

Community Integrated Management Plan

Satupa'itea 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 Plans is envisaged as the blueprint for climate change interventions across all development sectors – reflecting the programmatic approach to climate resilience 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.

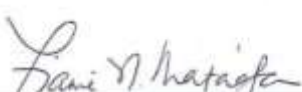
We wish to acknowledge the significant contributions of our District and Village communities and our key government partner stakeholders and implementing agencies, in particular:

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, the Pilot Program for Climate Resilience and Adaptation Fund, Adaptation Fund Project, through the UNDP, 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 further enhance the resilience of Samoa to the impacts of climate change.

Thank you



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 Satupa'itea (Satufia, Vaega, Pitonuu and Mosula)

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

Date of Signing: 15th June 2018

Representatives:

Signatures:

Satufia Village

- Asiata Toese
- Talopa'u Vagauta
- Alapeka Talopau
- Ta'ala Pemerika
- Maiava Tanielu

Asiata Toese.
 [Signature]
 Talopau.
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Vaega Village


- Taai Asiata
- Seupule Metu
- Asiata Lotana

Taai Asiata.
 Seupule Metu.
 [Signature]

Pitonuu Village

- Saveali'i Sevesi
- Nu'ufuli Livi
- Ala Nu'ufuli Sevesi
- Tavu'i Samana
- Tavu'i Lumana'i





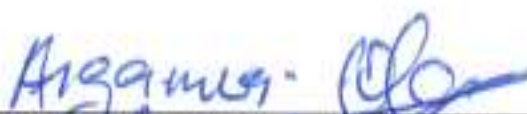


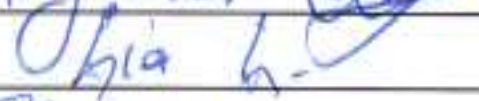


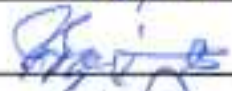



Mosula Village

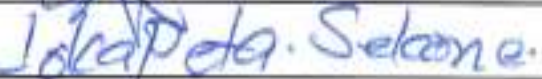
- Aigamua Ologa
- Li'a Lua'ipou
- Lafuniu Tavila
- Umama'o Saia
- Iokapeta Sekone











The Government of Samoa adopts the Community Integrated Management Plan for the Faipule District of Satupa'itea 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.



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	
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.
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 Satupa'itea 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 – Communities and their resources are Resilient to Natural Hazards". 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, August, 2015).***

1.2 The Aim of the CIM Plan

The aim of the CIM Plan is to help communities and government improve climate resilience by identifying actions and solutions for sustainable development.

The CIM Plan will enable communities and government service providers to:

1. Enhance awareness of hazard risks from the ridge to reef;
2. Improve climate resilience planning and development
3. Better adapt, respond and recover from natural disasters and other extreme events

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 to prepare 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.

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-GEF SGP.

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 Satupa'itea District

3.1 Physical and Natural Resource Setting

The Satupa'itea District is located on the southern coast of the island of Savaii between Palauli le Falefa and Palauli Sasa'e. The district is characterized by basalt lava rock flats gradually rising to inland mountains. The coastline is naturally buffered by volcanic rocks and vegetation. The district has a number of villages, including: Vaega, Pitonu'u, Mosula and Satufia. These four villages are located mainly on the coast, with Mosula extending further (1.5km) inland. The district contains a number of churches, one primary school (Satupa'itea Primary School) located in Vaega, one college (Wesleyan College) located in Satufia and a vocational training center at Mosula.

There are several rivers in the district. The largest is the Seugagogo River located to the east of Satupa'itea. A reservoir, which is the main source of water supply to the Satupa'itea District, is next to the river. Inland, the Seugagogo River runs down an incised valley. Closer to the sea it meanders. Most of the other rivers in the district have no clear channels near the coast, and can flood large areas. On the Seugagogo, flooding can affect the quality of water in the reservoir and therefore drinking water quality. The top of the reservoir adjoins a bank and road which drain into it.

There are no major reef breaks in the district. The reef system is far off shore (150m to more than 2.5km offshore) for all villages except for Satufia wherein the reef is about 150m from the coastline. Satufia has a marine reserve with a no-take zone clearly marked. The Samoa State of Environment (SOE, 2012) Report assessed the Southern Savaii coral reefs including Satupa'itea, as having a 'low' and declining level of coral cover, and a 'low' but increasing level of community coral structure. Compared to the rest of Samoa, the reefs of Southern Savaii including Satupa'itea comprises a relatively small part of Samoa's overall coral reef system.

The reef is used for fishing and canoes are generally required to access it because of the distance from the shore. The coast is characterized by volcanic rock rather than sand and there are no records of 1954 coastline available for this area to determine coastline changes. There are segments of a seawall along the coast of Vaega, Pitonu'u and Mosula, ranging in length from 50 to 100 metres, financed by the Tsunami Recovery Fund and constructed pre-2007, which are being eroded. Post 2007, about 100m of seawall was constructed in Vaega and appears incomplete. Satufia's coastal spring (Sogi) is filled with coral debris and soil as a result of the 2009 tsunami and is no longer useable. An approximately 15m long revetment also provides protection for the Vaega village pools.

There are a number of springs and pools in the district including inland in Pitonu'u and coast pools at Tufofauta, Tufofatai, Tugia and Tufofa. Vaega has springs and pools located both inland and along the coast, including Fatutea, Lalomaile, Matamau and Alape. Away from the coast, settlements and plantations dominate the area. These are located predominantly on the western side of the coast road. Further inland, houses in Mosula, plantations and agricultural activities located on steeper land are affecting land stability.

Satupa'itea has a narrow spatial footprint and experiences similar topographic and environmental condition to the other district on the south coast of Savaii. The district has a barrier coral reef system close to the coast and the coastline is dominated by high- energy wave action onto the reef. The location of Palauli Bay fringes the eastern boundary of the district. The sheltered waters of Palauli Bay and easy access to reef areas allows for a variety of fishing activities. A number of rivers flow into the coastal areas on the south coast including Satupa'itea, which influence the local coastal water quality (Dews, 2016).

Soil capability is class 1 land with few limitations to agricultural use. Topography is described as flat to undulating imperfectly and well-drained land without moisture deficit. Soils have high to medium natural nutrient levels and consist of less than 5% stones. Agriculture is similar to adjacent districts with subsistence household garden. Inland plantation of coconuts and taro with some livestock are common in areas that once were forests. Household production is varied with some for sale at the markets and some consumption within the family (Dews, 2016).

The terrestrial habitats of Satupa'itea district consists of the following as defined by the Samoa State of Environment (SOE, 2012) Report: Upland and Cloud Forest habitats, Lowland habitats, Coastal habitats, Inshore and Offshore Marine habitats, Rural and Urban Built Environment, Rivers and Streams and Protected Areas.

