Community Integrated Management Plan

Anoama'a West District - Upolu



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 Anoama'a West (Saoluafata, Fusi, Salelesi, Eva, Solosolo, Luatuanu'u and Leusoali'i villages).

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

Representative:	Signature:
Saoluafata Village	
Mao Peter Rasch	Anne (anous)
• Lesila Vili	Suchi (sur Tamarra
Pati Vili	Pile.
Vaivao Viliamu	Vaivas Vilam

Fusi Village

Faifai Lemo	Fagai A
Kalala Lauie	Kalula Lacic
Fuatavai Euta	Bastans
Talaifaga Vise	There,
Savea Lene Solofa	Stayed

Salelesi Village

- Asa Michael Leausa
- Togi Savea
- Peka Sogialofa
- Sikione Tamate
- Faaga Paulo Teniteni Vui

Tolopata.

Eva Village

- Leusu Seumanutafa
- Sina Leota
- Matamea Faafetai
- Seumanututusa Tavita
- Gafataumalo Ike

De (Automa)

Shutala

Church

Solosolo Village

- Ilaoa Tuua
- Vainiu Seinafo
- Savea Sio
- Peni Too

Hoor Juna

Worken . 5.

SAUSO Sio

Jan.

Luatuanuu Village

Autu Lolesio

Helecis (Anoun)

Tuafasa Alofae

Lulepson-

Malaga Simone

MalagaSimone

• Malaga Aukusitino

Malaga Aukustino

• Valentine Junior M.

Maragas Colombe Minter

Leusoalii Village

Malauia Afa

Andrewin Ha

Auloto Anosi

allune.

Faleafa Amuula

ERIGE.

Peni Too

Far.

Ana Mulitalo

Columnia

The Government of Samoa adopts the Community Integrated Management Plan for the Faipule District of Anoama'a West 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	
CC	Community Based Fisheries Management Plan 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
IAS	Invasive Alien Species
IG	Implementation Guideline
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
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
	Samoa Infrastructure Asset Management
SIAM	State of Environment Report
SOER	
	Samoa Water Authority
SOER	
SOER SWA	Samoa Water Authority
SOER SWA	Samoa Water Authority United Nations Development Programme Global Environment Facility Small

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.

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.

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. second) food insequrity). The concept of stability can therefore refer to both

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

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

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

1.2 The Aim of the CIM Plan

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

The CIM Plan will:

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

1.3 Structure of the Plan

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

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

2. Implementation Guidelines

2.1 Purpose of the Implementation Guidelines

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

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

2.2 Duration of the Plan

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

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

2.3 Financing of the Plan

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

- proposed development is in general accordance with the objectives of the CIM Strategy 2015;
- development is specifically recommended in the CIM Plan
- number of people that will benefit from the development, i.e. population benefit
- development will provide *life sustaining* support for communities
- minimum or neutral environmental effects
- · development will improve resilience
- development will achieve speedy recovery
- development will reduce risk
- also identified as a priority in other Sector Plans or National Strategies

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

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

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

3. Description of Anoama'a West District

3.1 Physical and Natural Resource Setting

The Faipule District of Anoama'a West is located on the north-eastern coast of the island of Upolu, to the east of Apia. It includes the villages of Saoluafata, Fusi, Salelesi, Eva, Solosolo, Luatuanu'u and Leusoali'i. The average annual rainfall varies with the district receiving above the national average for rainfall. Landuse make up is open forest, secondary forest and plantation. The narrow flat coastal plateau has small areas of houses positioned close to the coast main road and short set back from the coastline. Inland from the coast the landscape is described as hills, steep-lands and intervening valleys. The district has mainly wet climate including small areas with moderate dry season near the coast (Dews, 2017).

The Anoama'a east and west districts are characterised by a series of steep headlands with bays in between. The bays vary in length with the larger bays providing the setting for the villages of the Districts. The hilly and steep nature of the topography provides some protection for the natural vegetation although this also makes the villages highly vulnerable to flooding from upland rivers and streams. Short, fast flowing rivers and streams flow through most of the villages draining the steep catchments behind. The main river running through this district is the Namo River. The coast of Anoama'a West is exposed to the north and east and the steep land behind the villages restricts relocation options for the main infrastructure. There is no significant area of sheltered lagoon. Beaches in the bay areas are made up of a mixture of fine coral sand, unbroken, dead coral and fine, black, river sand near the mouths of the main rivers.

The reef systems are mostly broken opposite the rivers and streams and from past volcanic activity that have left rocky outcrops offshore. Where there is a coral reef it is generally less than 500 m offshore. There is evidence of beach erosion mostly towards the eastern ends of the bays with erosion occurring at the western end of the bays. The exception to this is at Solosolo where there is accretion at the western end of the bay. Most of the beaches are "protected" by existing seawalls but these are not always located in the best place to protect against erosion and are structurally weak (Reti, 2017).

The construction of seawalls in many places in the Anoama'a districts has resulted in the complete removal of some littoral vegetation which had originally provided better protection from soil erosion as opposed to the newly constructed seawalls. In some places of the Anoama'a west district, the seawalls have created more erosion problems for other places that had not experienced such problem before. Furthermore, because the seawalls were built without solid foundations, many of them are already collapsing and creating more problems for the district (Reti, 2017). In Eva for instance, the tidal stream and the main East Coast Road crossing with the effect of a seawall has created problems for the drainage system and stream alignment for Eva and a sand spit has extended due to longitudinal drift (Townsend, 2017).

The main East Coast Road runs through the Anoama'a West district. This road is considered to be **highly** susceptible because there is no alternative access along the East Coast. The main road acts as a barrier to flood waters prolonging recovery. Drainage under the road is not adequate for the volume of flood waters. There are 5¹ access roads² and several tracks within this district.

At the Anoama'a west district, village activities are dominated by plantation work on the tops of the headlands and inland hills. Fishing is restricted because the coast is generally exposed and reef and lagoon fishing opportunities are limited. Wetland areas along the Anoama'a west coast at Saoluafata and Fusi are **moderately** susceptible to a variety of hazards including flooding and erosion from the sea, encroachment from new development and contamination from adjacent land-use activities. Risk of flooding at Solosolo is considered to be **moderate to high**. Wetland areas have formed at Saoluafata and Fusi but these have generally been cleared of natural vegetation and village houses have developed around them. Some erosion has occurred along the coast at the outlet of the wetland (Reti, 2017).

Inland development is limited by steep land immediately behind the villages. Plantation and agricultural areas are generally located on the tops of the headlands and hills that run down to the coast at some distance from the villages. The lowland and upland forest areas of Anoama'a east and Anoama'a west are comprised mainly of disturbed secondary forests dominated by village plantations (mainly coconuts) and cattle grazing. The existence of

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¹ Eva Access Road, Fusi Road, Solosolo-uta Road, Leuosoalii Access Road and Luatuanuu Access Road

² LTA Samoa Infrastructure Asset Management Database

inland settlements with their own agricultural development needs exacerbate the land clearing problem. Wind damage by cyclones Ofa and Val in 1990 and 1991 respectively are still evident in high areas and the merremia vine has taken over most of the open areas. The tamaligi paepae (*Paraserianthes falcataria*) is common on exposed inland slopes and roads of Anoama'a west making them extremely vulnerable to strong winds. The species have lateral root systems and can be easily blown over by strong winds which sometimes result in land slips and soil erosion (Reti, 2017).

Most of the beaches are protected by existing seawalls but these are not always located in the best place to protect against erosion. The villages are located on flat areas of alluvial deposits in the larger bays. These deposits vary in height above sea level with drainage and flooding being a problem in the eastern villages of Saoluafata, Fusi, Salelesi and Eva but less of an issue for Solosolo, Luatuanu'u and Leusoali'i. These villages are affected more by landslips which cut off the East Coast Road during extreme weather events.

3.2 Social and Economic Setting

The Anoama'a West District currently has a population of 4,996. Total male 2,571, female 2,425³. The villages vary in size. The largest are Saoluafata⁴ and Solosolo⁵ while the most spread out are Luatuanu'u and Leusoali'i There are four primary schools⁶ in the district with the main district school, Anoama'a College, servicing both Anoama'a West and Anoama'a East, located at Saoluafata.

The main East Coast Road is considered an important part of the district's infrastructure and is in good condition. This road is sealed along its entire length and has numerous bridges and fords crossing the rivers and streams in the District. It is the lifeline access for districts located at the most eastern tip of Upolu commuting to Apia. It is also the same road used by the Anoama'a West residents to access the hospital at Lufilufi. This same East Coast Road runs all the way to the west, connecting to the Apia CBD where the majority of residents travel to sell their local produce. At Saoluafata, Fusi and Eva the East Coast Road has been relocated outside the CEHZ and as far to the back of the CFHZ as topography and existing coastal development will allow. At Salelesi, Luatuanu'u and Leusoali'i the road passes along the shoreline in both the CEHZ and CFHZ, while at Solosolo it cuts across the CEHZ behind most of the village. Between the villages it follows the coast at the base of the headlands and cliffs that separate them. In these areas the road is in the CLHZ at the base of the headland cliffs.

Primary services such as power and telephone generally follow the main road and are at **moderate** risk and susceptibility to flood and erosion damage Consistent and clean water supply is a concern for a number of villages, especially communities that live away from existing pipelines. A recent survey⁷ of 25 districts from Upolu and Savaii recorded Anoama'a West as the highest district with poor water supply⁸. Anoama'a West is serviced through an independent water scheme reservoir.

The main economic activities for the District are those in Apia, which provides significant employment opportunities for people in the District. The CDCRM survey recorded Anoama'a West with 35.5% of its total population earning income from salaries. This is the highest for all districts surveyed. A number of small stores are located throughout the District in each of the villages. Village activities are dominated by plantation work on the tops of the headlands and inland hills. Fishing is restricted because the coast is generally exposed and reef and lagoon fishing opportunities are limited. The three livelihood zones that occur in Anoama'a West are: coral reef and lagoon system that supports fisheries including mangroves; small household farming plots close to the houses along the narrow coastal areas; and Upland forest area used for plantations and selective timber products mainly for carving or artifacts (Dews, 2017).

³ SBS 2016 Village profile: census preliminary count 2016

⁴ Population = 825

⁵ Population = 1,851

⁶ Luatuanuu Primary School, Salelesi Primary School, Saoluafata Primary School and Solosolo Primary School

⁷ GEF-UNDP EWACC/DMO. 2017. Community Disaster and Climate Risk Management (CDCRM) Household Survey - Final Report

⁸ 166 families had either no access or non consistent access to clean water

3.3 Climate Risk and Resilience

The use of LiDar mapping data, hydrologist and geomorphologist data and findings for this district has helped determine inland and coastal hazard zones and high risk areas for Anoama'a West.

For the entire district there is about 9,097 hectares of land. There are approximately 1,036 buildings in the district. About 14.39 hectare is in the Tsunami shore exclusion zone (Red zone) and 22 buildings are in this zone. There are 352 buildings within the CFHZ and CEHZ. These buildings need to be relocated or have their floors reinforced and raised above flooding level. Part of the district is also covered by the Coastal Landslip Hazard Zone and about 22 buildings of the district are in this hazard zone. There are 394 buildings within the district that is in the Watershed Management Riparian Zone. The Watershed Management Riparian Zone is a 20m buffer on either side of the river banks. Healthy riparian areas are vital to the health of stream ecosystems and the entire watershed as well. Many of the threats to rivers and streams are directly related to physical changes to these areas and loss of vegetation. This district is prone to landslips and it is therefore recommended that a topographic and geomorphological assessment be carried out first if construction of any infrastructure is proposed within this buffer zone. To mitigate inland flooding, the culverts and drainage need to be improved. There are approximately 12 rivers running through this district which is exacerbating landslips.

