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# SOFF Investment Phase Funding Request

Samoa

20 May 2024

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Systematic Observations  
Financing Facility

**Weather  
and climate  
data for  
resilience**



# SOFF Investment Phase Funding Request




The SOFF Investment Funding Request includes the following sections:

1. **Basic Information**
2. **Programming Criteria**
3. **Readiness and Country Context**
4. **Investment Phase Outputs and Budget**
5. **Investment Phase Implementation Arrangements**
6. **Investment Phase Monitoring, Reporting, and Verification**
7. **Investment Phase Risk Management Framework**

The **GBON Gap Analysis**, the **GBON National Contribution Plan** and **Country Hydromet Diagnostic** are included in **Annex 1, 2, 3**.

The **Terms of References** of the advisory services provided by the **SOFF peer advisor** are provided in **Annex 4**.

## 1. Basic Information

<b>SOFF Beneficiary Country and Focal Point</b>	Samoa – Samoa Meteorology Division, Ministry of Natural Resources and Environment (MNRE)  Dr. Afa’ese Luteru Tauvale, Assistant Chief Executive Officer (ACEO) of Samoa Meteorology Division, <a href="mailto:luteru.tauvale@mnre.gov.ws">luteru.tauvale@mnre.gov.ws</a>			
<b>Country classification</b>	<input type="checkbox"/> LDC	<input checked="" type="checkbox"/> SIDS	<input type="checkbox"/> FCS	<input type="checkbox"/> ODA-recipient
<b>SOFF Implementing Entity and Focal Point</b>	World Bank (WB)  Dr. Ming Zhang, Practice Manager, Urban, Disaster Risk Management, Resilience and Land, East Asia and Pacific, <a href="mailto:mzhang1@worldbank.org">mzhang1@worldbank.org</a>			
<b>SOFF Peer Advisor and Focal Point</b>	Australian Government - Bureau of Meteorology  Dr. Andrew Jones, General Manager International Development, Bureau of Meteorology, <a href="mailto:andrew.jones@bom.gov.au">andrew.jones@bom.gov.au</a>			
<b>Total Budget (USD)</b>	Total: USD 5,982,100 (including peer advisor costs)  First tranche: USD3,000,000 (excluding peer advisor costs)  Second tranche: USD2,649,600 (excluding peer advisor costs)			
<b>Delivery timeframe</b>	September 2025 to August 2030			
<b>Date of Steering Committee Approval</b>				
<b>Signatures</b>   Dr. Luteru Tauvale, ACEO, Samoa Meteorology Division, Ministry of Natural Resources and Environment, Government of Samoa   Dr. Ming Zhang, Practice Manager, Urban, Disaster Risk Management, Resilience and Land for East Asia and Pacific, World Bank   Dr Andrew Jones, General Manager International Development, Bureau of Meteorology, Australia				

## 2. SOFF Programming Criteria (2 pages)

### Alignment with the SOFF Programming Criteria

*This section should be based on the SOFF Readiness Phase outputs, i.e. the National GBON Gap Analysis and GBON National Contribution Plan, and the Country Hydromet Diagnostic where available.*

#### Close the most significant data gaps

Samoa's national meteorological service (SMD) comprises skilled teams of observing, technical and forecasting personnel. These teams maintain:

- 2 staffed weather stations, Faleolo and Apia, currently experiencing data transmission and sensor issues;
- 17 automatic weather stations (AWS), of which 6 AWS are fully functioning. The remaining AWS are either partially functioning, not functioning or there are issues with the communications network, which means data is not being sent by the AWS; and 1 sea level station located at the Apia wharf.

There are currently no upper air stations in Samoa, with the closest upper air station located in American Samoa, 130 km to the south-east.

SMD faces major challenges in skilled and sufficient personnel, budget, logistics, sourcing of equipment and spares, maintenance and data communications, leading to quality and reliability issues. As a result, Samoa currently has no GBON-compliant surface stations and many of the AWS are not providing complete data.

There is substantial opportunity for SOFF to support Samoa to address these challenges, as outlined in the description of GBON targets below.

Samoa consists of two main islands, Upolu and Savai'i, and has a relatively small exclusive economic zone (EEZ).

In its global GBON gap analysis, the WMO applied the GBON marine surface and upper air station density requirements to the EEZ to develop its land-based targets for Samoa. This resulted in targets of:

#### **Surface stations:**

One staffed surface station to be upgraded alongside a new co-located AWS in/near Apia, located on Upolu island (representing the central location, providing a level of redundancy)

- Considering that SMD have two staffed stations in relatively close proximity (25 km), one of these should be designated as a GBON station. Locating the GBON site at a staffed station will allow staff members to monitor equipment and undertake first level maintenance tasks to improve

reliability of service The preferred location is in Apia to provide greater geographic spread.

One new standalone AWS to be installed on the western side of Savai'i island.

- The preferred location would be at Ministry of Natural Resources and Environment (MNRE) offices at Asau on the Western end of Savai'i.
- Staff on-site will be able to provide security and grounds maintenance (e.g. vegetation management) to ensure the site complies with WMO siting requirements.

• **Upper air station**

A new upper air station will need to be installed at a location where observers are present.

- Options during the GBON assessment included SMD office at Mulinu'u, Faleolo International Airport, or potentially near the National Emergency Operations Centre (NEOC) in Tuanaimato. However, SMD has determined that the optimal location is Faleolo International Airport due to spatial considerations, the need to be co-located with the Government's aviation services, and existing collaboration between SMD and the Samoa Airport Authority. To optimize long-term sustainability, the selection of the upper air station will depend on the potential relocation plans for SMD's Mulinu'u office. A site feasibility analysis is needed at the beginning of the procurement process to evaluate the relative merits of each of the proposed sites.

Type of station	Baseline (Results of the GBON National Gap Analysis)				GBON National Contribution Target	
	Target (# of stations) <sup>1</sup>	GBON-compliant stations (#)	Gap		To improve	New
			New	To improve		
Surface	1	0	0	1	2*	0
Upper air	1	0	1	0	0	1

Table 1: GBON National Contribution Target

\* Although the global gap analysis identifies one station, Samoa will be seeking to improve two stations via SOFF, one on each of the two main islands of Upolu and Savai'i. The second could be considered an "easy win" given Samoa operates a high-density network effectively. The rationale for keeping the second easy win to improve stations has been explored and justified in the National Contribution Plan (NCP) screened by WMO Technical Authority.