The overall health statuses of these various habitats are assessed in the SOE 2012 Report (MNRE, 2012). An updated assessment based on new 2016 Lidar images and field assessment conducted for this CIM Plans found the following. The vegetation of these various habitat types change and merge not in distinct and definable boundaries but in heterogeneous mixes with increasing altitude from the coastline to the ridge-top. Because much of

Satupa'itea's coastal area is of flat and or gently sloping terrain, it is also modified by cultivation, made easier by the intrusion of plantation access roads from all four villages. Consequently the dominant vegetation type is of a mosaic of cultivated areas, fallowed areas where remnant bananas and taros are scattered but dominated by vines, and pockets dominated by a mix of secondary forest trees and littoral/coastal species. The common canopy and sub-canopy species in this mix are tava (*Pometiapiinnata*), tufaso (*Rhustaitensis*), talie (*Terminalia* spp), fau (*Hibiscus* spp), papata (*Macarangaspp*), moso'oi (*Canangaodorata*) and fuafua (*Kleinnoviaspp*). The undergrowth in this vegetation system is mainly of saplings of the same canopy species, with the broad leaf vine (*Merremiapeltata*) and mile-a-minute observed in open and sparsely vegetated areas. There are a few small pockets of mangroves scattered along the coast.

In terms of native fauna, several land and shorebirds are observed with the Myna bird and bulbul – both invasive – the most common. Information gleaned from consultations suggests the relative abundance of lupe (Pacific pigeon) from the lower montane forests to the ridge top, which is hunted on a regular basis particularly in Satufia. Domesticated animals are mainly pigs, chicken –both free-ranging – and cattle.

Further inland to the ridgetop, LiDar images show a continuing mix of dense secondary forests with the continuing presence of broad-leaf vines in pockets of open spaces. Satupa'itea has medium forest (48.76%) covering most of the district (Tokalauvere, 2017). Part of Satupa'itea's interior falls under the western end of the Mauga o Salafai National Park and this area is reported to be heavily cleared for cultivation and cattle farming in some areas. The entire expanse of district land above 600m asl is part of the biodiversity hotspot being targeted by the Government for protection as part of Samoa's Central Savaii Key Biodiversity Area (SOE 2012, MNRE). Most of this area – within Satupa'itea district lands - is relatively intact but further assessments are needed to ascertain their true condition.

3.2 Social and Economic Setting

The Satupa'itea District has a total population of 2,112¹, 1,027 female and 1,085 male. District village populations are: Satufia (573), Vaega (571), Mosula (685) and Pitonu'u (283). Development is located in a linear nature along the western side of the main South coast road. The South coast main two-lane sealed road around Savaii runs through the district. The district has 3 sealed access roads (Pitonuu Road, Vaega Road and Satufia Road), which run inland through Mosula, Pitonu'u, Vaega and Satufia villages. These roads are an important part of the district's infrastructure. Vaega Road in particular has been identified as a tsunami escape route² for Satupa'itea and has SWA pipelines running through it to connect to the pipelines on the main South Coast road. The width of the seal on the inland roads is narrow and is not generally wide enough for two cars to pass at the same time. The condition of the road is generally good with few pot holes.

The access roads provide easy access to primary services such as the Satupa'itea Primary School and Uesiliana College, shops, as well as adjacent districts. The Satupa'itea school road is vulnerable to coastal erosion and inland flooding and has high voltage EPC lines hanging with low clearance to the ground. The coast road provides the most direct access for Satufia, Vaega, Pitonu'u to the main South Coast road and facilities such as the hospital, markets and bulk stores.

Other work roads to village plantations extend inland and are generally unsealed and do not have power or telephone services along them. Roads extending to Satupa'itea School, Wesleyan College and the Vocational Center are sealed and have power and telephone connections.

Village infrastructure includes reticulated water, power and telephone, except for inland parts of Mosula, which does not have a landline connection. There is good cell phone network coverage for coastal areas but not inland areas and there are a number of Digicel towers located throughout the district. Power supply is irregular, with frequent blackouts reported during consultations. Infrastructure follows the coast road and main inland road and along some work roads to serve schools and churches. Mosula has the district's main inland water reservoir. Water supply is managed under the Independent Water Scheme (IWS).

The cash economy of the District is dominated by traditional work. In the villages, 73% and 100% of households are engaged in fishing and plantations respectively, (MWCSO, 2011) and is the main source of income for the majority of households although there is some employment in local stores. The main crops are taro, bananas and yams. Breadfruits are planted around the houses, along the coast and in other areas as part of mixed cropping by all households. It is an important substitute for taro when in season. Vegetable gardening is reported in only 15.7% of all district households (ibid.) which is low in all villages except Pitonu'u where 62% of households have vegetable gardens. In all households, these are largely for home consumption.

¹ SBS Village Directory 2016- Census 2016 Preliminary Count

²Satupa'itea Village Disaster Management Plan

Almost all households (>95%) raise chickens and pigs in all four villages while 72.5% have cattle. Chicken and pigs are primarily for home consumption but cattle farming is for income generation (ibid.). Commercial sand mining, previously occurred on the coast of Vaega and Pitonu'u and was a source of income for some (CIM Plan, 2007), but this has discontinued.

3.3 Climate Risk and Resilience

The Satupa'itea coastal area has a Medium Coastal Hazard Sensitivity Index (LTA/SMEC, 2016). 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 Satupa'itea. The immediate risks for some areas of Satupa'itea are from coastal inundation, storm surges and river flooding. Some areas are located within the tsunami red zone.

The district of Satupa'itea has a total area of 4,657 hectares. The area covering the 0-15m Coastal inundation Zone is 697 hectares. Of the 389 buildings in the district, 379 buildings are located within 0-15m inundation zone. Therefore about 97% of the total number of buildings in the district is located in the immediate inundation zone; this includes the hospital, Satupa'itea Primary School and Uesiliana College. 31 of these buildings are located both in the immediate inundation and fluvial hazard zones making them **highly at risk** from storm surges, tsunamis, coastal erosion and in addition, river flooding. The Methodist Church that was identified in the 2007 CIM Plan as an Evacuation Shelter actually sits within the 0-5m immediate coastal inundation zone (Tokalauvere, 2017).

Mosula, Pitonu'u and Satufia are subject to inland flooding from heavy rain, which also affects its wetland areas. This is a worsening problem since the 2007 CIM Plan, with sizeable water ponds now observed in areas previously unaffected especially in Pitonuu. In Mosula, a roadside retail shop is blocking the road side drains, with the diverted surface water run-off causing problems to nearby households. All four villages are affected by coastal flooding and were severely impacted by the 2011 tsunami which damaged coastal water springs, houses and part of the coastal road.

Primary services such as water, power and telephone generally follow the coast road and are vulnerable to damage from coastal hazards. In a disaster, the utility services running along the coast road would be directly affected.

Water supply is less reliable in the Satufia and Vaega villages which are furthest away from the water intake, especially in the peak use hours of the morning and evening. Rusting steel pipes have been replaced with PVC in Pitonuu and parts of Mosula and Vaega and should be replaced for the rest of the district. Among the most vulnerable water-wise are the Primary School and the Uesiliana College.

