

# **Community Integrated Management Plan**

## **Gagaifomauga 1 District - Savaii**



## **Implementation Guidelines 2018**

## ***Foreword***

It is with great pleasure that I present the new Community Integrated Management (CIM) Plans, formerly known as Coastal Infrastructure Management (CIM) Plans. The revised CIM Plans recognizes the change in approach since the first set of fifteen CIM Plans were developed from 2002-2003 under the World Bank funded Infrastructure Asset Management Project (IAMP), and from 2004-2007 for the remaining 26 districts, under the Samoa Infrastructure Asset Management (SIAM) Project.

With a broader geographic scope well beyond the coastal environment, the revised CIM Plans now cover all areas from the ridge-to-reef, and includes the thematic areas of not only infrastructure, but also the environment and biological resources, as well as livelihood sources and governance.

The CIM Strategy, from which the CIM Plans were derived from, was revised in August 2015 to reflect the new expanded approach and it emphasizes the whole of government approach for planning and implementation, taking into consideration an integrated ecosystem based adaptation approach and the ridge to reef concept. The timeframe for implementation and review has also expanded from five years to ten years as most of the solutions proposed in the CIM Plan may take several years to realize.

The CIM Plan is envisaged as the blueprint for climate change interventions across all development sectors – reflecting the programmatic approach to climate change adaptation taken by the Government of Samoa. The proposed interventions outlined in the CIM Plans are also linked to the Strategy for the Development of Samoa 2016/17 – 2019/20 and the relevant ministry sector plans.

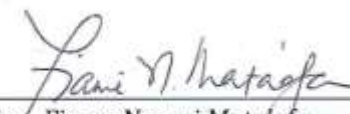
We wish to acknowledge the significant contributions of our District and Village communities and our key government partner stakeholders and implementing agencies, in particular:

Ministry of Women Community and Social Development (MWCSD)  
 Ministry of Works Transportation and Infrastructure (MWTI)  
 Ministry of Natural Resources and Environment (MNRE)  
 Ministry of Agriculture and Fisheries (MAF)  
 Electric Power Corporation (EPC)  
 Land Transport Authority (LTA)  
 Samoa Water Authority (SWA)  
 Ministry of Health (MOH)  
 Ministry of Finance (MOF)

We acknowledge also our key international donor partners: the World Bank and the UNDP Adaptation Fund, for the financial support that enabled the review and update of the CIM Plans.

Finally, I commend these CIM Plans to all relevant stakeholders from government ministries to districts and village communities and development partners to implement with the utmost urgency. It is assured that the implementation of the CIM Plans will further enhance the adaptive capacity of Samoa to respond to the impacts of climate change.

Thank you

  
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 Hon. Fiame Naomi Mata'afa  
 Minister of Natural Resources and Environment

## Participants in the Plan

The CIM Plan is a Partnership between the Government of Samoa and the villages within the Plan area. The Plan area starts from the ridge extending to the reef broadly covering 4 sectors; Infrastructure; Natural Environment and Resources; Livelihood and Food security; and Village Governance. Both partners have responsibilities for issues and solutions and the Plan gives an integrated approach to the provision of services and improvement of resilience now and in the future.

This Plan incorporates the Faipule District of Gagaifomauga 1 (Manase and Safotu villages).

The village representatives participated in the preparation of this CIM Plan in partnership with the Government of Samoa.

**Date of Signing:** 15<sup>th</sup> June 2018

Representatives:

Signatures:

### Manase Village

- Taito Vaea Taua
- Gaono Fa'alavelave
- Lemana Pita
- Sufia Papu

Handwritten signatures for Manase Village representatives on a lined background. The signatures are: Taito Vaea Taua, Gaono Fa'alavelave, Lemana Pita, and Sufia Papu.


### Safotu Village

- Lavea Natoe Iefi
- Seuaoauga Tupe
- Ausi Faletutu Kenese
- Ausage Akeripa
- Onolina S. Apelu

Handwritten signatures and dates for Safotu Village representatives on a lined background. The signatures are: Lavea Natoe Iefi, Seuaoauga Tupe, Ausi Faletutu Kenese, Ausage Akeripa, and Onolina S. Apelu. The date 15/6/2018 is written next to the first signature, and 15/6/18 is written next to the last signature.

The Government of Samoa adopts the Community Integrated Management Plan for the Faipule District of Gagaifomauga 1 as a Management Plan for the Implementation of the Community Integrated Management Strategy (CIMS).

The Ministry of Natural Resources and Environment, as lead organization of Government, on behalf of the participating Government Departments and Corporations, confirms the participation of the Government of Samoa in the preparation of this Community Integrated Management Plan and its adoption as a Management Plan for the implementation of the Community Integrated Management Strategy.



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Ulu Bismarck Crawley  
**CHIEF EXECUTIVE OFFICER, MNRE**

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## Acronyms

ASCH	Areas Sensitive to Coastal Hazards
BCA	Benefit Cost Analysis
CBFMP	Community Based Fisheries Management Plan
CCCS	Congregation Christian Church Samoa
CC	Climate Change
CCA	Climate Change Adaptation
CDCRM	Community Disaster & Climate Risk Management
CEP	Community Engagement Plan
CHZ	Coastal Hazard Zone
CEHZ	Coastal Erosion Hazard Zone
CFHZ	Coastal Flooding Hazard Zone
CIM	Community Integrated Management (Plan) or (Strategy)
CLHZ	Coastal Landslip Hazard Zone
COEP	Code of Environmental Practice
CSO	Civil Society Organization
CSSP	Civil Society Support Programme
DSP	District Sub Project
EbA	Ecosystem based Adaptation
ECCCR	Enhancing Coastal Community Climate Resilience
ECR	Enhancing Climate Resilience
EMP	Environmental Management Plan
EPC	Electric Power Corporation
ERN	Emergency Radio Network
HCSI	High Coastal Sensitive Index
IG	Implementation Guideline
IAS	Invasive Alien Species
KBA	Key Biodiversity Area
KPI	Key Performance Indicator
LTA	Land Transport Authority
LTO	Long Term Output
MAF	Ministry of Agriculture and Fisheries
MET Office	Meteorological Office
MoH	Ministry of Health
MNRE	Ministry of Natural Resources and Environment
MWCSD	Ministry of Women Community and Social Development
MWTI	Ministry of Work Transport and Infrastructure
NAP	National Action Programme
NBSAP	National Biodiversity Action Plan
NDMP	National Disaster Management Plan
NESP	National Environment Sector Plan
NGO	Non-Government Organization
NISP	National Infrastructure Strategic Plan
NRW	Non-Revenue Water
PA - KO	Priority Area - Key Outcome
PUMA	Planning Urban Management Agency
PPCR	Pilot Programme Climate Resilience
R2R	Ridge to Reef
SIAM	Samoa Infrastructure Asset Management
SOE	State of Environment
SWA	Samoa Water Authority
UNDP-GEF SGP	United Nations Development Programme Global Environment Facility Small Grants Programme
VCDMP	Village Climate Disaster Management Plan
WB	World Bank
WCR	West Coast Road
WMP	Watershed Management Plan
WSSP	Water Sanitation Sector Plan

