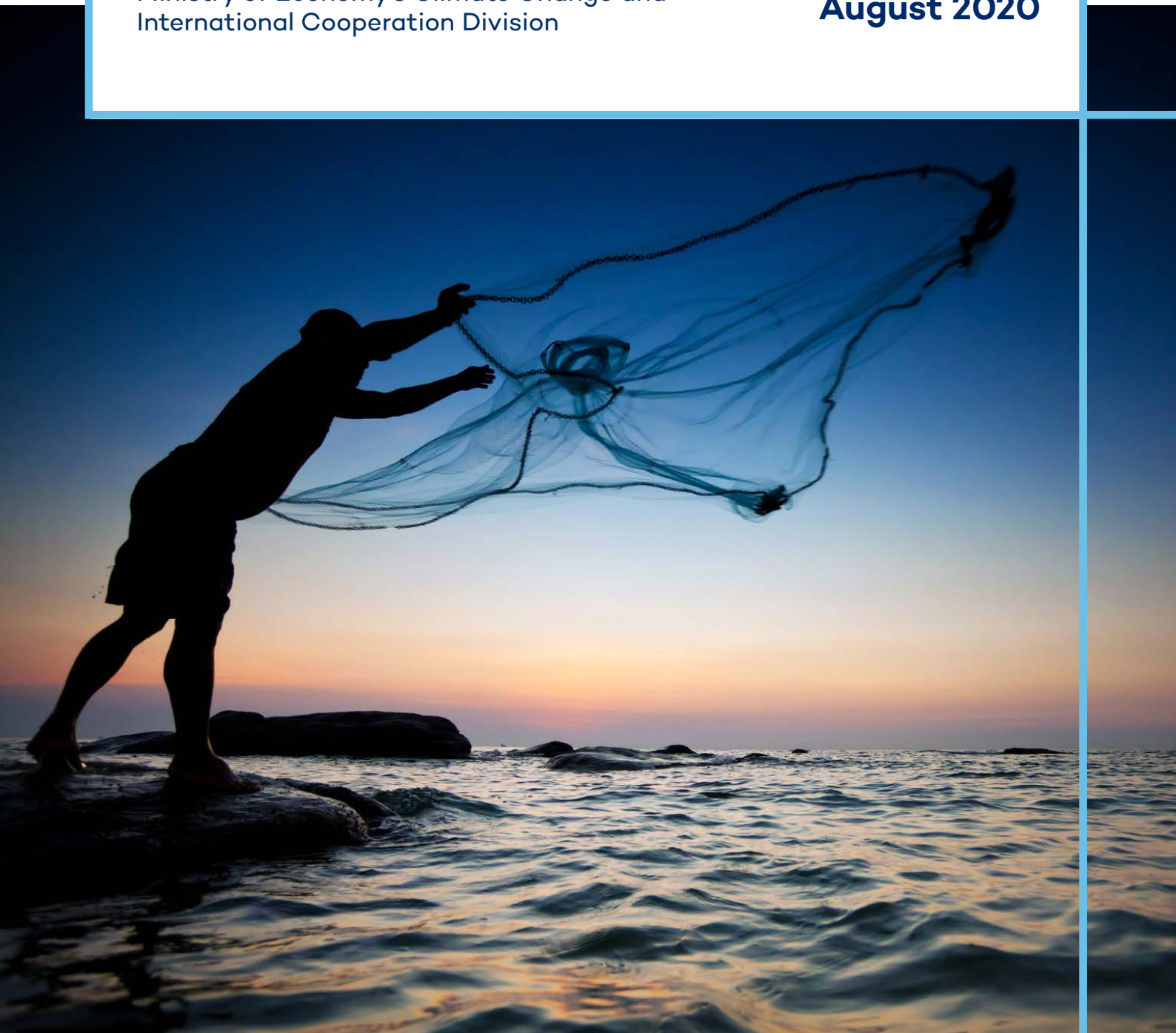
Costing Methodology for Fiji's National Adaptation Plan

Ministry of Economy's Climate Change and International Cooperation Division

August 2020



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About the NAP Global Network

The NAP Global Network was created in 2014 to support developing countries in advancing their NAP processes, and help accelerate adaptation efforts around the world. To achieve this, the Network facilitates sustained South-South peer learning and exchange, supports national-level action on NAP development and implementation, and enhances bilateral support for adaptation and climate-sensitive sectors through donor coordination. The Network's members include participants from more than 140 countries involved in developing and implementing National Adaptation Plans, as well as 11 donor members. Financial support for the Network has been provided by Austria, Canada, Germany, and the United States. The Secretariat is hosted by IISD. Any opinions stated herein are those of the author(s) and do not necessarily reflect the policies or opinions of the NAP Global Network, funders, or Network participants. For more information, visit www.napglobalnetwork.org.

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NAP Global Network

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Executive Summary

The National Adaptation Plan (NAP) Costing Methodology has been developed by Fiji's Ministry of Economy (MoE), Climate Change and International Cooperation Division (CCICD) to provide a rapid and comparable set of cost estimates for the 160 adaptation actions (called "measures") prioritized in its NAP document, over the five-year period from 2021 to 2025.

The NAP Costing Methodology has been developed by a consultancy that conducted a literature review of climate adaptation economic methods and project case studies, in Fiji, the Pacific, and internationally; launched a pilot trial effort to work through how to cost out several NAP measures while building the **Methodology**; and incorporated inputs from a stakeholder consultation hosted by MoE.

In a nutshell, the Methodology:

- Uses a simple bottom-up or engineering cost approach: individual cost elements are added to create the cost estimate for each activity (a set of activities comprises most measures).
- Is run via an Excel-based tool: users can enter resource and cost data into an Excel spreadsheet that calculates a measure's cost, compounds, or discounts costs to a common year, then runs sensitivity cases to test the robustness of the results.
- Is flexible: it can be applied to all adaptation measures prioritized in the NAP document; has low data input requirements compared to most economic models; requires only a basic level of technical expertise; and is designed to be easily adapted or updated.
- Employs a two-phased approach, with steps describing what needs to be done and how to do it.
- Has been tested via a pilot that entered two of the NAP's adaptation measures into the tool and shares that piloting experience throughout the report.
- Offers the user two different approaches to costing adaptation measures in the Excel tool: the "Calculated Cost Approach" (simply listing studies + capacity building + infrastructure + operational cost categories and asking staff to fill in costs for each resource needed within them); and "the Aggregate Cost Approach" (where agency budget line items or studies are available and provide ready-made integrated costs of whole activities).

- Can estimate costs at both the national and community scales: since data are often provided for one or the other, and the user may want to know one cost or the other.
- Recommends early policy-maker and expert review of which activities and costs to include in each measure (a fairly subjective but critical decision—and the crux of costing a NAP measure).
- Requests an agency using an existing, more-advanced model to use the NAP-CM tool as well, to produce an estimate consistent with other NAP measure estimates, and compare it to the advanced tool's results.
- Provides lessons learned from adaptation costing literature and case studies, along with good practice guidance for each step.

Next steps anticipated include: MoE will establish a pool of users from all key ministries and government agencies relevant to the NAP. Once this pool of users is established, then training and capacity building will be conducted, and eventually MoE may make the Methodology publicly available. Agencies are expected to include anticipated costs of using the Methodology in annual budget requests and to decide which NAP measures in their sector to pilot as their quick-start effort.

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Abbreviations

ACC	adaptation cost curve
BCRs	benefit-cost ratios
CBA	cost-benefit analysis
CCICD	Climate Change and International Cooperation Division
CEA	cost effectiveness analysis
COP	costed operational plan
CSA	climate-smart agriculture
CSO	civil society organizations
CVA	climate vulnerability assessment
EbA	ecosystem-based adaptation
FCPF	Forest Carbon Partnership Facility
GCAP	Global Climate Adaptation Partnership
GPs	good practices
IISD	International Institute of Sustainable Development
IPCC	Intergovernmental Panel on Climate Change
IRA	iterative risk assessment
MAC	marginal abatement cost curve
MCA	Multi-criteria analysis
M&E	monitoring and evaluation
MoE	Ministry of Economy
NAP	National Adaptation Plan
NAP-CM	NAP Costing Methodology
NCCP	National Climate Change Policy
NDC	Nationally determined contribution
NDMO	Fiji National Disaster Management Office
NGOs	non-governmental organizations
NPV	net present value
OECD	Organisation for Economic Co-operation and Development
ROA	real options analysis
PRRP	Pacific Risk Resilience Programme
SPC	Secretariat of the Pacific Community
SPREP	South Pacific Regional Environment Programme
UNCDF	United Nations Capital Development Fund
UNFAO	United Nations Food and Agriculture Organization
UNFCCC	United Nations Framework Convention on Climate Change

1. Introduction

Fiji's National Adaptation Plan (NAP) document (Republic of Fiji, 2018) was endorsed in 2018 as a five-year strategic action plan for climate-resilient development. Its primary aim is to integrate climate adaptation into development planning and budgeting at national, sectoral, and sub-national levels, to ultimately reduce Fiji's vulnerability to climate change impacts in the medium and long terms. The UNFCCC Cancun Adaptation Framework (UNFCCC, 2011) provides the overarching frame for Fiji's NAP, guided by the national Climate Change Bill (draft, 2019) that contains a mandate for continued development and evaluation of the NCCP and the NAP process (MoE, 2019).[1]

The Fijian government, through its Climate Change and International Cooperation Division (CCICD) within the MoE, partnered with the NAP Global Network, to develop a methodology to estimate the costs of adaptation measures prioritized in its NAP document. The Network's Secretariat is hosted by the International Institute for Sustainable Development (IISD).

The development of a standardized costing methodology is intended to:

1. Help CCICD and individual government agencies produce a cost estimate relatively quickly and inexpensively for each of the 160 NAP measures for which they are responsible, performed using comparable methods across measures.
2. Assist MoE and individual agencies in setting priorities for implementing adaptation measures under conditions of limited funding and staff capacity.
3. Clarify the overall resource and capacity requirements of proposed interventions, to build a business case for seeking domestic and international funding for Fiji's adaptation portfolio.

The NAP Costing Methodology (NAP-CM) has been informed by a national and international literature review (see Appendices B and C); structured interviews with experts (see Appendix E); and a stakeholder consultation in June, 2020, at MoE with about 25 stakeholders from six regional development partners, five Fijian government agencies, and a half-dozen international donors, NGOs, and private companies (see Appendix F).

The focus in recent years on designing and starting to implement climate change adaptation measures has been on reducing economic and ecological damages or losses associated with climate change. The costs of adaptation to climate change impacts are estimated to be relatively higher for a small island developing state like Fiji. Its isolation from major economic markets, long-distance transport costs for materials, small economic base, and the high impact of extreme events like tropical cyclones on a large percentage of a small island's landscapes and population severely impacting its GDP contribute to these high costs (Nurse et al., 2014). However, while adaptation *needs* are well-documented in Fiji's NAP document, the costs of the adaptation measures have not yet been comprehensively and consistently estimated using comparable data and methods. (Note that a Glossary is provided in Appendix A).

[1] Note that references are provided in Appendix B, and a broader adaptation costing Bibliography in Appendix C.

To accommodate these challenges, a two-phased approach is proposed for the NAP-CM.

Phase 1 of the NAP-CM aims to provide tools for rapid evaluation of the indicative costs required to implement the entire set of adaptation measures prioritized in the NAP document. It presents a simpler, less-expensive, **and** less-data-intensive method than those discussed in Phase 2. While most measures are designed to last far beyond the NAP document's five-year period, the NAP-CM calculates costs to be borne in that timeframe and generally does not look beyond it. But agencies could opt to include longer-term operating or other costs to meet changing climate impacts out 20 or 30 years within the five-year cost estimates, if agreed with MoE.

Phase 2 of the NAP-CM stresses optional use of methods that are more-advanced on an as-needed basis. The Methodology recognizes, first, that agencies will need to decide which longer-term or more expensive measures to secure funding for and to begin to implement; and second, that making these decisions will most likely necessitate employing a more sophisticated economic tool that can incorporate the benefits as well as the costs of measures.

The Methodology proposes that those agencies already using more sophisticated analytic methods for some measures they are managing can move straight to Phase 2 analyses if they have requisite trained staff and financial resources available. The Methodology, however, requests that such agencies cooperate with MoE to also use the NAP-CM Excel tool to develop an estimate comparable to those being prepared for the other measures, and to compare and discuss any differences in the results.

2. Lessons Learned and Best Practices From the Literature on Costing Adaptation

The approach in this tool builds upon a review of a half-dozen representative methodologies, standards, and guidance documents from relevant agencies such as development banks and multilateral funds, along with relevant Fijian, Pacific community, and international adaptation and economic literature.

Various studies have used different climate models' scenarios, climate impact forecasts, adaptation cost categories, and economic methods. These tools operate at different scales, ranging from project bottom-up engineering cost approaches, to cost-benefit analysis, to national Partial Equilibrium Models, on up to global integrated assessment models (Chambwera et al., 2014).

Overall, the available evidence on which to build tools to estimate adaptation costs and benefits remains relatively thin. Only about 25% of the 500 studies reviewed by one ambitious study are peer-reviewed; the majority are **grey literature** (i.e., literature produced outside of commercial or academic publishing and distribution channels), given the early stage of such work (ECONADAPT, 2010b).

Nonetheless, important lessons have been discovered in these studies. Overarching lessons learned and good practices to actualize the lessons are shared in Table 1. More task-specific lessons and good practices are woven into the six steps in Section 5 that guide use of the Methodology; other detailed lessons are contained in Appendix D. Some good practices spring directly from the literature, while others are recommended by the NAP-CM method development team, based on the literature and the team's experience.

Table 1. Overarching lessons learned and good practices for using NAP Costing Methodology - from literature review and experience

Lesson learned	Guidance and good practices recommended	Source
Overall cost of adaptation options varies depending on which categories of activities are included. Costs are higher the more categories of costs and activities per measure are included.	• Careful review of (and decision making on) which activities need to be included to constitute a measure, and which types of costs will be included, is critical early in the costing of each measure.	Adger (2007); NAP-CM team experience
Setting priorities among large sets of adaptation actions like the NAP is critical to move from an inclusive process into decisive action and funding. Set clear targets for each year, i.e., what measures to cost out or to implement.	• Organize a process to establish the order in which measures will be costed out and then implemented to avoid trying to advance the entire unwieldy portfolio at once.	Economics of Climate Adaptation Working Group (2009)
Designing high-risk projects today to account for future climate impacts can increase project costs by 5%–15%. But this is usually cheaper than retrofitting infrastructure to higher design standards.	• Agencies should carefully assess the trade-offs between retrofitting and new construction options and costs to minimize costs over time.	ECONADAPT (2015a)
Giving greater weight to costs and benefits that can be easily quantified can be a mistake that influences decisions on selection of adaptation options.	• Strive to put equal effort into finding data for the full array of costs and benefits, as much as feasible to avoid biasing results.	Wise and Capon (2016)
Bottom-up assessment of costs is preferred to calculate costs of adaptation measures where data are available, versus generalized top-down models, which tend to underestimate costs.	• Find data for or estimate all NAP-CM tool cost categories in order to produce a comprehensive, realistic cost estimate. • Use more complex models and methods you already use, if your agency has the required experience, data, and funding.	McKinsey (2009); IPCC (2007); NAP-CM team experience
Adapt or build modular tools to address costing and selecting adaptation measures, to allow adapting of the analytic approach as you learn.	• Adapt the NAP-CM Excel tool as needed for the requirements of specific measures or sectors by revising Excel sheets.	ECA (2009); NAP-CM team
Recognize the uncertainty of future climate impacts and of costs of adaptation options, but make decisions and act on the best information available.	• Use a scenario approach relying on the best science available. • Clearly state assumptions, data limitations, and major uncertainties during costing.	Economics of Climate Adaptation Working Group (2009)

3. The NAP Costing Methodology

Overview of the Methodology

After reflecting on the literature, CCICD has selected a pragmatic, relatively quick, and consistent approach of bottom-up engineering costs estimation, i.e., adding up the costs of individual activities to obtain the cost of the whole measure. This is vastly more efficient and feasible than more complex economic "full costs" approaches that require far more data, time, expense, and technical expertise to run sophisticated analytic tools and to interpret their results. The resulting approach relies on a methodology that provides guidance for agencies to estimate the additional costs of adaptation measures prioritized in the NAP document using roughly comparable methods. By following a transparent set of steps, agencies can produce results that are easily understood and readily usable for policy purposes. The rationale that led to the selection of this approach is documented in Appendix D.

Note that the focus for the NAP-CM is on Fiji's *public* measures cost estimation, not *private* sector activities that are likely to proceed without public policy incentives or finance. Markets are anticipated eventually to stimulate efficient private adaptation.

The Two Phases of the NAP Costing Methodology

Phase 1 is designed to produce a quick cost estimate for each measure that is consistent with the estimates for other NAP measures. It employs a straightforward bottom-up approach to break down each adaptation measure into roughly two to four major activities embedded within it, and then find cost data for them. (This is illustrated in the piloting summary table in Section 4). For example, a measure may call for revision of transportation planning regulations that pose barriers to implementation of the measure, and also for upgrading 70 water crossings and related roads to avoid flooding—two quite different and separate activities. The accompanying NAP-CM Excel tool and this document's Section 5 both instruct staff to follow a set of five steps to accomplish an estimate for each measure.[2]

Phase 2 occurs after comparable estimates of measures using the same tool have been performed or if an advanced tool is already in use. Over time, Fiji agencies could individually decide to apply more sophisticated methods of cost estimation for major activities, as needed. Such advanced estimates may be necessary to justify multi-million dollar investments in competing options, e.g., transportation infrastructure or moving whole villages to higher ground. Guidance on Phase 2 requests that if an agency uses a more advanced model, it also deploy the NAP-CM tool to produce a quick estimate consistent with other NAP measure estimates, and then compare the two methods' results.

Further details on Phase 2 and specific methods available are the focus of Section 6.

[2] The calculated cost approach in the Excel tool is inspired by the spreadsheet and data display methods that South Africa evolved to cost its climate adaptation strategy actions (Department of Environment, Forestry and Fisheries [DEFF], 2019). These methods are substantially different from studies such as the World Bank's that typically use top-down, partial equilibrium models of the interactions across sectors in a country's economy (e.g., World Bank, 2010c).

General Principles for Evaluating and Costing Adaptation Options

Principles for evaluating the suite of adaptation options are offered in Fiji's NAP Framework (Fiji, 2017). Many other authors and publications use or propose other guiding principles.

The principles below are selected from this range of documents and can help assist agencies implementing the NAP-CM in the day-to-day reality of Fiji. These principles also may help them select initial pilot measures to start using the Methodology (per Section 4).

