

Funding Proposal

FP037: Integrated Flood Management to Enhance Climate Resilience of the Vaisigano River Catchment in Samoa

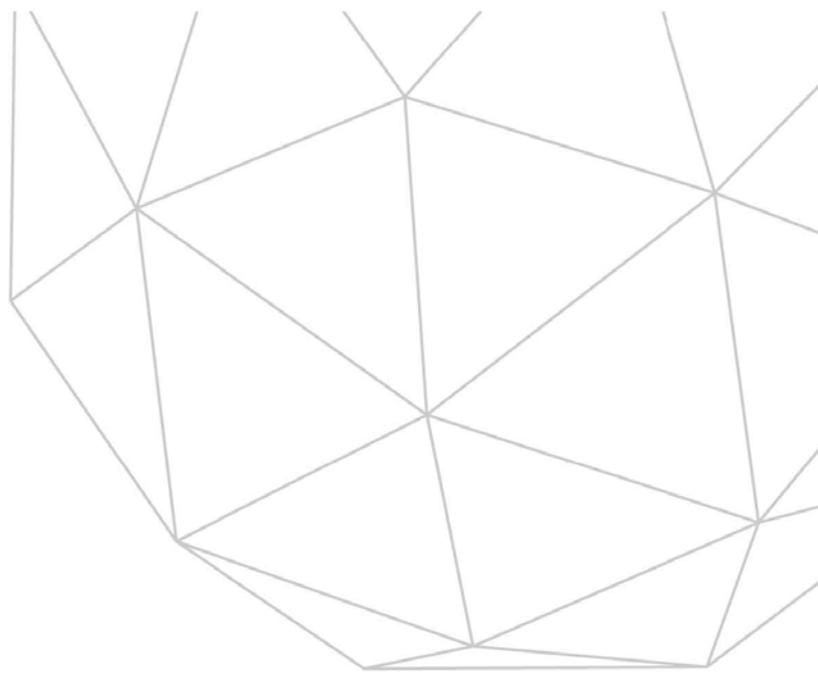
Samoa | United Nations Development Programme (UNDP) | Decision B.15/24

24 November 2016





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Funding Proposal

Version 1.1

The Green Climate Fund (GCF) is seeking high-quality funding proposals.

Accredited entities are expected to develop their funding proposals, in close consultation with the relevant national designated authority, with due consideration of the GCF's Investment Framework and Results Management Framework. The funding proposals should demonstrate how the proposed projects or programmes will perform against the investment criteria and achieve part or all of the strategic impact results.

Project/Programme Title: Integrated Flood Management to Enhance Climate Resilience of the Vaisigano River Catchment in Samoa

Country/Region: Samoa

Accredited Entity: UNDP

Date of Submission: 02 November 2016

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Note to accredited entities on the use of the funding proposal template

- Sections **A, B, D, E** and **H** of the funding proposal require detailed inputs from the accredited entity. For all other sections, including the Appraisal Summary in section F, accredited entities have discretion in how they wish to present the information. Accredited entities can either directly incorporate information into this proposal, or provide summary information in the proposal with cross-reference to other project documents such as project appraisal document.
- The total number of pages for the funding proposal (excluding annexes) is expected not to exceed 50.

Please submit the completed form to:

fundingproposal@gcfund.org

Please use the following name convention for the file name:

"[FP]-[Agency Short Name]-[Date]-[Serial Number]"

A.1. Brief Project / Programme Information		
A.1.1. Project / programme title	Integrated Flood Management to Enhance Climate Resilience of the Vaisigano River Catchment in Samoa	
A.1.2. Project or programme	Project	
A.1.3. Country (ies) / region	Samoa	
A.1.4. National designated authority (ies)	Mr. Lavea Tupaimatuna Iulai Lavea Chief Executive Officer (CEO), Ministry of Finance Apia, Samoa	
A.1.5. Accredited entity	UNDP	
A.1.5.a. Access modality	<input type="checkbox"/> Direct <input checked="" type="checkbox"/> International	
A.1.6. Executing entity / beneficiary	Executing Entity: Ministry of Finance (MoF) Beneficiary: Ministry of Natural Resources and Environment (MNRE), Land Transport Authority (LTA), Ministry of Works, Transport and Infrastructure (MWTI), Ministry of Health (MoH).	
A.1.7. Project size category (Total investment, million USD)	<input type="checkbox"/> Micro (≤ 10) <input type="checkbox"/> Small ($10 < x \leq 50$) <input checked="" type="checkbox"/> Medium ($50 < x \leq 250$) <input type="checkbox"/> Large (> 250)	
A.1.8. Mitigation / adaptation focus	<input type="checkbox"/> Mitigation <input checked="" type="checkbox"/> Adaptation <input type="checkbox"/> Cross-cutting	
A.1.9. Date of submission	21/09/2016; 17/10/2016; 02/11/2016	
A.1.10. Project contact details	Contact person, position	Reis Lopez Rello
	Organization	UNDP
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	Mailing address	United Nations Service Building, 4th Floor Rajdamnern Nok Avenue, Phranakorn Bangkok 10200 Thailand

A.1.11. Results areas *(mark all that apply)*

Reduced emissions from:

- Energy access and power generation
(E.g. on-grid, micro-grid or off-grid solar, wind, geothermal, etc.)
- Low emission transport
(E.g. high-speed rail, rapid bus system, etc.)
- Buildings, cities and industries and appliances
(E.g. new and retrofitted energy-efficient buildings, energy-efficient equipment for companies and supply chain management, etc.)
- Forestry and land use
(E.g. forest conservation and management, agroforestry, agricultural irrigation, water treatment and management, etc.)

Increased resilience of:

- Most vulnerable people and communities
(E.g. mitigation of operational risk associated with climate change – diversification of supply sources and supply chain management, relocation of manufacturing facilities and warehouses, etc.)
- Health and well-being, and food and water security

(E.g. climate-resilient crops, efficient irrigation systems, etc.)

- Infrastructure and built environment
(E.g. sea walls, resilient road networks, etc.)
- Ecosystem and ecosystem services
(E.g. ecosystem conservation and management, ecotourism, etc.)

A.2. Project / Programme Executive Summary (max 300 words)

1. As a Small Island Developing State (SIDS) in the Pacific, Samoa has been heavily impacted by increasing severe tropical storms. Given the topography of the country, these extreme events result in significant river discharge that results in flooding of lowland areas. Recent tropical events such as Cyclone Evan have caused significant damage to both public and private assets as a result of flooding, resulting in serious health impacts. Urban infrastructure has suffered considerably by the recurrence of flooding and is unable to cope as climate change-related events are expected to become more frequent and intense.

2. In response, the Government of Samoa (GoS) has adopted a programmatic approach to address the issue of climate change induced flooding in Samoa. As part of this programme, the proposed project will enable GoS to reduce the impact of recurrent flood related impacts in the Vaisigano river catchment, which flows through the Apia Urban Area (AUA). Recent extreme events have resulted in approximately US\$200m worth of damages during each event. Climate projections for Samoa suggest that the risk of climate induced events will increase, potentially undermining development progress in urban Apia where the majority of the population and economic activity is located.

3. In conjunction with GoS co-financing leveraged for this project, GCF resources will be used to address a number of key technical including infrastructure; capacity and information based barriers to enhancing the effectiveness of flood management systems in the context of risks that are likely in 20 year return periods. The objective of the project is to strengthen adaptive capacity, and reduced exposure to climate risks of vulnerable communities, infrastructure, and the built environment in the Vaisigano River Catchment.

4. The expected key fund level impact is increased resilience of infrastructure and the built environment to climate change. The primary direct beneficiaries include approximately 26,528 people in the Vaisigano river catchment who will benefit from integrated planning and capacity strengthening for increased likelihoods of flooding induced by extreme events, flood mitigation measures especially riverworks and ecosystems solutions in the Vaisigano River Catchment, upgrading of key infrastructure to withstand the negative effects of excessive water and upgrading of drainage in downstream areas for improved regulation and rapid discharge of water flows during periods of extreme events. Overall, 37,000 people will also benefit indirectly from project interventions.

5. The project represents the GoS's initial steps in operationalizing a comprehensive flood management solution to the likely consequences of extreme events in Apia, the capital with about 80,000 people. In this project, three interlinked project outputs will be pursued:

- (a) Capacities and information base strengthened for GoS to pursue an integrated approach to reduce vulnerability towards flood-related risks
- (b) Key infrastructure in the Vaisigano River Catchment are flood-proofed to increase resilience to negative effects of excessive water; and
- (c) Upgraded drainage in downstream areas to increase capacity and allow for more rapid outflow of flood waters.

6. The proposed project, financed by a GCF grant, leverages domestic financing of US\$ 8 million. The Ministry of Finance (MoF), the National Designated Authority (NDA) to the GCF, has issued a letter of no-objection for the proposed project that is very much country-driven and responds to a national priority. The NDA's office has led the proposal development phase with the support of the UNDP.

A.3. Project/Programme Milestone

Expected approval from accredited entity's Board (if applicable)	20 September 2016
Expected financial close (if applicable)	TBD [date of agreement on the FAA between UNDP and GCF]

Estimated implementation start and end date	Start: <u>01/05/2017</u> End: <u>31/04/2023</u>
Project/programme lifespan	Benefit stream: 25 years Project Implementation lifespan: 6 years

B.1. Description of Financial Elements of the Project / Programme

7. Grant financing is requested from the GCF to reduce the impact of increasingly intense extreme events (storm events; increasing sea-level rise, and storm surges) that is amplifying and compounding the impacts of flooding in the Greater Apia Area, Samoa. Recent extreme events and climate modelling show that climate induced events will only worsen flood risks in Samoa. The GCF grant will enable the GoS to invest in resilient infrastructure, benefiting nearly 20% of the national population, and a large proportion of those vulnerable to flooding in the Apia region. The GCF investments are directed toward river catchments in densely populated Apia, initially focusing on the Vaisigano River Catchment. This catchment has the highest concentration of public infrastructure (schools, hospitals, and government buildings), private (homes and businesses) and other social and economic assets (“high-value” urban area) in Samoa.

8. Samoa is a SIDS with a total population of 190,000. The relatively high per capita income is considered “barely sufficient to cover the high economic cost of business in Samoa given its geographic remoteness and relatively limited economic size. National income is heavily dependent on volatile foreign aid, and donor assistance currently comprises ~20% of annual GDP.”¹

9. Samoa’s livelihood and economic assets were devastated by Cyclone Evan (Category Three) in late 2012. The impact of Cyclone Evan saw the undoing of years of economic gain in infrastructure development and hard earned livelihood sources, loss of human lives and degradation of native habitats and species populations. According to the Post-Disaster Needs Assessment (PDNA) undertaken by the GoS with the assistance of the World Bank, the total damages were estimated to be approximately US\$200 million with a further US\$70 million required for rebuilding human capital. By comparison, in 2012, Gross Domestic Product (GDP) was estimated to be US\$683.7 million². The total impact of Cyclone Evan was therefore 40% of Samoa’s GDP at the time.

10. Given combined factors of high upfront investments required for flood management, and the and the high debt levels (more than 50% of GDP),³ Government and communities have been constrained to implement critical interventions that are necessary for flood management. Efforts to-date have been undertaken at a slow pace and are less integrated. As previously available resource envelopes were also generally limited to no more than a few million at a time, these past initiatives have been piecemeal interventions rather than holistic solutions that can effectively tackle the problem at hand.. Limitations in budgets have driven what has been done rather than what needs to be done. Inevitably, without GCF support, such sub-optimal practices are likely to continue for the foreseeable future, with the continuation of asset losses as extreme events affect Samoa in the years to come. It is within this context that GCF grant (i.e. 100% concessionality) is requested for the proposed project so that, in conjunction with domestic and donor-based co-financing, Samoa can take comprehensive and systemic steps to manage flood risks in high—value areas.

11. Samoa has committed US\$8 million to co-financing the project. The co-financing will cover the necessary monitoring and operation and maintenance (O and M) of the infrastructures constructed in the project, including riverworks, bridge and drainage upgrades. This will be used during, and beyond, the project implementation period.

12. A breakdown of cost estimates by sub-component in local and foreign currency is provided below:

Component	Output	Activity	Financing (MUS\$)		Total Cost per output	
			GCF	GoS	Foreign Currency (MUS\$)	Local Currency (Million Tala) ⁴
Component 1 Strengthened adaptive capacity and reduced exposure to climate risks of vulnerable livelihoods and infrastructure in the	1. Capacities and information base strengthened for GoS to pursue integrated approach to reduce	1.1 Strengthen capacities and information requirements to pursue an integrated programme approach to flood management.	3.425		9.725	24.410

¹ See World Bank Data, World Development Indicators: <http://data.worldbank.org>.

² WB.2014. Samoa. <http://data.worldbank.org/country/samoa>. Accessed on 10 March 2014.

³ Samoa’s public debt increased from around 30 percent of GDP at end-2007/08 to about 55 percent of GDP at end-2013/14. The increase followed increased reconstruction and rehabilitation expenditures following extreme climate events (<https://www.imf.org/external/pubs/ft/dsa/pdf/2015/dsacr15191.pdf>)

⁴ Exchange rate used is as of 1 September 2016 (UN Operational Rates of Exchange)

Vaisigano River Catchment.	flood-related risks in place					
		1.2 Establish health surveillance systems to track and manage flood-related health issues	1.353			
		1.3 Expand EWS coverage to provide flood alerts in Apia	3.995	0.130		
		1.4 Conduct awareness raising campaigns on flood resilient building practices and designs for at risk communities living along the Vaisigano river	0.822			
	2. Key infrastructure in the Vaisigano River Catchment are flood-proofed to increase resilience to negative effects of excessive water	2.1 Channelization of segment 2 and 3 of the Vaisigano river streambed to accommodate increased water flow and decrease flood risks	15.169	3.325	40.914	102.694
		2.2 Implement ecosystem responses upstream to reduce flows during extreme events	10.916	0.193		
		2.3 Construction upgrade of Lelata bridge to accommodate increase flood waters	7.276	1.537		
		2.4 Extension of floodwalls at Leone bridge to prevent damage during extreme events	2.239	0.259		
	3. Drainage in downstream areas upgraded for increased regulation of water flows.	3.1 Develop a climate resilient Drainage Master Plan	1.404		15.079	37.848
		3.2 Upgrade drainage systems and outfalls in hazard areas to accommodate flooding events	11.119	2.556		
	Total project financing		57.718	8.000	65.718	164.952

B.2. Project Financing Information

	Financial Instrument	Amount	Currency	Tenor	Pricing
(a) Total project financing	(a) = (b) + (c)	.....65.718.....	million USD (\$)		
(b) GCF financing to recipient	(i) Senior Loans	.....	Options	() years	() %
	(ii) Subordinated Loans	.....	Options	() years	() %
		.....	Options		() % IRR

(iii) Equity	.....	<u>Options</u>	
(iv) Guarantees	...	<u>Options</u>	
(v) Reimbursable grants *	.....	<u>million USD</u>	
(vi) Grants *	.....	<u>( \$ )</u>
	57.718		

* Please provide economic and financial justification in [section F.1](#) for the concessionality that GCF is expected to provide, particularly in the case of grants. Please specify difference in tenor and price between GCF financing and that of accredited entities. Please note that the level of concessionality should correspond to the level of the project/programme's expected performance against the investment criteria indicated in [section E](#).

Total requested (i+ii+iii+iv+v+vi)	.....57.718...	<u>million USD</u>	
		<u>(\$)</u>	

Financial Instrument	Amount	Currency	Name of Institution	Tenor	Pricing	Seniority
<u>Grant</u>	8.000	<u>million USD</u>	Govt of Samoa	() years	() %	<u>Options</u>
<u>Options</u>	.....	<u>Options</u>	.....	( ) years	() %	<u>Options</u>
<u>Options</u>	.....	<u>Options</u>	.....		( ) % IRR	<u>Options</u>
<u>Options</u>	.....	<u>Options</u>	.....			<u>Options</u>
Lead financing institution: Not applicable						
* Please provide a confirmation letter or a letter of commitment in section I issued by the co-financing institution.						

(d) Financial terms between GCF and AE (if applicable)

In cases where the accredited entity (AE) deploys the GCF financing directly to the recipient, (i.e. the GCF financing passes directly from the GCF to the recipient through the AE) or if the AE is the recipient itself, in the proposed financial instrument and terms as described in part (b), this subsection can be skipped.

If there is a financial arrangement between the GCF and the AE, which entails a financial instrument and/or financial terms separate from the ones described in part (b), please fill out the table below to specify the proposed instrument and terms between the GCF and the AE.

Financial instrument	Amount	Currency	Tenor	Pricing
Choose an item.	<u>Options</u>	() years	() %

Please provide a justification for the difference in the financial instrument and/or terms between what is provided by the AE to the recipient and what is requested from the GCF to the AE.

B.3. Financial Markets Overview (if applicable)
Not applicable

C.1. Strategic Context

13. Samoa is a SIDS located in the Polynesian region of the South Pacific. In 2012, Samoa's GDP was estimated to be US\$683.7 million⁵ with a growth rate of 1.2%.⁶ The economy of Samoa relies strongly on agriculture, fisheries, development aid and remittances. The service sector, notably tourism contributes 25% of the GDP.⁷ Agriculture contributes ~10% of the GDP; however, the sector accounts for ~68% of the labor force,⁸ the majority of whom are mostly in subsistence agriculture.

14. Projected climate change scenarios cited by the Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) suggests that Samoa is expected to have: i) more frequent and extreme rainfall events; ii) more frequent and longer drought events; iii) increased air and water temperatures; iv) sea level rise; and v) more frequent extreme wind events. An extreme daily rainfall of 400 mm; currently a one-in-60-year event will likely become a one-in-40-year event by 2050. Similarly, an extreme six-hourly rainfall of 200 mm; that is, currently a one-in-30-year event will likely become a one-in-20-year event by 2050. Further, the CSIRO model projected an 8% increase in the wind speed for a 50-year storm by 2059.⁹ The increase in frequency and severity of cyclones expected from climate change threatens the sustainability of infrastructure in the long-term and potentially can set back Samoa by decades in terms of its development agenda.

15. Settlements are concentrated in coastal areas with approximately 70% of the population living and earning their livelihoods within one kilometer of the coast.¹⁰ Critical infrastructure such as hospitals, government buildings, schools, places of employment, and the international airport are also predominantly located in the coastal zone. This infrastructure and livelihoods are at risk to flooding caused by extreme rainfall events and coastal inundation. Further, roads and other key infrastructure (power supply, health facilities, communications systems) in Samoa are exposed to a range of hazards, including but not limited to: i) sea flooding caused by sea level rise; ii) flooding as a result of storm surges and intense wave action during cyclones and other periods of extreme rainfall; iii) landslides during extreme rainfall events; and iv) accelerated deterioration of road surfaces owing to extreme weather and rising water tables. Key transport infrastructure is therefore vulnerable to flood events. At present, the GoS considers maintenance of the approximately 2,340 kilometers of road and 52 bridges to be a priority for promoting connectivity and access of communities to inter alia economic growth, provision of public services including small holder livelihoods.¹¹ As an example, the Leone Bridge was destroyed by Cyclone Evan, thereby causing significant connectivity issues in Apia.

16. According to the Post-Disaster National Assessment (PDNA 2013) for Cyclone Evan (Category Three), damages were estimated at more than US\$200 million. The damage to physical assets totaled approximately US\$103 million as well as lost productivity of an additional US\$100 million. In addition to the damage caused to economic infrastructure, community assets, worth an undisclosed amount, were also damaged/destroyed. The flooding during Cyclone Evan also resulted in extensive destruction of household goods and the temporary displacement of approximately 7,500 people. The cost of this displacement would make the total damages even higher. The flooding during the cyclone damaged 2,088 houses, mostly in poorer urban settlements in Apia.

17. Damages caused by Cyclone Evan in the AUA was ten times greater than those occurring in all but four of the districts in Samoa. Flooding of the Vaisigano River was very significant during the last cyclone, necessitating the evacuation of local communities in parts of the catchment. About 6,000 people were evacuated after high winds damaged homes and the Vaisigano River broke its bank. The severity of the impact was such that the government called for international assistance.¹² The collapse of the Leone Bridge disrupted a major east–west transport corridor and destruction of road infrastructure affected other commercial links. Further, the drainage system was unable to cope resulting in extensive flooding of lower Apia. In addition to the Vaisigano River, four other major rivers, these being the Gasegase, Fuluasou, Loimata o Apaula and Fagalii Rivers all flow through the Greater Apia catchment area. While these rivers were not the primary source of flooding of AUA, in the last series of extreme events, the threat that they pose as climate change impacts intensify is recognized.

18. With the support from various development partners, the GoS has launched a series of efforts that are addressing reduction of the risks of climate-induced hazards, including the Post-disaster Recovery Plan, various LDCF projects

⁵ WB.2014. *Samoa*. <http://data.worldbank.org/country/samoa>. Accessed on 10 March 2014.

⁶ Asian Development Bank. 2012. *Asian Development Bank and Samoa: Fact Sheet*. <http://www.adb.org/sites/default/files/pub/2013/SAM.pdf>. Accessed on 10 March 2014.

⁷ Central Intelligence Agency (CIA). 2014. *The World Factbook*. <https://www.cia.gov/library/publications/the-world-factbook/geos/ws.html>.

⁸ Samoa Bureau of Statistics. 2009. *Agriculture Census Analytical Report 2009*.

⁹ GoS. 2013. Strategic Programme for Climate Resilience.

¹⁰ EWACC prodoc, 2013.

¹¹ EWACC prodoc, 2013.

¹² PDNA, 2013

related to health, forestry and tourism (ICCRAHSS, ICCRIFS, ICCRITS), and regional programmes (Pacific Adaptation to Climate Change (PACC) - financed by the SCCF, Ridge-to-Reef Project- financed by the GEF Trust Fund).

19. A particularly important baseline project for the proposed GCF project is the '*Economy Wide Adaptation to Climate Change (EWACC)*' project that started in 2014. The EWACC was financed by the Least Developed Country Fund (LDCF) that recognizes, among others, the mainstreaming of adaptation efforts into sector policies is critical to address long-term climate change risks. Under the EWACC, an integrated watershed resource management plan (IWMP) for the Greater Apia Catchments was developed to identify the root causes of climate vulnerability and outline strategies for reducing the risks posed by climate-induced disasters. The IWMP follows the "Ridge-to-Reef" principle with an integrated approach to building climate resilience and protecting community livelihoods/assets. On the basis of the IWMP, the GoS is in the process of developing the first phase of required flood protection infrastructure for the Vaisigano River, this being called Segment 1. The construction of limited climate-resilient riverbank protection measures (particularly at the mouth of the river) will assist in safeguarding adjacent communities and physical infrastructure from flooding associated with extreme weather events although the needs are far bigger than that currently being designed. The IWMP includes recommendations on a mix of "hard" (i.e. structural) and "soft" (i.e. non-structural) adaptation measures to build climate resilience.

20. Although the efforts of the GoS under projects such as the EWACC and its sectoral sister projects are contributing towards reducing the vulnerability of the AUA, technology, policy and institutional capacity constraints is hindering the necessary transformative process to induce game-changing flood-proofing of the Samoan climate change response mechanism, particularly for the economically vital AUA. By definition, the LDCF financed projects address only urgent and immediate needs, which are insufficient to tackle the longer term challenges. Moreover, budgetary restrictions only allow for the focus on the highest priority risk-prone geographical areas and/or focus on a subset of critical infrastructure and/or part solutions that can be accommodated in available budgets, as opposed to solutions that are ideally required to address the risks at hand (and expected) in a holistic manner.

21. These limitations, together with the realization of the climate hazards that Samoa is and will more frequently be facing in the future as a result of climate change prompted the GoS to request support from UNDP in developing a programmatic approach to climate change adaptation. The Government has identified, as a priority, a multi-sectoral ridge to reef programme covering water catchments, reservoirs, drainage, hydro generation, river walls, road network, bridges as well as the Matautu port.¹³

22. Specifically, the GoS has aspirations to pursue an integrated ridge-to-reef approach that encompasses the following:

- (a) Integrated catchment management for the protection of the AUA;
- (b) Construction of a resilient flood protection network including detention storage to manage river flows and the drainage network;
- (c) Establishment of hydro-power system for climate-smart economic development;
- (d) Sustainable water supply for ensured availability of agricultural and potable water during climatic duress; and
- (e) Resilient infrastructure (roads, bridges, drainage, port) capable of withstanding extreme weather.

23. Against this context, the GoS has identified a comprehensive programme on integrated flood management in Samoa as a priority area for climate financing. The overarching programme envisaged, based on a series of assessments and consultations, consists of the following components:

- (a) Integrated flood management to enhance resilience in the Vaisigano River Catchment;
- (b) Climate Proofing the Cross Island Road;
- (c) Construction of a reservoir upstream of the Vaisigano river (to support flood management with co-benefits in hydropower generation and as a potable water storage for the AUA); and
- (d) Promotion of climate resilient drainage systems in the AUA.

24. The financing requested from the GCF for a comprehensive programme on climate change induced flood management is approximately US\$200 million.

¹³ GoS, Letter to UNDP Samoa Resident Representative 'Org 130/2/3-MoF', 22 June 2016.

25. Figure 1 portrays the hierarchy of objectives with regards to climate change adaptation in Samoa that reflect objectives stated in the GoS's Strategy for Development of Samoa (2017 – 2020) (SDS) and those in the measures that the GoS proposes for submission to the GCF.

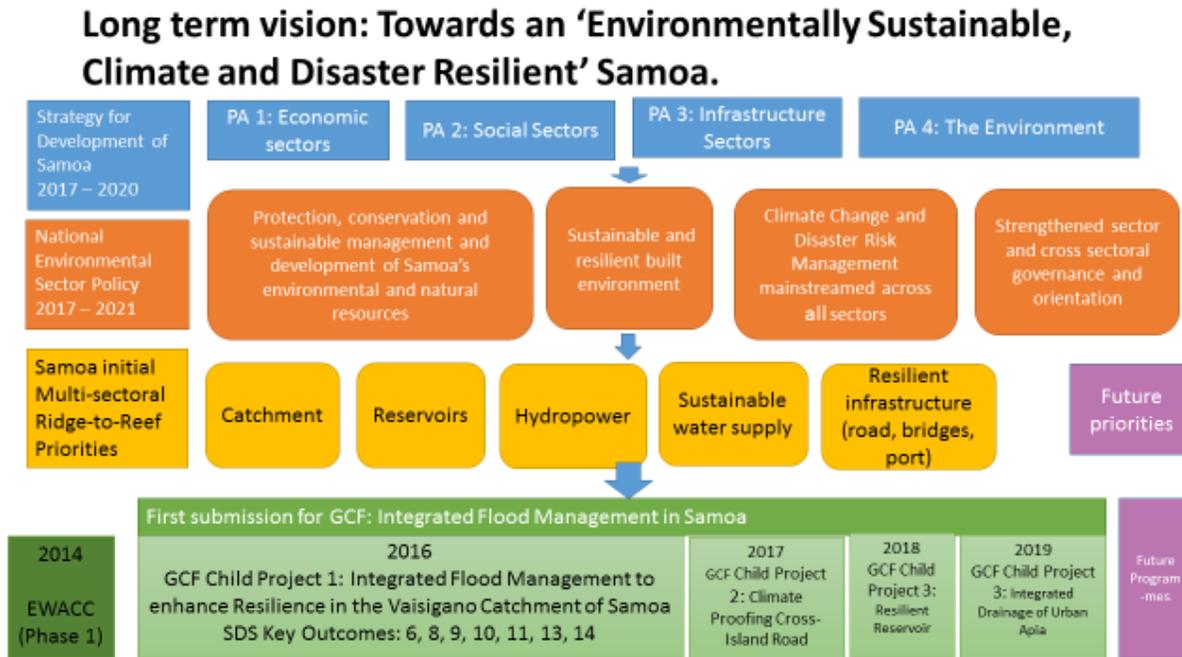


Figure 1: Toward an Environmentally Sustainable, Climate, and Disaster Resilient Samoa.

