

Community Integrated Management Plan

Siumu District



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 Si'umu East (Si'umu West, Si'umu East, Sa'aga-fou and Maninoa villages).

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

Date of Signing: 22 June 2018

Representatives:

Signatures:

Si'umu West Village

- To'oto'o Tofaeono
- Fata Pago
- Tofaeono Lafi
- Eseta Faailo









Siumu East Village

- Leato Tuu'u Tupuola
- Oliva Tuilaepa
- Rivo Puni
- Fogalele A. T. A
- Tu'uu A











Sa'aga fou Village

- Leau Apisaloma
- Leau Ripine
- Tupuola Selefuti
- Leata Tupuola









Maninoa Village

- Lualauafolasa Mataio
- Su'a Ioane
- Tausili Sepa
- Su'a Taimane



The image shows four handwritten signatures in blue ink, each positioned above a horizontal line. The signatures are stylized and appear to be in a local language. From top to bottom, they correspond to the names listed in the adjacent list: Lualauafolasa Mataio, Su'a Ioane, Tausili Sepa, and Su'a Taimane.

The Government of Samoa adopts the Community Integrated Management Plan for the Siumu District 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.



A handwritten signature in blue ink, consisting of a stylized 'U' followed by 'BC' and a large loop, positioned above the name and title of the signatory.

Ulu Bismarck Crawley
CHIEF EXECUTIVE OFFICER, MNRE

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Glossary

“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.
Food Security	Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life
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)
Food availability:	The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid)
Stability:	To be food secure, a population, household or individual must have access to adequate food at all times. They should not risk losing access to food as a consequence of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). The concept of stability can therefore refer to both the availability and access dimensions of food security
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
Hazard	A source of potential harm or a situation with a potential to cause loss.
Hazard Zones	<p>Defined areas 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 six hazard zones:</p> <p><i>ASCHs</i> (areas sensitive to coastal hazards);</p> <p><i>CEHZs</i> (coastal erosion hazard zones);</p> <p><i>CFHZs</i> (coastal flood hazard zones) and</p> <p><i>CLHZs</i> (coastal landslip hazard zones)</p> <p><i>CIHZ</i> (coastal inundation hazard zones)</p> <ul style="list-style-type: none"> - Coastal Inundation 0 to 15mASL – immediate coastal inundation hazard zone - Coastal Inundation 15 to 20mASL – 5-metre uncertainty buffer on the immediate coastal inundation hazard zone (due to potential LiDAR inaccuracies) - Coastal Inundation 20 to 50mASL – additional hazard zone for the purpose of assessing/planning the location of tsunami protection infrastructure beyond the 0-20mAmSL contour. Please note tsunami risk includes 0-20mASL, so tsunami hazard zones need to include the 0-15mASL and 15-20mASL polygons as well as the 20-50mASL polygon - Coastal Inundation 50 to 55mASL – 5-metre uncertainty buffer on the tsunami infrastructure hazard zone (due to potential LiDAR inaccuracies) <p><i>IFHZ</i> (immediate fluvial hazard zone) within the steep banks of the river gorges</p> <ul style="list-style-type: none"> - River bank encroachment control – 5m buffer on either side of river banks - Watershed management riparian zone – 20m buffer on either side of the river banks
Infrastructure	Built structures and networks which support the national, regional or local community
Lifeline infrastructure:	Infrastructure that contributes directly to the survival of the community and its ability

to respond and recover at the time of extreme events.

Secondary infrastructure: Infrastructure that contributes to the every-day development of the community.

Implementation Guideline A document to guide land use and resource practices to achieve specified goals, objectives and policies and provide a framework for the implementation of defenses and works.

Issue A specific concern regarding both cause and effect.

Land and Resource Use The use of land and resources by the community for social, economic or other benefit (e.g. land use includes areas used for villages or crops, resource use includes activities such as sand mining, gravel extraction or fishing).

Livelihood Livelihood refers to a person or group's "means of securing the necessities -food, water, shelter and clothing- of life".

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

Introduction to the CIM Plan

The Strategic Vision

The District Community Integrated Management (CIM) Plan for the Siumu 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).***

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.

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.

Implementation Guidelines

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.

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.

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-GEF SGP.
- **District Sub Project (DSP)** – the guidelines provided in the DSP targets single districts or multi-district projects with a large number of beneficiaries.

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

1. Description of Si'umu District

Physical and Natural Resource Setting

The Faipule District of Si'umu is located on the south west coast of the island of Upolu opposite Apia and adjacent to O Le Pupu Pue National Park. The district is characterised by a gentle coastal plain sloping down from steep inland mountains. Situated on the south west coast, Siumu District receives above the national average for rainfall (Dews, 2017). The three villages; Maninoa, Si'umu Sasa'e and Si'umu Sisifo, are located at the western end of the district along the edge of a large lagoon. The lagoon is formed by a reef system bounded to the east by the rocky headland at Aganoa, and to the west by the reef breaks at Maninoa. The fourth village in the district, Sa'aga-fou, is located on the main South West Coast Road. Sa'aga-fou village was established as residents relocated from the coast.

The main South Coast Road whilst sitting far from the coast has some areas running through several fluvial hazard zones. Apart from the main south west coast road, this district has three other roads; Siumu Road, Matafala Loop Road and Maninoa-uta Road. All three are sealed and form part of the Samoa national road network. Expansion of the inland road network with improved services, particularly water supply, has been identified as a priority by the communities. Capacity of culverts and roadside drainage is a recurrent issue, with ponding water from storm water runoff evident in-front of private homes, churches and schools during community consultations. Inadequate culverts and roadside drainage is contributing to inland flooding and stormwater surges (Townsend, 2017).

The majority of the district and developments occur inland. Residents residing near the coast also have lands located further inland. Residual occupation within the CEFZ continues with the majority of requests from these residents focusing on seawalls to protect assets near the coast. These include village pools and tourist facilities. Siumu was one of the districts impacted by the 2009 tsunami. A seawall at Siumu-tai was constructed in 2010 as part of the Tsunami Recovery Programme.

The coastline itself is very diverse with fine coral sand, pockets of black sand, long segments of volcanic rock and a number of lava tubes. There are at least five large fresh water springs along the coast. There is a large wetland area at Maninoa and a piece of secondary scrub forest at Saaga-fou. The fast rate of development taking place in this part of the island is a threat to these and any other areas of natural or cultural significance in this district. The Si'umu coastal area has a high Coastal Sensitivity Index, and has changed noticeably over the last several decades. There is no consistent long- shore drift, but in some areas there has been some sediment accretion from nearby river runoff. In other areas, erosion is evident. West of the Coconuts Resort the ocean entrance to the wetland has shifted more than 30 metres east of its 1954 location. In front of Si'umu Sasa'e the coastline has receded more than 10 metres in places and is now protected by a revetment. There is also a revetment along the coastal frontage of Si'umu Sisifo that provides some protection to several existing houses and three village pools.