Table 2. Principles used to guide the design of the costing methodology

Principle	Description
Pragmatism and effectiveness	Methodology is practical, and matches the needs, capacities, and priorities of key government agencies and stakeholders, in the Fijian context.
Consistency	Relatively consistent methods and data are applied for most NAP measures, allowing comparability of cost results, and avoiding the need for non-comparable methods.
Transparency	Data, methods, calculations, and assumptions are explicit and used in observable ways so that the resulting cost estimates are readily understandable.
Efficiency	Cost effectiveness. Efficient ratio of existing inputs (e.g., data collection, staff labor) resulting in a given output (a quality cost estimate that is timely).
Low resource intensity	Existing agency staff generally can find data readily available from agency budgets, projects, experts, or the literature. New data collection or training in complex methods not required.
Adaptability and flexibility	Ability of the method to be flexible to be applied and updated as needed for the Fiji context, as piloting and early use learning occur.

Sources: Fiji, 2017a; discussions with MoE's CCICD; ECONADAPT, 2015b; DEFF, 2019, Deliverable 2; UNFCCC, 2011.

These principles should work for all three major types of adaptation activities catalogued below.

Table 3. Types of adaptation measures

Green measures	Soft measures	Grey or hybrid measures
Coastal mangrove restoration to reduce storm damage	Financial incentives to change behavior	Constructing seawalls or hard coastal erosion structures
Ecosystem-based adaptation (EbA) measures: e.g., restore wetlands and revegetate riparian corridors to avoid flooding	Climate-sensitive land-use planning and zoning	Building or repairing roads and bridges to meet forecast flood levels
Introducing climate-smart agricultural techniques like alternative crops or agroforestry	Revise or provide clear policy framework that stimulates investment in adaptation actions	Revising maintenance and operational guidance for infrastructure

Source: ECONADAPT (2013, 2015a); Sovacool (2011).

Types of Costs Used in the NAP-CM and Other Methods

A range of different types of costs typically are included in the NAP-CM and other cost analyses, summarized below.

Table 4. Types and definitions of costs included in NAP-CM or in other cost methods

Type of Cost	Definition	Included in NAP-CM?
CAPEX	Capital expenditures for good lasting over a year generally, e.g., a bulldozer or computer	Yes—called capital costs > 1 year
OPEX	Operating expenditures or recurring costs, e.g., labor, concrete, workshop	Yes—called recurring or short-term costs <1 year
Additional or incremental cost	Cost of an activity needed to address adaptation to climate change impacts, above the baseline or business-as-usual cost	Yes
Baseline cost	Business-as-usual activities and their costs, without adaptation actions	Yes, indirectly—by tasking users only to enter additional costs above baseline costs
Shared cost	Costs shared by multiple activities or adaptation measures prioritized in the NAP document, whose share can be allocated to each measure	Yes, explicitly
Transaction costs	Costs incurred during economic exchanges involving the purchase of goods and services (e.g., legal fees, cost of borrowing money)	No, unless specifically added in by user
Opportunity cost	Economic cost of a resource, measured as the cost of giving up the nearest alternative use; the value of the next best option that must be surrendered	No
Full or net cost/ benefits	Net value when all costs and benefits are included	No—no benefits included

Note that the NAP-CM tool includes a range of costs, while more complex and data-heavy methods also include benefits (using a spectrum of economic techniques). Adding in benefits allows analysts to calculate net cost-to-benefit ratios—which are often the critical metric used by policy-makers to make decisions on which options to pursue. By comparison, the NAP-CM is constructed to deliver indicative cost estimates for the entire set of NAP measures in short order and at a low cost.

Overview of the Fiji NAP-CM Excel Tool

The NAP-CM tool approach is inspired by several prior Excel-based adaptation cost analyses at two scales pertinent for the Fijian context. At the national level, South Africa's Initial Cost Estimate for Implementation of National Climate Change Adaptation Strategy (DEFF, 2019) and the World Health Organization's (WHO's) Damage and Adaptation Costs Model (WHO, 2013) informed the structure of the NAP-CM tool. At the project scale in Fiji, the Economic Analysis of Ecosystem-Based Adaptation for Lami Town's coastal areas (Rao et al., 2013), and the Fiji Climate Change Division's case study of the Narikoso village coastal relocation project (Jolliffe, 2016) both used fairly intricate cost-benefit analysis methods (though with very limited benefits due to inadequate data) and conveyed insights into how to proceed.

The Excel tool (accessed via the links below and in Appendix G) employs as its default a hybrid cost approach. This allows the user to rely primarily on the aggregate cost approach described below, but also to add in selected costs entered into the calculated cost approach in Sheet 2. (Either the aggregate cost approach or calculated cost approach could also be used separately).

- The calculated cost approach requires two major types of data: resource data (e.g., number of mangrove seedling nurseries developed or jetties to be upgraded), and cost data (cost of renting and operating a bulldozer, labor, etc.). Data are entered into Sheet 2 of the tool for all or some of five default generic activities likely to be needed in most measures: Activity 1) Conduct research and feasibility studies, 2) Enhance capacity building, 3) Conduct technology transfer, 4) Enhance policies & institutions, 5) Undertake infrastructure improvement.
- The aggregate cost approach relies on the same structure of five generic default activities listed just above but requires the user to insert the costs of whole sub-activities like, e.g., Replant Mangroves and Riparian Buffers on the Coastline, or Limit Extractive Activities and Curtail Coral Extraction. These costs are derived from agency annual budgets or case studies found for a whole activity and are entered in the tool's Sheet 3.
- The types of data required are shown in Sheets 2 and 3 of the Excel spreadsheet and need to be obtained from agency budgets, prior studies, or interviews with experts.

The Excel tool is comprised of a Welcome Sheet plus six calculation sheets in one file (illustrated in the figure below). These sheets are discussed in the relevant steps in Section 5.

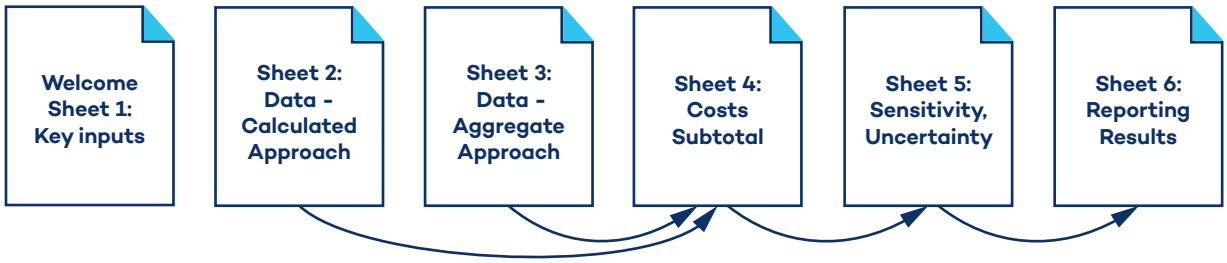

Figure 1. Structure of the NAP-CM Excel tool

Two versions of the Excel tool are provided:

1. A clean version without any data in it, ready for use.
2. A pilot measures version as an example with data entries, showing how data were found and entered for two specific NAP measures as a test case.

4. Learning From a Piloting Approach

The NAP document combined its 160 measures into five systems components (with 55 measures), and five sectoral components (comprised of 105 measures). To learn by doing, CCICD undertook a selection process to prioritize a few adaptation measures to run through the emerging Methodology. This process can also be utilized by other government agencies to identify their first measures to cost out.

Steps for selecting the first adaptation measures to pilot:

1. Review the principles in the principles table a few pages above, to inform the piloting process.
2. Review relevant adaptation measures in the NAP that each agency considers within its domain.
3. Discuss CCICD's or your agency's priority measures to cost first in each sector.
4. Assess the practical feasibility of piloting each high-priority measure. In the pilot, CCICD initially identified six sectors and one or two measures per sector important to CCICD or other agencies as potential pilots—which turned out to be too ambitious.
5. Talk through a) which activities seem to be embedded in candidate measures (e.g., a new land-use planning code; and raising a roadway above flood levels), b) the data requirements and challenges for each activity and measure, and c) the time and level of effort potentially needed to find appropriate data (two major constraints).

Following this process in the pilot, the team finally agreed that two measures would be more feasible and still sufficient for an informative pilot. These are summarized in Table 5: 12.A.6 (Agriculture sector) and 14.1 (Human Settlements).

These two were used to test if the Methodology will work on the full range of the NAP's proposed measures: both the "grey" activities (engineering and construction projects), and "green" or soft types of activities (regulations or policies, land-use management practices, etc.). Examples of each are contained in Tables 6 and 7 summarizing the agricultural and coastal measures piloted.

Understanding which adaptation measures make sense as the first to pilot can be explored in several ways. One illuminating, yet simple, ally is the time-honored decision matrix. A team can establish criteria for selecting which measures to begin work on by initiating a team discussion that considers **questions and criteria important for this decision. Initial questions and criteria could include:**

- Are the majority of measures in sector grey, or green, or a mix?
- Is there strong agency or stakeholder support for one or more measures to be costed sooner?

- Can about two to four of the constituent activities within the measure be readily identified (e.g., revising a land tenure policy, training workshops, renovating port facilities)?
- Do most key data needed appear available for these major activities?
- Can available staff perform the costing? Relying on existing training and using available resources and funding?
- Can costing be performed quickly and successfully as a pilot and provide useful early learning on using the NAP-CM tool?

Next, the team can work through filling in a worksheet like the one shown below to instill discipline and equity in the process and to record the results. The example worksheet is derived from a real UN FAO exercise for **climate-smart agriculture** options, with some questions and the scoring introduced by the NAP-CM team (reflecting FAO qualitative comments). Note that the measure scores vary widely from 7 to 28, synthesizing trade-offs across the various criteria for each measure and offering real choices. This is simply a format to deploy and modify as you see fit for your measures and context.

Table 5. Potential worksheet for reviewing & scoring criteria for selecting early pilots (with example)

Measure	Urgency of costing this measure	Cost data & method available?	Initial cost estimate	Cost estimate feasible in six months?	Costs & benefits monetized?	Co-benefits (social, envir.)	Score
Scoring	5 = high 3 = medium 1 = low	5 = yes 3 = likely 1 = unlikely	5 = low 3 = medium 1 = high	5 = yes 3 = likely 1 = unlikely	5 = yes 3 = likely 1 = unlikely	5 = high 3 = medium 1 = low	
Forecasts & water availability information	3	3	3	3	3	yes 5	20
Improved varieties & genetic seedbanks	3	3	1	5	5	Depends 3	20
Introduce local agroforestry best practices	5	5	5	5	3	yes 5	28
Revise policy on agriculture & food security	1	1	1	3	1	Possible Health Benefits 3	7

Source: Adapted from FAO, 2017; Least Developed Countries Expert Group, 2011; scores introduced by NAP-CM team

Overview of Pilot Results Testing Phase 1 Methods for Two Adaptation Measures

The decisions made regarding what activities are assumed to constitute each of the two pilot measures (along with the data found in agency budgets and elsewhere to cost out the measures) are presented in the Excel tool pilot version, Sheets 3a and 3b.

The experience of piloting the Agriculture Sector measure 12.A.6 on climate-smart agriculture practices is summarized in the table beneath. The set of activities that were assumed to comprise the measure are listed on the left—this is an important set of assumptions that need to be corroborated by discussions with experts. Relevant cost data found in Ministry of Agriculture annual operational budgets populate the center, testing the aggregate cost approach that relies on such full-activity data being available. Note that most activities in the pilot were represented by numerous agency budget line items that the experts interviewed by the team deemed worthwhile to consider for this measure.

Table 6. Summary of agriculture measure pilot case used to test the NAP-CM Excel tool

FOOD AND NUTRITION SECTOR MEASURE: Agriculture Measure 12.A.6 "Promote and integrate climate-smart agriculture (CSA) practices, into farming, trainings, extension services, policies, and plans (responsive to the needs of disadvantaged groups and tailored to subsistence, semi-commercial and commercial farmers) and adopt nature-based and urban solutions where possible."		
Activities identified within measure	**Cost per unit or activity (FJD)**	**Data & analysis: Experience and Issues**
Soft measures:		
1. Increase knowledge and training of extension staff	74,160	
2. Training on disaster responsiveness	6,180	
3. Technical adaptation capacity of farmers	46,350	Annual aggregate estimates for 2019–2020, with specific target units provided.
Policies:		
1. Strengthening effective planning, response and recovery of stakeholders	20,085	*Source: Ministry of Agriculture annual COP*
2. Coordination of program to prepare and adapt to risks from climate change and disasters	412,00	
3. Coordination meetings	20,060	
Green measures or grey: none		

The Human Settlements Sector coastal measure has more grey measure engineering options.

Table 7. Summary of human settlements pilot case used to test the NAP-CM Excel tool

HUMAN SETTLEMENTS SECTOR: MEASURE 14.1 "Scale up efforts to strengthen coastal boundaries of urban centers and rural communities through hybrid or nature-based solutions to risk reduction purposes and slow need to relocate communities and infrastructure."		
Activities identified within measure	**Cost per unit or activity (FJD)**	**Data & analysis: Experience and Issues**
Soft measure activities: 1. Strengthening institutional framework and legislations	1.5 mil	Measure is cross-cutting and requires national approach to strengthen policies. Ministries include fisheries, lands, forestry, NDMO, Environment, etc.
Green measure activities: 1. Replanting of mangroves and riparian buffers on coastline	1.1 mil	Assumes seedlings purchased and labor paid. In community scenarios, seedlings and labor are free. Main cost is assessment to determine which option to use.
Green/grey or grey activities: 1. Gabion seawall 2. Geotextile seawall 3. Shotcrete 4. Timber seawall 5. Boulder seawall	 40 mil 23 mil 47.2 mil 23.2 mil 26.3 mil	Costs vary depending on design and the type of option chosen.

5. Phase 1: Rapid Cost Evaluation

Overview of the 6-Step Approach

The following sections of this document describe in detail the six steps illustrated in Figure 2. The two adaptation measures piloted and described above are used throughout to illustrate key features and issues for each step.

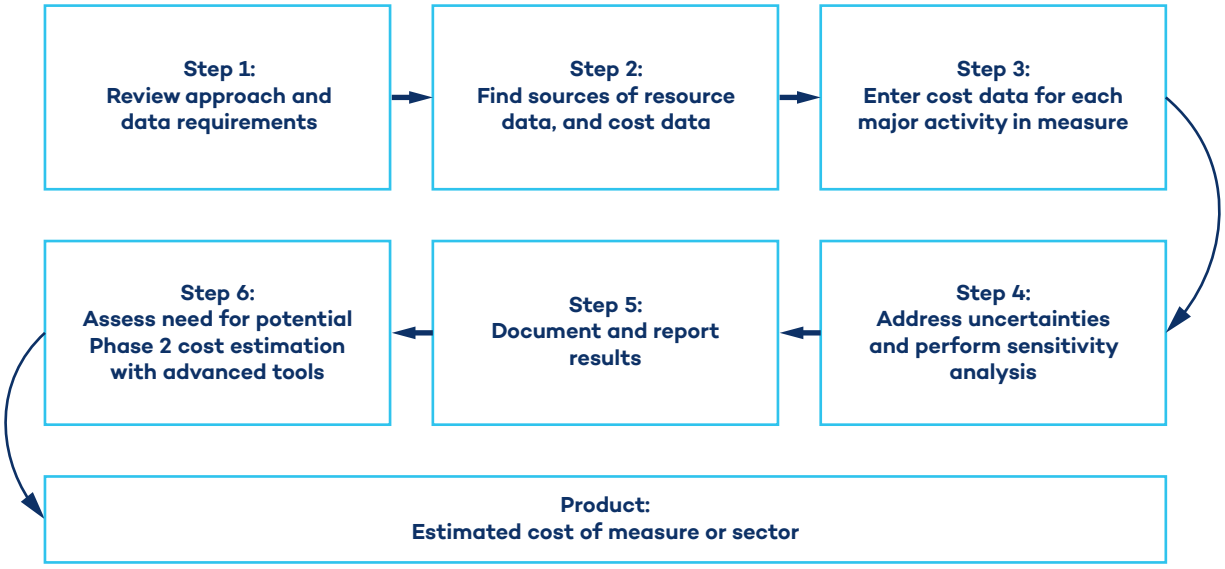

Figure 2. Overview of methodology steps

Each step section addresses four key elements:

- Resources you will need for this step
- What you need to do for this step (checklist)
- What you should produce
- How pilot or other case handled this step – including guidance and good practices for step.

Step 1: Review Approach and Data Requirements

Step 1 prepares the user to start to collect data in Steps 2 and 3 by reviewing the methods, challenges, and good practices. The step importantly asks the user to break down each adaptation measure into two to four major activities that are implied by the NAP measure's often very general text.

Resources You Will Need

1. Findings from climate change technical or project assessments or studies.
2. Technical expertise—local, national, and international if needed.
3. Time to consider and address challenges regarding support for the proposed work, i.e., political, technical, or staffing considerations.

What You Need to Do: Checklist of activities for this step

1. Review guidance and good practices before starting. Identify any potential training or resources needed, issues, etc.
2. Consult with experts in organizations delivering similar activities, prior agency cost estimates, and review pertinent literature.
3. Conduct stakeholder consultations as needed, to seek insights, data and support.
4. Decide how to approach your sector, and which measure(s) to start piloting — to test data collection, make early mistakes on, and learn lessons.
5. Break down each adaptation measure into two–four major activities implied in the measure's text. Determine which activities require different types of data or approaches. Note that Sheets 2 and 3 revolve around five default activities, with standard titles—try to build around these.
6. Assess what available data look like: What types of costs do they cover? How you could use them in the NAP-CM Excel tool? What other data would be needed to fill in gaps?

What You Should Produce

1. Stakeholder consultations
2. Select pilot measure(s) to start with
3. Overview of data requirements

How Pilot or Other Case Handled This Step

1. Selecting pilot measure(s) requires quick assessment of: Level of effort and expertise required; if agency budgets offer representative costs; feasibility of quick results; and potential to learn lessons across multiple types of hard and soft activities.
2. Breaking down each adaptation measure into one to three major sub-activities simplified the process.