Food security risks are also compounded from climatic changes 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).

The livelihoods derived from the Palauli Bay will be influenced by any decline in health of the coral reefs. Climate change impact arising from sea level rise, ocean warming and acidification will cause the reef to lose biodiversity leading to a decline in associated fish abundance. The health of the reefs can be altered by water quality as a result of land-based impacts caused by soil erosion and fertilizer run-off entering the bay. Storm surges and sea level rise may influence the productive capacity of the coastal households. Loss or major alteration of upland forest areas will impact on the water flows. Forest fires may become more common as air temperatures increase and rain periods are less frequent but more intense (Dews, 2016).

Community consultations, drive through (ground truthing) site assessments and summary reports by AF Technical Advisors show that lowland inundation, uncontrolled runoff, inland flooding, culvert washouts or blockages, pool sedimentation and wetland flooding were directly related to developments further inland and in upland catchment areas of the district. Excessive land clearance for agricultural developments (including cattle farms, subsistence plantations), poor or non-existent drainages along access and national roads, illegal rubbish dumping into waterways and encroachment into riverbank management riparian zone are some of the activities that have contributed to Satupa'itea's current climate risk.

Satupa'itea has in place a District Bylaw as well as a Disaster Management Plan. These two key plans document crucial actions and processes required to build Satupa'itea's resilience both to climate change risks and also help govern and monitor developments and actions by the district/villages that are contributing to problems currently experienced by the district.

4. Satupa'itea District Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Implementation Guideline	Relevant National, Sector Plans and Strategies
Main South Coast road: exposure to coastal hazard zones	Maintain or replace the seawall at targeted sections (and Pitonu'u in particular) where the road is closest to the coast Responsibility: LTA/MWTI/MNRE/Villages	<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</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Include in budget programming design, construction costs</p> <p>Utilise Hazard maps and Geomorphologist findings for planning purposes</p> <p>Utilize environmental and social safeguards including EIAs in screening and designing infrastructure facilities</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> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA/SMEC</p>
Village houses, church, school and other assets in high risk hazard zones	<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</p>	<p>Minimise expenditure on damaged properties and personal assets</p> <p>Safer villages, houses and roads</p> <p>Increases awareness for insurance</p>	<p>Planning provisions to be guided by the Planning and Urban Management 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 hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions</p>	<p>CIM Strategy 2015</p>

	<p>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>Responsibility: Village / Families /MWTI/ MNRE/ MWCS D</p>			
<p>Drainage systems to be improved in high risk areas of main South Coast Road and where it joins access roads</p>	<p>Continue to assess and upgrade culverts on main and access roads (Vaega, Satufia and Pitonuu Access Roads) 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>Implement regular drainage inspection and maintenance</p> <p>Government to regulate developments and illegal rubbish dumping near and around waterways and drainage</p> <p>Responsibility: LTA/ MWTI/MNRE/MWCS D /Village/ Families</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>Minimizes national disaster recovery expenditure on damaged properties, public and private assets</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>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 for Gagaifomauga district</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>CIM Strategy 2015</p> <p>NISP 2011 KESO 5</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

<p>Electricity supply</p>	<p>Provide underground 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>Responsibility: EPC/MWTI/ Village /Families</p>	<p>Maintain electricity supply at all times including natural disasters</p> <p>Avoid accidents from fallen electricity posts.</p>	<p>Monitor distribution networks to avoid overloading poles and contributing to line failures</p>	<p>EPC Strategic Plan</p>
<p>Reticulated water supply, quality and network to be improved</p>	<p>Bury main distribution pipes at areas where they are exposed</p> <p>Upgrade water reticulation system by replacing old steel pipes with PEP</p> <p>Extend the water supply to families inland with no access to water</p> <p>Procure rainwater harvesting systems for vulnerable families as a short term solution</p> <p>District and village to support SWA water rationing programmes during times of drought</p> <p>District to support SWA efforts at exploratory boreholes in district</p> <p>District and villages to support SWA</p>	<p>Increase adaptation during drought periods</p> <p>Improve infrastructure resilience and rate of recovery</p> <p>Improve health and sanitation</p> <p>Reduce contamination of water supply</p> <p>Reduce impact from inland flooding</p>	<p>Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes</p> <p>Implement SWA (2016)10 year investment plan to improve water supply network to support all inland families without access to drinking water</p> <p>Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems</p> <p>Utilise hazard maps and Geomorphologist findings to inform designs</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities</p>	<p>CIM Strategy 2015</p> <p>Water and Sanitation Sector Plan</p> <p>SWA 10 Year Investment Plan (2016)</p> <p>Community Engagement Plan</p> <p>Health Sector Plan</p> <p>Community Sector Plan</p>

	<p>efforts at protecting and conserving boreholes, intakes and catchment areas</p> <p>Responsibility: <i>SWA/ IWS/ MNRE / District/ Village/ CSSP</i></p>			
Inland flooding and expanding CFHZ	<p>Conduct a detailed examination of the inland flooding issue in and assign priority for implementation to actions recommended</p> <p>Prepare a watershed management plan for Vailoa-Satupa'itea examining upstream solutions as a long term solution and implement priority recommendations</p> <p>Responsibility: <i>MNRE/ Village</i></p>	<p>Improved resilience and rate of recovery</p> <p>Improved access to elevated areas</p> <p>Safer village houses and roads</p> <p>Improved sustainability of natural resources</p> <p>Improve health</p>	<p>Programme into budgeting process</p> <p>Consider as priority for WRD's Watershed Management Planning work-plan for 2017</p>	NESP 2017-2020
Natural Resources and Environment	Best Solutions	Benefits	Implementation Guideline	Relevant National, Sector Plans and Strategies
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>Responsibility: <i>MNRE Villages</i></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 Satupaitea 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>
Water Reservoir at Fogatia	<p>Continue to replant trees at upper catchment areas.</p> <p>Restrict developments and land clearing at upper catchment areas</p> <p>Responsibility: <i>District water</i></p>	<p>Improved resilience and sustainability of water supply</p> <p>Improved Health</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>Update Satupa'itea District bylaws to include</p>	<p>NESP 2018 - 2022</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>