## ***Glossary***

Coastal Hazard Zones	Defined areas landward of the coast which are or are considered likely to be subject to the effects of hazards over a defined assessment period. In this study, reference is made to four coastal hazard zones: ASCHs (areas sensitive to coastal hazards); CEHZs (coastal erosion hazard zones); CFHZs (coastal flood hazard zones) and CLHZs (coastal landslip hazard zones).
“Do Minimum” option	A Management option that involves continuing with the present maintenance and upgrading programme on and when required basis.
Emergency Management	To provide communities with skills, facilities and materials so that they may adapt, respond and recover more quickly in the event of emergencies.
Hazard	A source of potential harm or a situation with a potential to cause loss
Infrastructure	Built structures and networks which support the national, regional or local community.
Lifeline infrastructure	Infrastructure that contributes directly to the survival of the community and its ability to respond and recover at the time of extreme events.
Secondary infrastructure	Infrastructure that contributes to the every-day development of the community.
Implementation Guidelines	A document to guide land use and resource practices to achieve specified goals, objectives and policies and provide a framework for the implementation of defenses and works.
Issue	A specific concern regarding both cause and effect
Land and Resource Use	The use of land and resources by the community for social, economic or other benefit (e.g. land use includes areas used for villages or crops, resource use includes activities such as sand mining, gravel extraction or fishing).
Monitoring	Process of measuring the effectiveness or impacts of projects and works against predicted standards, levels or outcomes.
Resilience	The ability to be adaptive, responsive and quick to recover.
Community Resilience	The ability for the community to be adaptive, responsive and quick to recover from the adverse effects of hazard.
Natural Resilience–	The ability of natural systems to be adaptive, responsive and quick to recover from natural processes or hazards.
Risk	The chance of something happening that will have an impact on objectives. It is measured in terms of consequence and likelihood. In the Community Integrated Management Plan context it is the likelihood that infrastructure, environment and biological resources and agricultural and marine resources (food security) will be subject to inland and coastal hazards and the potential for loss of property, life or land due to natural processes.
Stakeholders	Those people and organizations who may affect, be affected by, or perceive themselves to be affected by, a decision or activity. The term stakeholder may also include interested parties.
Strategy	Direction or course of action to achieve a define division.

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Susceptibility	The degree to which infrastructure at risk is likely to be damaged by coastal hazards and how easy/difficult, expensive/cheap it is to replace. In the context of the CIM Plan the term susceptibility is equivalent to the term vulnerability as the Samoan phrase for both susceptibility and vulnerability is the same.
Vision	A desired destiny.
Livelihood	A livelihood is a means of making a living. It encompasses people's capabilities, assets, income and activities required to secure the necessities of life Food availability: The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid).
Food access	Access by individuals to adequate resources (entitlements) for acquiring appropriate foods for a nutritious diet. Entitlements are defined as the set of all commodity bundles over which a person can establish command given the legal, political, economic and social arrangements of the community in which they live (including traditional rights such as access to common resources).
Utilization	Utilization of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met. This brings out the importance of non-food inputs in food security.
Stability	To be food secure, a population, household or individual must have access to adequate food at all times. They should not risk losing access to food as a consequence of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). The concept of stability can therefore refer to both the availability and access dimensions of food security.



# 1. Introduction to the CIM Plan

## 1.1 The Strategic Vision

The District Community Integrated Management (CIM) Plan for Gagaifomauga 1 District has been prepared as part of the Government of Samoa's Adaptation Fund - *Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project*. The CIM Plan is one of the primary means of implementing the CIM Strategy, which was formally approved by the Government of Samoa in February, 2001 and updated in 2015 as providing the Strategic direction for enhancing the resilience of community livelihoods, infrastructure, environment and natural resources using a holistic and integrated ridge-to-reef approach. The Strategy has as its central vision:

Resilience – Community Livelihoods, Infrastructure, Environment and Natural Resources  
to Climate Change and Natural Disasters

The CIM Plan takes this vision and provides the practical tools with which the communities and the government, in partnership, can implement the Strategy. ***To be resilient is to be adaptive, responsive and quick to recover so that communities are environmentally, socially and economically sustainable (CIM Strategy, 2015).***

## 1.2 The Aim of the CIM Plan

The aim of the CIM Plan is to help communities and government improves resilience by identifying actions and solutions considered as best approach to issues identified. Not all the solutions may be actioned immediately but the plan will ensure that issues and options are identified for the long-term improvement in resilience of community livelihoods, infrastructure, and environment and resource systems.

The CIM Plan will:

1. Improve the community's awareness of all hazard risks from the ridge to the reef;
2. Enable the community as well as providers of services and physical, financial, and technical support in all climate prone sectors, to reduce inland and coastal hazard risks in villages;
3. Enable the community and government service providers of infrastructure services, livelihoods, environment and natural resources to better adapt, respond and recover from cyclones.

## 1.3 Structure of the Plan

The CIM Plan consists of two parts each serving a separate and distinct purpose.

- ***Plan Development***, which describes the process undertaken in preparing the CIM Plan in conjunction with representatives of the Communities involved, the Government and other stakeholders with interests in the Plan area.
- ***Implementation Guidelines***, which describes the Plans and Actions recommended as outcomes of the process, together with the partner responsible for implementing these outcomes. The participants of the CIM Plan preparation process are acknowledged in the Implementation Guidelines.