There are three major reef breaks in the district of Siumu. One is at the western end of the district opposite the Sinalei and Coconuts Resorts, the second is opposite Si'umu Village and the third is opposite the small cluster of houses at Sa'aga. These are substantial reef breaks that influence tidal flows and sediment transport along the coast. The reef system ranges from 150 metres to more than a kilometre offshore.

There are several rivers in the district which supply two SWA intakes located in Siumu. Inland these rivers are generally found in deeply incised valleys. Near the coast the rivers often flood during extreme events or heavy rainfall, inundating nearby lands, houses, village pools and schools. This is of particular concern especially at areas where the rivers cross or meet over the South Coast Road.

Away from the coast, settlements, plantations, cattle farms and agricultural activities dominate the area. These are located on both sides of the South Coast Road.

Social and Economic Setting

The Si'umu District currently has a population of 2,349 persons consisting of 1,205 males and 1,144 females¹. Of this total, 439 reside in Maninoa, 423 in Saaga-fou, and 1,487 in Siumu². Development is mostly scattered along or near the South Coast Road.

¹ SBS Census 2016 Preliminary Count

² 1,183 Siumu and 304 Siumu-uta

The South West Coast Road is considered an important part of the district's infrastructure connecting Siumu to neighbouring districts; Safata to the west and Falealili to the east. The South West Coast Road also connects to the Cross Island Road which runs all the way into central Apia. The South West Coast Road provides easy access to local schools, shops and health facilities, as well as adjacent districts.

Primary services such as water, power and telephone generally follow the South West Coast Road. Coastal villages of Siumu also have access to water and electricity. Telephone and electricity pole lines where they run through the coastal communities are vulnerable to coastal flooding and erosion.

A survey³ conducted in 2017 of 25 districts in Savaii and Upolu recorded Siumu as the second highest district with 28.7% of their income earned from taro plantations. Although Siumu hosts four large, internationally renowned resorts; Sinalei, Coconuts, Lupe and the Maninoa Surf Resort, only 7.3% of household income came from employment at these tourist facilities. In all villages, the majority of residents are largely sustained by plantation work and fishing. The District supports 1 pre-school⁴, 1 primary school⁵ and large secondary school⁶, a number of churches⁷ and a small medical facility. In addition, there are a number of small shops and home occupations throughout the area.

Livelihoods and food security is dependent on plantation agriculture, small house hold plots and fishing. There are areas of extractive sand operations located along the coastline that also contribute to livelihoods. Landuse is dominated by plantations, mixed crops, open forests and grasslands as well as extensive coastal wetlands (Dews, 2017).

Climate Change 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 Siumu District. The immediate risks for some areas of Siumu are from coastal inundation, storm surges and fluvial hazards.

Element at risk includes all human-made infrastructure and natural features, which consist of physical and non-physical infrastructures that face risks from natural disasters Human-made physical infrastructures include houses, road networks, utilities networks, bridges, drainage networks and railways. Human made non-physical elements consist of economic, cultural and political environments. Natural features that may be affected by natural disasters include beaches, river systems, swamps, vegetation and all fauna in these environments. The Siumu District has about 7, 579 hectare in area. There are **77 buildings** in the district that are both in the Coastal Flood Hazard Zone and Coastal Erosion Hazard Zone. The watershed management riparian buffer covers **2, 686** hectares of hectares, and there are **149** buildings in this fluvial zone (Tokalauvere, 2018).

The South West Coast Road does not always run close to the coast sometimes sitting up to 3kilometres inland. The villages of Maninoa and Sa'aga-fou are concentrated mainly around the South West Coast Road. The Cross Island Road sits in the 'middle' of the district, connecting to the Matafala Loop Road that runs through the coastal communities of Siumu East and Maninoa. There are three 'access' roads in this district. All 3 sit within or near fluvial hazard zones. One, Siumu Road, sits in the CEHZ and CFHZ.

Further inland on the steeper land some taro plantations are affecting land stability. Land-use practices, such as deforestation, cattle farming and agriculture are increasing both the rate of erosion and the supply of sediment to the coast. These practices affect coastal processes including the incidence and degree of flooding in coastal areas, the rates of sediment accretion along the coast and the impact on the health of the lagoon and reef systems as fine sediments suffocate coral systems. They have a direct impact on the reef as the first line of defence from cyclone hazards and increase the risk of coastal infrastructure to damage (Reti, 2017).

As the majority of the coastal community infrastructure are situated within both the CFHZ and CEHZ; relocation options should be considered. The electricity lines fall within both the CFHZ and CEHZ with the exception of the High Voltage electricity lines that generally follow the Main South West Coast Road. Overhead lines are at high risk as they are exposed to extreme events. Long term planning for underground lines will likely increase the resilience of the communities in these areas. The water source is frequently contaminated through stormwater runoff from nearby

³ MNRE (EWACC Project) Community Disaster and Climate Risk Management Household survey: final report 2017

⁴ Siumu East Pre-School

⁵ Siumu Primary School

⁶ Palalaua College

⁷ LDS & AOG; Siumu East, CCS & Catholic; Siumu West, Methodist & SDA; Maninoa, CCCS, LDS & AOG; Saaga-fou

cattle pastures and unsustainable land management practices (use of toxic chemicals in farming and fishing). Climate change and its variability will exacerbate these conditions.

There is a need to upgrade existing culverts to help reduce the impact on the coastline from inland flooding. Access roads also need to be upgraded since many people have moved and relocated inland. Improvements in utilities facilities such as water and power should also be considered to facilitate relocation further inland and away from the coast. Certain coastal areas of Siumu is eroding at a much faster rate due to human influence. Unregulated sand extraction is one of these 'human influences' (Dews, 2017).

The conservation of the upland forests will be a major contribution to climate change adaptation. The conditions of the upland ecosystems directly influence the livelihoods of communities downstream. The ecological service of the upland forest areas can be sustained through sustainable forest management including replanting. A number of invasive species were observed and a very serious taro disease was found to be affecting many taro plantations in the district. This is of concern as taro plantations are the major income earner for Siumu residents. Crops production can be maximized by using intensive farming activities in small plots where possible. Future agricultural practices will have to account for longer dry periods and droughts which may be localized and more intense rainfall events (Dews, 2017).