	Committee; Village, MNRE-WRD, MNRE-PUMA/ MWCS D		management of catchment areas, illegal rubbish dumping and wastewater effluent Utilise Sui o Nu'u monthly meetings to monitor progress of village cleanup and awareness programmes	Village Fono Act (Amendment Bill 2016)
Coral Reefs, lagoons and inshore fisheries	Continue the ban on the use of chemicals, dynamites and other unsuitable fishing practices Responsibility: Village / MWCS D/MNRE	Enhances sustainability of inshore and reef marine resources	Update Satupa'itea District bylaws to include management of marine resources including coral reefs, lagoons and inshore fisheries Utilise Sui o Nu'u monthly meetings to monitor progress of village cleanup and awareness programmes	NESP 2018 - 2022 Community Sector Plan Village Fono Act (Amendment Bill 2016)
Land	Ban cultivation and clearing of forests on steep slopes to minimize the risk of erosion and land slips. Protection of river banks from land clearing and developments Enforce environmental safeguards Restore through replanting with native forest trees species degraded areas within the Mauga o Salafai National Park. Gazette areas proposed under the Mauga o Salafai National Park and enforce protection. Responsibility: Village Council/ MWCS D/MNRE	Enhances resilience of downstream and coastal ecosystems including coral reefs Sustains ecosystem services for downstream and coastal populations Enhances the protection of native biodiversity of conservation interest	Update Satupa'itea District bylaws to include restrictions on developments in watershed management riparian buffer zone Utilise Sui o Nu'u monthly meetings to monitor progress of village cleanup and awareness programmes	Agriculture Sector Plan 2016-2020 NESP 2018 - 2022 Community Sector Plan Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020
Forests and Trees	Plant coastal trees on shoreline and other exposed coastal areas. Plant forest trees on erosion prone and steep areas including along stream banks and in the upper catchment area at Fogatia water intake. Strengthen Government's capacity		Encourage village registration in MNRE Forestry's Forest Extension Program for access to seedlings and technical advice Update Satupa'itea District bylaws to include restrictions on developments in watershed management riparian buffer zone Utilise Sui o Nu'u monthly meetings to monitor progress	NESP 2018 - 2022 Community Sector Plan Village Fono Act (Amendment Bill 2016)Two Million Tree Strategy 2015-2020 Restoration

	to support community forestry and replanting initiatives Responsibility: Village/ MWCS D/MNRE/Village Water Committee /MOF/MAF		of village cleanup and awareness programmes	Operational Plan 2016-2020
Biodiversity	Monitor shooting of <i>lupe</i> in Satufia. Protect ridge top areas to sustain ecosystem services for coastal populations and preserve the Mauga of Salafai National Park Promote village awareness of the existence and boundaries of the <i>Motu o Salafai</i> National Park, and Savaii Key Biodiversity Areas (KBAs) Responsibility: Village / MWCS D/MNRE/NGOs	Enhances ecological stability and resilience Enhances the resilience, quality and sustainability of downstream water resources	Update Satupa'itea District bylaws to include restrictions on developments in watershed management riparian buffer zone MNRE and NGOs to provide technical advise and financial assistance to implement activities and conduct awareness programmes Utilise Sui o Nu'u monthly meetings to monitor progress of village cleanup and awareness programmes	NESP 2018 - 2022 Community Sector Plan Village Fono Act (Amendment Bill 2016)
Livelihood and Food Security	Best Solutions	Benefits	Implementation Guideline	Relevant National, Sector Plans and Strategies
Food security: threatened by changes in climate and inadequate soil for planting	Encourage and promote the planting of drought resistant and less cyclone prone root crops such as yams (ufi), talopalagi, manioca and other similar crops Promote and support the use of appropriate and environmentally friendly technologies and cultivation practices to increase agricultural production and productivity Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas.	Ensures security of staple foods Diversify cropping systems Enhance ecological stability and disease resistance. Sustains water supply Enhances resilience of catchment areas	MAF to advice on other crops and methods of propagation and cultivation. PUMA Development Consent requirements to be applied to all large scale developments, including agricultural developments. MAF and WIBDI technical support for organic farming ventures. Develop/Update District/Village bylaws to include maintenance of drainages and illegal rubbish dumping. Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities	Agriculture Sector Plan 2016-2020 CIM Strategy 2015 Community Sector Plan PUMA Act Village Fono Act (Amendment Bill 2016)

	Discourage large scale agricultural ventures and other developments that threaten catchment areas, upland native forests and sensitive habitats. Responsibility: MAF /MNRE/ NGOs/Village			
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant National, Sector Plans and Strategies
Strengthen the governance of natural resources and land use through Bylaws	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. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages Obtain necessary permits required by law before developments take place Responsibility: MWCSO /MNRE /Village	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	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 Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

Non-CR issue	Proposed Solution	Comments
District hospital Responsibility: NHS	To ensure that there is a doctor present at all times and to upgrade the hospital with equipment and medicines	Not a CR issue- but included because it was raised during consultations

Satupa'itea District Map



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

5. Satufia 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, School and private residences 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>Responsibility: Village / Families /MWTI/ MNRE/ MWCS</p>	<p>Minimise expenditure on damaged properties and personal assets</p> <p>Safer villages, houses and roads</p> <p>Increases awareness for insurance</p>	<p>Planning provisions to be guided by the Planning and Urban Management 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 hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	<p>CIM Strategy 2015</p> <p>NESP 2018 - 2022</p> <p>National Building Code</p> <p>[Draft] Samoa Relocation Strategy 2016</p>

<p>Village coastal work road in high risk hazard zones</p>	<p>Relocate coastal work road outside of the hazard zones when replaced Responsibility: Village / Families</p> <p>Upgrade work road #1. Responsibility: LTA/MNRE</p> <p>Build appropriate crossing for the creek near the school building to solve regular flooding affecting downstream properties Responsibility: MWTI /MESC/LTA /Village</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 inland flooding</p> <p>Safer villages, houses and roads</p>	<p>When the coastal work road requires upgrading or replacement to identify an alternative route away from the coastal hazard zones</p> <p>Utilise Hazard maps and Geomorphologist findings to inform location and design</p> <p>Programme and budget works</p>	<p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
<p>Reticulated water supply, quality and network to be improved</p>	<p>Extend the water supply to families inland with no access to water</p> <p>Procure rainwater harvesting systems for vulnerable families as a short term solution</p> <p>Responsibility: SWA/ MNRE / District/ Village/ CSSP</p>	<p>Increase adaptation during drought periods</p> <p>Improve infrastructure resilience and rate of recovery</p> <p>Improve health and sanitation</p> <p>Reduce contamination of water supply</p> <p>Reduce impact from inland flooding</p>	<p>Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes</p> <p>Implement SWA (2016)10 year investment plan to improve water supply network to support all inland families without access to drinking water</p> <p>Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems</p> <p>Utilise hazard maps and Geomorphologist findings for planning purposes</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities</p>	<p>CIM Strategy 2015</p> <p>Water and Sanitation Sector Plan</p> <p>SWA 10 Year Investment Plan (2016)</p> <p>Community Engagement Plan</p> <p>Health Sector Plan</p> <p>Village Fono Act(Amendment Bill 2016)</p>

Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
<p>Village pool (Laofala) located in high risk hazard zones (coastal erosion and flooding from fluvial inundation, wave impacts and storm surges)</p>	<p>Village pool is currently in a poor state with an assessment needed for options to either rejuvenate or find a new site depending on the location of springs.</p> <p>Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works)</p> <p>Responsibility: CSPP/NGOs/MNRE/Villages</p>	<p>Increase adaptation during drought periods</p> <p>Improve health and sanitation</p> <p>Reduce contamination of water supply</p>	<p>Utilise Hazard Maps and Geomorphologist findings for planning purposes</p> <p>MNRE Water & Sanitation to conduct water testing and analysis of village pool prior to any intervention</p> <p>Update Village bylaws to include managing and maintaining village natural resources</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities</p>	<p>CIM Strategy 2015</p> <p>Water and Sanitation Sector Plan</p> <p>Community Engagement Plan</p> <p>Village Fono Act (Amendment Bill 2016)</p>
<p>Coral reefs, lagoons and inshore fishery</p>	<p>Maintain and expand fisheries reserve.</p> <p>Assess the state of the coral reef and lagoon ecosystems in Satufia</p> <p>Conduct awareness programmes of marine resources</p> <p>Responsibility: MAF, MNRE-DEC/Village</p>	<p>Support food security and healthy diets</p> <p>Promotes sustainability of fish stocks</p> <p>Facilitates coral re-growth and coral reef restoration</p>	<p>MAF Fisheries to support implementation and provide technical backstopping and monitoring</p>	<p>NESP 2018 - 2022</p>
<p>Management of coastal land resources</p>	<p>Review existing village by-laws to support the effective enforcement of the sustainable management of individual and commercial sand mining through the DC and sand mining permit processes</p> <p>Mass media awareness of sand mining issues and on policy-legal measures in place</p> <p>Raise awareness of and support sustainable land use practices.</p>	<p>Improved coastal protection and resilience against climate change</p> <p>Improved sustainability of coastal-based natural resources</p>	<p>Village/Families to recognize the role that vegetation plays in stabilizing coastal areas</p> <p>Designation of the CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions</p> <p>Develop/Update District/Village bylaws to include regulating sand mining</p>	<p>CIM Strategy 2015</p> <p>Community Sector Plan</p> <p>NESP 2018 - 2022</p> <p>Village Fono Act (Amendment Bill 2016)</p>

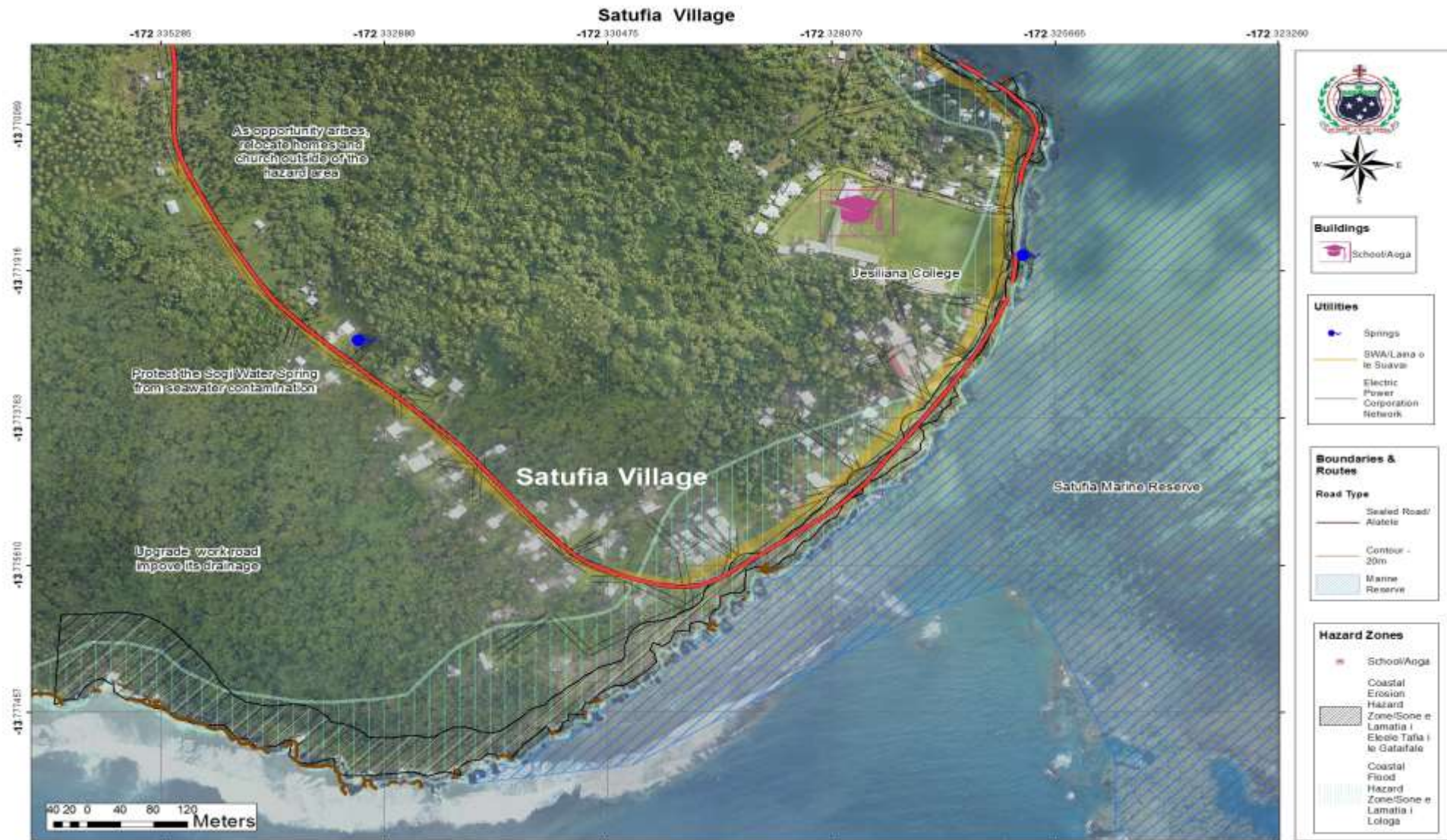
	Responsibility: MNRE-Lands, MAF/Village/ Families			
Forests and Trees	<p>Carry out the replanting of suitable forest trees and tree crops in erosion-prone areas and along the coastline.</p> <p>Responsibility: Village / Families</p>	<p>Improved protection and resilience of inland and coastal resources and infrastructure</p> <p>Both inland and coastal infrastructure and community assets protected</p>	<p>Village/Families to recognize the role that vegetation plays in stabilizing coastal areas.</p> <p>Inland and Coastal areas to be planted as soon as possible with suitable species</p> <p>MNRE to advise on appropriate tree species and where possible, provide seedlings</p>	<p>CIM Strategy 2015</p> <p>Community Sector Plan</p> <p>Two Million Tree Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>
Management of Terrestrial and Marine Biodiversity	<p>Review village by-laws to regulate and monitor the hunting of pigeons and all other endangered species (maomao, manumea, pea) to prevent overexploitation</p> <p>Support expansion of fisheries reserve</p> <p>Protect ridge-top habitats and forests from indiscriminate cultivate and other developments</p> <p>Responsibility: Village/ MNRE/MAF</p>	<p>Local species diversity conserved and protected ecosystem services and functions sustained</p>		<p>CIM Strategy 2015</p> <p>Community Sector Plan</p> <p>AgricultureSectorPlan2016-2021</p> <p>NESP 2018 - 2022</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
Food Security Cropping practices	<p>Plant drought and cyclone resistant crops (yam, cassava, taro palagi)</p> <p>Encourage organic farming and the planting of mixed planting systems (trees and crops) to promote ecological stability and soil protection</p> <p>Encourage and</p>	<p>Improved resilience and food security</p> <p>Provide possible option for income generation</p> <p>Maximizes land productivity</p> <p>Enhances</p>	<p>MAF to advice on other crops and methods of propagation and cultivation.</p> <p>MAF Fisheries to provide technical advice and monitoring, and possible source of new introductions e.g. clams, trochus etc.</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>NESP2017</p> <p>Align NAP 2015-2020</p> <p>Draft Soil Resource Management Bill 2018</p>