4. Anoama'a West District Interventions

CIM Plan Solutions

CIM Plan Solu				_
Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Slope stabilization and road armouring to avoid landslips and erosions in most high risk hazard zones	Implement slope stabilization or 'forced collapse' under controlled conditions at most vulnerable landslide areas of Anoama'a West as identified in the Vulnerability Assessment of the Samoa Road Network report Reduce sediment loads and loss of top soil by discouraging farming on steep slopes and keeping	Improve infrastructure resilience and rate of recovery Climate proof national road network Improve preparedness and readiness response to natural disasters Reduce impact	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs Implement Anoama'a West District Integrated Catchment Strategy and Flood Management Plan in conjunction with Geomorphologist Drainage Infrastructure Database findings Develop an integrated land management plan with the	CIM Strategy 2015 Transport Sector Plan 2014-2019 Goal 2 NISP 2011 (KESO 5 D&E)
	livestock in areas away from wetlands and watershed sites Government, Village and landowners to liaise and	from coastal erosion and landslides Maintain lifeline access for all of	aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area	
	collaborate on processes needed to protect upland catchment area, riverbanks from land clearing and developments	Upolu Safer villages, houses and roads Minimise national disaster recovery	Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama'a West district	
	Responsibility: LTA/MWTI/ MNRE/ Villages	expenditure on damaged properties, public and private assets	Include in budget programming CBA, design and construction Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Parts of main East Coast Road exposed to extremely high risk ⁹ hazard	Continue to upgrade roads, upsize ocean outfalls and improve drainage systems at junctions of main road and	Improve infrastructure resilience and rate of recovery	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs	CIM Strategy 2015 NISP 2011 KESO 5 TSP 2014-2019 Goal
zones	Solosolo uta Rd, Eva Access Road, Fusi Saoluafata and Manunu Roads to increase regulation of water flow and reduce flooding onto roads in extremely high risk hazard zones in	Improve preparedness and readiness response to natural disasters Reduce impact	Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama'a West district Designation of the IFHZ, CEHZ	2 KO 1

 $^{^9}$ Extremely high risk is where there is a combination of 4 hazard zones. High risk areas is where there is a combination of 2 or 3 hazard zones

	accordance with	from coastal	and CFHZ as an "at risk" zone	
	accordance with Vulnerability Assessment of	from coastal erosion and	with appropriate landuse	
	the Samoa Road Network	natural disasters	planning controls and	
	recommendations	ilatui ai uisastei s	restrictions	
	recommendations	Maintains lifeline	restrictions	
	Assess and upgrade	access for all of		
	approved access roads	Upolu		
	to include adequate sized	орога		
	culverts	Safer villages,		
	carveres	houses and roads		
	Implement regular			
	drainage inspection and	Minimise national		
	maintenance	disaster recovery		
		expenditure on		
	Enforce environmental	damaged		
	safeguards where	properties and		
	reclamations are proposed.	public assets		
	Government and district to			
	manage processes by			
	requiring villagers to get			
	the appropriate permits			
	and consent			
	Responsibility: LTA/			
	MWTI/ MNRE/ District/			
Flandtastian	Village /Families	Minimi	Conduct of Coll cotal cont	CIM Charles 2015
Flood protection measures for	Upgrade waterways	Minimise expenditure on	Conduct a full catchment management, drainage	CIM Strategy 2015
fords and bridges	Upgrade all crossings	damaged	analysis and geotechnical	TSP 2014-2019 Goal
lorus and bridges	opgrade an crossings	properties &	engineering survey and use	2 KO 1
	Upgrade or repair	personal assets	its recommendations to	21101
	riverine embankment	F	inform location and designs	Vulnerability
	protection work	Mitigate potential	S	Assessment of the
	upstream of Leusoali'i,	damage from	Implement Anoama'a West	Samoa Road
	Luatuanu'u, Eva, Solosolo	inland flooding	Integrated Catchment Strategy	Network (2016)
	and Fusi		and Flood Management Plan in	and Road Network
		Reduce flooding of	,	Adaptation
	Ensure river channel	built up areas	and Geomorphologist Drainage	Strategy, LTA
	upstream is cleared and		Infrastructure Database	
	maintained regularly	Maintains lifeline	findings	
		access for all of		
	Construct levees to	Upolu	Utilise environmental and	
	reduce flooding along	C - f 11	social safeguards including	
	estuaries and coastal	Safer villages, houses and roads	EIAs in screening and	
	streams	nouses and roads	designing infrastructure facilities	
	Install advisory edge		iacilities	
	markers and depth		Develop an integrated land	
	markers to warn vehicle		management plan with the	
	and pedestrians at all		aim of reducing any	
	crossings		unnecessary actions that may	
	, and the second		adversely affect the natural	
	Government and Villages		habitats and ecosystems of	
	to liaise and collaborate on		the area	
	processes needed to			
	protect riverbanks from		Include in budget	
	land clearing and		programming CBA, design and	
	developments		construction.	
	Decreased the Paragon /		Designation of the IFHZ as an	
	Responsibility: MWTI/		"at risk" zone with appropriate	
	LTA/MNRE/ District/		landuse planning controls and	
	Village			

			restrictions	
Drainage systems require maintenance and upgrade in high risk areas of main East Coast Road	Assess and upgrade culverts and cross drainage on main East Coast Road especially at junctions with access roads sitting within combined hazard zonesin accordance with Vulnerability Assessment of the Samoa Road Network recommendations Introduce new and widen existing culverts in wetland areas to improve tidal flow and fish passage in the wetland area Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance District to regulate developments near and around waterways and drainage connecting to main East Coast Road Responsibility: LTA	coastal families to relocate inland Maintains lifeline access for all of	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)" Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Anoama'a West District Develop and register District/Village bylaws to include maintenance of	
	/MWTI/MWCSD/ District/Village/ Families		drainages and illegal rubbish dumping into waterways	2012
Village houses, schools, churches and government assets in extremely high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and	CIM Strategy 2015 National Building Code

	I			
	immediate hazard zones;		restrictions	
	for example, raise floor levels of houses in flood			
	prone areas			
	profic areas			
	Families and village to			
	limit building and			
	developing on natural			
	overland flow paths exacerbating inland			
	flooding and storm water			
	surges			
	Surges			
	Responsibility: Village /			
	Families /MWTI/			
	MNRE/ MWCSD			
Reticulated	Extend the water supply to	Increase	Develop and register	CIM Strategy 2015
water supply,	families inland with no	adaptation during	District/Village bylaws to	7A7-4 J
quality and network to be	access to water	drought periods	include regulating developments around	Water and Sanitation Sector
improved		Improve	catchment areas and	Plan
improved		infrastructure	boreholes	1 1011
	Procure rainwater	resilience and		SWA 10 Year
	harvesting systems for	rate of recovery	Implement SWA (2016)10	Investment Plan
	vulnerable families as a		year investment plan to	(2016)
	short term solution	Improve health	improve water supply	
		and sanitation	network to support all inland	Community
		_	families without access to	Engagement Plan
	District and village to	Reduce	drinking water	
	support SWA water	contamination of		
	rationing programmes	water supply	Include in budget programming design, and	
	during times of drought	Reduce impact	extension costs of water	
		from inland	supply and procurement of	
		flooding	rainwater harvesting systems	
	District to support SWA		raminates many esting systems	
	efforts at exploratory		Utilise hazard maps and	
	boreholes in district		Geomorphologist findings to	
			inform location and designs	
			Hele C : M / (1)	
	District and villages to		Utilise Sui o Nu'u monthly	
	District and villages to support SWA efforts at		meetings to monitor progress of village programmes and	
	protecting and conserving		responsibilities	
	boreholes, intakes and			
	catchment areas			
	Responsibility: SWA/			
	MWCSD/MNRE/			
	District/ Village/ CSSP			
Coastline	Assess and strengthen	Improve	Undontalia a Cast Dan - Ct	CIM Strategy 2015
protection:	part of seawalls in most	infrastructure	Undertake a Cost Benefit	
upgrade	high risk areas to reduce	resilience and rate	Analysis to weigh options for funding	TSP2014-2019 Goal
seawalls at	vulnerability of road and	of recovery	iuiiuiiig	2 KO 1
most high risk	other critical village	D 1 .	Incorporate environmental	D 60 35
hazard zones	assets in accordance with	Reduce impact	and social safeguards	Draft Soil Resource
	Vulnerability Assessment	from coastal	concerns in the design and	Management Bill
	of the Samoa Road Network	erosion	undertake consultations with	
	recommendations	Safer villages,	affected communities	
	recommendations	Saidi Filiages,		

	Clear debris from existing culverts near seawalls to enable free outflow of storm water and streams Research the impacts of sand mining Village consultation on sand mining policy and regulation Enforce environmental social safeguards where reclamations, sand mining, extraction or other major coastal works are proposed. Government and village to manage processes by requiring villagers to get the appropriate permits and consent Responsibility: LTA/Village/MNRE/MWTI	houses and roads Minimise expenditure on damaged properties & personal assets	Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	
Access/work roads require maintenance and upgrade as it exacerbates flooding onto main East Coast Road	Assess and upgrade access/work roads as potential escape routes Construct roadside drainage ditches where needed Implement routine maintenance of the roads and clear any debris obstructing the free flow of surface water runoff Village to regulate developments near and around road shoulders of all access roads Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent Responsibility: LTA/MWTI/MNRE/Villages/Families		Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs 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 Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama'a West district	National Disaster Management Plan 2017-2021 CIM Strategy 2015 TSP 2014-2019 Goal 2 KO 1 Community Sector Plan

Electricity supply	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/	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
Natural	MWTI/ Village/Families Best Solutions	Benefits	Guideline to assist with the	Relevant Sector
Resources and Environment	Dest solutions	Benefits	Implementation	Plans, National Strategies & Policies
Restoration and conservation of upland forest	Protect ridge-top habitats and forests from indiscriminate cultivate and other developments Replant native forestry species of the upland forests to restore resilience and ecological function Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area District/village to help promote the development of the agroforestry sector by encouraging relevant land use practice and where possible resolve any associated land disputes Responsibility: MNRE//MWCSD/ District /village/CSSP	Reduce impact from inland flooding Improve preparedness and readiness response to natural disasters Safer villages, houses and roads	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Anoama'a West District MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village Develop and register District/Village bylaws to include penalizing illegal deforestation in district lands Utilise Sui o Nu'u monthly meetings to monitor progress of district/village forestry programmes	Community Engagement Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Protection of catchment areas	Promote and support agroforestry and other cropping systems that combine trees and crops,	Reduced risk of slips and erosion Improve	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for	Water Sector Plan Community Engagement Plan

	especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area	resilience of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of water supply	Anoama'a West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas	Restoration Operational Plan 2016-2020
	Replant catchment areas with local species such as tava, and poumuli Responsibility: MNRE/ /SWA/District/Village/			
Soft coastal protection measures needed for most vulnerable areas	CSSP/GEF-SGP Plant native species along coastal areas to strengthen	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops	NESP 2017-2021 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Flood protection measures (soft solution to support flood protection measures for infrastructure)	Conduct riparian replanting along river channels and watercourses Encourage planting of indigenous species in conjunction with engineered water land drainage action plans Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood	Mitigate potential damage from inland flooding Reduce flooding of built up areas Safer villages, houses and roads	Implement Integrated Watershed/Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and designs MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation	Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

	prone areas			
	Responsibility: MNRE/ Villages			
Wetland and mangrove area conservation	Undertake an assessment of tidal flow necessary to maintain a healthy natural environment Limit land clearance and developments adjacent to wetland areas Continue to plant native species along coastal areas to reduce erosion and landslips. To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed Village to fence off domestic animals Responsibility: MNRE / Village /CSSP/ UNDP-GEF	Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from inland flooding	Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Implement wetland and mangrove protection programme Identify funding /budget requirements and implementation programme for establishment of protected areas in district	Draft NESP 2017-2021 Community Engagement Plan
Illegal rubbish dumping in wetlands, coastal areas, riverbanks and roadsides within fluvial hazard zones	Produce posters and village signs for public awareness Introduce ban on illegal rubbish dumping in district especially around fluvial hazard zones Conduct campaign for public awareness of district ban and establish a "neighbourhood watch" agreement with district to monitor and report on illegal dumping activities Government, district and villages to monitor, report and apply penalty on offenders Responsibility: MNRE/District/Village/CSSP	Improve health and sanitation Reduce leachate into environment and water supply Reduce contaminant from overland flooding entering sea	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 Utilise Waste Management Act/Legislation to guide process of effecting the 'polluter pays' principle Develop and register District/Village bylaws to include penalizing illegal rubbish dumping in district lands Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes on waste management	National Waste Management Strategy National Waste Management Policy Draft NESP 2017- 2021 Community Engagement Plan
Sand mining	Identify alternative sustainable sources of sand for domestic use Research the impacts of sand mining	Mitigate potential damage from coastal erosion and flooding accommodating the hazard	MNRE to continue to identify specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks	Draft Soil Resource Management Bill
	Village consultation on sand mining policy and	Safer villages, houses and roads	Undertake assessments of identified sites	