2. Siumu District Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Drainage systems require maintenance and upgrade in high risk areas of main South West Coast Road	<p>Assess and upgrade culverts on main South West Coast road especially at junctions with access roads (Maninoa Uta road and Matafala Loop Road) sitting within combined hazard zones (IFHZ, CEHZ, CFHZ)– in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding</p> <p>Implement regular drainage inspection and maintenance</p> <p>Responsibility: LTA /MWTI/MWCSD /Village/ Families</p>	<p>Improves climate resilience of infrastructure resilience and rate of response and recovery to natural hazards and disasters</p> <p>Encourages coastal families to relocate inland</p> <p>Maintains lifeline access for all of Upolu</p> <p>Minimises national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Use existing information for guidance but not limited to: <i>“Vulnerability Assessment of the Samoa Road Network (2017)”</i>; <i>“Review of National Road Standards in Samoa (2016)”</i>; <i>“Samoa Code of Environmental Practice (2007)”</i></p> <p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities</p> <p>Apply for necessary permits as required by law</p> <p>Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs</p> <p>Develop Integrated Catchment Strategy and Flood Management Plan for Siumu District</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	<p>CIM Strategy 2015</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>
Reticulated water supply, quality and network to be improved	<p>Extend the water supply to families inland with no access to water</p> <p>Investigate extension of pipelines from Tiavi reservoir to villagers inland to reduce cost of connecting to pipelines in main South Coast Road</p>	<p>Increase adaptation during drought periods</p> <p>Improve infrastructure resilience and rate of recovery</p> <p>Improve health and sanitation</p> <p>Reduce contamination of</p>	<p>Develop and register District/Village bylaws to include regulating developments around catchment areas and boreholes</p> <p>Implement SWA (2016) 10 year investment plan to improve water supply network to support all inland families without access to drinking water</p>	<p>CIM Strategy 2015</p> <p>Water and Sanitation Sector Plan</p> <p>SWA 10 Year Investment Plan (2016)</p> <p>Community Engagement Plan</p> <p>Health Sector Plan</p> <p>Community Sector Plan</p>

	<p>Procure rainwater harvesting systems for vulnerable families as a short term solution</p> <p>Procure rainwater harvesting systems for identified evacuation shelter(s)</p> <p>District and village to support SWA water rationing programmes during times of drought</p> <p>District to support SWA efforts at exploratory boreholes in district</p> <p>District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas</p> <p>Responsibility: SWA/ MWCSPP/ MNRE / District/ Village/ CSSP</p>	<p>water supply</p> <p>Reduce impact from inland flooding</p>	<p>Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems</p> <p>Utilise hazard maps and Geomorphologist findings to inform designs</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities</p>	
<p>Coastal protection: Beach nourishment / offshore breakwaters</p>	<p>Evaluate effectiveness of offshore breakwaters</p> <p>Conduct feasibility or EIA considering location in flood hazard zone action plans</p> <p>Responsibility: MNRE/Village</p>	<p>Reduce impact from coastal erosion</p> <p>Safer villages, houses and roads</p> <p>Minimise expenditure on damaged public properties & assets</p>	<p>Undertake SEAR 5 years from date of completion</p> <p>Utilise recommendations of SEAR to replicate model in other districts/villages with similar conditions and considered highly vulnerable to coastal erosion</p> <p>Benefit cost analysis to include appropriate design loads and engineering design and supervision costs on top of capital work estimates</p>	<p>CIM Strategy 2015</p> <p>Draft NESP 2017-2021</p>
<p>Electricity supply</p>	<p>Provide underground lines in the long term</p> <p>Install and connect power supply for inland</p>	<p>Maintain electricity supply at all times including natural disasters</p> <p>Avoid accidents</p>	<p>Monitor distribution networks to avoid overloading poles and contributing to line failures</p>	<p>EPC Strategic Plan</p> <p>NISP 2011 KESO 5</p>

	<p>residents</p> <p>Relocate overhead lines to a more resilient location when being replaced</p> <p>Install streetlights along the roads where needed for community safety</p> <p>Install and connect to solar power supply if made available</p> <p>Families to limit building and developments near electricity posts</p> <p>Responsibility: EPC/ MWTI/ Village /Families</p>	<p>from fallen electricity posts.</p>		
<p>Evacuation Shelter and a connected escape route needed for emergency preparedness and response</p>	<p>Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter</p> <p>Conduct evacuation shelter assessment and mark on CIM Plan hazard maps</p> <p>Develop a Village Climate Disaster Management Plan (VCDMP)</p> <p>Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies</p> <p>Implement CDCRM program</p> <p>Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters</p> <p>Where no suitable houses exist, build emergency shelter(s) outside the hazard zones</p> <p>Retrofit identified and approved schools or churches outside hazard zones and designate as</p>	<p>Improve resilience of public infrastructure</p> <p>Improve preparedness and readiness response to natural disasters</p>	<p>Enforcement of National Building Code 2017</p> <p>Utilise hazard maps and Geomorphologist findings to inform location and designs</p>	<p>National Disaster Management Plan 2017-2021</p> <p>National Building Code</p> <p>National Policy for People with Disabilities</p> <p>NISP 2011 KESO 5</p>

	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
District Upland Forest and Catchment Areas	<p>Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland area</p> <p>Adopt agro-forestry and community tree farming practices instead of clear felling as is practiced at present</p> <p>Encourage planting of indigenous species in conjunction with engineered water land drainage action plans</p> <p>Regulate developments around catchment area, SWA intake and boreholes in district</p> <p>Limit land clearance and agricultural development around SWA intake and boreholes</p> <p>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</p> <p>District to support SWA efforts at exploratory intakes and boreholes in district</p> <p>Continue ban of destructive fishing practices including sand mining and introduce</p>	<p>Protects and enhance local species diversity</p> <p>Sustains ecosystem services and functions</p> <p>Reduce contamination of water supply</p> <p>Reduce impact from inland flooding</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Safer villages, houses and roads</p>	<p>Develop Integrated Catchment Strategy and Flood Management Plan for Siumu District. MNRE to develop zonation strategy for safe areas</p> <p>Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MNRE Forestry to advice on appropriate species, depth and density of planting and provide seedlings for different vegetation types suitable to the habitats and planting materials for village</p> <p>Develop and register District/Village bylaws to include penalizing illegal deforestation in district lands</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village forestry programmes</p>	<p>Forestry for Sustainable Development Policy</p> <p>Draft NESP 2017-2021</p> <p>Village Fono Act(Amendment Bill 2016)</p> <p>CIM Strategy 2015</p> <p>SWA 10 Year Investment Plan(2016)</p> <p>Community Engagement Plan</p>

	<p>village ban on rubbish dumping in waterways and watercourses (immediate fluvial hazard zones)</p> <p>Fence domestic and invasive animals to protect young trees</p> <p>Responsibility: MNRE/SWA/MWCSD/ District /Village /CSSP</p>			
<p>Sand/rock extraction (domestic): coastline, rivers and riverbanks</p>	<p>Identify alternative sustainable sources of sand/rocks for domestic use</p> <p>Research the impacts of sand mining</p> <p>Village consultation on sand mining policy and regulation</p> <p>Village and government to collaborate closely on designated areas for sand/rock mining</p> <p>Raise awareness and support of sustainable land use practices</p> <p>Responsibility: MNRE/Village/Families</p>	<p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Safer villages, houses and roads</p> <p>Reduce impact from coastal erosion</p> <p>Economic benefit for village from sustainable sand mining activities</p>	<p>MNRE to continue to identify specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks</p> <p>Undertake assessments of identified sites</p> <p>Undertake consultation with villages affected by proposed sand/rock mining</p> <p>Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of CIM Plan activities</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Draft Soil Resource Management Bill</p>
<p>Soft coastal protection measures needed for most vulnerable areas</p>	<p>Replant mangrove trees along the estuary at Si'umu to reduce coastal erosion and siltation of the inshore reef</p> <p>Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions</p> <p>To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed</p> <p>Responsibility: MNRE/MAF/Villages</p>	<p>Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Implements an Ecosystem Based Approach</p>	<p>Develop an integrated land management plan for Siumu district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops</p>	<p>NESP 2017-2021</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p> <p>Forestry Management Act 2011</p>