<p><b>Target easy fixes</b></p>	<p>The first easy win is to audit Samoa’s existing AWS which will identify those that are serviceable or repairable. A high-level review of existing stations was done as part of the Readiness Phase but needs to be updated and in more detail at the start of the Investment Phase, especially considering the start date of implementation is expected to be two or more years after the high-level review.</p> <p>A second easy win is to upgrade Samoa’s communications and IT systems to ensure data from operational stations report internationally via the new Meteorological Data Management System described in the NCP. This includes the replacement of outdated microwave communication systems on serviceable AWS financed by the Japan International Cooperation Agency (JICA) with a cellular communications system.</p> <p>A third easy win supported by BOM but complementary to proposed SOFF activities is upgrading the data transmission algorithms and systems for the existing sea level stations. This will enable the stations to report internationally to the Global Telecommunication System (GTS). This upgrade can be implemented concurrently with the SOFF investments and would convert the stations to designated marine GBON stations for the variable sea level pressure.</p>
<p><b>Create leverage</b></p>	<p>The World Bank-financed Pacific Resilience Program (PREP) has supported the Government of Samoa since 2015 to enhance its multi-hazard early warning systems (MHEWS) including development of a Concept of Operations, Technical Design, and the installation of hydromet (river) monitoring equipment. In addition PREP is funding an ICT refreshment to assist with data storage and sharing, with new systems installed for SMD, the Water Resources Division, and the Disaster Management Office, including at the National Emergency Operations Centre. This project is underway and is expected to be completed by August 2024. The World Bank is under discussion with the Government of Samoa on a potential pipeline investment, tentatively entitled the Pacific Region Preparedness, Adaptation and Resilience Program (PREPARE) – Samoa Project, that could include SOFF funds as co-financing to help ensure complementarity of global and national-level observation network improvements. The PREPARE-Samoa project would help to leverage GBON investments under SOFF to ensure national-level investments and benefits in integrated MHEWS, building on from initial PREP investments.</p> <p>The Climate and Oceans Support Program in the Pacific (COSPPac) is an Australia-funded government program that is, among other activities, assisting Samoa to maintain its CliDE Climate Data Management System.</p> <p>The Weather Ready Pacific decadal investment program is a broader regional multi-donor initiative to comprehensively strengthen the full hydro-meteorological system across the whole value chain in the Pacific region. The program is overseen by the Pacific Meteorological Council (PMC) and is Pacific-designed and Pacific-led, and will help to coordinate future investments in meteorological infrastructure and</p>

	<p>training. The program is under implementation, including the establishment of a Project Management Unit through contributions from the governments of Australia and New Zealand (with other bilateral partners considering contributions). Weather Ready Pacific can leverage the improved observations from SOFF investment as part of its broader focus on hydrometeorological services. Weather Ready Pacific currently has seed funding however full funding is not yet assured.</p> <p>The Climate Risk Early Warning Services (CREWS) initiative is working directly with Pacific countries to increase the availability of, and access to, early warning systems. As part of this project, National Strategic Plans for Meteorological Services are being developed for six Pacific SIDS, including Samoa. The project is due to be completed by December 2024. Under the World Bank, CREWS has supported Samoa to enhance its knowledge and capabilities for impact-based forecast and warning services.</p> <p>Samoa is leveraging from the EU-funded Pacific ClimSA project four (4) AWSs and two calibration kits with extended functions that meet GBON station requirements. Through the procurement process working collaboratively with partners, each instrumentation will comply with additional support for the life of the equipment procured. The ClimSA project would not provide the long-term maintenance support that SOFF offers. There may be spinoff benefits for these AWS from the new personnel and capacity building supported by SOFF. Also, the IT and international data transmission solutions developed under SOFF could potentially be used with ClimSA AWSs as well.</p> <p>A proposed One Pacific program, financed by the Global Climate Fund (GCF) and implemented by SPREP, intends to be complementary to SOFF interventions and support any efforts or upgrades. The proposal is at concept stage and there is no clear allocation for SMD at this stage. A procurement plan and guideline from SOFF investments would aid in the procurement of reliable and robust equipment under the proposed OnePacific project.</p> <p>The Pacific Weather Aviation Program financed by the Australian Government and implemented with support of BOM will improve two AWSs and upgrade one manual station at Faleolo; upgrade one manual station at Apia; and install one new AWS at Fagali'i.</p> <p>The Government of Samoa is responsible for ensuring that the activities under SOFF are not duplicated by other projects in Samoa.</p>
<p><b>Maximize delivery capacity</b></p>	<p>The World Bank is supporting the Government of Samoa to implement projects financed by the International Development Association (IDA), including the PREP project, which closes this year. The World Bank provides technical, fiduciary, and safeguards implementation support to its clients, including through regular technical missions and six-monthly formal implementation support missions.</p>

Through grant financing from the Global Facility for Disaster Reduction and Recovery, including from the Climate Risk and Early Warning Systems, the World Bank also provides technical advice, capacity building, and knowledge exchanges on MHEWS including impact-based forecast and warning services (IBFWS), geophysical early warning systems, and technical support on PREP including building design reviews (e.g., the planned Seismic Operations Center) and development of MHEWS plans (capacity building, implementation, and procurement).

Activities financed by the World Bank are required to adhere to the Bank's Environmental and Social Framework, Procurement Regulations for Investment Project Financing Borrowers (September 2023), and financial management requirements. The Bank's fiduciary and safeguards teams provide implementation support on these aspects, with day-to-day support from the Centralized Technical Services Support Unit (CTSSU) under the Ministry of Finance (MoF), which provides fiduciary, safeguards, and monitoring and evaluation support for all World Bank-financed projects in Samoa.

The MNRE is the Implementing Agency for PREP and is responsible for two technical components: (1) Strengthening Early Warning Preparedness; and (2) Risk Reduction and Resilient Investments. It is supported by a Project Implementation Unit including a Project Manager and a Procurement Officer, with support from the CTSSU. MNRE has the technical expertise to implement SOFF activities through the Samoa Meteorological Division and would be supported by the World Bank's technical team (including global and national specialists), and the CTSSU for fiduciary, safeguards, and M&E responsibilities.

The Bureau of Meteorology is working with the SMD on the Pacific Weather Aviation Program, funded by the Australian government. This focuses on support for AWOS installation, maintenance and training for aviation weather observations at Faleolo and Fagali'i Airports. The Bureau also works closely with SMD under the Australia and New Zealand government funded Climate and Ocean Support Program in the Pacific (COSPPac) project. This project is supporting core climate services including seasonal prediction products and the Climate Data for the Environment (CliDE) data management system. It also includes maintenance of a sea level monitoring station in Samoa. The Bureau has also worked closely with SMD in development of the Weather Ready Pacific initiative, funded by Australia, New Zealand and other regional partners.

Samoa is included in the first group of 30 countries that should receive coordinated and targeted support under the EW4All initiative, which will create further opportunities for accelerated implementation of early warning systems in the country. **The SOFF investment funding represents a major contribution as part of the EW4All overall support to Samoa.**

<p><b>Sub-regional gains</b></p>	<p>Economies of scale can be created through working in partnership with the other Pacific SOFF countries and under the guidance of existing Pacific regional architecture such as the PMC. A Pacific SIDS programmatic umbrella has been proposed by SOFF in response to a request from the Pacific countries to advance sub-regional implementation and maximize the benefits from standardized and coordinated GBON implementation in the region. In addition, collaboration with the Regional Specialized Meteorological Centre (RSMC) in Nadi, Fiji will be explored to assist with stations metadata and GBON compliance at station level.</p> <p>The proposed station layout, especially for upper air stations, will contribute to a broader well-distributed multi-country network across a critical region for Numerical Weather Prediction (NWP) encompassing other SOFF-funded stations in nearby countries including Tuvalu, Nauru, Fiji and Kiribati.</p> <p>The Investment Phase will also accommodate future regional coordination initiatives such as regionally-focused equipment calibration services, training, procurement of common equipment types, and maintenance services. Such regional initiatives are being planned under the WRP Program. The SOFF investment will accelerate efforts to build resilience and contribute to shared goals of WRP to improve <i>“production of forecasts and warnings”, ‘communication and delivery of forecasts and warnings to end-users’, enhanced systems and robust ‘infrastructure and ICT support’</i> and contribute to <i>‘capacity development’</i>. These will be pursued through several forums in which SMD is an active participant, including:</p> <ul style="list-style-type: none"> <li>• Regional SOFF coordination workshop in April 2024</li> <li>• WMO Regional Association (RA) V committee</li> <li>• PMC and its expert panel</li> <li>• Secretariat of the Pacific Regional Environmental Programme (SPREP)</li> <li>• Pacific Resilience Partnership.</li> <li>• The Pacific Community (SPC).</li> </ul> <p>During the Investment Phase, SMD, WB and BOM will also pursue opportunities for regional synergies for maintenance services that can be implemented during the Compliance Phase.</p>
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### 3. Readiness and Country context (1 page)

#### **SOFF Beneficiary Country Capacity Assessment**

*This section should summarize existing Beneficiary Country capacity to execute the GBON National Contribution Plan.*

SMD is the primary organisation of relevance to the operation and maintenance of GBON in Samoa. It maintains all the weather stations in Samoa, manages all the weather and climate data, and has a legislated mandate to do this. In addition, the WRD under MNRE operates and manages river gauges and data.