	<p>support household initiatives to plant fruits and vegetables</p> <p>Maintain and expand fisheries reserve.</p> <p>Enforce village ban on use of dynamites, herbal poisons (avaniukini) and other unsustainable fishing methods.</p> <p>Support initiatives to improve and sustain coastal and inshore fisheries.</p> <p>Responsibility: MAF/MNRE/Villages</p>	<p>crop resistance to pest and diseases</p> <p>Improved food security and healthy protein source</p> <p>Provide possible option for income generation</p>		
Health	<p>Monitor and test water quality regularly from water spring, taps and tanks</p> <p>Fence domesticated pigs to promote healthy living, and to beautify the village.</p> <p>Regularly clean out debris and maintain village ponds used for washing and bathing.</p> <p>Responsibility: IWS/Village/MWCSD/MOH</p>	<p>Improve health through access to clean water and waste management</p> <p>Improve recovery to create more resilient villages</p> <p>Improve preparedness and readiness response to natural disasters</p>	MoH to regularly test water at intake for quality	<p>Community Sector Plan</p> <p>Health Sector Plan</p>
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
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>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve</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>

	<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>Responsibility: MWCS D /Village</p>	<p>ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>		
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Satufia Village Map



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

6. Vaega Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant National, Sector Plans and Strategies
Main Access/Coast Road (Vaega Rd)	<p>Reassess need for extending the seawall at Vaega to protect main road if assessment recommends it</p> <p>Upgrade and provide electricity and water supply along the inland work road to facilitate relocation</p> <p>Responsibility: MWTI/ LTA/Village / Families</p>	<p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p> <p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Safer villages, houses and roads</p>	<p>Utilise Hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and design</p> <p>Prepare Environmental Impact Assessment to implement recommended actions</p> <p>Programme and budget works</p>	<p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Village houses, church, school and other assets in high risk hazard zones	<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</p>	<p>Minimise expenditure on damaged properties and personal assets</p> <p>Safer villages, houses and roads</p> <p>Increases awareness for insurance</p>	<p>Planning provisions to be guided by the Planning and Urban Management 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 hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	<p>CIM Strategy 2015</p> <p>National Building Code</p>

	<p>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>Responsibility: Village / Families /MWTI/ MNRE/ MWCS D</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>Develop a Village Climate Disaster Management Plan (VCDMP)</p> <p>Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies</p> <p>Implement CDCRM program</p> <p>Install relevant signs to guide the community on 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>Responsibility: MNRE /DMO/ MWTI/Village /CSP/Council of</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 Disaster Management Plan 2017-2021</p> <p>National Building Code</p> <p>National Policy for People with Disabilities</p> <p>NISP 2011 KESO 5</p>

Natural Resources and Environment	<i>Churches/MWCSD</i> Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Coral reefs, lagoons and inshore fishery	<p>Collect and dispose of crown-of-thorns (alamea) on a regular basis to prevent major outbreaks.</p> <p>Ban the use of dynamites, herbal poisons (avaniukini), chemicals and other unsustainable fishing methods.</p> <p>Responsibility: MAF/Village</p>	<p>Protect coral reefs and inshore fisheries</p> <p>Protect marine biodiversity</p>	MAF Fisheries to support implementation and provide technical backstopping and monitoring	Agriculture Sector Plan 2016-2021
Village pool (Fatutea, Lalomalie, Matumanu-Tai, Alape, Magalogalo) located in high risk hazard zones (coastal erosion and flooding from fluvial inundation, wave impacts and storm surges)	<p>Village pool is currently in a poor state with an assessment needed for options to either rejuvenate and/or protect it</p> <p>Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works)</p> <p>Responsibility: CSSP/NGOs/MNRE/Villages</p>	<p>Increase adaptation during drought periods</p> <p>Improve health and sanitation</p> <p>Reduce contamination of water supply</p>	<p>Utilise Hazard Maps and Geomorphologist findings for planning purposes</p> <p>MNRE Water & Sanitation to conduct water testing and analysis of village pool prior to any intervention</p> <p>Update Village bylaws to include managing and maintaining village natural resources</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities</p>	<p>CIM Strategy 2015</p> <p>Water and Sanitation Sector Plan</p> <p>Community Engagement Plan</p> <p>Village Fono Act (Amendment Bill 2016)</p>
Management of coastal land resources /Sand Mining	<p>Review existing village by-laws to support the effective enforcement of the sustainable management of individual and commercial sand mining through the DC and sand mining permit processes</p> <p>Mass media awareness of sandmining issues and on policy-legal measures in place</p> <p>Raise awareness of and support sustainable land use practices.</p> <p>Responsibility: MNRE/ Village/ MAF</p>	<p>Improved coastal protection and resilience against climate change</p> <p>Improved sustainability of coastal-based natural resources</p>	<p>Village/Families to recognize the role that vegetation plays in stabilizing coastal areas</p> <p>Designation of the CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions</p> <p>Develop/Update District/Village bylaws to include regulating sand mining</p>	<p>Draft Soil Resource Management Bill</p> <p>Community Sector Plan</p> <p>NESP 2018 - 2022</p> <p>Village Fono Act (Amendment Bill 2016)</p>