Governance	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	<p>Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes.</p> <p>Collaborate with Sui o Nu'u to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Responsibility: MWCSO /Village</p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>	<p>Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>

Siumu District Map



Siumu District



ADAPTATION FUND



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. Siumu-East Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
<p>Village houses, village pools, churches and government assets located in high risk hazard zones</p>	<p>Relocate outside of high risk hazard zones when building/infrastructure requires replacement</p> <p>Investments within the hazard zones to adopt appropriate mitigation measures</p> <p>Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ</p> <p>Design infrastructure appropriately to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones</p> <p>Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Government and Village to liaise and collaborate on processes needed to protect riverbanks and coastline from land clearing and developments</p> <p>Responsibility: Village / Families/MWTI/ MNRE/ MWCS</p>	<p>Minimise expenditure on damaged properties and personal assets</p> <p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Safer villages, houses and roads</p>	<p>Planning provisions to be guided by the PUMA Act 2004</p> <p>Enforcement of National Building Code 2017</p> <p>Encourage insurance of significant investments and assets within hazard zones</p> <p>Utilise updated hazard maps and Geomorphologist Drainage Infrastructure Database to inform policy development and possible relocation of assets</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	<p>CIM Strategy 2015</p> <p>Draft NESP 2017-2021</p> <p>NISP 2011 KESO 5</p> <p>TSP 2014-2019 Goal 2 KO 1</p>

<p>Flood protection measures for fords and bridges</p>	<p>Upgrade waterways</p> <p>Upgrade all crossings</p> <p>Upgrade or repair riverine embankment protection work upstream of Siumu East</p> <p>Ensure river channel upstream is cleared and maintained regularly</p> <p>Construct levees to reduce flooding along estuaries and coastal streams</p> <p>Install advisory edge markers and depth markers to warn vehicle and pedestrians at all crossings</p> <p>Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments</p> <p>Responsibility: MWTI/ LTA/MNRE/ District/ Village</p>	<p>Minimise expenditure on damaged properties & personal assets</p> <p>Mitigate potential damage from inland flooding</p> <p>Reduce flooding of built up areas</p> <p>Maintains lifeline access for all of Upolu</p> <p>Safer villages, houses and roads</p>	<p>Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing infrastructure facilities</p> <p>Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>Include in budget programming CBA, design and construction.</p> <p>Designation of the IFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	<p>CIM Strategy 2015</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
<p>Upgrade Siumu Road and drainages to reduce storm water runoff and inland flooding</p>	<p>Upgrades to include adequate sized culverts to facilitate the overland flow of storm water exacerbating river overruns, and to reduce flooding onto main roads and village lands</p> <p>Implement regular drainage inspection and maintenance</p> <p>Village to restrict rubbish dumping into waterways and conduct regular clearance of rubbish behind homes</p> <p>Village to regulate developments near and around road shoulders of all access roads</p> <p>Enforce environmental safeguards</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties and public assets</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform designs</p> <p>Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Siumu district</p>	<p>Draft NESP 2017-2021</p> <p>CIM Strategy 2015</p> <p>NISP 2011 KESO 5</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

	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			
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
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 Responsibility: MNRE/ MAF/Villages	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 Siumu 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 Forestry Management Act 2011
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/ Villages	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
Village pool located in high risk hazard zones (coastal erosion and flooding from fluvial inundation, wave impacts and storm surges)	Village pool is currently in a poor state with an assessment needed for options to either rejuvenate or find a new site depending on the location of springs	Increase adaptation during drought periods Improve health and sanitation Reduce contamination of	Utilise Hazard Maps and Geomorphologist findings to inform location and design MNRE Water & Sanitation to conduct water testing and analysis of village pool prior to any intervention	CIM Strategy 2015 Water and Sanitation Sector Plan Community Engagement Plan Health Sector Plan

	Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works) Responsibility: MoF-CSSP/NGOs/ MNRE/Villages	water supply	Update Village bylaws to include managing and maintaining village natural resources Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities	Village Fono Act (Amendment Bill 2016)
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Pest management : worm affecting taro plantations and vegetable gardens	<p>Implement an eradication programme to eradicate, contain or exclude invasive species</p> <p>Replant with climate resilient native species</p> <p>Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken</p> <p>Conduct education and awareness programmes on the impacts of invasive species</p> <p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources</p> <p>Conduct pilot site trials for climate ready plant varieties</p> <p>District to fence domestic animals</p> <p>Responsibility: Villages /District/ MNRE/MAF/ SROS</p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p>	<p>Develop an integrated land management plan for Siumu district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to raise awareness of farmers on impacts to water flows from poor livestock management</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops</p> <p>MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly</p> <p>Village to manage pig/cattle population (compounds, in particular around water supplies)</p> <p>Training for farmers on pests management particularly affecting fruit trees and crops</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>Draft NESP 2017-2021</p> <p>Samoa's National Invasive Species Action Plan (NISAP)</p>

Governance	Best Solutions	Other Benefits	Implementation Guideline	Relevant Sector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through Bylaws	<p>Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes.</p> <p>Collaborate with Sui o Nuu to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Responsibility: MWCSO /Village</p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>	<p>Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>

Non-CR issues raised during consultations	Proposed Solution	Comments
Speed hump for district road Responsibility: Village/LTA	Village to request LTA directly for assistance	Not a CR issue. Road/Safety issue that involves Village and LTA



Si'umu Sasa'e Village



ADAPTATION FUND

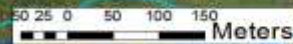
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Boundaries & Routes



Hazard Zones



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. Siumu West Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant National, Sector Plans and Strategies
<p>Village houses, church, school, government assets and a pool in CEHZ and CFHZ</p>	<p>Relocate outside of high risk hazard zones when building/infrastructure requires replacement</p> <p>Investments within the hazard zones to adopt appropriate mitigation measures</p> <p>Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones</p> <p>Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ</p> <p>Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Where reclamations are proposed, Government and district to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: Village / Families /MWTI/ MNRE</p>	<p>Minimise expenditure on damaged properties & personal assets</p> <p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Improve recovery to create more resilient villages</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Safer villages, houses and roads</p>	<p>Develop an Integrated Catchment and Flood Management Strategy for Siumu District. MNRE to develop zonation strategy for safe areas</p> <p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform designs</p> <p>Enforcement of National Building Code 2017</p> <p>Encourage insurance of significant investments and assets within hazard zones</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	<p>National Building Code</p> <p>CIM Strategy 2015</p> <p>Draft NESP 2017-2021</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p>