SMD's annual budget is insufficient to meet operational costs including new observations equipment, vehicles, and other capital items. The shortfall is partially met from external project spending on new equipment. There is no specific funding for technicians to service AWSs and this is being done by staff when funds are available.

Salaries are not generally competitive with other graduate positions in government. SMD has had challenges with staff retention with staff leaving for regional organisations, labor mobility programs, and other cultural / family reasons. Annual staff turnover is approximately 10% per year and expected to increase considering the above factors.

The Meteorology, Geoscience and Ozone Services Act (2021) in Samoa provides a mandate and outlines the functional responsibilities for SMD and other relevant agencies, including for MHEWS responsibilities. The Act clearly outlines the functions and accountability of SMD which include, among other functions, the following responsibilities relevant to GBON:

- analyse and provide scientific and quality managed data and information in the areas of:
  - meteorology including weather, climate, and air quality;
  - geoscience including geological, geomagnetic, geophysics, oceans, which includes waves, storm surges, ocean-tides, sea-level rise, ocean acidification and astronomy;
  - ozone layer and space weather;
- control collection, analysis and dissemination of quality managed data, information and material for the purposes of the Act;
- provide meteorological services including data, information, warnings which may be provided by the Division for the benefit of the general public including but not limited to sectors such as agriculture, tourism, sports, education and cultural affairs;
- provide aviation meteorological services or weather-related information or data for the purpose of aviation in accordance with NZCAA (New Zealand Civil Aviation Authority) Part 174 - Annex 3 of ICAO;
- provide meteorological information for the purposes of maritime, navigation and shipping; provide a comprehensive range of meteorological related information, data, analysis, as well as other products and services, for the purposes of national, regional and international meteorological and climate change agencies;
  - provide oceans services including oceans information, data, products and services relating to tides and ocean related measurements;
  - provide oceans information relating to sea-surface temperatures, currents, wave activity for the purpose of maritime transport and monitoring activities;
  - incorporate and implement the detection and assessment of extreme weather or natural phenomena as part of the country's Multi Hazard Early Warning System and ensure that such remains fully operational at all times and is regularly updated and fully capable of providing the alerts and warnings necessary in order to protect the public property and any part of the country or community; and

- allow and facilitate the exchange of meteorological, geoscience and ozone data with the Division or their counterparts from other countries, territories and in accordance with Resolution 40 of the WMO Policy and Practice (Cg-XII).

The Act provides clear, unambiguous authority and responsibility for SMD to establish and operate the GBON stations and share the data internationally.

SMD maintains teams of observation, technical and forecasting personnel. The staffing education profile of SMD reported as part of the Weather Ready Pacific proposal is shown in the National Contribution Plan. The total number of staff positions is 42. Key gaps in human capacity necessary to ensure GBON compliance of observations are:

- There are currently three (3) Basic Information Package for Meteorological Technicians (BIP-MT) certified staff through the Australian Bureau of Meteorology, Fiji Meteorological Services and PAGSA in the Philippines which are essential to ensuring the quality of observations are met. There is high risk of staff turnover and training of more observers with BIP-MT certification is needed. The SMD personnel have no formal training in cellular and satellite communications which are critical to transmission of real-time data for GBON compliance.
- Observers require basic automatic and manual observing equipment maintenance skills to address equipment problems at stations in a timely manner to ensure reliability of observations. Given the costly and complex logistics of travel, this is much more efficient for basic maintenance than requiring reactive visits by technicians.
- SMD has no specific ICT personnel and no dedicated ICT support system. In order to successfully implement a new Meteorological Data Management System compliant with the WMO Information System 2.0, further ICT expertise will be required in meteorological data and communications systems.
- SMD has no technical officer roles in their organizational chart, and no staff currently trained in technical support. In order to ensure continuity of service for station equipment a permanent technical officer role should be created, with additional SMD staff trained to support this role to ensure back-up is available.

Out of 20 stations in total, Samoa has two staffed weather stations that report internationally. However, neither surface station fully complies with GBON, due to the observations frequency (3 hourly as opposed to hourly) at the two synoptic stations (Apia and Falelo) although a limited amount of GBON compliant data is shared internationally.

Data from the 17 AWSs and 1 sea level station are not transmitted outside Samoa. Stations experience quality and reliability issues with data due to maintenance and calibration challenges. The AWSs have been primarily installed under two different projects financed by JICA (10 AWSs) and the National Institute of Water and Atmospheric Research (NIWA – 7 AWSs).

AWSs financed by JICA and NIWA have different telemetry systems, with the NIWA-financed stations using general packet radio service (GPRS) mobile data, and the JICA-financed stations using microwave links. There is a general intent to transition the AWS stations using microwave links to GPRS telemetry, which would resolve issues experienced with microwave transmission.

Data from the received stations can be displayed within Samoan agencies, but not in an integrated manner, and the AWS data may be under-used by meteorologists as a result. Data from the NIWA-financed AWSs are ingested into the Climate Data for the Environment (CLiDE) database, but the data from JICA-financed AWSs is not ingested into CLiDE. The proposed activities in this proposal (Output 2.2) will help to address the challenge of data integration, that will need collaboration with Japan and potentially other bilateral partners including Australia and New Zealand. There is also a degree of double handling of data (where manual observations must be manually retyped into CLiDE), which causes delays in database updates and staff resource inefficiencies.

There are six other manual climate stations that rely on observers in the villages/communities, and 30 manual rain gauges.

The Water Resources Division under MNRE operates a monitoring network to support their responsibilities in water resources management. The network is largely complementary to the SMD field observation network, and includes inland stations, and water level and groundwater gauges.

Samoa has potential to have good network coverage if these issues are all addressed on a sustainable basis, whilst still noting a relative lack of stations in inland areas.

It can be concluded that while there is some institutional, administrative, and technical capacity in place to execute SOFF activities, there is substantial opportunity for SOFF to support the SMD to address all the challenges mentioned above.

Finally, government agencies and public bodies in Samoa are required to comply with the financial management policies and procedures as detailed in the 'Public Finance Management Act (PFMA) 2001' and Treasury Instructions 2015. An internal audit (pre-audit process) function is performed by the Samoa Audit Office over government ministry transactions processed through the FinanceOne system. World Bank-financed projects implemented by MNRE are normally governed by the project document, approved funding arrangement, the Samoa Public Finance Management Act 2001, Treasury Instructions 2015, and MNRE's own Finance Policies and Procedures. Given bilateral or multilateral arrangements in Samoa, all project transactions are processed through MoF thus this is an additional layer of monitoring. To supplement the governments systems, MoF will maintain (via spreadsheets) a Contract/Commitments register and an asset register to ensure adequate controls over project contractual payments and asset respectively. Detailed step-by-step FM instructions will be maintained as part of a Project Operations Manual.