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	regulation Village and government to collaborate closely on designated areas for sand/rock mining Raise awareness and support of sustainable land use practices	Reduce impact from coastal erosion Economic benefit for village from sustainable sand mining activities	Undertake consultation with villages affected by proposed sand/rock mining Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers	
	Responsibility: MNRE/ Village/Families		Utilise Sui o Nu'u monthly meetings to monitor progress of CIM Plan activities	
Effluent and wastewater management systems	Introduce ban on latrines established in and around fluvial hazard zones Families in fluvial hazard	Increase adaptation during extreme weather events	057	National Waste Management Strategy
	zones to install proper septic waste disposal systems Implement district/ village	Improve infrastructure resilience and rate of recovery	District/Village bylaws to include regulating developments and latrines in IFHZ and areas susceptible to flooding	
	drainage cleanup and awareness programme Produce posters and village signs for public	Improve health and sanitation Reduce contamination of	Utilise Hazard maps and Geomorphologist findings to inform location	
	awareness Responsibility: MNRE/ MWCSD/ District/ Village	water supply	Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes on waste management	
Livelihood and Food Security	Best Solutions	Benefits	Implementation	Relevant Sector Plans National Strategies & Policies
Plantations, crops and plants threatened by changes in climate, inland flooding and inadequate soil for planting	Promote and facilitate planting of rootcrops (i.e yams, sweet potato) which are more resilient to cyclones, droughts and floods Promote agroforestry and	clean water and waste management Improve recovery to create more	Agriculture sector to provide best practice management guidelines for the management of water that allows for levels of contamination to be kept to minimum MNRE Forestry, DEC and MAF	Agriculture Sector Plan 2016-2021 Two Million Tree Strategy 2015-2020 Restoration Operational Plan
	mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and	Improve preparedness and readiness response to natural disasters	to collaborate on supply of climate resilient crops and plants MAF to provide trainings, awareness raising on crop	2016-2020
	diseases Implement the Integrated Pest Management Programme Implement Sustainable	naturai uisasters	diversification to suit prolonged impacts of climate change and support in supply of nursery trees, technology and infrastructure to have a sustainable mechanism for replanting	
	Land Management (SLM) practices Conduct pilot site trials for climate ready plant		MAF to assist in establishment of pilot sites to trial climate ready plant varieties and provide advice,	

	varieties		seedlings and planting material for village/families	
			as a trial	
	Responsibility: MAF/ MNRE/village		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	
			MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village	
Pest management; invasive plants and animals	Implement an eradication programme to eradicate, contain or exclude invasive species Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken Conduct education and awareness programmes on the impacts of invasive species Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources	Maintains natural ecosystem Builds resilience of community livelihood and food security	Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to raise awareness of farmers on impacts to water flows from poor livestock management MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly Training for farmers on pests management particularly affecting fruit trees and crops	Agriculture Sector Plan 2016-2021 Samoa's National Invasive Species Action Plan (NISAP)
	animals Responsibility: Villages /District/ MNRE/MAF/ SROS			

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 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: MWCSD /MNRE /Village	all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to	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

Anoama'a West District Map

ANOAMA'A WEST DISTRICT



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

3. Saoluafata Village Interventions

CIM Plan Solutions

Drainage systems to be improved in high risk areas		Best Solutions	Benefits	Guideline to assist with the	Relevant Sector
systems to be improved in and access roads in district of negative specially at a discusser sorads in district of response and punctions of East Coast road and Fusion South State and Manunu Roads No of storm water and converse method the Samoa Road Network recommendations Introduce culverts in wetland areas to improve tidal flow and fish passage in the wetland area Introduce culverts in wetland area Village to conduct regular drainage inspection and maintenance Village to conduct regular drainage and waterway clearance behind homes Government to regulate developments and illegal rubbis hd dumping near and around waterways and drainage connecting to East Coast Road Village houses, Church and government assets in extremely high risk hazard zones such as CEIIZ and CFHZ CHIZ Village houses, Church and government some such as CEIIZ and CFHZ CHIZ Village houses, Church and government with high risk hazard zones such as CEIIZ and CFHZ CHIZ Village houses, Church and government spiks hazard zones such as CEIIZ and CFHZ CHIZ Village houses, Church and government controls to restrict developments within high risk hazard zones when re-building practices and designs on finod resilience and rate of response and recovery to maintain processing the financial process and social safeguards including ElAs in screening and designing built environment infrastructure projects for Anoama'a West district Undertake a Cost Benefit Analysis to weigh options for financial provisions to be guited by the Planning and designing built environment processors and legal rubbish dumping into waterways Village houses, Church and government such properties and properties and properties and properties and designs for at risk communities fiving in and area with properties and properties	Infrastructure	Dest Solutions	Delients		Plans, National Strategies & Policies
Willage houses, church and government assets in extremely high risk hazard zones Develop landuse planning and developments within high risk hazard zones within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Wespenditure on damaged properties and personal assets Safer villages, houses and roads awareness for insurance Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Include maintenance of drainages and illegal rubbish dumping into waterways Planning provisions to be guided by the Planning and Urban Management Act 2004 National Building Code 2017 Safer villages, houses and roads significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone	systems to be improved in high risk areas especially at junctions of East Coast road and Fusi Saoluafata and Manunu	upgrade culverts on main and access roads in district to facilitate the overland flow of storm water and reduce flooding - in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Introduce culverts in wetland areas to improve tidal flow and fish passage in the wetland area Implement regular drainage inspection and maintenance Village to conduct regular drainage and waterway clearance behind homes Government to regulate developments and illegal rubbish dumping near and around waterways and drainage connecting to	resilience of infrastructure resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate inland Maintains lifeline access for all of Upolu Minimises national disaster recovery expenditure on damaged properties, public	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform design Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)" Develop Integrated Catchment Strategy and Flood Management Plan for Anoama'a West District Undertake a Cost Benefit Analysis to weigh options for funding Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama'a West district Develop and register	Strategies & Policies CIM Strategy 2015 NISP 2011 KESO 5 TSP 2014-2019 Goa 2 KO 1 Community Sector Plan
Village houses, church and government assets in extremely high risk hazard zones Develop landuse planning and development controls to restrict developments within high risk hazard zones within high risk hazard zones Ochique assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to Relocate assets outside of high risk hazard zones when re-building expenditure on damaged properties and properties and properties and properties and properties and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone		MWTI/MNRE/MWCSD		include maintenance of drainages and illegal rubbish	
Language and the transfer of the state of th	church and government assets in extremely high risk hazard	high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to	expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone	National Building

Access/work roads (Saoluafata - Solaua, Manunu, Sauniatu) require maintenance and upgrade as it exacerbates flooding onto main East Coast Road and exacerbate river /ford overruns	immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Responsibility: Village / Families / MWTI / MNRE / MWCSD Assess and upgrade access/work roads as potential escape routes Construct roadside drainage ditches where needed Implement routine maintenance of the roads and clear any debris obstructing the free flow of surface water runoff Village to regulate developments near and around road shoulders of all access roads Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent Responsibility: LTA/ MWTI/ MNRE/	Minimise national disaster recovery expenditure on damaged properties and public assets	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs 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 IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama'a West district	National Disaster Management Plan 2017-2021 CIM Strategy 2015 TSP 2014-2019 Goal 2 KO 1 Community Sector Plan
Electricity supply	Villages/Families Provide underground lines in the long term	Maintain electricity supply at all times	Monitor distribution networks to avoid overloading poles and	EPC Strategic Plan
	Install and connect power	including natural disasters	contributing to line failures	
	supply for inland residents Relocate overhead lines to a	Avoid accidents from fallen electricity posts		
	more resilient location when being replaced			
	Install streetlights along the			

Coastline protection: seawall upgrade and maintenance	Install and connect to solar power supply if made available Families to limit building and developments near electricity posts Responsibility: EPC/MWTI/ Village/Families Assess and strengthen part of seawall in relevant area only to reduce vulnerability of road and other critical assets in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Clear debris from existing culverts near seawalls and waterways to enable free outflow of storm water and streams into sea Where reclamations, sand mining, extraction or other major coastal works are proposed, Government and village to manage processes by requiring villagers to get the appropriate permits and consent Responsibility: MNRE/Village/Families/CSSP/MWTI/LTA	Improve infrastructure resilience and rate of recovery Reduce impact from coastal erosion Safer villages, houses and roads Minimise expenditure on damaged properties & personal assets	Undertake a Cost Benefit Analysis to weigh options for funding Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama'a West district Develop and register Village bylaws to include banning of sand mining and illegal rubbish dumping in waterways and drains Utilise Sui o Nu'u monthly meetings to monitor progress of village replanting and clean up programmes	CIM Strategy 2015 TSP 2014-2019 Goal 2 KO 1 Community Sector Plan
Natural Resources and	Best Solutions	Benefits	Implementation	Relevant Sector Plan National Strategies &
Environment Wetland area	Doggonah massa ana sisa fasa 1	Duotoota and		Proft NESD 2017
Wetland area conservation	Research new species found in mangrove area Undertake an assessment of tidal flow necessary to maintain a healthy natural	Protects and enhance local species diversity Sustains ecosystem services and	MNRE DEC to provide technical assistance and backstopping in the development of a Wetland Management Plan for Anoama'a West District	Draft NESP 2017- 2021 Community Engagement Plan
	environment Limit land clearance and	functions Reduce	Identify funding /budget requirements and implementation programme	
	developments adjacent to wetland areas	contamination of water supply	to continue protection of mangrove/wetland areas in district	
	Continue to plant native species along coastal areas to reduce erosion and landslips. To act as an effective wave barrier, a	Reduce impact from inland flooding		