Lessons learned and good practices from the pilot and the literature include:

Lessons from projects or studies	Guidance and good practices for step	Source
• Interventions need to also consider gender dimensions and vulnerability of participants.	• Engage a gender specialist to review which costs are needed, and how to take gender into account—and to estimate costs of gender inclusion.	Denton (2004)
• Adopting a bottom-up approach and/or a participatory process is likely to involve a broad range of stakeholders and tends to engender support for the process and its results.	• Perform mapping of vulnerable communities, agencies, and private sector stakeholders in the early stages of estimating costs for or deciding among adaptation options and methods.	Oshman-Elsa (2007); BASE (2015); de Bruin et al. (2009b); Füssel (2007)
• Public and private sectors need to work together to better to assess costs of adaptation options where appropriate. • The private sector needs to realize that its companies' climate resilience depends on the resilience of communities in which it operates.	• Liaise with private sector entities potentially affected by adaptation options. • Develop guidance for sharing of relevant adaptation costs. • Study potential ways to provide more incentives for co-financing by private entities, including use of credit lines, insurance, etc.	Global Commission on Adaptation (2019)
• Study lessons learned when formulating the expected results of measures.	• Incorporate what has worked or failed in the past to avoid making similar mistakes—designing and costing adaption options. • Invest the time required to design measures that will generate useful lessons and data to inform future projects.	UNDP (2010)
• Acquiring detailed information on the costs of adaptation options can be difficult since most cases are preliminary and estimates are provisional and incomplete.	• Additional expert judgment and research about the environmental and economic costs are necessary to improve rough cost estimates.	de Bruin et al. (2009b)
• Subjective expert judgment is critical in validating assumptions relating to adaptation.	• Consult or conduct workshops with external experts to validate assumptions and outputs.	de Bruin et al. (2009b)

Step 2: Find Sources of Resource Data and Cost Data

In Step 2, the user searches for analogs of similar activities, consults with experts, and determines the types of data needed.

Resources You Will Need

1. Letter of introduction from Ministry of Economy or other authority to government agencies and other experts.
2. Network of contacts in agencies among budget and operations staff, and in broader climate and development community—for data sources and to review the proposed activities and their costs.
3. A template of questions to guide your discussions with experts on methods and data sources.

What You Need to Do: Checklist of activities for this step

1. Look for analogs of similar activities (i.e., comparable examples where data are available), and budget or prior cost information for each.
2. Begin to search for sources of resource data and cost data.
3. Consult with experts, prior agency cost estimates, review pertinent literature.
4. Identify major types of resource-use data needed for each activity (e.g., number of bulldozers needed, cubic meters of concrete for building a seawall) and cost data (e.g., renting and operating a bulldozer; hotel space and instructors for a workshop).
5. Seek early policy-maker and expert review of which activities and costs to include in each measure (a fairly subjective decision).
6. Find or calculate the additional or incremental cost of the adaptation case—above business-as-usual (BAU) development costs. For example, the cost of building a new road already planned—regardless of climate impacts or adaptation actions—is BAU. However the cost of designing and constructing that road a meter higher is the cost needed—the additional cost to address climate impacts via an adaptation activity.
7. Find cost data to allow the Excel tool to estimate costs for the five-year NAP timeframe, assumed to be 2021–2025. (Agencies could consult with MoE to assure consistency of estimates, and potentially agree to include maintenance and upgrading or other costs for larger investments expected to be borne over longer timeframes (say for upgrading bridges to address climate-induced flooding over 20 years). Document any such decisions and assumptions in the Excel tool in an existing or inserted comments column in the relevant sheet).

What You Should Produce

1. Consultations with topic experts for advice and sources of data, and to review cost estimates.
2. List of sources of resource data and cost data.

How Pilot or Other Case Handled This Step

1. Interviews with Fiji experts and agency staff illuminated types of costs not yet considered, the importance of consultations, and use of agency annual budgets.
2. Baseline costs are difficult to identify. Thus, the pilot used budget line items that agencies defined as additional funds as the best available data on measure activities.

Lessons learned and good practices from the pilot and the literature include:

Lessons from projects or studies	Guidance and good practices recommended	Source
• Report costs in fiscal years if possible. Allocate longer costs across years.	• Match government agency budget cycles if possible when reporting results, to aid implementation and avoid double counting.	Department of Environmental Affairs Republic of South Africa & Cowater International (2019)
• Analysis of agency budgets by the same team - using agreed procedures will help produce comparable results.	• Develop simple written procedure for interpreting budgets and estimating costs across measures, to facilitate efficiency and comparability.	NAP-CM piloting experience
• Estimating costs of hard interventions is generally easier to compute than costs of soft interventions.	• Estimate soft interventions via analysis of documentation of past projects that performed similar interventions, and engaging experts.	World Bank (2010a, p. 9)
• Studies in Fiji indicate low-regret or no-regret adaptation using soft approaches (e.g., replanting mangroves) provide high net economic benefits and low costs compared to hard approaches.	• Advocate for full consideration of soft adaptation options for measures, as feasible. • Include estimated benefits if data and appropriate tools are available.	Rao (2013); Jolliffe (2016)
• Most ministries in Fiji have costed annual operation plans offering context-specific sources of cost data.	• Consult relevant ministries to find prior budgeted line items that are analogs for activities in specific measures.	NAP-CM piloting experience

How Pilot or Other Case Handled This Step

Lessons from projects, or studies	Guidance and good practices recommended	Source
• Bottom-up costing can be very mechanical. Build more holistic costing by considering system and governance costs of activities.	• Consult with experts re: what should be included as part of the costs for interventions, especially development partners who fund adaptation interventions. Work to ensure sustainability and behavioral change.	Pilot interviews with experts
• Organizations like South Pacific Regional Environment Programme (SPREP), Secretariat of the Pacific Community (SPC), and World Bank have technical resources that provide costing for some adaptation initiatives in the region.	• Visit their websites or consult them directly to learn how they are estimating costs for adaptation activities of interest.	Pilot interview with experts
• Projections of costs in regional World Bank studies are highest in Pacific and East Asia regions; and for coastal zones, the water sector and infrastructure—all prominent in Fiji.	• Pay close attention to how coastal, water and infrastructure measures are costed, to produce realistic and comprehensive costs.	World Bank (2010b); ECONADAPT (2015b)

Step 3: Enter Resource and Costs Data for Each Major Activity Into Excel Data Sheets

Step 3 is the heart of the costing process. Detailed cost estimates are discovered and entered into the Excel tool for the measures being assessed, in either the calculated cost approach or the alternate aggregate cost approach.

Resources You Will Need

1. Staff familiar with the Excel tool and its use.
2. Agency budgets, cost estimates in studies.
3. Access to topic experts who can review the early cost data gathered, to help determine which cost examples are the most representative, and to evaluate results.

Box 1. Key Insight for This Step: Policy decisions are necessary to determine what activities constitute a measure

- What constitutes a measure in the NAP? Given the measures' short, generic text, how do you know what actions are needed to implement a measure?
- Most measures in the NAP document are not precisely defined (e.g., introduce climate-smart agriculture; or avoid having to relocate coastal communities).
- Decisions might reflect answers to questions such as: Are 12 or 45 workshops needed? 10 villages to relocate or 40? How many seawalls need to be built? etc.
- The pilot demonstrates the method with two examples.
- However, agency policy decisions are required to interpret the sense of each measure's brief text—and to decide what activities are needed and feasible within a five-year timeframe, given the policy context and resources available.

Source: NAP-CM pilot experience

What You Need to Do: Checklist of actions for this step

1. The Excel tool has two approaches you can use:
   a. #1) Calculated cost approach in Excel Sheet 2 uses an engineering costs approach identifying *individual costs* for components of an activity (like labor and hotel rooms for a workshop), and then adds them up to estimate the cost of a NAP measure.

   #2) The alternate aggregate cost approach in Excel Sheet 3 uses *aggregate estimates for a whole activity* found in agency budgets, reports on prior projects, etc. (like total cost of building a seawall—rather than of adding up the costs of concrete, labor, use of trucks, etc. in the calculated cost approach).

What You Need to Do, continued

2. Begin by identifying a few major activities embedded within each measure (e.g., 1) training, 2) restore mangroves, 3) revise land-use planning code). Then find and enter data for them in one of the five default activities in each measure within the tool (e.g., Activity 1: Conduct Research & Feasibility Studies).
3. Identify the relevant broad categories of costs for each activity. Note that Sheets 2 and 3 revolve around five default activities with standard titles—try to build around these. Use the default activity titles, or rename them with more appropriate names for their types of costs if that is helpful (e.g., "Activity 1: Perform studies of nature-based solutions in rural coastal areas"). The five default activities are: conduct research and feasibility studies, enhance capacity building, conduct technology transfer, enhance policies & institutions, and undertake infrastructure improvement.
4. Estimate the resource amounts required (e.g., tonnes of cement, trucks) for all of Fiji or for a community. Reference available and appropriate costs from existing sources such as ministries' costed annual plans, etc.
5. Find or estimate unit cost (e.g., FJD per truck rental day) for the calculated cost approach. The tool will multiply unit costs by number of units needed out to calculate total cost for a measure and add up the costs.
6. Avoid double counting if you use both cost approaches.
7. Both a community-scale costing section and a national-scale section are available to use. Thus if data are available on one scale, the other can be calculated, i.e., you may want to know either how much activity x costs per community or for all of Fiji.
8. Add in the year of each cost estimate used so the tool can compound or discount the costs to a common year of comparison.
9. Verify your proposed costs with experts in your ministries, to ensure reliability of estimates.
10. Distinguish between one-time costs for capital items like equipment (e.g., bulldozers, computers) lasting one year or longer, vs. recurring costs for ongoing expenditures (e.g., labor, supplies, fuel).
11. Remember to enter additional costs for adaptation above BAU costs of an activity (as noted in Step 2).
12. If multiple estimates of costs are available for the same activity: Decide which activities to cost out, and enter multiple cost estimates into the Excel worksheet for each activity. Then select which data to use to sum to create an estimate for the measure (ignoring or deleting the other data points).
13. Enter costs incurred over five-year assumed NAP timeframe (2021–2025). As noted in Section 1, some measures may need to be supported for 10 to 20 years beyond that. Agencies could decide to include longer-term operational and maintenance costs if they are a small fraction of the total cost of the activity. Discuss this with CCICD first, for consistency with estimates of the other measures.

What You Need to Do, continued

14. If both aggregate cost estimates and individual other costs are needed, then fill in the Aggregate Cost Sheet 3, and also add any supplemental costs needed in the Calculated Cost Sheet. The tool will add the two costs together at the end. Be careful to avoid double counting costs.
15. When numerous data estimates are available for the same activity cost, enter them temporarily into Sheet 2 or 3; then select the most representative cost or average across similar costs to pick a single estimate to use going forward.
16. Shared Costs are other sources of funding, in three categories: a) "domestic agency funding", b) "other domestic funding", c) "international funding." The tool will add any of these entered and subtract them from the total cost of a measure—to find the net cost of the measure.
17. Currency for costs is FJD as the default. It can be converted to USD at the end of the calculations in the Cost Summary table in Sheet 6.
18. The tool brings estimates to common year, using agreed discount rate and compounding (inflation) rate entered. The tool uses Fiji's Ministry of Economy's recommended government study discount rate of 5.75% (but that can be adjusted in Sheet 1).
19. Enter estimated Other Operational Costs in Sheet 6, not in Sheets 2 and 3. These include: costs of addressing enabling conditions (using the worksheet presented below), integrating gender considerations into the measure, and M&E.
20. If an agency has an existing more advanced model or detailed estimate: Please also the simple NAP-CM Methodology to generate an estimate consistent with other NAP measure estimates, then compare NAP-CM results to advanced tool results.
21. To add additional rows in the Excel tool—be careful, to avoid various formulae embedded in rows from miscalculating. Refer to the instructions contained in Appendix G on how to add rows.

What You Should Produce

1. Multiple examples of resources and costs data into data Worksheet 2.
2. Data values selected to represent each activity, to advance into Sheet 3 —with notes detailing sources and assumptions.
3. Fully populated Sheets 2 to 4

How Pilot or Other Case Handled This Step

1. Fiji government agency budgets provided succinct aggregate national or community cost figures for a wide range of activities that experts interviewed deemed important for implementing each of the pilot measures.
2. The team realized estimating pilot measures requires both an aggregate cost approach (using agency budgets and studies); and a calculated cost approach (summing costs for all the individual actions within an activity).
3. Agency budgets and other studies found included multiple estimates for a given cost (e.g., building a seawall). By entering them into the data worksheet first, in Sheet 2 it was possible to manage the data and go choose an average or representative single estimate to represent that cost.

Lessons learned and good practices from the pilot and the literature include

Lessons from projects, or studies	Guidance and good practices recommended	Source
• Cross-sectoral risks like flooding or tropical cyclones often require cross-adaptation responses, and so they allow efficiencies of scale (and thus cost savings) that need to be assessed.	• Review if other sectors or measures have overlaps in adaptation responses. • Assess if cost savings are possible by sharing common costs across multiple measures (e.g., capacity-building workshop, mangrove restoration).	ECONADAPT (2015a)
• Opportunity, transaction, and policy implementation costs appear to be significant in the few studies that include them.	• Assess the types of costs associated with a measure, and seek data or budgets for analogous activities.	ECONADAPT (2015a)
• Need to define one-time and recurrent costs and separate them, collecting data for each.	• Calculate the capital expenditure (CAPEX) one-time costs, and the recurring operating expenditure (OPEX) and use each guided by the NAP-CM tool.	McKinsey (2009); Rizvi et al. (2015)
• "Benefit transfer"-- applying economic benefits estimated in one ecosystem ("study site", say a marsh in Philippines) to a different location ("policy site")—is essential where few data exist, as in Fiji.	• Review if using benefit transfer to a new location is appropriate. • Recognize that benefit transfer assumes the specific ecosystem value at the study site is roughly equal to that at the policy site.	ECOADAPT (2015b)
• Avoid using different discount rates for some variables. This will artificially favor or disfavor some costs and options.	• Apply the same discount rate to all costs for a measure, then test that choice via sensitivity analysis.	Wise and Capon (2016)

How Pilot or Other Case Handled This Step (continued)

Lessons from projects, or studies	Guidance and good practices recommended	Source
• Selection of a discount rate is a critical component when cost-benefit analysis is used. However, choice of a discount rate is a policy decision with significant implications for the results.	• Discount rate must not be set too high, or the present value of even near-term future actions is heavily discounted and thus low. • Perform sensitivity analysis with at least two additional rates, to show impact of the discount rate decision.	de Bruin et al. (2009); World Bank (2010)
• Coastal adaptation cost estimates and benefits vary with the degree of protection from climate risk provided—the higher the protection level, the higher the costs.	• Review the level of protection from climate risks proposed in each measure to avoid excess costs.	ECONADAPT (2015a); Rizvi et al. (2015)
• Ecosystem-based adaptation (EbA) measures offer high benefit-to-cost ratios for coastal systems in many studies and offer livelihood and other benefits beyond adaptation. Hard measures generally are limited to a specific function.	• Evaluate if EbA actions can replace proposed hard options, to provided higher net benefits and lower costs.	ECONADAPT (2015a); Rizvi et al. (2015)
• While EbA costs data can be available, data to quantify economic benefits is lacking.	• EbA benefits are usually expressed in qualitative terms and for specific ecological and country contexts difficult to transfer to other locations.	ECONADAPT (2015a)

Key Considerations for Step 3

The kinds and sources of cost data discovered in the pilot exercise are summarized below to stress that a wider range of sources may contain the data sought—be creative.

Table 8. Data sources found in pilot measures for aggregate cost and calculated cost approaches

Document and Source	Relevant Data for Agriculture Measure 12.A.6. or Human Settlements, Coastal Measure 14.1
Fiji Ministry of Agriculture (2019)	Budget line items for climate-smart agriculture (CSA) activities and measure: adoption of CSA by farmers, livestock research, improve technical adaptation capacity of farmers
Fiji Ministry of Waterways and Environment (2018)	Community-scale activity cost data reviewed
Fiji Ministry of Lands and Mineral Resources (2019)	Local communities consultations and awareness training on land regulatory framework
Fiji Ministry of iTaukei Affairs (2019)	Community-scale activity cost data reviewed
World Bank/Fiji (2017)	Climate-smart agriculture practices, disaster preparedness and rehabilitation, crop insurance scheme Vulnerability assessments of flood risks and drought Strengthened monitoring of ecosystems
Samoa (2005)	Community-scale activity cost data reviewed
Rao, N. et al. (2013)	Cost-benefit analysis major study, including avoided damages, benefits. 9 experts, funded by 8 donors. Costs over 10 and 20 years for: replant mangroves, replant stream buffer, monitoring & enforcement, build seawalls
Jolliffe (2016)	Community-scale activity cost data reviewed
University of the South Pacific (USP) (2017)	Community-scale activity cost data reviewed
UNDP (2020)	Community-scale activity cost data reviewed
Mackey et al. (2018)	Estimated costs and benefits of village relocation options, using cost effectiveness analysis (to find low-cost option) Replant mangroves and riparian buffers on coastline Build sea walls

SHARED COSTS OF MEASURES ARE SUBTRACTED TO FIND THE NET COST

There are useful ways to allocate costs across various projects or adaptation measures and thus include various funding sources and avoid double-counting of costs: e.g., if a measure includes revision of land-use planning codes nationally, that might be a) already planned by a ministry in a current budget, or b) could be shared across three or four measures that would utilize the updated code. Excel sheet 4 prompts the user to enter estimated shared costs for the measure, from three potential sources: a) domestic agency budgets, b) other domestic sources like NGOs, and/or c) international donors, NGOs, etc.

Example of handing shared costs: A measure on replanting coastal mangroves is estimated to cost FJD 2.7 million. Staff identify FJD 300,000 in agency budgets expected to be approved during the NAP five-year period, and a FJD 450,000 grant commitment from an international donor. Thus the remaining adaptation funding gap is FJD 2.7 million minus other sources = FJD 1,950,000.

WORKING WITH EXISTING GOVERNMENT AGENCY COSTING ESTIMATES

Where an agency already has an existing or preferred more-advanced model or detailed estimate, then the **Methodology** requests that the agency:

1. Use the simple NAP-CM to prepare a quick estimate that is consistent with NAP-CM estimates for other NAP measures. Compare these results to those from existing or more-advanced model results and discuss the rationale for any major differences.
2. Describe the model or method and data used in the estimation process.
3. Report model results for use in consistent estimation of NAP costs of measures.
4. Cooperate with CCICD staff regarding costing out the interventions your agency is estimating. Use of advanced methodologies is not discouraged in the NAP-CM Methodology since these may be necessary for regulatory or funding purposes.

DISCOUNTING: BRINGING ESTIMATES OF FUTURE COSTS TO A COMMON YEAR

Discounting is used to express future costs in a common year's currency value. This function is performed by the NAP-CM tool in Sheets 2 and 3 automatically, using an agreed discount rate and inflation rate (generally equal to the return on an investment or the interest rate, known as *r*).

The costs and benefits of an adaptation action occur at various points in time—many costs occur in early years, while benefits play out slowly over time—yet must be calculated in the same period, by discounting both back to the present to allow us to compare them. This yields the net present value (NPV) of future actions: the sum of the present value of benefits (if there are any) minus costs, expressed in simple form as: NPV = $\sum$PV (Benefits − Costs).