### **Investment Phase Alignment with the GBON National Contribution Plan**

*Please attach the National GBON Gap Analysis and GBON National Contribution Plan as Annex 1.*

The Investment Phase targets include organization of inception workshops at the national and subnational levels targeting different stakeholders; establishing a stakeholder engagement plan to be managed and monitored regularly by a designated person; conducting stakeholder engagement workshops on the implementation of the SOFF project deliverables. These activities aim at more building capacity for more systematic stakeholder engagement, including CSO and private sector. In addition, the development of Gender Gap Analysis and Gender Action Plan, as suggested in the National Contribution Plan, is highlighted as a key activity.

Although the global gap analysis identifies the need for one new AWS, Samoa is requesting to improve two stations via SOFF, one on each of the two main islands. The Investment Phase targets therefore include the upgrading of one manual station and installation of two new AWSs.

## 4. Investment Phase Outputs and Budget

The GBON National Contribution Plan provides detailed information on the Investment Phase Outputs (please see Annex 1).

Output 1. GBON institutional and human capacity developed	Main activities	Budget (USD)
<p>1.1 <b>National consultations</b> including with CSOs, and other relevant stakeholders conducted</p>	<p>1.1.1 Engagement with aviation stakeholders to develop plans for aviation cost recovery to support ongoing funding for SMD.</p> <p>1.1.2 Inception workshops at the national and sub-national level targeting different stakeholders, including CSO and private sector.</p> <p>1.1.3 Develop procurement plan that allows for the procurement of equipment to include private sector ongoing support (e.g. maintenance, training, advice, spare parts, etc.) for the life of the equipment through Investment and Compliance phases.</p> <p>1.1.4 Confirm the status of the SMD Strategic Plan and undertake a comprehensive environment scan at start of Investment Phase of planned development activities related to GBON to identify opportunities for leverage and to ensure works are complementary.</p> <p>1.1.5 Engage with the Ministry of Finance and other potential partners, to develop a robust plan for ongoing procurement of essential services, to support SME to operate and maintain the stations to a GBON standard during Investment and Compliance phases.</p> <p>1.1.6 Develop an environmental and social management plan for investment activities prior to the commencement of site works.</p>	<p>400,000</p>
<p>1.2 <b>NMHS institutional capacity</b> required to operate the GBON network developed</p>	<p>1.2.1. Develop a Gender Gap Analysis and Gender Action Plan for mainstreaming of Gender ad social inclusion initiatives into SOFF initiatives.</p>	<p>300,000</p>

	<p>1.2.2 Organise stakeholder engagement consultations with civil society organisations (CSOs) focused on women's empowerment.</p> <p>1.2.3 Develop a sustainability plan to ensure longer-term sustainability of GBON investments, including under the SOFF Compliance funding.</p>	
<p>1.3 <b>NMHS human capacity</b> required to operate the GBON network developed</p>	<p>1.3.1. Provide training in basic automatic and manual weather station verification and maintenance at the start of the Investment Phase for all SMD observers, and nominated staff on Savai'i, with ongoing training through the Compliance Phase (funded with SOFF Compliance funding, not under this phase). The training should be specific to the equipment types that will be installed. This would ideally be included in a 'supply and support' contract as part of the equipment procurement.</p> <p>1.3.2 SMD to be supported by SOFF to recruit one Technician Officer during the Investment Phase. This position will be responsible for completing and recording preventative and corrective maintenance at SMD sites. This role would manage a store of spare parts.</p> <p>1.3.3 Provide comprehensive training in weather station maintenance and metadata collection for the new technical officer and one to three staff members to provide back up support, both at the start of Investment Phase and ongoing through Compliance Phase (to be financed by SOFF Compliance funding). This would ideally similarly be structured into 'supply and support' contract.</p> <p>1.3.4 Provide training in cellular and satellite communications and router configuration during the Investment Phase to the new technical personnel and staff supporting this role. Similarly, this training could be included in a 'supply and support' contract as part of equipment procurement.</p>	<p>1,950,000</p>

	<p>1.3.5 Offer training leading to BIP-MT qualifications to all of SMD's observing personnel not currently qualified. This could be organised through the Bureau of Meteorology, NZ Met Service or Fiji Met Service.</p> <p>1.3.6 Provide training in OSCAR/Surface and WDQMS operation to selected members of the Observations and Technical teams.</p> <p>1.3.7 SMD to be supported by SOFF to recruit one ICT professional, skilled in network, database and communications technology critical to WIS2.0, MDMS and CDMS. Support will be required both during Investment and Compliance phase (funded by Compliance funding). Training in WIS2.0, MDMS and CDMS may also be required.</p> <p>1.3.8 SMD to be supported by SOFF to train an existing staff member as a back-up ICT officer to support the ICT professional employed through Activity 4.7. in the NCP.</p> <p>1.3.9 Offshore technical training for several existing SMD staff (approximately 5 officers) in quality management systems, including field sensor verification, observations metadata management and maintaining quality records.</p> <p>1.3.10 Recruitment of a SOFF-funded program/project manager to oversee equipment procurement, installation and commissioning during the Investment phase, with the position to ideally continue for the life of the equipment during the Compliance phase (funded with SOFF compliance funding).</p>	
<b>Output 2. GBON infrastructure in place</b>	<b>Main activities</b>	<b>Budget (USD)</b>
2.1 <b>New land-based</b> stations and related equipment, ICT systems, data management systems and standard operating practices in place	2 N/A	

<p>2.2 <b>Improved land-based</b> stations and related equipment, ICT systems, data management systems and standard operating practices in place</p>	<p>Upolu station</p> <p>2.2.1. Determine optimal site to co-locate AWS with staffed station on Upolu by undertaking a site selection assessment of the relative merits of: the existing site at SMD office location in Mulinu'u; the possibility of co-locating at the National Emergency Operations Center; and the Faleolo International Airport site. Secure land at chosen location.</p> <p>2.2.2 Undertake audit of existing site conditions, manual equipment and facilities at the the preferred Upolu site, to identify all items that require procurement.</p> <p>2.2.3 As required, procure 1 x uplifted manual observing equipment, and 1 x new AWS for colocation at the Upolu station under 'build and support' contracts, including site works, structures, facilities, power and communications infrastructure.</p> <p>Savai'i station</p> <p>2.2.4 Undertake site selection assessment for the Savai'i AWS and secure land access at the preferred AWS site.</p> <p>2.2.5 Undertake audit of existing site conditions, equipment and facilities at the preferred Savai'i site, to identify all items that require procurement.</p> <p>2.2.6 As required, procure 1 x new AWS for the Savai'i station under 'build and support' contract, including site works, structures, facilities, power and communications infrastructure.</p> <p>2.2.7 Audit existing AWS, identify those that are serviceable or repairable and uplift their communications and IT systems to enable them to report internationally via the new MDMS</p> <p>2.2.8 Upgrade the data management and storage system to have functionalities to be a WIS 2.0 node including:</p>	<p>1,000,000</p>
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	<ul style="list-style-type: none"> <li>• Expert audit of power supply, ICT equipment and data flows to develop detailed architecture for the Meteorological Data Management System for WIS 2.0 implementation</li> <li>• Procurement, installation and commissioning a Meteorological Data Management System (including WIS 2.0 capability), including ongoing trainings and maintenance support.</li> <li>• Installation of the MDMS to include recommended upgrades to the SMD office to ensure optimal working environment for staff and equipment.</li> <li>• Procure, install and commission upgraded Climate Data Management System (CDMS) components through a 'supply and support' contracting approach.</li> <li>• Support upgrades to existing SMD web presence to provide weather data products to stakeholders and the public.</li> </ul>	
2.3 <b>New upper-air</b> stations and related equipment, ICT systems, data management systems and standard operating practices in place	<p>2.3.1. Undertake site selection and feasibility analysis for the new upper air station on Upolu. Secure land access for upper air station at preferred location.</p> <p>2.3.2 Procure 1 x upper air station equipment under 'build and support' contract, including site works and all ancillary infrastructure (including building structure).</p> <p>2.3.3 Develop SOPs and provide training for Upper Air stations</p>	1,300,000
2.4 <b>Improved upper-air</b> stations, related equipment, ICT systems, data management systems and standard operating practices in place	N/A	
<b>Outcome: Sustained compliance with GBON</b>	<b>Main activities</b>	<b>Budget (USD)</b>
3.1 <b>GBON land-based stations' commissioning period completed</b> , country-specific standard cost for operations and	3.1.1. Procurement of spare parts and supplementary materials to maintain consistent operation of land-based stations after commissioning.	80,000

