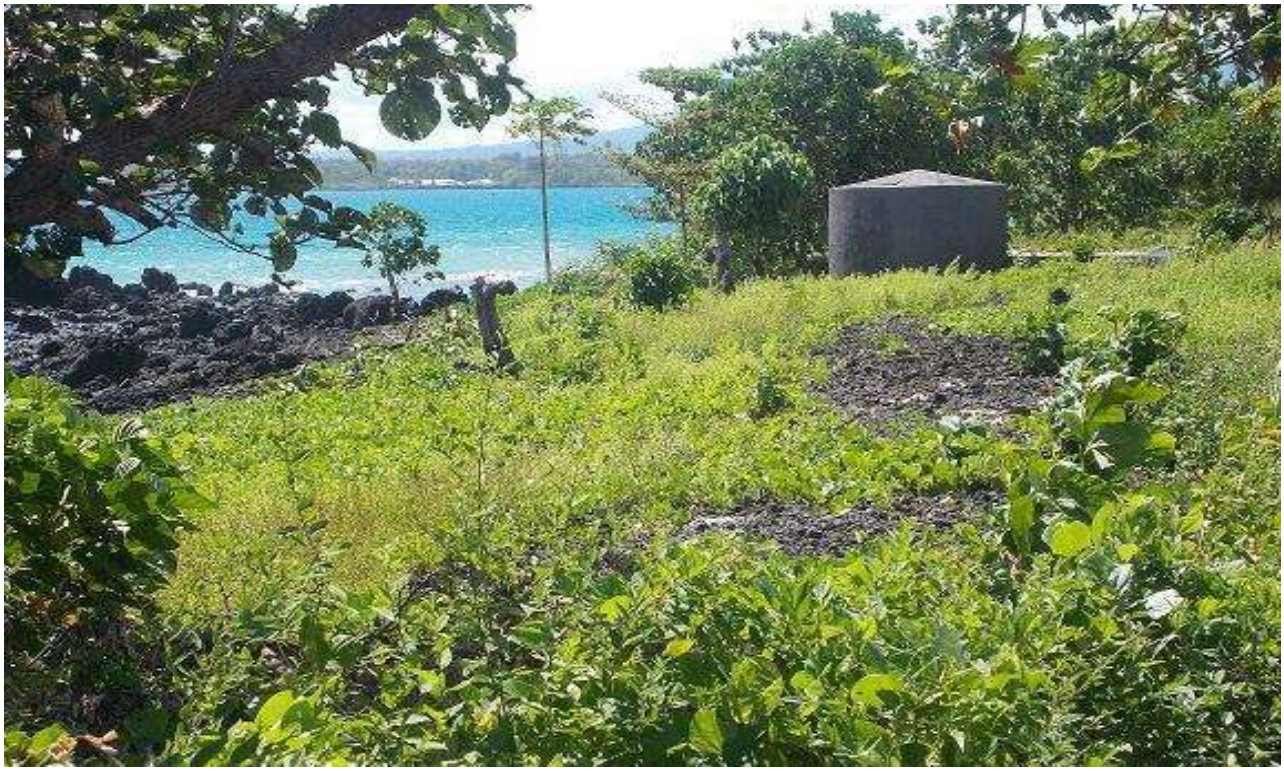
Community Integrated Management Plan

Vaisigano 1 District - Savaii



Implementation Guidelines 2018

Foreword

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

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

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

The CIM 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 Vaisigano 1 (Asau, Vaisala and Auala villages)

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

Date of Signing: 15 June 2018

Representative:	**Signature:**
Asau Village	
• Tufuga Siaosi	
• Masoe Lui	
• Malie Selau	
• Makereta Tufuga	
• Si'uolefanua Ieti	
Vaisala Village	
• Leati Manutai Musika	
• Alaelua Salefu	
• La'afaua Maafi	
• Alo Saualofa	
• Lanuola Leatimanutai	
Auala Village	
• Fuatino Lavalufo	
• Ta'avao Tiaina	
• Momoitu Sauni	
• Matamea Sauloa	
• Liufau Siaosi	

The Government of Samoa adopts the Community Integrated Management Plan for the Faipule District of Vaisigano1as a Management Plan for the Implementation of the Community Integrated Management Strategy (CIMS).