The choice of discount rate has important effects on cost-benefit or other analysis of adaptation measures—and is controversial. If a low discount rate is selected, this has the effect of enhancing the economic importance of future climate change, and thus translates in higher estimates of climate damage (if that is being assessed, say in Phase 2). Some economists argue in favor of a very low social or consumption discount rate for climate adaptation projects, between 0.1 and 2.5% (Chambwera et al., 2014). Picking a high discount rate significantly reduces the present value of actions addressing climate impacts spread long into the future and makes projects with benefits realized over decades – like Ecosystem-based Adaptation

options – economically unattractive and less likely to be funded (Buncle et al., 2013; Hecht, 2013). Generally, public projects use lower discount rates to reflect their 20–40+ year time horizons, compared to private investments or projects, which are more concerned with nearer-term financial returns and tend to use market interest rates.

Fiji's MoE currently recommends using a discount rate of 5.75%. Many studies in the Pacific employ discount rates of 7% to 10% (Buncle et al., 2013), while the Asian Development Bank previously endorsed relying on a rate between 10% and 12% in the Pacific region (Buncle et al., 2013). The cost-benefit analysis case study of an eroding village and school's land base in Tanna Island, Vanuatu relies on a base discount rate of 10% and conducts sensitivity tests of 7% and 12% rates (Mackey et al., 2013). Adaptation analyses in Fiji include the case study of the Narikoso relocation project, which used 7%, 10% and 12% rates in a detailed cost-benefit analysis, as illustrated in the table below, to show the effect on NPV (Jolliffe, 2016); while a central discount rate of 7% was relied on in the SPREP study of adaptation options in Lami Town, with sensitivity cases of 1%, 3% and 10% explored as well (Rao et al., 2013).

Recommendations on discounting:

- In Sheet 1: Use the MoE recommended discount rate of 5.75% as the default. This is a moderate value reflecting long-term economic conditions in Fiji that will treat various types of measures evenly. Note that Sheets 2 and 3 automatically compute discounted costs as a final step, using the rates set in Sheet 1.
- Test at least two other rates: 3% and 10% are the default sensitivity test discount rates in the Excel tool in Sheet 1 Key Inputs, carried forward into Sheet 5's Sensitivity Tests. These can be changed in Sheet 1 as desired, to test the impact of other choices and how they advantage or disadvantage specific measures.

Table 9. Effect of discount rate choice in cost-benefit analysis in the Narikoso relocation project, Fiji, for rates of 7%, 10% and 12% on NPV and the benefit-cost ratio (BCR) (values in 2015 FJD. Negative values = costs greater than benefits)

Metric	Relocate entire village	Relocate red zone	Relocate front line	Build new seawall
7% discount rate				
NPV	- 629,771 (3)	- 376,358 (1)	- 416,772 (2)	- 913,766 (4)
BCR	0.43 (2)	0.53 (1)	0.27 (4)	0.29 (3)
10% discount rate				
NPV	- 726,124 (3)	- 461,983 (2)	- 428,081 (1)	- 851,523 (4)
BCR				
12% discount rate				
NPV	- 765,553 (3)	- 496,966 (2)	- 432,622 (1)	- 825,231 (4)
BCR	0.28 (2)	0.35 (1)	0.18 (4)	0.22 (3)

Note that using a 12% discount rate, the NPVs and BCRs estimated are less favorable since the higher discount rate reduces the value of future benefits in present terms. Even at a lower 7% rate, NPVs and BCRs remain negative financially This indicates that all the options are unattractive, and validates that the analysis is robust regarding uncertainty about which discount rate to use (since none of the rates used change the sign of the return to positive).

ENABLING CONDITIONS

Estimating costs of the enabling conditions or environment is important for stimulating or inhibiting adaptation actions and changing behavior. If introducing enabling actions would contribute to success of a measure, their costs could be estimated via interviews with experts and literature review and entered into a table like the one below to help select a proxy cost for this topic. This function is found in the Excel tool in Sheet 6 as one of the Other Operational Costs incorporated there.

Table 10. Worksheet for estimating Enabling Conditions (with one example)

Enabling condition contributing to success of measure	Example and cost [hypothetical example]	Lower cost estimate	Higher cost estimate	Cost proxy selected
1. National regulation(s) amended to facilitate measure activities	[E.g., 2010 land-use planning regs revised to address adaptation, by Min. of Planning. Cost: Example 2: xxxxx]	FJD 50,000	FJD 120,000	FJD 70,000
2. National legislation required	etc.	etc.		
3. Technical study or workshop on options to improve conditions				
4. Financial incentives from government (e.g., tax breaks, grants, capital cost requirements met, etc.)				
5. Socialization and awareness campaign to change consumer behavior				

INTEGRATING GENDER CONSIDERATIONS

Gender equality must be considered and addressed in all climate activities to ensure inclusion of women, youth, and vulnerable populations and a measure's sustainability, per the principles in Fiji's National Climate Change Policy and the NAP document. Gender experts at Oxfam offered informal guidance that the additional costs of integrating gender considerations in projects generally adds roughly 10% to project cost. Thus, this cost is represented in the Excel tool as one of the Other Operational Costs in Sheet 6, where:

- 10% of project budget amount for projects < FJD 1,000,000 is added, or
- 5% for projects > FJD 1,000,000 is added (adjusting for efficiencies in larger projects).

ADDITIONAL COST OF MONITORING AND EVALUATION

The same approach as for enabling conditions could be used—find some examples, enter them into a table as above and determine an average value to use. The Excel tool offers a cell to add estimated M&E costs as one of three Other Operational Costs in Sheet 6. Use expert judgment, agency budgets, or other ways to generate a reasonable value to enter, as no default value is given.

Step 4: Perform Sensitivity Analysis and Address Risks and Uncertainties

Decisions on how to set the discount and inflation rates for the analysis can be tested in this step via sensitivity cases, i.e., varying those rates and observing the impact those changes make on the results. Significant uncertainty exists over what climate impacts will occur in the future, their magnitude, and how Fiji will—or will not—prepare for the risks of such impact over the intervening years. The rate decisions and these two unknown climate risks are addressed in Step 4. The Excel tool provides the default values in Sheet 1 that can be modified to undertake these sensitivity tests.

Resources You Will Need

1. The NAP-CM tool includes Sheet 5 to address uncertainties and perform sensitivity analysis.

What You Need to Do: Checklist of activities for this step

1. Perform sensitivity analysis of key assumptions, using the tool's Sheet 5 tables and choices of discount and interest rates. This analysis simply assesses the impact of making lower or higher assumptions about key variables like the discount rate. Usually one lower and one higher value are evaluated (e.g., if discount rate is 5%, try 3% and 8%).
2. Fill in the risk assessment worksheet to estimate risks from climate change, ensuring the sustainability of the measure over time and other sources if desired. Enter your best estimates or guesses of the rough magnitude (low to very high); then select the corresponding default value given).
3. Identify major uncertainties associated with the measure's activities.
4. Apply an uncertainty adjustment as called for in Excel Sheet 5, using a value from the table of aggregate proxy uncertainty values. (This is a shorthand method of addressing uncertainty when it is difficult to quantify).

What You Should Produce

1. Identification and consideration of the measures' uncertainties.
2. Uncertainty values to enter into the Excel tool.

How Pilot or Other Case Handled This Step

Lessons learned and good practices from the pilot and the literature include:

Lessons from projects, or studies	Guidance and good practices recommended	Source
• Recognizing and addressing uncertainty is the most important of many methodological challenges in estimating the costs of adaptation.	• Think through the context of proposed adaptation interventions carefully, to help design interventions that minimize their uncertainties, and to plan appropriate methods to estimate their uncertainty.	Watkiss et al. (2010); World Bank (2010a)
• Fiji's existing 20-year and 5-year Development Plan includes investments and expenditures of FJD 50 billion over two decades.	• Take planned agency budget expenditures and activities into account in cost estimation. • Review Development Plan and agency budgets to avoid double counting of costs that may already be captured in the baseline.	World Bank & Government of Republic of Fiji (2017)
• Uncertainty necessarily will remain in any cost estimates, since future global emissions pathways, and global climate model uncertainties are both unknown.	• Clearly state in reporting of results that a) the climate system and model uncertainties make it more difficult to estimate the benefits of adaptation options, and b) adaptation costs are increased by this uncertainty.	ECONADAPT (2015b)
• Sensitivity analysis calls attention to the relative value of the key assumptions being used – discount rate, interest rate, etc.	• Use sensitivity analysis results to reconsider these assumptions and adjust them, if possible; and to provide policymakers with alternative scenarios for their consideration.	World Bank (2010)
• Risk assessment can be utilized to isolate the first-order costs of meeting those risks by making a set of transparent assumptions.	• Utilize existing risk assessment results or perform your own to inform making indicative estimates of costs of addressing key risks in each measure.	PRRP (2015); CoastAdapt (2018)

Key Considerations for Step 4

SENSITIVITY ANALYSIS

Sensitivity analysis involves three standard steps: a) identifying critical or sensitive variables that are uncertain; 2) proposing alternate values for such variables, like using a lower and higher discount rate than the base rate; and 3) running an analysis of the impact of each change in the assumed value of each variable on the cost or cost-benefit analysis (CBA) results (altering only one variable at a time). Sensitivity testing is especially valuable in cases where uncertainty appears high due to the absence of empirical data or use of important assumptions (Buncle et al., 2013). If a sensitivity case significantly changes the results compared to the base case, then a change in costing analysis or even in the project design may be warranted.

The Excel tool allows the user to change the assumed 5.75% base discount rate in Sheet 1 to two other values, lower and higher than the assumed base rate – and includes 3% and 10% as defaults that can be modified. Sensitivity tests could be added for other variables deemed critical by an agency for its sector's measures, like the interest rate; or the rate of policy penetration (i.e., the assumption of the percentage of a measure's 5-year target that would be met by 2025—100%? 50%? etc.).

ADDRESSING UNCERTAINTY IN COST ESTIMATION

The concept of uncertainty can apply to climate variables like precipitation or future impacts, and either the costs or the benefits of climate projects. Generally, the benefits are likely to be more uncertain (Hecht, 2013). The UNFCCC IPCC definition of good practice for GHG emissions inventories specifies that data collection and use should neither overestimate nor underestimate values to address statistical bias concerns, and uncertainties be reduced as much as is feasible (IPCC, 2014).

The uncertainty of an estimate is usually expressed in "confidence intervals." A confidence interval at the 90% level means that statistically 90% of such intervals include the true value of the variable in question, e.g., the cost of a project, or, for climate impacts, the probability of increased precipitation in Fiji in 2030 using a given climate model. Thus, this estimate is considered to have relatively low uncertainty.

Commercial software often is used to conduct Monte Carlo or other multiple simulation methods using varying assumptions and data distribution. Monte Carlo analysis of climate events, for example, (say changes in precipitation or cyclones per year in 2030) uses software to run thousands of simulations of different assumptions or climate model scenario results. These runs produce a band of uncertainty estimates that are described with a confidence interval around the resulting value (Olofsson et al., 2014).

However, the use of Monte Carlo and most other uncertainty methods in adaptation costing case studies and literature is limited to advanced methods like cost-benefit analysis. In Fiji, uncertainty analysis does not appear to have been utilized, even for CBA (e.g., neither the Lami Town nor Narikoso CBA analyses addresses uncertainty other than by incorporating the benefits of avoided damages from climate impacts like disasters and flooding by using several assumed rates).

The overarching objective of considering uncertainty in the design and assessment of adaptation projects is to follow a three-step process: 1) identify and assess sources of uncertainty, 2) minimize uncertainty where feasible and cost effective, and 3) quantify remaining uncertainty where feasible (Olofsson et al., 2014; Forest Carbon Partnership Facility [FCPF], 2016).

However, the level of uncertainty associated with any given cost estimate is difficult to calculate quantitatively. Agencies will need to decide whether to use expert peer review of cost estimates or agreed proxy values as a general conservativeness factor for aggregate uncertainty.

To simplify and encourage inclusion of uncertainty estimation, the Methodology recommends using the lookup table provided below, which features ranges of proxy uncertainty values to assign to a measure or its activities. This solution of combining various poorly known sources of uncertainty into a single aggregate proxy value is adapted from the World Bank/FCPF Carbon Fund's Methodological Framework for REDD+ national avoided deforestation programs (FCPF, 2016). (Fiji participates in the Carbon Fund of FCPF, and used this approach in its FJD 80 million proposal to the Carbon Fund, approved in 2019).

Excel sheet 5 reproduces the table below and has a location to select a proxy uncertainty factor that adds 4%–15% to the estimated cost of a measure, to account for uncertainties not easily quantifiable.

Table 11. Use of a proxy uncertainty factor to estimate potential added costs of uncertainty

Aggregate uncertainty assessment (your first-order best guesstimate)		Proxy uncertainty factor
Likely low uncertainty	≤ 30%	4%
Likely medium	> 30% and ≤ 60%	8%
Likely high	> 60% and ≤100%	12%
Likely very high	> 100%	15%

ADDITIONAL COSTS OF CLIMATE AND SUSTAINABILITY RISKS OF INTERVENTIONS

Climate and other risks contribute another form of uncertainty. The UNDP anticipates they could add roughly 10%–25% to project budgets (personal communication with NAP-CM team, 2020). Risk assessment is a standard aspect of adaptation planning. The Pacific Risk Resilient Programme (PRRP, 2015) created a risk screening template to assess both a) risks to a project, and b) risks from a project. Their template prompts users to reply to 16 question response matrices to assess climate risks (climate variability and longer-term climate-induced disaster events like floods or sea level rise), environment risks (changes in natural resource availability, pollution levels), disaster risks from hazards like landslides, and social protection risks like changes in the distribution of goods or services across social groups.

The additional indicative costs of addressing various risks inherent in adaptation interventions can be estimated by 1) using a risk screening tool, and 2) estimating the costs of addressing these risks. Some Fijian experts also propose adding contingency funding to ensure sustainability if major natural disaster events were to occur. An optional risk and sustainability cost option is included in the Excel tool in Sheet 5. It does not provide a default value, leaving this decision up to each agency.

A first-pass risk assessment screening tool for climate change and other risks is presented here and in Sheet 5 of the Excel tool. This allows a quick qualitative process to develop a preliminary understanding of climate change or other major risks to an adaptation measure and whether further assessment is advised. It leverages existing information and agency and expert knowledge. Both PRRP and Australia's CoastAdapt program use elaborate versions of risk screening tools. CoastAdapt provides first-pass, second-pass, and third-pass templates (CoastAdapt, 2018).

Note that the template and its values simply demonstrate the approach. The cost percentage to add is a policy decision to be made, potentially by MoE or an agency. Another option is for the NAP portfolio measures to be reviewed as a set and assigned lower or higher risks once some experience has accumulated.

Table 12. First-pass risk assessment template for estimating indicative costs of risks and sustainability (hypothetical examples; modify as needed. Negative value reduces risk. NA = not applicable in example)

Potential Risks to measure (examples)	Potential hazards in measure's zone - *next 10 years*	Zone vulnerability/ Potential impact of hazard	Major benefits expected from measure	Will measure significantly manage this risk?	First-order cost of risk, if occurs	Risk score for measure (sum of risks) /Added cost (in %)
Scoring	-	5 = high 3 = medium 1 = low	-5 = high -3 = medium -1 = low	-5 = high -3 = medium -1 = low	5 = high 3 = medium 1 = low	20% = high cost 10% = medium 3%= low cost
Disaster risk 1	Cyclone hits zone	1/5		-1	5	
Disaster risk 2	NA					
Climate risk 1	Coastal flooding	1/3		-3	3	
Climate risk 2	Persistent drought	1/1		-1	1	
Environmental risk 1	NA					
Environmental risk 2	NA					
Measure implementation risk 1	Governance challenges in zone	3/3	-3	-1	3	
Implementation risk 2	Activist group unsupportive	3/3	-3	-1	3	
Sustainability risk 1	Disaster cancels measure	5/5			5	
Sustainability risk 2	NA					
Summary		34	-6	-7	20	41 / + 10%

Source: Inspired by CoastAdapt (2018) risk assessment templates and PRRP (2015).

Step 5: Document and Report Results

This step walks through reporting final results and challenges within your agency and with CCICD to facilitate early learning and promote consistency across agencies using the NAP-CM.

Resources You Will Need

1. Draft or final results of costing analysis and the Cost Estimate Summary template.
2. Cooperative spirit within the agency units or across agencies, to discuss results, and any issues that arose.

What You Need to Do: Checklist of activities for this step

1. Reflect on costing exercise and identify issues and solutions that emerged.
2. Enter strengths and weaknesses into Cost Estimate Summary template provided.
3. Document and store data used.
4. Report results as instructed by your agency or MoE.

What You Should Produce

1. Summary of cost estimate.
2. Recommendations on improving use of the Methodology.

How Pilot or Other Case Handled This Step

Not applied in pilot, as no reporting protocols established yet for use of the NAP-CM.

Literature and NAP-CM team experience includes:

Lessons from projects, or studies	Guidance and good practices recommended	Source
• Team reflection on what data are needed, how to break down measures for costing their constituent activities, which activities should be included for a measure, etc. improves the results.	• Hold a debriefing mini workshop or open discussion among the whole team involved in the NAP-CM exercise.	NAP-CM piloting experience
• Adaptation cost curves (ACCs) are powerful, easily communicated tools for policy decisions and stakeholder discussions on adaptation options. (ACC's are derived from McKinsey MAC curves for climate mitigation).	• Develop an ACC curve if this sparks senior manager interest, available for presentations on short notice. • Useful when conducting cost-benefit analysis of adaptation options.	NAP-CM team experience McKinsey (2009)

The level of success and issues encountered in your costing exercise should be reflected on, and potential improvements or future capacity building or data collection proposed. A template is provided both here and in Excel sheet 6 to modify for your needs and to help guide this process.

Table 13. Cost Estimate Summary Report and Recommendations Template

MEASURE ASSESSED: ***[fill in here, e.g., Measure 14.1 & title]*** **Issues and Constraints Arising in Costing Estimation Process**		
Identity and position of staff filling in summary : **Date :**		
Brief summary of measure's indicative cost estimate, costing experience, and recommendations:		
Issue or constraint & impact of issue	**How was issue addressed in your costing exercise?**	**Recommendations for improving process (e.g., training xx data, etc.)**
Management, capacity, and estimation process issues or improvements needed		
1)	[modify to meet your needs]	
2)		
Methods enhancements needed or to be considered		
1)		
2)		
Data Compilation and Analysis: Enhancements needed or to be considered		
1)		
2)		
Key assumptions used to estimate costs		
Sensitivity of cost estimate to key assumptions		
Any key factors not quantified		

Source: NAP-CM team; Buncle et al., 2013.

- Tools to compare and display the relative merits of options

Decision making when faced with a large number of opportunities is perplexing, since many variables and trade-offs need to be considered. Potential tools to consider for assistance in evaluating measures and communicating the results include:

Tool 1: Potential worksheet for reviewing & scoring criteria for selecting options or highlighting their cost effectiveness

A matrix of evaluation criteria can be assembled to compare a set of candidate interventions or their indicative costs. The worksheet table contained in Step 6 on Phase 2 summarizes a hypothetical example of a set of measures being assessed in a matrix format.