C.2. Project / Programme Objective against Baseline

Baseline Scenario

26. The anticipated climate change scenarios based on projections for Samoa suggest the following:

- (a) Temperatures have and will continue to increase. Projections show that by 2030, under a high emission scenario, temperature may increase in the range of 0.4 – 1.0°C by 2030 and 1.9-3.3°C by 2090;
- (b) Rainfall is projected to increase over this century with more extreme rainfall days expected. Wet season and dry season increases of rainfall are expected, mainly due to the projected intensification of the South Pacific Convergence Zone. However, there is some uncertainty in the rainfall projections and not all models show consistent results. Drought projections are inconsistent across Samoa. However, the frequency and intensity of extreme rainfall events are projected to increase; and
- (c) **Sea level near Samoa has and will continue to rise** throughout this century (very high confidence). By 2030, under a high emissions scenario, the increase in sea level is projected to be in the range of 5-15 cm and 21-59 cm by 2090. The sea-level rise combined with natural year-to-year changes will increase the impact of storm surges and coastal flooding.¹⁴

27. With more extreme rainfall projected, in terms of intensity and frequency, both communities and infrastructure located within catchments vulnerable to flood hazards are at risk. This means that vulnerability reduction in densely populated catchments in Samoa is an important adaptation objective for the country. The urgency of the issue led to the GoS launching a series of efforts addressing the reduction of the risks of climate-induced hazards, among which are the Post-disaster Recovery Plan, various LDCF financed projects (ICCRAHSS, ICCRIFS, ICCRITS, AF-project, SMSMCL) and regional programmes (PACC, Ridge-to-Reef) financed by the Special Climate Change Fund, Australian Government and the Global Environment Facility.

28. There are several ongoing initiatives that contribute to reducing the vulnerability of the country and are relevant to the proposed project. Samoa has recently undertaken a series of assessments on the effectiveness of national initiatives for climate change adaptation related to flood management and other climate-induced disasters. These assessments have generated recommendations to strengthen and coordinate climate change adaptation at the national and specific area level. These assessments include those completed under: i) National Action Plan for Adaptation (NAPA, 2005); ii) National Capacity Self-Assessment (NCSA, 2007); iii) the National Communications to the UNFCCC (INC, 1999; SNC 2009); iv) National Strategy for a Climate-Resilient Samoa (otherwise known as Climate Resilience Investment Programme (CRIP 2011)); v) Climate Public Expenditure and Institutional Review (CPEIR, 2013); vi) PDNA, 2013; vii) Samoa's Intended Nationally Determined Contribution (INDC, 2015) for the UNFCCC COP21, viii) Samoa's National Environment Programme (SNEP 2017 – 2021), and most recently the development of Samoa's National Adaptation Plan as well the assessments integrated as part of Samoa's implementation program of the SAMOA Pathway and Sustainable Development Goals.

29. These assessments provide substantial information about the strengths and weaknesses of the institutional setting for climate change adaptation and the opportunities and threats for its further development. A common denominator in all of the assessment was the vulnerability of the AUA. Additional funding is required to ensure adaptation efforts provide the transformational impact that is desired by the Government. Table 26 in the feasibility report summarizes what successes were noted for each component of the five NAPA projects and what technical, political and operational staff working across various government Ministries felt should be the next steps after each NAPA project is completed.

30. The "Integrating Climate Change Risks into the Agriculture and Health Sectors and Integration of Climate Change Risk and Resilience into Forestry Management" (LDCF US\$4,400,000; Government US\$970,000; Other Donors US \$3,660,000) is focused on addressing climate risks in the agriculture (into forestry management) and health sectors and. Addressing different NAPA priorities, the projects have distinctive yet mutually reinforcing features. While ICCRAHS has focused on the agriculture and health sectors, it has made major contributions to the enhancement of climate early warning systems and services (CLEWS) also benefiting the forestry sector. Together, the projects have led to improved knowledge transfer and increased cooperation among the Ministry of Natural Resources and Environment (MNRE), Ministry of Agriculture and Fisheries (MAF) and the National Health Service under the Ministry of Health (MoH).

¹⁴ ¹⁴Pacific Climate Change Science Programme (2014). *Current and future climate of Samoa*. (http://www.pacificclimatechangescience.org/wp-content/uploads/2013/06/3_PACCSAP-Samoa-10pp_WEB.pdf)

31. The “**Pacific Adaptation to Climate Change (PACC)**” (Special Climate Change Fund (SCCF) Grant: US\$13,125,000; Australian Government: US\$7,800,000; PIC Governments: US\$44,303,799; SPREP: US\$100,000; UNDP: US\$100,000) is a region-wide systematic framework to combat climate change. The first major climate change adaptation initiative in the region, the PACC, has helped partner countries to lay the groundwork for more resilient Pacific communities that are better able to cope with climate variability today and climate change tomorrow. Efforts that are focused on three key development areas: food production and food security, coastal management and water resources management. The project will close October 2016.

32. The **EWACC** (LDCF US\$12,000,000): This project foresees the further mainstreaming of adaptation efforts into sector policies. Under the EWACC, an IMWP for the Greater Apia Catchments was developed to identify the root causes of climate vulnerability and outline strategies for reducing the risks posed by climate-induced disasters. Details about this project are included above. As part of the project preparation phase for the EWACC project USAID / Adapt Asia- Pacific in partnership with UNDP developed the report “Samoa Infrastructure vulnerability assessment” with the overall objective to identify key infrastructure and their functions and status in order to provide an overall picture of relative vulnerability to climate related stresses of such infrastructure on the island. The report also identified feasible adaptation measures based on consultations with the Government of Samoa and its implementation plan relevant to this project. A case study for the economic costs and benefits for an early warning system are also summarized. Note the report is focused only on water supply, sewerage, land transportation and power supply vulnerability assessment due to climate-related hazards relevant to this project.

33. This project has been designed to align and complement with the World Bank/Asia Development Bank-supported **Pilot Programme for Climate Resilience (PPCR)** and the **Adaptation Fund**-supported project titled “Enhancing resilience of coastal communities of Samoa to climate change” (hereafter referred to as the AF project). These projects will review Coastal Infrastructure Management (CIM) Plans in a total of 41 districts. The updated plans will be known as Community Integrated Management, or “CIM-2” Plans and will incorporate the multitude of existing plans – e.g. Village Sustainable Development Plans, Village Disaster Risk Management Plans and Watershed Management Plans – into comprehensive local-level planning frameworks for each district. Based on the CIM-2 Plans, both the PPCR and the AF project will implement prioritised interventions that are informed by communities’ development needs. The PPCR will demonstrate investments into climate-resilient infrastructure. The West Coast Road linking Apia to Faleolo International Road will be rehabilitated to reduce its vulnerability to flooding and coastal inundation. The PPCR will support technical assistance for design and construction of the road infrastructure. Building on this, the PPCR will also prepare a vulnerability assessment and improvement programme detailing climate-resilient options for Samoa’s entire road network. The AF project and the PPCR will review CIM Plans in 25 districts and 16 districts respectively. The proposed project will align EBA interventions based on the results of CIM Plan review relevant to districts in the Vaisigano river catchment area.

Key Barriers addressed by the project

34. Despite Samoa’s existing programmes and aspiration to reduce its vulnerability to climate change and ongoing international support, there are several barriers that need to be removed in order to bring about transformational impact in the context of climate change induced flood management that is both effective and sustainable.

35. Annex II – Feasibility Study contains extensive information on previous assessment and planning documents that have identified barriers and recommended initiatives and these have been reflected in the proposed project. These include:

- Apia, Samoa - Climate Change Vulnerability Assessment (UN-Habitat, 2014) concluded that Apia’s exposure to climate change varies with respect to climatic hazards, with a moderate exposure to intense and more frequent hazard risks with respect to rainfall, storms and sea-level rise. The report noted concerns “because of its potential effect on electricity, water and livelihoods, leading to knock on impacts for the city population.”
- The 2007 Flood Management Action Plan (FMAP, SOPAC) discusses various structural measures to mitigate flooding in the lower Vaisigano River. The methods by which the structural mitigation options have been identified could also be applied to other river catchments across Samoa. The FMAP has two main components:
- Component 1 – Flood Risk Reduction. Flood risk reduction or mitigation includes prevention, protection and / or adaptation. However, floods cannot be totally prevented or mitigated by structural means. Hence, integrated flood management is important combining structural and non-structural measures, such as adopting to flood risks and implementing development control in flood prone areas.

- Component 2 – Flood Emergency Management. Flood emergency management addresses preparedness (including flood forecasting and warning), response (moving to higher grounds) and recovery (cleaning and rebuilding after floods) before, during and after flood events.
- The ADB funded Water Supply, Sanitation and Drainage Project paved the way for a national sanitation master plan addressing the policies, standards, and guidelines for the development of sustainable wastewater systems throughout Samoa, and an integrated, fully costed, and prioritized water supply, sanitation, and drainage master plan for the greater Apia area. The work resulted in the Draft Outline Integrated Apia Master Plan for Water Supply, Sanitation and Drainage - KBR (2011) report.

36. Samoa's vulnerability to climate change and natural disasters is the result of multiple environmental, institutional and socio-economic factors. These root causes of climate vulnerability include:

- (a) **Inadequate integrated planning:** The urban infrastructure and community settlements in the AUA are particularly vulnerable to flooding and cyclones. This is largely a result of concentrated development without integrated planning to manage the risks posed by climate-induced natural disasters. As an example, GoS sectoral plans recognize distinct watersheds, but do not plan for integrated management of these watersheds. As a consequence, feasibility studies designed to develop a cross-sectoral approach to improving water management in the Vaisigano River Catchment is lacking.
- (b) **Limited technical capacity to expand the Early Warning System (EWS):** Samoa's EWS currently only covers tsunamis and earthquakes, but not floods or cyclones. There is no system in place to warn communities along the Vaisigano River that they are at risk of an extreme flood event. Secondly Health Surveillance Systems as part of the EWS to track and manage flood-related health issues is non-existent. The lack of collection and integration of analysis and reporting of health data puts communities at risk of outbreaks, particularly water-borne diseases that arise from flood events.
- (c) **Vulnerable infrastructure:** Post-Cyclone Evan, a new buildings code was developed for previously flood affected areas (only recently passed). As a consequence, current building practices, designs and as well as gaps in enforcement create additional risks for communities living along the Vaisigano River since they are not always constructed according to the new building codes. Further, infrastructure to supply electricity, water and sanitation are vulnerable to climate-induced natural hazards. This is evidenced by the disruption to these services in the aftermath of Cyclone Evan. In addition to housing vulnerability, critical infrastructure in the Vaisigano River Catchment, including the Lelata and Leone Bridges were not designed to withstand increased extreme water flows. The collapse of the Leone Bridge demonstrated the unpreparedness of Samoa to the impacts of extreme events during the flooding that resulted following Cyclone Evan.
- (d) **Reduced resilience of degraded ecosystems:** Inappropriate environmental management practices have degraded natural ecosystems along the Vaisigano River Catchment. These practices include deforestation, agricultural expansion into vulnerable areas, and urban development. Degraded ecosystems are less able to buffer against the effects of flooding. Efforts to increase upstream afforestation in the upper and mid-catchment areas are not at scale to make a sufficient difference in increasing much needed water retention, thus reducing flood impacts in the lower catchment.
- (e) **Limited technical capacity to implement climate resilient practices that reduce flood risk:** As highlighted above, inappropriate environmental management practices have degraded natural ecosystems along the Vaisigano River Catchment. Communities in the Vaisigano River Catchment have inadequate access to inputs, finance and information for improving their agricultural practices to reduce flood risks for themselves and for downstream residents. Farmers have not organized into cooperatives that could, for example, undertake joint landscaping or terracing activities which can not only serve risk reduction purposes but also have co-benefits through seeking market connections. Some community members farm customary lands, which are not accepted as collateral for financing (making access to finance challenging), while even those on freehold lands typically do have the financial skills required to access commercial bank loans.
- (f) **Exclusive focus on urgent and immediate:** Until recently, Samoa was an LDC. While it has graduated from LDC status, many of the projects under implementation focus on, by definition, urgent and immediate priorities. Consideration of the long-term climate change is not as comprehensive as it should be. Further, the timespans for the current projects and programmes cover only short periods of time (4 – 5 years), which is insufficient to tackle the complex challenges at hand. More importantly, budgetary restrictions of the past cohort of small projects have allowed for focus on all but the highest priority risk-prone geographical areas and critical infrastructure in Samoa.
- (g) **Inadequate Drainage:** Drainage systems in place are inadequate for the volume of water that is now repeatedly discharged during periods of extreme events. The drainage systems are also inadequate to cope with coastal inundation from the occurrence of frequent storm surges. This results in flooding of the AUA where critical infrastructure is located.

37. The proposed GCF project will address these barriers that prevents the GoS to reduce the vulnerability of the Vaisigano River Catchment to climate change impacts in an urgent, effective and sustainable manner. These barriers will be addressed within the context of a broader coherent programmatic approach to flood management [for description of the programme approach, Annex II (b)] in the AUA.

38. First, the project will tackle the issue of inadequate integrated planning. This will be achieved by integrated catchment planning of the Vaisigano River Catchment. It is expected that, by the end of the project, Samoa will have

strengthened capacities and built up information bases required to make informed decisions on pursuing a comprehensive approach to flood management through river and drainage works. In addition, relevant technical feasibility studies will be commissioned for a flood-buffering reservoir in Vaisigano River and flood-proofing the Central Cross Island Road. In addition, GCF resources will support developing an integrated sewage system for AUA that takes into account likelihood of increased rainfall that will provide technical information for a programmatic approach to address flood risks in Samoa.

39. Secondly, GCF resources will be used to ensure that key infrastructure along the Vaisigano River will be resilient to the adverse effects of excessive water and higher run off. This will be achieved by the construction upgrade of the Lelata Bridge (to ensure it is resilient to expected intensity of water as a result of heavy rainfall) and extension of floodwalls at Leone and Lelata Bridges as part of the proposed river bank works (Segments 2, 3 and 4). Improvement of river works in the Vaisigano River Catchment to withstand flash floods during extreme weather events will further increase resilience of key infrastructure and affected ecosystems in Apia. This will be achieved by channeling Segment 2, 3 and 4 of the Vaisigano River streambed to decrease flood risks and also by developing ecosystem-based responses upstream for decreased flows and sediment loads during extreme weather events. The ecosystems based responses include using agroforestry and reforestation schemes to reduce run-off. Co-benefits of youth employment and income generation will also be achieved.

40. Thirdly, the proposed project will scale up activities that have already been tested and proven to be effective to support climate resilient livelihood options in the Vaisigano River Catchment. At present, LDCF financing is used through non-government organizations (NGOs) to provide training, monitoring, and mentoring of village based multi-disciplinary frontline workers who will in turn train community members in resilient livelihoods, and in linking households with green jobs and agro processing markets. The GCF proposal will build on these two foundational investments to provide transformational support to the river catchment communities through support for enterprise development specifically focused on reducing flood risk and increasing households' resilience. These communities will play a key role in preserving and revitalizing the water catchment by influencing water flow reduction down-stream through enhanced agro-forestry practices.

41. Finally, inadequate drainage systems in the context of increased water flows as a result of extreme events will be addressed by developing a climate resilient Drainage Master Plan and also upgrading drainage systems in specific high priority hazard areas and upsizing ocean outfalls to move water away more quickly, thus reducing buildup in the AUA. This will increase the regulation of water flows and reduce flooding in the AUA.

42. By implementing the project, a long-term transformative response to climate resilient critical infrastructure located in a risk-prone geographical area will begin to be addressed. Over time, GoS will begin to operationalize its overarching programme approach to flood management through several other projects, some of which that may seek GCF financing.

C.3. Project / Programme Description

43. Samoa seeks to operationalize its comprehensive programme on climate change induced flood management through its first project on enhancing resilience of communities and urban infrastructure in the Vaisigano River Catchment of Samoa. This project is directly linked to the SDS with the vision of "improved quality life for all" and theme "Boosting Productivity for Sustainable Development" related to 4 priority areas- Economic Sector, Social Sector, Infrastructure sectors and the Environment. The proposed project is directly related to outcomes (2) reinvigorate agriculture; (4) sustainable tourism; (5) enabling environment for business development; (6) a healthy Samoa; (8) community development; (9) sustainable access to safe drinking water and basic sanitation; (10) efficient, safe and sustainable transport systems and networks; (13) the environment; and (14) climate and disaster resilience.

44. GCF resources will be used to address a number of key technical, capacity and information based barriers to enhancing the effectiveness of flood management systems. The objective of the proposed project is to strengthen adaptive capacity, and reduced exposure to climate risks, of vulnerable livelihoods and built environment infrastructure in the Vaisigano River Catchment.

45. The expected key fund level impact is increased resilience of infrastructure and the built environment to climate change in Samoa. The primary direct beneficiaries, including approximately 26,000 people in Apia, will benefit through integrated planning and capacity strengthening for increased likelihoods of flooding induced by extreme events; flood mitigation measures, specifically river works, and ecosystems solutions in the Vaisigano River Catchment; upgrades to key infrastructures that can withstand the negative effects of excessive water; and upgrades to drainage systems in downstream areas for improved regulation and rapid discharge of water flows during periods of extreme events. An

additional 37,000 people will also benefit from the learning that will be generated from this project and from the safeguarding of critical economic assets in Apia.

46. The project represents the GoS's initial steps in operationalizing a comprehensive flood management solution to the likely consequences of extreme events in the Apia area. The proposed project seeks GCF resources to overcome key technical and financial barriers to enhance resilience in flood management in the Vaisigano River Catchment. GCF resources will contribute towards minimizing the likelihood of damages from extreme events including disruption to livelihoods of over 30% of Samoa's population. Three interlinked project outputs will be pursued to operationalize the Government's plans in the context of an overarching programme for managing flood risks, including:

- (a) Strengthening capacities and mechanisms for integrated approach to reduce flood-related risks in place;
- (b) Key infrastructure in the Vaisigano River Catchment are flood-proofed to increase resilience to negative effects of excessive water; and
- (c) Drainage in downstream areas upgraded for increased regulation of water flows.

Output 1. Strengthening capacities and mechanisms for integrated approach to reduce flood-related risks in place.

47. GCF resources will strengthen national capacity and mechanisms to reduce flood related risks in the Vaisigano River Catchment induced by climate change. Tropical storms and cyclones (damaging winds, rainfall, flooding, swells, and storm surges) have caused significant economic and social losses at the national and household level. The needs for an integrated approach are necessary as to date, key barriers exist that limit a comprehensive approach to reducing vulnerability in the Vaisigano River Catchment. First, flood management under the IWMP allows for only partially coping with increased long-term hazards. Secondly, a cross-sectoral approach in the Vaisigano River Catchment is lacking due to the absence of feasibility studies. Thirdly, the EWS only cover tsunamis and earthquakes, but not floods and storm events. Finally, current building practices and designs create risks for communities living alongside the Vaisigano River. The project resources will be used to address these barriers in a coherent and holistic manner, thus avoiding a fragmented approach to barrier removal, which historically has resulted in a piecemeal set of solutions that have fallen short of realizing a paradigm shift. This Output comprises three activities:

Activity 1.1 Strengthen capacities and information requirements to pursue an integrated programme approach to flood management.

48. GoS seeks to pursue a programmatic ridge-to-reef approach with regards to reducing flood risk for Samoan society. As such, the current project is part of a bigger vision of the GoS; of extending GCF collaboration towards other related key areas of intervention including other vulnerable catchments in the AUA among others. The latter vision has been noted down in the Programmatic Approach annexed to the Feasibility study (Annex II (a)). In order for GoS to realize this vision, capacities need to be strengthened and information requirements need to be met to guide the design and implementation of a number of related interventions.

49. GCF resources will strengthen national capacity and mechanisms to reduce flood related risks in the Vaisigano River Catchment induced by climate change. Key barriers have limited a comprehensive approach to reducing vulnerability. First, flood management under the IWMP allows for only partially coping with increased long-term hazards. Second, a cross-sectoral approach in the Vaisigano Catchment is lacking due to the absence of feasibility studies. Third, early warnings only cover tsunamis and earthquakes, but not floods. Finally, current building practices and designs create risks for communities living alongside the Vaisigano River.

50. The activity has three sub-activities. These include:

- (a) Review the interdependence of flood mitigation options: A number of flood mitigation interventions have been identified but have to-date only been considered in isolation. An assessment of the overall performance of the proposed interventions as an integrated flood management system is required. This is best achieved through the use of an integrated hydraulic model;
- (b) Conduct feasibility studies for flood-buffering reservoir in the upper catchment of the Vaisigano River: The study will assess options to support flood management with co-benefits in hydropower generation and as a potable water storage for the AUA. Terms of Reference for the study have been prepared as part of this proposal;
- (c) Conduct feasibility studies for Apia integrated sewage system: the project will undertake a feasibility study to develop an integrated sewage system for the whole AUA. In the first 18 months of the project implementation, actions that will be undertaken are described in Annex XIII (b):

51. For each sub-activity, the following will occur:

- (a) Prepare a Request for Proposal and Terms of Reference (currently in draft form) for the study and have these approved by GoS;
- (b) Undertake stakeholder engagement on the Terms of Reference to ensure they access the communities' needs;
- (c) Undertake an Expression of Interest and Request for Proposal procurement process and engage a consultant;
- (d) Undertake and finalize the feasibility study;
- (e) Undertake a validation workshop with GoS, UNDP, other accredited entities, donors and stakeholders including civil and community-based organizations (CBOs);
- (f) Revise the programmatic approach in line with findings from feasibility studies; and
- (g) Work with the GoS to obtain funding to in line with findings from feasibility studies and the updated programme.

Activity 1.2 Establish health surveillance systems to track and manage flood-related health issues

52. The specific threat to health relating to climate induced flood events places significant burden on health resources. For example, large bodies of stagnant water cause an increase in mosquito populations and a greater likelihood for these mosquitos to transmit diseases such as Filariasis, Dengue Fever, Chikukunya, Malaria, Zika, and Diarrhea as well as a number of other gastrointestinal infections. Another important public health issue resulting from extreme rainfall events is the overflow of riverbanks, drainage systems, and sewage systems that give rise to pathogenic diseases such as Typhoid, Leptospirosis, E-coli and non-pathogenic diseases such as malnutrition. Flash flooding associated with extreme rainfall events can result in serious injuries and loss of life.

53. Samoa's public health system lacks the capability to access, understand, and apply climate risk information, which can result in significant burden on health resources during the acute phase of flood events. Public health practitioners are therefore not prepared for surge capacity scenarios, such as an extreme rainfall event in the Vaisigano Catchment that can cause vector-borne diseases. Flash flooding associated with extreme rainfall events can also result in serious injuries and loss of life. The project will improve Samoa's public health system with the necessary information and equipment to interpret climate risk information in order to forecast healthcare surge scenarios as they relate to flood-related health issues. Electronic data management is required to establish baseline values for climate variables, health outcomes and public health outcomes in order to better forecast and plan for health risks and needs during extreme climate events.¹⁵

54. GCF resources will be instrumental in bridging the information gap between the meteorological data provider, Samoa Meteorology Division, and health sector users in order to build robust climate change impact scenarios, and to more effectively use climate data and information on tactical time scales such as days, months, and seasons. This activity will include the development of a tracking system to review weather and climate-sensitive health data on spatial and temporal distributions in order to better forecast and track disease outbreaks in the Vaisigano Catchment within 24 hours, as opposed to the existing baseline of three weeks.¹⁶ It will improve the capacity for public health practitioners to prevent and manage disease outbreaks. The enhanced system will provide information that enables monitoring of risks and detecting hotspots where disease epidemics are emerging. Rather than accessing, viewing and managing data manually, GCF resources will be used to electronically integrate health and climate information and automate the generation of health impact scenario information so that public health practitioners can easily interpret changes taking place and be more informed in their decision-making process. Finally, GCF funding will go toward building capacity for health professionals to access, understand, interpret and apply information on climate change induced health risks to health risk management plans. This will, increase the capacity for health professionals and affiliated groups in Samoa (including Medical personnel, Allied Health Professionals, Health Planners and Policy Analysts, GoS stakeholders, CBOs to improve the public health response to at-risk populations residing in the Vaisigano River Catchment.

55. The target to reach the majority of health sector professionals with training on accessing, understanding, and applying climate risk information is currently not available in Samoa's public health system. This project will bridge the information gap between the meteorological data provider, Samoa Meteorology Division, and health sector users in order to build robust climate change impact scenarios, and to more effectively use climate data and information on tactical time scales such as days, months, and seasons.¹⁷

¹⁵ Ministry of Health, Samoa's Climate Adaptation Strategy for Health 2014 p7.

¹⁶ Ministry of Health, Samoa's Climate Adaptation Strategy for Health, 2014.

¹⁷ Terminal Report, ICCRAHSS Project

56. The activity has four sub-activities. These include:

- (a) Inclusion of flood-related information in Samoa's CLEWS messaging system: An EWS exists in Samoa and is operational in the context of tsunamis and earthquakes (see Activity 1.3). GCF resources will be used to expand the existing infrastructure with flood related information, so health practitioners and evacuation personnel can prepare for and minimize adverse impacts from an early stage. Prevention and adaptation will be facilitated as opposed to recovery after the damage has been done;
- (b) Train health practitioners dealing with and how to respond to flood-related emergencies: Even when the system is operational, there is still a necessity for the right people to react to the messages. The health practitioners that need to make informed decisions to prepare for floods will be trained in a consistent application of the flood-related EWS;
- (c) Train village councils on how to prepare for and evacuate flood-related victims: Key members of village councils will be trained to make informed decisions to prepare for evacuation during floods. As with 54(b), the training needs to be so decisions are made consistent with the best approaches; and
- (d) Awareness raising among health practitioners and village councils about the flood-related EWS.

57. For each sub-activity, the following will occur:

- (a) Prepare a Request for Proposal and Terms of Reference (currently in draft form) for the study and have these approved by GoS;
- (b) Undertake stakeholder engagement on the Terms of Reference to ensure they access the communities' needs;
- (c) Undertake an Expression of Interest and Request for Proposal procurement process and engage a service provider with extensive experience in health management and EWS in tropical systems;
- (d) Prepare for and undertake training on health management and EWS; and
- (e) Undertake a validation workshop with GoS, UNDP, other accredited entities, donors and stakeholders including civil and community-based organizations (CBOs) on additional work required for the medium to longer term to maintain capacity within the health sector and community related to health and floods.

