If more substantive repairs were required—such as replacing taps or the RWH roof, or the pump and generator (for boreholes)—they planned to fundraise among users. One RWH beneficiary in Central Province also mentioned planned contributions from zone users. If still further help was needed, they would ask the committees (SIC, water, school or church committees) to ask donors or the province for assistance.

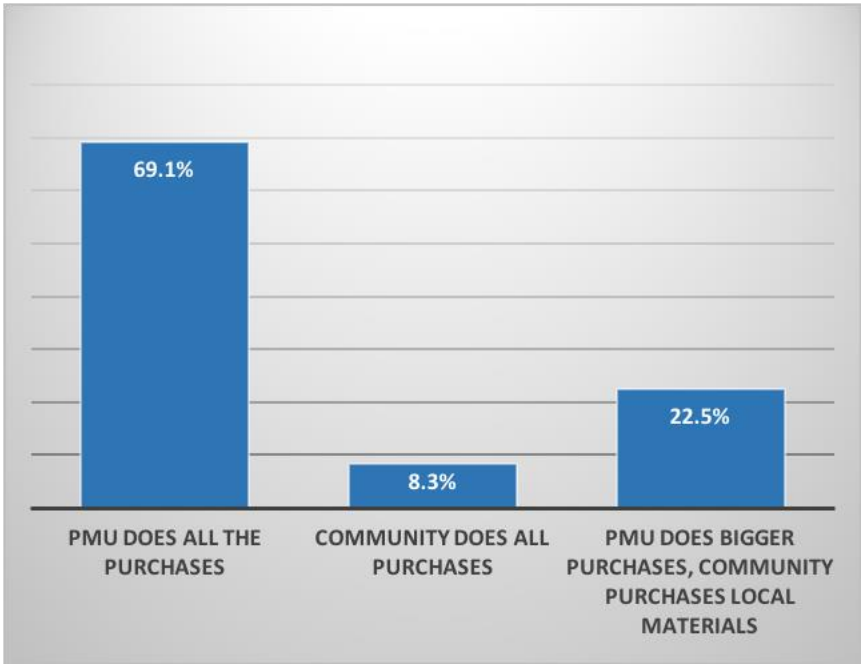
41. At the time of the survey, no community seemed to be collecting water fees. Several respondents in Temotu raised concerns about fundraising due to very limited opportunities for cash income (one respondent mentioned only earning SI$200 per year—or SI$2-5,000 if they were able to sell pigs in Honiara—but needed the money for school fees).

42. For the community hall (resilient buildings), respondents mentioned they would fundraise or use funds saved from renting the space. Some expressed concerns the footbridge location could start eroding, or that some of the timber would need to be replaced. However, respondents mentioned their footwalk committee looked after its maintenance. School fees, grants and fundrainsing were expected to cover maintenance costs of schools.

F. OTHER IMPLEMENTATION ASPECTS

43. **Procurement Method.** The majority of respondents (69 percent) felt that the PMU should purchase all the items, with another 23 percent preferring a combination approach—with the PMU responsible for purchasing larger items and the community responsible for purchasing smaller, local materials. Only 8 percent felt that the community should be responsible for all purchases (Figure 6.11). Preferrence for PMU-based procurement was unanimous among more isolated Tomotu beneficiaries who felt they had no choice given that they had no hardware stores or banking facilities, transport ships came infrequently, and most skilled people were away in Honiara. In Santa Cruz Island, in particular, where many were recent settlers, respondents also cited difficulties providing local materials (timber, sand and gravel) as they did not have access to natural resources and had to purchase them from landowners.

Figure 6.11: Preferred Procurement Method



44. For many respondents across all islands, PMU-managed procurement was seen as the faster, more efficient option, given many committees lacked purchasing experience and did not know what to buy or where to purchase materials. They also felt this option was less risky, as it would free committees from having to travel and incur extra (and potentially unforseen) costs. A substantial number of respondents also mentioned that having local committees or local leaders handle substantial funds would increase mistrust and suspicion, and could result in misuse or stealing of funds.