Tool 2: Graphic comparison of key variables to illustrate the impact of costs

The graphic below on agricultural adaptation interventions in India, for example, contrasts low- and high-cost options with the near-term relative ease of capturing the adaptation opportunity. It focuses attention on the low-cost and readily achievable options in the upper left quadrant — drip irrigation, soils techniques like zero-tillage, and integrated pest management.

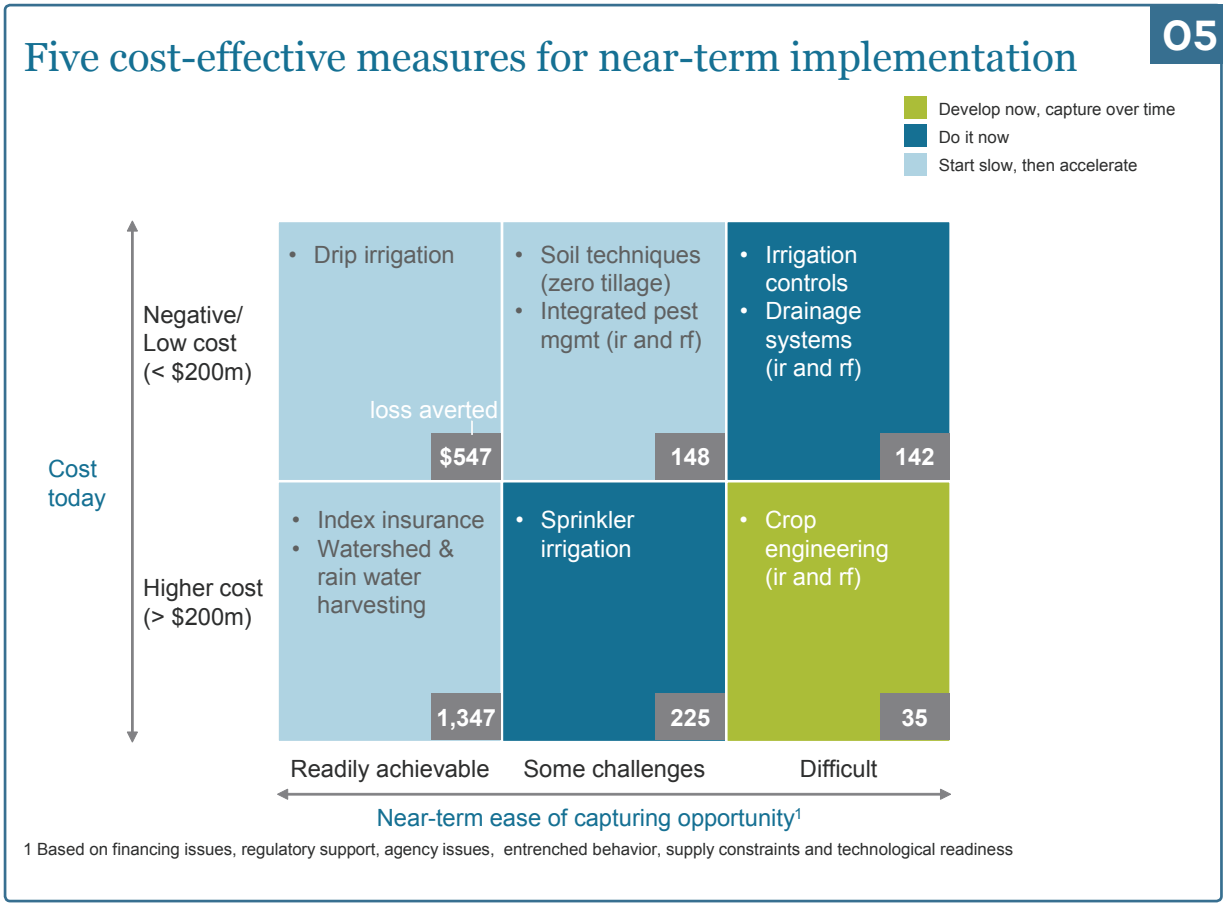

Figure 3. Displaying results of analyzing measures, e.g., by cost and feasibility

Source: Economics of Climate Adaptation Working Group, 2009

Tool 3: Adaptation cost curves (ACC):

A valuable and very graphic technique for comparing a range of adaptation options is to array them in terms of their cost effectiveness. Such ACC curves are derived from the marginal abatement cost curve (MAC) popularized by McKinsey and Company analyses of climate mitigation options for countries. A representative ACC is presented below.

This is a powerful tool for communicating the results of your assessment, within your sector or across sectors since the least-cost and higher-cost options are displayed on either end of a cost continuum that is visually appealing and usually triggers considerable discussion.

Adaptation option	Cost (1000 FJD) 10-years	20-years
Replant mangroves	$1,781	$3,016
Replant stream buffer	$935	$1,584
Monitoring & enforcement	$89	$155
Reduce upland logging	$65	$114
Reduce coral extraction	$44	$78
Build sea walls	$12,377	$15,188
Reinforce rivers	$1,975	$2,424
Increase drainage	$1,348	$1,655

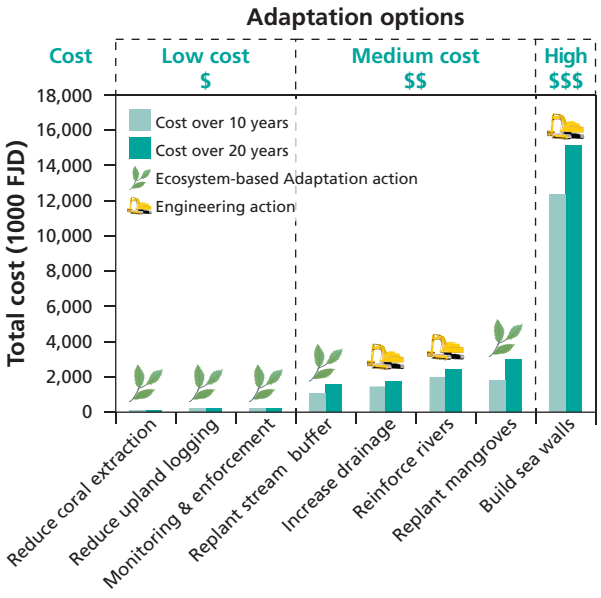

Figure 4. Example of adaptation cost curve (AAC) for Lami Town adaptation study in Fiji. The costs of options (left, 10 years and 20 years, 3% discount rate) are ordered into the clear display of an ACC curve (right, costs only, no benefits).

Source: Rao et al., 2013

6. Assessing Need for Phase 2 Cost Estimation With Advanced Tools

6.1 Why Have a Phase 2?

NAP-CM's Phase 1 evolved to produce quick, consistent estimates of the costs of the NAP document portfolio's measure using the Excel tool created (which does not cover any of the methods likely to be utilized in Phase 2 analyses).

Phase 2 recognizes that some agencies already use other, more-advanced methods due to regulatory requirements or other capacities; or may want to prepare detailed evaluations of major potential investments for final decisions and the quest for funding.

Selecting the right tool for the job is essential. Missteps in this decision can generate complications and delays later. CBA and other advanced methods allow analysts to propose projects where benefits exceed costs. Importantly, though, CBA is complex and requires the following: extensive data; significant staff expertise in running advanced tools; use of seldom-used economic valuation methods for those types of benefits not generally monetized (especially environmental services); managing costs and benefits over long periods; and dealing with high uncertainty about both costs and benefits (United States Agency for International Development [USAID], 2016). A range of methods is discussed in this section.

6.2 Overview of Advanced Methods

Four or five quite different types of economic methods are regularly used for analysis of adaptation options. The key elements of CBA and related adaptation economic methods are threefold:

- First, forecasting future climate change impacts
- Second, setting monetary values on those impacts (often called "damages")
- Third, finding ways to estimate the various costs and benefits of adaptation actions under consideration by policy-makers.

Table 14. Comparison and characteristics of advanced economic analytic methods

Tool	Applicable to What Kinds of Actions	Challenges / Resource Requirements
CBA	Actions that primarily provide monetary benefits to people, that affect market activity, and have known risks. For decision support to determine ratio of total benefits to total costs, greater than 1; or highest actions ranked by benefit-cost ratio (when multiple actions are compared).	Valuation of non-market sectors like ecosystems very difficult. Resource requirements can be very high for thorough empirical analyses.
Cost effective ness analysis (CEA)	Useful to assess actions where benefits are not monetized. Possible to assess non-market economic benefits such as environmental impacts or services like ecosystems, and for social objectives like avoiding flooding. Use to select the action that achieves the most desired outcomes per dollar of cost.	Resources similar to CBA, but somewhat less resource-heavy; not necessary to put monetary values on outcomes.
Real options analysis (ROA)	Useful for making major decisions on irreversible actions, like big infrastructure investments, when information is available about climate risks and their probabilities.	Requires major economic analysis like CBA, plus clear decision points and known probabilities.
Multi-criteria analysis (MCA, or qualitative CBA)	Usually uses expert judgment for benefits in non-monetary terms, though can include some economic elements. Used for any issue for which stakeholders can identify issues and qualitatively score the performance of the proposed action with respect to that issue. Action(s) with the highest scores win.	Less rigorous than quantitative analysis, depending on consistency of analysts in their scoring. Modest; less data, modeling, and technical skill required.
Iterative risk assessment (IRA)	Iterative analysis for long-term, uncertain conditions, when risk thresholds are clear. Can be used as a policy framework as well.	Difficult when multiple risks interact, and risk thresholds not easy to ascertain.

- CBA is one of the best-known methods, essentially a process for identifying, valuing, and comparing a project's estimated costs and benefits. The primary objective of CBA is to determine whether the benefits of a project outweigh its costs, and by how much relative to other alternatives (Jolliffe, 2016).

CBA analysis generally follows a routine progression of actions and questions (Jolliffe, 2016):

1. Determine the objective of the cost-benefit analysis: Clarify questions and what decision the analysis seeks to inform.
2. Identify the costs and benefits: Clarify potential impact of action, and the kinds of costs and benefits it would generate.
3. Value the costs and benefits: Express the value of benefits and costs in monetary terms; identify which can be valued and how.
4. Aggregate the costs and benefits: Sum costs and benefits over time.
5. Perform sensitivity analysis: Assess the importance of major uncertainties.
6. Consider distributional impacts: Who incurs costs and benefits; How do they impact the activity?
7. Prepare recommendations.

Step 6: Implement Phase 2

For Step 6, the following applies:

Resources You Will Need

1. Decision tree process below
2. Your existing economic analytic method, and staff or consultants who know how to run it

What You Need to Do: Checklist of activities for this step

1. Build on existing committees or create a multi-disciplinary team committed to the analysis over the full timeframe proposed, and empowered by its managers.
2. Use decision tree to help decide if a more advanced cost estimate or update is needed and which tool to consider.
3. Consult with CCICD, other agencies or experts to validate decisions. A mini workshop can facilitate discussion of alternative methods and their pros and cons.
4. Assemble resources, funding and expertise, then apply the selected method.

What You Should Produce

1. This varies by the method selected. Generally, a draft and revised analysis that has been peer-reviewed within the agency and externally.
2. Decision tree analysis of methods options.
3. Report on the analysis: methods, data used, issues in use of methods, policy issues, and potential next steps.

How Pilot or Other Case Handled This Step

Not applied in pilot, as no reporting protocols established yet for use of the NAP-CM.

Literature and NAP-CM team experience includes:

Lessons from projects, or studies	Guidance and good practices recommended	Source
• More advanced economic tools like CBA or modeling are complex, require detailed data that is usually expensive to acquire, and major investments of funds, staff training, and analytic time.	• Perform substantial evaluation of which tool to use, and resource, expertise and funding requirements before selecting a tool. • Use the NAP-CM Phase 2 decision tree, and then encourage staff discussion.	OECD (2015); NAP-CM pilot experience
• More advanced economic tools like Cost- Benefit Analysis or modeling are complex, require detailed data usually expensive to acquire, and major investments of funds, staff training and analytic time.	• Perform substantial evaluation of which tool to use, and resource, expertise and funding requirements before selecting a tool.	OECD (2015)
• SPC and others have database on how it calculates costs of damages and losses from climate-induced disasters.	• Consult SPC directly on how to access and use this database.	Interviews with experts
• Technical know-how on complex cost modelling of adaptation initiatives lies in regional organizations like SPC and SPREP.	• Consider engaging regional organizations when carrying out advanced cost methods.	Interviews with experts
• Advanced methods usually require use of complex baselines (of economic activity, climate impacts, etc.), issues of scale and aggregation, issues with how transferable cost and benefit estimates are from other locations, and selecting discount rate.	• Thorough review of the resource and cost data and technical expertise required by an advanced method is essential to success in its use.	OECD (2015); World Bank (2010c)
• Creating a cross-disciplinary team committed to the analysis for the time required is essential to success.	• Create a cross-unit team for the analysis, whose managers approved their time commitment.	NAP-CM team experience

How Pilot or Other Case Handled This Step (continued)

Lessons from projects, or studies	Guidance and good practices recommended	Source
• Seasoned experts in a given method can save time, understand how to find and use data specific to the tool, and best comprehend the results produced.	• Find and engage the right agency or exterior expertise to save time and money—and avoid failure of analysis.	NAP-CM team experience
• Values for ecosystem-based adaptation benefits that lack market prices can be estimated using non-market economic valuation methods, like hedonics (e.g., the travel cost method), though these require dedicated studies.	• Robust assessment methods need to be developed and applied to estimate the benefits of promising EbA measures in Fiji, and need to address the longer-term sustainability of the measures.	Rizvi et al., (2015)

Considerations for Step 6:

EVALUATING ANALYTICAL METHODS

Each agency will need to assess its current economic methods and other potential choices to determine the optimal tool for the sector and measures of concern. Relevant considerations or criteria may include:

- Data and expertise requirements vary substantially by tool: the extent of data needed, their types, technical capacity of analysts, time required to find data and refine how the tool uses them, funding and staff availability for the analysis.
- Usefulness of the tool in terms of helping to explain and display its results in ways that facilitate decision making by (and communicating with) policy-makers (e.g., cost curves organize options by ascending cost and can show the magnitude of benefits).
- Some tools or methods are more appropriate for some kinds of adaptation measures. Engineering or hard solutions and insurance schemes can be well-handled by rigorous quantitative methods like CBA and ROA. However, benefits and even cost data for green or soft measures (e.g., for ecosystem services, cultural heritage, or stakeholder preferences) may be far more difficult to handle in any given tool and may respond better to decision-support systems (e.g., MAC depending on expert judgment) (OECD, 2015).
- Feasibility of introducing stakeholder consultations and equity considerations varies with the tool selected. Many methods rely entirely on comparing quantified monetized costs with benefits (like CBA) and do not address the allocation of either or of other non-monetized benefits.
- Choosing any option will involve making trade-offs across all of these factors.

- Recognize that many of the methods reviewed could be used to evaluate a portfolio of measures, especially with CBA or CEA, if each measure is assessed individually, then compared (OECD, 2015).
- Figuring out which measures make the most sense to pilot first was discussed in Section 4.1, and can be explored using decision tools or techniques that mirror those in Step 5 above.

DECISION MATRIX

A team can propose criteria for selecting a Phase 2 tool and work through them by relying on a process that enforces equal consideration of all criteria. The worksheet and scoring discussed in Section 4.1 on choosing the first measures to pilot can be adapted for this problem.

DECISION TREES

Decision trees are a type of flow chart used to visualize the decision-making process by mapping out different courses of action and displaying their potential outcomes. The user can produce a list of fundamental questions and factors in the decision, and use them to draw a tool that requires yes or no replies to each question to arrive at a recommended choice. These trees can be profitably turned to issues like:

1. When a cost estimate update is needed
2. Which tools to consider and how to select the method to utilize for large specific measures and activities
3. How to use existing studies and models and other uses.

A decision tree is provided below to stimulate discussion about whether you are ready to utilize an advanced tool to integrate both costs and benefits of major potential investments, and if so, which tool.