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

Ulu Bismarck Crawley
CHIEF EXECUTIVE OFFICER, MNRE

Acronyms

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

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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	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: *ASCHs* (areas sensitive to coastal hazards); *CEHZs* (coastal erosion hazard zones); *CFHZs* (coastal flood hazard zones) and *CLHZs* (coastal landslip hazard zones) *CIHZ* (coastal inundation hazard zones) - 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) *IFHZ* (immediate fluvial hazard zone) within the steep banks of the river gorges - 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

1. Introduction to the CIM Plan

1.1 The Strategic Vision

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

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

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

1.2 The Aim of the CIM Plan

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

The CIM Plan will:

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

1.3 Structure of the Plan

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

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

2. Implementation Guidelines

2.1 Purpose of the Implementation Guidelines

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

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

2.2 Duration of the Plan

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

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

2.3 Financing of the Plan

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

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

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

- ***Community Engagement Plan (CEP)*** - the guidelines provided in the CEP is an excellent capacity building

tool that can be used by CSO's and village communities themselves to aid development of small grant proposals to existing small grant funding mechanisms like CSSP and the UNDP-GEF SGP.

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

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

3. Description of Vaisigano 1 District

3.1 Physical and Natural Resource Setting

The Faipule District of Vaisigano 1 is located at the north-western end of the island of Savaii. It includes the villages of Asau, Auala and Vaisala. The coastline has cliffs and bays with some coral reefs offshore with some areas exposed to sea storms. Access to reefs from the sheltered bays allows for fishing activities. The district faces north and is exposed to sea storms although the terrain offers some protection.

The three villages are located around the edge of a small lagoon formed by a reef system that links two hard lava headlands at either end of the district. Typically the coast inside the lagoon forms irregular lava headlands with intervening bays which, in turn, form sandy pocket beaches. At Vaisala the "pocket" beach is about 800m long and forms a sand berm with low-lying fresh-water pools and wetland behind it. It now consists of grass with some large freshwater pools. The pools are used by Vaisala village as their communal pools and the area is not open to the sea. The reef system is approximately 500m off-shore from Vaisala but extends up to 1.5km from the settlements of Asau and Auala. Inland behind the villages are plantations while further to the east is forest.

For the entire Vaisigano1 district there is about 5,854 hectares of land. The eastern end of the district coastline forms a bay protected by a substantial sand-spit and reef system (previously the site of the original airfield) which has created a natural harbour. The harbour is used by the Samoa Ports Authority (SPA) for a wharf providing access for oil products and movement of timber from the sawmill. This area also hosts the Asau Airstrip. The wharf is currently non operational while SPA conducts feasibility studies to ascertain how to safely deepen the channel without causing any major environmental impacts. The main entrance to the lagoon is at the western end of the Asau/Auala bay and has been cut into the coral and sand as much as possible. Further upgrading would require blasting or cutting into the underlying solid rock. The entrance is skewed to the west so that the bay is still protected from the north by the coral/sand-spit system. A second, smaller, entrance is located almost opposite the Vaisala Beach Hotel. The Asau Marine Reserve implemented by the Ministry of Agriculture and Fisheries (MAF) in collaboration with the Asau village council is located near the harbour. The Ministry of Natural Resource and Environment (MNRE) also has a Forestry Division Office located in Asau.

The major agricultural ecological zone is described as mainly wet climate including small areas with moderate dry season near the coast. The inland areas of the district has gently rolling landscape but without deep gorges.
The dry conditions of the Vaisigano1 district in particular, makes it extremely vulnerable to wild fire as has been observed since 1983. Such wild fires are suspected to have also contributed to the decreased number of snakes (Pacific boa) found in the area. Snakes used to be common in Vaisigano 1 and neighbouring districts but as their natural habitats have largely been destroyed by logging operations, the snakes are now rare in the district. The lowland forests of Vaisigano 1 and Alataua-west have been heavily logged that only small remnants of the original species are scattered in these once rich forested areas (Reti, 2016).