Forests and Trees	<p>Carry out the replanting of suitable forest trees and tree crops in erosion-prone areas and along the coastline.</p> <p>Responsibility: Village / Families</p>	<p>Improved protection and resilience of inland and coastal resources and infrastructure</p> <p>Both inland and coastal infrastructure and community assets protected</p>	<p>Village/Families to recognize the role that vegetation plays in stabilizing coastal areas.</p> <p>Inland and Coastal areas to be planted as soon as possible with suitable species.</p> <p>MNRE to advise on appropriate tree species and where possible, provide seedlings</p>	<p>CIM Strategy 2015</p> <p>Community Sector Plan</p> <p>Two Million Tree Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>
Biodiversity	<p>Discourage cultivation on higher elevation and near ridge top areas to protect and sustain ecosystem services for coastal populations and preserve the Mauga of Salafai National Park.</p> <p>Responsibility: MNRE/ Villages</p> <p>To the extent possible, use native trees in all coastal replantings and other ecosystems restoration initiatives</p>	<p>Protect endangered biodiversity including endangered endemic bird species</p> <p>Prevent soil erosion and habitat fragmentation</p> <p>Protect Mauga o Salafai National Park</p>	<p>Limit access roads to lower elevation, i.e. below 600m asl</p> <p>Utilise Hazard maps and Geomorphologist findings for planning purposes</p>	<p>NESP 2018 - 2022</p> <p>Two Million Tree Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Food Security	<p>Plant drought resistant root crops such as taro, yams (ufi) and other similar crops.</p> <p>Encourage organic farming and the planting of mixed planting systems (trees and crops) to promote ecological stability and soil protection.</p> <p>Support initiatives to improve and sustain coastal and inshore fisheries.</p> <p>Responsibility: MAF/ Village/ NGOs</p>	<p>Improved food security and resilience</p> <p>Provide potential income generating option</p>	<p>MAF to advice on other crops and methods of cultivation.</p> <p>MAF and WIBD Inc to be engaged in organic farming initiatives</p>	<p>Agriculture Sector Plan 2016-2021</p>

Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
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 Nuu to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Responsibility: MWCS D /Village</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 issue raised during consultations	Proposed Solution	Comments
Education: school fence Responsibility: Village Council of Chiefs	To provide a fence around the school compound	Not a CR issue. Issues in 2007 CIM Plan. Village expressed wish to keep in 2017 CIM Plan
Establishment of small businesses & other income generating activities Responsibility: Village Women's Groups, MWCS D/ SBEC	Promote and support women's income generating activities. Diversify household incomes. Strengthen women's economic role	Not a CR issue. Relevant under Social 'jurisdiction' of MWCS D



Vaega Village Map



Coordinate System: UTM 10S
 Datum: UTM 10S
 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

7. Pitonuu Village Interventions

CIM Plan Solutions

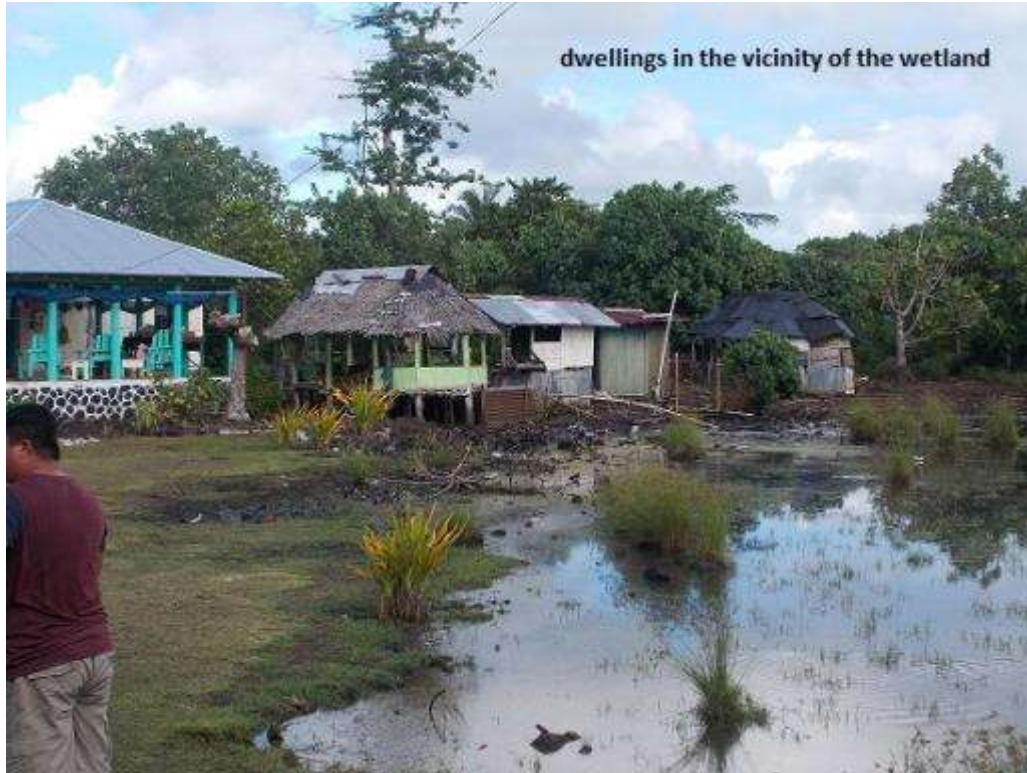
Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant National, Sector Plans and Strategies
Seawall: Main South Coast Rd	<p>Upgrade existing seawall at Pitonuu to protect main coast road</p> <p>Responsibility: LTA, MWTI</p>	<p>Minimise national disaster recovery expenditure on damaged properties, public and private assets</p> <p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Safer villages, houses and road</p>	<p>Utilise Hazard maps and Geomorphologist Drainage Infrastructure Database</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Satupaitea district</p> <p>Programme and budget works</p>	<p>NISP 2011 KESO 5</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
Village houses, churches, school and other village assets located in IFHZ	<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>Minimise expenditure on damaged properties & 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>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>

	<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>Responsibility: Village / Families /MWTI/ MNRE</p>			
Electricity supply	<p>Provide underground 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>Responsibility: EPC/ MWTI/ Village /Families</p>	<p>Maintain electricity supply at all times including natural disasters</p> <p>Avoid accidents from fallen electricity posts.</p>	<p>Monitor distribution networks to avoid overloading poles and contributing to line failures</p>	EPC Strategic Plan
Village pool (Tufofa-tai) upgrade	<p>Raise and repair protective wall of the Tufofa-Tai water spring</p> <p>Support the district level hydrological assessment and</p>			

	<p>watershed management planning initiative to address water and inland flooding related issues</p> <p>Replace old and rusty steel pipes with PEP supplying household water from the intake.</p> <p>Responsibility: IWS/Village/MNRE</p>			
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village pool located in high risk hazard zones (coastal erosion and flooding from fluvial inundation, wave impacts and storm surges)	<p>Village pool is currently in a poor state with an assessment needed for options to rejuvenate and to protect it</p> <p>Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works)</p> <p>Responsibility: CSSP/NGOs/MNRE/Villages</p>	<p>Increase adaptation during drought periods</p> <p>Improve health and sanitation</p> <p>Reduce contamination of water supply</p>	<p>Utilise Hazard Maps and Geomorphologist findings for planning purposes</p> <p>MNRE Water & Sanitation to conduct water testing and analysis of village pool prior to any intervention</p> <p>Update Village bylaws to include managing and maintaining village natural resources</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities</p>	<p>CIM Strategy 2015</p> <p>Water and Sanitation Sector Plan</p> <p>Community Engagement Plan</p> <p>Village Fono Act (Amendment Bill 2016)</p>
Coral reefs, lagoons and inshore fishery	<p>Assess state of the lagoon and coral reef to inform climate resilience planning</p> <p>Regularly collect <i>beche-de-mer</i> to control and avoid any major outbreaks.</p> <p>Responsibility: MAF/Village/</p>	<p>Improved fishery</p> <p>Improved health of coral reefs and inshore habitats</p> <p>Improved coastal protection</p>	<p>MAF Fisheries to provide technical advice</p>	<p>Agriculture Sector Plan 2016-2021</p>
Unsustainable sand mining (commercial and domestic)	<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</p>	<p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Safer villages, houses and roads</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>Village Fono Act (Amendment Bill 2016)</p> <p>Draft Soil Resource Management Bill</p>