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	minimum distance of 200m of vegetation is needed			
	or vegetation is needed			
	Village to fence off			
	domestic animals foraging in wetland areas			
	iii wedana areas			
	Responsibility: MNRE /			
	Village /CSSP/ UNDP-GEF			
	SGP/ MWTI			
Water supply	Village and relevant	Improve health	Develop and register	CIM Strategy 2015
from Independent	authorities to conduct water		District/Village bylaws to	211 1 2 1 1 1 1 2 1 1 1 1 2 1 1 1 1 1 1
Water Scheme	quality tests on a regular	_	include regulating	Water and
(IWS)/ village	basis	Reduce	developments around rivers, streams and water catchment	Sanitation Sector
reservoir dirty: affected by	Introduce ban on illegal	contamination of water supply	streams and water catchment	Plan
flooding and	rubbish dumping in district	water supply	Develop Integrated Catchment	Community
unsustainable	especially around fluvial	Reduce impact from	Strategy and Flood Management	Engagement Plan
land practices	hazard zones	inland flooding	Plan for Anoama'a West district	Community Sector
	Enforce Watershed	Improve	Develop an integrated land	Plan
	Management Riparian Zone	preparedness and	management plan with the aim	-
	and Riverbank	readiness response	of reducing any unnecessary	
	Encroachment Control and	to natural disasters	actions that may adversely	
	regulate agricultural developments around the	Safer villages,	affect the natural habitats and ecosystems of the area	
	upland forest area	houses and roads	ecosystems of the area	
	·		Utilise Sui o Nu'u monthly	
	Limit land clearance and		meetings to monitor progress of	
	agricultural development around intake and		village programmes and responsibilities	
	boreholes		responsibilities	
	District to support SWA			
	efforts at exploratory			
	intakes and boreholes in			
	district			
	Responsibility: IWS/			
	MNRE/ SWA/MWCSD/ District/ Village			
Soft coastal	Re-stock existing nursery	Soft coastal	Develop an integrated land	NESP 2017-2021
protection		protection	management plan for	
measures	Plant native species along	measures will	Anoama'a West district with	Two Million Tree
needed for most vulnerable areas	coastal areas to strengthen existing seawall and to	support and	the aim of reducing any	Planting Strategy 2015-2020
vuillerable areas	reduce coastal erosion and	strengthen existing and new	unnecessary actions that may adversely affect the natural	ZU15-ZUZU
	landslips; Talie, Fetau, Toa,	infrastructure	habitats and ecosystems of the	Restoration
	Togatogo are known to have	along the coast	area	Operational Plan
	greater resilience to natural disasters and changing	Padua impact fram	MAF to assist in establishment	2016-2020
	climate conditions	Reduce impact from coastal erosion and	of pilot sites to trial climate	
		natural disasters	ready plant varieties	
	To act as an effective wave			
	barrier, a minimum distance of 200m of vegetation is	implements an	MNRE Forestry, DEC and MAF	
	needed	Ecosystem Based Approach	to collaborate on supply of climate resilient crops	
		FF 33011		

	Responsibility: MNRE/ MAF/Villages		Utilise PD3 to inform location for planting/replanting	
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Pest management; invasive plants and animals affecting taro plantations	Implement an eradication programme to eradicate, contain or exclude invasive species Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken Conduct education and awareness programmes on the impacts of invasive species Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources Responsibility: Villages/District/ MNRE/MAF/ SROS	Builds resilience of community livelihood and food security	Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to raise awareness of farmers on impacts to water flows from poor livestock management MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly Training for farmers on pests management particularly affecting fruit trees and crops	Agriculture Sector Plan 2016-2021 Samoa's National Invasive Species Action Plan (NISAP)

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 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: MWCSD	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	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 issues raised during	Proposed Solution	Comments
consultations		
New diseases found in domestic	Village to seek assistance of	Not a CR issue
animals Responsibility: Village	veterinarian	
/NGOs		



Saoluafata Village Map

SAOLUAFATA VILLAGE



Coordinate System: GCS WGS 1984

Datum: WGS 1984 Units: Degree Data Source: Ministry of Natural Resource and Environment, Samoa Map Production: Spatial & DRM Specialist, Adaptation Fund - Enhancing Resilience of Coastal Communities of Samoa to Climate Change Project

4. Fusi Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	the Implementation	Relevant National, Sector Plans and Strategies
Village houses, schools, churches and government assets in extremely high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015
	Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges			
	Responsibility: Village / Families /MWTI/ MNRE/ MWCSD			
Drainage systems require maintenance and upgrade in high risk areas of main East Coast Road	Assess and upgrade culverts and cross drainage especially at junction with Fusi Saoluafata access road sitting within combined hazard zones- in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Introduce new and widen	Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate inland	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)" Undertake a Cost Benefit	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Community Sector Plan
	existing culverts in wetland areas to improve tidal flow and fish passage in the wetland area Implement national	Maintains lifeline access for all of Upolu Minimises	Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with	

	standards for culverts and	national disaster	affected communities	
	drains to facilitate the	recovery	anected communities	
	overland flow of storm	expenditure on	Apply for necessary permits	
	water and reduce flooding	damaged	as required by law	
		properties,		
	Implement regular	public and	Utilise hazard maps and	
	drainage inspection and	private assets	Geomorphologist	
	maintenance		Infrastructure Drainage	
	District to accordate		Database to inform designs	
	District to regulate developments near and		Develop Integrated Catchment	
	around waterways and		Strategy and Flood	
	drainage connecting to		Management Plan for	
	main East Coast Road		Anoama'a West District	
	Responsibility: LTA		Develop and register	
	/MWTI/MWCSD/		District/Village bylaws to	
	District/Village/Families		include maintenance of	
			drainages and illegal rubbish	
Flood protection	Upgrade waterways	Minimise	dumping into waterways Conduct a full catchment	CIM Strategy 2015
measures for	opgrade waterways	expenditure on	management, drainage	om suategy 2013
	Upgrade all crossings	damaged	analysis and geotechnical	TSP 2014-2019 Goal 2
	- F8-1111 111 11 11-18-11-8-	properties &	engineering survey and use	KO 1
	Upgrade or repair riverine	personal assets	its recommendations to	
	embankment protection		inform location and designs	Vulnerability
	work upstream of Fusi	Mitigate		Assessment of the
		potential	Implement Anoama'a West	Samoa Road Network
	Ensure river channel	damage from	Integrated Catchment Strategy	
	upstream is cleared and	inland flooding	and Flood Management Plan	Network Adaptation
	maintained regularly	Dodygo flooding	in conjunction with hazard	Strategy, LTA
	Construct levees to reduce	Reduce flooding of built up areas	Maps and Geomorphologist Drainage Infrastructure	
	flooding along estuaries	or built up areas	Database findings	
	and coastal streams	Maintains	2 acasas comunings	
		lifeline access	Utilise environmental and	
	Install advisory edge	for all of Upolu	social safeguards including	
	markers and depth		EIAs in screening and	
	markers to warn vehicle	Safer villages,	designing infrastructure	
	and pedestrians at all	houses and roads	facilities	
	crossings		Develop an integrated land	
	Government and Villages to		management plan with the	
	liaise and collaborate on		aim of reducing any	
	processes needed to protect		unnecessary actions that	
	riverbanks from land		may adversely affect the	
	clearing and developments		natural habitats and	
			ecosystems of the area	
	Responsibility: MWTI/			
	LTA/MNRE/ District/		Include in budget	
	Village		programming CBA, design and construction.	
			and construction.	
			Designation of the IFHZ as an	
			"at risk" zone with	
			appropriate landuse planning	
			controls and restrictions	

Natural	Best Solutions	Benefits	Guideline to assist with the	Relevant Sector Plans.
Resources and Environment	2000001110	20110110	Implementation	National Strategies & Policies
Sand mining	Identify alternative sustainable sources of sand for domestic use Research the impacts of sand mining Village consultation on sand mining policy and regulation Village and government to collaborate closely on designated areas for sand/rock mining Raise awareness and support of sustainable land use practices	coastal erosion and flooding accommodating the hazard Safer villages, houses and roads Reduce impact from coastal erosion Economic benefit for village from sustainable sand mining	MNRE to continue to identify specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks Undertake assessments of identified sites Undertake consultation with villages affected by proposed sand/rock mining Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers	Management Bill
	Responsibility: MNRE/ Village/Families	activities	Utilise Sui o Nu'u monthly meetings to monitor progress of CIM Plan activities	
Flood protection measures (soft solution to support flood protection measures for infrastructure)	Conduct riparian replanting along river channels and watercourses Encourage planting of indigenous species in conjunction with engineered water land drainage action plans Promote and support village and district afforestation in the upper and mid- catchment areas to reduce riverbank failures especially in flood prone areas Responsibility: MNRE/	Mitigate potential damage from inland flooding Reduce flooding of built up areas Safer villages, houses and roads	Implement Anoama'a West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and designs MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation	Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016- 2020
Soft coastal protection measures needed for most vulnerable areas	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 To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an	Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on	NESP 2017-2021 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020

	Responsibility: MNRE/ MAF/Villages	Ecosystem Based Approach	supply of climate resilient crops	
			Utilise PD3 to inform location for planting/ replanting	
Livelihood and Food Security	Best Solutions	Benefits	-	Relevant Sector Plans, National Strategies & Policies
Pest management; invasive plants and animals	Implement an eradication programme to eradicate, contain or exclude invasive species Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken Conduct education and awareness programmes on the impacts of invasive species Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources District to fence domestic animals Responsibility: Villages/District/MNRE/MAF/SROS	Maintains natural ecosystem Builds resilience of community livelihood and food security	Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to raise awareness of farmers on impacts to water flows from poor livestock management MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly Training for farmers on pests management particularly affecting fruit trees and crops	Agriculture Sector Plan 2016-2021 Samoa's National Invasive Species Action Plan (NISAP)

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 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: MWCSD /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 issues raised	Proposed Solution	Comments
during consultations		
Funding to procure	Village to seek financial assistance	Not a CR issue. Potential for MAF financing if
fencing for domestic	from other sources	fencing is related to agricultural initiatives
animals		
Responsibility:		
Village/NGOs		



Fusi Village Map

FUSI VILLAGE



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. Salelesi Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant National, Sector Plans and Strategies
Village houses, schools, churches and government assets in extremely high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Responsibility: Village / Families /MWTI/ MNRE/MWCSD	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Access/work roads require maintenance and upgrade as it exacerbates flooding onto main East Coast Road	Assess and upgrade access/work roads as potential escape routes Construct roadside drainage ditches where needed Implement routine maintenance of the roads and clear any debris obstructing the free flow of surface water runoff Village to regulate developments near and around road shoulders of all access roads	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties and	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs 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 Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	National Disaster Management Plan 2017-2021 CIM Strategy 2015 NISP 2011 KESO 5 TSP 2014-2019 Goal 2 KO 1 Community Sector Plan