<p>Flood protection measures for fords and bridges</p>	<p>Upgrade waterways</p> <p>Upgrade all crossings</p> <p>Upgrade or repair riverine embankment protection work upstream of Siumu West</p> <p>Ensure river channel upstream is cleared and maintained regularly</p> <p>Construct levees to reduce flooding along estuaries and coastal streams</p> <p>Install advisory edge markers and depth markers to warn vehicle and pedestrians at all crossings</p> <p>Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments</p> <p>Responsibility: MWTI/ LTA/MNRE/ District/ Village</p>	<p>Minimise expenditure on damaged properties & personal assets</p> <p>Mitigate potential damage from inland flooding</p> <p>Reduce flooding of built up areas</p> <p>Maintains lifeline access for all of Upolu</p> <p>Safer villages, houses and roads</p>	<p>Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations to inform location and designs</p> <p>Implement Siumu Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database findings</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing infrastructure facilities</p> <p>Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>Include in budget programming CBA, design and construction.</p> <p>Designation of the IFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	<p>CIM Strategy 2015</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>
<p>Evacuation Shelter and a connected escape route needed for emergency preparedness and response</p>	<p>Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter</p> <p>Conduct evacuation shelter assessment and mark on CIM Plan hazard maps</p> <p>Develop a Village Climate Disaster Management Plan (VCDMP)</p> <p>Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies</p> <p>Implement CDCRM program</p> <p>Install relevant signs to guide the community on</p>	<p>Improve resilience of public infrastructure</p> <p>Improve preparedness and readiness response to natural disasters</p>	<p>Enforcement of National Building Code 2017</p> <p>Utilise hazard maps and Geomorphologist findings to inform location and designs</p>	<p>National Disaster Management Plan 2017-2021</p> <p>National Building Code</p> <p>National Policy for People with Disabilities</p> <p>NISP 2011 KESO 5</p>

	<p>emergency response procedures and to locations of evacuation shelters</p> <p>Where no suitable houses exist, build emergency shelter(s) outside the hazard zones</p> <p>Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter</p> <p>Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD</p>			
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Soft coastal protection measures needed for most vulnerable areas	<p>Plant native species along coastal areas to strengthen existing seawall and to reduce coastal erosion and landslips; Talie, Fetau, Toa, Togatogo are known to have greater resilience to natural disasters and changing climate conditions</p> <p>To act as an effective wave barrier, a minimum distance of 200m of vegetation is needed</p> <p>Responsibility: MNRE Villages</p>	<p>Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Implements an Ecosystem Based Approach</p>	<p>Develop an integrated land management plan for Siumu district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops</p>	<p>NESP 2017-2021</p> <p>Two Million Tree Planting Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p> <p>Forestry Management Act 2011</p>
Flood protection measures (soft solution to support flood protection measures for infrastructure)	<p>Conduct riparian replanting along river channels and watercourses</p> <p>Encourage planting of indigenous species in conjunction with engineered water land drainage action plans</p> <p>Promote and support village and district afforestation in the upper and mid-catchment areas to reduce riverbank failures especially in flood prone areas</p> <p>Responsibility: MNRE/ Villages</p>	<p>Mitigate potential damage from inland flooding</p> <p>Reduce flooding of built up areas</p> <p>Safer villages, houses and roads</p>	<p>Implement Siumu Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and designs</p> <p>MNRE to zone hazard areas along major watercourses based on flood risk to provide suitable areas for riparian revegetation</p>	<p>Two Million Tree Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p>
Village pool located in high risk hazard zones	Village pool is currently in a poor state with an assessment needed for	Increase adaptation during drought	Utilise Hazard Maps and Geomorphologist findings for planning purposes	<p>CIM Strategy 2015</p> <p>Water and Sanitation</p>

(coastal erosion and flooding from fluvial inundation, wave impacts and storm surges)	options to either rejuvenate or find a new site depending on the location of springs. Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works) Responsibility: CSSP/NGOs/MNRE/Villages	periods Improve health and sanitation Reduce contamination of water supply	MNRE Water & Sanitation to conduct water testing and analysis of village pool prior to any intervention Update Village bylaws to include managing and maintaining village natural resources Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities	Sector Plan Community Engagement Plan Village Fono Act (Amendment Bill 2016)
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Pest management : worm affecting taro plantations and vegetable gardens	Implement an eradication programme to eradicate, contain or exclude invasive species Replant with climate resilient native 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 Conduct pilot site trials for climate ready plant varieties District to fence domestic animals	Maintains natural ecosystem Builds resilience of community livelihood and food security	Develop an integrated land management plan for Siumu 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 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 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 Village to manage pig/cattle population (compounds, in particular around water supplies) Training for farmers on pests management particularly affecting fruit trees and crops	Agriculture Sector Plan 2016-2021 Draft NESP 2017-2021 Samoa's National Invasive Species Action Plan (NISAP)

	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	<p>Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes.</p> <p>Collaborate with Sui o Nuu to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Responsibility: MWCSO /Village</p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>	<p>Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>

Non-CR issues raised during consultations	Proposed Solution	Comments
Rubbish bins for district Responsibility: MNRE Waste Management Division/Village	Village to submit request to MNRE Waste Management Division	Not a CR issue, however deemed valuable if it helps reduce illegal rubbish dumping into rivers/creeks and other areas