45. About 23 percent of respondents, particularly in Malaita and Central Province, felt the combination approach used by CRISP was the right one, with the PMU providing external materials and the community providing local materials and manpower, as well as handling some funds to make small payments. The advantages of this approach included: *empowering the community*, so they felt they were part of the project by working together with the PMU; *flexibility,* by being able to use their account to quickly pay for missing, delayed or unexpected items, thereby avoiding delays; and *capacity building,* so they could learn to progressively purchase bigger items through interaction with the technical team. Some respondents also felt this would diminish the overall burden to the PMU. Communities in Kwa'neone, Bethany, and Kelekwai in Malaita strongly preferred this combination method.

46. A small number of respondents (8 percent) in Polomughu, Tathi, Siota, Gumba (Central Province) and Onepara (Malaita) felt communities should do most of the purchasing, and that it would be easier for them to buy the materials. They felt they had sufficiently qualfied members to handle procurement and could result in faster delivery. This included respondents from schools. However, even in those communities, there was no consensus, with one respondent stressing it all depended on local circumstances and capacity.

47. **Perceived Partnership with Government.** Respondents unanimously felt the partnership between the community and government had improved as a result of the project. They felt their needs were recognized and properly addressed and collaboration was successful. One respondent mentioned that, unlike other projects which purchased items and left installation up to the villages, community members really felt they worked in partnership with CRISP project experts.

48. **Role of Women.** Women were actively involved through most of the sub-project stages. During community meetings to discuss *sub-project proposals,* women strongly voiced their views, particularly in prioritizing water and in selecting SIC members. Even in highly patrilineal communities, women were said to have presented their priorities through their husbands and influenced men's decisions. Women also provided their inputs on how to organize the work. Some community meetings also included girls.

49. During *implementation,* women helped carry materials, such as gravel, sand, stones and timber, to the worksite, and provided food and water for workers. In some sub-projects, they also helped with digging (e.g., borehole in Balo, GFS in Polomughu, and community hall in Dende) and land clearing, or helped the skilled laborers (e.g., RWH in Haghalu).

50. Women were perceived to play important roles in *maintenance:* cleaning, weeding and beautifying the areas around RWH tanks, water taps, and footbridges; cleaning community halls; emptying and cleaning water tanks; preventing children from damaging taps or wasting water; fundraising for eventual maintenance needs; posting notices to inform villages how to use the sub-projects with care; controlling water puddles to prevent mosquito breeding; and organizing family maintenance tasks.

51. Women comprised *one third (32 percent) of SIC members*, when responses were averaged across each site.[55] Up to 84.5 percent of respondents mentioned that women were active participants in committees, voicing their views, organizing community works, providing information, and fundraising. However, in communities where the role of the committee had been replaced by a lead individual (e.g., school principal in Siota or catechist in Emua) or where decision making was strongly patrilineal, women's contributions were perceived to be more muted.

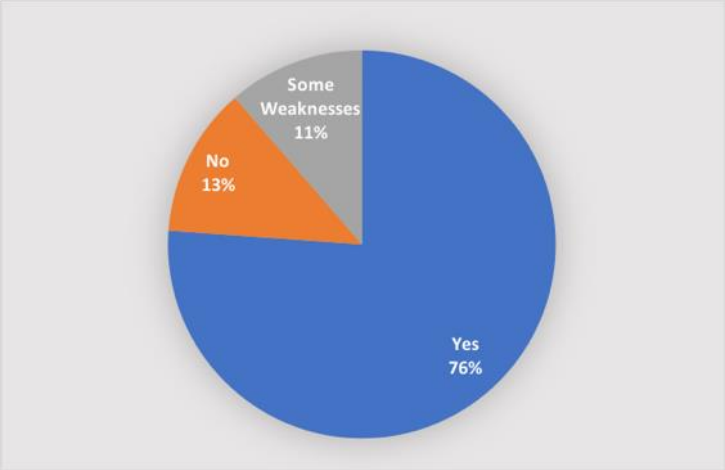
52. **Role of Village Committees.** All communities reported having village committees. In some cases, however, pre-existing school boards (Onepuso and Siota), health (Leitongo), or church and water committees seem to have taken the place of, or outright replaced, SICs established by CRISP.