Activity 1.3 Expand EWS coverage to provide flooding alerts in Apia

58. Although the EWS in Samoa is well advanced, it does not cater for flood-related emergencies. The EWS currently covers only tsunami and earthquake warnings. GCF resources will not only enhance the existing EWS with health information, but will support expansion and development of tailored warnings for flooding. The existing climate network, rainfall and river gauges, lightening detection etc., for flood forecast will be upgraded. GCF resources will also be used for training technical officers at MNRE to integrate flood forecast into the existing EWS, along work with at risk populations on ways to tailor the EWS to their needs.

59. In addition, GCF resources will be used to upgrade and link community level system of sirens into the national Emergency Siren Network so they can be remotely and automatically activated in the lead up to a flood event. An addition of five sirens will also be installed along the Vaisigano River to provide flood-related EWS, in addition to tsunami and earthquake early warnings. Placing these sirens in the Vaisigano River Catchment, where none exist, will help village councils in the evacuation of their villagers to appropriate high ground or shelters, reducing flood-related injuries and traumas. MNRE will identify each site for installation, test the sirens monthly and facilitate training through village level training. Training will assist villagers to identify the sound and prepare evacuation plans for all times of the day, with special attention to upstream villages where reaction time is limited. An ongoing project funded through the Pacific Resilience Project focuses on identifying and supporting disabled populations and the elderly, establishing alternative forms of notification depending on special needs.

60. The activity has two sub-activities. These include:

- (a) Update data collection so as to undertake hydrological modelling to generate flood scenarios: work will be undertaken to upgrade of existing network of instruments and gauges to collect key information on rainfall and river flow, lightening detection etc., to generate key data to facilitate improved flood forecasting; and
- (b) Integration of flood warning into the EWS in Vaisigano River Catchment: activities will be undertaken to integrate the five new sirens into the national Emergency Siren Network. This will include installation and regular testing of the sirens as well as signpost indicating the nearest storm shelters. Work will be undertaken with villages, with special attention to upstream populations, on identifying the appropriate sounds and evacuation preparations need for daytime

and night time flooding scenarios. The capacity of the technical officers at MNRE will be enhanced to integrate flood forecast into the EWS.

61. For each sub-activity, the following will occur:

- (a) Prepare a Request for Proposal and Terms of Reference (currently in draft form) for the study and have these approved by GoS;
- (b) Undertake stakeholder engagement on the Terms of Reference to ensure they access the communities' needs;
- (c) Undertake an Expression of Interest and Request for Proposal procurement process and engage a service provider with extensive experience in flood modelling and EWS in tropical systems;
- (d) Prepare for and undertake training of technical officers at MNRE to integrate flood forecast into the EWS;
- (e) Undertake a range of activities with village communities in relation to the best approach and locations of the sirens;
- (f) Undertake testing of the system and evacuations;
- (g) Ensure shelters are fitting with the necessary materials and items for a flood event; and
- (h) Undertake a validation workshop with GoS, UNDP, other accredited entities, donors and stakeholders including civil and community-based organizations (CBOs) on additional work required for the medium to longer term to maintain capacity of the network for the EWS for floods.

Activity 1.4. Conduct awareness raising campaigns on climate resilient building practices and designs for at risk communities living along the Vaisigano River

62. Samoa has recently updated its Building Code with sections on methodology for hazard-proofing infrastructure, including buildings and roads. The code is written in technical language and it must be communicated to builders and home-owners in a user-friendly manner. Visualization is key in this approach, as well as the involvement of civil society and private sector.

63. GCF funds will support the translation of the building code to non-technical visual aids and tools to reach a wide audience living along the Vaisigano River. These tools will demonstrate the effects of flooding on infrastructure and provide recommendations for building flood resilient homes. The campaign will engage civil society, the private sector, as well as village councils.

64. For this activity, it will be essential the involvement of private sector and civil society in the promotion of flood proofing infrastructure and livelihoods. As such, the activity has three sub-activities, these being:

- (a) Translation of the new building code and Apia spatial plan into simple manuals for builders: as the new Building Code is a technical document, translation is needed in lay-person's terms. This will be done by preparing simple guidelines for do it yourself and professional builders to follow when building or making renovations to housing;
- (b) The production and exhibition of flood-resilient buildings; and
- (c) The articulation of appropriate land use practices to be used in the Upland Watershed Conservation Policy and the 2 million trees campaign.

65. For each sub-activity, the following will occur:

- (a) The signing of Memorandum of Understandings with CBOs to participate in the campaigns;
- (b) The signing of Memorandum of Understandings with builders associations on promoting flood-resilient buildings;
- (c) Prepare a Request for Proposal and Terms of Reference (currently in draft form) for the preparation of Building Code materials and have these approved by GoS;
- (d) Undertake stakeholder engagement on the Terms of Reference to ensure they access the builders and communities' needs;
- (e) Undertake an Expression of Interest and Request for Proposal procurement process and engage the services of consultants with extensive experience in Building Codes and best land use practices as appropriate for each sub-activity;
- (f) Workshops with building associations for needs assessment;

(g) Validation workshop of the Code and land use manuals; and

(h) Undertake a validation workshop with GoS, UNDP, other accredited entities, donors and stakeholders including civil and community-based organizations (CBOs) on additional work required for the medium to longer term.

Output 2. Key infrastructure in the Vaisigano River Catchment are flood-proofed to increase resilience to negative effects of excessive water

66. Currently, a flood wall scheme in the lower section of the Vaisigano River, Segment 1 is under construction. Segments 2, 3 and 4 have been designed but have not been funded. To provide the intended flood protection all segments of the proposed scheme need to be implemented. The proposed flood wall scheme including Segments 1, 2, 3 and 4 are designed to pass the 1:20 year flood with 0.5m freeboard. This output, accounting for 57% of the total GCF investments, represents the investments that will support channelization of Segment 2, 3 and 4 to reduce risks of flooding from the Vaisigano River. This investment is necessary regardless of what happens up stream including the potential future construction of a retention reservoir that would be designed to withstand a 1-100 year flood including ensuring that downstream effects in those instances are closer to impacts of a 1-20 year flood.

Activity 2.1. Channelization of segment 2, 3 and 4 of the Vaisigano river streambed to accommodate increased water flow and to decrease flood risks

67. The lower sections of the Vaisigano River is often the source of flooding during extreme weather events, inundating a large part of the AUA. Channelization of Segment 1 is already being done under the LDCF financed EWACC project, albeit with limited financing. GCF resources will enable the construction of Segments 2, 3 and 4 which are required to complete the channelization work and achieve the designed level of flood protection. The GCF resources will enable Samoa to fully complete the scheme, a result which would not be possible with the limited financing that is currently available.

68. The designs of Segment 2, 3 and 4 measures have been completed with LDCF financing, with the scope of a 1:20 flood event in mind. GCF resources will allow for these measures to be constructed. The detention dam will attenuate flood flows in a 100 year event so that outflows from the storage equal the current 1:20 year level of protection provided by the proposed channel design.

69. The upgraded designs will be implemented by selected contractors through the regular procurement procedures and channels following UNDP Policies and Procedures for National Implementation. Maintenance teams for the works will be contracted out by MNRE and LTA and resources for this (from GoS's annual budget allocation to MNRE and Land Transport Authority (LTA)) have been confirmed over the lifetime of the project's benefit stream. Monitoring of flooding along the Vaisigano River segments will be undertaken by LTA, MNRE and other relevant local bodies. The construction activities will create short-term employment opportunities for local communities as well some long-term.

70. The activity has four sub-activities. These include:

- (a) Review proposed designs for channelization of Segment 2, 3 and 4 of the Vaisigano River including the impact on channel capacity of the new Lelata Bridge and the potential for optimizing scheme design and durability;
- (b) Establishment of flood protection measures along segments 2, 3 and 4 of the Vaisigano River: The upgraded designs will be implemented by contractors selected through a competitive bidding process;
- (c) Capacity Building of maintenance teams for flood protection measures: Maintenance teams from MNRE and LTA will be trained in the preparation of the development of maintenance manuals and maintenance schedules. Over the life of the project, monitoring of flooding along the Vaisigano River segments will be undertaken to provide for the construction of similar infrastructure in the other Greater Apia Catchments; and
- (d) Contracting members of the local communities for execution of activities with regards to building and landscape restoration along the Vaisigano River: A plan for the involvement of members from vulnerable population will developed related to labor intensive activities to generate employment opportunities.

71. For the sub-activities, the following will occur:

- (a) Prepare a Request for Proposal and Terms of Reference (currently in draft form) to conduct site investigation, survey and design, project management, construction administration, as well as capacity building and training through technical involvement and handover and have these approved by GoS;
- (b) Prepare a Request for Proposal and Terms of Reference (currently in draft form) to undertake construction works;

- (c) Undertake stakeholder engagement on the Terms of Reference to ensure the works will not impact communities;
- (d) Capacity building and training through technical involvement and handover;
- (e) The construction of the relevant infrastructure; and
- (f) Undertake a validation workshop with GoS, UNDP, other accredited entities, donors and stakeholders including civil and community-based organizations (CBOs) on additional work required for the medium to longer term.

Activity 2.2. Implement ecosystem responses upstream for decreased flows during extreme weather events

72. In addition to the river works and drainage measures that are necessary in the AUA, ecosystem based adaptation activities along the river banks, and especially upstream catchment areas are necessary to make sure excessive water during extreme events does not result in flash flooding. An important response is the enforcement of a clear zoning policy. Ensuring that key areas that are critical for preventing flash floods remain under conservation, provide optimal ecosystem functions as well as provide an opportunity for land based livelihoods are important elements of reducing vulnerability and/or enhancing adaptive capacity of communities living in the catchment.

73. This activity will help the vulnerable populations in the Vaisigano River Catchment and the agencies that assist them to determine and implement the best options for flood management for different sub-catchment areas, depending on land tenure and ongoing projects and programmes. This zoning and land tenure clarification is necessary to avoid land tenure problems when foreseeing land use interventions. A demarcation of one area within the Vaisigano catchment as a 'no development zone' in combination with a 'restricted zone' below it (including the delineation of the area as a Water Source Protection Area) is already in place through an order issued by the Minister of MNRE under the *Water Resources Management Regulations 2013*. This regulation has not yet come into effect. GCF resources will be used to help the regulation into force. This will be complimented with the financing of community orientated ecosystem based adaptation options focused on improved flood management, with the added co-benefit of providing a means of alternative income generation. GCF resources will be used to enhance awareness and capacity among vulnerable community members on alternative income generating activities that also promote flood management. GCF resources will be used to provide assistance with business incubation for small-medium and micro agribusiness enterprises that develop businesses ideas around flood-risk management related business.

74. In order to foster a sustainable ecosystem-based adaptation response to reduce water flow during extreme weather events, GCF resources will support enterprise development focused on reducing flood risk in the catchment area. Channeled via MoF, GCF resources will be used to facilitate the participation of vulnerable households in climate resilient agri-businesses through removal of financial barriers for technology transfer and/or adoption, business skills development, and to facilitate access to markets to ensure financial viability and sustainability. GCF resources will be used within existing government sponsored programs to increase uptake of climate-resilient packages that help farmers access resilient technological inputs, information, and finance (by reducing the cost of existing financial services packages for SMEs), and to access distant markets for climate resilient products, including through partnerships with the private sector. These potential linkages include with the tourism sector, such as hotels that have confirmed demand for domestically grown produce, international companies that are committed to supporting smallholder farmers in Samoa, and village council stakeholders concerned with lack of availability of affordable produce in Samoa and correlated high obesity rates.

75. In addition to enterprise development, this activity has been designed to improve ecosystem functions that contribute to flood risk reduction. In general, activities that expand forest canopy and improve soil quality will help reduce water runoff and retain rainwater before it is slowly discharged to the streams that flow into the Vaisigano River. With the premise that local communities can be stewards of the local environment when their livelihoods are secured, this activity will help farmers organize into cooperative or similar structures that allow them to undertake mutually beneficial activities, such as terracing and landscaping that reduce erosion, activities that will also result in co-benefits such as increasing the bargaining power with buyers.

76. The activity is innovative because that enterprise development is intrinsically linked with the improvement of ecosystem functions that contribute to flood risk reduction. GCF resources will support business ideas that expand forest canopy and improve soil quality while helping reduce water runoff and/or retain rainwater before it is slowly discharged to the streams that flow into the Vaisigano River. With the premise that local communities can be stewards of the local environment when their livelihoods are secured, this activity will help local communities to organize themselves into cooperative or similar structures that allow them to undertake mutually beneficial activities, such as terracing and landscaping that reduce erosion, or activities that will result in co-benefits such as increasing the bargaining power with buyers and access to finance.

77. In this context, GCF resources will support 18 vulnerable villages located in the Vaisigano River Catchment by increasing income generation opportunities for community members. Livelihoods in these communities are critically impacted by Vaisigano River flooding, as evidenced from Cyclone Evan. Located along the banks of the Vaisigano River and immediate surroundings are the 18 villages that will be targeted including Maagiagi Uta, Papauta, Tanugamanono, Lelata, Maluafou, Faatoialemanu, Aai o Niue, Leone, Vinifou, Matautu Uta, Vaisigano, Vaipuna, Vaiala Uta, Levili, Vailima, Avele, Letava and Vaoala.

78. In this activity, beneficiaries include those eligible for a commercial loan from the Development Bank of Samoa (DBS), a quasi-government bank mandated to stimulate economic activities. GCF support, in the form of financial support for the procurement of inputs for business development, will be extended only if their planned/intended livelihood activities are evaluated by DBS to contribute to the enhancement of ecosystem functions for flood risk reduction. Based on a preliminary assessment conducted during the proposal preparation, the number of prospective eligible beneficiaries is 1,450 individuals.

79. Overall, the activity includes:

- (a) Participatory mapping by communities and value chain system actors, with a focus on women and youth, to support adoption of climate-resilient technologies and practices. This will entail 1) scientific crop selection in consultation with farmers and MNRE, with a particular focus on crops and tree species that can reduce erosion and contribute to food security and/or economic value; 2) mapping of lands and identification of support delivery mechanisms suitable for each; 3) identification of non-degraded lands or areas that should be prioritized for conservation; and 4) market mapping to identify value chain development strategies;
- (b) Development, packaging, and dissemination of suite of climate-smart practices among community members;
- (c) Enterprise development of small agricultural and flood management businesses through targeted business management training and credit guarantees supported by the Small Business Enterprise Center (SBEC);
- (d) Strengthen value addition, marketing and business development (based on market mapping) for linkages with tourism industry, supermarkets, and export markets; and
- (e) Work with the communities involved to increase afforestation/conservation of native species where necessary to reduce flood risk.

80. One activity with the crowding in SMEs that engage in business ventures that have flood management benefits. Under this modality, GCF support will be used to crowd in private sector investments in support of livelihood creation and ecosystem-based adaptation that are otherwise financially unviable due to high upfront costs and/or high risk. This activity will build on an ongoing baseline initiative in which DBS extends loans to end customers at 4% interest through the SBEC.

81. In this baseline-lending program, DBS financing is used for general enterprise development purposes. To encourage SMEs that address the double bottom-lines of profitability and ecosystem enhancement that results in flood management, DBS has agreed to provide additional screening criteria that include a predefined positive list of activities that qualify as "EBA (ecosystem-based adaptation) business activities." Those activities that are considered EBA business activities would receive the regular 4% loans from DBS over a 5-year term, as well as additional financing from GCF that will be used for the procurement of inputs required to kick-start the business. The GCF support will cover approximately 30-60% of total investment required. This will lower risk exposure to DBS, reduce the overall indebtedness for SME owners, and increase the viability of the enterprise. The positive list of activities that have been identified as having flood risk reduction potential include the following:

- (a) Coconut tree planting;
- (b) Cocoa tree planting;
- (c) Banana tree planting;
- (d) Taro and other tuber crop production;
- (e) Nonni tree planting; and
- (f) Intercropping.

82. Investments required for ancillary activities that make the enterprise viable, such as post-harvest, value addition, and marketing support will also be part of the package of support provided through DBS and GCF. More specifically, financing can be used for:

- (a) Purchase of stocks of adapted propagation materials;
- (b) Local nurseries for seedling production;
- (c) Procurement of necessary specialized farming tools and utensils; and
- (d) Training of beneficiaries and of 'peer-to-peer' trainers.

83. For effective flood risk management, it is important that the tree or crop planting be done as part of a broader soil conservation approach that aims at increasing infiltration, rehabilitating degraded land and improving soil texture. Thus, part of the criteria also includes a short initial training on the concept of micro-watershed management and a submission of a simple soil/environment management plan by the loan applicant. The positive list can be updated as additional activities are recognized as effective EBA solutions for flood risk reduction based on a technical endorsement by the Technical Advisory Team established within the Project.

84. GCF financing will be used in the following manner under this modality: a loan applicant or a group of applicants, with support from the SBEC, will develop a business plan that requires an investment of up to US\$15,000 and prepare a loan application. Once the applicant(s) is confirmed to meet all requirements for taking a loan and their business plan satisfies the EBA business activities criteria, DBS will provide a loan of up to US\$10,000. In parallel, the three parties – DBS, SBEC and the applicant – identify the required production inputs to be purchased by DBS on behalf of the applicant, which are worth 30-60% of the total investments required. Based on a preliminary assessment, the investments required for the activities presented above would range from approximately \$5,000 to \$15,000. The physical production inputs that DBS will procure, using GCF resources, will range from \$1,500-\$9,000 (or 30-60% of the total loan extended), and the value of the inputs will be deducted from the principle of the loan.

85. This approach has three notable advantages over transferring cash to the beneficiaries. First, the material support, as opposed to top-up grants in cash, eliminates the risk of misappropriating the grant for a purpose different from what was agreed with the bank. It is widely acknowledged that a large fraction of microfinance clients' use loans for non-productive purposes. The procurement support, as opposed to cash support, almost eliminates the risk of misappropriation of resources. Second, related to the first, because the risk of misappropriating is practically eliminated, DBS and/or the project team can save significantly the costs associated with the verification of the use of the loan. Furthermore, because the GCF financing channeled via MOF to various beneficiaries through line Ministries and departments will be used to purchase materials that will contribute to flood risk reduction, rather than transferring cash with the hope that they will indeed invest the money in flood risk reduction activities, there is much higher possibility of achieving the desired impacts. Third, as the procurement of materials will be done in bulk by DBS, as opposed to loan applicants independently procuring materials, they are likely to benefit from discounted price for the materials making the business even more viable overall.

86. The figure below shows how GCF support will be blended with DBS commercial loans. Note that the support from the GCF project is not only "top-up grants" in the form of production materials, but also technical assistance services such as business development, financial literacy which will be provided by SBEC.

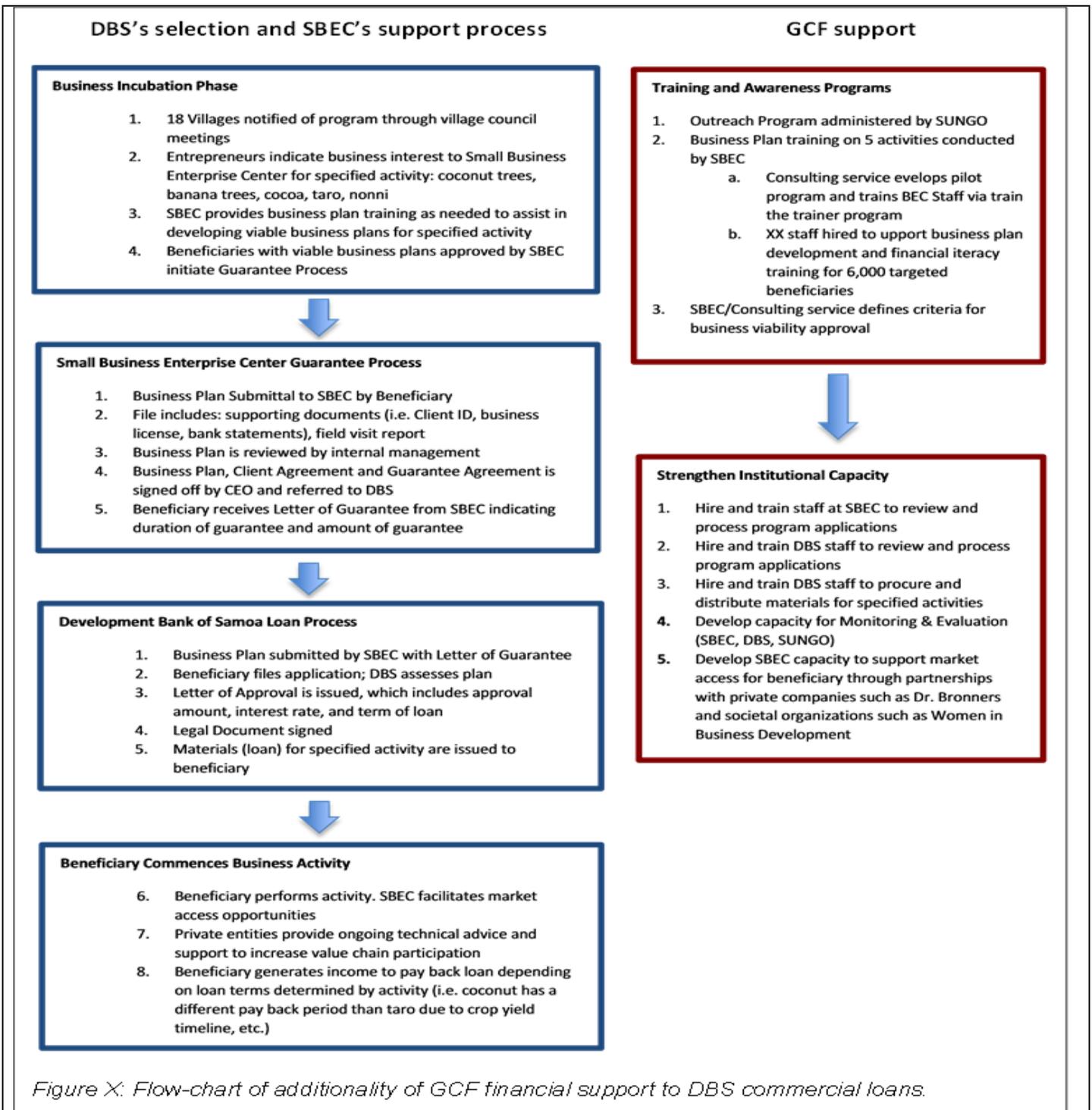


Figure X: Flow-chart of additionality of GCF financial support to DBS commercial loans.

87. In public areas that are considered “no development zone” or “water source protection area”, where enterprise activities are virtually restricted, MNRE will implement ecosystem flood risk management measures including small-scale check dams, gully plugs, contour bunds, and vegetation establishment. These activities will be implemented through a cash-for-work program.

88. GCF resources will be used for:

(a) Participatory mapping by communities and value chain system actors, with a focus on women and youth, to support adoption of climate-resilient technologies and practices. This will entail 1) crop selection in consultation with farmers

and MNRE, with a particular focus on crops and tree species that can reduce erosion and contribute to food security and/or economic value; 2) mapping of lands and ongoing aerial surveys utilizing drone technology; 3) identification of non-degraded lands or areas that should be prioritized for conservation; and 4) market mapping to identify value chain development strategies;

- (b) Development, packaging, and dissemination of suite of climate-smart practices among community members;
- (c) Enterprise development of small agricultural and flood management businesses through targeted business management training and credit guarantees supported by the SBEC;
- (d) Strengthen value addition, marketing and business development (based on market mapping) for linkages with tourism industry, supermarkets, and export markets; and
- (e) Work with the communities involved to increase afforestation/conservation of native species where necessary to reduce flood risk

89. The activity includes the following six sub-activities:

- (a) Determining and implementing the best protection options for flood management activities in the Vaisigano River Catchment area, depending on landscape, land tenure, existing land use and planned developments: This sub-activity entails a characterization (land tenure, vegetation, land use, water resources, landscape etc.) of the Vaisigano River Catchment that will determine relevant interventions;
- (b) Demarcation process of one area within the Vaisigano River Catchment as a 'no development zone' in combination with a 'restricted zone' below it and assign this as a "Water Source Protection Area" as mandated under the *Water Resources Management Act 2008* and the *Water Resources Management Regulation 2013*: Zoning will inform proper land use at different sub-catchment areas (i.e. steep slopes, delineation of riparian environments, sustainable agricultural sites). This will also indicate priority landowners for targeted consultations to avoid land tenure problems. Specific remote sensing exercises (e.g. via drone technology) will support in the demarcation process and detailed mapping;
- (c) Follow development consent process for demarcation: This sub-activity will formalize the status of a "Water Source Protection Area" ('no development zone' 600m above sea level (ASL) and 'restricted development zone' 300-600m ASL) will improve enforcement on unsustainable developments which contribute to increased runoff;
- (d) Develop a community based adaptation strategy for ecosystem based alternative income generating activities: Precautionary approaches such as promoting conservation of critical upland areas (e.g. payment of ecosystem services) will be explored and implemented to ensure that highly sensitive areas for flood management are protected, as it is cheaper to conserve and rehabilitate now than to mitigate in the future;
- (e) Train members of local population on these alternative income generating activities, as well as providing resources for business incubation for entrepreneurial agribusiness and climate change and flood-related business options: Ecosystem based income generating activities promote community involvement and benefit sharing of protective measures to reduce flood risks. Capacity building of community members and intermediaries on alternative income generating activities will allow for the optimization of economic impact while respecting integrity of ecosystems; and
- (f) Provision of a cash-for-work option for flood-related catchment rehabilitation (anti-erosive measures, landscaping options): The will provide a source for potential laborers from vulnerable groups to gain income.