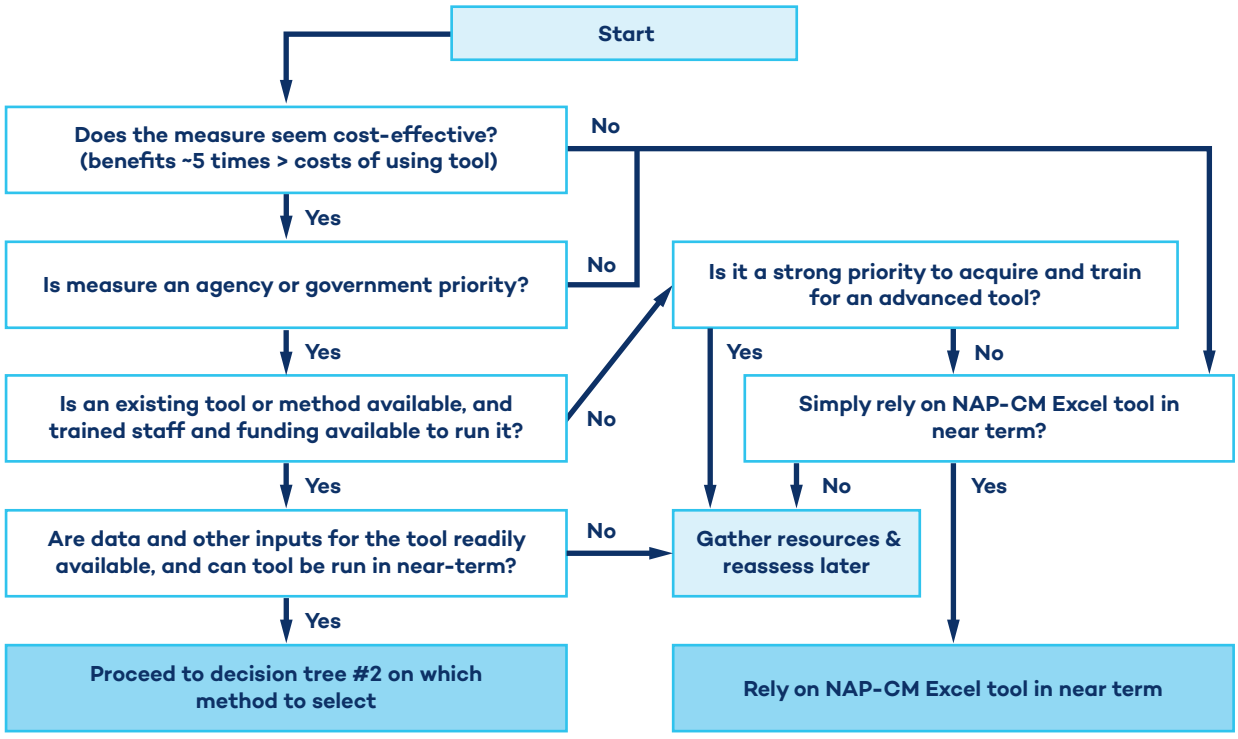

Figure 5. Decision tree 1: Feasibility and priority of using advanced costing methods for measure

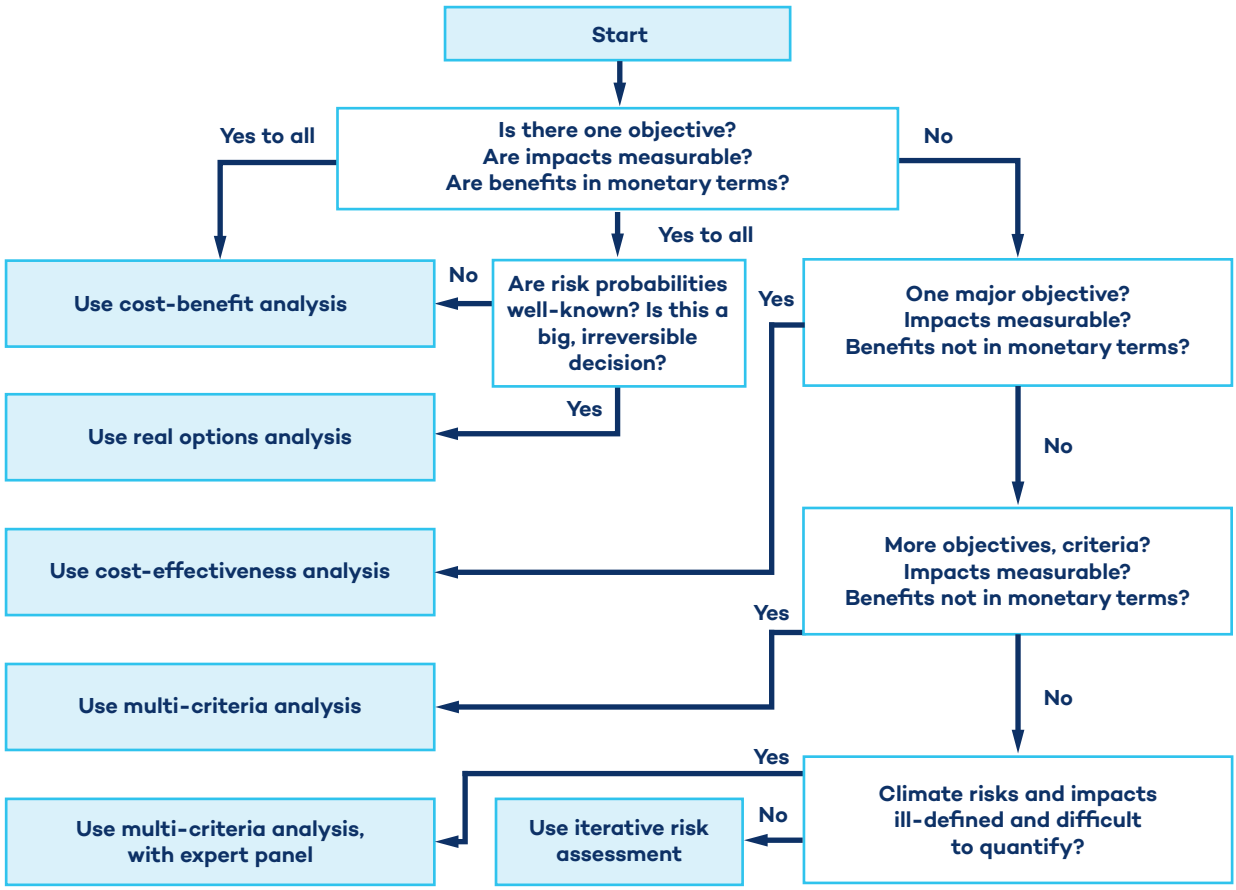

Figure 6. Decision tree 2: Selection of appropriate method for assessing costs and benefits of adaptation options

ADAPTATION COST CURVES FOR PRESENTING THE RESULTS OF COST-BENEFIT ANALYSIS

The ACC curves discussed in Step 5 above can be upgraded in their usefulness by incorporating benefits and climate avoided-damage estimates if such calculations are available via reliance on CBA or similar tools. Numerous examples are demonstrated in sources like, e.g., Economics of Climate Adaptation Working Group (2009); and ECONADAPT (2015a, 2015b).

An ACC for Samoa's adaptation options is illustrated below. Note that: a) it features a cost-benefit ratio (rather than say the marginal net cost (benefits minus costs); b) about 14 options are evaluated; and c) this graphical illustration clearly separates the most favorable benefit-to-cost candidate actions (lower left and center) from the less appealing ones (upper right).

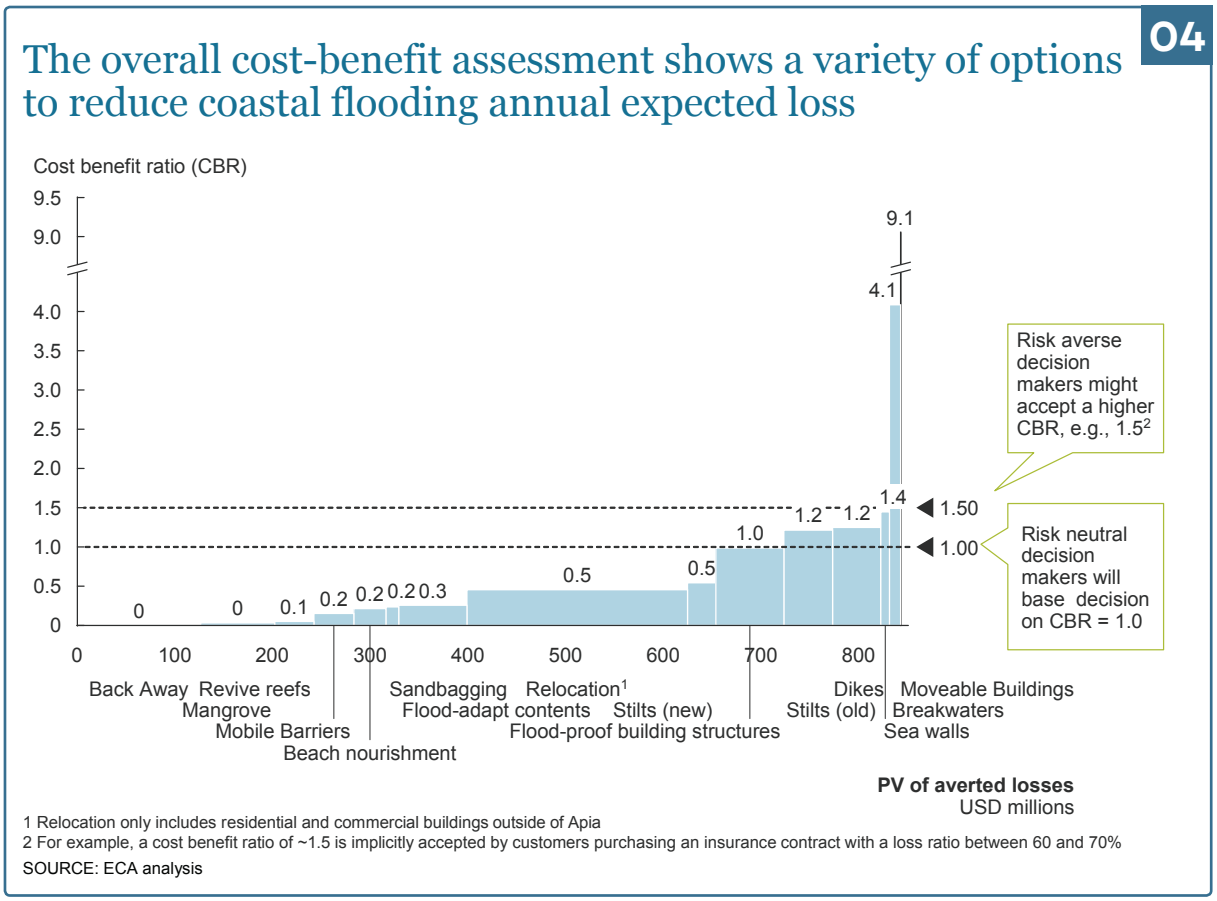

Figure 7. Example of marginal ACC for Samoa – for communicating to policy-makers and facilitating review of adaptation options

Final Thoughts and Next Steps

This Methodology, like most, will need to be piloted across more measures and sectors to elucidate its strengths and uncover areas that need adjustments. MoE anticipates that:

- MoE will establish a pool of users from key ministries and government agencies relevant to the NAP. Once this pool of users is established, training and capacity building will be conducted.
- After a few rounds of mobilization of the tool by the users, MoE could make it publicly available.
- Agencies may want to organize themselves via capacity building and training in the use of the NAP-CM. They could set up pilot task groups that work together to try out a measure or two in order to learn early lessons quickly, and the to train others in how to apply them to the rest of each agencies' costing work.
- Information, techniques, and early lesson sharing could be facilitated via intra-agency or cross-agency data-sharing platforms, workshops, and informal presentations.

Other, somewhat later, steps could include:

- Each agency introducing costs to their annual budget requests for capacity building and implementing the first tranche of measures in their sectors.
- Agencies establishing criteria and priorities to select the first NAP measures to pilot as a quick-start effort.
- Consultation with NAP-CM users and the public on how the tool and process are evolving, issues encountered, and potential enhancements to improve the process.

Appendices

Appendix A. Glossary

Adaptation	Adjustment in natural or human systems, in response to actual or expected climatic stimuli or their effects, that moderates harm and exploits beneficial opportunities
Additional or incremental costs for adaptation	Cost of an activity needed to address adaptation to climate change impacts, above the baseline or business-as-usual costs
Baseline costs	Business-as-usual activities and their costs, without adaptation actions
Benefit	Monetary or non-monetary gain received because of an action taken or a decision made
Benefit-cost ratio	Ratio of the present value of benefits from an activity, expressed in monetary terms, relative to the present value of its costs
CAPEX	Capital expenditures for goods lasting over a year, e.g., a bulldozer or computer
Cost	Monetary amount given up for an asset or non-monetary loss due to an action taken or decision made
Cost-benefit analysis (CBA)	Systematic process for assessing, calculating and comparing the advantages (benefits) and disadvantages (costs) of an activity. Includes costs and benefits that cannot be quantified in monetary terms but are valued by society
Cost- effectiveness analysis (CEA)	Systematic method to find the lowest cost of accomplishing a desired objective
Decision tree	Type of flow chart used to visualize the decision-making process by mapping out different courses of action as well as their potential outcomes
Discount rate (r):	The rate at which future values of benefits or costs are adjusted to express them in present day values
Discounting	A method to determine the present value of future benefits or costs to be received or paid in the future

Ecosystem-based Adaptation (EbA)	A broad set of nature-based solutions that harness biodiversity and ecosystem services to reduce vulnerability and build resilience to climate change
Full or net cost/benefits	Net value when all costs and benefits are included
Good Practice	Set of procedures intended to help direct and ensure that estimates of climate change costs or other aspects (e.g., greenhouse gas emissions), quality control, and quantification of uncertainties are accurate and performed using agreed standard practices
Guidance	Set of directions and/or tools that detail and explain how to apply good practice
Indicative costs	Representative cost estimate where precise data and values are not yet available or known
Measure	One of the 160 adaptation actions contained in Fiji's NAP, usually comprised of a number of specific activities (e.g., revising a building code, repairing 100 bridges)
Nature-based solutions	Measures that protect, sustainably manage and restore natural or modified ecosystems to solutions provide human well-being and biodiversity benefits while responding to societal or infrastructural challenges
Net present value (NPV)	Sum of the discounted stream of benefits and costs over time
Non-market benefits and costs	Benefits or costs arising from the production or consumption of goods or services that are not traded in markets and either have no monetary price or whose price does not reflect all the benefits and or costs
Opportunity cost	Economic cost of a resource, measured as the cost of giving up the nearest alternative use; the value of the next best option that must be surrendered
OPEX	Operating expenditures, or recurring costs, e.g., labor, concrete, workshop
Sensitivity analysis	An assessment of how different values for one (independent) variable will impact a particular dependent variable under a given set of assumptions
Shared costs	Costs shared by multiple activities or NAP measures, that can be allocated to each measure
Transaction costs	Costs incurred during economic exchanges involving the purchase of goods and services (e.g., legal fees, cost of borrowing money)
Uncertainty	Lack of knowledge of the true value of a variable (e.g., reductions in emissions or increases in removals) that can be described as the probability of the range and likelihood of a value

Appendix B. References

Note: authors who have multiple references in the same year are listed as, e.g., (2010a); some of the author's other references from that year may be found in Appendix C.

Fiji and Pacific Official or Context Documents

Buncle, A., Daigneault, A., Holland, P., Fink, A., Hook, S., & Manley, M. (2013). *Cost-benefit analysis for natural resource management in the Pacific: A guide*. SPREP. http://www.undp-alm.org/sites/default/files/downloads/cost-benefit_analysis_for_natural_resource_management_in_the_pacific-a_guide.pdf

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Appendix D. Additional Lessons and Good Practices, and Rationale Behind the NAP Costing Methodology

Table D1. Additional lessons and good practices from the literature

Lesson learned	Guidance and good practices recommended	Source
• Literature on adaptation costs remains limited and fragmented in terms of sectoral and regional coverage.	• A literature review on the adaptation landscape is required for sectors and programs along with a quick review of costing measures.	Adger (2007); NAP-CM team experience
• Adopting a bottom-up approach and/or a participatory process is likely to involve a broad range of stakeholders, and tends to engender support for the process and its results.	• Perform mapping of vulnerable communities, agencies, and private sector stakeholders in the early stages of estimating costs for (or deciding among) adaptation options and methods.	Oshman-Elsa (2007); BASE (2015); de Bruin et al. (2009b); Fussel (2007)
• Interventions need to also consider gender dimensions and vulnerability of participants.	• Engage a gender specialist to review which costs are needed and how to take gender into account for these costs.	Denton (2004)
• Projections of costs in regional World Bank studies are highest in Pacific and East Asia regions; and for coastal zones, the water sector and infrastructure—all prominent in Fiji.	• Pay close attention to coastal, water, and infrastructure measures, to produce realistic and comprehensive costs.	World Bank (2010b); ECONADAPT (2015b)
• Public and private sectors need to work together to better assess costs of adaptation options where appropriate. • The private sector needs to realize that its companies' climate resilience depends on the resilience of the communities in which it operates.	• Liaise with the private sector entities potentially affected by adaptation options. • Develop guidance for sharing of relevant adaptation costs. • Study potential ways to provide more incentives for co-financing by private entities, including use of such things as credit lines, insurance, etc.	Global Commission on Adaptation (2019)

The Rationale Behind the NAP Costing Methodology: General considerations and key questions

GENERAL CONSIDERATIONS

Fiji's NAP document has 160 adaptation measures of many types of activities. Therefore:

- The costing methodology needs to be simple and flexible enough to be used for all or most of the measures.
- Fiji's Ministry of Economy/CCICD's objective is to rapidly assess the overall costs of the full NAP, both quickly and using comparable methods and results.
- Cost estimates for each measure need to include costs for the five-year timeframe of the NAP document, plus future costs if known or estimable. (Adaptation measures need to be forward-looking over a long timeframe, e.g., 20–50 years).
- An engineering cost, bottom-up approach is proposed as the most pragmatic solution.

Three generic options are standardly considered for selecting a method or tool to estimate climate impacts, and adaptation options and their costs. Each method has advantages and disadvantages that need to be carefully assessed prior to committing resources to it (IPCC, 2014).

These options are:

1. 1. Use an existing tool already in use in Fiji. This would be very efficient, and would allow use of country-specific data and existing expertise. However, very few costing analyses have been performed in Fiji, so the few tools available use complex cost-benefit methods.
2. 2. Adapt an existing tool. Users need to review the expertise and data requirements, as well as costs of adapting an existing tool—all of which can be significant and time-intensive.
3. 3. Develop a new tool. Costs of development and ongoing maintenance need to be considered. However, Excel-based tools are simple, do not require highly specific coding expertise rarely available in agency staff, and are inexpensive to maintain or update.

As such, the following questions were considered in designing a costing Methodology for Fiji:

- Which analytic cost approach is best for the Fiji context?: e.g., use a formal method like cost-effectiveness analysis, cost-benefit analysis, or multi-criteria analysis—or a simpler engineering cost approach with far lesser data requirements?
- Are data readily available to support more complex approaches?
- What approach would allow Fiji to produce cost estimates for the full set of adaptation measures prioritized in the NAP document in the near term, with potentially available resources? … vs. taking years and major funding?
- Can Govt. of Fiji identify and update its current priorities of adaptation activities for immediate extensive costing rather than costing the whole NAP at once?
- Is full costing analysis feasible that considers: e.g., all costs (monetized and no-monetized?), benefits, costs and benefits over the 30–50 year timeframes of climate change impacts, etc.?

- Can the method handle land- or marine-based benefits that occur via provision of ecosystem services, which are difficult to quantify and monetize, in terms of both costs and benefits provided.

Some of the challenges the methods selected will need to address are summarized in Box D1.

Box D1. Challenges in performing adaptation cost estimation

- Establishing a baseline of current climate impacts and socioeconomic status, to forecast changes under future climate regimes, due to inadequate data on current status and benefits provided for some ecosystems and countries.
- Estimating climate risks from forecast impacts in the future, and the benefits from adaptation interventions, is challenging, given forecasts that vary across models and scenarios within models, and that have significant uncertainty.
- Uncertainty of future climate emissions pathways and impacts.
- Difficulty of providing a definitive cost estimate for adaptation interventions, which are usually simply the technical costs of an action.
- Understanding and costing the interactions across these various interventions, including opportunity costs (other investments an entity forgoes to select and fund this action) and transaction costs.
- Estimating adaptative capacity—the ability of public and private institutions to change in response to learning and policy decisions, or of an ecosystem to respond to climate impacts, in a given timeframe.
- Private sector role in co-financing adaptation actions—little empirical evidence to date and thus difficult to estimate.

Source: ECONADAPT (2015b)

A few detailed cost estimation studies using advanced cost-benefit or other methods have been completed in Fiji or the Pacific region, and are drawn on for some aspects of the NAP-CM. These studies include:

- Narikoso Relocation Project analysis of moving Narikoso Village on Ono Island, Fiji (Joliffe, 2016)
- Economic analysis of EbA and engineering options for coastal erosion in Lami Town, Fiji (Rao et al., 2013)
- Cost Effectiveness Analysis: Case Study from Tanna Island in Vanuatu (Mackey et al., 2018).