[55] If averaged across all respondents, women comprised 36.2 percent of village committees. This discrepancy is due to different perceptions of respondents within the same community.

53. Village committees were responsible for allocating and overseeing the work of community groups (e.g., digging, transport materials, cooking), calling for meetings to inform the community about sub-project progress, ensuring the water was used properly, and organizing maintenance, including fundraising when needed. One respondent also mentioned that the committees adopted by-laws to fine anyone misusing the tanks/taps.

54. **Performance of Village Committees.** While around two thirds of respondents (76 percent) reported that their village committee was working well (Figure 6.12), about a quarter of respondents said their committees were weak or inactive. Reasons cited included: committee members having other priorities and/or jobs (e.g., logging in Temotu); lack of cooperation or conflicts; difficulties in coordinating work across islands with mixed culture (e.g., Santa Cruz), weak leadership; or "slacking off" after project staff left the village. In cases where SIC committees were viewed as performing poorly, a leading villager (e.g., a catechist), family groups or another pre-existing committee often took the initiative to organize the works.

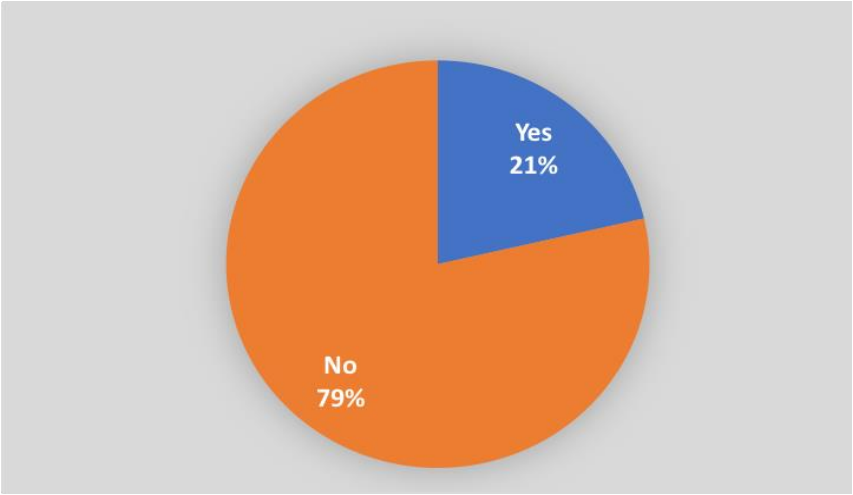
Figure 6.12: Is the Village Committee Working Well?



55. **Role of CBDRM/V&A consultations.** Some 40 percent of respondents reported they participated in the CBDRM/V&A consultations and/or trainings while 60 percent did not. Those who participated mentioned learning how climate change and disasters could affect their lives, the importance of managing climate change and disaster risks, and the role of CRISP in helping communities manage those risks. They also cited learning how to: stay safe from floods (such as evacuating to safer areas during disasters); learning the signs a tsunami was coming; manage food security; use water wisely during disasters; how to build more resistant houses; and become eligible for CRISP funding. They also learned about the ways in which sea level rise was eroding their beaches. Nevertheless, several respondents mentioned forgetting what was discussed as trainings took place long ago, highlighting the importance of repeating the training periodically. Very few respondents (4 percent) mentioned having received or knowing someone who had a copy of the CBDRM/V&A plan, possibly because the plans had not yet been distributed to communities at the time of the survey.

56. **Outstanding Issues with Water Supply.** The majority of respondents (79 percent) from water sub-projects reported no outstanding problems with the water supply. Another 21 percent reported problems, primarily with maintenance (Figure 6.13): debris collected in the gutter during heavy rains and strong winds (they suggested using a net); taps rusting quickly (recommended rust-resistant taps), slacked, or needing fittings' replacement; minor leaks in GFS pipes; overly strong water pressure (suggested buying new fittings and/or adding more taps). Respondents in Mbola were worried that the roof color bond coppers were not safe for water

Figure 6.13: Are there Remaining Problems with the Water Supply?



consumption. Some expressed concern that the tanks may prove insufficient during the approaching dry season. CRISP project staff used the opportunity of the survey to provide advice and/or report back to the PMU for further support.