90. For the sub-activities, the following will occur:

- (a) Prepare a Request for Proposal and Terms of Reference (currently in draft form) for a consortium of consultants for prepare an implementation strategy to guide the Project Management Unit and facilitate the necessary trainings and drafting of legal documents and procedures;
- (b) Prepare a Request for Proposal and Terms of Reference (currently in draft form) for the River Ecosystem Health Monitoring (including water quality tests for rivers and Apia waterfront);
- (c) Prepare a Request for Proposal and Terms of Reference (currently in draft form) for the ground-truthing surveys including GIS mapping etc.;
- (d) Undertake stakeholder engagement on the Terms of References to ensure the works will not impact communities
- (e) Prepare and sign a Memorandum of Understanding between SBEC and DBS for collaboration in capacity building of small business units;

- (f) Procurement of service provider and consortium of consultants for the above services;
- (g) Establish a mechanism for hiring of temporary labor from vulnerable groups for ecosystem based activities;
- (h) Execute capacity building plans by consortium of consultants, including facilitation of trainings;
- (i) Establish business incubator in line with MoU with SBEC and DBS; and
- (j) Execute the implementation strategy.
- (k) Undertake a validation workshop with GoS, UNDP, other accredited entities, donors and stakeholders including civil and community-based organizations (CBOs) on additional work required for the medium to longer term

91. The enterprise development activity will be led by the MoF, to which UNDP will allocate approved GCF funding. Per the National Implementation Modality (NIM), MoF will spend the resources itself and/or through its partners, to achieve specific results as per an agreed work-plan with UNDP. Each quarter, MoF will reconcile advances received from UNDP against expenditures and report to UNDP on results achieved. The activity will operate in partnership with the SBEC, a quasi-governmental agency established in 1994 to support the creation of small businesses through financial management training and credit guarantees, as well as the DBS. GCF resources will be used to extend existing lending, guarantee, and training programs to new businesses that contribute to flood management in the catchment area. SBEC's business and financial management training programs are delivered in conjunction with loan guarantees and are required for all members of a household, including women and youth. GCF resources would go towards these trainings as well as the purchase of equipment and improving access to markets through quality assurance, marketing, and branding efforts. Eligible sectors would include agroforestry, tourism, resilient construction, and aquaculture. GCF resources will also be used to provide technical assistance to area commercial banks, the DBS, and the SBEC in integrating climate resilient criteria across their lending portfolios. Partnership in this activity will be sought with the Technical Centre for Agricultural and Rural Cooperation (CTA), who has been requested by the GoS to provide support on promotion of agribusiness in Samoa, particularly targeting the tourism sector. CTA works on value chain promotion, climate smart agriculture, introduction of innovative ICT options and knowledge management and as such will be able to provide valuable contributions to the design and implementation of activity 2.2.

Activity 2.3. Replacement of Lelata Bridge to accommodate increase flood waters

92. Lelata Bridge is a major artery for transport in the AUA. Disruption to this bridge results in significant knock on effects including some with life threatening consequences during emergencies. The design for implementation of Segments 2, 3 and 4 of the Vaisigano River flood scheme will necessitate replacing this bridge to maintain the design capacity of the channelization works. The Lelata Bridge was built in a time when the context with regards to flood hazards was different and not as well-known as it is now. The bridge sits lower than the proposed Vaisigano flood protection wall and therefore will impede flows and the ability of the channel to pass the design flow. The bridge will be replaced to provide sufficient freeboard to not impede flows in the proposed channel in a 1:20 year event.

Activity 2.4. Extension of floodwalls at Leone and Lelata Bridges to prevent damage during extreme events

93. The proposed floodwalls adjacent to the Lelata and Leone Bridge have not been designed in line with the designs for new Leone Bridge and the proposed Lelata Bridge. The floodwalls need to be extended to accommodate the new bridges. Extension of the new floodwalls is needed for the floodwalls to be aligned with the flood proofing measures foreseen for Segments 2 and 3.

Output 3. Drainage in downstream areas upgraded for increased regulation of water flows

94. Adequate drainage for quick dispersal of flood water and proper sanitation and sewerage facilities that avoid the mixing of polluted sewage water with storm water have been promoted in Samoa. However, their integrated planning has yet to be consolidated in an approved master plan for urban areas. While efforts are underway to do so, certain high risk hazard areas in the AUA need rapid measures to avoid their negative influence on the inland areas (nine hazard areas have been identified) along with the need to increase outfall capacity. In this context, GCF resources will be used for the following:

Activity 3.1. Develop a climate resilient Stormwater Master Plan

95. The AUA currently has no master plan for management of the urban storm water network. Developing such a plan will lead to linking the storm water systems (developed under 3.2) to a wider storm water network that can be upgraded according to recognized priority areas. While storm water systems have been designed in the past, these designs need to be updated to adapt them to expected flood risks. These designs need to reflect adequately the causes of local flooding and the performance of the urban storm water network. As such, an integrated hydraulic model is

required. The model would be part of the catchment wide model. A storm water masterplan can then be produced, and updated, based on model results.

96. GCF resources will also be used to assess different storm water systems that might require different measures for upgrading. An assessment will be undertaken based on an overview of options for site specific interventions. Since the storm water master plan will provide a prioritization of areas where storm water works will be executed, local stakeholders will need to be consulted on this prioritization and the foreseen intensity and length of activities. Consequently, on basis of the review, options analysis and consultations, the master plan can be developed according to recognized priority areas and measures. Clear linkage to activity 3.2 will be made. The new storm water master plan will hold requirements for execution of various agencies and groups operating in the hazard areas, such as waste collectors, landscapers, etc. The requisite training will be provided to relevant entities in Samoa (Ministry of Works, Transport and Infrastructure (MWTI) as well as MNRE, LTA etc.) on the implications of the plan.

Activity 3.2 Upgrade drainage systems and outfalls in hazard areas to accommodate flooding events

97. During the LDCF financed EWACC project, nine specific priority upgrades or drainage reticulation were recognized to be of extreme importance for upgrading if flooding of the AUA was to be contained. An upgrade of drainage outfalls and adjacent piped reticulation in the critical hazard coastal area is also targeted with GCF financing. The nine priority upgrades were recognized with regards to flood prone drainage areas in the Vaisigano floodplain. A critical hazard on the northern edge of the CBD adjacent to the coast is also recognized as a priority. Hazard areas will also need to be integrated into the Master plan, along with lessons learned during the implementation of the drainage systems in these areas. A contractor will be tendered for the execution of the establishment of the drainage systems.

98. The project will also upgrade a number of outfall locations. These upgrades will significantly improve the movement of flood waters out to sea, thereby significantly reducing flood water build up that occurred in the past. These works are vital to reducing impacts on the AUA.

C.4. Background Information on Project / Programme Sponsor (Executing Entity)

99. MoF will serve as the UNDP's implementing partner/ Executing Agency for this GCF project. MoF will serve as chair of the steering committee for this project. MNRE, LTA, MoH and MWTI are other key ministries in this project who will be responsible for implementation of project activities.

100. The MoF is in charge of the centralized database of donor assistance, which comprises approximately 20% of Samoa's GDP annually. All external development financing must be approved through this mechanism prior to allocation. Direct access to this data, in conjunction with the information compiled on national productivity by the Samoan Bureau of Statistics, provides MoF with the most comprehensive view of national expenditures. This allows for more widespread analysis of cross-sector expenditures, including all projects pertaining to climate change and disaster risk management.

101. MoF, through its Economic Policy and Planning Division (EPPD) is also responsible for the coordination of programme objectives across 14 sectors that contribute to the SDS. These sectors include: Finance; Agriculture; Education; Tourism; Trade, Commerce and Manufacturing; Health, Law and Justice; Community Development; Public Administration; Water; Communication; Transport; and Energy and Environment. MoF conducts bimonthly meetings attended by the coordination units of each sector, along with representatives from relevant MoF divisions such as those pertaining to donor aid, budget, planning, corporate services, procurement, accounts and the Climate Resilience Investment Coordination Unit (CRICU). Finally, MoF has been the implementing partner of numerous multilateral institution-led development initiatives which has demonstrated extensive experience with international accounting and reporting procedures as well as donor coordination.

102. MoF is also the NDA of Samoa for the GCF. MoF is also the lead agency in carrying out fiduciary responsibilities as well as implementation of public financial management reforms. MoF with the support of Ministry of Foreign Affairs and Trade (MFAT) immediately facilitates the mobilization of resources for recovery following major events ensuring a smooth transition from emergency to early recovery.

103. MNRE is one of the GoS's largest ministries and houses multiple separate divisions dedicated primarily to land, water and environmental planning and management. It is the largest repository of knowledge and experience on climate and natural resources in the country, with technical staff in trained in the areas of hydrology, land registry and management, and urban planning. MNRE is also the Ministry responsible for producing the key policy documents that guide climate change programming for the country, including the National Policy Statement on Climate Change and the NAPA. It is the designated secretariat for the National Climate Change Country Team (NCCCT), members that include the CEOs of relevant ministries. Lastly, MNRE has been the implementing partner for Samoa for all UNDP-supported

GEF funded projects, amassing experience with both UNDP and GEF rules and reporting procedures. Recently, it has set up a separate division within the Ministry dedicated to managing GEF administrative work and communications.

104. The MWTI is principally responsible for establishing, regulating, promoting and monitoring transport and infrastructure legislation and policy to ensure safe, secure and viable transportation modes and infrastructure assets. It is the legislative policy and regulatory agency for civil works, land transport, civil aviation, maritime and infrastructure. This includes ensuring full compliance with International conventions, protocols, codes, standards and recommended practices.

MWTI is the national ministry in charge of developing, disseminating and monitoring specifications for the national building code, which has been revamped to accommodate Samoa's goal of building climate resilient homes and businesses to international standard. The LTA brings together the road asset management and road use management functions under the *Land Transport Authority Act 2007*. The prime objective of this organization is to plan, develop, operate, maintain, and provide safe, efficient, effective and environmentally friendly national road system for Samoa.

105. A capacity assessments of the main executing bodies is underway and will be completed in October 2016. UNDP will submit the report of the independent capacity assessment once the report is available. The ESMP will be updated at this time to include this information.

C.5. Market Overview (if applicable)

106. The project, through Activity 2.2, will work with farmers and producer groups, particularly focusing on women and youth, to establish market linkages for products developed and promoted using climate resilient practices and contributing to reduced flood risk. The project in particular will work with business and enterprise development organizations, tourism companies including hotels, and export-oriented companies to establish market linkages for climate resilient agricultural and agroforestry products. The project will also support value-added activities, such as basket-weaving using natural tree materials, and evaluate opportunities for additional value chain upgrading. In addition, the project will work to support businesses and develop markets for flood-resilient services, including information technologies aimed at early warnings and forecasting, deforestation monitoring, including via drone surveillance, and flood resilient construction in compliance with Samoa's updated building codes developed after Cyclone Evan.

C.6. Regulation, Taxation and Insurance (if applicable)

107. All procurement conducted by the GoS will adhere to government procedures and will be subject to government policies including tax. Procurement conducted by UNDP (if imported) can get the customs / duty exemption at the port. Otherwise, all procurement done in country is subject to the value added goods and services tax with no exemption.

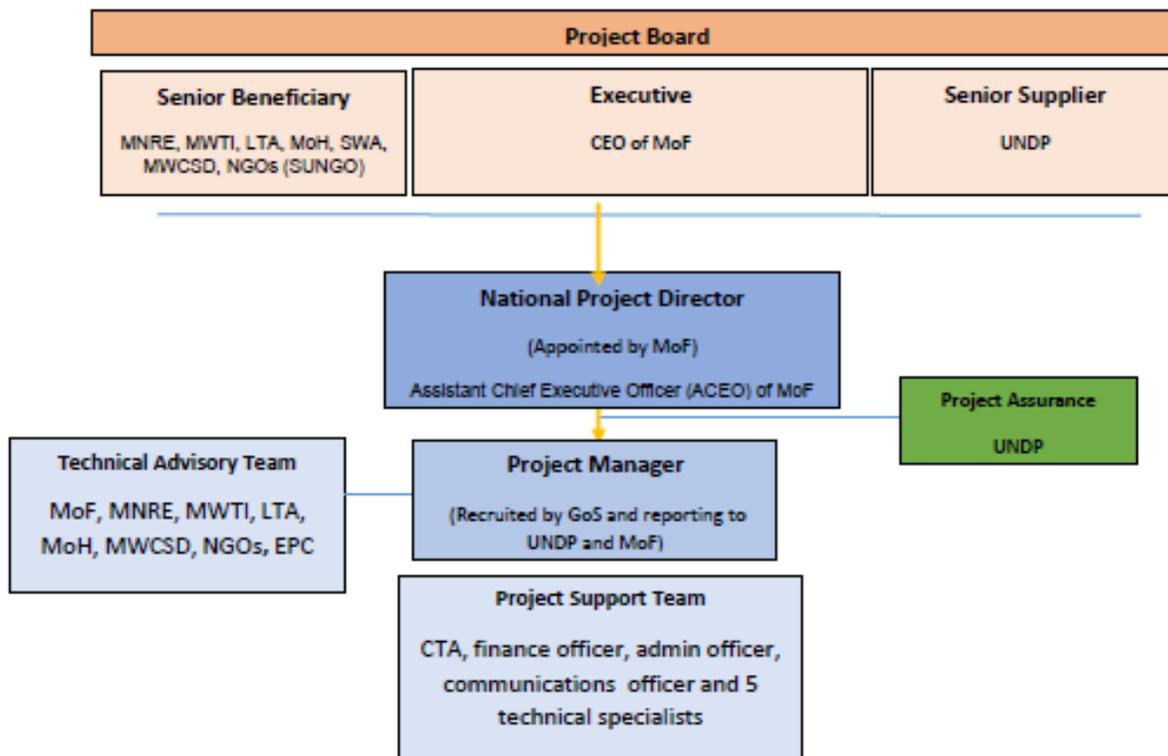
108. Based on the *Land Survey and Environment Act 1989* and the *Planning and Urban Management Act 2004* development consents and EIA is required before the commencement of the river works. This work has been undertaken as part of the EWACC project. In addition, the project activities are subject to UNDP's standard Social and Environmental Safeguards (SES) and Social and Environmental Policy Screening Procedure (SESP). For permits and licenses, MWTI require a building permit and will also require development consent from the Planning and Urban Management Agency (PUMA) of MNRE which has requirements for an EIA prior any construction.

C.7. Institutional / Implementation Arrangements

109. The project will be implemented following UNDP's NIM, according to the Standard Basic Assistance Agreement (SBAA) between UNDP and the GoS and as policies and procedures outlined in the UNDP POPP (see <https://info.undp.org/global/popp/ppm/Pages/Defining-a-Project.aspx>).

110. The national executing entity, also referred to as the national 'Implementing Partner/Executing Entity' in UNDP terminology is required to implement the project in compliance with UNDP rules and regulations, policies and procedures, including the NIM Guidelines. These include relevant requirements on fiduciary, procurement, environmental and social safeguards, and other performance standards. In legal terms, this is ensured through the national government's signature of the SBAA, together with a UNDP project document which will be signed by the Implementing Partner/Executing Entity to govern the use of the funds. The SBAA was signed with the GoS in 2008.

111. **The (national) Implementing Partner/Executing Entity** for this project is the MoF which is accountable to UNDP for managing the project, including the monitoring and evaluation of project interventions, achieving project outcomes, and for the effective use of resources made available by UNDP. The management arrangements for this project are summarized below:



Governance Arrangements

112. UNDP's overall role as an Accredited Entity is to provide oversight and quality assurance through its Headquarters, Regional and Country Office units. This role includes: (i) project preparation oversight; (ii) project implementation oversight and supervision, including financial management; and (iii) project completion and evaluation oversight. It also includes oversight roles in relation to reporting and knowledge-management. The 'project assurance' function of UNDP is to support the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. Project assurance has to be independent of the Project Manager; therefore, the Project Board cannot delegate any of its assurance responsibilities to the Project Manager. A UNDP Programme Officer, or M and E Officer, typically holds the Project Assurance role on behalf of UNDP at the country level, with support from, in this case, the GEF Unit (responsible for managing GCF resources) at the HQ and Regional level. The 'senior supplier' role of UNDP is to represent the interests of the parties which provide funding and/or technical expertise to the project (designing, developing, facilitating, procuring, implementing). The senior supplier's primary function within the Board is to provide guidance regarding the technical feasibility of the project. The senior supplier's role must have the authority to commit or acquire supplier

resources required. Typically, the Implementing Partner/Executing Entity, UNDP and/or donor(s) would be represented under this role.

113. The project will be governed by a Project Board. The Board will consist of a group of representatives responsible for making consensus-based strategic and management decisions for the project. It will oversee the project implementation; review compliance with GoS, UNDP and GCF requirements; and ensure implementation of the management plan for the risks identified. The Board will be comprised of:

- An Executive (role represented by National Implementing Partner) that holds the project ownership and chairs the Board. The Executive will be the CEO of MoF.
- A Senior Supplier representative providing guidance regarding the technical feasibility of the project, compliance with donor requirements, and rules pertaining to use of project resources. This role will be fulfilled by UNDP in its capacity as GCF IA;
- Senior Beneficiary representatives who ensures the realization of project benefits from the perspective of project beneficiaries; and
- The National Project Director, Assistant Chief Executive Officer (ACEO) of CRICU, who is responsible for overall direction, strategic guidance, and timely delivery of project outputs.

114. The Board will also include additional membership including representatives from relevant GoS ministries, Development Partners, NGOs and the Samoan NDA for the GCF. The Board will meet once every six months and/or upon a call by the National Project Director.

Management Arrangements

115. Using established practice under NIM, GoS will designate a National Project Director (NPD) who will be the ACEO of CRICU. The NPD will provide up to 50% of his/her time, and be responsible for the overall direction, strategic guidance, and timely delivery of project outputs. This position is not remunerated by GCF resources but are Government financed positions.

116. MoF will recruit a Project Manager (PM) who will be responsible for day-to-day operations and the management of a team of professionals and technical staff (who will also be recruited by UNDP to implement the project).

117. The PM will be supported by a core team of technical and support staff forming the Project Implementation Unit (PIU) located at the MoF to execute project activities, including day-to-day operations of the project, and the overall operational and financial management and reporting.

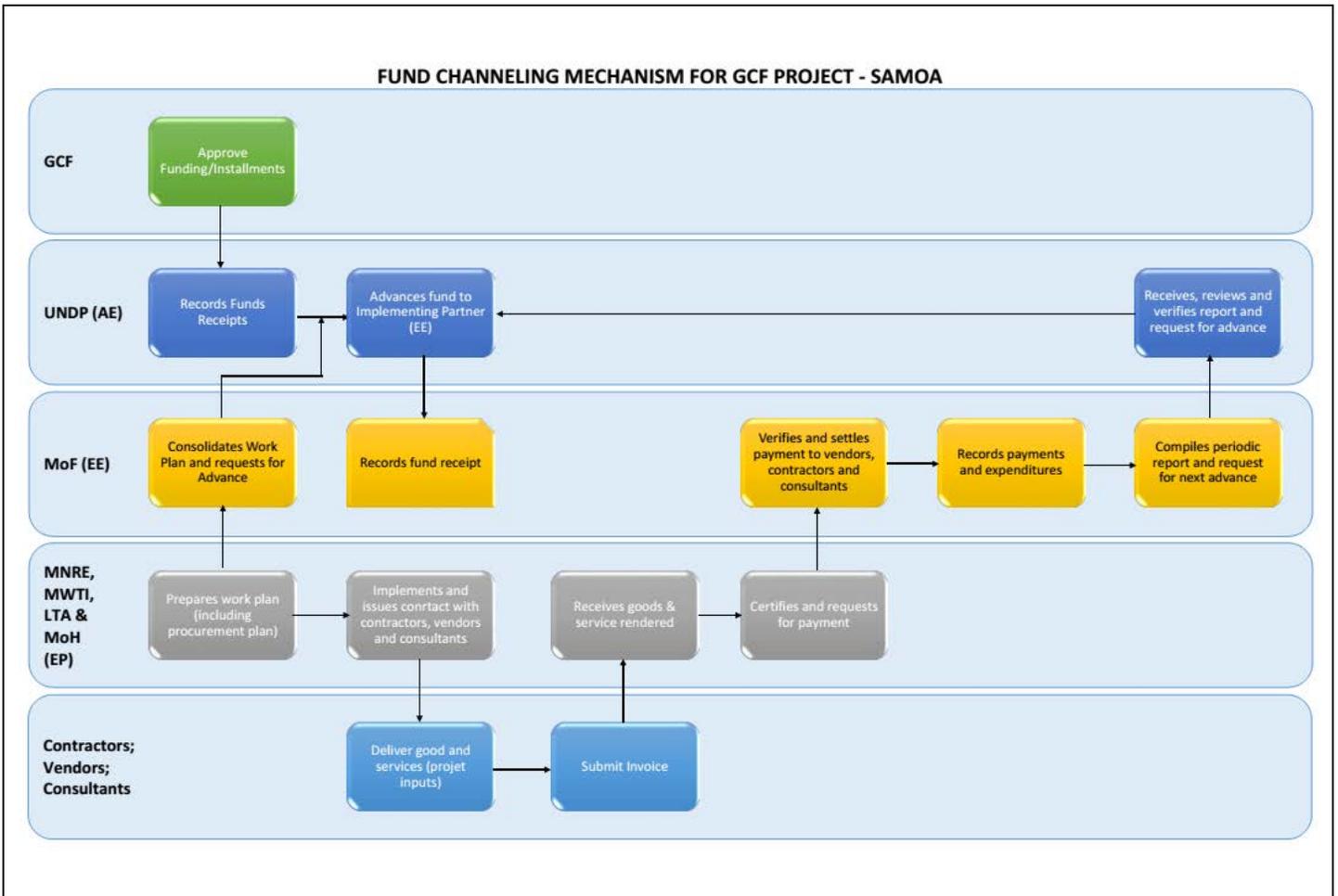
118. UNDP will play Project Assurance Role in line with the requirements outlined in the AMA. This includes management of funds, programme quality assurance, fiduciary risk management, timely delivery of financial and programme reports to GCF and other requirements as per the AMA.

119. The MoF will enter into specific "letter of agreement" with relevant agencies for the implementation of the project. UNDP will manage the funds from GCF, and will disburse quarterly in advance against agreed work plans, to a project account managed by the MoF. The MoF will deliver reporting, auditing and M&E requirements of the government to UNDP, in line with UNDP requirements.

120. The Technical Advisory Team (TAT) consists of technical level staff from all Ministries and NGOs, represented on the Project Board. It will provide the platform for debate and contributions across the project outputs at a more technical and working level.

Fund Channeling Mechanism

121. The following diagram outlines the fund channelling mechanism for the project.



C.8. Timetable of Project/Programme Implementation

Please refer to Annex X.

D.1. Value Added for GCF Involvement

122. By scaling up investments in flood management, GCF will deliver real benefits, in terms of reduced risk from extreme flooding events, to 30% of the population in one of the most vulnerable countries in the world to climate change.

123. The existing level of infrastructure to mitigate extreme flooding events, or lack thereof, suggests the counterfactual of what Samoa would look like without GCF involvement. Strengthening of disaster preparedness measures have proven to be more cost-effective when compared to disaster response and reconstruction activities.¹⁸ For example, the inclusion of disaster-resilient features in the design of new construction projects is estimated to increase construction costs by 1%. In comparison, the cost of repair and reconstruction of damage caused by climate-induced natural disasters is estimated to be 35-40% of total construction costs.¹⁹ A case study of the damage caused by Hurricane David (1979) showed that losses totaling ~4.2% of construction cost could have been avoided by investing an additional 1.9% of original construction costs in climate-resilient measures.²⁰

124. Due to the small economy, it is likely that Samoa will face fiscal constraints in using central government expenditures on expanding flood management beyond the GCF project at a sizable scale. By improving these systems with new and improved features that increase resilience to climate change and investing in the supportive development of public health, microenterprises, and hard infrastructure, GCF investment will help GoS strengthen the country's adaptive capabilities

125. The GCF project will implement measures to flood-proof infrastructure within the Vaisigano River Catchment. Investment into project interventions will contribute to safeguarding long-term socio-economic development. An example includes reducing vulnerability of major transport corridors; such as the east-west corridor over the Leone Bridge and other commercial links to climate risks. This will enhance the resilience of economic activity by maintaining connectivity and access to markets. In addition, it will enhance the safety and welfare of communities as they will have improved access to government services, such as health care and support for post-flood recovery.

126. **Address financial and technical barriers to address flood risks in the AUA:** Solutions to reduce the vulnerability of AUA from the current and future impact of heavy rains and cyclones require a large financial investment and long-term engagement, which the GoS cannot currently draw upon from either the domestic resources or the existing funding sources such as LDCF. Not only is the design and construction of river works and physical assets to withstand extreme flooding expensive, highly technical skills are needed for successful execution, which relevant departments such as MWTI, LTA and MNRE have limited capacities in. Further, the large capital investment required usually put river works / flood-proof infrastructure is beyond the scope of projects conventionally financed by bilateral donors or other environmental/adaptation funds that are available to the Samoa today. The scope envisaged in the proposed GCF project allows the GoS to address both the financial needs address flood risks as well as the long-term support to build the technical capacities within the Government to design, monitor and maintain the results expected from the GCF investment.

127. **Reaching the most vulnerable in the AUA:** The proposed GCF project will reduce the negative impact extreme flooding has on 26,000 people directly located in the AUA and another 37,000 people indirectly. The value of its involvement, in turn, is expressed in the form of reduced or avoided damages borne by the most vulnerable populations in terms of economic damages to houses, livelihoods and other public infrastructures and social disruptions.

128. **Catalyzing additional integrated flood management finance:** The scale of the proposed GCF project allows multifaceted barriers to be addressed in a comprehensive manner within a single programme framework which past donor support has not been able to do. In particular, this project has an element of supporting the SDS as an integral part of the project's sustainability and replication strategy for the results achieved. Without implementation of appropriate counter-measures for such climate risks, economic assets are threatened with damage of critical infrastructure while resources are likely to be diverted away from development spending, such

¹⁸ Kellett, J. and Peters, K. 2013. *Dare to prepare: Taking risk seriously*. Overseas Development Institute.

¹⁹ Pereira, J. 1995. *Costs and Benefits of Disaster Mitigation in the Construction Industry*. Caribbean Disaster Mitigation Project.

²⁰ Vermeiren, J., S. Stichter, and A. Wason. 2004. *Costs and Benefits of Hazard Mitigation for Building and Infrastructure Development: A Case Study in Small Island Developing States*.

as health and education; towards flood response and reconstruction efforts.

129. Without GCF involvement, Samoa and its vulnerable citizens will continue to be exposed to increasing threats from extreme flooding events. At best, international support for constructing a robust flood management project will come at a very slow speed. Yet, even then, it is probable that, because flood management is expensive, much of the resources would be dedicated to the construction itself, leaving out the possibility for building the country capacities and for sustainability. Eventually, left unaddressed, the loss and damage in the AUA will roll back progress made in economic development, particularly Samoa's successful transition from LDC Status to Middle Income Country (MIC) Status.

D.2. Exit Strategy

130. The proposed project has been designed through extensive consultations and involvement of government, NGOs, and CBOs to ensure ownership of the interventions and effectiveness of their impact. Relevant government departments and local communities have been involved in the proposed design and will be leading on implementation of project interventions. The topic of flood management is very real to a majority of Samoans given that many have been directly affected by their repeated occurrence.

131. The project builds on this commitment and ownership to ensure that the investments and impacts are sustained for the long-term. The project will be sustainable because it will remove key technical and capacity barriers in order to enhance resilience in flood management of the Vaisigano River Catchment.

River works:

132. Proposed river works and physical assets to be constructed/strengthened will protect the local community from inundation during flood events.

133. The selection of the intervention has been done to achieve long-lived protection measures with minimal maintenance. However, for the minimal maintenance that is typically required for hard infrastructure, such as the repair of the bridges or river works, or monitoring and repairing vandalism and visual wear and tear, GoS co-financing will cover such costs. For the O and M plan developed indicates that the costs associated to the river works (Activity 2.1, 2.3 and 2.4) would be approximately \$200,000/year. GoS has committed financial resources to cover these expenses during the lifespan of the project (See Annex IV).