An ideal assessment of adaptation costs would utilize an integrated approach that would include, e.g.:

- A range of climate impact models from a representative range of global model scenarios
- Assessment of a number of alternative options for each type of adaptation response (i.e., analyzing a set of actions for, say, reducing fossil fuel use in remote communities to find a superior solution)

- Detailed data on resource requirements and costs based on empirical study results from studies in the region in question, e.g., Fiji and the western Pacific
- Both market and non-market, non-monetized benefits included (like value of ecosystem services from restoring mangroves, or avoided disaster damages), to allow cost-benefit analysis or other advanced methods
- Full consideration of a range of climate impact, adaptative response, economic/market effect performance, and other uncertainties.

No studies in Fiji (and few elsewhere), however, are available that include all these elements (ECONADAPT, 2015b; Chambwera et al., 2014). Thus a full economic cost-benefit approach for all the NAP measures is beyond the reach of an overarching costing Methodology for Fiji's NAP document. However, agencies may engage in such CBA or related methods under Phase 2 of the Methodology, if they have completed a Phase 1 analysis of the measures in question and have the resources in place to invest in advanced tools (as outlined in Section 6 of this document).

Appendix E. Interview Survey Form and Interviewees

Sample of guiding questions used to collect the indicative estimates and cost data in the pilot. The questions are to be used as guidance and should be tailored appropriately to fit participant's context.

INTERVIEW TEMPLATE

Participants Information

Expert Participant's Name:	
Organization:	
Current Position:	
Date/Time Of Interview:	
Email Contact/ Phone Contact:	

INTRODUCTION OF THE PILOT [EXPLANATION OF THE PILOT TO THE INTERVIEW PARTICIPANTS—PLEASE TAILOR ACCORDINGLY]

The Government of Fiji is currently undertaking an exercise of developing a methodology to realistically and practically cost its National Adaptation Plan (NAP). Fiji's NAP was launched in 2018 and its main aim is to integrate climate adaptation into development planning and budgeting at the national, sectoral, and sub-nationals level. The ultimate objective of the NAP is to reduce Fiji's vulnerability to climate change impacts in the medium and the long term.

I, Jale Samuwai and Mr. Kenneth Andrasko have been engaged as consultants to develop this Methodology. Mr. Andrasko is the lead international consultant, while I am the supporting local consultant. The project timeframe will be from April to June 2020.

The Government of Fiji have identified this as one of its key priorities. The Methodology will be used by the Climate Change Unit as well as the Sectoral Ministries in their effort to implement the NAP.

Being mindful of the data and the capacity challenges in conducting such an exercise in Fiji, we have been specifically requested by the Fiji's Climate Change Unit to develop a methodology that can accurately cost the activities while being able to be applied across the various line ministries.

Thus to ensure we develop a methodology that is realistic, practical, and fit for the context, we are adopting a consultative process, seeking input and the participation of experts in respective line ministries, Civil Society Organisations (CSO), private sector and development partners.

Based on your active contribution to the climate change and the development landscape in Fiji and the region, we believe that your participation and input in this process will be invaluable.

We thank you once again for agreeing to accommodate our humble request to have a 'talanoa' with you.

Your input will be treated with the utmost confidentiality and will solely be used for the purpose of the said exercise.

Vinaka vakalevu.

Targeted Questions

FOOD SECURITY AND NUTRITION SECURITY INTERVENTIONS

Measure 12.A.1. P*romote and integrate climate-smart agriculture (CSA) practices, into farming, trainings, extension services, policies and plans* (responsive to the needs of disadvantaged groups and tailored to subsistence, semi-commercial and commercial farmers) *and adopt nature-based and urban solutions where possible. [NAP INTERVENTION TO BE COSTED]*

[List down other relevant Ministries and Agencies that are all also contributing in the implementation of the intervention. You will also need to consult these institutions to identify the costs.]

Targeted Participants	Contacts
1. Ministry of Agriculture	
2. MoE	
3. SPC	
4. Fiji Development Bank	

As per the NAP: CSA practices include integrated farming (e.g., contour farming, minimum tillage, cover vegetation, crop rotation) and climate-based crop planning, and are aimed at diversifying crop cultivation, enhancing soil fertility, best and weed control (e.g., marigold), expanding agro-forestry practices (e.g., plant, shades of trees and live fences for grazing of cattle or pigs under tree crops), promoting the use of heat-, drought-, flood- and salt-resistant varieties and cultivars (e.g., early maturity crops, shorter varieties), climate-resilient livestock breeds (e.g., by selective breeding and artificial insemination AI), increasing the production and awareness of traditional farm approaches (including methods of traditional medicine for livestock) and Indigenous crops (which can be grown easily, organically, and are relatively disaster-resilient) and strengthen these through scientific research and toolkits (including investing in scientific capacity and in the capacity of users to demand, interpret and apply scientific outputs effectively).

[Measures already broken into sub- activities that could be measured. The process of breaking up the interventions into sub-costs must be go through a consultative process within your agencies so that you are able to know the parameters and the scope of the costs that you are trying to identify.]

MEASURE 12.A.6 (I): PROMOTE AND INTEGRATE CSA PRACTICES INTO *FARMING*...

Q1. To integrate CSA in *farming*... (will need to be specific which CSA practice we are referring to here as per the NAP list), what are the broad activities/costs that will be involved? Can you list them down?

Q2. What would be the sub activities/costs involved in those broad activities? Can you list them down?

Q3. What are the estimated costs of this sub activities? Do you have any costed documents that you can provide?

Q4. Which of these sub activities/costs are once-off and which are recurrent in nature?

Q5.Have you factored in the "incremental costs" of climate impacts for relevant activities? What would be the percentage range of these incremental costs for those activities?

Q6. What are you coverage spread like? i.e. what are the specific target they are trying to achieve for these sub-activities identified—for example how many farming communities are you targeting etc.?

Q7. What other relevant ministries or agency should I consult for the costing estimations for this intervention?

MEASURE 12.A.6. (II) PROMOTE AND INTEGRATE CSA PRACTICES INTO *TRAINING*...

Q1. To integrate CSA in *training* (will need to be specific which CSA practice we are referring to here as per the NAP list), what are the broad activities/costs that will be involved? Can you list them down?

Q2. What would be the sub activities/costs involved in those broad activities? Can you list them down?

Q3. What are the estimated costs of this sub activities? Do you have any costed documents that you can provide?

Q4. Which of these sub activities/costs are once-off and which are recurrent in nature?

Q5.Have you factored in the "incremental costs" of climate impacts for relevant activities? What would be percentage range of these incremental costs for those activities?

Q6. What are you coverage spread like? i.e., what are the specific target they are trying to achieve for these sub-activities identified- for example how many farming communities are you targeting etc.?

Q7. What other relevant ministries or agency should I consult for the costing estimations for this intervention?

MEASURE 12.A.6. (III) PROMOTE AND INTEGRATE CSA PRACTICES INTO *EXTENSION SERVICES*...

Q1. To integrate CSA in *extension services* (will need to be specific which CSA practice we are referring to here as per the NAP list), what are the broad activities/costs that will be involved? Can you list them down?

Q2. What would be the sub activities/costs involved in those broad activities? Can you list them down?

Q3. What are the estimated costs of this sub activities? Do you have any costed documents that you can provide?

Q4. Which of these sub activities/costs are once-off and which are recurrent in nature?

Q5.Have you factored in the "incremental costs" of climate impacts for relevant activities? What would be percentage range of these incremental costs for those activities?

Q6. What are you coverage spread like? i.e., what are the specific target they are trying to achieve for these sub-activities identified—for example how many farming communities are you targeting etc.?

Q7. What other relevant ministries or agency should I consult for the costing estimations for this intervention?

1.6.4 MEASURE 12.A.6. (IV) PROMOTE AND INTEGRATE CSA PRACTICES INTO *POLICIES AND PLANS* (RESPONSIVE TO THE NEEDS OF DISADVANTAGED GROUPS AND TAILORED TO SUBSISTENCE, SEMI-COMMERCIAL FARMERS AND COMMERCIAL FARMERS) ...

Q1. To integrate CSA in *policies and plans*... (will need to be specific which CSA practice we are referring to here as per the NAP list), what are the broad activities/costs that will be involved? Can you list them down?

Q2. What would be the sub activities/costs involved in those broad activities? Can you list them down?

Q3. What are the estimated costs of this sub activities? Do you have any costed documents that you can provide?

Q4. Which of these sub activities/costs are once-off and which are recurrent in nature?

Q5.Have you factored in the "incremental costs" of climate impacts for relevant activities? What would be percentage range of these incremental costs for those activities?

Q6. What are you coverage spread like? i.e., what are the specific target they are trying to achieve for these sub-activities identified—for example how many farming communities are you targeting etc.?

Q7. What other relevant ministries or agency should I consult for the costing estimations for this intervention?

16.5 MEASURE 12.A.6. (V) ... AND *ADOPT NATURE-BASED AND URBAN SOLUTIONS* WHERE POSSIBLE.

Q1. To *adopt nature-based and urban solutions....,* what are the broad activities/costs that will be involved? Can you list them down?

Q2. What would be the sub activities/costs involved in those broad activities? Can you list them down?

Q3. What are the estimated costs of this sub activities? Do you have any costed documents that you can provide?

Q4. Which of these sub activities/costs are once-off and which are recurrent in nature?

Q5. Have you factored in the "incremental costs" of climate impacts for relevant activities? What would be percentage range of these incremental costs for those activities?

Q6. What are you coverage spread like? i.e., what are the specific target they are trying to achieve for these sub-activities identified—for example how many farming communities are you targeting etc.?

Q7. What other relevant ministries or agency should I consult for the costing estimations for this intervention?

Human Settlements

MEASURE 14.1. SCALE UP EFFORTS TO STRENGTHEN COASTAL BOUNDARIES OF URBAN CENTERS AND RURAL COMMUNITIES THROUGH HYBRID OR NATURE-BASED SOLUTIONS TO RISK REDUCTION PURPOSE AND SLOW THE NEED TO RELOCATE COMMUNITIES AND INFRASTRUCTURE.

Targeted Participants	Contacts
1. Ministry of Waterways	
2. NDMO	
3. Department of Planning	
4. WWF	
5. Conservation International	
6. USP	

MEASURE 14.1.(I) SCALE UP EFFORTS TO STRENGTHEN COASTAL BOUNDARIES OF URBAN CENTERS...THROUGH HYBRID OR NATURE-BASED SOLUTIONS TO REDUCE RISK REDUCTION PURPOSES AND TO SLOW THE NEED TO RELOCATE COMMUNITIES AND INFRASTRUCTURE.

Q1. How many *urban centers* are we targeting?

Q2. What are specific hybrid/nature-based solutions targeted for urban communities?

Q3. What are the broad activities/costs that will be involved? Can you list them down?

Q4. What would be the sub activities/costs involved in those broad activities? Can you list them down?

Q5. What are the estimated costs of this sub activities? Do you have any costed documents that you can provide?

Q6. Which of these sub activities/costs are once-off and which are recurrent in nature?

Q7. Have you factored in the "incremental costs" of climate impacts for relevant activities? What would be percentage range of these incremental costs for those activities?

Q8. What other relevant ministries or agency should I consult for the costing estimations for this intervention?

MEASURE 14.1.(II) *SCALE UP EFFORTS TO STRENGTHEN COASTAL BOUNDARIES OF RURAL COMMUNITIES... THROUGH HYBRID OR NATURE-BASED SOLUTIONS* TO REDUCE RISK REDUCTION PURPOSES AND TO SLOW THE NEED TO RELOCATE COMMUNITIES AND INFRASTRUCTURE.

Q1. Do we know how many rural communities that we need to target?

Q2. What are specific hybrid/nature-based solutions targeted for urban communities?

Q3. What are the broad activities/costs that will be involved? Can you list them down?

Q4. What would be the sub activities/costs involved in those broad activities? Can you list them down?

Q5. What are the estimated costs of this sub activities? Do you have any costed documents that you can provide?

Q6. Which of these sub activities/costs are once-off and which are recurrent in nature?

Q7. Have you factored in the "incremental costs" of climate impacts for relevant activities? What would be percentage range of these incremental costs for those activities?

Q8. What other relevant ministries or agency should I consult for the costing estimations for this intervention?

14.1 Interview List

No	Name	Organisation	Date	Time	Mode	Status
1	Ms. Titilia Davetanivalu	Ministry of Agriculture	13/05/2020	3pm – 4pm	Face-to-face (MoA)	Completed
2	Mr. Phillipe Brewster	Ministry of Agriculture	13/05/2020	3pm – 4 pm	Face-to-face (MoA)	Completed
3	Mr. Amit Singh	Ministry of Waterways	14/05/2020	11am – 12pm	Face-to-face (MoW)	Completed
4	Mr. Mahendra Kumar	Ministry of Waterways	14/05/2020	11am – 12pm	Face-to-face (MoW)	Completed
5	Mr. Viliamu Iese	USP	14/05/2020	2pm – 3 pm	Skype	Completed
6	Mr. Kevin Petrini	UNDP	18/05/2020	10am- 11 am	Skype	Completed
7	Mr. Noa Seru	USAID Climate Ready	18/05/2020	12pm – 1pm	Skype	Completed
8	Ms. Lisa Buggy	SPC	18/05/2020	3pm – 4pm	Skype	Completed
9	Ms. Teresai Powell	USP GCCA	19/05/2020	10am – 11am	Face-to-face (USP)	Completed
10	Ms. Natasha Verma	DFAT	19/05/2020	11am – 12pm	Webex	Completed
11	Ms. Kristin Donaldson	DFAT	19/05/2020	11am – 12pm	Webex	Completed
12	Ms. Christine Fung	GIZ	19/05/2020	3pm – 4pm	Face-to-face (Madhatters Café)	Completed
13	Mr. Amini Delai	UNDP	20/05/2020	10am – 11 am	Zoom	Completed
14	Mr. Moortaza	UNDP	20/05/2020	10am-11am	Zoom	Completed
15	Mr. Mosesese Sikivou	PIFS	21/05/2020	10am – 11 am	Zoom	Completed
16	Mr. Ledua Vakaloloma	PIFS	21/05/2020	10am – 11 am	Zoom	Completed

No	Name	Organisation	Date	Time	Mode	Status
17	Ms. Teea	PIFS	21/05/2020	10am – 11 am	Zoom	Completed
18	Mr. Exsley Taloiburi	PIFS	21/05/2020	10am – 11 am	Zoom	Completed
19	Mr. Rusiate Ratuniata	Ridge to Reef Project – UNDP	22/05/2020	2pm-3pm	Skype	Completed
20	Mr. Epeli Waqavonovono	SPC	26/05/2020	10am-11am	Skype	Completed

Appendix F. Stakeholder Consultation

I. Planning the Consultation

A. PLANNING STEPS

Stakeholder consultations are critical for the purposes of: transparency of and support for the NAP-CM costing process, collecting insights from stakeholders on sources and types of data needed, and ensuring robustness of the costs data that are collected. This section describe the process of facilitating the consultations with experts to discuss the results of the pilot costing exercise.

We followed eight broad steps to conduct the consultations.

1. Identify the key stakeholders that you think will be important in the review process.
2. Develop an agenda covering both what the stakeholders and MoE would like to know.
3. Develop presentation slides showing key results.
4. 4Develop key questions to guide the discussions.
5. Send out meeting invites, meeting agenda, and presentation slides as well as draft costs estimates in advance to the participants (if available).
6. Capture the proceedings: Ensure colleagues are on hand to capture the questions and comments raised during the discussion, and record them in a summary table after the event. Record attendance of participants and their contact details.
7. Consider facilitating the consultations online via platform like Zoom because of reach, convenience, and cost effectiveness in hosting consultations.
8. It is good practice to send an updated version of the document/output back to the stakeholders for transparency purposes so that they can see how their comments and questions have been addressed.

B. INVITATION LIST

No	Name	Designation	Organization
	Titilia Davetanivalu	Project Officer	Ministry of Agriculture
	Misaeli Funaki	Director FijiMet	Fiji Meteorological Services
	Kelera Oli		Ministry of Health and Medical Services
	Vasiti Soko	Director	Ministry of National Disaster Management
	Ana Tora	Acting Principal Administrative Office	Office of Prime Minister
	Bindula Devi	Director	Ministry of Local Government
	Mere Lakeba	Director Fisheries	Ministry of Fisheries

No	Name	Designation	Organization
	Reshmi Kumari	Director Policy Research	Ministry of Sugar
	Sanjay Kumar	Director Sugar	Ministry of Sugar
	Idrish Khan	Accounts Officer	Ministry of Health
	Mikaele Belena	Senior Scientific Officer	Ministry of Infrastructure and Meteorological Services (Department of Energy)
	Apaitia Ravaga Macanawai	Director Research	Ministry of Agriculture
	Jale Kunawalu	Director Corporate Services Division	Ministry of Lands and Minerals
	Semi Dranibaka	Executive Director	Ministry of Forestry
	Kartik Pratap	Director Economics	Ministry of Commerce, Trade and Tourism
	Amelia Komaisavai	Senior Administrative Officer	Office of Prime Minister
	Prashila K. Devi	Information Officer	Department of Information
	Brenda Caucau		Department of Information
	Tupoutua'h.baravilala	Director General – Digital Government Transformation, Cybersecurity and Communications	Ministry of Communications
	Kelera Oli		Ministry of Health
	Mahendra Kumar	Director Operations	Ministry of Waterways and Environment
	Amit Singh	Director - Policy, Research and Planning	Ministry of Waterways and Environment
	Sandeep Singh	Director Environment	Ministry of Waterways and Environment
	Selai Korovusere	Director Women	Ministry of Women, Children and Poverty Alleviation
	Akuila Savu	Director Monitoring and Evaluation	Ministry of Defense, National Security, and Policing
	Phillipe Brewster	Policy Adviser	Ministry of Agriculture
	Natasha Verma		DFAT
	Kristin Donaldson		DFAT

No	Name	Designation	Organization
	Christine Fung		GIZ
	Amini Delai		UNDP
	Moortaza		UNDP
	Mosesese Sikivou		PIFS
	Ledua Vakaloloma		PIFS
	Teea		PIFS
	Exsley Taloiburi		PIFS
	Rusiate Ratuniata		Ridge to Reef Project- UNDP
	Epeli Waqavonovono		SPC
	Lisa Buggy		SPC
	Mason Smith		IUCN
	Hermant Timmermans		SPREP
	Doris Susau		LiveLearn
	Areca Tawakelotu		Fiji Roads Authority
	H. Sharma		Water Authority of Fiji
	Zakia Dean		Fiji Roads Authority
	Karunesh Rao		Energy Fiji Limited
	Doreen Singh		Ministry of Housing and Community
	Fiji Hotel & Tourism Association		Fiji Hotel & Tourism Association
	Sangeeta Mangubhai	Director	Wildlife Conservation Society
	Nafitalai Cakacaka		Fiji Development Bank
	Kevin Petrini		UNDP
	Noa Seru		USAID Climate Ready
	Viliamu Iese		USP
	Teresai Powell		USP GCCA

C. AGENDA AND INVITATION LETTER

NAP Global Network

Financial support provided by:
Ce projet a été réalisé avec l'appui financier de :

Environment and Climate Change Canada / Environnement et Changement climatique Canada

Federal Ministry for Economic Cooperation and Development

Secretariat hosted by:
Secrétariat hébergé par :

IISD

AGENDA

Virtual Consultation on NAP Costing Methodology
Ministry of Economy, Level 8 Conference Room

Tuesday 16 June 2020

1. Introduction of the NAP and rationale behind the need for a costing methodology - CCICD
2. Presentations of the Methodology development process, methodology and pilot- Ken/Jale
3. Questions and Answer sessions – Open to all participants
4. Way forward on how comments will be addressed- CCICD
5. End presentations

MINISTRY OF ECONOMY

P.O Box 2212, Government Buildings, Suva, Fiji; Tele: (679) 3307011, Fax: (679) 3308654
Website: www.economy.gov.fj Email: EconomyInformation@economy.gov.fj
Ro Lalabalavu House, 370 Victoria Parade, Suva

23 April 2020

To whom it may concern

Support for Developing the Methodology to Cost Fiji's National Adaptation Plan

1. The Fijian Government through its Climate Change and International Cooperation Division (CCICD) in partnership with the International Institute for Sustainable Development (IISD) has embarked on a project to develop a ***Methodology*** of costing Fiji's National Adaptation Plan (NAP). Fiji's NAP was launched in 2018, and its primary aim is to integrate climate adaptation into development planning and budgeting at national, sectoral, and sub-national levels, to ultimately reduce Fiji's vulnerability to climate change impacts in the medium and the long term.