Table 6.2: Surveyed Communities by Sub-Project Type and Province

		Total Sub-Projects CRISP	Surveyed Sub-Projects	% of Total Surveyed	Total Beneficiaries CRISP	Surveyed Beneficiaries	% Total Beneficiaries Surveyed
Community:							
	RWH	30	14	46.7%	15,527	66	0.43%
	GFS	15	5	33.3%	7,505	19	0.25%
	Pumped Spring/Boreholes	10	1	10.0%	4,435	2	0.05%
	Resilient Buildings	7	1	14.3%	3,978	4	0.10%
	Shoreline Protection	1	0	0.0%	267	0	0.00%
	Footbridge	2	2	100.0%	438	8	1.83%
	Total	**65**	23	35.4%	32,150	99	0.31%
Province							
	RWH	2	1	50.0%	19,831	4	0.02%
	GFS	2	0	0.0%	3,363	0	0.00%
	Shoreline Protection	1	0	0.0%	13,534	0	0.00%
	Total	**5**	1	20.0%	36,728	4	0.01%
Grand Total		70	24	34.3%	68,878	103	0.15%

	Total Sub-Projects by Province	Surveyed Sub-Projects	
Community:			
Temotu	10	5	50.0%
Guadalcanal	15	2	13.3%
Central Islands	19	10	52.6%
Malaita	22	7	31.8%
Renell	4	0	0.0%
Total*	**70**	24	34.3%