Livelihoods:

134. Capacity building for upstream ecosystem enhancing activities as well as establishing producer groups will protect and revitalize the water catchment areas, including through agroforestry projects, forest-pastoral systems and microbusinesses. Trainings will be designed to ensure interventions are maintained over the long-term. As microbusinesses develop, stakeholders will facilitate market access links to the value chains of larger national and foreign-owned companies, ensuring business feasibility well beyond the duration of the project. In addition, commercial banks and government lending authorities will receive technical assistance to incorporate climate resilience into their lending criteria, and local construction companies will receive training in meeting new flood resilient building codes. Furthermore, the capacity of farmers to access financial resources, including through financial management training, will be enhanced through partnerships with several NGOs and government small business lending programs.

135. The Samoa Umbrella of Non-Governmental Organizations (SUNGO) which is a network of over 110 member organizations comprising of NGOs, CBOs, Civil Society Organizations (CSOs) and Trusts that provide alternative development options and assistance to community groups in Samoa has been, and continues to be consulted during the preparation of this project and will play a key role during the implementation of the project through upstream ecosystem response and outreach activities.

136. Programmes such as the SBEC that work closely with SMEs will also be involved in the upstream ecosystem based responses, thus ensuring that the results achieved by the GCF financed activities are sustained well beyond the lifetime of the project by these organizations. This project is therefore part of a broader suite of actions that the GoS is seeking support on in addition to its own resource commitments to address flood management from extreme events. GCF resources, once invested in the measures outlined in this proposal, will address a need that will not require additional investment for the next 30-40 years.

Drainage:

137. The project will support to upgrade nine drainage reticulation upgrades that were recognized to be of extreme importance for upgrading if flooding of the AUA was to be contained. The project will also include the upgrading of outfalls to move water away more quickly during a flood event. It was assessed that the annual O and M cost will be 1% of capital cost which is very reasonable. Activity 3.2.2 budget US\$10 million, therefore O and M cost for the in Activity 3.2.2 would be \$100,000/year. GoS has committed financial resources to cover these expenses during the lifespan of the project (See Annex IV).

Capacity building:

138. At the central government level, the Climate Resilient Investment Coordination Unit within MoF will receive capacity building as part of efforts to prepare GoS for GCF direct access in the future. The lessons drawn from this project will also feed into the broader programme that GoS ultimately will be operationalizing over the coming years with GCF and other resources. The broader programme will work in a phased approach, treating both consecutive geographic zones (starting with Vaisigano River Catchment to the Greater Apia Catchment and onwards to other macro- and micro-catchments in Samoa), as well as prioritized themes (starting with integrated flood management).

Programmatic approach:

139. A body of knowledge will be developed through these interventions that will contribute towards more sustained climate resilient solutions across the Pacific where other islands are confronted with similar flood management challenges. It is important to emphasize that building a climate resilient flood management programme is a new field in Samoa and many parts of the Pacific. Information and awareness gaps are still significant in the country in terms of water management and locally appropriate solutions. Through monitoring of the effectiveness of the proposed GCF investments, awareness raising support, targeting all the islands, exchange visits (bringing island representatives from non-target islands), collection and dissemination of public health data at the village level by MoH, and organization of regional knowledge sharing events, the project builds national and regional knowledge on effective flood management processes and climate resilient hard and soft infrastructure options. Moreover, in the final year of the project, a technical assessment will be carried out by an expert to review the effectiveness of the flood management measures put in place in the project.

140. This GCF project will become one of the first projects in the Pacific that delivers a comprehensive flood management programme solution for a densely populated, high economic impact area. The overall experience from the implementation of this project, therefore, will contribute significantly to the national and regional body of knowledge. Accumulation of such knowledge in turn becomes critical to effectively expand and maintain flood management programmes in the region.

E.1. Impact Potential

Potential of the project/programme to contribute to the achievement of the Fund's objectives and result areas

E.1.1. Mitigation / adaptation impact potential

141. The design of the proposed GCF project incorporates lessons and best practices from several other projects to bring about transformative impact that is effective, efficient and sustainable. These lessons include a) the use of locally- appropriate technologies based on information available that are expected to be most cost-effective; b) the effectiveness of comprehensive barrier removal strategy; c) an innovative approach for capacity development in the Samoa context; and d) the critical importance of leveraging available local resources for promoting longer-term autonomous adaptation. These lessons have been derived from experiences from previous LDCF projects and community-based adaptation initiatives in Samoa.

142. The Integrated Flood Management Programme would see hard and/or soft measures for adaptation through designing flood management interventions in the AUA. This is because the population of the AUA constitutes ~40% of the population of the entire country.²¹ In addition, loss-and-damages caused by Cyclone Evan in the AUA were ten times greater than those occurring in all but four of the districts in Samoa.²² Most of Samoa's economically important infrastructure occurs within the AUA. The high proportion of Samoa's population live in the AUA and the concentration of critical economic infrastructure in Apia make it more cost-effective to focus on implementation of flood protection measures in this area rather than spreading such measures across a number of districts.

143. The project has been designed to build on the recommendations of the PDNA regarding land-use management. At present, the population of Apia is growing as a result of urban migration. As such, it is imperative that the vulnerability of people and infrastructure in Apia to climate-induced flooding is reduced. For example, development along the Vaisigano River is vulnerable to flooding as a result of extreme precipitation events and coastal inundation.

144. GCF resources will be used to implement a combination of integrated watershed and flood management works including both hard and soft measures. This includes upgrading river works to cater to increased water flows during flood events (taking into account the likelihood of the increased frequency of extreme events), ensuring that infrastructure works (home dwellings, government and private sector buildings) are made more secure and provide adequate shelter in case of floods and their aftermaths. Additionally, the project will ensure that when floodwaters occur, the excess waters are channeled away through an effective, efficient, and fit-for-purpose drainage system. GCF resources will consequently play a critical role in assisting the urban population and economy to effectively manage the inevitable increased intensity and frequency of flooding.

145. This flood protection and watershed management will provide benefits to at least 26,000 people living within the AUA. Direct benefits from these interventions include: i) reduced risk of damage to public and private infrastructure/assets; ii) reduced possibility of loss of life; and iii) enhanced land value in flood-prone areas. Indirect benefits include: i) reduced losses in income/sales; ii) reduced costs of clean-ups, maintenance and repairs; iii) reduced costs of relief and response efforts; and iv) reduced possibility of health hazards. In addition to these 26,000 direct beneficiaries, the general population of Samoa -37,000 inhabitants, will benefit from the safeguarding of critical economic assets and learning that will be generated. For example, protection of bridge infrastructure in the AUA will benefit livelihoods across both Upolu and Savai'i as there will be more reliable access to markets for agriculture and trade goods.

146. In addition mid and upstream ecosystem and community based adaptation measures will enhance capture, infiltration, storage and delayed release of rainwater in soils and biomass, and water retention ponds will serve both climate smart agribusiness development and combating degradation of vulnerable ecosystems through appropriate agro-forestry land use practices. The improved upstream land management practices will reduce flood risks downstream in the AUA.

147. Activity 2.2 is also designed to support livelihoods, particularly those related to agroforestry. The project

²¹ Samoa Bureau of Statistics. 2011. *Population and Housing Census*.

²² GoS. 2013. PDNA. *Post-disaster Needs Assessment: Cyclone Evan 2012*.

will promote diversified livelihoods through participation in ecosystem enhancing value chains to develop resilient micro-businesses. Diversified livelihoods will improve household-level income, which will in turn promote savings and can be expected to catalyze larger investments into activities that result in improved ability to respond to and recover from climate-induced natural disasters. Possible outcomes of increased income-earning opportunities include: i) reinvestment into livelihood assets and production; ii) improved health and welfare, especially of children; iii) investments into education; iv) enhanced savings, especially for post-disaster recovery; v) investment in climate resilience of household or community assets (e.g. climate proofed housing evacuation centers); vi) improved nutrition; vii) clean water; and viii) sanitation. Such investments decrease climate vulnerability by reducing the impact of disasters on community/household assets (through climate proofing), increasing water and enhancing post-disaster recovery (through savings). Further, by focusing on ecosystem based adaptation activities, this intervention will ensure that the additional livelihoods created will either improve the resilience of the natural catchment area to withstand floods and/or accommodate flood water.

148. The activity has also been designed with a strong focus on gender considerations. The proposal has been drafted to ensure overall alignment of project activities with the specific needs of women and other vulnerable groups residing in the Vaisigano River Catchment. The implementation of business incubators focused on improving the Vaisigano River Catchment will cater specifically for the needs of women and youth. It will also result in enhanced capacities of communities to monitor, evaluate and communicate results and impacts of flood protection adaptation investments. The estimated number of beneficiaries for this portion of the project is 6,000 people.

E.1.2. Key impact potential indicator

<i>GCF core indicators</i>	<i>Expected tonnes of carbon dioxide equivalent (t CO₂ eq) to be reduced or avoided (Mitigation only)</i>	<i>Annual</i>	
		<i>Lifetime</i>	
	<ul style="list-style-type: none"> <i>Expected total number of direct and indirect beneficiaries, disaggregated by gender (reduced vulnerability or increased resilience);</i> <i>Number of beneficiaries relative to total population, disaggregated by gender (adaptation only)</i> 	<i>Total</i>	Direct: 26,000 Direct + Indirect: 37,000 inhabitants of the Greater Apia Catchment area
		<i>Percentage (%)</i>	14% of total population (direct); 20% of total population (direct +indirect)

149. The total number of beneficiaries who will be under flood management through the GCF investments in the Vaisigano River Catchment, were estimated with the support of the RiskScape platform.²³ Approximately 26,528 people in exposed area will benefit from the river works. The drainage master plan and the updated EWS will target all the population 37,000 inhabitants of the AUA.

150. For the ecosystem component of the project, 9,000 beneficiaries residing in 18 villages in the Vaisigano River Catchment will be offered specialized training to generate activities and business proposals to implement community-based adaptation measures. Of these 9,000 beneficiaries, it is expected that 50%, or 4,500 beneficiaries, will take up the training. Coupled with adequate business skills training, it is assumed that more than 25%, will develop business ideas that will increase incomes for themselves and their family.

E.2. Paradigm Shift Potential

Degree to which the proposed activity can catalyze impact beyond a one-off project/programme investment

²³ RiskScape is a collaboration between New Zealand's [GNS Science](#) and the [National Institute of Water and Atmospheric Research \(NIWA\)](#). RiskScape provides a modular framework to estimate impacts and losses for assets exposed to natural hazards, including flooding. The software combines hazard, asset and vulnerability modules through a data selection process to quantify a range of economic and social consequences. NIWA's generous contribution is here acknowledged.

E.2.1. Potential for scaling up and replication (Provide a numerical multiple and supporting rationale)



raising campaigns on new building codes that have been developed by GoS to hazard-proof infrastructure, including buildings. A key output will be translating the building code, which is a technical document, into key messages that can be received by a broad group of end-users. This knowledge will offer the user a better understanding of the general effects of flood damage on infrastructure and assist in developing solutions that will reduce vulnerability.

154. In output 2, GCF resources will support the construction and strengthen physical assets along the Vaisigano River to address flood risks. The proposed flood wall and embankment river protection works has been divided into four segments:

- Segment 1 - Vaisigano Bridge to Leone Bridge (GEF funds); and
- Segment 2, 3 and 4 - Leone Bridge to above Lelata Bridge (GCF funds).

155. There are three bridges crossing the Vaisigano River, namely Lelata, Leone and Vaisigano Bridges. Once Segments 2, 3 and 4 are constructed the Lelata Bridge will become a choke point within the Vaisigano River as the existing road deck level will be approximately 1.5m lower than the design flood water. The Lelata Bridge will therefore need to be rebuilt to maintain the designed minimum flood wall level and design flood capacity of the channelization works. Extension of floodwalls either side of the Leone and Lelata Bridges will be required to maintain the designed level of flood protection adjacent to the bridge abutments.

156. Output 2 will help reduce vulnerability of AUA to climate change induced hazards. Underlying activities include flood wall and embankment river protection and construction of a raised Lelata Bridge to maintain the design capacity of the proposed flood wall scheme.

157. In addition, the livelihoods activities will directly benefit the 30% of Samoa's population that lives in the AUA by reducing their risks of catastrophe flooding and increasing their resilience to flooding through infrastructure and improved construction. In addition, it will benefit directly 9,000 community members living alongside the Vaisigano River, who will benefit not only from reducing flood risk but also from value chain development for alternative income generating strategies. The programs undertaken in this area will be set up so that the institutions in charge of them will be able to continue them beyond the lifespan, geographical area, and scope of the project. In addition, the project is establishing partnerships with private companies, including hotels and international exporters that are demanding domestically grown, sustainable products.

158. Output 3 will develop a comprehensive stormwater master plan for the AUA and GCF resources will support nine specific priority upgrades and drainage outfalls. The AUA currently has no master plan for management of the urban stormwater network. Developing such a plan will lead to linking the stormwater systems to a wider stormwater network that can be upgraded according to recognized priority areas.

159. Lastly, the knowledge accumulation and lessons learned from the project is expected to have a replication potential beyond Samoa. Many Pacific SIDS face similar constraints in terms of accessing finance for addressing flood risks and obtaining the needed data on hydrological dynamics to even plan for such investments. Samoa's experience as a comprehensive barrier removal approach through GCF support will be shared in regional forums.

E.2.2. Potential for knowledge and learning

160. Implementation of concrete adaptation actions on the ground will constitute the primary learning experience, which will feed into all awareness, training and knowledge management actions facilitated and conducted by the project. The adaptation initiatives through this project such as river works, appropriate drainage systems, health surveillance systems and upstream ecosystems-based interventions and related youth employment programmes will generate a wealth of knowledge that will be acquired by the Samoans involved in the project and will benefit a large proportion of the Samoan population in building their capacities to adapt. The directly targeted trainings built into the different elements of the project will provide specialized technical skills for GoS and non-government technical staff as well as communities and businesses. The knowledge sharing elements will be beneficial not only for other areas of Samoa but to other Pacific islands as well as this would be one of the first projects in the Pacific to deliver a comprehensive flood management solution for a densely populated, high economic impact area.

161. Knowledge and learning is envisaged at multiple levels within this project. Firstly, at the policy and planning level, the feasibility studies conducted for future projects will be integrated by the GoS into their policy planning as

well towards a comprehensive programmatic approach to flood management. Secondly, the project increases potential for knowledge and learning of ecosystems-based approaches to water management, flood mitigation and health surveillance across multiple government sectors through targeted trainings at the technical level. Finally, it will increase the knowledge at the village and community levels of measures that can be taken to build climate-resilient homes, alternative livelihoods, entrepreneurial agribusiness and EWS.

162. More specifically, knowledge and learning will be applied with regards to the Health Surveillance System to track and manage flood-related disease outbreaks at the village level. GoS officials, especially from the MoH will be provided with targeted trainings on linking health and climate information and how to manage this information in order to forecast public health risks caused by flooding. Health practitioners will be trained on dealing with flood-related emergencies and at the village level, councils will be trained on how to prepare for and evacuate flood-related victims. This will become a part of the additional support through this project to the EEWS in Samoa, which while well advanced already does not cater for flood-related early warnings. Targeted trainings for technical officers at MNRE to integrate flood forecast into the EWS is part of the projects efforts to improve the technical capacities of institutions in Samoa towards climate change-induced hazards. This will also go hand in hand with the activities to raise awareness on flood-related EWS, targeting health practitioners and village councils.

163. The project has included capacity building for upstream ecosystem enhancing activities that will protect and revitalize the water catchment, including: agroforestry projects, forest-pastoral systems and microbusinesses. This forms a strong element of knowledge and learning that will benefit communities and the businesses alike. From a business incubation angle, GCF resources will be used to extend the existing lending, guarantee, and training programs to new businesses that contribute to flood management in the catchment area, established under the SBEC and Development Bank of Samoa. Trainings will be designed to ensure interventions are maintained over the long-term.

164. To date, the SBEC has not had a strong focus on climate change resilience. GCF resources will allow the SBEC to strengthen and extend its services to SMEs and vulnerable populations, particularly women and youth, to enhance their resilience to climate change and reduce downstream flood risks. Through this these trainings and the knowledge acquired, microbusinesses can develop and improve their capacity to access market links to the value chains of larger national and foreign-owned companies, ensuring business feasibility well beyond the duration of the project.

165. Financial management trainings for farmers will improve the capacity of farmers to access financial resources, which will also be enhanced through partnerships with several NGOs and government small business lending programs. The already established relationship of this project with SUNGO will be a strong link these trainings as SUNGO has not only provided input for government policy and planning processes on issues impacting quality of life for the people of Samoa but is also part of a regional NGO network involved in implementing international projects as well as trainings. NGOs will provide training, monitoring, and mentoring of village based multi-disciplinary frontline workers who will in turn train community members in resilient livelihoods, and in linking households with green jobs and agro processing markets.

166. Overall for the ecosystem component of the project, 6,000 beneficiaries residing in 18 villages in the Vaisigano River Catchment will be offered specialized training to generate activities and business proposals to implement community-based adaptation measures. Of these 6,000 beneficiaries, it is expected that 50%, or 3,000 beneficiaries, will take up the training. Of these 3,000 beneficiaries receiving training, it is assumed that 25%, or 750 people will develop a business plan that is approved for a microfinance loan ranging from 500 Tala to 30,000 Tala. Coupled with adequate business skills training, it is assumed that more than 95%, or 715 beneficiaries will develop business ideas that will increase incomes for themselves and their family.

167. Finally, a body of knowledge will be developed through these interventions that will contribute towards more sustained climate resilient solutions across the Pacific where other islands are confronted with similar flood management challenges. Through monitoring of the effectiveness of the proposed GCF investments, awareness raising support, targeting all the islands, exchange visits (bringing island representatives from non-target islands), collection and dissemination of public health data at the village level by MoH, and organization of regional knowledge sharing events, the project builds national and regional knowledge on effective flood management processes and climate resilient hard and soft infrastructure options. Moreover, in the final year of the project, a technical assessment will be carried out by and expert to review the effectiveness of the flood management

measures put in place in the project. The M and E plan (Section H.2) will include provisions for generation of lessons learned and best practices (reports, publications, and other communication and knowledge products for various media) to not only support adaptive project management but also to inform learning across national/sub-national/community levels within the country and region.

E.2.3. Contribution to the creation of an enabling environment

168. This project forms a part of a broad and comprehensive ridge-to-reef approach on integrated flood management in the AUA identified by the GoS. The approach will work on programmatic barriers in a phased manner, treating both consecutive geographic zones (starting with Vaisigano River Catchment to the Greater Apia Catchment and onwards to other micro and macro catchments in Samoa), as well as prioritized themes (starting with integrated flood management). Through various interventions in this project that focuses on capacity building (both technical and knowledge-based) and private sector partnerships (especially focusing on innovative approaches) an enabling environment will be created towards the achievement of the broader development goal of the GoS envisaged under the SDS. It will also contribute towards upscaling and replication in the broader Pacific region context as this project is one of the first in the region to address flood management in a comprehensive manner.

169. The infrastructure components of this project is focused on the Vaisigano River Catchment area with emphasis on structural measures of flood control including riverbank protection and reconstruction of bridges. Built in within the project are numerous elements of capacity building focusing on the technical capabilities and know-how of essential GoS bodies such as MNRE and LTA that will benefit future projects that will come out of the broader programmatic context. Furthermore, this project is specifically supporting the development of feasibility studies for the preparation of similar activities in other catchments in the AUA with this intention. These feasibility studies will focus on flood mitigation measures that are necessary for optimal flood management in Vaisigano river catchment area as well as adjacent critical catchments, including flood-proofing the critical Central Cross Island Road. It will include sectors such as water/reservoir with co-benefits, road/infrastructure, drainage and sanitation/sewage. These feasibility studies designed to develop a cross-sectoral approach is contributing towards removing a barrier in planning within GoS where concentrated development largely overlooks integrated planning to manage risks such as flooding posed by climate-induced natural disasters.

170. The project is expanding the existing EWS. With this, a Health Surveillance System is also being established which is designed to help prepare for higher occurrences of water- and vector-borne diseases as well as flood-related injuries and trauma by building the capacities of relevant Government entities such as the MoH as well as health practitioners and village councils. The Health Surveillance System is an innovative approach that electronically integrate health and climate data on spatial and temporal distributions in order to determine disease outbreaks in a much quicker timeframe. See paragraph 50 for additional information.

171. This project is supporting the health professionals, enabling them to access, understand, interpret and apply climate events to health specific outcomes, thereby increasing the capacity for health professionals and affiliated groups (Medical, Nursery and Midwifery, Allied Health Professionals, Health Planners and Policy Analysts, Government Stakeholders, Civil and CBOs) to improve the public health response to at-risk populations residing in the Vaisigano River Catchment. See paragraph 51 for additional information.

172. The project will support the translation the new building code, which contains a clear section on hazard prone infrastructure elements (buildings, roads, etc.) and hazard-proofing, to non-technical visual aids and tools will create a more enabling environment to the enforcement of the code. The tool will provide visualization of the effects of floods on infrastructure and livelihoods and provide recommendations that can help population spring into action together with the private sector and civil society.

173. The ecosystems responses upstream for decreased flows during extreme weather events is a key enabling activity for the sustainability, upscaling and replication of the project's activities and it does so through private sector partnerships. Enterprise development focused on reducing flood risk through strengthening the participation of vulnerable households in climate resilient agri-businesses by supporting technology transfer, financial support, business skills development, and access to markets to ensure financial viability and sustainability. This project will work with existing government programs such in partnership with the WIBDI and SBEC to increase uptake of climate-resilient packages that help farmers access resilient technological inputs, information, and finance, and to access markets for climate resilient products, including through linkages with private companies. It will pursue

private sector partnerships also through the tourism sector, such as hotels that have confirmed demand for domestically grown produce, international companies that are committed to supporting smallholder farmers in Samoa,²⁴ and institutional stakeholders that are concerned with lack of availability of affordable produce in Samoa and correlated high obesity rates.

E.2.4. Contribution to regulatory framework and policies

174. This project is in line with the SDS, as well as the orientations of the new National Environment Sector Plan (2017–21). The project strongly builds on the achievements under the NAPA follow up projects. The intervention reacts to part of the elements outlined by the GoS in their letter to the UNDP, requesting support in the elaboration of the first submission to the GCF. In order to integrate more of the requested elements into a longer term approach, the GCF team has simultaneously been working on a Programmatic Approach, focusing on integrated flood management of not only Vaisigano River Catchment but the AUA and for a longer period of time.

175. Specifically, the GoS has aspirations to pursue an integrated ridge-to-reef approach that encompasses integrated catchment management, construction of a resilient flood protection network to manage river flows and the drainage network, establishment of hydro-power system, sustainable water supply and resilient infrastructure (roads, bridges, port) capable of withstanding extreme weather. This project is in line with this approach, the SDS and some of the key policies, strategies and plans of GoS namely, National Climate Change Policy (2000) and National Policy to Combat Climate Change (2007) which outline Samoa's response to climate change, providing a national framework to mitigate and adapt to climate change; National Adaptation Program of Action (NAPA, 2005) provides an overview of climate change impacts and vulnerabilities, identifies adaptation strategies and outlines the process used to select and priorities' specific adaptation projects for priority sectors. NAPA is the key document for the identification of the most urgent and immediate adaptation needs from the adverse impacts of climate change; Initial and Second National Communication to the UNFCCC which identified water resources, water resources, health, agriculture, fisheries, biodiversity and infrastructure as priority sectors. The National Environment Strategy and Plan (2017 – 2021) (NESP) and the Samoa National Infrastructure Strategic Plan (SNISP) the overall vision and goal for the environment sector and economic infrastructure respectively including improved environmental sustainability and disaster resilience through green growth. Furthermore, the national policy and legal framework for disaster risk reduction in Samoa is comprised of the *Disaster and Emergency Management Act 2007*, the *National Disaster Management Plan 2011*, the National Action Plan for DRM (2011 – 2016) (which also serves as the national DRM policy), *Fire and Emergency Service Act 2007*, the Red Cross Response Plan, the National Policy on Combating Climate Change (2005), the National Adaptation Programme of Action (2005), the National Tsunami Plan, the Tropical Cyclone Plan, and various statutory and non-statutory pieces of legislation amongst relevant agencies.

176. Over time, Samoa has undertaken a series of assessments on the effectiveness of national initiatives for climate change adaptation related to flood management and other climate-induced disasters. These assessments have generated recommendations to strengthen and coordinate climate change adaptation at the national and specific area level. These assessments include the ones done under the: i) NAPA; ii) National Capacity Self-Assessment (NCSA, 2007); iii) the National Communications to the UNFCCC (INC, 1999; SNC 2009); iv) National Strategy for a Climate-Resilient Samoa (otherwise known as Climate Resilience Investment Programme (CRIP 2011)); v) Climate Public Expenditure and Institutional Review (CPEIR, 2013); vi) PDNA, 2013; vii) Samoa's Intended Nationally Determined Contribution (NDC, 2015) for the UNFCCC COP21, viii) Samoa's National Environment Programme (SNEP 2017 – 2021), ix) UN-Habitat Vulnerability Assessment, x) EWACC's IWMP development, and most recently the development of Samoa's National Adaptation Plan as well the assessments integrated as part of Samoa's implementation program of the Samoa Pathway and Sustainable Development Goals. These assessments provided substantial information about the strengths and weaknesses of the institutional setting for climate change adaptation and the opportunities and threats for its further development. They have been of importance to feed climate change adaptation information and interventions into the various policies and institutional coordination structures that are mandated to act on climate change.

E.3. Sustainable Development Potential

Wider benefits and priorities

²⁴ Such as Dr. Bronner's coconut oils

E.3.1. Environmental, social and economic co-benefits, including gender-sensitive development impact

177. The proposed GCF project will contribute towards the following sustainable development goals in Samoa. Of particular relevance is the contribution the project makes to SDG Goal 13 on taking urgent action to combat climate change and its impacts. The project directly contributes towards target 13.1 on strengthening resilience and adaptive capacity to climate related hazards and natural disasters in all countries and target 13b, promoting mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing states, including focusing on women, youth and local and marginalized communities. The project is also a direct contribution to Samoa's aspirations with respect to Goal 11: making cities and human settlements inclusive, safe, resilient and sustainable (especially target 11.5): By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations).

ECONOMIC

178. The implementation of river works on the Vaisigano River will negate a significant amount of flooding of the AUA. As numerous cyclones that have passed through Samoa in the last ten years have demonstrated, the volume of water that discharges along the Vaisigano River is far more than what the natural banks can accommodate. Without infrastructure to manage excess flows, and direct excess water to the sea, the end result is flooding of the AUA. Cyclone Evan demonstrated this vulnerability when damage and loss was estimated at US\$203 million, including temporary displacement of approximately 7,500 people, including 6,000 people when the Vaisigano River broke its banks. Further, numerous economic infrastructure, including bridges, community assets, homes and household goods were damaged. The tourism sector, which contributes to more than 20% of the GDP,²⁵ is also at risk as tourism developments are generally located on the coast, and consequently exposed to the constant disruption of business as a result of intense flooding events and in the worst case, destruction of assets as a result of climate-induced natural disasters. Furthermore, vulnerability in disasters is most often identified around women, the elderly, children and youth, and people living with disability.²⁶ The latest household income and expenditure survey (HIES) of 2013-14 shows that while the incidence of severe hardship as measured by the food poverty line has declined in total for Samoa between 2002 and 2013-14, it increased in the AUA.