maintenance established, and data sharing verified by WMO Technical Authority	3.1.2. Staff travel for routine and emergency maintenance of the equipment.	
<b>3.2 GBON upper air stations' commissioning period completed</b> , country-specific standard cost for operations and maintenance established, and data sharing verified by WMO Technical Authority	3.2.1. Procurement of spare parts and supplementary materials to maintain consistent operation of upper-air stations after commissioning. 3.2.2. Staff travel for routine and emergency maintenance of the equipment.	250,000
<b>Total for all Outputs</b>		<b>5,280,000</b>
<b>Implementing Entity Fee<sup>1</sup></b>		<b>Max 369,600</b>
<b>SOFF peer advisory services</b>		<b>332,500</b>
<b>Total funding request</b>		<b>5,982,100</b>

<b>Budget breakdown by UNDG category (Excluding SOFF peer advisory services)<sup>2</sup></b>	<b>USD</b>
Staff and personnel costs	<b>1,350,000</b>
Supplies, Commodities and Materials	<b>1,825,000</b>
Equipment, Vehicles, Furniture and Depreciation	<b>0</b>
Contractual Services Expenses	<b>1,630,000</b>
Travel	<b>475,000</b>
Transfers and Grants	<b>0</b>
General Operating Costs	<b>0</b>

<sup>1</sup> The implementation fee cannot exceed 7% of the total Investment Phase funding request. +26

<sup>2</sup> The total budget (excluding the budget for the SOFF peer advisory services) is expected to be disaggregated by UNDG category. It includes direct and indirect costs of the Implementing Entity and beneficiary countries to establish a fully operational observation network, collecting and internationally exchanging data according to GBON requirements. Eligible expenditures are any type of expenditure required to implement the GBON National Contribution Plan, including the requirements of the beneficiary country to manage and administer the day-to-day activities of the Investment Phase. It also includes the budget required for the operation and maintenance of the observing network.

## 5. Investment Phase Implementation Arrangements

<b>Execution model and implementation arrangements</b>	<p>WB is discussing with the Government of Samoa on a potential follow-up pipeline investment to the PREP, through the Bank’s Investment Project Financing instrument, to further enhance Samoa’s MHEWS and emergency preparedness and response capacities, and invest in select resilient public facilities. The WB proposes SOFF to be a Recipient-Executed Trust Fund (RETF) attached to this potential pipeline investment as co-financing to cover all SOFF activities. This approach would help ensure that global investments under SOFF and other national-level investments requested by the Government of Samoa are integrated seamlessly. A Bank-Executed Trust Fund (BETF) is proposed to channel the proposed Implementing Entity Fee.</p> <p>WB will be the Implementing Entity for the Project and will be responsible for supporting the implementation, financial management, evaluation, reporting and closure of the activities under the Project. WB will monitor and supervise the execution of the Project and ensure the proper management and application of SOFF Grant Proceeds. WB will ensure that the Grant Proceeds are utilised in accordance with the general terms of this Funding Request and applicable WB policies.</p> <p>WB will leverage global and national technical specialists with experience in hydrometeorological early warning systems and disaster risk management to provide project implementation support. In addition, fiduciary and safeguards specialists based in the Pacific region will also provide implementation support.</p> <p>The MNRE through the SMD will serve as the Implementing Agency. MNRE will be accountable to WB for Project execution including the effective and efficient use of resources. WB will enter into an appropriate agreement (Financing Agreement - FA) with the Government of Samoa for the execution of the Project. The FA will establish clear roles and responsibilities for the delivery of the proposed activities, and the schedule and conditions for instalments, the determination of the prevailing fiduciary standards, and the terms and conditions for arbitrations and termination of contract. The FA will include specific obligations for the MNRE on Project execution, procurement, financial management, safeguards, personnel administration, and reporting.</p> <p>Typically, a Designated Account (DA) for each World Bank-financed project would be established at the Central Bank of Samoa in U.S. dollars currency. MoF would coordinate and authorize the funds flow through the DA and make all payments for the project via their FinanceOne system. Funds will flow from the World Bank into the DA for advances. The Bank will assess other options for payment mechanisms (such as</p>
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	<p>reimbursement, direct payment, and special commitments) during the project preparation phase.</p> <p>SMD in its executing role may consider engaging relevant Technical Partner agencies to conduct activities such as trainings. These might include the SPREP, the WMO-SPREP Pacific Met Desk, and NIWA. These partners are highly qualified, internationally recognised, professional agencies with many years' experience of partnership in the Asia-Pacific region.</p>
<p><b>Private sector involvement</b></p>	<p>Currently, there are no private sector operators providing meteorological observations or data services in Samoa. The current business model of the SMD is fully public, and it is recommended that it continues using this model. However, there is opportunity for a substantial private sector role in supporting the NHMS by including ongoing maintenance, calibration, and training support in the procurement contracts for weather stations and ICT and communications equipment. This would require developing a procurement plan as a part of the Investment Phase that allows for the procurement of equipment to include ongoing support from the private sector for the life of the equipment including supply of spare parts during both Investment and Compliance phases. Under the Bank's Procurement Regulations, private sector entities would be able to bid for procurement activities financed by SOFF.</p>
<p><b>Civil society participation</b></p>	<p>Samoa is highly vulnerable to climate change and short-term hazards due to the high exposure of people and assets, with the majority of the population living in coastal areas. SMD has a people-centred culture and seeks to meet people's needs to an extent possible. Specific programs such as Climate and Oceans Support Program in the Pacific (COSPPac) include social inclusion components as part of their process.</p> <p>SMD works closely with the Samoa Fire and Emergency Services Authority (FESA) to raise awareness of weather hazards and impacts, taking part in community-based initiatives where possible. Education is also done through social media by SMD and the Disaster Management Office (DMO), also under MNRE.</p> <p>The Investment Phase will include the following activities to ensure that engagement of civil society is strategic and systematic:</p> <ul style="list-style-type: none"> <li>• Organize inception workshops at the national and subnational levels targeting different stakeholders, including diverse groups of all abilities, ages, and genders;</li> <li>• Establish a project-level stakeholder engagement plan to be managed and monitored regularly by a designated person in SMD; and</li> </ul>