*Includes both community and provincial sub-projects

ANNEX 7. LIST OF SUB-PROJECTS SUPPORTED BY THE PROJECT

			Geographical Coordinates		Beneficiary Population				Sub-Project Costs (SI$)				
	Name of Sub-project	Type	Latitude (degrees)	Longitude (degrees)	Total	Female	Starting Date	Completion Date	CRISP Contribution (Grant)	Community Contribution (in-kind)	RDP Co-Financing	TOTAL COSTS	Sub-Project Costs (US$)
COMMUNITY SUB-PROJECTS:													
GUADALCANAL:													
1	Mbola Rainwater Harvesting	RWH	-9.626	160.648	216	108	Dec-18	Jul-19	250,831	48,890		299,721	$36,198
2	Balo Water Supply	Pumped Borehole	-9.537	160.493	466	235	Dec-18	Oct-19	288,816	67,241		356,057	$43,002
3	Bauna Water Supplies	RWH	-9.631	160.636	269	141	Apr-18	Jan-19	184,777	30,720		215,497	$26,026
4	Babasu Water Supply	Pumped Spring	-9.709	160.714	386	187	Nov-17	Jun-18	172,600	27,616		200,216	$24,181
5	Lonngu Community Hall	Resilient Buildings	-9.659	160.658	554	249	Oct-17	Apr-20	300,884	48,890		349,774	$42,243
6	Namaraoni Water Supply (RDP-led)	GFS	-9.504	160.064	137	69	Jan-17	May-19	101,860	82,300	200,000	384,160	$46,396
7	Tomurora Water Supply (RDP-led)	Pumped Spring	-9.421	160.183	165	81	Jan-17	Apr-19	75,000	77,850	250,000	402,850	$48,653
8	Numbu Water Supply (RDP-led)	Pumped Borehole	-9.510	160.337	727	226	Jan-17	Mar-20	60,000	58,800	200,000	318,800	$38,502
9	Tetupa Water Supply (RDP-led)	Pumped Spring	-9.520	160.250	227	122	Jan-17	Jun-18	96,790	85,440	200,000	382,230	$46,163
10	Selwyn College Girls Dormitory (RDP-led)	Resilient Buildings	-9.289	159.626	794	377	Jan-17	Apr-20	300,228	289,155	250,000	839,383	$101,375
11	St. Joseph's School Tenaru Water Supply	Pumped Borehole	-9.446	160.076	910	301	Oct-18	Oct-19	430,512	30,580		461,092	$55,687
12	Sunghina Water Supply (RDP-led)	Pumped Spring	-9.507	160.069	54	20	Jan-17	May-19	83,340	21,000	225,000	329,340	$39,775
13	Matanga Water Supply	Pumped Spring	-9.425	160.183	100	63	Jan-17	Apr-19	75,000	23,500		98,500	$11,896
14	Bolukalai Water Supply	Pumped Borehole	-9.532	160.486	966	491	Oct-18	Nov-19	327,094	35,250		362,344	$43,761
15	Hebron Water Supply	Pumped Borehole	-9.534	160.484	434	211	Oct-18	Nov-19	218,063	26,700		244,763	$29,561
	SUB-TOTAL (Guadalcanal)				***6,405***	***2,881***			***2,965,795***	***953,932***	***1,325,000***	***5,244,727***	***$633,421***
TEMOTU:													
16	Lipe Community Hall	Resilient Buildings	-10.265	166.358	796	139	Mar-19	Oct-19	394,735	35,604		430,339	$51,973
17	Nembao Water Supply	GFS	-11.276	166.488	420	290	Oct-18	Apr-19	148,023	36,569		184,592	$22,294
18	Emua Water Supply	GFS	-11.715	166.915	430	201	Sep-18	Feb-19	118,789	18,264		137,053	$16,552