	<p>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>Responsibility: MNRE/Village/Families</p>	<p>Reduce impact from coastal erosion</p> <p>Economic benefit for village from sustainable sand mining activities</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>	
Forests and Trees	<p>Carry out the replanting of suitable forest trees and tree crops in erosion-prone areas and along the coastline.</p> <p>Responsibility: Village / Families</p>	<p>Improved protection and resilience of inland and coastal resources and infrastructure</p> <p>Both inland and coastal infrastructure and community assets protected</p> <p>Sustain essential ecosystem services</p>	<p>Village/Families to recognize the role that vegetation plays in stabilizing coastal areas.</p> <p>Inland and Coastal areas to be planted as soon as possible with suitable species.</p> <p>MNRE to advise on appropriate tree species and where possible, provide seedlings</p>	<p>CIM Strategy 2015</p> <p>Community Sector Plan</p> <p>NESP2017-2020</p> <p>2 million tree strategy</p> <p>NESP</p>
Biodiversity	<p>Eradicate the Myna population affecting village crops.</p> <p>Discourage cultivation on higher elevation and near ridge top areas</p> <p>Responsibility: Village/ MNRE</p>	<p>Protect native biodiversity including endangered endemic bird species</p> <p>Protect Mauga o Salafai National Park</p>	<p>MNRE DEC to provide technical advice</p> <p>Links with Watershed Management Planning exercise</p> <p>MNRE Forestry to provide advice on species and provide seedlings, and possible training on propagation techniques</p>	<p>NESP 2018 - 2022</p>
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Food security	<p>Plant drought resistant and less cyclone prone root crops such as taro, yams (ufi) and other similar crops.</p> <p>Encourage organic farming and the planting of mixed planting systems (trees and crops) to promote ecological stability and soil protection.</p>	<p>Enhances food security and resilience</p> <p>Improve disease resistance and sustains land productivity</p> <p>Improve fisheries for healthy diets, and possible household income</p>	<p>MAF to advice on other crops and methods of cultivation</p> <p>MNRE Forestry's Community Forestry Program providing seedlings and technical advice on agroforestry and woodlots</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>NESP 2017-2020</p> <p>Community Sector Plan</p>

	<p>Encourage women’s initiatives in vegetable gardening</p> <p>Initiate measures to improve and sustain coastal and inshore fisheries.</p> <p>Responsibility: MAF/MNRE/Village/NGOs</p>	sources		
Health	<p>Fence pigs to protect water sources and to beautify the village.</p> <p>Test water quality on a regular basis</p> <p>Responsibility: IWS MOH/Village/ District Water Committee</p>	<p>Reduce soil erosion</p> <p>Improved health</p>	<p>Liaise with MOH Water testing program</p>	<p>Community Sector Plan</p> <p>Health Sector Plan</p>
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
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 Nuu to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Responsibility: MWCS D /Village</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>



Pitonuu Village Map



8. Mosula 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</p>	<p>Minimise expenditure on damaged properties & 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>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>

	villagers to get the appropriate permits and consent Responsibility: Village / Families /MWTI/ MNRE			
Electricity supply	Provide underground lines in the long term Install and connect power supply for inland residents Relocate overhead lines to a more resilient location when being replaced Install streetlights along the roads where needed for community safety Install and connect to solar power supply if made available Families to limit building and developments near electricity posts Responsibility: EPC/ MWTI/ Village /Families	Maintain electricity supply at all times including natural disasters Avoid accidents from fallen electricity posts.	Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan
Water Supply	Fence off the spring eye/reservoir to protect from stray animals Responsibility: Village /Families/MWCSD IWSA/CSSP	Increase adaptation during drought periods Improve health and sanitation Reduce contamination of water supply	Update Village bylaws to include managing and maintaining village natural resources Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities	Village Fono Act(Amendment Bill 2016) NESP 2018 - 2022
Environment and Natural Resources	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Village pool located in high risk hazard zones (coastal erosion and flooding from fluvial inundation, wave impacts and storm surges)	Village pool is currently in a poor state with an assessment needed for options to either rejuvenate or find a new site depending on the location of springs Test the quality of the water source before	Increase adaptation during drought periods Improve health and sanitation Reduce contamination	Utilise Hazard Maps and Geomorphologist findings to inform location and design MNRE Water & Sanitation to conduct water testing and analysis of village pool prior to any	CIM Strategy 2015 Water and Sanitation Sector Plan Community Engagement Plan Health Sector Plan

	any further investment on the pool is undertaken (eg: fence/repair works) Responsibility: MoF-CSSP/ MNRE/Villages	of water supply	intervention Update Village bylaws to include managing and maintaining village natural resources Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities	Village Fono Act (Amendment Bill 2016)
Coral reefs, lagoons and inshore fishery	Assess status of coral reef, lagoon and inshore fishery to inform climate resilience planning Responsibility: MAF-Fisheries	Improved fishery Improved health of coral reefs and inshore habitats Improved coastal protection	MAF Fisheries to provide technical advise	Agriculture Sector Plan 2016-2021
Management of Land Resources	Raise awareness and support of sustainable land use practices. Responsibility: MNRE-Land Management, MAF	Improved knowledge	MNRE Land Management to assist	NESP 2018 - 2022
Forests and Trees	Replant catchment areas with local species such as tava, and poumuli Responsibility: Village /MNRE	Reduced risk of slips and erosion Improved resilience of catchments	MNRE Forestry to advise on appropriate species and provide seedlings	Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Biodiversity	Eradicate or control the myna bird population and other invasive bird species (Pacific pigeon) Responsibility: MNRE-DEC	Protect native birds	MNRE DEC to provide technical advice and support	NESP 2018 - 2022
Governance	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	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	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies	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	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

	<p>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>Responsibility: MWCSD /Village</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>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	
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Non-CR issues raised during consultations	Proposed Solution	Comments
Village Work Road	To upgrade including paving the remaining section of the work road up to the Reservoir; Construct drainage culverts at appropriate places under and across the village work road; To extend electricity coverage to families further inland of the village work road; To replace distribution water pipe from the reservoir to increase water pressure	Not a CR issue - The village work road provides important access to plantations and agricultural areas inland as well as the water reservoir. The road is outside the coastal hazard zones and may be encroaching onto the watershed management riparian buffer zone.

Mosula Village Map



Savaii AF Districts Overview Map of Coastal Inundation Zones