## 2. Implementation Guidelines

### 2.1 Purpose of the Implementation Guidelines

The Implementation Guidelines describe the solutions proposed that will increase the resilience of the villages in the Plan area and the ways these solutions can be implemented. The solutions are presented for various livelihoods, infrastructure, environment and natural resources items that have moderate to low resilience. Where one solution will provide benefits to other items of livelihoods, infrastructure, environment and natural resources these “Other Benefits” are also noted. Implementation is considered to be the joint responsibility of both the villages and the government in partnership. The government is responsible for the provision of national and district “Public”, infrastructure and public goods and benefits derive from environmental services and natural resources, while villages are responsible for local and community infrastructure and livelihoods related actions. The responsibility for implementing the proposed actions is also defined. Solutions for both District and Village level issues related to livelihoods, infrastructure, environment and natural resources respectively, and the responsibility of both partners, should be considered together as they combine to provide for the integrated management of all community development initiatives.

The solutions for village level interventions related to livelihoods, infrastructure, environment and natural resources will usually be the responsibility of the Village Council and Families in the village to implement. Advice and resources may be available from the Government to assist the village in implementing these solutions. In most situations these solutions will also provide benefits to both village and district infrastructure and resources and environmental goods that are shared between villages. These solutions should be considered an integral part of strengthening community resilience at both levels.

### 2.2 Duration of the Plan

The CIM Plan is *reviewed* every 10 years but during the Plan period, the solutions implemented will be *monitored* on a five (5) yearly basis to ensure the proposed solutions are effective and are actually improving resilience. The 5 yearly monitoring of the new CIM Plan is aligned with the 5 year review of **the key national planning and programming** strategy for Samoa: the *Strategy for the Development of Samoa* (SDS). The new CIM Plan recognizes some solutions are likely to take longer than 5 years, whilst others may take up to 10 years to implement due to the complexity of planning process, funding and budgeting programming required to implement these solutions.

Detailed implementation of the solution will determine the monitoring requirements and Key Performance Indicators.

### 2.3 Financing of the Plan

Implementation of best solutions is the collective effort of all identified responsible agencies, civil society organizations, donor partners **and** district and village communities themselves. Funding will be sourced through several mechanisms recognizing the Government of Samoa’s programmatic approach to tackling climate change impacts on its development progress. While every effort has been made to identify priority actions needed to build the resilience of Samoa and its communities, the Government also recognizes that not all actions identified can be financed at once. Implementation of best solutions will be undertaken strategically and over time in line with available funding and, **if** determined a priority CCA activity that will actually build the resilience of communities and Samoa as a whole. Criteria of determining priority CCA best solutions for financing are:

- proposed development is in general accordance with the objectives of the CIM Strategy;
- development is specifically recommended in the CIM Plan
- number of people that will benefit from the development, i.e. population benefit
- development will provide *life sustaining* support for communities
- minimum or neutral environmental effects
- development will improve resilience
- development will achieve speedy recovery
- development will reduce risk
- also identified as a priority in other Sector Plans or National Strategies

During the development of the new CIM Plans, the World Bank funded Pilot Programme for Climate Resilience Enhancing Climate Resilience for Coastal Resources and Communities (PPCR ECR) prepared two (2) key documents:

- **Community Engagement Plan (CEP)**- the guidelines provided in the CEP is an excellent capacity building tool that can be used by CSO's and village communities themselves to aid development of small grant proposals to existing small grant funding mechanisms like CSSP and the UNDP-GEFSGP.
- **District Sub Project (DSP)** – the guidelines provided in the DSP targets single districts or multi-district projects with a large number of beneficiaries.

Noting Samoa's programmatic approach to CC and CCA, these key documents are fundamental in guiding development partners, implementing agencies and other stakeholders on the most effective way of resourcing and supporting climate change adaptation projects at the village and district levels. These village and district level CCA projects actually achieve the majority of key indicators in various Sector Plans, subsequently achieving key national indicators contained in the *Strategy for the Development of Samoa* (SDS).

### 3. Description of Gagaifomauga 1 District

#### 3.1 Physical and Natural Resource Setting

Gagaifomauga1 is a political district located on the northern point of the island of Savaii, characterised by a low-lying coral sand beach, inland ridges and coastal plains that have featured in various promotional materials for the Samoan tourism industry. It has a total area of 4,242 hectares with only 17.5% of the total landmass covered with plantations. A major part of the district is medium forest (Tokalauvere, 2017).

Manase is relatively small both by landmass and population compared to neighbouring village Safotu. Safotu also has a larger area of coastal plains that the village have settled on whilst Manase is placed between a cliff wall and the ocean. The villages of Manase and Safotu were traditionally formed alongside the coastline which presents vulnerability like most other villages to tsunami, coastal erosion and coastal inundation. Very few families in Manase have built further inland due mostly to limitations in land availability.

The main North Coast Road stretches between residential homes on the landward side and Beach Fales or tourist attractions on the coast. It is part of the national road network and a lifeline access connecting the whole island, so maintenance is a high government priority. The North Coast Road connects neighbouring districts to the east (Gagaemauga 2, Gagaemauga 3) and districts to the west (Gagaifomauga 2, Falealupoetc) to the Hospital as well as the petrol station, rental car place, restaurants, supermarkets and other retail shops within this district. Manase's coastal settlement lies within the North Coast Road. It is only a short stretch of road with approximately 20 households, but within this short span of road are several tourist resorts and *fale* accommodations. Stevenson's Hotel, Jane's Beach Fales, Regina Beach Fales, Tailua Beach Fales, Tanu Beach Fales and Vacations Beach Fales are all located in Manase. It also has a petrol station.

During 2015 two (2) offshore breakwaters of 35m length were constructed at Manase under AF funding. The success of the breakwaters in accumulating sand behind is obvious (see front cover). The beach replenishment with control structures was considered the best option for maintaining the beach and promoting tourism at Manase. Maintenance of the beach is considered important in the long-term given the importance of tourism to the local economy (Townsend, 2016). Sand mining (commercial and domestic) still remains an issue for this district.

The district has two access roads, both located in Safotu. The access road in Manase is only a dirt track and hugs the cliff wall making it difficult to access, even by 4-wheel trucks. The Safotu Access Road and Safotu Road both connect to the Paia Road and many residents of Safotu have moved inland and built permanent structures next to their plantations. Behind the two villages lie montane forests and further up still is the cloud forest which covers most of the central part of Savaii. There are fresh water springs in Safotu, one in particular-Le Vai o Sina has historical and cultural value but, lie within the 0-15m immediate inundation zone and tsunami red zone. Safotu has access to SWA reticulated water supply and Rainwater Harvesting Systems for families further inland. This is backed up by fresh water springs which lie near the coast. Manase relies solely on SWA reticulated water supply. The resorts and fale accommodations also have Rainwater Harvesting Systems installed for guests' convenience.