19	Ngauta Water Supply	GFS	-9.894	167.183	511	230	Oct-17	Jul-18	121,760	21,632		143,392	$17,318
20	Rofaea Water Supply	RWH	-12.292	168.824	575	278	Apr-18	Dec-18	206,868	17,640		224,508	$27,114
21	Ravenga Water Supply	RWH	-12.298	168.838	710	390	Apr-18	Dec-18	267,529	17,640		285,169	$34,441
22	Anuta Shoreline Protection	Shoreline Protection	-11.614	169.856	267	140	Apr-18	Oct-18	88,935	33,000		121,935	$14,726
23	Mona School Foundation Stengthening (RDP led)	Resilient Buildings	-10.760	165.816	432	220	Dec-18	Aug-19	88,415	33,400	200,000	321,815	$38,867
	SUB-TOTAL (Temotu)				***4141***	***1,888***			***1,435,054***	***213,749***	***200,000***	***1,848,803***	***$223,285***
CENTRAL ISLANDS:													
24	Dende Community Hall	Resilient Buildings	-9.181	160.347	483	220	Feb-18	Oct-19	458,940	38,659		497,599	$60,097
25	Haghalu RWH Schemes	RWH	-9.092	160.178	484	226	Feb-18	Sep-18	201,332	39,983		241,315	$29,144
26	Leitongo RWH Schemes	RWH	-9.014	160.077	1386	597	Feb-18	Nov-18	616,263	87,703		703,966	$85,020
27	Ghumba RWH Schemes	RWH	-9.181	160.259	574	277	Feb-18	Jul-19	332,874	47,937		380,811	$45,992
28	Mbelagha RWH Schemes	RWH	-9.074	160.331	934	440	Feb-18	Mar-19	429,981	63,843		493,824	$59,641
29	Polomughu Water Supply	GFS	-9.039	160.270	826	423	Feb-18	Nov-18	217,476	66,525		284,001	$34,300
30	Haleta Water Supply	GFS	-9.097	160.116	454	221	Feb-18	Nov-18	221,534	66,525		288,059	$34,790
31	Ilua RWH Schemes	RWH	-9.059	159.056	253	119	Feb-18	Dec-18	217,548	24,077		241,625	$29,182
32	Losioleni Community Hall	Resilient Buildings	-9.048	159.109	469	237	Feb-18	Mar-20	446,160	38,659		484,819	$58,553
33	Nukufero Grav Feed WS	GFS	-9.049	159.092	505	281	Feb-18	Mar-20	277,894	22,777		300,671	$36,313
34	Maruloan Gravity-fed WS	GFS	-8.993	159.108	436	211	Feb-18	Aug-19	379,332	46,150		425,482	$51,387
35	Leru RWH Schemes	RWH	-9.005	159.058	105	51	Feb-18	Dec-18	190,552	21,634		212,186	$25,626
36	Balola-Sisiaka RWH Schemes	RWH	-9.103	159.807	429	215	Feb-18	Feb-19	290,178	39,983		330,161	$39,875
37	Bonala-Leboni RWH Schemes	RWH	-9.116	159.832	608	208	Feb-18	Dec-18	306,547	47,937		354,484	$42,812
38	Siota School RWH Scheme	RWH	-9.062	160.312	300	171	Jan-19	Oct-19	139,615	11,000		150,615	$18,190
39	Rara Footbridge with Bank Protection	Footbridge	-9.009	160.239	213	102	Jan-19	Jun-19	101,662	8,000		109,662	$13,244
40	Tathi School Footbridge with Bank Protection	Footbridge	-8.882	160.006	225	107	Jan-19	Jun-19	130,859	15,700		146,559	$17,700
41	Taumako Community and ECE Centre	Resilient Buildings	-9.050	159.092	450	218	Jul-19	Apr-19	90,000	32,000		122,000	$14,734
	SUB-TOTAL (Central Islands)				***9,134***	***4,324***			***5,048,746***	***719,092***	***0***	***5,767,838***	***$696,599***