179. The vast majority of households do not have the financial capital to implement household-level interventions for climate change adaptation. The limited disposable income of most Samoan households means that tendencies for short-term gain take precedence over investment into longer-term measures for climate resilience. Households are not able to save for contingencies, nor are they able to proactively implement interventions that will reduce their vulnerability to the effects of climate change. Communities and infrastructure within these catchments will consequently remain exposed to flood risks during extreme rainfall events. Furthermore, there is limited public access to catastrophe insurance in Samoa, with only 20% of businesses and 10% of residential premises having cyclone insurance. The GoS is unable to implement the large-scale flood protection infrastructure that would be required to protect communities.

180. The GCF financed interventions will help avert damages to infrastructure and will also avert lost earnings and economic activity, including to the tourism sector, as a result of the disruptions that flooding otherwise creates. It will also support a reduction in the recovery costs to the GoS directly while avoiding additional burden on donor funds which may be diverted from development activities (such as education or healthcare) during such catastrophes. The national/local economy can be brought back on track much faster, with as little and more short-lived economic and social disruptions as possible from such disaster events while reducing the economic impact on businesses and households who are unable to access insurance.

181. The interventions will also result in income generating activities and green jobs for vulnerable groups, including women and youth, relating to adaptation which also contributes to the improvement of household welfare. The project will assist communities in transitioning to ecosystem enhancing activities through the development of business incubators focused on flood prevention as well as preserving and revitalizing the water catchment,

²⁵ Williams, S., Tait, A., Porteous, A., Miville, B., Ramsay, D. (2016). Situation Analysis, Climate Early Warning System and Tourism Sector Needs in Samoa. Prepared for Samoa Tourism Authority. NIWA Client Report No. CHC2016-045, SAM16501. 46p; GoS. 2016. Draft SDS 2017 – 2020.

²⁶ Feasibility Study 2016, *Post Disaster Needs Assessment for Cyclone Evan 2013*, and *EWACC Socio-cultural gender considerations 2014*

including: agroforestry projects, forest-pastoral systems, or other eco-system-based microbusinesses such as tourism or value-added production within the Vaisigano River Catchment.

182. Targeted technical training coupled with pathways to start a business will allow beneficiaries to improve the sustainability and profitability of their livelihoods resulting in direct as well as indirect improvements in climate resilience. Possible outcomes of increased income-earning opportunities include: i) re investment into livelihood assets and production; ii) improved health and welfare, especially of children; iii) investments into education; iv) enhanced savings, especially for post-disaster recovery; v) investment in climate resilience of household or community assets (e.g. climate proofed housing evacuation centers); vi) improved nutrition; vii) clean water; and viii) sanitation. Such investments decrease climate vulnerability by reducing the impact of disasters on community/household assets (through climate proofing), increasing water and enhancing post-disaster recovery (through savings). Multiplier benefits will result from activities related to the financing of flood-management measures that community groups can implement upstream of the Vaisigano River Catchment, especially on ecosystems based solutions involving forestry and agroforestry that can reduce excess flows during periods of extreme rainfall and will ensure that the additional livelihoods created will either improve the resilience of the natural catchment area to withstand floods and/or accommodate flood water. Finally, the alternative income generating activities will provide vulnerable groups in Apia society with resources to both climate proof their dwellings as well as build financial resilience to future flooding events.

ENVIRONMENTAL

183. The project has significant environmental benefits arising from the improved riverbank protection, drainage infrastructure, strengthened ecosystems resilience, increased biodiversity and improved water quality. The environmental damage due to floods will be reduced protecting coastal flood plains as well as communities that are dependent on them. The ecosystems based response upstream contributes towards reforestation and improved agroforestry through bioengineering to regenerate vegetation cover and stabilize hill slopes. Strengthening the habitat will also be invaluable to those downstream as well. The minimal and fine scale environmental impacts, such as from acid sulfate soil, is minimized by the detailed risk mitigation measures undertaken at various phases of the project.

SOCIAL

184. The project will generate a range of social benefits that will positively affect the overall well-being of the Samoan people. The project interventions are going to contribute towards minimal disruption to the lives and livelihoods of the people living in the AUA due to cyclones and floods. Not only does a robust river bank protection and drainage system brings in the perception of safety, it protects economic, agricultural, public, cultural activities and medical services which in turn increases the level of resilience in a society.

185. Samoa is also experiencing a range of climate change-induced impacts, many of which are increasing the burdens on the public health system. The most significant include the increased prevalence of climate-related water-borne, vector-borne and food-borne diseases, as well as traumatic injuries and deaths from extreme weather events such as floods. Furthermore, such events can increase mental health problems (from loss of land, livelihoods and population displacement as well as the mental health impact of natural disasters) while compromising food security and heat-related illnesses. These problems are likely to be borne disproportionately by certain vulnerable sectors of the population; the very poor, young children, the elderly, people with disabilities, and people with pre-existing illnesses (e.g. NCDs).²⁷

186. Continuous monitoring of public health threats along with health service capacity is essential to track disease trends and possible outbreaks caused by such events. This project is supporting the establishment of a health surveillance system as part of the early warning system which will develop a tracking system to review weather and climate-sensitive health data on spatial and temporal distributions in order to determine disease outbreaks in the Vaisigano River Catchment within 24 hours. The project will electronically integrate health and climate information so that public health practitioners can easily interpret it and better inform decision-making. Finally, project funding will go toward building capacity for health professionals to access, understand, interpret and apply climate events to health specific outcomes, thereby increasing the capacity for health professionals and affiliated groups (Medical, Nursery and Midwifery, Allied Health Professionals, Health Planners and Policy Analysts,

²⁷ World Health Organization, *WHO Multi-Country Cooperation Strategy for the Pacific 2013-2017*

Government Stakeholders, Civil and CBOs) to improve the public health response to at-risk populations residing in the Vaisigano River Catchment.

E.4. Needs of the Recipient

Vulnerability and financing needs of the beneficiary country and population

E.4.1. Vulnerability of country and beneficiary groups (Adaptation only)

187. Apia is located on the north coast of Upolu Island. With an urban population of 20% in the AUA²⁸ and an urbanization rate of 0.6 %/year (2011 census), the impacts of climate change, especially extreme events, is of priority concern to the GoS. The AUA with a total land area of 61km², is characterized by a narrow, low lying, coastal plain with Mount Vaea and highlands bordering the AUA in the south from east to west.²⁹ Most of Samoa's economically important infrastructure is located within the AUA. Extensive urban development, including peri-urban development and commercial agriculture in the catchments remain extremely vulnerable to adverse effects of climate change. The expected rapid urbanization of AUA has and will continue to result in greater exposure of infrastructure to the climate risks identified above.

188. Damages caused by Cyclone Evan in the AUA was ten times greater than those occurring in all but four of the districts in Samoa. Small catchment areas and steep slopes; coupled with stretched drainage, result in rapidly rising water levels during rain events. These problems are compounding ongoing development challenges including deforestation in upper watershed areas that reduce infiltration and increase run-off. The GoS has commenced work on many of these issues, but as a result of events such as Cyclone Evan, some of the work has been impacted and more work is needed. Flooding of the Vaisigano River was particularly evident during the cyclone, necessitating the evacuation of local communities. About 6,000 people were evacuated after high winds damaged homes when Vaisigano River broke its bank. The GoS immediately called for international assistance.³⁰ The damage to the Leone Bridge disrupted a major east–west transport corridor and destruction of road infrastructure affected other commercial links. Further, the drainage system was unable to cope with these extreme events which resulted in extensive flooding. In addition to the Vaisigano River, four other major rivers, these being the Gasegase, Fuluasou, Loimata o Apaula and Fagalii Rivers all flow through the AUA. The high proportion of Samoa's population living in the AUA, the concentration of critical economic infrastructure in Apia, and Apia's exposure to natural hazards necessitate that this work be undertaken as a priority and as such, is the focus of this project.

189. Settlements are concentrated in coastal areas with approximately 70% of the population living and earning their livelihoods within one kilometer of the coast.³¹ As a result, critical infrastructure, such as hospitals, government buildings, schools, places of employment, and the international airport, is also predominantly located in the coastal zone.

190. These infrastructure and livelihoods are at risk to flooding caused by extreme rainfall events and coastal inundation during storms. Moreover, next to flooding, roads and other infrastructure (power supply, health institutes, communication) in Samoa are exposed to a range of climate risks, including but not limited to: i) sea level rise; ii) storm surges and wave action during cyclones; iii) landslides during extreme rainfall events; and iv) accelerated deterioration of road surfaces owing to extreme weather and rising water tables. Transport infrastructure is vulnerable to flood events. At present, the GoS considers maintenance of the approximately 2,340 kilometers of road and 52 bridges to be a priority for promoting connectivity and access of communities to inter alia economic growth, provision of public services including small holder livelihoods.³²

191. Much of the impact of climate change is felt by individual households. The vast majority of households do not have the financial capital to implement household-level interventions for climate change adaptation. The limited disposable income of most Samoan households means that tendencies for short-term gain take precedence over investment into longer-term measures for climate resilience. Households are not able to save for contingencies, nor are they able to proactively implement interventions that will reduce their vulnerability to the effects of climate

²⁸ Samoa Household Income and Expenditure Survey 2013 / 14 Tabulation Report; Samoa Bureau of Statistics, Population and Housing Census 2011; The PUMA through its Act reform proposes the AUA as the four districts Vaimauga East and West, Faleata East and West.

²⁹ UN-Habitat, 2014. Apia, Samoa - Climate Change Vulnerability Assessment

³⁰ PDNA, 2013

³¹ EWACC prodoc, 2013.

³² EWACC prodoc, 2013.

change. With the GoS being unable to implement the large-scale flood protection infrastructure that would be required to protect communities given their financial resources, both communities and infrastructure within these catchments will consequently remain exposed to flood risks during extreme rainfall events.

192. In Samoa, tourism contributes to more than 20% of the GDP.³³ It is also at risk as tourism developments are generally located on the coast, and consequently exposed to the constant disruption of business as a result of intense flooding events and in the worst case, destruction of assets as a result of climate-induced natural disasters.

193. Despite the minimal contributions to global greenhouse gas emissions, Samoa is disproportionately burdened with the significant impacts from climate change risks. The root cause of this adverse condition is its high exposure and vulnerability to climate hazards, combined with limited adaptive capacity. A number of environmental, economic, and socio-political factors contribute to its vulnerabilities, and leads to increased risks of climate change impacts in Samoa.

194. Over and above the baseline development challenges, climate change impacts are putting additional strains on Samoa's efforts towards attaining sustainable development. Available climate change projections suggest that Samoa will face more frequent and extreme rainfall events. The increase in frequency and severity of cyclones expected from climate change threatens the sustainability of infrastructure in the long-term and potentially can set back Samoa by decades in terms of its development agenda.

E.4.2. Financial, economic, social and institutional needs

195. The project/programme addresses the following needs:

- (a) Economic and social development level of the country and the affected population;
- (b) Absence of alternative sources of financing (e.g. fiscal or balance of payment gap that prevents from addressing the needs of the country; and lack of depth and history in the local capital market); and
- (c) Need for strengthening institutions and implementation capacity.

196. Economic and social development level of the country and the affected population:

- (a) Avoided costs of remedial infrastructural repairs after extreme weather events can now be invested in boosting green economy;
- (b) Decrease in flood related health costs (both physical and mental) will provide both government and Samoans with a higher portion of income to be spent on investments in wellbeing;
- (c) Increase in flood-related employment will provide members of vulnerable groups with alternative income generating activities;
- (d) Adapted land-use practices will boost agricultural production both in quantity as in diversity, providing better market penetration for high end agricultural commodities; and
- (e) Ecosystem based adaptation measures will protect vulnerable ecosystems from overexploitation and provide a better refuge for endangered flora and fauna;

197. Absence of alternative sources of financing:

- (a) Current budgetary capability of GoS can only focus on short- and medium term flood prevention efforts, with GCF it can also tackle long term hazards.

198. The need for strengthening institutions and implementation capacity:

- (a) Micro-assessments of the implementing partners will provide opportunities for capacity building;
- (b) Integrated approach to catchment planning and management will improve coordinating capacity of implementing partner for more effective coordination of joint efforts.

³³ Williams, S., Tait, A., Porteous, A., Miville, B., Ramsay, D. (2016). Situation Analysis, Climate Early Warning System and Tourism Sector Needs in Samoa. Prepared for Samoa Tourism Authority. NIWA Client Report No. CHC2016-045, SAM16501. 46p; GoS. 2016. Draft SDS 2017 – 2020.

E.5. Country Ownership

Beneficiary country (ies) ownership of, and capacity to implement, a funded project or programme

E.5.1. Existence of a national climate strategy and coherence with existing plans and policies, including NAMAs, NAPAs and NAPs

199. The GoS has invested heavily in developing a comprehensive and systemic approach to water resources management in Samoa. The implementation of IWMP for the catchments serves this purpose. While the development and enforcement of water management plans (WMPs) have been delayed by limited capacity for design and implementation, in the AUA, WMPs have been developed for the Vaisigano and all rivers except for the Fagalii River. The proposed interventions are fully in line with the WMPs and will help Samoa operationalize these plans. Without the effective implementation and the upgrading of public assets, urban planning and infrastructure construction in the AUA will remain vulnerable to the projected effects of climate change.

200. This is fully in-line the SDS and its priority areas. These priorities are further reflected and unpacked in the NESP and guides the development of the Samoa's National Adaptation Plan (currently under development). The details of the priority areas and components (as highlighted in section B.1) is developed based on a series of assessments (NAPA, NCSA, INC, SNC, CRIP, CPEIR, PDNA, NDC SNEP) on the effectiveness of national initiatives for climate change adaptation related to flood management and other climate-induced disasters. All these assessments has highlighted the vulnerability of the AUA. Further, the next steps after the completion of the five NAPA projects has recommendations along the lines of improving Apia draining system through taking forward the finalized Apia Spatial Plan and building the capacity of MNRE and other ministries to have the technical skills required to implement climate change projects as well.

201. This project is also closely linked to Samoa's country priorities of the UNDAF where Outcome 1.1 is that by 2017 the most vulnerable communities across the PICTs are more resilient and select government agencies, CSOs and communities have enhanced capacity to apply integrated approached to environmental management, climate change adaptation/mitigation and disaster risk management.

202. The MoF is the implementing partner/ Executing Agency for project and will serve as chair of the steering committee for this project, along with two other on-going climate related projects, that of the National Adaptation Fund (NAF) and the Pilot Programme for Climate Resilience (PPCR). MNRE, LTA and MWTI are key ministries in this project with regard to implementation, and MoF with regard to administration, strategic coordination and steering. MoF through its Economic Policy and Planning Division (EPPD) is responsible for the coordination of the country's 14 sectors that contribute to the national development strategy and program objectives in line with a relatively recently adopted sector-wide approach to development. EPPD responsibility for sector coordination puts the ministry in the best position for facilitating the development of necessary cross-sector mechanisms and structures such as those related to better management of climate change and disaster risk management. Finally, MoF has been the implementing partner of numerous multilateral institution led development initiatives, which gives the ministry extensive experience with international accounting and reporting procedures as well as donor coordination. MoF is also the NDA for the GCF. MoF is also the lead agency in carrying out fiduciary responsibilities as well as implementation of public financial management reforms. MoF with the support of MFAT immediately facilitates the mobilization of resources for recovery following major events ensuring a smooth transition from emergency to early recovery

203. MNRE is the largest repository of knowledge and experience on climate and natural resources in the country, with a number of highly trained staff in areas from hydrology to land registry and management to urban planning and beyond. MNRE is also responsible for producing the key policy documents that guide climate change programming for the country, including the National Policy Statement on Climate Change and the NAPA. It is the designated secretariat for the National Climate Change Country Team (NCCCT), members of which include the CEOs of relevant ministries. The NCCCT has served as the key coordination mechanism for national response to climate change initiatives in the past, but has not remained active. Further, MNRE has been the traditional UNDP GEF implementing partner for Samoa in past years and has amassed experience with both UNDP protocol and GEF reporting procedures. Recently, it has even set up a separate division within the ministry dedicated to managing all GEF administrative work and communications.

204. The MWTI is the government entity principally responsible for establishing, regulating, promoting and monitoring transport and infrastructure legislation and policy to ensure safe, secure and viable transportation modes and infrastructure assets. It focuses mainly on airport, road and port initiatives, but MWTI is also the national ministry in charge of developing, disseminating and monitoring specifications for the national building code, which has been revamped to accommodate the country's objectives in connection with climate change, disaster risk management and "building back better" philosophy. In this area, MWTI has considerable construction experience of relevance for the development of this GCF project.

205. The LTA is the third partner in the implementation of the project brings together the road asset management and road use management functions under the *Land Transport Authority Act 2007*. The prime objective is to provide a safe and environmentally friend land transport networks for Samoa.

E.5.2. Capacity of accredited entities and executing entities to deliver

206. The project will be implemented following UNDP's NIM (see para 109).

207. UNDP's comparative advantage for the proposed GCF project includes considerable support to GoS on climate change adaptation and DRM in coastal areas. UNDP has initiated several flagship development programmes, including the: i) Private Sector Support Facility; ii) MDG Acceleration Project; iii) Community-Centered Sustainable Development Programme; iv) Tsunami Early Recovery Project; and v) the Tourism Tsunami

208. UNDP assisted GoS with the formulation of its NAPA. UNDP also supported the implementation of projects to address NAPA priorities in a cohesive and programmatic framework. This includes UNDP-supported adaptation projects underway in the agriculture, health, coastal management and forestry sectors. The proposed GCF project will build on UNDP's experience in implementing these adaptation projects using an integrated programmatic approach.

209. UNDP has supported GoS to access large amounts of development funding, including more than US\$20 million in recent years. Projects related to climate change include:

- (a) Integrating Climate Change Risks into the Agriculture and Health Sectors in Samoa (LDCF);
- (b) Integration of Climate Change Risk and Resilience into Forestry Management (LDCF);
- (c) Pacific Adaptation to Climate Change (LDCF);
- (d) Pacific Islands Greenhouse Gas Abatement through Renewable Energy Project;
- (e) Enhancing resilience of coastal communities of Samoa to climate change (Adaptation Fund);
- (f) Strengthening Multi-Sectoral Management of Critical Landscapes (GEF);
- (g) Enhancing the Resilience of Tourism Reliant Communities to Climate Change Risks (LDCF); and
- (h) Economy-Wide Integration of Climate Change Adaptation and Disaster Risk Management (EWACC).

210. These resources have been used to enhance Samoa's climate resilience in the ways listed below.

- (a) Mainstreaming climate change into sectoral planning for tourism, agriculture, health, forestry and coastal protection;
- (b) Strengthening climate information services such as a network for climate monitoring and provision of tailored information on climate change to the various sectors;
- (c) Enhancing technical capacities on climate risk and hazard mapping, early warning systems, remote sensing, cost-benefit analyses for selection of adaptation options and the use of climate information to inform adaptation strategies;
- (d) Strengthening finance and budgeting capacities through the CPEIR, which assisted the various sectors to analyses public expenditure on climate change, design markers for climate change adaptation and identify budget gaps and opportunities for planning; and

(e) Supporting communities in the implementation of adaptation interventions through demonstrations of agriculture, watershed management, coastal protection and health.

211. UNDP's multi-country office in Samoa has numerous staff experienced in the fields of climate change adaptation, disaster risk management (including disaster prevention and recovery) and natural resource management. The office has established relationships with all ministries executing the GCF project. Technical aspects of project implementation are supported by a dedicated technical advisor based in Bangkok and a global senior technical advisor. The global network of the region-based advisors enables sharing and dissemination of knowledge beyond the country and region. The operational staff of UNDP Samoa has long-standing working relations with both MNRE and MoF. In addition, UNDP has project operational support mechanisms that are provided to line ministries such as the MAF and MoH. This will enable effective implementation of project processes that will include an established system for quarterly work planning and review of project performance. UNDP's use of the NIM has built capacity for project management and reporting in GoS. This will prove beneficial for supporting ongoing partnerships between UNDP and GoS for project implementation. UNDP's emphasis application of the Human Rights Based Approach and its emphasis on gender equality in development programming will ground the implementation of the proposed GCF project on these important development principles.

212. The UNDP multi-country office's comparative advantage in the implementation of this project lies in its experience with effective facilitation of partnerships with fellow UN Agencies and regional organizations. In particular, UNDP has experience in collaborative partnerships with agencies that are party to the Council of Regional Organizations of the Pacific, such as SPREP, SPC/SOPAC, SPTO and several NGOs.

213. Technical aspects of project implementation is supported by a dedicated technical advisor based in Bangkok and a global senior technical advisor. The global network of the regional based advisors enables sharing and dissemination of knowledge beyond the country and region, drawing on best practices from projects with similar elements. UNDP's comparative advantage for GCF focal areas lies in its global network of country offices –such as the UNDP Multi-Country Office in Samoa – and its experience in supporting integrated policy development, human resources development and institutional strengthening as well as promotion of NGO and community participation. This experience means that UNDP is well-placed to assist GoS Samoa in designing and implementing this project in a manner that is consistent with the LDCF mandate as well as national development planning.

214. UNDP's comparative advantage for GEF focal areas lies in its global network of country offices, such as the UNDP office in Samoa, and its experience in supporting integrated policy development, human Resources development and institutional strengthening as well as promotion of NGO and community participation. This experience means that UNDP is well-placed to assist GoS Samoa in designing and implementing this project in a manner that is consistent with the LDCF mandate as well as national development planning. UNDP's added value is also evident as described below.

- (a) Accountability: a track record of quality management of development finance as well as M&E and reporting on project implementation;
- (b) Technical Expertise: a large number of experienced and qualified staff with expertise in a number of relevant fields (e.g. climate change adaptation, development planning) in country offices and regional headquarters, as well as a world-wide knowledge network of specialists;
- (c) Regional and global cooperation: experience with developing synergies and cooperation at the regional and global levels, including through initiatives for North-South and South-South collaboration; and
- (d) Coordination with other UN agencies: a mandate to support coordination and collaboration between other UN agencies as leader of the UN Development Group.

215. UNDP has a proven ability to: i) formulate project proposals; ii) collaborate with development partners and donors; iii) mobilize resources for development implementation; iv) monitor, evaluate and report on results; v) support and further develop national/local capacities for implementation; and vi) contribute to ongoing learning and improvement of processes. UNDP's track record of effective coordination of development planning and implementation; both with GoS and other development partners, makes it ideally placed to support the implementation of this project.

E.5.3. Engagement with NDAs, civil society organizations and other relevant stakeholders

216. A series of consultations with the Government, CSOs, NGOs and the public have reiterated the importance of selected engineering interventions of this project as well as the need for an integrated approach. Affected residents remain informed and their awareness of the issues are increased paving the way for stronger inputs from the residents starting from the early stages of the project while redressing any major obstructions that may occur during construction.

217. A civil society led stakeholder engagement was held on 25 August 2016 led by the SUNGO. SUNGO has provided input for GoS policy and planning processes on issues impacting quality of life for the people of Samoa and is also part of a regional NGO network involved in implementing international projects and training. The workshop discussed the project and agreed on the details of the project to ensure that the solutions and the interventions are appropriate and well supported by the communities, GoS and non-government entities alike.

E.6. Efficiency and Effectiveness

Economic and, if appropriate, financial soundness of the project/programme

E.6.1. Cost-effectiveness and efficiency

218. The project will reduce the vulnerability of 30% of the population of Samoa through minimizing the likelihood of damages from extreme events in the Vaisigano River Catchment. This objective will be achieved in a cost-effective manner through the following considerations that have been reflected in the design of the project:

- (a) Selection of locally appropriate options, based on detailed site-specific assessments and public consultations, taking into consideration the O and M requirements; and
- (b) A comprehensive approach to removal of multiple barriers

219. During the implementation of the project, advantages and disadvantages of the proposed engineering solutions will be discussed to ensure community acceptance and optimal solutions can be obtained. The cost effectiveness of strengthening disaster preparedness and climate change adaptation measures have been proven. For example, inclusion of disaster resilient features in the design of new construction projects is estimated to increase construction costs by 1%. In comparison, the cost of repair and reconstruction of damage caused by climate-induced natural disasters is estimated to be 35-40% of total construction costs.³⁴ According to the PDNA (2012), the total cost of damage and losses from Cyclone Evan was estimated at US\$203 million which equates to more than a quarter of the country's GDP. Without appropriate counter-measures for climate risks, economic assets are threatened by damage and resources are likely to be diverted away from development spending towards disaster response and reconstruction. Thus, this project will include upstream "soft" interventions to address root causes of vulnerability.

220. The project will also address a range of issues that limit the sustainability and effectiveness of ongoing or planned interventions such as technical, institutional, financial and regulatory barriers. The short timespans for current projects/programmes of 4-5 years is insufficient to tackle longer term challenges. Budgetary restrictions does not allow for the highest priority risk-prone geographical areas and critical infrastructure to be addressed by such projects. This project will also remove the capacity barrier through institutional capacity building, thus bringing in more transformational change in the medium to longer-term.

221. The project will also establish a sustainable financing mechanism for continuous monitoring, operations and maintenance for what is considered a public good. It will do so through design by crowding in public finance once the existing barriers are sufficiently removed. The donor Governments who are interested in assisting the operationalization of the parts of the SDS will benefit from the knowledge and lessons from this project which can be used to upscale and introduce in other catchments.

222. The Government will be investing in O and M related to the planned infrastructure. The technology selected is done so in part because they require relatively low maintenance, in addition to be industry best practices while being locally appropriate to the context of Samoa.

³⁴ Pereira, J. 1995. *Costs and Benefits of Disaster Mitigation in the Construction Industry*. Caribbean Disaster Mitigation Project. Available at http://www.preventionweb.net/files/1177_CDMPCostsandBenefits.pdf

223. The economic net present value of the proposed investment project has been estimated to reach approximately US\$15.6 million, and to yield an economic internal rate of return of approximately 15.5%.³⁵ This is expected to be an under-estimate as assumptions made in the economic analysis are conducive to under-estimating the true economic value of the proposed investment project. Sensitivity analysis shows the net present value (NPV) to be reasonably robust to both increases in estimated economic costs and decreases in estimated economic benefits. As such, the proposed investment project is deemed to be economically efficient.

E.6.2. Co-financing, leveraging and mobilized long-term investments (mitigation only)

N/A

E.6.3. Financial viability

224. This investment project is of a public good nature and is not amenable to the generation of financial or fiscal revenues. As such a financial analysis is not appropriate.