Manase village is within a wetland that flushes out into the sea through culverts below the main road. These culverts are usually blocked due to littering and also taro and other food crops planted encroaching into waterways and drainage system. "Several residents have noted that the freshwater wetland landward of the coastal road through Manase has been partially filled for construction of new *fales*, including in the area landward of Stevenson's Resort and the adjacent Tanu Beach Fales. This action is believed to have blocked freshwater outflow to the ocean, caused the wetland to spread alongshore, and encouraged the seaward encroachment of the development."<sup>1</sup>The wetland is heavily invaded by the merremia vine and is being used as a rubbish dump by a number of families that are also cultivating the area for their taro patches (Reti, 2016). Manase also has a village reserve for the stocking of giant clams in the lagoon.

#### 3.2 Social and Economic Setting

Gagaifomauga1 has a total population of 1,393 of which 753 are males and 640 females<sup>2</sup>. Of this 1,393, Manase population is only 123, Safotu 1,270. The coastal areas in parts of Gagaifomauga1 are low lying and mostly made up of sandy beaches which have been extensively modified as tourist development became an important economic activity for the village. Sand mining is also another income generating activity for this district. Natural vegetation has either been removed or eroded and urgent action is required to protect them from further erosion. Tree planting along the coastline with species such as pulu (Indian banyan) talie (terminaliacatappa) and other indigenous littoral species is recommended (Reti, 2016).

<sup>1</sup>SPREP Coastal Management Adaptation to Climate Change (Samoa Component) Coastal Management and Restoration Plans; pp10.

<sup>2</sup>Census 2016 Preliminary Count

The District School and Hospital are located within Safotu and service the majority of residents of districts lying in the east and west of Gagaifomauga 1. The hospital also provides job opportunities (landscape, cleaning services) for Safotu and Manase residents. The residents of Gagaifomauga 1 and neighbouring districts Gagaifomauga2, Gagaemauga 2 and 3 all benefit through employment opportunities offered by the tourist industry within this district. Some tourism industry employees travel from as far as Salelologa, Faasaleleaga and Salega.

There is a lot of commercial activity in this district especially for Manase village. The presence of tourist accommodations and attraction (i.e. beach) has seen a boom for local businesses such as rental car services, 6 retail shops, 1 supermarket, petrol station and one restaurant/café. There are also restaurants within the actual hotels and beach *fale* accommodations servicing guests as well as the general public. Both Safotu and Manase villagers benefit through provision of supplies (meat -beef, pig, and poultry) for local businesses as well as for special occasions such as tourism arranged weddings conducted at LeLagoto Resort.

Safotu has also benefited from various capacity building activities, workshops and other government projects and schemes. These include social development projects such as sewing, establishment of vegetable gardens, microfinance schemes, brick products and cattle farming.

### 3.3 Climate Risk and Resilience

The use of LiDAR mapping data, hydrologist and geomorphologist data and findings for this district has helped determine inland and coastal hazard zones and high risk areas for Gagaifomauga 1. The immediate risks for Gagaifomauga 1 are from coastal inundation, storm surges and inland flooding. Some areas are located within the tsunami red zone.

The district of Gagaifomauga 1 has a total area of 4,242 hectares. The area covering the 0-15m Coastal inundation Zone is 140.6 hectares, which is 3.3% of the total area of the district. Of the 416 buildings in the district, 344 buildings are located within 0-15m inundation zone. Therefore about **83% of the total number of buildings in the district is located in the immediate inundation zone**; this includes the district hospital, district school, all tourist accommodations and other local businesses. The Tsunami hazard zone is 395.1 hectares in district area which is about 9.3 % of the total area of the district. About **34 buildings** are located in the **Tsunami hazard** zone of 15-50m (Tokalauvere, 2017).

For Manase, assessments<sup>3</sup> predict that it will be more vulnerable to the consequent effects of a volcanic eruption within the next 50-100 years.

Some areas of the North Road labeled in the high physical hazards index (i.e. coastal hazard, landslip hazard) lie within this district. There is a recommendation for a seawall and land slope stabilization 3.5km west of Avao. Safotu is listed as one of the areas where major landslide hazard and major coastal hazards coexist (LTA/SMEC, 2016). During extreme weather events and king tides, some parts of the road are impassable. The two access roads in Safotu have been upgraded but the absence of culverts and drains has exacerbated local flooding and inundation, with water pooling where access roads intersect with the main coastal road.

Sand mining remains an issue although several bans have been put in place to control such activities especially for large scale commercial operations. There are evidence of recent efforts to protect coastal areas from erosion and flooding through tree planting initiatives as well as the beach replenishment project funded by AF, which installed 2 offshore breakwaters to maintain the beach and promote tourism. The community-initiated efforts need support and encouragement from government and other concerned organizations.

Food security risks are also compounded from climatic change to rainfall and temperature. The incidence of alien invasive species (IAS) is also a determinant of soil nutrient deficiencies (from natural causes or poor sustainable land management practices) and affects regeneration of indigenous species which may change the entire biodiversity of the district (Reti, 2016).

Locals rely heavily on the forest deep inland for income generating opportunities like timber, food and medicinal production. It is also the site for cattle farms, taro and coconut plantations. The lowland forests of Gagaifomauga 1 have been extensively developed into coconut plantations and cattle farms. Its secondary forest is dominated by tinamoni (*Cinnamomum verum*) which villagers consider an invasive species. The species is also present in Gagaemauga 2 and Gagaemauga 3 but not as prolific as in Gagaifomauga 1. In addition to cinnamon, other introduced species are also present. They include pulumamoe (*Castilla elastica*) which was introduced experimentally to see if it could produce commercial rubber (it couldn't) and subsequently escaped into disturbed areas, and puluvao (*Funtumia elastica*). Fa'apasi (*Spathodea campanulata*) and fau (*Hibiscus tiliaceas*)

<sup>3</sup> Logistics Capacity Assessment 2012

are slowly taking over disturbed and cultivated lands as they are used extensively as live fence posts for cattle farms. These species in some instances have formed mono-dominant forests and have become pests in the districts (Reti, 2016). Safotu for instance has large cattle, pig and poultry farms raised on land available further inward from the coast.