	<ul style="list-style-type: none"> <li>• Conduct stakeholder engagement workshops on the implementation of the SOFF project deliverables.</li> </ul> <p>CSOs will not only participate in the proposed workshops but provide valuable information on impacts of weather and climate on their daily operations and how information from SMD could be improved. For example, consultations will include Upolu and Savaii Farming Associations, Nuanua ole Alofa (People with Disabilities), Fishing Community Association, Faith-based Organisations, Nofotane Initiative (Womens Group).</p>
<p><b>Fiduciary systems</b></p>	<p>Procurement of all SOFF activities, including consulting services, non-consulting services, goods, and civil works will be carried out according to the World Bank Procurement Regulations for Investment Project Financing Borrowers, dated September 2023. A Project Procurement Strategy for Development (PPSD) will be prepared, including a Procurement Plan for the first 18 months of implementation. The use of the World Bank’s Systematic Tracking of Exchanges in Procurement (STEP) will be mandatory for use for all SOFF activities. The system is being used on all World Bank-financed projects in Samoa.</p> <p>The Financial Management (FM) of all SOFF activities will need to meet the requirements as stipulated in the World Bank Directive: Investment Project Financing. Most of the project FM functions will be conducted by MoF using a centralized system which is well established in Samoa. MoF has established a CTSSU including FM expertise to support the MNRE. Detailed step-by-step FM instructions will be included in the Project Operations Manual, supplemented by ongoing training from the WB team, to help ensure ongoing clarity of respective roles and responsibilities.</p> <p>Unaudited interim financial reports (IFRs) for the project would be prepared and consolidated by MoF on at least semester (six-monthly) basis. The IFRs would include an analysis of actual expenditure for the current period, year to date, and cumulative to date, plus outstanding commitments, compared against the total project budget. The financial reports should be submitted by MoF to the World Bank within 45 days of the end of each calendar semester via the World Bank’s Client Connection system. MoF would also prepare annual Project financial statements incorporating all project components and expenditures, within six months of the end of the fiscal year (June 30), and shall be made publicly available. The Samoa Audit Office is responsible for the audit of public assets, liabilities, equity and money, and the audit of financial statements of public bodies and related agencies.</p>

<p><b>Social and environmental safeguards</b></p>	<p>SOFF activities will be subject to relevant national and international laws, as well as the World Bank’s Environmental and Social Framework (ESF), which was approved in 2018 and sets out the mandatory requirements of the Bank in relation to the projects it supports through Investment Project Financing. The objective of the ESF is to support World Bank-financed projects in the development and implementation of project activities that are environmentally and socially sustainable, and to enhance the capacity of its clients to assess and manage the environmental and social risks and impacts of projects.</p> <p>Projects supported by the Bank through Investment Project Financing are required to meet the following Environmental and Social Standards (ESSs):</p> <ul style="list-style-type: none"> <li>• ESS 1: Assessment and Management of Environmental and Social Risks and Impacts;</li> <li>• ESS 2: Labor and Working Conditions;</li> <li>• ESS 3: Resource Efficiency and Pollution Prevention and Management;</li> <li>• ESS 4: Community Health and Safety;</li> <li>• ESS 5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement;</li> <li>• ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources;</li> <li>• ESS 7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities;</li> <li>• ESS 8: Cultural Heritage;</li> <li>• ESS 9: Financial Intermediaries; and</li> <li>• ESS 10: Stakeholder Engagement and Information Disclosure.</li> </ul>
<p><b>Dispute resolution mechanism</b></p>	<p>Communities and individuals who believe that they are adversely affected by a World Bank supported project may submit complaints to existing project-level grievance redress mechanisms or the World Bank’s Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address project-related concerns. Project affected communities and individuals may submit their complaint to the World Bank’s independent Inspection Panel which determines whether harm occurred, or could occur, as a result of World Bank non-compliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the World Bank’s attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the World Bank’s corporate Grievance Redress Service (GRS), please visit <a href="http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service">http://www.worldbank.org/en/projects-operations/products-and-services/grievance-redress-service</a>. For information on how to submit complaints to the World Bank Inspection Panel, please visit <a href="http://www.inspectionpanel.org">www.inspectionpanel.org</a>.</p>

<b>Additional relevant policies and procedures</b>	N/A
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## 6. Investment Phase Monitoring and Reporting

The implementing entity, with the support of the peer advisor, is expected to monitor the implementation of the Investment Phase following an output-based approach. The Investment Phase outputs as well as respective indicators and targets are presented below.

Output 1. GBON institutional and human capacity developed	Indicator	Target Y1	Target Y2	Target Y3	Target Y4	Target Y5
1.1 <b>National consultations</b> including with CSOs, and other relevant stakeholders conducted						
1.1.1 Stakeholder engagement workshops (including inception) on the implementation of SOFF activities	# workshops	2	1	1	1	1
	% women participants	40	40	40	40	40
1.1.2 Development of Procurement Plan for life of equipment through Investment and Compliance phases	Years in which Plan will be developed	X	X			
1.1.3 Development of Environmental and Social Management Plan for investment activities	Years in which Plan will be developed	X	X			
1.2 <b>NMHS institutional capacity</b> required to operate the GBON network developed						
1.2.1 Development of Gender Gap Analysis and Gender Action Plan for mainstreaming Gender and social inclusive initiatives	Years in which Plan will be developed	X	X			
1.2.2 Stakeholder consultations with civil service organizations (CSOs) as part of implementation of SOFF activities	# CSOs consulted	5	5	5		
1.3 <b>NMHS human capacity</b> required to operate the GBON network developed						
1.3.1 Project-funded positions recruited and maintained to support implementation of SOFF activities	# of personnel	2	3	3	3	3
1.3.2 Development of training programs to support sustainability of SOFF investments and upskilling of technical officers and stakeholders in global observation	# of training programs	0	2	3	6	8
	# of people trained	0	10	20	60	80
Output 2. GBON infrastructure in place	Indicator	Target Y1	Target Y2	Target Y3	Target Y4	Target Y5
2.1 <b>New land-based</b> stations and related equipment, ICT systems, data management systems and standard operating practices in place	# stations as per the GBON National Contribution Plan					

2.2 <b>Improved land-based</b> stations and related equipment, ICT systems, data management systems and standard operating practices in place	# station as per the GBON National Contribution Plan		1	1		
2.3 <b>New upper-air</b> stations and related equipment, ICT systems, data management systems and standard operating practices in place	# station as per the GBON National Contribution Plan				1	
2.4 <b>Improved upper-air</b> stations, related equipment, ICT systems, data management systems and standard operating practices in place	# stations as per the GBON National Contribution Plan					
<b>Outcome: Sustained compliance with GBON</b>	<b>Indicator</b>	<b>Target Y1</b>	<b>Target Y2</b>	<b>Target Y3</b>	<b>Target Y4</b>	<b>Target Y5</b>
3.1 <b>GBON land-based stations'</b> commissioning period <sup>3</sup> completed, country-specific standard cost for operations and maintenance established, and data sharing verified by WMO Technical Authority	# stations as per the GBON National Contribution Plan					2
3.2 <b>GBON upper air stations'</b> commissioning period completed, country-specific standard cost for operations and maintenance established, and data sharing verified by WMO Technical Authority	# stations as per the GBON National Contribution Plan					1

<sup>3</sup> The commissioning period is the last year of the Investment Phase. The beneficiary country, supported by the Implementing Entity, must demonstrate the sustained operation of all the SOFF-supported stations according to the GBON compliance.

The implementing entity is expected to report on progress as described below.

- **Quarterly updates** to the SOFF Secretariat: A simple standardized form providing a progress update against the Investment Phase Outputs' indicators (and Outcome, where applicable<sup>4</sup>) and flagging major issues that are delaying implementation, if any.
- **Annual narrative and financial reports** according to the UNMPTF reporting requirements indicated in the legal agreements. The annual narrative report reports on progress on the delivery of the Investment Phase Outputs, measured by the Investment Phase Indicators. It includes also a review of the Investment Phase risks and an update on environmental and social safeguards, including gender.
- **Final narrative and financial reports** according to the UNMPTF reporting requirements indicated in the legal agreements. The final narrative report confirms the completion of all the activities and report on the number of stations that have completed the commissioning period (outcome). The WMO technical authority verifies GBON compliance of the indicated stations and provides a verification report to the SOFF Secretariat. Upon WMO verification, the Investment Phase can be considered completed. The Final Report should describe the Investment Phase results achieved and lessons learned; and it should also specify the long-term institutional arrangements to secure sustained GBON compliance with SOFF Compliance Phase support.