E.6.4. Application of best practices

225. The proposed project will integrate best practices and lessons learned from the EWACC project based on the design and river work under Segment 1. Consequently, the investments in this project will not only be replicated in other SIDS in the region, but will also catalyze further investments that will help scale up this nationwide approach. In particular, the results from the quasi-experimental design pilot to analyze benefits from the livelihood diversification interventions by the EWACC project will be used to develop best practice guidelines. Lessons learned from the GCF project will provide the basis for detailed documentation of the impacts of livelihood diversification on community resilience with specific reference to benefits provided to women and youth. These will be shared nationally, through awareness campaigns as well as internationally to contribute to current knowledge on building climate resilience.

E.6.5. Key efficiency and effectiveness indicators

<i>GCF core indicators</i>	Estimated cost per t CO ₂ eq, defined as total investment cost / expected lifetime emission reductions (mitigation only)
	Expected volume of finance to be leveraged by the proposed project/programme and as a result of the Fund's financing, disaggregated by public and private sources (mitigation only)
Other relevant indicators (e.g. estimated cost per co-benefit generated as a result of the project/programme)	

³⁵ These estimates will be subjected to further analysis and review.

F.1. Economic and Financial Analysis

226. Samoa is no stranger to the impacts of hydrometeorological hazards, as it has been affected by cyclones numerous times in recent decades. In 1990 and 1991, Cyclone Ofa and Cyclone Val respectively caused a total of 21 fatalities and losses between USD 300 and 500 million equivalent to approximately four times Samoa's GDP.³⁶ More recently, Cyclone Evan caused significant damages and losses. Damages to durable physical assets destroyed by Cyclone Evan were estimated to reach approximately USD\$103 million while production losses were estimated to reach approximately USD\$100 million, for a total effect reaching beyond USD 200 million. Compared to the size of Samoa's economy (estimated at the time of Cyclone Evan to be approximately USD\$725 million), Cyclone Evan created an adverse impact corresponding to approximately 30% of Samoa's economy.³⁷ Following Cyclone Evan, real GDP declined by 0.4%.

227. Associated with cyclones and heavy precipitations are floods. Extreme floods have been experienced numerous times in recent decades, including in 1990, 1991, 2001, 2003, 2006 and 2008. Samoa, including the AUA, has suffered significantly from the impacts of flooding.

228. Perhaps more importantly in the context of the current proposed flood mitigation investment project, Samoa's disaster risk profile indicates a high degree of risk in the context of climate change. Samoa is expected to incur, on average, approximately USD\$7 million/year in direct losses due to cyclones and an additional USD\$1.6 million/year (on average) in emergency losses.

229. In a more recent analysis of the economic costs of adaptation in the Pacific, adapting infrastructure to projected changes in rainfall³⁸ and associated floods solely in the more urbanized areas of Samoa was projected to cost on average USD\$7.8 million/year over the period 2011-2050 for a total outlay of approximately USD\$300 million (without discounting).³⁹

230. There is thus clear evidence in Samoa that the economic costs of climate hazards have historically been high and that they are projected to increase as result of climate change. The current project aims to significantly contribute to achieving climate resilience in Samoa, and more specifically in the Vaisigano River Catchment.

Approach and Methodology to the Economic Analysis

231. The economic analysis of the proposed project was carried out in accordance with the *Guidelines for the Economic Analysis of Projects of United Nations Development Programme*.⁴⁰ The economic efficiency of the investment was determined by computing the economic NPV with an assumed 10% discount rate, and the economic internal rate of return (IRR). For consistency purposes, all proposals developed with the support of UNDP have opted to use a 10% discount rate, in line with the existing practice of multilateral development banks. The time horizon for the economic analysis was set at 25 years.

232. Economic values (costs and benefits) are all measured in real terms of 2016. Economic costs of the project are net of taxes, duties, and price contingencies. Furthermore, the analysis assumes a shadow wage rate of 1.00 for unskilled and semi-skilled labor in Samoa. Provided that the economic cost of labor in Samoa is expected to be lower than the market wage rate (financial cost), we expect this assumption leads to significantly over-estimating the economic cost of the project, and under-estimating the true net economic value of the project. For example, in a recent (2014) cost-benefit analysis of an Agribusiness Support Project in Samoa, the Asian Development Bank (ADB) used a shadow wage rate factor of 0.9, reflecting a judgment that the labor component of the project had a lower opportunity cost than is implied by the financial labor cost (as a result of the existence of surplus unskilled and semi-skilled labor in Samoa).⁴¹ In the more recent Samoa Submarine Cable Project, the

³⁶ Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI). 2011. *Country Risk Profile: Samoa*.

³⁷ GoS. 2013. *Samoa: Post-Disaster Needs Assessment Cyclone Evan 2012*. Apia. Samoa.

³⁸ Changes in projected rainfall were based on 19 simulations run by 12 general circulation models (GCMs) runs using the RCP4.5 climate scenario.

³⁹ World Bank. 2016. *Climate and Disaster Resilience*. Pacific Possible. World Bank. Washington, D.C.

⁴⁰ UNDP. 2015. *Guidance on the conduct and reporting of the Economic and Financial Analysis of Climate Change Adaptation and Mitigation Projects and Programmes*. UNDP.

⁴¹ The economic analysis is available at: <https://www.adb.org/sites/default/files/linked-documents/46436-002-efa.pdf>. The shadow wage rate is presented in paragraph 20.

ADB used a shadow wage rate factor of 0.8 in the cost-benefit analysis of the project.⁴² Using a shadow wage rate of 1.00 allows the use of financial cost as a measure of the economic cost of the project (once again noting that in doing so, the economic cost of the project is over-estimated, and the net present value of the investment is then under-estimated).

233. As is common when undertaking the economic analysis of investment projects, numerous assumptions were used to delineate the “with project scenario” from the “without project scenario”. These assumptions are presented and discussed in details in Annex XII. Assumptions were made so as to under-estimate the true net economic value of the proposed investment project.

234. The cost of the various components (both capital and operation and maintenance costs) were provided with the support of engineering experts.⁴³

235. The assessment of the benefits of the proposed investment proceeded in four different steps. First, mapping of flooded areas in the lower Vaisigano River Catchment area was simulated for four return period flooding events: 1:1, 1:5, 1:20, and 1:100 year event. For each of these four events, mapping of flooded areas with and without the proposed investment project were performed. The shrinking of the extent of the flooded areas provided by the project intervention indicated the mitigation impacts of the project.⁴⁴

236. Second, housing and building were overlay on the identified flooded areas. For this purpose, the project team had access to the extensive database the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI).⁴⁵

237. Third, flooding damages to housing and building were estimated with the support of the RiskScape platform.⁴⁶ Estimated flooding damages include damages to housing, building, and to housing contents. Estimates of flooding damages to housing and building with and without project interventions were performed and the difference between the two scenarios provided an estimate of the potential benefits of the project.

238. Fourth, estimates of infrastructure damages as well as production losses (lost revenues) were estimated using information available in the Woodruff (2008), GoS (2013), and World Bank (2016).⁴⁷ The details of the above methodology are available in Annex XII.

Results

239. The economic NPV of the proposed investment project has been estimated to reach approximately US\$15.6 million, and to yield an economic IRR of approximately 15.5%.⁴⁸ As indicated earlier, this is expected to be an under-estimate as the assumptions made in the economic analysis are conducive to under-estimating the true economic value of the proposed investment project. Sensitivity analysis shows the NPV to be reasonably robust to both increases in estimated economic costs and decreases in estimated economic benefits. As such, the proposed investment project is deemed to be economically efficient.

Other Benefits

240. Some benefits of this project were not included in this analysis due to limited data. In particular, the health benefits of the proposed investment projects were not included in the analysis. Data collected by the MoH indicates

⁴² The economic analysis is available at: <https://www.adb.org/sites/default/files/linked-documents/47320-001-ea.pdf>. The shadow wage rate is presented in paragraph 9.

⁴³ MHW Global (New Zealand) through the generous assistance of New Zealand’s Ministry of Foreign Affairs and Trade provided the required expertise.

⁴⁴ This first step was performed by the Australian consultancy firm *Water Technology* whose generous contribution is here acknowledged.

⁴⁵ PCRAFI is a joint initiative of the South Pacific Applied Geoscience Commission, World Bank, and the Asian Development Bank with the financial support of the Government of Japan, the Global Facility for Disaster Reduction and Recovery, and the ACP-EU Natural Disaster Risk Reduction Programme. It aims to provide the Pacific Island Countries with disaster risk modeling and assessment tools.

⁴⁶ RiskScape is a collaboration between New Zealand’s [GNS Science](#) and the [National Institute of Water and Atmospheric Research \(NIWA\)](#). RiskScape provides a modular framework to estimate impacts and losses for assets exposed to natural hazards, including flooding. The software combines hazard, asset and vulnerability modules through a data selection process to quantify a range of economic and social consequences. NIWA’s generous contribution is here acknowledged.

⁴⁷ Woodruff, A. 2008. *Samoa Technical Report – Economic Analysis of Flood Risk Reduction Measures for the Lower Vaisigano Catchment Area*. EU EDF – SOPAC Project Report 69g; GoS. 2013. *Samoa Post-disaster Needs Assessment Cyclone Evan 2012*. Apia; and World Bank. 2016. *Climate and Disaster Resilience*. World Bank, Washington, D.C.

⁴⁸ These estimates are subject to on-going analysis and revisions.

a positive correlation between the occurrence of flooding events and the (reported) incidence of various diseases. Similarly, this economic analysis did not include the potential impacts of flooding on the rapidly growing tourism sector in Samoa. Finally, the macro-economic impacts of the flooding were not included in the analysis. Including the benefits of mitigating these impacts would increase the estimated NPV and IRR of the proposed project.

F.2. Technical Evaluation

241. Please refer to the feasibility study (Annex II) and Evaluation Report of the Baseline Project (Annex VIII).

F.3. Environmental, Social Assessment, including Gender Considerations

242. This project has completed the UNDP social and environmental screening procedure (see SESP attached as Annex VI (a)). This screening was undertaken by a highly experienced ESIA specialist with extensive experience in riverine projects to ensure this project complies with UNDP's Social and Environmental Standards. UNDP's Social and Environmental Standards have been reviewed by the GCF accreditation panel and deemed sufficient to accredit UNDP to submit low and medium risk projects. Based on the specialist's extensive experience of undertaking ESIA on some of the largest developments internationally (including the largest export port in the world, mega port and coastal development projects in World Heritage Areas valued at US\$40 Billion) as well as large scale riverine protection infrastructure internationally of a very similar nature, the overall social and environmental risk category for this project is Moderate (Category B). It is highly unlikely that the project will have any medium to long term and/or irreversible impacts, and potentially moderate risks associated with the proposed construction of river and drainage works can be sufficiently managed. Specific project risks are listed in Section G below, together with appropriate mitigation measures. Please refer to Environment and Social Framework and Management Plan (ESMP) (Annex VI (b) and Gender Action Plan (Annex XIII).

243. There are three key factors that determine that this project is classified as a Category B project:

- (a) The proposed project will not be undertaken in pristine or protected areas where the construction of a built structure could potentially cause irreversible changes to the biological, ecological and physical environment. The project will be undertaken in areas that have been impacted by both anthropogenic and natural processes in the past;
- (b) Improving river works and infrastructures in the Vaisigano River Catchment will involve the construction of infrastructure to reduce the risk posed by climate-induced disasters. The proposed infrastructure has the potential to affect natural resources negatively. As a consequence, the GCF project will develop detailed plans for watershed management and flood protection measures prior to construction such as vulnerability and adaptation assessments, gap analysis, feasibility plans, cost-benefit analyses, environmental impact assessments and social impact assessments that will guide the design of infrastructure that will mitigate any potential negative effects; and
- (c) There are limited social risks associated with the project. Importantly, no people will be displaced or relocated. No land acquisition is required. River works measures may alter the way local communities interact with the river and this has been assessed within the design. Participatory local consultations will be carried out during the implementation so that views and concerns can be reflected in the adjustment of the design and construction of the river works. Importantly, the channelization of Segments 2, 3 and 4 will act as a buffer during storm and flooding events and therefore reduce the potential loss of lives and assets.

244. The investment is expected to deliver the following economic, environmental and social benefits across the project area:

- (a) Reduced loss of lives, livelihoods and assets including public infrastructure, houses and property, which will raise environmental and social wellbeing and economic productivity, including reduced loss of earnings and economic activities due to disruptions that flooding otherwise creates;
- (b) Increased income generating activities, alternative livelihoods and green jobs for vulnerable groups through development of business incubators focused on flood prevention as well as preserving and revitalizing the catchment;
- (c) Increased capacity of communities and institutions through targeted trainings/learning on flood mitigation, EWS

on flooding, health surveillance systems, building codes and climate change resilience;

(d) Improved environmental benefits through ecosystems based response upstream which supports reforestation and improved agroforestry through bioengineering to regenerate vegetation cover and stabilize hill slopes; and

(e) Improved management and reduction of climate change-related health impacts

245. The following Key Environmental and Social Indicators have been identified for the project and the ESMP (see Annex VI (b)) details the respective management objectives, potential impacts, control activities and the environmental performance criteria against which these indicators will be judged. The UNDP and MNRE are accountable for the provision of specialist advice on environmental and social issues to the contractor and for environmental and social monitoring and reporting. The MNRE will assess the environmental and social performance of the contractor in charge of construction throughout the project and ensure compliance with the ESMP.

Environmental and Social Considerations

246. Water Quality Management Measures - Although sediment movement may affect ground/surface water, the project will actually improve water quality in the Vaisigano River overall. By following the management measures set out in the ESMP, the construction of river works, bridges and drainage and revegetation upstream will not have a significant impact on water quality across the broader area. A standardized water quality monitoring program has been developed for the project.

247. Erosion, Drainage and Sediment Control - Riverbank excavations and soil disturbance during vegetation activities (if undertaken during wet periods) and drainage works can result in the loss of soil stability, soil erosion and soil productivity. However, all sediment removed from the river and drainage work will be assessed, and where practicable, will be reused and placed on agricultural lands or other beneficial reuse options. The effective and efficient mitigation measures can not only reduce, but could improve the conditions over the existing conditions.

248. Noise and Vibration Management Measures - All construction and operation activities have the potential to cause noise nuisance. No blasting is required in this project. Vibration disturbance to nearby residents and sensitive habitats is likely to be caused through the use of vibrating equipment. A standardized noise monitoring program developed for this project will ensure equipment and machinery is regularly maintained and appropriately operated and potentially noisy construction activities will be carried out during daylight hours for minimal disruption.

249. Air Quality Management Measures - A standardized air monitoring program will ensure minimal impact on air quality from release of dust/particles during construction in sensitive areas and from construction vehicle emissions as well as quick corrective actions to respond to complaints.

250. Flora and Fauna - The project is unlikely to have direct impacts on flora and fauna species found in Samoa or on the national parks and reserves. Protection of the flora and fauna will be ensured through maintaining clear boundaries for vegetation clearance when required, no introduction of new weed or increase in existing weed species proliferation during construction activities and rehabilitation works incorporate native species to local areas.

251. Waste Management - The key waste streams generated during construction are likely to include residual sediment from both the river and drainage works, vegetation, construction materials and materials from the replacement of the Lelata Bridge. Contractors involved in construction and operational activities should be familiar with methods minimizing the impacts of clearing vegetation to minimize the footprint to that essential for the works and rehabilitate disturbed areas. A waste management monitoring program has been established for the project.

252. Chemical and Fuel Management - Some types of chemicals and fuels such as diesel, unleaded petrol, grease and few chemicals are likely to be stored on-site during construction. If not handled, stored or used appropriately, contamination of land and the surface water and groundwater systems could occur. Further, accidental discharge of hazardous materials during construction and operation activities is a potential risk to the local environment. Accordingly, all oil, grease, diesel, petrol and chemicals should be stored off site within a bounded area. A Material Safety Data Sheet Register will be developed for all chemicals and fuels retained on site and the handling and storage of hazardous material will be in accordance with the relevant legislation and best management practices.

253. **Social Management Measures** - The project has been designed with the assistance of stakeholders and aims to provide benefits to the broader community. The project and its sub-projects do not require involuntary resettlement or acquisition of land although they may temporary impacts on land during construction activities. In case dissatisfaction or conflicts arise over construction activities, early recognition and appropriate actions will be taken to avoid or minimize conflicts. Community consultation is crucial and the Stakeholder Engagement Strategy (see Annex XIII) ensures close and systematic consultations with all stakeholders for increased participation and representation during project design and implementation alike.

254. **Archaeological, Indigenous and Cultural Heritage** - No cultural heritage places, buildings and monuments are known to exist in areas where the project will be undertaken. The Archaeological, Indigenous and Cultural Heritage monitoring program that has been developed for the projects will ensure that cultural heritage awareness training is provided to all construction site personnel (including contractors), identify and collect any cultural heritage items worthy of protection, consult with the relevant Museums about any important Archaeological, Indigenous and/or Cultural Heritage material discovered during construction and will cease work in the area where any human remains are discovered.

255. **Emergency Management Measures** - In the event of actions occurring, which may result in serious health, safety and environmental (catastrophic) damage, emergency response or contingency actions will be implemented as soon as possible to limit the extent of environmental damage

Gender Considerations

256. The project has been designed with attention paid to gender and social inclusion considerations. The influence of Samoan traditional culture, *fa'asamoa*, plays a central role in the Samoan way of life, regardless of modernization influences. This provides for the distinct and different roles of men, women, and children in society, and this provides both significant strengths and challenges in relation to gender equality in Samoa. In terms of how gender equality influences vulnerability to climate change and disasters, there are a range of factors that intersect with gender, such as age, disability status, and rural or urban location. In Samoa vulnerability is particularly linked to an inability to participate in income generating activities, and as a result, six groups are recognized as being particularly vulnerable women, youth, children, elderly people, people living with disability, and rural residents.

257. The analysis and project formulation drew on a wide range of consultations, existing analytical material, and data from projects currently being implemented, and focused on gender and social inclusion dimensions including through the use sex and age disaggregated data where available. A number of key principles informed the approach taken, including:

- (a) Recognition of the centrality of the family unit to the organization and working of Samoan communities;
- (b) A commitment to build on the projects, structures and initiatives being rolled out by the GoS and its development partners, in order to maximize the use of resources for greatest efficiency and effectiveness;
- (c) Assess how gender is being mainstreamed in various Ministries and Sectors to most effectively develop needs assessments, enable planning and be effective in monitoring and evaluation; and
- (d) A commitment to link income generating activities in the project, with those already active in the Vaisigano River Catchment area, such as the Small Business Incubator for example.

258. The project has been designed to provide key entry points for gender-responsive and socially inclusive actions to be taken under each of its activity areas. These are set out in the annexed gender and social inclusion plan, and include indicators to measure and track the progress of these actions at the activity level. The action plan links directly into the project log frame, and these two documents should be read together. The actions identified in the action plan are of two types; overall mainstreaming actions, and specific actions to strengthen gender and social inclusion wherever feasible. Thus, all activities including the major infrastructural works, will ensure that equitable consultations are undertaken, and the outcomes considered, with detailed sex and age disaggregated data collected in the process.

259. In the early stages of implementation, a detailed analysis of the differentiated roles and responsibilities, needs and knowledge of men and women, youth, elderly and people living with disability, in relation to disaster

and climate response is planned, with the findings used to develop appropriately targeted health surveillance information and strengthen the expansion of the early warning system for flooding alerts.

260. Beyond participation in information sharing and consultations, the project has identified several activities to address vulnerability in the groups identified as being particularly vulnerable to disasters. These include training for alternative income generating activities, business incubation for entrepreneurial agribusinesses and climate change and flood-related business options, with targets set for women and young people to participate. Further, there are provisions for cash-for-work options for flood-related catchment rehabilitation, again targeting women and youth in particular.

261. There are activities planned to raise awareness of building practices and designs for the at-risk communities of the Vaisigano River Catchment, and these will include particular attention to reflect the needs of people living with disability. Care will also be taken to ensure that there is evidence of gender, disability, age and youth in planned model exhibitions and awareness raising campaigns, with clear requirements built into the partnerships with CSOs and builders associations. The complete gender and social inclusion assessment and action plan is at Annex XII.

F.4. Financial Management and Procurement

262. The financial management and procurement of this project will be subject to UNDP financial rules and regulations available here: https://info.undp.org/global/documents/frm/Financial-Rules-and-Regulations_E.pdf. Further guidance is outlined in the financial resources management section of the UNDP Programme and Operations Policies and Procedures available at <https://info.undp.org/global/popp/frm/Pages/introduction.aspx>. UNDP has comprehensive procurement policies in place as outlined in the 'Contracts and Procurement' section of UNDP's Programme and Operations Policies and Procedures (POPP). The policies outline formal procurement standards and guidelines across each phase of the procurement process, and they apply to all procurements in UNDP. See here: <https://info.undp.org/global/popp/cap/Pages/Introduction.aspx>.

263. The project will be implemented following the NIM guidelines available here: https://info.undp.org/global/documents/_layouts/WopiFrame.aspx?sourcedoc=/global/documents/frm/National%20Implementation%20by%20the%20Government%20of%20UNDP%20Projects.docx&action=defaultandDefaultItemOpen=1. UNDP will ascertain the national capacities of the implementing partner by undertaking an evaluation of capacity following the Framework for Cash Transfers to Implementing Partners (part of the Harmonized Approach to Cash Transfers - [HACT](#)). All projects will be audited following the UNDP financial rules and regulations noted above and applicable audit guidelines and policies.

264. The NIM Guidelines are a formal part of UNDP's policies and procedures, as set out in the UNDP Programme and Operations Policies and Procedures (POPP) which are available here: <https://info.undp.org/global/popp/Pages/default.aspx>. The NIM Guidelines were corporately developed and adopted by UNDP, and are fully compliant with UNDP's procurement and financial management rules and regulations.

265. The national executing entity MoF also referred to as the national 'Implementing Partner' in UNDP terminology, is required to implement the project in compliance with UNDP rules and regulations, policies and procedures (including the NIM Guidelines). In legal terms, this is ensured through the national Government's signature of the SBAA, together with a UNDP project document which will be signed by the Implementing Partner to govern the use of the funds. Both of these documents require compliance. Prior to signature of the project document, all national Implementing Partners need to have undergone a Harmonized Approach to Cash Transfer (HACT) assessment by UNDP to assess capacities to implement the project. During implementation, UNDP will provide oversight and quality assurance in accordance with its policies and procedures, and any specific requirements in the Accreditation Master Agreement (AMA) and project confirmation to be agreed with the GCF. This may include, but not limited to, monitoring missions, spot checks, facilitation and participation in project board meetings, quarterly progress and annual implementation reviews, and audits at project level on the resources received from UNDP.

266. The Harmonized Approach to Cash Transfer (HACT) framework consists of four processes: (1) macro assessments; (2) micro assessments; (3) cash transfers and disbursements; and (4) assurance activities.

Assurance activities include planning, periodic on-site reviews (spot checks), programmatic monitoring, scheduled audits and special audits. During micro-assessment, there can weaknesses identified for which actions are required to addresses the gaps. When a spot check finds that the gaps are not addressed it will mean that the level of assurance activities will have to remain higher and modalities of engaging with that implementing partner will have to be reviewed if necessary. All details are available here: <https://undg.org/wp-content/uploads/2015/02/2014-UNDG-HACT-Framework-English-FINAL.pdf>.

267. The project will be audited in accordance with UNDP policies and procedures on audits, informed by and together with any specific requirements agreed in the AMA currently being negotiated with the GCF. According to the current audit policies, UNDP will be appointing the auditors. In UNDP scheduled audits are performed during the project cycle as per UNDP assurance/audit plans, on the basis of UNDP's guidelines. A scheduled audit is used to determine whether the funds were used for the appropriate purpose and in accordance with the work plan. A scheduled audit can consist of a financial audit or an internal control audit.

268. All GCF resources will be provided to the implementing partner, less any agreed costs recovery amount. Under UNDP's NIM, UNDP advances case funds on a quarterly basis to the implementing partner (Executing entity) for the implementation of agreed and approved project/programme activities, in accordance with UNDP Standard Policies and the NIM Guidelines. The Implementing partner reports back expenditures via a financial report on quarterly basis to UNDP. Any additional requirements will be as in accordance with the AMA and when it is agreed.

269. A draft procurement plan (which will be further discussed and revised prior to UNDP Project Document signature) is provided in Annex XIII.

G.1. Risk Assessment Summary

270. The project design has carefully considered all social, financial, operational and environmental risks. Risks associated with this project are medium scale. The project is a category B project under UNDP's Safeguards policies and a risk management plan has been developed together with the safeguards screening. Awareness of these risks is well integrated in the project design, and resources have been allocated to mitigate them. The environmental risk will be mitigated by following the principles of environmental sustainability and standards for biodiversity conservation.

271. Improving river works and infrastructures in the Vaisigano River Catchment will reduce the risk posed by climate induced disasters. The proposed infrastructure has the potential to affect natural resources negatively. As a consequence, the GCF project will develop detailed plans for watershed management and flood protection measures prior to construction as well as comply with the ESMP. This comprehensive planning will include vulnerability and adaptation assessments, gap analysis, feasibility plans, cost-benefit analyses, environmental impact assessments and social impact assessments that will guide the design of infrastructure that will mitigate any potential negative effects. The planning will include extensive consultations with local communities to ensure that interventions maximize social and environmental benefits while minimizing social and environmental costs. On the basis of these plans, all potential negative impacts will be adequately mitigated.

272. Construction of flood protection infrastructure could result in increased settlement in areas where the infrastructure has reduced hazard risk. The potential environmental and social effects associated with this has been considered in the IWMP and the design of the flood protection infrastructure. Appropriate mitigation responses for any negative impacts will be clearly elaborated by the implementing partner in consultation with UNDP during the design and implementation of proposed interventions.

273. There are limited social risks associated with the project. Importantly, no people will be displaced or relocated. No land acquisition is required. River works measures may also alter the way local communities interact with the river. Participatory local consultations will be carried out during the implementation so that views and concerns can be reflected in the adjustment of the design and construction of the river works. Importantly, the channelization of Segments 2, 3 and 4 will act as a buffer during storm and flooding events and therefore reduce the potential loss of lives and assets.

274. In summary, the proposed GCF project is expected to have largely positive effects on the environment and local communities. Where the potential for negative effects are anticipated, adequate mitigation measures will be included through the development of comprehensive plans based on environmental and social impact assessments.

G.2. Risk Factors and Mitigation Measures

Please describe financial, technical and operational, social and environmental and other risks that might prevent the project/programme objectives from being achieved. Also describe the proposed risk mitigation measures.