			Geographicall Coordinates		Beneficiary Population				Sub-Project Costs (SI$)				
	Name of Sub-project	Type	Latitude	Longintude	Total	Female	Starting Date	Completion Date	CRISP Contribution (Grant)	Community Contribution (in-kind)	RDP Co-Financing	TOTAL COSTS	Sub-Project Costs (US$)
MALAITA:													
42	Alota'a RWH Scheme	RWH	-8.772	160.694	324	110	Feb-18	Feb-19	250,596	23,763		274,359	$33,135
43	Fouo RWH Scheme	RWH	-8.743	160.941	205	123	Feb-18	Jun-19	159,731	19,839		179,570	$21,687
44	Kelakwai RWH Scheme	RWH	-8.745	160.674	320	143	Feb-18	Feb-19	270,925	29,111		300,036	$36,236
45	Ndai RWH Scheme	RWH	-7.925	160.647	286	112	Nov-18	Apr-19	232,404	33,000		265,404	$32,054
46	To'ae RWH Scheme	RWH	-8.937	160.775	500	220	Feb-18	Feb-19	319,598	39,461		359,059	$43,365
47	Luaniua RWH Scheme	RWH	-5.493	159.694	1,396	699	Oct-18	Feb-19	250,000	27,500		277,500	$33,514
48	Pelau RWH Scheme	RWH	-5.098	159.402	700	357	Aug-18	Feb-19	292,300	25,000		317,300	$38,321
49	Tawaimare-Onemae WS	GFS	-9.208	160.967	600	305	Jan-19	May-20	553,879	50,749		604,628	$73,023
50	Sikaiana RWH	RWH	-8.410	162.939	249	127	Sep-18	Feb-19	250,000	27,500		277,500	$33,514
51	Kwa'aoneone RWH Scheme	RWH	-8.871	160.758	320	103	Mar-18	Feb-19	236,156	27,688		263,844	$31,865
52	Suafa Water S Supply	GFS	-8.340	160.715	1,251	606	Apr-19	May-20	458,643	63,465		522,108	$63,056
53	Tawaaro RWH with Clinic Roof Replacement	RWH	-9.517	161.514	2,620	1,046	Jan-18	Jun-18	324,000	35,640		359,640	$43,435
54	Fulifo'oe Water Supply	GFS	-8.331	160.582	402	188	Apr-19	Apr-20	345,000	33,000		378,000	$45,652
55	Koroha-Kinapa Water Supply	GFS	-9.285	161.022	689	148	Jan-19	May-20	298,417	53,000		351,417	$42,442
56	Kiu-Katariwa Water Supply	GFS	-9.289	161.024	298	156	Jan-19	May-20	320,082	12,500		332,582	$40,167
57	Onepuso-Onepara RWH Scheme	RWH	-9.294	161.030	130	36	Aug-18	Sep-19	198,177	12,000		210,177	$25,384
58	Nahu Water Supply	GFS	-9.302	161.087	221	102	Jan-19	Apr-20	236,454	22,100		258,554	$31,226
59	Airasi RWH Scheme	RWH	-9.313	161.078	168	85	Aug-18	Sep-19	225,598	27,000		252,598	$30,507
60	Surairo RWH Scheme	RWH	-9.315	161.077	174	92	Aug-18	Sep-19	216,863	20,000		236,863	$28,607
61	Kopo Water Supply	GFS	-9.312	161.090	325	240	Dec-18	Mar-20	193,595	23,750		217,345	$26,249
	SUB-TOTAL (Malaita Islands)				***11,178***	***4,998***			***5,632,420***	***606,066***	***0***	***6,238,486***	***$753,440***
RENNELL AND BELLONA:													
62	Matangi RWH	RWH	-11.307	159.818	254	121	Jan-19	Nov-19	253,803	27,411		281,214	$33,963
63	East Gonghau RWH	RWH	-11.302	159.799	365	214	Jan-19	Nov-19	364,717	39,389		404,107	$48,805
64	West Gonghau RWH	RWH	-11.294	159.783	414	222	Jan-19	Nov-19	413,680	44,677		458,357	$55,357
65	Sa'aiho RWH	RWH	-11.282	159.762	259	143	Jan-19	Nov-19	258,800	27,950		286,750	$34,632
	SUB-TOTAL (Rennell and Bellona)				***1,292***	***700***			***1,291,000***	***139,428***	***0***	***1,430,428***	***$172,757***
	SUB-TOTAL (Community-led)				**32,150**	**14,791**			**16,373,016**	**2,632,267**	**1,525,000**	20,530,283	**$2,479,503**
PROVINCIAL SUB-PROJECTS:													
1	Nangu Water Supply **(Temotu)**	GFS	-10.785	166.049	1,863	800	Feb-15	Jan-16	1,068,835			1,068,835	$129,086
2	Lata Station RWH **(Temotu)**	RWH	-10.712	165.814	10,631	5,800	Jan-19	Nov-19	576,333			576,333	$69,605
3	Langa-langa Water Supply **(Malaita)**	RWH	-8.860	160.764	9,200	4,674	Mar-19	Oct-19	1,717,666			1,717,666	$207,448
4	Afio Water Supply **(Malaita)**	GFS	-9.596	161.401	1,500	760	Aug-19	May-20	560,000			560,000	$67,633
5	Tulagi Shoreline Protection **(Central)**	Shoreline Protection	-9.109	160.149	13,534	6,767	Oct-18	Dec-19	3,175,461			3,175,461	$383,510
	SUB-TOTAL (Provincia-ledl)				36,728	18,801			**7,098,294**			**7,098,294**	**$857,282**
	GRAND TOTAL				68,878	33,592			**23,471,310**	**2,632,267**	**1,525,000**	**27,628,577**	**$3,336,785**