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<sup>4</sup> The quarterly reports should also include, when applicable, progress achieved in terms of new or rehabilitated stations that have become operational and are already sharing the data into the WIS 2.0 system as confirmed through the WIGOS Data Quality Monitoring System (WDQMS) web tool.

## 7. Investment Phase Risk Management Framework

The Investment Phase Risk Management Framework should be based on the [SOFF Risk Management Framework](#), incorporating relevant programmatic risks and including additional country-specific risks. Please follow the [methodology established by the Multi-Partner Trust Fund Office \(MPTFO\)](#) presented below.

		Impact				
		Insignificant (1)	Minor (2)	Moderate (3)	Major (4)	Extreme (5)
Likelihood	Very Likely (5)	Medium (5)	High (10)	High (15)	Very High (20)	Very High (25)
	Likely (4)	Medium (4)	Medium (8)	High (12)	High (16)	Very High (20)
	Possible (3)	Low (3)	Medium (6)	High (9)	High (12)	High (15)
	Unlikely (2)	Low (2)	Low (4)	Medium (6)	Medium (8)	High (10)
	Rare (1)	Low (1)	Low (2)	Medium (3)	Medium (4)	High (5)

Risk	Risk level	Likelihood	Impact	Risk Mitigation Measures
Non-compliance with fiduciary and procurement standards in some SOFF activities	Medium	Rare	Major	WB will undertake an assessment of the financial management capacity of MNRE to identify risk elements and to prepare appropriate mitigation measures including ongoing capacity development support by WB. WB will also closely monitor the financial management of the Project using the established Monitoring and Evaluation procedure and financial reporting

<b>Risk</b>	<b>Risk level</b>	<b>Likelihood</b>	<b>Impact</b>	<b>Risk Mitigation Measures</b>
SOFF-funded investments cause environmental or social impacts	Medium	Unlikely	Moderate	<p>The potential impacts are likely to be very limited in terms of magnitude and easily avoided by proactive planning. Many of the project activities are related to capacity building and training, which are inherently low-impact activities. While the activities related to infrastructure development and installation of new observation equipment will require low-level monitoring, management of environmental and social risks will be a matter of following the WB’s Environmental and Social Framework and industry best practice. As a mitigation measure, environmental and sustainability considerations will be included in the procurement process, as selection criteria for suppliers. In addition, prior to site works for upgrading stations or installing new stations, an environmental management plan will be prepared considering local conditions and approaches to minimise the environmental</p>

Risk	Risk level	Likelihood	Impact	Risk Mitigation Measures
				impact of construction activities.
NMHS staff depart after being trained	High	Possible	Major	To mitigate the risk of the staff departing, the Investment Phase will work on providing additional incentives for the staff including regular opportunities for regional trainings and workshops. It is recommended that the Compliance phase includes budget to cover salaries for the new staff, as well as to cover participation in some of the trainings and workshops which would contribute to the staff wellbeing.
Slow implementation and delays in procurement, installation and capacity building activities	Medium	Possible	Minor	Delays in the implementation, particularly due to transportation/shipping, might be caused by limited availability of shipping. Seamless collaboration between the Implementing Entity, peer advisor, beneficiary country and technical partners will help to ensure that the project activities are executed without any delays.
After the conclusion of the Investment phase, GBON data	Medium	Rare	Moderate	The Investment Phase will include budget operations and

Risk	Risk level	Likelihood	Impact	Risk Mitigation Measures
<p>are not collected or shared or are shared of insufficient quality</p>				<p>maintenance of the equipment to ensure that GBON Infrastructure has been installed and internationally exchanges data. This will also help in smooth transition to the compliance phase. After this the country will receive SOFF support in the compliance phase which will help to ensure that all the equipment is properly functioning and sharing data. In addition, trainings held during the Investment Phase trainings will help to ensure that the beneficiary country has the capacity to manage quality of the data.</p>
<p>Destruction or theft of SOFF-financed equipment and infrastructure</p>	<p>Medium</p>	<p>Unlikely</p>	<p>Moderate</p>	<p>The Investment Phase will ensure that all the observation sites will be fenced and guarded to minimize risk of theft. There is also a risk that the equipment will be destroyed by a natural hazard. At the same time, improved availability of climate data as a result of SOFF investments will lead to more accurate forecasts and early warnings, which will enable to take early action for protection of the</p>

Risk	Risk level	Likelihood	Impact	Risk Mitigation Measures
				<p>equipment and reduce the risk to low. The project will support SOPs for equipment, including early action protocol in case of climate-related hazards. Mitigation measures will be taken as a part of site preparation. The budget for the GBON equipment procurement will also cover additional equipment needed to safeguard against the climate-related hazards (such as sheltering, protective covers and clothes, torches etc) to the extent possible.</p>
<p>Countries cannot make optimal use of data, including accessing or using improved forecasts products from the Global Producing Centers throughout the hydromet value chain</p>	<p>Medium</p>	<p>Unlikely</p>	<p>Moderate</p>	<p>To mitigate the risk, it is proposed that the Investment Phase includes extensive and comprehensive training for the SMD staff from the peer advisor and technical partners. This will help to ensure that the country has enough capacity to make the optimal use of data, including accessing or using improved forecasts products from the Global Producing Centers throughout the hydromet value chain.</p>

Risk	Risk level	Likelihood	Impact	Risk Mitigation Measures
Lack of equipment maintenance due to lack of spare parts leads to equipment malfunction	High	Possible	Major	Procurement of equipment under 'supply and support' contract including continuous supply of spare parts. Maintain a local store of key spare parts.
Insufficient human resources or technical skills to install or maintain stations and ICT system	High	Possible	Major	<p>SOFF to provide support for training of technical and observing staff during Investment and Compliance phase</p> <p>SOFF to fund recruitment of additional skilled expertise during both Investment and Compliance Phase</p> <p>Build public and government support for SMD to ensure its budget is supported by:</p> <ul style="list-style-type: none"> <li>• Improved visibility of observations through stakeholder dissemination via uplifted data management systems and webpage</li> <li>• Workforce planning to address attrition</li> </ul>
Slow implementation and delays in procurement, installation and	High	Possible	Moderate	Delays in the implementation, particularly transportation of materials to Savai'i, might be caused by

<b>Risk</b>	<b>Risk level</b>	<b>Likelihood</b>	<b>Impact</b>	<b>Risk Mitigation Measures</b>
capacity building activities				limited availability of shipping. Seamless collaboration between the Implementing Entity, peer advisor, beneficiary country and technical partners will help to ensure that the project activities are executed without any delays. Procurement support from the CTSSU under MoF would also be utilized to provide timely advice on procurement processes.
Lack of equipment maintenance due to lack of funding for travel and logistics	Medium	Unlikely	Major	Inclusion of travel costs, vehicle maintenance or rental, daily subsistence allowance (DSA) under this proposal.
Lack of equipment maintenance due to lack of dedicated technical staff member	High	Possible	Major	Recruitment of dedicated technical officer with continued support for this position through investment and compliance phases
Loss of data due to long lead-times for repairs due to travel distance, complicated logistics	High	Possible	Moderate	Co-locate the Savai'i automatic weather station near the office of a parent ministry.  Manual observers or other staff to provide basic maintenance and redundancy
Poor data quality or lack of data from standalone AWS due to degradation	Medium	Rare	Moderate	Locate standalone AWS at MNRE office site

<b>Risk</b>	<b>Risk level</b>	<b>Likelihood</b>	<b>Impact</b>	<b>Risk Mitigation Measures</b>
of site conditions, vandalism or theft				Proactive maintenance by SMD staff funded through establishment of 'logistics fund'  Review of data that fails automated quality checks
Poor internet connections lead to data transmission delays	Medium	Unlikely	Moderate	Equip all stations with redundant cellular and/or satellite communications
Key observations are not traceable to a known standard	Medium	Unlikely	Moderate	Develop a routine program and record keeping of field sensor verification and regular calibration of field transfer standards
Unreliable power leads to communications outage and data delay	Medium	Unlikely	Moderate	Equip all stations with batteries, uninterruptible power supply and solar/wind power generators
Unsuitable accommodation for equipment leads to degradation of condition	Medium	Unlikely	Moderate	Include building accommodation audit and upgrade if required in procurement for staffed station uplift.  Equipment status audit.