2. The costing of Fiji's NAP is a priority for the Fijian Government since a standard approach or methodology for costing adaptation activities currently do not exist. The development of a costing methodology is the first step towards the financing and implementation of Fiji's NAP.

3. To that end, the CCICD in partnership with IISD has engaged Mr Kenneth Andrasko (lead consultant: kandrasko3@gmail.com) and Dr. Jale Samuwai (local consultant: jalecuruki5@gmail.com) to develop and pilot a methodology of costing the adaptation actions prioritised in Fiji's NAP. The timeline of the project is from 25 April to 30 June, 2020.

4. The Methodology will be primarily used by the CCICD and sector line ministries, and will also be useful for development partners working with the Fijian Government.

5. To ensure that a realistic, practical, and fit for context costing methodology is developed, we therefore seek your expert participation and inputs in the process of shaping and developing the costing Methodology. We believe that your inputs will be invaluable to this exercise given your vast experience and knowledge of the climate change and development landscape in Fiji and the region.

6. Your willingness to assist the local consultant in providing the required data, and participation in this important national initiative led by the Fijian Government is greatly appreciated.

7. For any further information pertaining to this exercise, please contact Shivanal Kumar on shivanal.kumar@economy.gov.fj.

Thank you.

Yours Sincerely

Shivanal Kumar
for **Permanent Secretary for Economy**

GUIDING QUESTIONS FOR THE DISCUSSION SESSION WITH PARTICIPANTS

Questions for & From Stakeholders (40 Minutes)

- Q1: Does this seem a reasonable approach, that will produce relatively quick results useful to you?
- Q2: Are steps or types of costs missing?
- Q3: Do you expect to use more advanced economic methods within the next year (i.e., "Phase 2")?
- Q4: What comments or questions do you have?

D. ATTENDANCE SHEET

Fiji NAP Costing Methodology Consultation
Fiji, June 16, 2020

No	Name	Gender	Affiliation	Signature
1	Vasiti Soko (With her team)	F	Ministry of National Disaster Management	
2	Brenda Caucau	F	Department of Information	
3	Jese Vatukela	M	Ministry of Health	
4	Natasha Verma	F	DFAT	
5	Kristin Donaldson	F	DFAT	
6	Christine Fung	F	GIZ	
7	Teea	F	PIFS	
8	Exsley Taloiburi	M	PIFS	
9	Akuila Savu	M	Ministry of Defence, National Security and Policing	
10	Lisa Buggy	F	SPC	
11	Noa Seru	M	USAID Climate Ready Project	
12	Hermant Timmermans	M	SPREP	
13	Keshaw Sharma	M	Fiji Roads Authority	

No	Name	Gender	Affiliation	Signature
14	Karunesh Rao	M	Energy Fiji Limited	
15	Julia Korovou	F	Live & Learn FIJI	
16	FORAN Andrew	M	IUCN	
17	Mason Smith	M	IUCN	
18	Krishil Kumar	M	Fiji Development Bank	
19	Fiji Development Bank (Team)		Fiji Development Bank	
20	Salim Mazouz	M	Australia Pacific Climate Partnership	
21	Mosesese Sikivou	M	PIFS	
22	Aholoto Palu	M	PIFS/GIZ	
23	Evia Tavanavanua	F	IUCN	
24	Shayal Kumar	F	MoE	
25	Shivanal Kumar	M	MoE	
26	Vineil Narayan	M	MoE	
27	Jale Samuwai	M	Consultant	
28	Kenneth Andrasko	M	Consultant	

II. Summary of Comments During CCICD Stakeholder Consultation

Held at MoE, June 16, 2020
[underlining added to highlight key points]

#	Comment	Source of Comment	MoE or NAP-CM Team Response Given
1	Identify recurrent costs vs. 1-year costs in Excel tool.	? - during Zoom	Agreed—Excel does this already
2	Your simple approach is good and makes sense. But w/o including benefits estimates, difficult for NAP and govt. to prioritize actions. Could you develop way to prioritize?	Salim Mazouz, Aus. Pac. Climate Partnership	MoE response in meeting: NAP was written by & with ministries, so it already reflects their priorities
3	Presentation of methodology is very clear, and you have convinced us you have a solid method and a clear path forward.	Hermant Timmermans, Salim Mazouz; Christine Fung	
4	Reducing upstream logging example in Lami Town study has low costs [in Adaptation Cost Curve in the presentation] only because governance, livelihood etc. other costs are not included.	Christine Fung, GIZ	Excel includes option to add such costs; & will include option to add enabling conditions costs & table to calculate them
5	[response to comment]: Key question for costing NAP is, we realized: What constitutes a measure in the NAP? Given measures' short, generic text, what actions are needed to implement a measure? This is largely a policy decision interpreting the sense of the measure—but becomes a technical costing issue.	Ken Andrasko, a presenter & consultant to IISD	Will add note on this to guidance document
6	Need to include costs of communications of measure (PR), and evaluation costs.	Christine Fung, GIZ	M&E costs will be included in Excel. Communications costs can be added
7	Costs of engaging regional or other external partners (e.g., for expertise in using advanced models, or benefits, damages estimates) need to be included. Urge use of existing MOUs w/ partners to reduce costs.	Christine Fung, GIZ	This could be added Will add note in guidance document.
8	Top-down funding needs to be considered – e.g., from international donors etc.	Christine Fung, GIZ	Adding this to Shared Costs columns in Excel sheet 3 – asking for domestic agency shared costs, other domestic shared costs, and international shared costs – to avoid double-counting & overestimate of costs

#	Comment	Source of Comment	MoE or NAP-CM Team Response Given
9	"You convinced us this is very well thought out and a feasible approach." Methodology appears sound, and not including benefits is unfortunate but is the right decision – since data are scarce. Pacific national action plans for disaster and risk management use similar approach.	Hermant Timmermans, SPREP	
10	You could use the term "indicative costs" to reflect the unavoidable uncertainty of the estimates.	Hermant Timmermans, SPREP	Useful idea, Will consider
11	Many assumptions are necessary. Agencies will need to sit with relevant ministry and talk thru each measure: which communities would be involved, how many, where, how much assistance can be provided.	Hermant Timmermans, SPREP	Useful idea for ministry process. Could be included in internal ministry guidance
12	Need to set targets for each measure for what would be accomplished over five years – e.g., x villages relocated, y villagers trained etc.	Hermant Timmermans, SPREP	Useful idea for ministry process
13	Very clear presentation and approach. Governance issues include: can you identify co-benefits of measures? How will development of measures be coordinated within Govt of Fiji?	Kristin Donaldson, DFAT Australia	MoE reply: Climate Change bill is in development to address this. Agencies will take the NAP measures & add work on some high priorities into their annual budgets to begin executing them. Next step in World Bank-funded vulnerability study is do sectoral costing of vulnerabilities and adaptation needs to address them. Each ministry would set its priorities for the NAP measures it manages. The NAP Costing Method. Is a surgical quick approach to start this effort.
14	Where do the Natl Disaster Policy's 122 items link into the NAP work?	Vasiti Soko or her team, Min. Natl Disaster Management	MoE reply: the measures in the NAP are the result of the priorities of each ministry, whose senior managers were directly involved in developing the NAP. So will be coordinated with MMO office team.

#	Comment	Source of Comment	MoE or NAP-CM Team Response Given
15	M&E: How can this be a good test case of M&E for climate impact analysis? Good opportunity to develop M&E component.	Lisa Buggy, SPC	MoE reply: Will monitor gender involvement and involvement of youth, and vulnerable and marginalized people – number of each involved, voices shared, participatory methods
16	Need to capture current status of money spent on this of the total needed.	Karunesh Rao, Energy Fiji Ltd	MoE reply: NAP actions are new actions not yet funded, so little spent to date. Excel will ask users to enter funding expected to be available from other sources.
17	Thank you MoE for invitation …and to Jale and Ken for the clear presentation on the NAP costing methodology. I think this a good starting point and the presented methodology meets the objective to have a rapid costing methodology for the prioritized NAP interventions. Two quick comments: "1) The success of this costing spreadsheet methodology will really be determined once it is being used by … Ministries. [emphasis added throughout]. To support the usability and success of methodology, a suggestion … for MoE to now identify or build a "pool of users" – one/two persons from each Ministry (or sector) who will actually be responsible for using the methodology. By identifying the "pool of users" at this stage, these people will hopefully appreciate and understand the methodology from its inception to implementation phase and hopefully puts the users in a more comfortable position to use the costing spreadsheet. This may also be a good way of building the capacity of your Ministries whereby the members of this "pool of users" can help each other out and there is also consistency with participation from the Ministries. Maintaining contact and involvement of the pool of users may also support any further refinement or build-up to this methodology, should there be plans to include the "benefits" etc. at a later stage."	Noa Seru, USAID Climate Ready Project via email June 15	Comments via email after the consultation that MoE can consider for implementation of the Methodology

#	Comment	Source of Comment	MoE or NAP-CM Team Response Given
18	"2) A suggestion is to put together a simple Guideline/SOP document on how to use the costing spreadsheet methodology. For each of the steps indicated in the presentation, identify what needs to be done, who will be responsible for the "sub-step" and what is to be done with the output. Tabulate these "sub-steps." The Guideline/SOP document should be simple and understandable not only to the "pool of users" but to any other new user who will use the costing spreadsheet methodology. Again suggest to involve the "pool of users" to help develop/refine the Guideline/SOP."	Noa Seru, USAID Climate Ready Project via email June 15	A guidance document for the Methodology is in advanced draft and should be available shortly.

Appendix G. Excel Tool

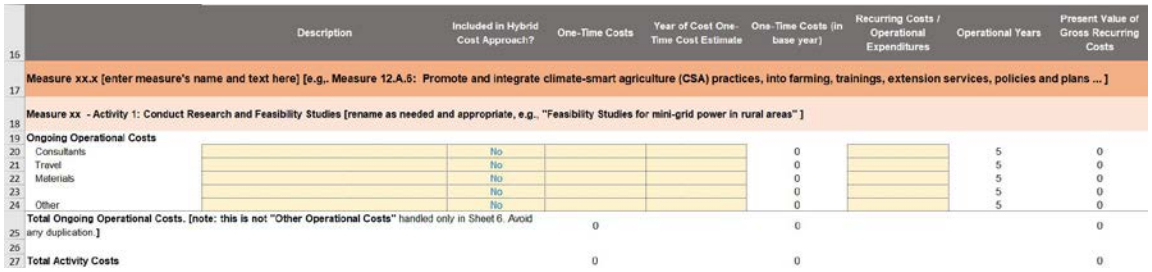
Two versions of the Excel tool are provided:

1. A clean version without any data in it, ready for use.
2. A pilot measures version as an example with data entries, showing how data were found and entered for two specific NAP measures as a test case.

APPENDIX G.1: HOW TO ADD NEW ROWS TO THE COSTING TOOL

Step 1: Insert New Row

a) Click on the row number on the left side of the screen below the row where you want to insert a new row:



	Description	Included in Hybrid Cost Approach?	One-Time Costs	Year of Cost One-Time Cost Estimate	One-Time Costs (in base year)	Recurring Costs / Operational Expenditures	Operational Years	Present Value of Gross Recurring Costs
16								
17	Measure xx.x [enter measure's name and text here] [e.g,. Measure 12.A.6: Promote and integrate climate-smart agriculture (CSA) practices, into farming, trainings, extension services, policies and plans ...]							
18								
19	Measure xx - Activity 1: Conduct Research and Feasibility Studies [rename as needed and appropriate, e.g., "Feasibility Studies for mini-grid power in rural areas"]							
20	Ongoing Operational Costs							
21	Consultants	No			0		5	0
22	Travel	No			0		5	0
23	Materials	No			0		5	0
24	Other	No			0		5	0
25	Total Ongoing Operational Costs. [note: this is not "Other Operational Costs" handled only in Sheet 6. Avoid any duplication.]		0		0			0
26								
27	Total Activity Costs		0		0			0

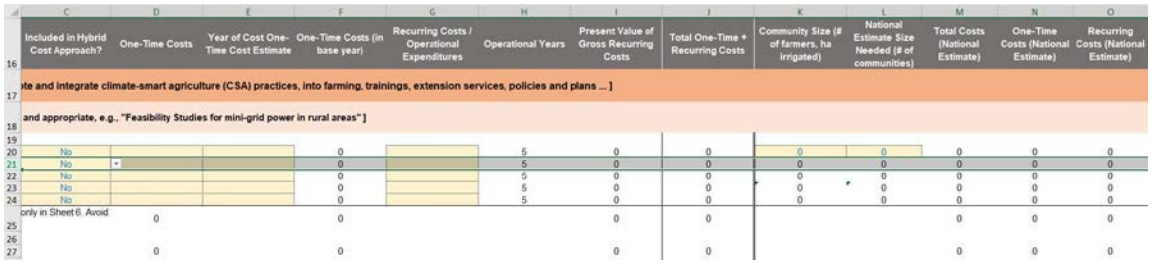
Example: If a user wanted to add a row below " Travel" (line 21), the user needs to click on the "22," circled in red in the screenshot above. This will select the entire row.

Note: The user should not insert a row between the last line item and the total row, nor should they enter a new row above the first line item.

b) Right-click and select "Insert Row"

Step 2: Copy Formulas

a) Select all of the cells containing data entry or formulas in the row above. In the example below, the user has selected cells B21 to O21.

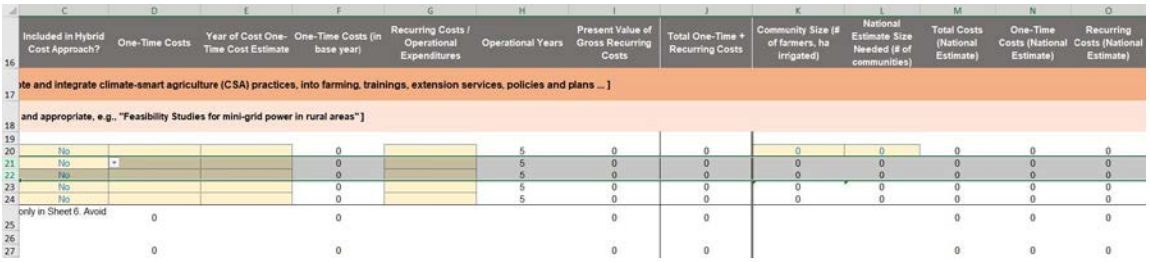


	C	D	E	F	G	H	I	J	K	L	M	N	O
	Included in Hybrid Cost Approach?	One-Time Costs	Year of Cost One-Time Cost Estimate	One-Time Costs (in base year)	Recurring Costs / Operational Expenditures	Operational Years	Present Value of Gross Recurring Costs	Total One-Time + Recurring Costs	Community Size (# of farmers, ha irrigated)	National Estimate Size Needed (# of communities)	Total Costs (National Estimate)	One-Time Costs (National Estimate)	Recurring Costs (National Estimate)
16													
17	te and integrate climate-smart agriculture (CSA) practices, into farming, trainings, extension services, policies and plans ...]												
18	and appropriate, e.g., "Feasibility Studies for mini-grid power in rural areas"]												
19													
20	No			0		5	0	0	0	0	0	0	0
21	No			0		5	0	0	0	0	0	0	0
22	No			0		5	0	0	0	0	0	0	0
23	No			0		5	0	0	0	0	0	0	0
24	No			0		5	0	0	0	0	0	0	0
25	only in Sheet 6. Avoid	0		0			0	0			0	0	0
26													
27		0		0			0	0			0	0	0

b) Hover the mouse over the small green box in the lower right corner of the selected cells (circled in red above). The mouse should turn into a cross.

c) When the mouse appears as a cross, click and drag the entire selection down one row.

d) Excel will then copy all of the formulas into the new row. The user should now see that columns C, F, and H-O now have the appropriate data entry and formulas copied down.



	C	D	E	F	G	H	I	J	K	L	M	N	O
16	Included in Hybrid Cost Approach?	One-Time Costs	Year of Cost One-Time Cost Estimate	One-Time Costs (in base year)	Recurring Costs / Operational Expenditures	Operational Years	Present Value of Gross Recurring Costs	Total One-Time + Recurring Costs	Community Size (# of farmers, ha irrigated)	National Estimate Size Needed (# of communities)	Total Costs (National Estimate)	One-Time Costs (National Estimate)	Recurring Costs (National Estimate)
17	te and integrate climate-smart agriculture (CSA) practices, into farming, trainings, extension services, policies and plans ...]												
18	and appropriate, e.g., "Feasibility Studies for mini-grid power in rural areas"]												
19													
20	No			0		5	0	0	0	0	0	0	0
21	No			0		5	0	0	0	0	0	0	0
22	No			0		5	0	0	0	0	0	0	0
23	No			0		5	0	0	0	0	0	0	0
24	No			0		5	0	0	0	0	0	0	0
25	only in Sheet 6. Avoid	0		0			0	0			0	0	0
26													
27		0		0			0	0			0	0	0

e) The user can now enter cost data for the new line item, ensuring to " name" the line item in column A.

f) Repeat Steps 1 and 2 for additional line item entries.


Rerevaka na Kalou ka doka na Tui