The economic benefits provided by the tourism industry means there is a fine balance between economically viable districts but with many environmentally associated problems. Due to most of the agriculture being away from the coast the impacts from storms and sea level rise is low for this district. Impact from extended periods of dry conditions will impact household crops. Impacts from change in climatic conditions will result in an increase in forest fires being more likely. Varied rainfall will create conditions that will require farmers to diversify crops and management of pests (Dews, 2016).

## 4. Gagaifomauga1 District Interventions

### CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant National, Sector Plans and Strategies
Main north coast road: exposure to Landslides and coastal hazard zones	<p>Implement seawall at most vulnerable coastal hazard area identified in Assessment of the Samoa Road Network and Road Network Adaptation Strategy</p> <p>Implement slope stabilization at most vulnerable landslide area identified in Assessment of the Samoa Road Network and Road Network Adaptation Strategy</p> <p><b>Responsibility: LTA/M WTI/ MNRE/ Villages</b></p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Improve preparedness and readiness responseto natural disasters</p> <p>Reduce impact from coastal erosion and landslides</p> <p>Maintain lifeline access for all of Savaii</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Identify funding/budget requirements and implementation programme for construction and development</p> <p>Utilise Hazard maps and Geomorphologist findings to inform location and design</p> <p>Utilize the environmental and social safeguards including EIAs in screening and designing infrastructure facilities</p> <p>Prepare EIA and detailed surveys: topographical, geotechnical and soils</p> <p>Designation of the CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	<p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>
Drainages systems to be improved in high risk areas on main north coast road	<p>Assess and upgrade the main road drainage system in particular near bridge over Muliolo Stream and near wetlands</p> <p>Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding</p> <p>Implement regular drainage inspection and maintenance</p> <p><b>Responsibility: LTA/M WTI/MWCSD /Village/ Families</b></p>	<p>Improves climate resilience of infrastructure and rate of response and recovery to natural hazards and disasters.</p> <p>Minimises national disaster recovery expenditure on damaged properties, public and private assets</p> <p>Encourages coastal families to relocate inland.</p> <p>Maintains lifeline access for all of Savaii</p> <p>Use as escape routes when necessary</p>	<p>Use existing information for guidance but not limited to: “Vulnerability Assessment of the Samoa Road Network (2017)”; “Review of National Road Standards in Samoa (2016)”; “Samoa Code of Environmental Practice (2007)”</p> <p>Use updated Hazard Maps to inform designs</p> <p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities.</p> <p>Apply for necessary permits as required by law.</p>	<p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p> <p>Village Fono Act (Amendment Bill 2016)</p>

		Provides access for utility providers to extend their services inland	Utilise Sui o Nu'u monthly meetings to monitor progress of village cleanup and awareness programmes	
Electricity supply	<p>Provide under ground lines in the long term</p> <p>Install and connect power supply for inland residents</p> <p>Relocate overhead lines to a more resilient location when being replaced</p> <p>Install streetlights along the roads where needed for community safety</p> <p>Install and connect to solar power supply if made available</p> <p>Families to limit building and developments near electricity posts</p> <p><b>Responsibility: EPC/ MWTI/ Village /Families</b></p>	<p>Maintain electricity supply at all times including natural disasters</p> <p>Avoid accidents from fallen electricity posts.</p>	Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan
District hospital, school, tourist facilities, village houses, government and village assets in CFHZ and CEHZ	<p>Relocate outside of high risk hazard zones when building/infrastructure requires replacement</p> <p>Investments within the hazard zones to adopt appropriate mitigation measures</p> <p>Develop land use planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ</p> <p>Design infrastructure appropriately to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones</p> <p>Families and village to</p>	<p>Minimise expenditure on damaged properties and personal assets</p> <p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Safer villages, houses and roads</p>	<p>Planning provisions to be guided by the PUMA Act 2004</p> <p>Enforcement of National Building Code 2017</p> <p>Encourage insurance of significant investments and assets within hazard zones</p> <p>Utilise updated hazard maps and Geomorphologist Drainage Infrastructure Database to inform policy development and possible relocation of assets</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate land use planning controls and restrictions</p>	<p>CIM Strategy 2015</p> <p>NESP 2018 -2022</p>



	<p>limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Government and Village to liaise and collaborate on processes needed to protect riverbanks and coastline from land clearing and developments</p> <p><b>Responsibility: Village / Families/MWTI/ MNRE/ MWCS</b></p>			
<b>Natural Resources and Environment</b>	<b>Best Solutions</b>	<b>Benefits</b>	<b>Guideline to assist with the implementation</b>	<b>Relevant Sector Plans, National Strategies/ Policies</b>
<p>Soft coastal protection measures needed for most vulnerable areas</p>	<p>Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions</p> <p>To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed</p> <p><b>Responsibility: MNRE/ MAF/Villages</b></p>	<p>Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Implements an Ecosystem Based Approach</p>	<p>Develop an integrated land management plan for Gagaifomauga 1 district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops</p>	<p>NESP 2018 -2022</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p> <p>Forestry Management Act 2011</p>

<p>Unsustainable sand mining (commercial and domestic)</p>	<p>Identify alternative sustainable sources of sand/rocks for domestic use</p> <p>Research the impacts of sand mining</p> <p>Village consultation on sand mining policy and regulation</p> <p>Village and government to collaborate closely on designated areas for sand/rock mining</p> <p>Raise awareness and support of sustainable land use practices</p> <p><b>Responsibility: MNRE/ Village/Families</b></p>	<p>Mitigate potential damage from coastal erosion and flooding to accommodate the hazard</p> <p>Safer villages, houses and roads</p> <p>Reduce impact from coastal erosion</p> <p>Economic benefit for village from sustainable sand mining activities</p>	<p>MNRE to continue to identify specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks</p> <p>Undertake assessments of identified sites</p> <p>Undertake consultation with villages affected by proposed sand/rock mining</p> <p>Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of CIM Plan activities</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Draft Soil Resource Management Bill</p>
<p><b>Governance</b></p>	<p><b>Best Solutions</b></p>	<p><b>Benefits</b></p>	<p><b>Guideline to assist with the implementation</b></p>	<p><b>Relevant Sector Plans, National Strategies/ Policies</b></p>
<p>Strengthen the governance of natural resources and land use through Bylaws</p>	<p>Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes.</p> <p>Collaborate with Sui o Nu'u to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p><b>Responsibility: MWCS /Village</b></p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>	<p>Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>