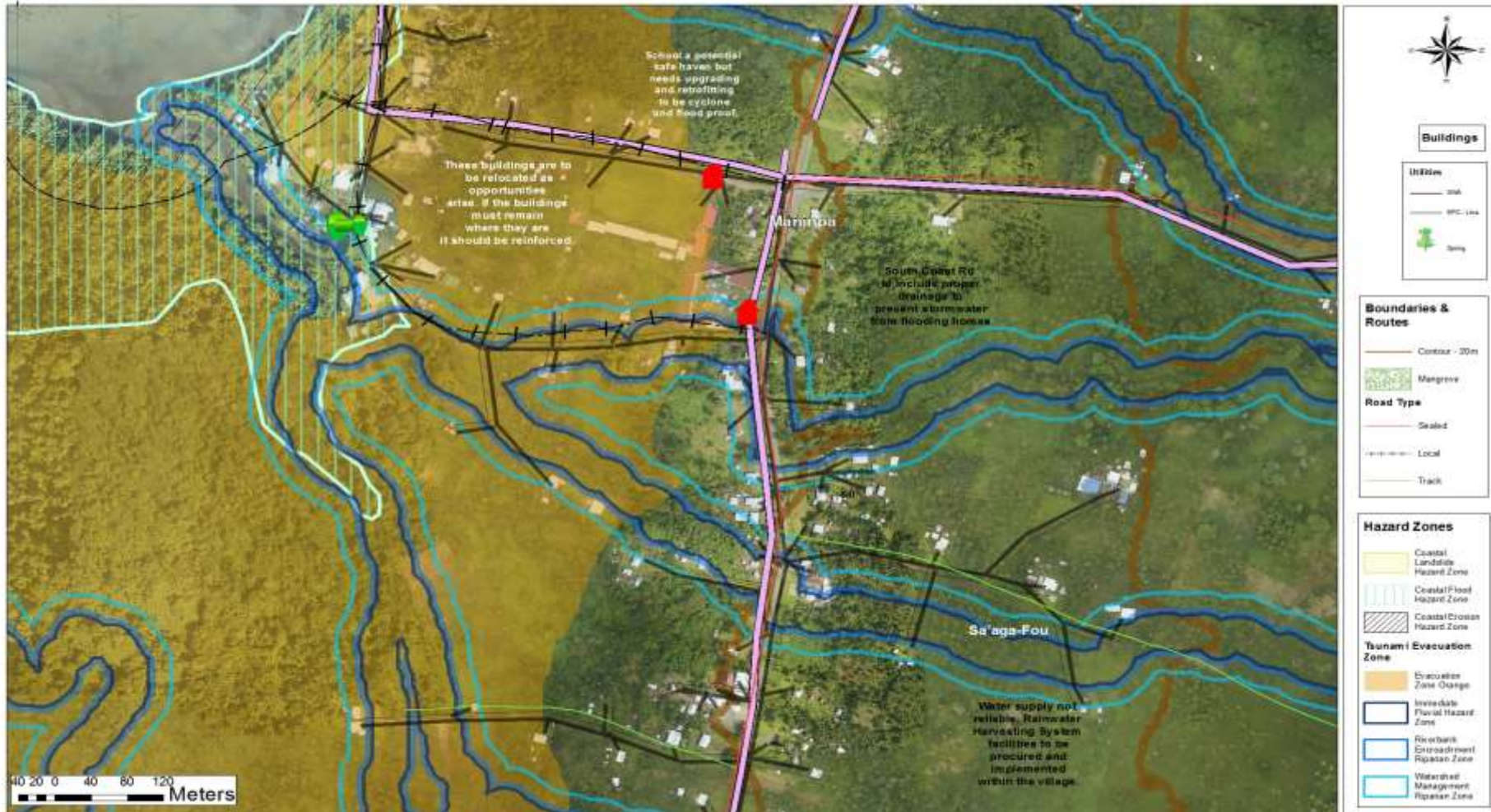
Siumu West Village Map



Si'umu Sisifo Village



ADAPTATION FUND



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. Saaga Fou Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant National, Sector Plans and Strategies
Drainage systems to be improved in high risk areas especially at junction of South West Coast Road and access roads	<p>Continue to assess and upgrade culverts on main and 'access' roads in district and widen culverts in accordance with <i>Vulnerability Assessment of the Samoa Road Network</i> recommendations</p> <p>Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding</p> <p>Implement regular drainage inspection and maintenance</p> <p>Government to regulate developments and illegal rubbish dumping near and around waterways and drainage</p> <p>Responsibility: LTA/MWTI/MNRE/MWCSD/Village/Families</p>	<p>Improves climate resilience of infrastructure resilience and rate of response and recovery to natural hazards and disasters</p> <p>Encourages coastal families to relocate inland</p> <p>Maintains lifeline access for all of Upolu</p> <p>Minimises national disaster recovery expenditure on damaged properties, public and private assets</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform design</p> <p>Use existing information for guidance but not limited to: <i>"Vulnerability Assessment of the Samoa Road Network (2017)"</i>; <i>"Review of National Road Standards in Samoa (2016)"</i>; <i>"Samoa Code of Environmental Practice (2007)"</i></p> <p>Develop Integrated Catchment Strategy and Flood Management Plan for Siumu District</p> <p>Undertake a Cost Benefit Analysis to weigh options for funding</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects</p> <p>Include in budget programming CBA, design and construction</p> <p>Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways</p>	<p>Draft NESP 2017-2021</p> <p>CIM Strategy 2015</p> <p>NISP 2011 KESO 5</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>
Village houses, pool, church and other village assets in high risk hazard zones	<p>Relocate outside of high risk hazard zones when building/infrastructure requires replacement</p> <p>Investments within the hazard zones to adopt appropriate mitigation measures</p> <p>Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living</p>	<p>Minimise expenditure on damaged properties & personal assets</p> <p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Improve</p>	<p>Develop an Integrated Catchment and Flood Management Strategy for Siumu District. MNRE to develop zonation strategy for safe areas</p> <p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform designs</p> <p>Enforcement of National Building Code 2017</p>	<p>National Building Code</p> <p>CIM Strategy 2015</p> <p>Draft NESP 2017-2021</p> <p>NISP2011 KESO 5</p> <p>TSP2014-2019 Goal 2 KO 1</p>

	<p>in and near high risk hazard zones</p> <p>Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ</p> <p>Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Where reclamations are proposed, Government and district to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: Village / Families /MWTI/ MNRE</p>	<p>recovery to create more resilient villages</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Safer villages, houses and roads</p>	<p>Encourage insurance of significant investments and assets within hazard zones</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	
<p>Flood protection measures for riverbanks, bridges and fords</p>	<p>Upgrade waterways</p> <p>Upgrade all crossings</p> <p>Upgrade or repair riverine embankment protection work upstream</p> <p>Ensure river channel upstream is cleared and maintained regularly</p> <p>Construct levees to reduce flooding along estuaries and coastal streams</p> <p>Government and Villages to liaise and collaborate on processes needed to protect riverbanks from land clearing and developments</p>	<p>Minimise expenditure on damaged properties and personal assets</p> <p>Mitigate potential damage from inland flooding</p> <p>Reduce flooding of built up areas</p> <p>Safer villages, houses and roads</p>	<p>Conduct a full catchment management, drainage analysis and geotechnical engineering survey and use its recommendations during the planning phase</p> <p>Implement Siumu District Integrated Catchment Strategy and Flood Management Plan in conjunction with hazard Maps and Geomorphologist Drainage Infrastructure Database to inform location and designs</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing infrastructure facilities</p> <p>Include in budget programming CBA, design and construction</p> <p>Designation of the CEHZ and CFHZ as an “at risk” zone with</p>	<p>CIM Strategy 2015</p> <p>NISP 2011 KESO 5</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Two Million Tree Strategy 2015-2020</p> <p>Restoration Operational Plan 2016-2020</p> <p>Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA</p>

	Responsibility: MWTI/ LTA/MNRE/ District/ Village		appropriate landuse planning controls and restrictions	
Electricity supply	<p>Provide underground lines in the long term</p> <p>Install and connect power supply for inland residents</p> <p>Relocate overhead lines to a more resilient location when being replaced</p> <p>Install streetlights along the roads where needed for community safety</p> <p>Install and connect to solar power supply if made available</p> <p>Families to limit building and developments near electricity posts</p> <p>Responsibility: EPC/ MWTI/ Village/ Families</p>	<p>Maintain electricity supply at all times including natural disasters</p> <p>Avoid accidents from fallen electricity posts</p>	Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan NISP
Upgrade Saaga-fou work road to reduce stormwater runoff and inland flooding	<p>Upgrades to include adequate sized culverts to facilitate the overland flow of storm water exacerbating river overruns, and to reduce flooding onto main roads and village lands</p> <p>Implement regular drainage inspection and maintenance</p> <p>Village to restrict rubbish dumping into waterways and conduct regular clearance of rubbish behind homes</p> <p>Village to regulate developments near and around road shoulders of all access roads</p> <p>Enforce environmental safeguards</p> <p>Where reclamations are proposed, Government and district to manage processes by requiring</p>	<p>Improve infrastructure resilience and rate of recovery</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Reduce impact from coastal erosion and natural disasters</p> <p>Safer villages, houses and roads</p> <p>Minimise national disaster recovery expenditure on damaged properties and public assets</p>	<p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform designs</p> <p>Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p> <p>Utilise environmental and social safeguards including EIAs in screening and designing built environment infrastructure projects for Siumu district</p>	<p>Draft NESP 2017-2021</p> <p>CIM Strategy 2015</p> <p>NISP 2011 KESO 5</p> <p>TSP 2014-2019 Goal 2 KO 1</p> <p>Community Sector Plan</p>