Selected Risk Factor 1

Description	Risk category	Level of impact	Probability of risk occurring
Sediment movement during riverbank works that require earth works	Social and environmental	Low (<5% of project value)	Medium

Mitigation Measure(s)

Prepare an erosion control sediment plan and install silt curtains to restrict sediment movement to ensure that the sediment is not mobilized through either wind or more specifically water. The plan will contain aspects including but not limited to the installation of sediment curtains to reduce sediment movement and the covering of sediment where practicable. All works should be undertaken during the dry season

Selected Risk Factor 2

Description	Risk category	Level of impact	Probability of risk occurring
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Sediment movement during ecosystem revegetation works such as planting and reforestation	Social and environmental	Low (<5% of project value)	Low
Mitigation Measure(s)			
Prepare an erosion control sediment plan and install silt curtains to restrict sediment movement to ensure that the sediment is not mobilized through either wind or more specifically water. The plan shall contain aspects including but not limited to the installation of sediment curtains to reduce sediment movement and the covering of sediment where practicable.			
Selected Risk Factor 3			
Description	Risk category	Level of impact	Probability of risk occurring
Exposure of Acid Sulfate Soils within <5m above sea level in the coastal areas due to sediment movement during drainage and riverbank construction	Social and environmental	Medium (5.1-20% of project value)	Medium
Mitigation Measure(s)			
Prepare an acid sulfate management plan consistent with international good practice. Prior to any excavation, sediments will be tested for their presence of acid sulfate soils and/or potential acid sulfate soils. If the analysis proves positive, the sediment can be treated by a range of techniques including but not limited to liming the sediment. Reference will be made to appropriate standards and guidelines. Every effort will be made to ensure there is no direct or residual impact following treatment.			
Selected Risk Factor 4			
Description	Risk category	Level of impact	Probability of risk occurring
Production of construction waste due to demolition of existing bridge and bridge construction	Social and environmental	Low (<5% of project value)	Medium
Mitigation Measure(s)			
Prepare a waste management plan to address all construction waste. As part of that plan, all waste such as damaged concrete and metal sheeting will be stored in an appropriate manner to reduce the impacts on the environment. Where possible, materials will be recycled to reduce the impact and prefabricated and cut to size prior to being moved to the construction site			
Selected Risk Factor 5			
Description	Risk category	Level of impact	Probability of risk occurring
High staff turnover affects project implementation.	Technical and operational	Low (<5% of project value)	Medium
Mitigation Measure(s)			
Explore a partnership between the University of the South Pacific, the Secretariat of the Pacific Community and GoS, whereby national students or new graduates can be fast-tracked into working in the project in the case of staff turnover. These students could join the project as interns or on a time-bound entry-level contract. This will not only directly contribute to the project implementation capacity, but also help build a pool of young professionals who can contribute towards future initiatives in the environment space.			
Selected Risk Factor 6			
Description	Risk category	Level of impact	Probability of risk occurring

Community participation decreases as benefits of adaptation measures and project interventions are not immediately evident.	Other	Low (<5% of project value)	Medium
Mitigation Measure(s)			
Maintain constant communication with communities concerning project progress, targets and expected benefits. Implement tangible and visible activities to address community priorities early during project implementation. Manage community expectations to ensure that they are aligned with project scope. Disseminate project findings and lessons learned through appropriate media to maintain project profile and positive community perception.			
Selected Risk Factor 7			
Description	Risk category	Level of impact	Probability of risk occurring
Competing mandates and poor coordination between government agencies/line ministries disrupt project activities.	Technical and operational	Low (<5% of project value)	Low
Mitigation Measure(s)			
Continuously inform policy- and decision-makers of project aims and potential synergies with other projects as well as on-going government initiatives, Demonstrate links between on-the-ground implementation and policies/strategies, with particular reference to contributions to relevant mandates of line ministries. Engage with relevant Sector Coordination Units to ensure alignment of project with sectoral priorities.			
Selected Risk Factor 8			
Description	Risk category	Level of impact	Probability of risk occurring
Disaster events/ hazards destroy or delay project interventions.	Technical and operational	Low (<5% of project value)	Low
Mitigation Measure(s)			
Maintain contact with GoS Meteorology Office to ensure adequate lead-time when disaster is imminent. Schedule project activities during low storm risk periods to reduce likelihood of extreme climate events. Monitoring potential extreme events and ensure coordination of preparation and responses with the national Disaster Risk Management Framework. Adequate monitoring of potential risks ensures that impacts of these risks are mitigated.			
Selected Risk Factor 9			
Description	Risk category	Level of impact	Probability of risk occurring
Land disputes amongst community members hamper implementation of adaptation interventions.	Social and environmental	Low (<5% of project value)	Low
Mitigation Measure(s)			
Ensure adequate consultation with targeted communities throughout planning, design and implementation of project interventions. Maintain strict adherence to approved national practices concerning community involvement. Ensure that project activities are aligned with community priorities in a culturally and social responsible manner. Socially sensitive approaches to project activities that are in line with approved national practices will prevent land disputes from arising.			

Selected Risk Factor 10			
Description	Risk category	Level of impact	Probability of risk occurring
Limited human resources in government ministries and agencies delay project activities.	Technical and operational	Low (<5% of project value)	Low
Mitigation Measure(s)			
Adequately resource the PMU including the securing of positions to be recruited for key technical support. Monitor project processes to identify limitations timeously and allow for alternatives to be implemented. Human resources in government ministries and agencies will be sufficient to ensure successful implementation of project activities.			
Selected Risk Factor 11			
Description	Risk category	Level of impact	Probability of risk occurring
Project interventions are not implemented in a gender- and culturally-sensitive manner.	Social and environmental	Low (<5% of project value)	Low
Mitigation Measure(s)			
Ensure that project team is sensitized to gender and cultural sensitivities. Involve Civil Society (SUNGO) and traditional authority structures in planning and implementation of project activities. Involvement of Civil Society and traditional authority structures will ensure gender and cultural sensitivity of project interventions.			
Selected Risk Factor 12			
Description	Risk category	Level of impact	Probability of risk occurring
Insufficient political and financial support from line ministries, other government departments/ agencies and co-financiers.	Technical and operational	Low (<5% of project value)	Low
Mitigation Measure(s)			
Consistently reinforce the importance of adherence to agreed-upon roles and responsibilities for project progress. Update governmental decision-makers and co-financiers of project progress in order to garner high-level support and political will. Adequate political and financial support contributes to successful implementation of project interventions.			
Selected Risk Factor 13			
Description	Risk category	Level of impact	Probability of risk occurring
Unanticipated social and/or environmental impacts are caused by project activities	Social and environmental	Low (<5% of project value)	Low
Mitigation Measure(s)			
No interventions will be implemented unless they have adequate measures for mitigating social and environmental impacts. Constant monitoring of design/planning to ensure adequate mitigation measures are included.			

H.1. Logic Framework.

H.1.1. Paradigm Shift Objectives and Impacts at the Fund level⁴⁹

Paradigm shift objectives						
<i>Increased climate resilient sustainable development</i>	The objective of the project is to strengthen adaptive capacity, and reduced exposure to climate risks of vulnerable communities, infrastructure, and the built environment in the Vaisigano River Catchment.					
Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
Fund-level impacts						
<i>A3.0 Increased resilience of infrastructure and the built environment to climate change</i>	<p>3.1 Number physical assets made more resilient to climate variability and change, considering human benefits</p> <p>3.2 Value of physical assets made more resilient to climate variability and change, considering human benefits</p>	<p>Questionnaire-based surveys (QBS / Interviews) at the beginning, mid-term and end of the project.</p> <p>Prepare quarterly reports by construction vendors</p>	<p>No single engineered river works solutions to minimize and to withstand flooding exists in Segments 2, 3 and 4 in the Vaisigano River.</p> <p>EWACC project (12 M) climate proofing only segment 1 of Vaisigano river catchment area.</p>	N/A	<p>Following physical assets constructed or strengthen:</p> <p>Channelization of Segments 2, 3 and 4 of the Vaisigano River</p> <p>Construction upgrade of Lelata bridge</p> <p>Extension of floodwalls at Lelata and Leone Bridges</p> <p>At least 40 M dedicated to climate proof segment 2, 3 &4 and drainage works in AUA.</p>	<p>Political stability fosters implementation as planned.</p> <p>The presence and magnitude of earthquakes and tsunamis do not delay the implementation of the project.</p> <p>Coordination among EWACC project (Segment 1) and GCF project (Segments 2, 3 and 4) will be aligned during implementation of interventions along the Vaisigano River.</p> <p>Environmental and social impact assessment is completed and approved without delay.</p>

H.1.2. Outcomes, Outputs, Activities and Inputs at Project/Programme level

Expected Result	Indicator	Means of Verification (MoV)	Baseline	Target		Assumptions
				Mid-term (if applicable)	Final	
Project/ programme outcomes	Outcomes that contribute to Fund-level impacts					
A7.0 Strengthened adaptive capacity and reduced exposure to climate risks	A7.1 Use by vulnerable households, communities, businesses and public-sector services of Fund supported	Questionnaire-based surveys (QBS /	Currently, residents and economic assets located in the AUA lack protection from extreme flooding of the Vaisigano River		At least 26,528 residents located in the AUA are protected by flood management interventions	<p>Good coordination between government agencies enhances and sustains project progress that is aligned with sectoral adaptation priorities.</p> <p>Coordination among EWACC project (segment 1) and GCF project (Segment 2, 3 and 4) will be aligned</p>

⁴⁹ Information on the Fund's expected results and indicators can be found in its Performance Measurement Frameworks available at the following link (Please note that some indicators are under refinement): http://www.gcfund.org/fileadmin/00_customer/documents/Operations/5.3_Initial_PMF.pdf



	<p>tools, instruments, strategies and activities to respond to climate change and variability.</p> <p>A7.2: Number of males and females (and percentage of total population) reached by climate-related early warning systems established/ strengthened</p>	<p>Interviews) at the beginning, mid-term and end of the project.</p> <p>Prepare quarterly reports by construction vendors;</p>	<p>Currently the EWS covers only tsunami and earthquake warnings.</p>		<p>At least 26,528 residents located in the AUA receive EWS for flooding.</p>	<p>during implementation along the Vaisigano River.</p> <p>Good coordination among National Siren Network and MNRE foster expansion of the EWS.</p>
<p>Project/programme outputs</p>	<p>Outputs that contribute to outcomes</p>					
<p>1. Assessments and mechanisms in place for an integrated approach to reduce vulnerability towards flood-related risks</p>	<p>Number of sectoral plans and studies developed and/or adopted aligned to the IWMP.</p> <p>Number of technical and extension officers trained on flood-related EWS data collection and interpretation.</p>	<p>Review of Sectoral plans and IWMP document along with GoS staff semi-structured interviews.</p> <p>Workplace survey at the beginning, mid-term and end of the project.</p>	<p>Limited number of sectoral plans and projects to centrally plan drainage. No feasibility studies prepared for better rain and wastewater storage.</p> <p>Limited capacity exists for technicians to interpret early warning data instruments and utilize for flood-related response.</p>		<p>4 sectoral plans / studies developed/adopted for key sectors in the Greater Apia Catchment (Roads, Drainage, Reservoir, Water supply, etc.) aligned to the IWMP.</p> <p>At least 300 technician will be trained on EWS related to flooding.</p>	<p>Coordination between government agencies enhances and sustains project progress that is aligned with sectoral adaptation priorities. MNRE Climate Change Unit and MoF-CRICU will ensure a programmatic approach and coordination of adaptation work.</p> <p>Human resources in government ministries and agencies will be sufficient to ensure successful development of sectoral plans aligned to IWMP and implementation of flood-related EWS...</p>
<p>2. Infrastructure in the Vaisigano River are flood-proofed to increase resilience to negative effects of excessive water</p>	<p>Number of people benefitting from improved flood management through implementation of hard and soft measures for protection of community assets (set by gender)</p> <p>Number of people reached by</p>	<p>Review of infrastructure design to verify climate resilience. Site visits to verify implementation of climate-resilient flood protection measures.</p> <p>Household and businesses surveys conducted at baseline (prior to implementation of</p>	<p>No people benefit from flood management from climate-resilient flood protection measures introduced in Vaisigano River catchment for protection of community assets.</p> <p>The current EWS does not cover floods.</p>		<p>At least 26,528 people benefit from improved flood management from climate-resilient flood protection measures introduced in Vaisigano River Catchment for protection of community assets (separate gender).</p> <p>At least 26,528 people benefit from EWS coverage related to flooding alerts in Apia.</p>	<p>Coordination with EWACC project increases opportunities for collaboration and alignment with interventions segment 2 and 3.</p> <p>Coordination between government agencies enhances and sustains project progress that is aligned with sectoral adaptation priorities and EWS expansion.</p> <p>Involvement of women committees and traditional authority structures will ensure gender and cultural sensitivity of project interventions.</p>

	flood-related early warning systems established (separate by gender).	interventions), MTR and TE/end line.				
3. Drainage in downstream areas upgraded for increased regulation of water flows.	Number of households served with flood-proofed drainage in Vaisigano River Catchment	Review of Drainage Master Plan design to verify climate resilience. Site visits to verify drainage systems upgraded to withstand flooding.	Currently, hazard areas exist within the AUA have inadequate drainage systems to withstand high volumes of water.		At least 5,000 households benefit from flood-proofed drainage in Apia.	Awareness-raising of communities allows them to perceive adaptation benefits of project interventions. Constant communication and management of expectations ensures continuous community involvement throughout planning and implementation.
Activities	Description		Inputs		Description	
1.1 Strengthen capacities and information requirements to pursue an integrated programme approach to flood management.	The GoS is pursuing a programmatic ridge-to-reef approach with regards to reducing flood risk for Samoan society. As such, the current project is part of a bigger vision of the GoS – of extending GCF collaboration towards other topics and (sub-) catchments. Within this approach, feasibility studies need to be carried out for flood-mitigation measures that are necessary for optimal flood management in Vaisigano River catchment area and adjacent critical catchments. Sectors included: Water/Reservoir, Road/Infrastructure, Drainage and Sanitation/Sewage.		<p>1.1.1 Review the interdependence of flood mitigation options</p> <p>1.1.2. Conduct feasibility studies for Flood-buffering reservoir in Vaisigano River</p> <p>1.1.3. Conduct feasibility studies for flood-proofing Central Cross Island Road</p> <p>1.1.4. Conduct feasibility studies for Apia integrated Sewage system.</p>		<p>Some of the proposed flood mitigation interventions have previously been considered in isolation. An assessment of the overall performance of the proposed interventions as an integrated flood management system is required. This is best achieved through the use of an integrated hydraulic model to test the urban stormwater network, Segments 2, 3 and 4 of the channel works including new bridges, diversion channels, detention storage and coastal defenses.</p> <p>The study will assess areas of improvement for the reservoir to contain and buffer rain water during extreme weather events and explore ways for productive use of water resources.</p> <p>The cross-island road turns into a flood conductor during heavy rains; flood-proofing of road construction and accompanying drainage and landscaping is a necessity and will be explored during this study.</p> <p>Under the current project the most critical areas in AUA will be treated to pilot an overall Apia integrated sewage system for the whole AUA and other Samoan urban areas.</p>	
1.2. Establish health surveillance systems to track and manage flood-related health issues	Although the EWS in Samoa is pretty advanced already, it doesn't cater to the need for flood-related early warning, covering only tsunami and earthquake warnings. Particularly the Health Sector would be benefiting from a flood-related early warning system, helping them to prepare for an expected higher occurrence of water- and vector borne diseases, as well as flood-related injuries and traumas. Such early warning can also help village councils in the evacuation of their villagers to appropriate high ground or shelters.		<p>1.2.1 Include flood-related information in CLEWS messaging system;</p> <p>1.2.2 Train health practitioners dealing with emergencies how to respond to flood-related emergencies;</p> <p>1.2.3 Train village councils on how to prepare for and evacuate flood-related victims;</p> <p>1.2.4 Awareness raising among health practitioners and village councils about the flood-related EWS.</p>		<p>Climate EWS exists, but needs to be expanded with flooding information;</p> <p>Consistent application of the flood-related early warning messages by those that need to make decisions.</p> <p>Enhance knowledge of population and practitioners about the possibilities of the flood-proofed CLEWS.</p>	
1.3 Expand EWS coverage to provide flooding alerts in Apia	Although the Early Warning System in Samoa is pretty advanced already, it doesn't cater to the need for flood-related early warning, covering only tsunami and earthquake warnings. Expansion and development of		<p>1.3.1 MNRE conduct hydrological modelling to generate flood scenarios</p> <p>1.3.2 Integration of flood warning into the EWS by training technical officers</p>		<p>Upgrade of existing climate network, rainfall and river gauges, and temperature thermometers for flooding forecast.</p> <p>Provide training the technical officers at MNRE to integrate flood forecast into the EWS.</p>	

	tailored warnings for flooding will be established.	1.3.3 Increase awareness of updated EWS with at risk populations (mock drills, etc.)	Work with at risk populations on ways tailor the EWS to their needs.
1.4 Conduct awareness raising campaigns on building practices and designs for at risk communities living along the Vaisigano River	The new building code contains a clear section on hazard prone infrastructure elements (buildings, roads, etc.) and hazard-proofing these. The code needs to be explained to the citizens and builders of Samoa, particularly the AUA, in a comprehensive and simple way, offering alternative solutions for different budgets. Visualization is key in this approach, as well as the involvement of civil society and private sector.	1.4.1 Translation of the new building code and Apia spatial plan into simple manuals for builders to follow 1.4.2 Production of exhibition on flood-proof building and land use practices to be used in water tower and 2two million trees campaign; 1.4.3 MoU with SUNGO and members to participate in campaign; 1.4.4 MoU with builders associations on flood-proof building.	The building code is a technical document, not meant for laypeople – translation is necessary; Visualization of the effects of floods on infrastructure and livelihoods and remedies can help population spring into action. Promotion of flood proofing infrastructure and livelihoods cannot be done without involvement of private sector and civil society.
2.1 Channelization of segment 2 and 3 of the Vaisigano river streambed to accommodate increased water flow and decrease flood risks	The lower part of the streambed of the Vaisigano River is often the source of flooding during extreme weather events, inundating a large part of urban Apia's floodplain. Channelization of Segment 1 is already being done under the EWACC project; follow up with construction of Segments 2, 3 and 4 is necessary to provide additional channel protection and to complete the proposed scheme	2.1.1. Review proposed designs for channelization of Segments 2, 3 and 4 of the Vaisigano River including the impact on channel capacity of the new Lelata Bridge and the potential for optimizing scheme design and durability. 2.1.2 Establishment of flood protection measures along Segments 2, 3 and 4 of Vaisigano River 2.1.3 Capacity Building of Maintenance teams for flood protection measures 2.1.4 Contracting members of local communities for execution of activities with regards to building and landscape restoration along the segments	The designs of Segments 2, 3 and 4 of Vaisigano River Flood Management measures have been done under EWACC, but with the scope of a 1:20 year event in mind; the review will take a longer horizon into account and provide retrofitting solutions. The upgraded designs will be implemented by selected contractors through the regular procurement procedures and channels. Maintenance teams for the works will be trained on the correct maintenance manuals and maintenance schedules will be elaborated. Monitoring of flooding along the Vaisigano River segments. A plan for involvement of members of the vulnerable population in labor intensive activities will be elaborated with a contracting scheme laying the basis for generation of employment opportunities.
2.2 Implement ecosystem responses upstream for decreased flows during extreme weather events	Next to hard infrastructural measures in the downstream areas of Vaisigano River Catchment areas, ecosystem-based adaptation activities in the side- and upstream catchment areas are necessary to make sure excessive rain during extreme weather events does not accumulate into flashfloods. Zoning is part of this: ensuring that the most vulnerable areas remain under conservation, whereas the lesser vulnerable areas provide optimal ecosystem functions as well as the opportunity for land based livelihoods. The realization that sustainability of such activities is only ensured when community members (particularly members of vulnerable groups) see the value of them: in other words – they need to be provided with flood-proofing related alternative income generating activities that ensure perpetuation of the activities in the future.	2.2.1 Determining the best protection options for flood management activities from Ridge to Reef, depending on landscape, land tenure, existing land use and planned developments. 2.2.2 Demarcation process of one area within the Vaisigano River Catchment as a 'no development zone' in combination with a 'restricted zone' below it and assign this as a "Water Source Protection Area" as mandated under the <i>Water Resources Management Act 2008</i> and the <i>Water Resources Management Regulation 2013</i> 2.2.3 Follow development consent process for demarcation 2.2.4 Develop a community based adaptation strategy for ecosystem based alternative income generating activities. 2.2.5 Community based ecosystem solutions supported including cash-for-work flood-related catchment rehabilitation (anti-erosive measures, landscaping options),	Characterization (land tenure, vegetation, land use, water resources, landscape etc.) of the catchment area will determine relevant interventions Zoning will inform proper land use at different sub catchment areas (i.e. steep slopes, delineation of riparian environments, sustainable agricultural sites). This will also indicate priority landowners for targeted consultations to avoid land tenure problems. Formalizing the status of a "Water Source Protection Area" ('no development zone' above 600m asl and 'restricted development zone' 300-600m asl) will improve enforcement on unsustainable developments which contribute to increased runoff. Precautionary approaches such as promoting conservation of critical upland areas through Payment of Ecosystem Services will ensure that highly vulnerable areas are protected, as it is cheaper to conserve and rehabilitate now than to mitigate in the future. Creating a livelihood from flood-related activities promotes Ecosystem based income generating activities promote community involvement and benefit sharing of protective measures. to reduce flood risks Capacity building of community members and intermediaries on alternative income generating activities

		and procurement of inputs for business ventures that promote enhancement of ecosystem functions that can support flood risk reduction.	allows for optimization of economic impact while respecting integrity of ecosystems. Source for potential laborers among vulnerable groups for provision of labor with cash remuneration.
2.3 Construction upgrade of Lelata bridge to accommodate increase flood waters	Lelata Bridge is a major artery for transport in the AUA. The design for implementation of Segments 2, 3 and 4 of the Vaisigano River flood scheme will necessitate upgrading this bridge to maintain the design capacity of the channelization works.	2.3.1. Review current design of Lelata Bridge 2.3.2 Construction of Lelata bridge according to upgraded design	The Lelata Bridge was built in a time when the context with regards to flood hazards was different. The bridge sits lower than the proposed Vaisigano flood protection wall and therefore will impede flows and the ability of the channel to pass the design flow. The original design can be used as basis for upgrading the bridge to the current standard.
2.4 Extension of floodwalls at Lelata and Leone Bridges to prevent damage during extreme events	The currently existing floodwalls adjacent to the bridge have not been designed in line with the designs for Segment 1 and 2 of the Vaisigano River flood measures. The floodwalls need to be extended to accommodate the new plans.	2.4.1 Review current design of floodwalls adjacent to both bridges. 2.4.2 Construction of floodwall extensions at both bridges	The existing floodwalls at both rivers were designed according to the state of the art at the time of the bridge building. The new flood hazard information suggests an extension is needed for the floodwalls to be aligned with the flood proofing measures foreseen for Segment 2 and 3.
3.1 Develop a climate resilient Stormwater Master Plan	The greater Apia area currently has no master plan for management of the urban stormwater network. Developing of such a plan will lead to linking the stormwater systems developed under 3.2 to a wider stormwater network that can be upgraded according to recognized priority areas.	3.1.1 Review the current drainage systems existent in the Vaisigano River floodplain 3.1.2 Identification of specific design options for current hazard spots in order to flood proof these in line with expected flood risks 3.1.3 Consultation process for selection of priority areas to be upgraded 3.1.4 Elaborate a multi-year climate resilient stormwater master plan for the Vaisigano River floodplain 3.1.5 Capacity building of the relevant stakeholder agencies with regards to implementation of the Master Plan	Stormwater systems have been designed in the past; these designs need to be reviewed to adapt them to the current flood risks. To test these designs and adequately understand the causes of local flooding and the performance of the urban stormwater network an integrated hydraulic model is required. The model would be part of the catchment wide model described in 1.1.1. A stormwater masterplan can then be produced based model results. A review of stormwater infrastructure asset data and potentially the collection of additional data would be required prior to the model build phase. Different existing stormwater systems might require different measures for upgrading; an overview of options will provide various alternatives for the site specifics Since the stormwater master plan will provide a prioritization of areas where stormwater works will be executed, the local stakeholders need to be consulted on this prioritization and the foreseen intensity and length of activities. On basis of review, options and consultations, the master plan can be developed according to recognized priority areas and measures; clear linkage to activity 3.2 will be made. The new stormwater master plan will hold requirements for execution of various agencies and groups operating in the hazard areas, such as waste collectors, landscapers, etc. These need to be trained on the implications of the plan.
3.2 Upgrade drainage systems and outfalls in hazard areas to accommodate flooding events	During the EWACC project, 9 specific priority upgrades or drainage reticulation were recognized to be of extreme importance for upgrading if flooding of the urban area was to be contained. Upgrade of drainage outfalls and adjacent piped reticulation in the critical hazard coastal area is also targeted first.	3.2.1 Assessment and design of the priority drainage upgrades and critical hazard areas with regards to needed upgrade 3.2.2 Implementation of upgrades 3.2.3 Integration of upgrades in the Master plan (activity 3.1)	Nine (9) priority upgrades were recognized with regards to flood prone drainage areas in the Vaisigano floodplain. A critical hazard on the northern edge of the CBD adjacent to the coast is also recognized as a priority. These need to be scoped and design completed for implementation. A contractor will have to be tendered for the execution of the establishment of the drainage systems. Hazard areas will need to be integrated into the Master plan, along with lessons learned during the implementation of the drainage systems in these areas.

H.2. Arrangements for Monitoring, Reporting and Evaluation

275. The project results as outlined in the project results framework will be monitored and reported annually and evaluated periodically during project implementation to ensure the project effectively achieves these results.

Project-level monitoring and evaluation will be undertaken in compliance with UNDP requirements as outlined in the [UNDP POPP and UNDP Evaluation Policy](#). While these UNDP requirements are not outlined in this project document, the UNDP Country Office will work with the relevant project stakeholders to ensure UNDP M&E requirements are met in a timely fashion and to high quality standards. Additional mandatory GCF-specific M&E requirements will be undertaken in accordance with relevant GCF policies (AMA, FAA, etc.)

276. In addition to these mandatory UNDP and GCF M&E requirements, other M&E activities deemed necessary to support project-level adaptive management will be agreed during the Project Inception Workshop and will be detailed in the Inception Workshop Report. This will include the exact role of project target groups and other stakeholders in project M&E activities including national/regional institutes assigned to undertake project monitoring.



I. Supporting Documents for Funding Proposal

- NDA No-objection Letter **Annex I**
 - Feasibility Study **Annex II**
 - Integrated Financial Model that provides sensitivity analysis of critical elements **Annex III Not Applicable** for this project
 - Confirmation letter or letter of commitment for co-financing commitment **Annex IV**
 - Term Sheet (including cost/budget breakdown, disbursement schedule, etc.) **Annex V**
 - Environmental and Social Impact Assessment (ESIA) or Environmental and Social Management Plan
 - Social and Environmental Screening Template **Annex VI (a)**
 - Environmental and Social Management Plan **Annex VI (b)**
 - Appraisal Report or Due Diligence Report with recommendations **Annex VII**
 - Evaluation Report of the baseline project **Annex VIII**
 - Map indicating the location of the project/programme **Annex IX**
 - Timetable of Project/Programme Implementation **Annex X**
 - Project/Programme confirmation **Annex XI**
- Additional information**
- Economic Analysis **Annex XII (a), Annex XII (b)**
 - Additional Background Details **Annex XIII**; Procurement Plan **Annex XIII (a)**
 - Responses to GCF comments on Proposal **Annex XIV**
 - Letter of Endorsement from UNDP Senior Management **Annex XV**

** Please note that a funding proposal will be considered complete only upon receipt of all the applicable supporting documents.*