# Gagaifomauga 1 District Map

## Gagaifomauga I District



142001  
142019  
142010

District School and Hospital  
both at immediate inundation  
Zone

Build  
foundations  
above flood levels

Replace  
bridge over  
Muliolo  
River

Beauly Grange  
Reservoir  
& Amamano



- Buildings**
- Church
  - Petrol station
  - District Hospital
  - School/College

- Utilities**
- Safotu Borehole
  - EPC Supply
  - SWA/Laine o le Suva'i

- Boundaries & Routes**
- Sealed Road/Atafie
  - Unsealed Sealed Road/Atafie
  - Contour - 20m

- Hazard Zones**
- Coastal Flood Hazard Zone/Sone o Lemata i Loloa
  - Coastal Erosion Hazard Zone/Sone o Lemata i Elele Tafa i le Gatafala
  - Landslide Hazard Region
  - Immediate Fluvial Hazard Zone
  - Riverbank Encroach... Zone
  - Watershed Managem... Riparian Zone

160 60 0 160 320 480  
Meters

Coordinates System: UTM 10Q UTM 1984  
Datum: WGS 1984  
Units: Degree

Data Source: Ministry of Natural Resources and Environment, Samoa  
Map Production: Spatial & DMR Specialists, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

## 4.1 Manase Village Interventions

### CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant National, Sector Plans and Strategies
<p>Village houses, churches and government assets located in high risk hazard zones</p>	<p>Relocate outside of high risk hazard zones when building/infrastructure requires replacement</p> <p>Investments within the hazard zones to adopt appropriate mitigation measures</p> <p>Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones</p> <p>Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Develop land use planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ</p> <p>Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Where reclamations are proposed, Government and district to manage processes by requiring villagers to get the appropriate permits and consent</p> <p><b>Responsibility: Village / Families / MWTI/ MNRE</b></p>	<p>Minimise expenditure on damaged properties &amp; personal assets</p> <p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Improve recovery to create more resilient villages</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Safer villages, houses and roads</p>	<p>Develop an Integrated Catchment and Flood Management Strategy for Gagaifomauga 1 District. MNRE to develop zonation strategy for safe areas</p> <p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform designs</p> <p>Enforcement of National Building Code 2017</p> <p>Encourage insurance of significant investments and assets within hazard zones</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate land use planning controls and restrictions</p>	<p>National Building Code</p> <p>CIM Strategy 2015</p> <p>NESP 2018 -2022</p> <p>NISP 2011 KESO 5</p> <p>TSP 2014-2019 Goal 2 KO 1</p>

<p>Upgrade Manase access/ work road to facilitate relocation of houses away from the CEHZ and CFHZ</p>	<p>Assess and upgrade as potential escape route and to encourage relocation away from hazard zones</p> <p>Upgrade to include adequate sized culverts to facilitate the overland flow of storm water exacerbating river overruns, and to reduce flooding onto main roads and village lands</p> <p>Implement regular drainage inspection and maintenance</p> <p>Village to restrict rubbish dumping into waterways and conduct regular clearance of rubbish behind homes</p> <p>Village to regulate developments near and around road shoulders of all access roads</p> <p>Enforce environmental safeguards</p> <p>Where reclamations are proposed, Government and district to manage processes by requiring villagers to get the appropriate permits and consent</p> <p><b>Responsibility: LTA/ MWTI/ MNRE/ District/ Village /Families/CSSP</b></p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties and public assets</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs</p> <p>Develop an Integrated Flood Management Plan for Gagaifomauga 1 District. MNRE to develop zonation strategy for safe areas</p> <p>Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>Include in budget programming CBA, design and construction</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p> <p>Develop and register Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p> <p>Utilise Sui o Nu’u monthly meetings to monitor progress of village cleanup and awareness programmes</p>	<p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p> <p>Community Engagement Plan</p> <p>Village Fono Act (Amendment Bill 2016)</p>
<p>Drainage systems to be improved in high risk areas on main north coast road</p>	<p>Continue to assess and upgrade culverts on main and ‘access’ roads in district and widen culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding</p> <p>Introduce culverts in wetland areas to improve tidal flow and fishp</p>	<p>Improves climate resilience of infrastructure resilience and rate of response and recovery to natural hazards and disasters</p> <p>Encourages coastal families to relocate inland</p> <p>Maintains lifeline access for all of Upolu</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform design</p> <p>Use existing information for guidance but not limited to: <i>“Vulnerability Assessment of the Samoa Road Network (2017)”</i>; <i>“Review of National Road Standards in Samoa (2016)”</i>; <i>“Samoa Code of Environmental Practice (2007)”</i></p> <p>Develop Integrated Catchment Strategy and Flood Management Plan for Safata District</p>	<p>NESP 2018 -2022</p> <p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

	<p>assageinthewetlandarea</p> <p>Implement regular drainage inspection and maintenance</p> <p>Government to regulate developments and illegal rubbish dumping near and around waterways and drainage</p> <p><b>Responsibility: LTA/ MWTI/MNRE/MWCSD /Village/ Families</b></p>	<p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects</p> <p>Include in budget programming CBA, design and construction</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	
<p>Beach nourishment / offshore breakwaters</p>	<p>Assesseffectiveness of offshore breakwaters (eg: model)</p> <p><b>Responsibility: MNRE</b></p>	<p>Improveinfrastr uctureresilience and rate of recovery</p> <p>Reduce impact from coastal erosion</p> <p>Safer villages, houses and roads</p> <p>Minimise expenditure on damaged properties &amp; personal assets</p>	<p>Undertake EIA 5 years from date of completion</p> <p>Utilise recommendations of EIA to replicate model in other districts/villages with similar conditions and considered highly vulnerable to coastal erosion</p> <p>Benefit cost analysis to include appropriate design loads and engineering design and supervision costs on top of capital work estimates</p>	<p>CIM Strategy 2015</p> <p>Tourism Sector Plan</p>
<p>Evacuation Shelter and a connected escape route needed for emergency preparedness and response</p>	<p>Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter</p> <p>Conduct evacuationshelterassessment and mark on CIM Plan hazard maps</p> <p>Develop aVillageClimateDisasterManagementPlan(VCDMP)</p> <p>Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies</p> <p>Implement CDCRMprogram</p> <p>Install relevant signs to guide the community on</p>	<p>Improve resilience of public infrastructure</p> <p>Improve preparedness and readiness response to natural disasters</p>	<p>Enforcement of National Building Code 2017</p> <p>Utilise hazard maps and Geomorphologist findings to inform location and designs</p>	<p>National DisasterManagement Plan2017-2021</p> <p>NationalBuildingCode</p> <p>National Policy for People with Disabilities</p>