	villagers to get the appropriate permits and consent Responsibility: LTA/ MWTI/ MNRE/ Villages/Families			
Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
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 Responsibility: MNRE Villages	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 Siumu 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 Forestry Management Act 2011
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/ Villages	Mitigate potential damage from inland flooding Reduce flooding of built up areas Safer villages, houses and roads	Implement Siumu 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
Village pool located in high risk hazard zones (coastal erosion and flooding from fluvial inundation, wave impacts and storm surges)	Village pool is currently in a poor state with an assessment needed for options to either rejuvenate or find a new site depending on the location of springs. Test the quality of the water source before any further investment on the pool is undertaken (eg:	Increase adaptation during drought periods Improve health and sanitation Reduce contamination of water supply	Utilise Hazard Maps and Geomorphologist findings for planning purposes MNRE Water & Sanitation to conduct water testing and analysis of village pool prior to any intervention Update Village bylaws to include managing and maintaining village natural resources	CIM Strategy 2015 Water and Sanitation Sector Plan Community Engagement Plan Village Fono Act (Amendment Bill 2016)

	fence/repair works) Responsibility: CSSP/ NGOs/MNRE/Villages		Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities	
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Pest management; invasive species (african snails and worms affecting taro plantations)	<p>Implement an eradication programme to eradicate, contain or exclude invasive species</p> <p>Replant with climate resilient native species</p> <p>Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken</p> <p>Conduct education and awareness programmes on the impacts of invasive species</p> <p>Implement the Integrated Pest Management Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources</p> <p>Conduct pilot site trials for climate ready plant varieties</p> <p>District to fence domestic animals</p> <p>Responsibility: Villages /District/ MNRE/MAF/ SROS</p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p>	<p>Develop an integrated land management plan for Siumu district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to raise awareness of farmers on impacts to water flows from poor livestock management</p> <p>MAF to assist in establishment of pilot sites to trial climate ready plant varieties</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops</p> <p>MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct campaign on public awareness accordingly</p> <p>Village to manage pig/cattle population (compounds, in particular around water supplies)</p> <p>Training for farmers on pests management particularly affecting fruit trees and crops</p>	<p>AgricultureSectorPlan2 016-2021</p> <p>Draft NESP 2017-2021</p> <p>Samoa's National Invasive Species Action Plan (NISAP)</p>

Governance	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through bylaws	<p>Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes.</p> <p>Collaborate with Sui o Nuu to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Responsibility: MWCS D /Village</p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>	<p>Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>



Saaga Fou Village Map



Sa'aga-Fou 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

6. Maninoa Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant National, Sector Plans and Strategies
Village houses, tourist facilities, road and other village assets high risk hazard zones	<p>Relocate outside of high risk hazard zones when building/infrastructure requires replacement</p> <p>Investments within the hazard zones to adopt appropriate mitigation measures</p> <p>Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones</p> <p>Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas</p> <p>Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ</p> <p>Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges</p> <p>Where reclamations are proposed, Government and district to manage processes by requiring villagers to get the appropriate permits and consent</p> <p>Responsibility: Village / Families /MWTI/ MNRE</p>	<p>Minimise expenditure on damaged properties & personal assets</p> <p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Improve recovery to create more resilient villages</p> <p>Improve preparedness and readiness response to natural disasters</p> <p>Safer villages, houses and roads</p>	<p>Develop an Integrated Catchment and Flood Management Strategy for Siumu District. MNRE to develop zonation strategy for safe areas</p> <p>Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform designs</p> <p>Enforcement of National Building Code 2017</p> <p>Encourage insurance of significant investments and assets within hazard zones</p> <p>Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions</p>	<p>National Building Code</p> <p>CIM Strategy 2015</p>
Reticulated water supply,	Extend the water supply to families inland with no	Increase adaptation during	Develop and register District/Village bylaws to	CIM Strategy 2015

<p>quality and network to be improved</p>	<p>access to water</p> <p>Investigate extension of pipelines from Tiavi reservoir to villagers inland to reduce cost of connecting to pipelines in main South West Coast Road</p> <p>Procure rainwater harvesting systems for vulnerable families as a short term solution</p> <p>Procure rainwater harvesting systems for identified evacuation shelter(s)</p> <p>District to support SWA efforts at exploratory boreholes in district</p> <p>District and villages to support SWA efforts at protecting and conserving boreholes, intakes and catchment areas</p> <p>Responsibility: SWA/ MWCSPP/ MNRE / District/ Village/ CSSP</p>	<p>drought periods</p> <p>Improve infrastructure resilience and rate of recovery</p> <p>Improve health and sanitation</p> <p>Reduce contamination of water supply</p> <p>Reduce impact from inland flooding</p>	<p>include regulating developments around catchment areas and boreholes</p> <p>Implement SWA (2016) 10 year investment plan to improve water supply network to support all inland families without access to drinking water</p> <p>Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems</p> <p>Utilise hazard maps and Geomorphologist findings to inform designs</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of village programmes and responsibilities</p>	<p>Water and Sanitation Sector Plan</p> <p>SWA 10 Year Investment Plan (2016)</p> <p>Community Engagement Plan</p>
<p>Natural Resources and Environment</p>	<p>Best Solutions</p>	<p>Benefits</p>	<p>Guideline to assist with the Implementation</p>	<p>Relevant Sector Plans, National Strategies & Policies</p>
<p>Unsustainable sand mining (commercial and domestic) contributing to coastal erosion and flooding</p>	<p>Identify alternative sustainable sources of sand/rocks for domestic use</p> <p>Research the impacts of sand mining</p> <p>Village consultation on sand mining policy and regulation</p> <p>Village and government to collaborate closely on designated areas for</p>	<p>Mitigate potential damage from coastal erosion and flooding accommodating the hazard</p> <p>Safer villages, houses and roads</p> <p>Reduce impact from coastal erosion</p> <p>Economic</p>	<p>MNRE to continue to identify specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks</p> <p>Undertake assessments of identified sites</p> <p>Undertake consultation with villages affected by proposed sand/rock mining</p> <p>Develop and register District</p>	<p>Draft Soil Resource Management Bill</p>