	Enforce environmental	public assets		1
	safeguards where	public assets		1
	reclamations are proposed.		Utilise environmental and	
	Government and district to		social safeguards including	
	manage processes by		EIAs in screening and	
	requiring villagers to get the		designing built	
	appropriate permits and		environment infrastructure	
	consent		projects for Anoama'a West	
	Decree 21.11 A.T.A./		district	
	Responsibility: LTA/ MWTI/ MNRE/ Villages			
	/Families			
Coastline	Assess and strengthen part	Improve	H. I. I. C. (D. C.	CIM Strategy 2015
protection:	of seawalls in relevant	infrastructure	Undertake a Cost Benefit Analysis to weigh options	
upgrade	areas to reduce	resilience and	for funding	TSP 2014-2019 Goal 2
seawalls at	vulnerability of road and	rate of recovery	Tor runuing	KO 1
most high risk	other critical village assets	3.6	Incorporate environmental	D 6.6.1D
hazard zones	in accordance with	Maintains	and social safeguards	Draft Soil Resource
	Vulnerability Assessment of the Samoa Road Network	natural ecosystem	concerns in the design and	Management Bill
	recommendations	connectivity	undertake consultations	
	100000000000000000000000000000000000000	Commediate	with affected communities	
	Clear debris from existing	Reduce impact	Apply for necessary	
	culverts near seawalls to	from coastal	permits as required by law	
	enable free outflow of storm	erosion		
	water and streams	Safer villages,	Utilise hazard maps and	
	Research the impacts of	houses and roads	Geomorphologist	
	sand mining	nouses and roads	Infrastructure Drainage	
	Sand mining	Minimise	Database to inform designs	
	Village consultation on sand	expenditure on	Develop and register	
	mining policy and	damaged	District/Village bylaws to	
	regulation	properties &	include maintenance of	
	- 4	personal assets	drainages and illegal	
	Enforce environmental		rubbish dumping into	
	social safeguards where reclamations, sand mining,		waterways	
	extraction or other major			
	coastal works are proposed.			
	Government and village to			
	manage processes by			
	requiring villagers to get the			
	appropriate permits and			
	consent			
	Responsibility: MNRE/			
	Village /Families/MWTI			
Upgrade village	Upgrade pool fence	Increase	Utilise Hazard Maps and	CIM Strategy 2015
pool	Tark the small City	adaptation during	Geomorphologist findings to	Matanan I C '' ''
	Test the quality of the	drought periods	inform location and design	Water and Sanitation Sector Plan
	water source before any investment on the pool is	Improve health	MNRE Water & Sanitation	Sector Fidil
	undertaken (eg:	and sanitation	to conduct water testing	Community Engagement
	fence/repair works)		and analysis of village pool	Plan
	, -	Reduce	prior to any intervention	
	Responsibility: CSSP/	contamination of		
F	NGOs/ MNRE/Village	water supply	E.C. CAT.	M C ID:
Evacuation Shelter and a	Assess and/or select location for either an	Improve resilience	Enforcement of National	National Disaster
connected escape	existing or new evacuation	of public infrastructure	Building Code 2017	Management Plan 2017-2021
route needed for	shelter, including safe	mm asci uccui e	Utilise hazard maps and	4011-4041
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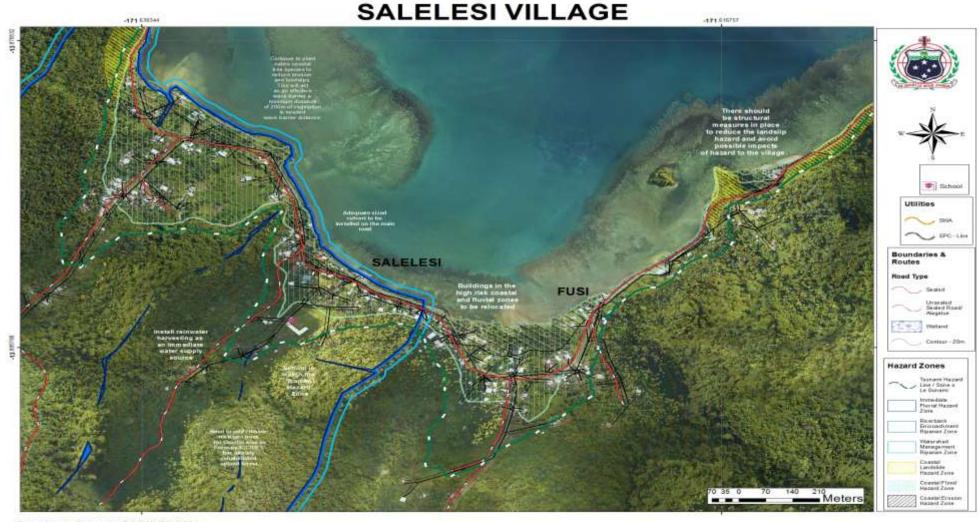
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emergency preparedness	access routes to the shelter	preparedness	Geomorphologist findings to inform location and designs	National Building Code
and response	Conduct evacuation shelter assessment and mark on CIM Plan hazard maps		J	National Policy for People with Disabilities
	-	natural disasters		NISP 2011 KESO 5
	Develop a Village Climate Disaster Management Plan (VCDMP)			
	Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies			
	Implement CDCRM program			
	Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters			
	Where no suitable houses exist, build emergency shelter(s) outside the hazard zones			
	Retrofit identified and approved schools or churches outside hazard			
	zones and designate as evacuation shelter			
	Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of			
•••	Churches/MWCSD	- CI		
Natural	Best Solutions	Benefits	Guideline to assist with the	Relevant Sector Plans, National Strategies &
Resources and Environment			Implementation	Policies
Restoration and conservation of upland forest	Re-stock existing nursery with appropriate trees	Protects and enhance local species diversity	MNRE Forestry to advice on appropriate species, depth and density of	Community Engagement Plan
	Protect ridge-top habitats		planting and provide	Two Million Tree
	and forests from indiscriminate cultivate and	Sustains ecosystem services	seedlings for different vegetation types suitable to	Planting Strategy 2015- 2020
	other developments	and functions	the habitats and planting materials for village	Restoration
	Replant native forestry	Reduced risk of	.	Operational Plan 2016-
	species of the upland forests to restore resilience and	slips and erosion	Develop and register District/Village bylaws to	2020
	ecological function	Reduce	include penalizing illegal deforestation in district	
	Enforce Watershed Management Riparian Zone	contamination of water supply	lands	
	and Riverbank Encroachment Control and	Reduce impact	Utilise Sui o Nu'u monthly	
	regulate developments	from inland flooding	meetings to monitor progress of district/village	
	around the upland area	noounig	forestry programmes	
		Improve		

	District/village to help promote the development of the agroforestry sector by encouraging relevant land use practice and where possible resolve any associated land disputes **Responsibility: MNRE/**	preparedness and readiness response to natural disasters Safer villages, houses and roads	Utilise PD3 to inform location for planting/ re- planting	
	/MWCSD/ District /Village/CSSP			
Protection of catchment areas	Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli Responsibility: MNRE//SWA/District/Village/CSSP/GEF-SGP	Reduced risk of slips and erosion Improve resilience of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of water supply	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Anoama'a West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas Utilise PD3 to inform location for planting/ re- planting	Water Sector Plan Community Engagement Plan Restoration Operational Plan 2016-2020
Soft coastal protection measures needed for most vulnerable areas	Plant native species along coastal areas to strengthen	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters Implements an Ecosystem Based Approach	Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops	NESP 2017-2021 Two Million Tree Planting Strategy 2015- 2020 Restoration Operational Plan 2016- 2020

Sand/rock extraction (domestic): coastline, rivers and riverbanks	Identify alternative sustainable sources of sand/rocks for domestic use Research the impacts of sand mining Village consultation on sand mining policy and regulation Village and government to collaborate closely on designated areas for sand/rock mining Raise awareness and support of sustainable land use practices Responsibility: MNRE/	Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads Reduce impact from coastal erosion Economic benefit for village from sustainable sand mining activities	MNRE to continue to identify specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks Undertake assessments of identified sites Undertake consultation with villages affected by proposed sand/rock mining Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers Utilise Sui o Nu'u monthly meetings to monitor	Draft Soil Resource Management Bill
	Village/Families		progress of CIM Plan activities	
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 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 Responsibility: MWCSD /Village	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	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



Salelesi 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. Eva Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant National, Sector Plans and Strategies
Village houses, schools, churches and government assets in extremely high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Responsibility: Village / Families / MWTI / MNRE / MWCSD	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Upgrade 'Eva' causeway on main East Coast Road	Upgrade or repair riverine embankment protection work upstream of Eva and Luatuanu'u Ensure river channel upstream is cleared and maintained regularly Construct levees to reduce flooding along estuaries and coastal streams Install advisory edge markers and depth markers to warn vehicle and pedestrians at all crossings	Minimise expenditure on damaged properties & personal assets Mitigate potential damage from inland flooding Reduce flooding of built up areas Safer villages, houses and roads Maintain lifeline access for Upolu	Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs Implement Anoama'a West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and design Utilise environmental and social safeguards including EIAs in screening and	CIM Strategy 2015 TSP 2014-2019 Goal 2 KO 1 Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA

Eva Access Road: extend into	Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments *Responsibility: MWTI/LTA/MNRE/ District/Village* Conduct feasibility study using hazard maps and geomorphologist database	Improve preparedness and readiness	designing infrastructure facilities Include in budget programming CBA, design and construction. Bridge/causeway and road designs to take account of forecast changes in sea level rise and local flooding from increased rainfall intensity Designation of the CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to	National Disaster Management Plan 2017-2021
mountainside	to inform location and	response to	inform location and design	2017 2021
as potential	design	natural disasters		Community Sector Plan
escape route and to facilitate	Enforce environmental	Safer villages,	Include in budget programming CBA, design	
relocation	safeguards where	houses and roads	and construction	
inland	reclamations are proposed. Government and district to	Minimise national	Designation of the IFHZ,	
	manage processes by	disaster recovery	CEHZ and CFHZ as an "at risk" zone with appropriate	
	requiring villagers to get the appropriate permits and	expenditure on damaged	landuse planning controls	
	consent	properties and	and restrictions	
	Responsibility: MNRE	public assets		
	/MWCSD/ District/ Village /Families/MWTI			
Evacuation Shelter and a	Assess and/or select location for either an	Improve resilience of public	Enforcement of National Building Code 2017	National Disaster Management Plan
connected escape route needed for	existing or new evacuation shelter, including safe	infrastructure	Utilise hazard maps and	2017-2021
emergency preparedness	access routes to the shelter	Improve preparedness	Geomorphologist findings to inform location and designs	National Building Code
and response	Conduct evacuation shelter	and readiness		National Policy for
	assessment and mark on CIM Plan hazard maps	response to natural disasters		People with Disabilities
	Develop a Village Climate Disaster Management Plan (VCDMP)			
	Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies			
	Implement CDCRM program			
	Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters			

Reticulated water supply, quality and network to be improved	Where no suitable houses exist, build emergency shelter(s) outside the hazard zones Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD Extend the water supply to families inland with no access to water Procure rainwater harvesting systems for vulnerable families as a short term solution District to support SWA efforts at exploratory boreholes in district District and villages to support SWA efforts at exploratory boreholes, intakes and catchment areas	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA (2016)10 year investment plan to improve water supply network to support all inland families without access to drinking water Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems Utilise hazard maps and Geomorphologist findings to inform location and designs	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan (2016) Community Engagement Plan
Electricity	Responsibility: SWA/ MWCSD/ MNRE / District/ Village/ CSSP Install streetlights along	Maintain	Monitor distribution	EPC Strategic Plan
supply	the roads where needed for community safety Relocate overhead lines to a more resilient location when being replaced Provide underground lines in the long term	electricity supply at all times including natural disasters Avoid accidents from fallen electricity posts	networks to avoid overloading poles and contributing to line failures	S
	Install and connect to solar power supply if made available Responsibility: EPC /MWTI/ Villages			