	<p>emergency response procedures and to locations of evacuation shelters</p> <p>Where no suitable houses exist, build emergency shelter(s) outside the hazard zones</p> <p>Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter</p> <p><b>Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD</b></p>			
<b>Natural Resources and Environment</b>	<b>Best Solutions</b>	<b>Benefits</b>	<b>Guideline to assist with the implementation</b>	<b>Relevant Sector Plans, National Strategies &amp; Policies</b>
Soft coastal protection measures needed for most vulnerable areas	<p>Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions</p> <p>To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed</p> <p><b>Responsibility: MNRE Villages</b></p>	<p>Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Implements an Ecosystem Based Approach</p>	<p>Develop an integrated land management plan for Safata district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops</p>	<p>NESP 2018 -2022</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p> <p>Forestry Management Act 2011</p>
Wetland protection from illegal rubbish dumping and waste water effluent	<p>Implement village awareness and cleanup programme to reduce illegal rubbish dumping</p> <p>Implement district/village drainage cleanup and awareness programme</p> <p>Produce posters and village signs for public awareness</p> <p><b>Responsibility: MNRE/ MWCSD/ District/ Village</b></p>	<p>Increase adaptation during extreme weather events</p> <p>Improve infrastructure resilience and rate of recovery</p> <p>Improve health and sanitation</p> <p>Reduce contamination of water supply</p>	<p>Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>Review wastewater strategy/ legislation to include role of Village/District bylaws</p> <p>Utilise Hazard maps and Geomorphologist findings to inform location</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes on waste management</p>	<p>National Waste Management Strategy</p> <p>Village Fono Act(Amendment Bill 2016)</p>

Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Pest management; invasive species (african snails, myna birds, and worms affecting taro plantations and vegetable gardens)</p>	<p>Implement an eradication programme to eradicate, contain or exclude invasive species</p> <p>Replant with climate resilient native species</p> <p>Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken</p> <p>Conduct education and awareness programmes on the impacts of invasive species</p> <p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources</p> <p>Conduct pilot site trials for climate ready plant varieties</p> <p>District to fence domestic animals</p> <p><b>Responsibility: Villages /District/ MNRE/MAF/ SROS</b></p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p>	<p>Develop an integrated land management plan for Safata district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to raise awareness of farmers on impacts to water flows from poor livestock management</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops</p> <p>MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly</p> <p>Village to manage pig/cattle population (compounds, in particular around water supplies)</p> <p>Training for farmers on pests management particularly affecting fruit trees and crops</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>NESP 2018 -2022</p> <p>Samoa's National Invasive Species Action Plan (NISAP)</p>
<p>Food security: threatened by changes in climate and inadequate soil for planting</p>	<p>Promote and facilitate planting of root crops (i.e yams, sweet potato) which are more resilient to cyclones, droughts and floods</p> <p>Promote agro-forestry and mixed planting including fruit trees to reduce crop vulnerability to pests and diseases</p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p> <p>Improve preparedness and readiness response to</p>	<p>MAF to provide trainings, awareness raising and support in supply of nursery trees, technology and infrastructure</p> <p>MAF to provide trainings and awareness on crop diversification to suit the prolonged impact of climate change such as drought or rainy seasons</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>Community Engagement Plan</p> <p>Two Million Tree Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>



	<p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Replanting of native forestry species of the upland forests to restore resilience and ecological function</p> <p>Conduct pilot site trials for climate ready plant varieties</p> <p><b>Responsibility: MAF/MNRE/villages/CSSP</b></p>	natural disasters	<p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village</p>	
<b>Governance</b>	<b>Best Solutions</b>	<b>Benefits</b>	<b>Guideline to assist with the implementation</b>	<b>Relevant Sector Plans, National Strategies &amp; Policies</b>
Strengthen the governance of natural resources and land use through Bylaws	<p>Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes.</p> <p>Collaborate with Sui o Nu'u to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p><b>Responsibility: MWCS D/Village</b></p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>	<p>Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>



# Manase Village Map



**Legend**

**Buildings**

- Green square: Petrol Station

**Utilities**

- Red line: EPC
- Blue line: Samoa Water Supply

**Boundaries & Routes**

- Red line: Sealed Road/Alataia
- Grey line: Unsealed Sealed Road/Alagatae
- Black line: Breakwater
- Grey line: Contour - 20m

**Hazard Zones**

- Green hatched: Coastal Flood Hazard Zone/Sone o Lamatia i Loloa
- Grey hatched: Coastal Erosion Hazard Zone/Sone o Lamatia i Elele Tafa i le Gatafale
- Yellow: Landslide Hazard Region
- White: Immediate Fluvial Hazard Zone
- Blue hatched: Riverbank Encroach... Zone
- Light blue: Watershed Managem... Riparian Zone

Coordinate System: GCS WGS 1984  
 Datum: WGS 1984  
 Units: Degree

Data Source: Ministry of Natural Resource and Environment, Samoa  
 Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

## 4.2 Safotu Village Interventions

### CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant National, Sector Plans and Strategies
<p>Village houses, churches and government assets located in high risk hazard zones</p>	<p>Relocate outside of high risk hazard zones when building/infrastructure requires replacement</p> <p>Investments within the hazard zones to adopt appropriate mitigation measures</p> <p>Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones</p> <p>Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ</p> <p>Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Where reclamations are proposed, Government and district to manage processes by requiring villagers to get the appropriate permits and</p>	<p>Minimise expenditure on damaged properties &amp; personal assets</p> <p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Improve recovery to create more resilient villages</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Safer villages, houses and roads</p>	<p>Develop an Integrated Catchment and Flood Management Strategy for Gagaifomauga 1 District. MNRE to develop zonation strategy for safe areas</p> <p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform designs</p> <p>Enforcement of National Building Code 2017</p> <p>Encourage insurance of significant investments and assets within hazard zones</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	<p>National Building Code</p> <p>CIM Strategy 2015</p>