	<p>sand/rock mining</p> <p>Raise awareness and support of sustainable land use practices</p> <p>Responsibility: MNRE/Village/Families</p>	<p>benefit for village from sustainable sand mining activities</p>	<p>bylaws to include managing and monitoring domestic sand/rock mining of rivers</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of CIM Plan activities</p>	
<p>Marine reserve: Giant Clam</p>	<p>Rejuvenate existing marine reserve</p> <p>Continue to ban the use of dynamites, herbal poisons (ava niukini), chemicals and other unsustainable fishing methods including sand mining and extraction</p> <p>Research improved inshore fishery resources that are resilient to climate change</p> <p>Responsibility: Villages /District/ MNRE/MAF/ SROS</p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p> <p>Protect coral reefs and inshore fisheries</p> <p>Protect marine biodiversity</p> <p>Protects and enhance local species diversity</p>	<p>Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>Village to seek funding to rejuvenate marine reserve</p> <p>MAF to raise awareness of farmers on impacts to water flows from poor livestock management</p> <p>MAF to provide technical advice on pest and disease management processes for fish/marine reserves</p> <p>Village to manage pig/cattle population (compounds, in particular around water supplies) around areas susceptible to flooding</p>	<p>Agriculture Sector Plan 2016-2021</p> <p>Draft NESP 2016-2020</p>
Livelihood and Food Security	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
<p>Pest management; invasive species (african snails, crown-of-thorns, and worms affecting plantations and vegetable gardens)</p>	<p>Implement an eradication programme to eradicate, contain or exclude invasive species</p> <p>Replant with climate resilient native species</p> <p>Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken</p> <p>Conduct education and awareness programmes on the impacts of invasive species</p> <p>Implement the Integrated Pest Management</p>	<p>Maintains natural ecosystem</p> <p>Builds resilience of community livelihood and food security</p>	<p>Develop an integrated land management plan for Siumu district with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area</p> <p>MAF to raise awareness of farmers on impacts to water flows from poor livestock management</p> <p>MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops</p> <p>MNRE, MAF and SROS to implement aggressive, nationwide invasive species eradication programme based on inventory of invasive species and conduct</p>	<p>AgricultureSectorPlan2016-2021</p> <p>Samoa's National Invasive Species Action Plan (NISAP)</p>

	<p>Programme</p> <p>Implement Sustainable Land Management (SLM) practices</p> <p>Build the capacity of farmers to manage stray animals (pigs, cattle) that are contaminating water sources</p> <p>District to fence domestic animals</p> <p>Responsibility: Villages /District/ MNRE/MAF/ SROS</p>		<p>campaign on public awareness accordingly</p> <p>Village to manage pig/cattle population (compounds, in particular around water supplies)</p> <p>Training for farmers on pests management particularly affecting fruit trees and crops</p>	
Governance	Best Solutions	Benefits	Guideline to assist with the Implementation	Relevant Sector Plans, National Strategies & Policies
Strengthen the governance of natural resources and land use through bylaws	<p>Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes.</p> <p>Collaborate with Sui o Nuu to monitor the use of and impact on natural resources</p> <p>Facilitate continuous awareness raising programs with the villages</p> <p>Responsibility: MWCS D /Village</p>	<p>Strengthen implementation of all national sector plans</p> <p>Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies</p> <p>Improve ability of communities to adapt, respond and recover quickly in the long term</p> <p>Improve accountability and enabling environment of communities</p>	<p>Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline</p> <p>Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws</p>	<p>Village Fono Act (Amendment Bill 2016)</p> <p>Community Sector Plan</p> <p>Community Development Plan 2016-2021</p>

Maninoa Village Map

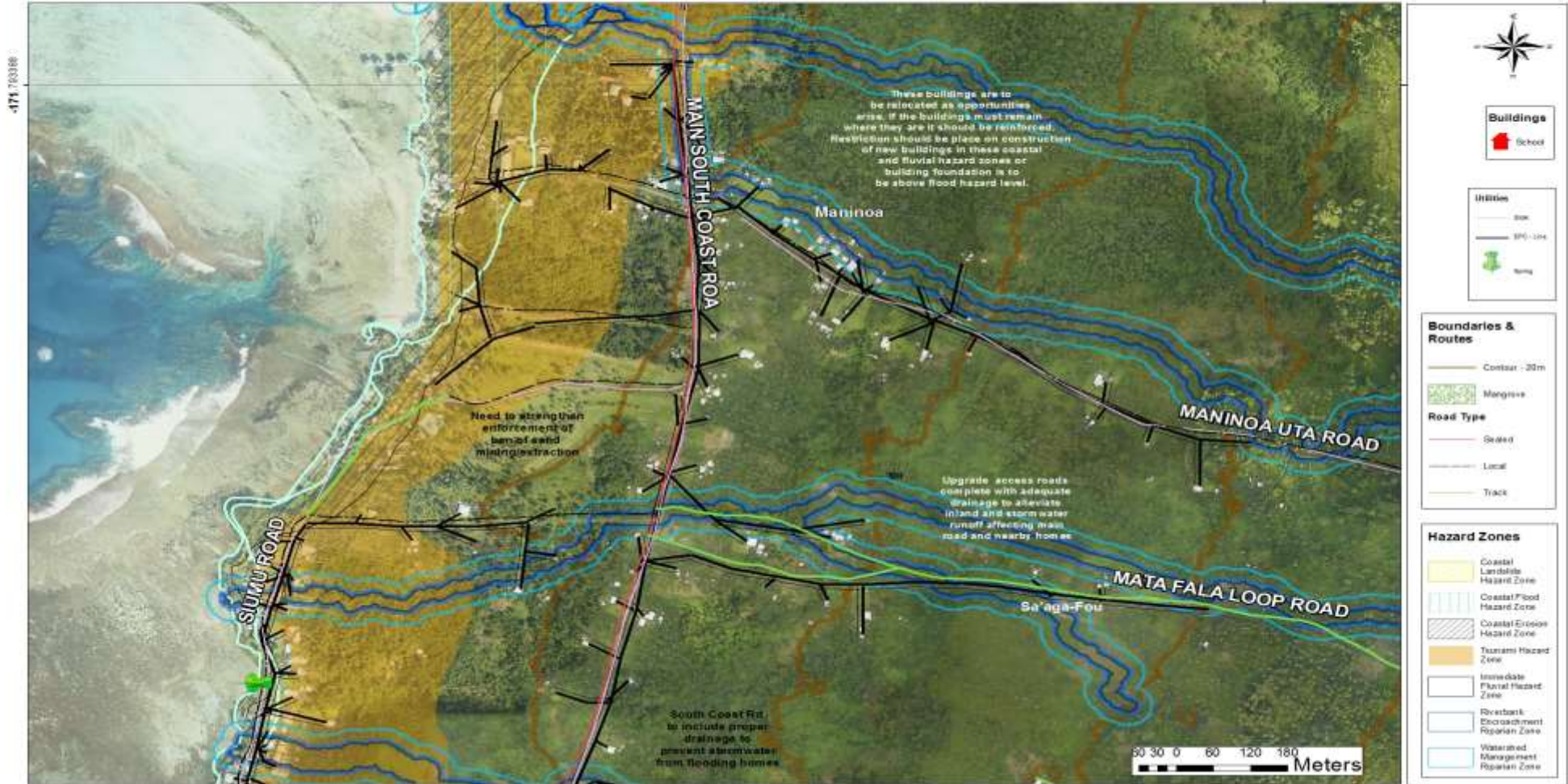


Maninoa Village



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Upolu AF Districts Overview Map of Coastal Inundation Zones