Upgrade	Extend wall of pool to	Increase	Utilise Hazard Maps and	CIM Strategy 2015
village pool	cover exposed area from	adaptation during drought periods	Geomorphologist findings to inform location and design	Water and Sanitation
	flooding	diougnit perious	illioi ili locatioli aliu desigli	Sector Plan
	Research installation of a	Improve health	MNRE Water & Sanitation	300001 1 1411
	facility to store water	and sanitation	to conduct water testing	Community
	from village pool as		and analysis of village pool	Engagement Plan
	backup supply for village	Reduce	prior to any intervention	
	Took the quality of the	contamination of	Hadata Willaga bulayya ta	
	Test the quality of the water source before any	water supply	Update Village bylaws to include managing and	
	investment on the pool is		maintaining village natural	
	undertaken (eg:		resources	
	fence/repair works)			
	Responsibility: CSSP/			
	NGOs/ MNRE/Village			
	ridos, rintel, rinage			
Natural ₋	Best Solutions	Benefits	Guideline to assist with the	
resources and				National Strategies and Policies
Environment Sand/rock	Identify alternative	Mitigate potential	MNRE to continue to identify	
extraction	sustainable sources of	damage from	specific sites for	Management Bill
(domestic):	sand/rocks for domestic	coastal erosion	inshore/inland sustainable	
coastline, rivers	use	and flooding	sand/rock mining to meet	
and riverbanks		accommodating	demand without	
	Research the impacts of	the hazard	compromising riverbanks	
	sand mining	Safer villages,	Undertake assessments of	
	Village consultation on sand		identified sites	
	mining policy and			
	regulation	Reduce impact	Undertake consultation with	
	17:11	from coastal	villages affected by proposed	
	Village and government to collaborate closely on	erosion	sand/rock mining	
	designated areas for	Economic benefit	Develop and register District	
	sand/rock mining	for village from	bylaws to include managing	
		sustainable sand	and monitoring domestic	
	Raise awareness and	mining activities	sand/rock mining of rivers	
	support of sustainable land			
	use practices			
	Responsibility: MNRE/			
	Village/Families			
Soft coastal	Re-stock existing nursery	Soft coastal	Develop an integrated land	NESP 2017-2021
protection		protection	management plan for	m =
measures needed	•	measures will	Anoama'a West district with	Two Million Tree
for most vulnerable areas	coastal areas to strengthen existing seawall and to	support and strengthen	the aim of reducing any unnecessary actions that	Planting Strategy 2015-2020
vuillerable alleas	reduce coastal erosion and	existing and new	may adversely affect the	2013-2020
	landslips; Talie, Fetau, Toa,	infrastructure	natural habitats and	Restoration
	Togatogo are known to have	along the coast	ecosystems of the area	Operational Plan
	greater resilience to natural			2016-2020
	disasters and changing	Reduce impact	MAF to assist in	
	climate conditions	from coastal erosion and natural	establishment of pilot sites to trial climate ready plant	
	To act as an effective wave	disasters	varieties	
	barrier, a minimum distance			
	of 200m of vegetation is			

	needed Responsibility: MNRE/ MAF/Villages	Implements an Ecosystem Based Approach	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient plants Utilise PD3 to inform location for planting/ re-	
Livelihood and	Best Solutions	Benefits	planting Guideline to assist with the	
Food Security			Implementation	National Strategies & Policies
Pest management; invasive plants and animals	Research new type of vegetation found in river near bridge) and seas of Eva Implement an eradication programme to eradicate, contain or exclude invasive species Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken Conduct education and awareness programmes on the impacts of invasive species Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources Responsibility:	Maintains natural ecosystem Builds resilience of community livelihood and food security	Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to raise awareness of farmers on impacts to water flows from poor livestock management MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly Training for farmers on pests management particularly affecting fruit trees and crops	Agriculture Sector Plan 2016-2021 Samoa's National Invasive Species Action Plan (NISAP)
	Villages/District/ MNRE/MAF/ SROS			
Plantations, crops and plants threatened by changes in climate, inland	Promote and facilitate planting of rootcrops (i.e yams, sweet potato) which are more resilient to cyclones, droughts and	Improve recovery to create more resilient villages	Utilise Hazard Maps and Geomorphologist findings to inform location and design	Agriculture Sector Plan 2016-2021 Two Million Tree Strategy 2015-2020
flooding and inadequate soil for planting	floods		Agriculture sector to provide best practice management guidelines for the management of water that	Restoration Operational Plan 2016- 2020

Promote agroforestry and mixed planting including fruit trees species to promote ecological stability, soil protection and reduce crop vulnerability to pests and diseases

Implement the Integrated Pest Management Programme

Implement Sustainable Land Management (SLM) practices

Conduct pilot site trials for climate ready plant varieties

Responsibility: MAF/ MNRE/village Improve preparedness and readiness response to natural disasters allows for levels of contamination to be kept to minimum

MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops and plants

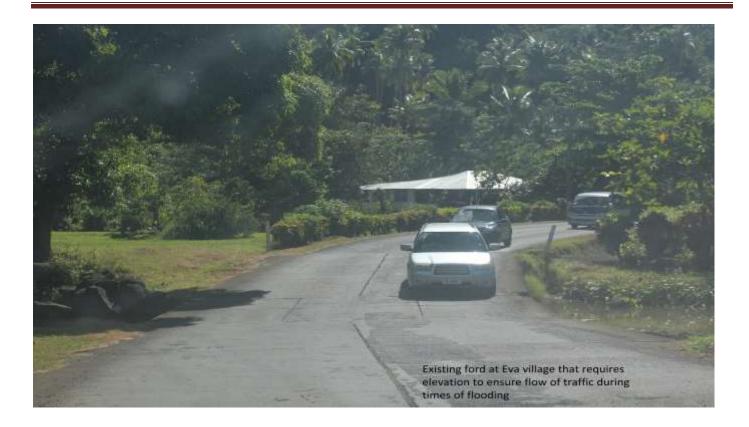
MAF to provide trainings, awareness raising on crop diversification to suit prolonged impacts of climate change and support in supply of nursery trees, technology and infrastructure to have a sustainable mechanism for replanting

MAF to assist in establishment of pilot sites to trial climate ready plant varieties and provide advice, seedlings and planting material for village/families as a trial

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

MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village

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 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 Responsibility: MWCSD /Village	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	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





Eva Village Map

EVA VILLAGE



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

7. Solosolo Village Interventions

CIM Plan Solutions

Access/work roads require maintenance and upgrade as it exacerbates flooding and to be used as potential escape route More and upgrade as it exacerbates flooding and to be used as potential escape route More and upgrade as it exacerbates flooding and to be used as potential escape route More and upgrade as it exacerbates flooding and to be used as potential escape route More and upgrade as it exacerbates flooding and to be used as potential escape route More and upgrade as it exacerbates flooding and to be used as potential escape route More and upgrade as it exacerbates flooding and to be used as potential escape route More and upgrade as it exacerbates flooding and to be used as potential escape route More and upgrade as it exacerbates flooding and to be used as potential escape route More and upgrade as it exacerbates flooding and to be used as potential escape route More and upgrade as it exacerbates flooding and to be used as potential escape route More and upgrade as it exacerbates flooding and to be used as potential escape route More and upgrade as it exacerbates flooding and to be used as potential escape route More and upgrade as it exacerbates flooding and to to include adequate sized culverts to facilitate the overland flow of storm water exacerbating river overruns, and to reduce flooding onto main roads and village lands Minimise national disasters flooding and uppropriate land to an analy unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Minimise national disaster recovery expenditure on damaged properties and public assets Minimise national disasters flooding and vallage lands Minimise national disasters flooding and eracines from coastal erosion and natural habitats and ecosystems of the area Minimise national disasters flooding and eracines from coastal erosion and natural habitats and ecosystems of the area Minimise national disasters flooding and eracines from coastal erosion and natural habitats and ecosystems of the area floodi	ESO 5 19 Goal 2 Sector
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district to manage processes Utilise Sui o Nu'u monthly	
larr no arrivina a rrilla acora to acot	
by requiring villagers to get meetings to monitor	
the appropriate permits and progress of village cleanup	
consent and awareness programmes	
Responsibility: LTA/	
MWTI/ MNRE/ District/	
Village /Families/CSSP	
Village houses, Relocate assets outside of Minimise Planning provisions to be CIM Strategy	
church and high risk hazard zones expenditure on guided by the Planning and government when re-building damaged Urban Management Act 2004 National Buil	2015
assets in properties and	
extremely high Develop landuse planning personal assets Enforcement of National	2015 ding Code
risk hazard and development controls Building Code 2017	
zones to restrict developments Safer villages,	
within high risk hazard houses and roads Encourage insurance of significant investments and	
CFHZ Increases assets within hazard zones	
awareness for	

Coastline protection: seawall upgrade and maintenance	campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Responsibility: Village / Families / MWTI / MNRE / MWCSD Assess and strengthen part of seawall in relevant area only to reduce vulnerability of road and other critical assets in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Clear debris from existing culverts near seawalls and waterways to enable free outflow of storm water and streams into sea Where reclamations, sand mining, extraction or other major coastal works are proposed, Government and village to manage processes by requiring villagers to get the appropriate permits and consent Responsibility: MNRE/ Village /Families/ CSSP/	Improve infrastructure resilience and rate of recovery Reduce impact from coastal erosion Safer villages, houses and roads Minimise expenditure on damaged properties & personal assets	Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama'a West district Develop and register Village bylaws to include banning of sand mining and illegal rubbish dumping in waterways and drains Utilise Sui o Nu'u monthly meetings to monitor progress of village replanting and clean up programmes	CIM Strategy 2015 TSP 2014-2019 Goal 2 KO 1 Community Sector Plan
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Reticulated	Extend the water supply to	Increase	Develop and register	CIM Strategy 2015
water supply, quality and	families inland with no access to water	adaptation during drought periods	District/Village bylaws to include regulating	Water and Sanitation
network to be	access to water	arought perious	developments around	Sector Plan
improved		Improve	catchment areas and	Sector rian
improvou		infrastructure	boreholes	SWA 10 Year
	Procure rainwater	resilience and		Investment Plan
	harvesting systems for	rate of recovery	Implement SWA (2016)10	(2016)
	vulnerable families as a short term solution		year investment plan to	0 "
	Short term solution	Improve health	improve water supply	Community Engagement Plan
		and sanitation	network to support all inland families without	Eligagement Flan
		Reduce	access to drinking water	
	District and village to	contamination of	access to utiliking water	
	support SWA water	water supply	Include in budget	
	rationing programmes during times of drought	· · · · · · · · · · · · · · · · · · ·	programming design, and	
	during times of drought	Reduce impact	extension costs of water	
		from inland	supply and procurement of	
		flooding	rainwater harvesting systems	
	District to support SWA		Utilise hazard maps and	
	efforts at exploratory		Geomorphologist findings to	
	boreholes in district		inform location and designs	
			morm rocation and acsigns	
			Utilise Sui o Nu'u monthly	
	District and villages to		meetings to monitor	
	support SWA efforts at		progress of village	
	protecting and conserving		programmes and	
	boreholes, intakes and		responsibilities	
	catchment areas			
	Responsibility: SWA/			
	MWCSD/ MNRE / District/ Village/ CSSP			
Evacuation	Assess and/or select	Improve resilience	Enforcement of National	National Disaster
Shelter and a	location for either an	of public	Building Code 2017	Management Plan
connected escape		infrastructure	8	2017-2021
route needed for	shelter, including safe		Utilise hazard maps and	National Building
emergency	access routes to the shelter	Improve	Geomorphologist findings to	Code
preparedness		preparedness	inform location and designs	douc
and response	Conduct evacuation shelter	and readiness		National Policy for
	assessment and mark on CIM Plan hazard maps	response to natural disasters		People with
	CIM Flaii liazai d iliaps	ilaturai uisasters		Disabilities
	Develop a Village Climate			NISP 2011 KESO 5
	Disaster Management Plan			NISI ZUTI KESU S
	(VCDMP)			
	Conduct trainings for			
	People With Disabilities			
	(PWDs) on emergency and disaster response strategies			
	uisastei Tesponse strategies			
	Implement CDCRM			
	program			
	Install relevant signs to			
	guide the community on			
	emergency response			
	procedures and to locations			