## **Annex 1: National Gap Analysis**

The National Gap Analysis for Samoa is available here: <https://www.un-soff.org/wp-content/uploads/2024/05/Samoa-GBON-National-Gap-Analysis.pdf>

## **Annex 2: National Contribution Plan**

The National Contribution Plan for Samoa is available here: <https://www.un-soff.org/wp-content/uploads/2024/05/Samoa-GBON-National-Contribution-Plan.pdf>

## **Annex 3: Country Hydromet Diagnostics**

The Country Hydromet Diagnostics for Samoa is available here: <https://www.un-soff.org/wp-content/uploads/2024/03/Samoa-CHD.pdf>

## **Annex 4: Terms of Reference for the provision of technical advisory services during the SOFF Investment Phase**

### **1. Purpose and scope**

These Terms of Reference describe the provision of technical advisory services by Bureau of Meteorology to Samoa to contribute to the delivery of the SOFF Investment Phase outputs as described in Section 3.

The Terms of Reference are based on the [SOFF Operational Manual](#), Section 4.4.3 on the Operational Partners and Section 4.5.2 on the Investment Phase; as well as on the [SOFF Investment Framework](#), Section 4.5 on the Peer Advisors and WMO Technical Authority.

### **2. Roles and responsibilities**

#### **Beneficiary country National Meteorological and Hydrological Service**

- Is responsible for implementing the activities of the SOFF Investment Phase activities with the support of the Implementing Entity and the peer advisor.
- Submits the SOFF Investment Phase funding request using the standardized template provided by the SOFF Secretariat, including the Terms of References for the peer advisor's technical advisory services during the Investment Phase.
- Is responsible for collaborating with the Implementing Entity to provide all the necessary information, participate in and facilitate the national activities that the Implementing Entity and peer advisor need to conduct in order to deliver the SOFF Investment Phase outputs.
- Confirms the completion of all the Investment Phase activities and provides comments as needed on the final report prepared by the Implementing Entity.

#### **Peer advisor**

- Is accountable to the beneficiary country and the Implementing Entity.
- Is contracted via the WMO pass-through mechanism and operates on a cost-recovery basis.
- Provides technical advisory services to support beneficiary countries and Implementing Entities in the design and implementation of the SOFF Investment Phase activities.
- Contributes to the final report of the SOFF Investment Phase.

#### **Implementing Entity**

- Prepares the Investment Phase funding request in collaboration with the beneficiary country and the peer advisor, including the Terms of References for the provision of technical advisory services during the SOFF Investment Phase.
- Manages the Investment Phase activities following the terms specified in the funding request and in collaboration with relevant national partners, including civil society organizations.

- Delivers the Investment phase outputs and is responsible for their quality and timely delivery, in coordination with the country and the peer advisor.
- Provides quarterly updates to the SOFF Secretariat according to a simple standardized form and annual reports according to the United Nations Multi-Partner Trust Fund Office's reporting requirements indicated in the legal agreements.
- Informs the SOFF Secretariat of circumstances that could materially impede the implementation of the Investment phase or any considerable deviation in the conditions of the funding request to achieve its objectives.
- Submits the final report to the SOFF Secretariat including the beneficiary country's comments and the peer advisors' feedback. The final report describes the institutional arrangements to secure sustained operation and maintenance of the investments made.

### **WMO Technical Authority**

- Provides basic on-demand technical assistance to the beneficiary country, Implementing Entity and peer advisor on GBON regulations, including on monitoring and assessing the data-sharing status of the stations using the WDQMS web tool<sup>5</sup>
- Is responsible for the verification of data sharing of the new or rehabilitated surface and upper -air stations as per GBON regulations.
- WMO provides a verification report to the SOFF Secretariat, upon which the Investment Phase can be considered completed.
- Establishes and administers the pass-through mechanism for contracting and funding of the advisory services provided by the peer advisors.

### **SOFF Secretariat**

- Facilitates communication, coordination and collaboration between the beneficiary country, the Implementing Entity, the peer advisor and WMO Technical Authority.
- Reviews the SOFF Investment Phase funding request, including the Terms of Reference for the provision of technical advisory services and provides feedback as needed. Then transmits the funding request to the SOFF Steering Committee for their decision.
- Compiles quarterly updates and annual reports and monitors implementation based on information received from the Implementing entity, the peer advisor and the beneficiary country. Regularly informs the Steering Committee of progress.
- Coordinates regional implementation approaches to the SOFF Investment Phase.
- Confirms receipt of the final report by the Implementing Entity and completion of the Investment Phase based on WMO verification of data sharing.
- Organizes exchange of knowledge and experiences and captures lessons learned.

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<sup>5</sup> The WDQMS web tool monitors the availability and quality of observational data based on near -real-time information from the four participating global Numerical Weather Prediction centres: the German Weather Service (DWD), the European Centre for Medium range Weather Forecasts (ECMWF), the Japan Meteorological Agency (JMA) and the United States National Centers for Environmental Prediction (NCEP). These are four of the ten World Meteorological Centres, designated by WMO to provide global numerical weather prediction products for all WMO Members.

### 3. Peer advisors' activities during the SOFF Investment Phase

The peer advisor, the Australian Bureau of Meteorology (Bureau), will provide the following advisory services to Samoa Meteorology Division (SMD) during the SOFF Investment Phase:

**Technical advice and support**– The Bureau will facilitate access to subject matter experts (SME) within its organisation to be available for on-call consultation, advice and support to SMD via telephone or videoconference. This could include topics such as:

- Station siting and exposure assessment
- Equipment or communications issues
- Quality management
- WIS2.0 configuration and setup
- WIGOS, OSCAR/Surface metadata setup and configuration
- Suggestions for suppliers of equipment and services
- Assistance with budgeting for operation and maintenance of stations during compliance phase

The fee in this Investment Proposal amount allows for up to 100 hours of Bureau SME consultation per year. Should further support be required, this would need to be requested as additional financing.

**Regional engagement support** – The Bureau will assist SMD to connect with other met services, regional bodies and other hydromet initiatives in the region. This could include activities such facilitating introductions and multi-party discussions.

**Periodic peer reviews** – The Bureau will undertake annual in-country peer reviews of progress during the Investment Phase and contribute to reporting as relevant. Each review will include a short assessment report and recommendations for adjustments to the Investment Phase approach if required. The regular reviews will aim to identify and head off any emerging problems or issues to avoid waste or investment funds or delays to the investment program.

The peer advisor may also undertake or have some involvement in some of the activities listed under Outputs 1 and 2 above, particularly relating capacity-building (e.g. BIP-MT training). However, this would be done through a transparent procurement process and covered under the budget allowed for these Outputs by the Implementing Entity.