Most of the original native species logged in the 1970s were replaced by exotic tree species plantations by the government to sustain the timber industry. Extensive damage to these plantations was caused by cyclones Ofa and Val in 1990 and 1991. There are currently new efforts by the government and various NGOs to conserve remaining upland areas and biodiversity of Vaisigano 1 and other neighbouring districts. Some of the native plants and birds of Samoa are believed to be found only on these upland forest areas.

There are 11[1] roads within this District, 10 of which connect to the main North Coast Road. All 11 roads are in LTA's normal road maintenance programme. Part of the main North Coast Road running through Vaisalalies just outside of the Coastal Erosion Hazard Zone (CEHZ), Coastal Flood Hazard Zone (CFHZ) and Coastal Inundation Hazard Zone (CIHZ), as it was relocated and rebuilt after cyclones Val and Ofa. The junction of the North Coast Road and Asau Harbour Road and for another approximately 500metres to the west of the Asau EFKS Church, lies in a very high risk area. This small section of road sits in a combination of four (4) hazards; CEHZ, CFHZ, CIHZ and the tsunami shore exclusive zone. The location of the main North Coast Road and the Asau Harbour Road creates a barrier between village houses and the village pools which are important social and community centres. Development is characteristically "ribbon-like", along the main North Coast Road, which provides easy access to the main services and direct access to the lagoon.

[1]Asau Road 1, Asau Road 2, AsauHarbour Road, Asau Airstrip Road, Auala Access Road, Vaisala Loop Road, Vaisala Road 1, Vaisala Road 2, Vaisala Road 3 and Vaisala Road 4

There remains some development between the main road and the coast although most development in all three villages is inland. There are new developments in Auala (refer photo in Auala interventions) that are sitting in a high risk area with a combination of three hazards; immediate inundation zone (CEHZ and CFHZ), fluvial hazard zone and the tsunami shore exclusive zone. Village pools in Vaisala and Auala are either close to or located on the beach.

3.2 Social and Economic Setting

The District of Vaisigano 1 has a total population of 2,105; female 1,042 and male 1,063. This figure does not include the village of Utuloa which has a total population of 20; 10 male and 10 female. There are four schools within Vaisigano 1; the Itu Asau No.1 District College, Asau Primary School, Auala Primary School and Vaisala Primary School.

Vaisigano 1 comprises of sandy beaches upon which their ecotourism industry is based. While this may prove economically beneficial for the coastal area residents, the negative impact is felt on the lowland forest areas where important forests have been cleared to accommodate these tourism projects. Close monitoring of people movement will be important to minimise the negative impacts on forested lands (Reti, 2016). Sand mining remains an issue although several bans have been put in place to control such activities especially for large scale commercial operations. There is evidence of recent efforts to protect coastal areas from erosion and flooding through tree planting initiatives. These community-initiated efforts need support and encouragement from government and other concerned organizations (Reti, 2016).

The district is the site of a number of significant economic activities including the wharf, the Mobil storage tanks for diesel and petrol next to the wharf and the Airport (at present not operated by scheduled flights). All of these activities are located in Asau and take advantage of the natural harbour. There is potential for further development around the wharf area to allow larger cruise ships to land at Asau however there is also potential for adverse environmental impacts noting further deepening of the channel would require blasting or cutting into the underlying solid rock. Upgrading the entrance to take larger boats would require significant investment as it would also need to consider the harbour is located within the CEHZ, CFHZ and the tsunami shore exclusive zone.

There are 3 tourist accommodations in Vaisigano 1 district; the Vaisala Beach Hotel, Auga Seaside Resort and Vai-i-Moana Resort which are also significant economic activities for the district providing employment for people from the villages. They are also major clients for locally grown products such as taro, banana, vegetables, local oranges and freshly caught fish by local fishermen. There are a number of small stores, a bakery and a petrol station in the district and a currency conversion facility within the Vaisala Hotel. Village activities are dominated by fishing, particularly in the lagoon, and plantation work. Some larger plantations ship their products to Apia to service hotels and restaurants and also export to overseas markets.

3.3 Climate Risk and Resilience

The use of LiDar mapping data, hydrologist and geomorphologist data and findings for this district has helped determine inland and coastal hazard zones and high risk areas for Vaisigano 1 (refer District Map). The immediate risks for Vaisigano 1 are from coastal inundation, storm surges and inland flooding. This is further exacerbated by inadequate drainage on the main North Coast Road as well as the 'major' access roads.