	of evacuation shelters			
	Where no suitable houses exist, build emergency shelter(s) outside the hazard zones			
	Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter			
	Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD			
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Protection of catchment areas	Promote and support agroforestry and other cropping systems that combine trees and crops, especially in catchments, and erosion-prone and sensitive areas Limit land clearance and agricultural development around catchment areas, SWA intake and boreholes in district Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area Replant catchment areas with local species such as tava, and poumuli Responsibility: MNRE//SWA/District/Village/CSSP/GEF-SGP	Reduced risk of slips and erosion Improve resilience of catchments Improve preparedness and readiness response to natural disasters Reduce contamination of water supply	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Anoama'a West District Develop and register District/Village bylaws to include penalizing illegal deforestation and developments in upper catchment areas Utilise PD3 to inform location for planting/ re- planting	Water Sector Plan Community Engagement Plan Restoration Operational Plan 2016-2020
Restoration and conservation of upland forest	Continue programme by Forestry on replanting native forestry species of	Protects and enhance local species diversity	Develop Integrated Watershed/Catchment Strategy and Flood	Community Engagement Plan
	the upland forest	Reduced risk of	Management Plan for Anoama'a West District	Water Sector Plan
	Re-stock existing nursery with appropriate trees Responsibility: MNRE-	slips and erosion Reduce impact from inland	MNRE Forestry to advice on appropriate species, depth and density of planting and	Two Million Tree Planting Strategy 2015-2020
	WRD & Forestry/ District /Village/CSSP	flooding	provide seedlings for different vegetation types	Restoration Operational Plan

			suitable to the habitats and planting materials for village	2016-2020
			Utilise PD3 to inform location for planting/ replanting	
Soft coastal protection measures needed for most vulnerable areas	Re-stock existing nursery 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 To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed Responsibility: MNRE/MAF/Villages	Reduce impact from coastal erosion and natural disasters	Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient plants	NESP 2017-2021 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Pest management; invasive plants and animals	Research new type of vegetation found in rivers and seas of Solosolo Implement an eradication programme to eradicate, contain or exclude invasive species Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken Conduct education and awareness programmes on the impacts of invasive species Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Build the capacity of farmers to manage stray		Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to raise awareness of farmers on impacts to water flows from poor livestock management MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly Training for farmers on pests management particularly affecting fruit trees and crops	Agriculture Sector Plan 2016-2021 Samoa's National Invasive Species Action Plan (NISAP)

Local and overseas markets for produce needed	are contaminating water sources Responsibility: Villages /District/MNRE/MAF/ SROS Village to set up agreement with local and overseas markets for produce Responsibility: Villages /NGOS/WIBDI	resilience of community livelihood and food security Improve preparedness and readiness response to natural disasters	MAF and relevant NGOs to Solosolo acquire agreements with local markets (e.g. restaurants etc) and overseas markets for exportation of local produce	Agriculture Sector Plan 2016-2021
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 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 Responsibility: MWCSD /Village	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	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





Solosolo Village Map

SOLOSOLO VILLAGE



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

8. Luatuanu'u Village Interventions

CIM Plan Solutions

LIM Plan Soll		Donofito	Cuidalina to agaist with	Delevent National Costan
Infrastructure	Best Solutions	Benefits	Guideline to assist with	Relevant National, Sector
4 1	** 1 1	*	the Implementation	Plans and Strategies
Access/work	Upgrade and seal	Improve	Utilise hazard maps and	CIM Strategy 2015
roads requires	existing track	infrastructure	Geomorphologist Drainage	
upgrade to		resilience and	Infrastructure Database to	National Disaster
facilitate	Upgrade to include	rate of recovery	inform location and	Management Plan 2017-
relocation inland	adequate sized		designs	2021
and to be used as	culverts to facilitate	Improve		
potential escape	the overland flow of	preparedness	Develop an Integrated	
route	storm water	and readiness	Flood Management Plan	
	exacerbating river	response to	for Anoama'a West	
	overruns, and to	natural disasters	District. MNRE to develop	
	reduce flooding onto		zonation strategy for safe	
	main roads and village	Reduce impact	areas	
	lands	from coastal		
		erosion and	Develop an integrated land	
	Implement regular	natural disasters	management plan with the	
	drainage inspection	naturar disasters	aim of reducing any	
	and maintenance	Safer villages,	unnecessary actions that	
	and manneenance	houses and	may adversely affect the	
	Village to restrict	roads	natural habitats and	
	rubbish dumping into	Tuaus	ecosystems of the area	
	waterways and	Minimise	ecosystems of the area	
	conduct regular	national disaster	Include in budget	
	clearance of rubbish		Include in budget	
		recovery	programming CBA, design	
	behind homes	expenditure on	and construction	
	V:11 t	damaged	Designation of the IFHZ,	
	Village to regulate	properties and	CEHZ and CFHZ as an "at	
	developments near and	public assets	risk" zone with	
	around road shoulders			
	of all access roads		appropriate landuse	
	n .		planning controls and restrictions	
	Enforce environmental		restrictions	
	safeguards			
			Develop and register	
	Where reclamations are		Village bylaws to include	
	proposed, Government		maintenance of drainages	
	and district to manage		and illegal rubbish	
	processes by requiring		dumping into waterways	
	villagers to get the		r 3 12 11 11 11 29 0	
	appropriate permits		Utilise Sui o Nu'u monthly	
	and consent		meetings to monitor	
			progress of village cleanup	
	Responsibility: LTA/		and awareness	
	MWTI/ MNRE/		programmes	
,	District/ Village		programmes	
	/Families/CSSP			

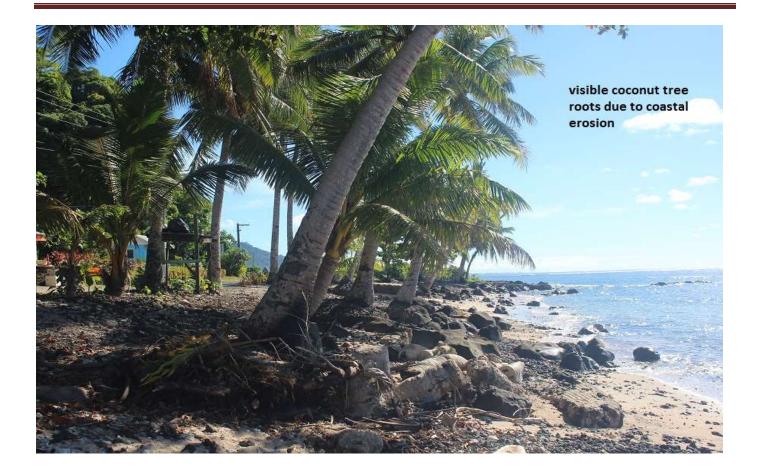
Village houses, schools, churches and government assets in extremely high risk hazard zones Village to seek migrate to due expanding CEF CFHZ Develop landus planning and development of to restrict developments whigh risk hazard such as CEHZ at Conduct awarer raising campaig flood resilient be practices and do for at risk commuliving in and nerisk hazard zon Design infrastrato take into accate immediate zones; for examalise floor level houses in flood areas Families and vill limit building and developing on roverland flow pexacerbating in flooding and stowater surges Responsibility Village / Family MWCSD	expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance ontrols within d zones and CFHZ ness an on ouilding esigns nunities ar high es ructure count hazard inple, els of diprone llage to indinatural paths land orm cities	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
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Drainage systems require maintenance and upgrade in high risk areas of main East Coast Road	Assess and upgrade culverts and cross drainage on main East Coast Road especially at junctions with access roads— in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Introduce new and widen existing culverts in wetland areas to reduce flooding onto nearby village houses	Improves infrastructure resilience and rate of response and recovery to natural hazards and disasters Encourages coastal families to relocate inland Maintains lifeline access for all of Upolu	Use existing information for guidance but not limited to: "Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)" Undertake a Cost Benefit Analysis to weigh options for funding	CIM Strategy 2015 NISP2011 KESO 5 TSP2014-2019 Goal 2 KO 1 Community Sector Plan
	Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance District to regulate developments near and around waterways and drainage connecting to main East Coast Road Responsibility: LTA /MWTI/MWCSD/ District/Village/	Minimises national disaster recovery expenditure on damaged properties, public and private assets	Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop Integrated Catchment Strategy and Flood Management Plan for Anoama'a West District Develop and register District/Village bylaws to	
	Families		include maintenance of drainages and illegal rubbish dumping into waterways	
Coastline protection: upgrade seawalls at most high risk hazard zones	Assess feasibility of extending seawall to protect and reduce vulnerability of road and other critical village assets in accordance with Vulnerability Assessment of the Samoa Road Network recommendations Enforce environmental social safeguards where reclamations, sand mining, extraction or other major coastal works are proposed. Government and village to manage processes by requiring villagers to	Improve infrastructure resilience and rate of recovery Maintains natural ecosystem connectivity Reduce impact from coastal erosion Safer villages, houses and roads Minimise expenditure on damaged properties &	Planning provisions to be guided by the Planning and Urban Management Act 2004 Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Draft NESP 2017-2021

	get the appropriate permits and consent	personal assets		
	•			
	Responsibility: LTA/ Village /MNRE/MWTI			
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Sand mining	Continue ban on sand mining Research on the impacts of sand mining Government to honor village ban on sand mining for commercial purposes Responsibility: MNRE/Village	Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads Reduce impact from coastal erosion	MNRE to continue to identify and undertake assessments of specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks Undertake consultation with villages affected by proposed sand/rock mining Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers	Draft Soil Resource Management Bill
Restoration and conservation of upland forest	Continue programme by Forestry on replanting native forestry species of the upland forest Re-stock existing nursery with appropriate trees Responsibility: MNRE-WRD & Forestry/District / Village/CSSP	Protects and enhance local species diversity Reduced risk of slips and erosion Reduce impact from inland flooding	Develop Integrated Watershed/Catchment Strategy and Flood Management Plan for Anoama'a West District MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village Utilise PD3 to inform location for planting/ re- planting	Community Engagement Plan Water Sector Plan Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Soft coastal protection measures needed for most vulnerable areas	Re-stock existing nursery 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	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters	Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and	NESP 2017-2021 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020

	To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed Responsibility: MNRE/MAF/Villages	Implements an Ecosystem Based Approach	MAF to collaborate on supply of climate resilient plants	
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Pest management; invasive plants and animals	Implement an eradication programme to eradicate, contain or exclude invasive species Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken Conduct education and awareness programmes on the impacts of invasive species Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources District to fence domestic animals Responsibility: Villages/District/MNRE/MAF/SROS	Maintains natural ecosystem Builds resilience of community livelihood and food security	Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to raise awareness of farmers on impacts to water flows from poor livestock management MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly Training for farmers on pests management particularly affecting fruit trees and crops	Agriculture Sector Plan 2016-2021 Samoa's National Invasive Species Action Plan (NISAP)

Strengthen the governance of natural resources and land use through Bylaws to adapt, respond and recover quickly in the long term through Bylaws to control land use implementation of all national sector plans Strengthen district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Strengthen district/village bylaw to protect all district/village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Strengthen district/village bylaw to protect all district/village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Strengthen district/village bylaw to protect all district/village	Governance	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies &
governance of natural resources and land use through 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 divelop bylaws to manage the use of natural resources, and to control land use implementation of all national sector plans implementation of all national sector plans 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 bylaw to protect all district/village on district/village bylaw to protect all district/village on 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 Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws Utilise Sui o Nu'u monthly meetings to monitor progress of district/village and government assets, environment, livelihood and government assets, environment of sector plans Collaborate with Sui o Nu'u monthly meetings to monitor progress of district/village bylaw to protect all district/village bylaw to proventment assets, environment, liveliho				•	Policies
MWCSD /Village	governance of natural resources and land use	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 Responsibility:	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	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	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development