	consent  <b>Responsibility: Village / Families /MWTI/ MNRE</b>			
Drainage systems to be improved in high risk areas on main north coastal road where it joins with Safotu Road and Safotu Access Road	<p>Assess and upgrade culverts and cross drainage especially at junctions with access roads sitting within combined hazard zones- in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Introduce new and widen existing culverts in wetland areas to improve tidal flow and fish passage in the wetland area</p> <p>Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding</p> <p>Implement regular drainage inspection and maintenance</p> <p><b>Responsibility: LTA /MWTI/MWCSD /Village/ Families</b></p>	<p>Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters</p> <p>Encourages coastal families to relocate inland</p> <p>Maintains lifeline access for all of Upolu</p> <p>Minimises national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Use existing information for guidance but not limited to: <i>“Vulnerability Assessment of the Samoa Road Network (2017)”</i>; <i>“Review of National Road Standards in Samoa (2016)”</i>; <i>“Samoa Code of Environmental Practice (2007)”</i></p> <p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities</p> <p>Apply for necessary permits as required by law</p> <p>Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	<p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>
Slope stabilization: landslips on main North Coast Road	<p>Implement slope stabilization at most vulnerable landslide areas of Gagaifomauga 1 as identified in the <i>Vulnerability Assessment of the Samoa Road Network</i> report</p> <p>Reduce sediment loads and loss of top soil by discouraging farming on steep slopes and keeping livestock in areas away from wetlands and watershed sites</p> <p>Government, Village and landowners to liaise and collaborate on processes needed to protect upland</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Reduce impact from coastal erosion and landslides</p> <p>Maintain lifeline access for all of Savaii</p> <p>Safer villages, houses and roads</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform designs</p> <p>Implement Gagaifomauga 1 Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for district</p> <p>Include in budget programming CBA, design</p>	<p>CIM Strategy 2015</p> <p>Transport Sector Plan 2014-2019 Goal 2</p> <p>NISP2011 (KESO 5 D&amp;E)</p>

	<p>catchment area, riverbanks from land clearing and developments</p> <p><b>Responsibility: LTA/ MWTI/ MNRE/ Villages</b></p>	<p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>and construction</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	
<b>Natural Resources and Environment</b>	<b>Best Solutions</b>	<b>Benefits</b>	<b>Guideline to assist with the implementation</b>	<b>Relevant Sector Plans, National Strategies &amp; Policies</b>
<p>Soft coastal protection measures needed for most vulnerable areas</p>	<p>Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions</p> <p>To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed</p> <p><b>Responsibility: MNRE Villages</b></p>	<p>Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Implements an Ecosystem Based Approach</p>	<p>Develop an integrated land management plan for Gagaifomauga 1 district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops</p>	<p>NESP 2018 -2022</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p> <p>Forestry Management Act 2011</p>
<p>Unsustainable sand mining (commercial and domestic)</p>	<p>Identify alternative sustainable sources of sand/rocks for domestic use</p> <p>Research the impacts of sand mining</p> <p>Village consultation on sand mining policy and regulation</p> <p>Village and government to collaborate closely on designated areas for sand/rock mining</p> <p>Raise awareness and support of sustainable land use practices</p> <p><b>Responsibility: MNRE/ Village/Families</b></p>	<p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Safer villages, houses and roads</p> <p>Reduce impact from coastal erosion</p> <p>Economic benefit for village from sustainable sand mining activities</p>	<p>MNRE to continue to identify specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks</p> <p>Undertake assessments of identified sites</p> <p>Undertake consultation with villages affected by proposed sand/rock mining</p> <p>Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers</p> <p>Utilise Sui o Nu’u monthly meetings to monitor progress of CIM Plan activities</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Draft Soil Resource Management Bill</p>

Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Pest management; invasive plants and animals</p>	<p>Implement an eradication programme to eradicate, contain or exclude invasive species</p> <p>Replant with climate resilient native species</p> <p>Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken</p> <p>Conduct education and awareness programmes on the impacts of invasive species</p> <p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources</p> <p>Conduct pilot site trials for climate ready plant varieties</p> <p>District to fence domestic animals</p> <p><b>Responsibility: Villages/District/MNRE/MAF/SROS</b></p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p>	<p>Develop an integrated land management plan for Gagaifomauga 1 district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to raise awareness of farmers on impacts to water flows from poor livestock management</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops</p> <p>MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly</p> <p>Village to manage pig/cattle population (compounds, in particular around water supplies)</p> <p>Training for farmers on pests management particularly affecting fruit trees and crops</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>NESP 2018 -2022</p> <p>Samoa's National Invasive Species Action Plan (NISAP)</p>
<p>Food security: threatened by changes in climate and inadequate soil for planting</p>	<p>Promote and facilitate planting of root crops (i.e yams, sweet potato) which are more resilient to cyclones, droughts and floods</p> <p>Promote agro-forestry and mixed planting</p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p>	<p>MAF to provide trainings, awareness raising and support in supply of nursery trees, technology and infrastructure</p> <p>MAF to provide trainings and awareness on crop diversification to suit</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>Community Engagement Plan</p> <p>Two Million Tree Strategy 2015-2020</p>

	<p>including fruit trees species to reduce crop vulnerability to pests and diseases</p> <p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Replanting of native forestry species of the upland forests to restore resilience and ecological function</p> <p>Conduct pilot site trials for climate ready plant varieties</p> <p><b>Responsibility: MAF/MNRE/villages/CSSP</b></p>	<p>Improve preparedness and readiness response to natural disasters</p>	<p>the prolonged impacts of climate change such as drought or rainy seasons</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MNRE Forestry to advise on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village</p>	<p>Restoration Operational Plan 2016-2020</p>
<b>Governance</b>	<b>Best Solutions</b>	<b>Benefits</b>	<b>Guideline to assist with the implementation</b>	<b>Relevant Sector Plans, National Strategies &amp; Policies</b>
<p>Strengthen the governance of natural resources and land use through bylaw</p>	<p>Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes.</p> <p>Collaborate with Sui o Nuu to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p><b>Responsibility: MWCS D/Village</b></p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>	<p>Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>



Non-CR issues raised during consultations	Proposed Solution	Comments
Access to tourist site <i>Responsibility:</i> <i>Village/STA</i>	Currently a track. Road improvement to encourage tourists to visit. Land issues involved	Not a CR issue- relevant under STA ICCRITS Project



# Safotu Village Map



# Savaii AF Districts Overview Map of Coastal Inundation Zones