Some village houses and assets are located within the tsunami shore exclusive zone also known as the "tsunami red zone". The number of households that have ownership to agriculture land in the district is estimated to be 530-570. The Watershed Management Riparian Zone is a 20m buffer on either side of the river banks. Healthy riparian areas are vital to the health of stream ecosystems and the entire watershed as well. Many of the threats to our rivers and streams are directly related to physical changes to these areas and loss of vegetation. It is therefore recommended that a topographic and geomorphological assessment be carried out first if construction of any infrastructure is proposed within this buffer zone (Tokalauvere, 2017). The majority of buildings in the village are located in the CFHZ area and the Tsunami evacuation zone Orange. All three primary schools are located within the fluvial hazard zones. Vaisala Primary School in particular is located in a high risk area prone to flooding (immediate fluvial and immediate inundation zones).

The more substantial sand-spit at the eastern end provides some protection to the lagoon and infrastructure in this area. However, the distance of the sand-spit from the shore and the depth of the lagoon may enable large waves to re-form when seas are high. On-shore the underlying rock is porous and there is little surface water and no permanently flowing streams. Because of the porous nature of the lava and rocky soils, the wetlands at Vaisigano 1

are devoid of water in most times (Reti, 2016). Restoration of native forests species increases the resilience of the forest against droughts, invasive species, fires and cyclones. The forest provides valuable ecological services downstream along the catchment (Dews, 2016).

This district has a narrow coastal plateau. The coastal plateau rises steeply into the mountain region that supports forests. The areas at the base of the mountains support cocoa and coconut plantations. The exposure to the sea winds and the shallow soils do not support extensive mixed cropping on the coastal strip. Plantations are at more risk to damage from storm activities the closer they are situated to the coast. The agricultural areas can be subject to long periods of days without rain that will impact on household crops. The management of water surface runoff will increase resilience of local livelihoods.

4. Vaisigano1 District Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Main North Coast Rd: exposure to high risk hazard zones (inundation, fluvial and tsunami shore exclusive zone)	Investigate relocating main road inland (approx length 2km) from the coast as **long term solution** for high risk hazard area in Asau where road sits less than 5mtrs from the tsunami shore exclusive zone, the immediate inundation and fluvial zones. Area also identified in *Assessment of the Samoa Road Network* and *Road Network Adaptation Strategy* as medium severity from coastal hazards Where reclamations, sand mining or other major coastal works are proposed Government and village to manage processes by requiring villagers to get the appropriate permits and consent ***Responsibility: LTA /MWTI/ MNRE/ Villages/Families***	Improve infrastructure resilience and rate of recovery Improve Preparedness and readiness response to natural disasters Reduce impact from coastal erosion and natural disasters Safer villages, houses and roads Minimise national disaster recovery expenditure on damaged properties and public assets	Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Community Sector Plan Vulnerability Assessment of the Samoa Road Network (2016) and Road Network Adaptation Strategy, LTA
Village houses, school, churches, government and other village assets in high risk hazard zones	Relocate outside of high risk hazard zones when building/infrastructure requires replacement Investments within the hazard zones to adopt appropriate mitigation measures Conduct awareness raising campaign on flood resilient building practices and designs	Minimise expenditure on damaged properties & personal assets Mitigate potential damage from coastal erosion and flooding accommodating the hazard Improve recovery to create more resilient villages	MNRE to develop zonation strategy for safe areas Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to inform designs Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Designation of the IFHZ,	National Building Code CIM Strategy 2015

	for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges Where reclamations are proposed, Government and district to manage processes by requiring villagers to get the appropriate permits and consent ***Responsibility: Village / Families /MWTI/ MNRE***	Improve preparedness and readiness response to natural disasters Safer villages, houses and roads	CEHZ and CFHZ as an "at risk" zone with appropriate landuse planning controls and restrictions	
Drainage systems require maintenance and upgrade in high risk areas of main South Coast Road especially at junctions of Access Rd	Upgrade drainage and culverts in accordance with *Vulnerability Assessment of the Samoa Road Network* recommendations Implement national standards for culverts and drains to facilitate the overland flow of storm water and reduce flooding Implement regular drainage inspection and maintenance	Improves climate resilience of infrastructure resilience and rate of response and recovery to natural hazards and disasters Minimises national disaster recovery expenditure on damaged properties, public and private assets	Use existing information for guidance but not limited to: *"Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)"* Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Community Sector Plan