Luatuanu'u Village Map

LUATUANU'U VILLAGE



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

9. Leusoali'i Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant National, Sector Plans and Strategies
Village houses and other assets in extremely high risk hazard zones	Relocate assets outside of high risk hazard zones when re-building Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code
Access/work roads require maintenance and upgrade as it exacerbates flooding onto main East Coast Road	Responsibility: Village / Families / MWTI / MNRE / MWCSD Assess and upgrade access / work roads as potential escape routes Construct roadside drainage ditches where needed Implement routine maintenance of the roads and clear any debris obstructing the free flow of surface water runoff Village to regulate developments near and around road shoulders of all access roads	Improve infrastructure resilience and rate of recovery Improve preparedness and readiness response to natural disasters Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties and	Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform location and designs 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 Designation of the IFHZ, CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	National Disaster Management Plan 2017-2021 CIM Strategy 2015 TSP 2014-2019 Goal 2 KO 1

Flood protection measures for fords and bridges	Enforce environmental safeguards where reclamations are proposed. Government and district to manage processes by requiring villagers to get the appropriate permits and consent *Responsibility: LTA/MWTI/MNRE/Villages/Families* Upgrade waterways Upgrade all crossings Upgrade or repair riverine embankment protection work upstream of	Minimise expenditure on damaged properties & personal assets Mitigate potential	Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Anoama'a West district Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs	CIM Strategy 2015 TSP 2014-2019 Goal 2 KO 1 Vulnerability Assessment of the
	Leusoali'i Ensure river channel upstream is cleared and maintained regularly Construct levees to reduce flooding along estuaries and coastal streams Install advisory edge markers and depth markers to warn vehicle and pedestrians at all crossings Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments Responsibility: MWTI/ LTA/MNRE/ District/ Village	damage from inland flooding Reduce flooding of built up areas Maintains lifeline access for all of Upolu Safer villages, houses and roads	Implement Anoama'a West Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database findings Utilise environmental and social safeguards including EIAs in screening and designing infrastructure facilities 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 Include in budget programming CBA, design and construction. Designation of the IFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA

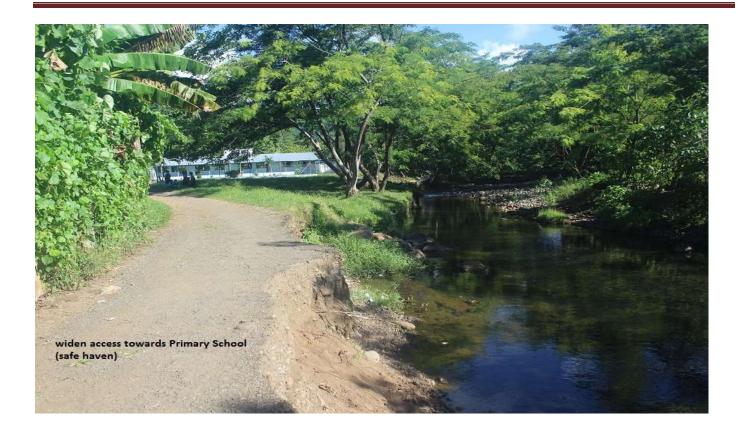
Duninggo	Aggagg and unawada	Imamuorroa	Has switting information for	CIM Chrotogra 2015
Drainage systems require	Assess and upgrade culverts and cross drainage	Improves infrastructure	Use existing information for guidance but not limited to:	CIM Strategy 2015
maintenance	on main East Coast Road	resilience and	"Vulnerability Assessment of	TSP2014-2019 Goal 2
and upgrade in	especially at junctions with	rate of response	the Samoa Road Network	KO 1
high risk areas	access roads sitting within	and recovery to	(2017)"; "Review of National	
of main East	combined hazard zones- in	natural hazards	Road Standards in Samoa	
Coast Road	accordance with	and disasters	(2016)"; "Samoa Code of	
	Vulnerability Assessment of			
	the Samoa Road Network	Encourages	Environmental Practice	
	recommendations	coastal families to	(2007)"	
		relocate inland	Undertake a Cost Benefit	
	Introduce new and widen			
	existing culverts in	Maintains lifeline	Analysis to weigh options for funding	
	wetland areas to reduce	access for all of	rununig	
	flooding onto main road and	Upolu	Incorporate environmental	
	nearby village homes		and social safeguards	
		Minimises	concerns in the design and	
	Implement national	national disaster	undertake consultations with	
	standards for culverts and	recovery	affected communities	
	drains to facilitate the overland flow of storm	expenditure on		
	water and reduce flooding	damaged	Apply for necessary permits	
	water and reduce hooding	properties, public	as required by law	
	Implement regular	and private assets		
	drainage inspection and		Utilise hazard maps and	
	maintenance		Geomorphologist	
			Infrastructure Drainage	
	District to regulate		Database to inform designs	
	developments near and		Develop Integrated Catchment	
	around waterways and		Strategy and Flood	
	drainage connecting to		Management Plan for	
	main East Coast Road		Anoama'a West District	
	Responsibility: LTA		Develop and register	
	/MWTI/MWCSD/		District/Village bylaws to	
	District/Village/ Families		include maintenance of	
			drainages and illegal rubbish	
			dumping into waterways	
Coastline	Assess and strengthen part	Improve	Planning provisions to be	CIM Strategy 2015
protection:	of seawalls in most high	infrastructure	guided by the Planning and	mapaaaa aaaa a la
upgrade	risk areas to reduce	resilience and	Urban Management Act 2004	TSP2014-2019 Goal 2
seawalls at	vulnerability of road and other critical village assets	rate of recovery	Undertake a Cost Benefit	KO 1
most high risk hazard zones	in accordance with	Maintains	Analysis to weigh options for	Draft Soil Resource
liazaru zones	Vulnerability Assessment of	natural	funding	Management Bill
	the Samoa Road Network	ecosystem	rununig	Management bin
	recommendations	connectivity	Incorporate environmental	
	1000	00111100017109	and social safeguards	
	Clear debris from existing	Reduce impact	concerns in the design and	
	culverts near seawalls to	from coastal	undertake consultations with	
	enable free outflow of storm	erosion	affected communities	
	water and streams			
		Safer villages,	Apply for necessary permits	
	Research the impacts of	houses and roads	as required by law	
	sand mining	Minimi	Utilisa hazard mans and	
		Minimise	Utilise hazard maps and Geomorphologist	
	Village consultation on sand	expenditure on	Infrastructure Drainage	
	mining policy and	damaged properties &	Database to inform designs	
	regulation	personal assets	Zambase to inform designs	
	Enforce environmental	personal assets	Develop and register	
	Emorce environmental		L	

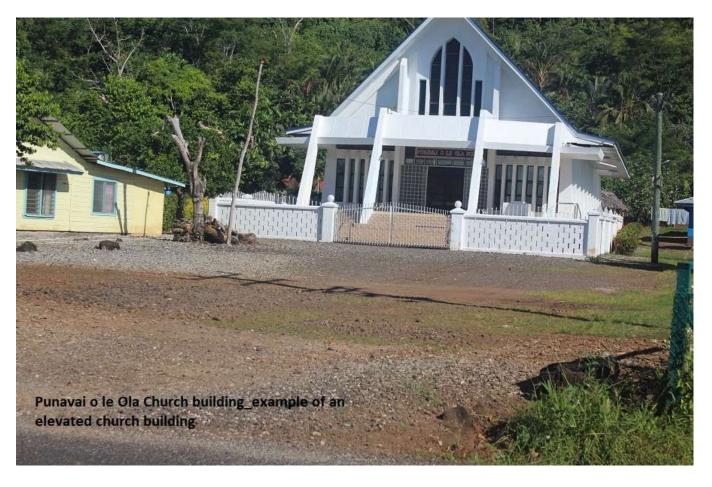
	social safeguards where		District/Village bylaws to	
	reclamations, sand mining,		include maintenance of	
	extraction or other major		drainages and illegal	
	coastal works are proposed.		rubbish dumping into	
	Government and village to		waterways	
	manage processes by			
	requiring villagers to get the			
	appropriate permits and			
	consent			
	Responsibility: LTA/			
	Village /MNRE/MWTI			
Reticulated	Extend the water supply to	Increase	Develop and register	CIM Strategy 2015
water supply,	families inland with no	adaptation during	District/Village bylaws to	
quality and	access to water	drought periods	include regulating	Water and Sanitation
network to be			developments around	Sector Plan
improved		Improve	catchment areas and	
	Duo arras na increator	infrastructure	boreholes	SWA 10 Year
	Procure rainwater	resilience and		Investment Plan
	harvesting systems for	rate of recovery	Implement SWA (2016)10	(2016)
	vulnerable families as a		year investment plan to	
	short term solution	Improve health	improve water supply	Community
		and sanitation	network to support all	Engagement Plan
			inland families without	
	District to support SWA	Reduce	access to drinking water	
	efforts at exploratory	contamination of		
	boreholes in district	water supply	Include in budget	
	Borenoies in district		programming design, and	
		Reduce impact	extension costs of water	
		from inland	supply and procurement of	
	District and villages to	flooding	rainwater harvesting systems	
	support SWA efforts at			
	protecting and conserving		Utilise hazard maps and	
	boreholes, intakes and		Geomorphologist findings to	
	catchment areas		inform location and designs	
	Responsibility: SWA/			
	MWCSD/ MNRE / District/ Village/ CSSP			
Natural	Best Solutions	Benefits	Guideline to assist with	Relevant Sector Plans,
Resources and Environment			the Implementation	National Strategies & Policies
Flood protection	Conduct riparian	Mitigate potential	Implement Anoama'a West	Two Million Tree
measures (soft	replanting along river	damage from	Integrated Catchment Strategy	Strategy 2015-2020
solution to	channels and	inland flooding	and Flood Management Plan	
support flood	watercourses	-	in conjunction with hazard	Restoration
protection		Reduce flooding	Maps and Geomorphologist	Operational Plan 2016-
measures for	Encourage planting of	of built up areas	Drainage Infrastructure	2020
infrastructure)	indigenous species in	•	Database to inform location	
	conjunction with	Safer villages,	and designs	
	engineered water land	houses and roads	-	
	drainage action plans		MNRE to zone hazard areas	
			along major watercourses	
	Promote and support village		based on flood risk to provide	
	and district afforestation in		suitable areas for riparian	
	the upper and mid-		revegetation	
	catchment areas to reduce		-	
	riverbank failures especially			

	in flood prone areas Responsibility: MNRE/ Village			
Soft coastal protection measures needed for most vulnerable areas	Re-stock existing nursery 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 To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed Responsibility: MNRE/	Reduce impact from coastal erosion and natural disasters	Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to assist in establishment of pilot sites to trial climate ready plant varieties MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient plants	NESP 2017-2021 Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020
Livelihood and Food Security	MAF/Villages Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Pest management; invasive plants and animals	Implement an eradication programme to eradicate, contain or exclude invasive species Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken Conduct education and awareness programmes on the impacts of invasive species Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources	Builds resilience of community livelihood and food security	Develop an integrated land management plan for Anoama'a West district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area MAF to raise awareness of farmers on impacts to water flows from poor livestock management MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly Training for farmers on pests management particularly affecting fruit trees and crops	Agriculture Sector Plan 2016-2021 Samoa's National Invasive Species Action Plan (NISAP)

Governance	District to fence domestic animals Responsibility: Villages /District/MNRE/MAF/ SROS 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 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 Responsibility: MWCSD /Village	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	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 issues raised during consultations	Proposed Solution	Comments
Women's committee house upgrade Responsibility: Women's Committee/Village	Village to seek assistance from other sources	Not a direct CR issue
Remnants of old bridge at Leusoalii river Responsibility: Village	Remove remnants from river	Not a CR issue but could be a potential threat to the bridge downriver during extreme events





Leusoali'i Village Map

LEUSOALI'I VILLAGE



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

Upolu AF Districts Overview Map of Coastal Inundation Zones