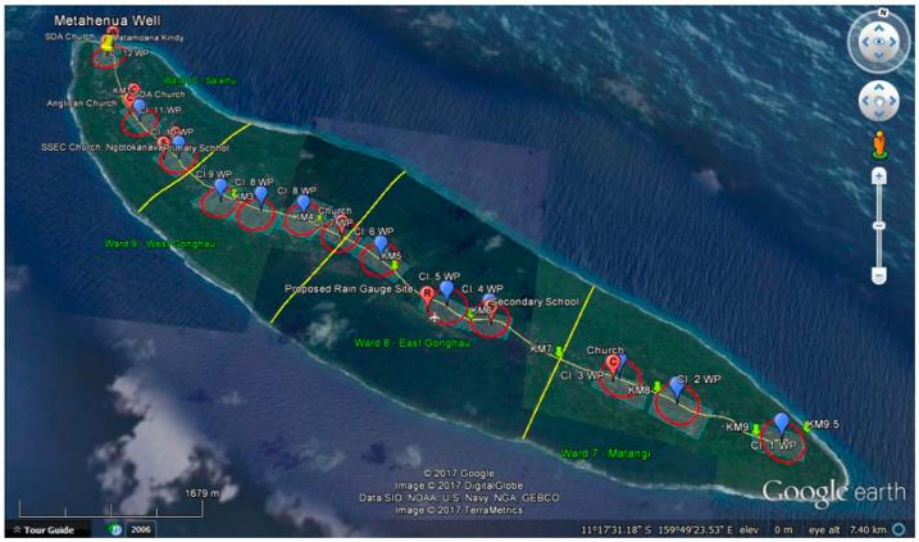
ANNEX 8. PHOTOGRAPHS OF SUB-PROJECTS

1. Provincial Shoreline Protection (Tulagi, Central Province) .

Left: Situation before investment. Tulagi's circumferential road and surrounding public assets were threatened by coastal erosion along a 260-meter critical stretch.

Left: Situation after investment. Road protected by a rock armor revetment, including a concrete ramp and a repaired drainage culvert.

2. Bellona Rainwater Harvest (Rennel and Bellona Province)



Bellona, a small isolated island on southern Solomon Islands, suffers from periodic droughts, and groundwater sources were contaminated or brackish.

CRISP designed and installed rainwater harvest points in 28 community-managed collection points in four wards.

3. Rainwater Harvesting in Malaita and Central Province

In Kelakwai (Malaita), the project helped install seven 5,000-liter tanks, served by a built-in roof catchment area. Other communities, such as Aleafai (Malaita) used pre-existing household metal roofs as capture areas, but with agreements that the tank would be shared by four to five households.

Upper left: Kelakwai (Malaita); *Right*: Aleafai, Langa Langa (Malaita); *Lower photos:* Hagalu (Central Province). *Lower right:* Traditional polluted well at Hagalu

4. Pumped Borehole at Balo, Guadalcanal

Previously, this isolated coastal community on eastern Guadalcanal relied on (often brackish) stream water, which required a two-hour daily walk to collect. The project helped install a pumped borehole and 17 water taps.

5. School Sub-Projects

CRISP funded four sub-projects to improve the resilience of schools, by funding safe water and flood resistant buildings. By improving school conditions, CRISP also had an impact on student transition to higher education, thus influencing their future earning potential.

Upper photos: pumped borehole at St. Joseph Tenaru school (Guadalcanal); *Lower right:* rainwater harvest at Siota secondary school (Central Islands); *Lower left:* girl dormitory at Selwyn college (Guadalcanal).

6. Footbridge with Bank Protection at Rara (Central Province)

This small footbridge allowed children to safely access the primary school during flood season and high tides. It also facilitated community access to the local clinic and allowed a market serving households on both sides of the bridge to operate during flood days.

7. Beneficiaries

CRISP benefits were broad-based, but according to the beneficiary survey, women, children, the elderly and young girls benefited the most.

Water sub-projects freed up time for women and young girls which they used to earn extra income (such as the making of shell money on photo above) rest and relax more and engage in community activities.

Children and the elderly benefited from better health (due to cleaner water), increased safety, and, for children, more time to study.

Photos (clockwise): Girls and children in Hagalu, Central Province (two top photos); Gwaedalo, Langa Langa lagoon (Malaita); Raro (Central Province); Aelafai, Langa Langa lagoon (Malaita).
(photo above, shell money in Gwaedalo, Langa Langa lagoon, Malaita).

8. Consultations

Target communities went through at least five rounds of consultations. The photos on the left show sub-project completion and handover ceremonies in Langa Langa lagoon, Malaita.

Top photo: Gwaedalo;
Lower photo: Aelafai.