	Responsibility: LTA /MWTI/MWCSD /Village/ Families		undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs Develop and register District/Village bylaws to include maintenance of drainages and illegal rubbish dumping into waterways	
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting rainwater harvesting systems for vulnerable families as a short term solution District and villages to support SWA water rationing programs during times of drought District to support SWA efforts at exploratory boreholes in district ***Responsibility: SWA /MNRE/ District /Villages/ CSSP***	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Develop/Update and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA (2016) 10year investment plan to improve water supply network to support all inland families without access to drinking water Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems Utilize Hazard Maps and Geomorphologist findings to inform location and design Utilize Sui o Nu'u monthly meetings to monitor progress of village programs and responsibilities	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan(2016) Community Engagement Plan
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter	Improve resilience of public infrastructure Improve preparedness and readiness	Enforcement of National Building Code 2017 Utilise hazard maps and Geomorphologist findings to inform location and designs	National Disaster Management Plan 2017-2021 National Building Code National Policy for

	Develop a Village Climate Disaster Management Plan (VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement CDCRM program Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters Where no suitable houses exist, build emergency shelter(s) outside the hazard zones Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter ***Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD***	response to natural disasters		People with Disabilities
Electricity supply	Provide underground lines in the long term Install and connect power supply for inland residents Relocate overhead lines to a more resilient location when being replaced Install streetlights along the roads where needed for community safety Install and connect to solar power supply if	Maintain electricity supply at all times including natural disasters Avoid accidents from fallen electricity posts	Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan

	made available Families to limit building and developments near electricity posts ***Responsibility: EPC/ MWTI/ Village/ Families***			
Beach nourishment / offshore breakwaters	Investigate beach replenishment at critical locations along the beach as **long term alternative** option to protect coastal road and other assets against inundation, coastal erosion and natural disasters Where reclamations, sand mining, extraction or other major coastal works are proposed, Government and village to manage processes by requiring villagers to get the appropriate permits and consent *R**esponsibility: MNRE/ STA/ Village /Families***	Improve infrastructure resilience and rate of recovery Maintains natural ecosystem connectivity Reduce impact from coastal erosion Safer villages, houses and roads Minimise expenditure on damaged properties & personal assets	Undertake EIA Utilise recommendations of EIA and lessons learnt from Manase beach replenishment project to design beach replenishment to suit Vaisigano 1 district conditions Benefit cost analysis to include appropriate design loads and engineering design and supervision costs on top of capital work estimates	CIM Strategy 2015 PUMA Act NISP 2011 KESO 5 NESP 2017-2021 Tourism Sector Plan Vaisigano 1 District Plan
Natural Resources and Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Vaisigano 1 District Upland Forest	Formally declare Vaisigano 1 Upland Forest a Key Protected Area (KPA) Enforce Watershed Management Riparian Zone and Riverbank Encroachment Control and regulate developments around the upland forest area Conduct campaign for public awareness and establish a "neighbourhood watch" agreement with district to monitor and report on	Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from inland flooding	Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Develop a Forestry Conservation Programme/ Implementation Plan for Fa'asaleleaga 4 District Develop and register District/Village bylaws to include penalizing illegal deforestation in district lands Utilise Sui o Nu'u monthly	Forestry for Sustainable Development Policy NESP 2017-2021

	illegal deforestation District/village councils to help promote the development of the agroforestry sector by encouraging relevant land use practice and where possible resolve any associated land disputes Government, district and villages to monitor, report and apply penalty on offenders ***Responsibility: MNRE / District/Village/CSSP***		meetings to monitor progress of district/village forestry programmes	
Sand mining	Continue ban on sand mining Research on the impacts of sand mining Village consultation on sand mining policy and regulation ***Responsibility: MNRE/ Village***	Mitigate potential damage from coastal erosion and flooding accommodating the hazard Safer villages, houses and roads Reduce impact from coastal erosion	MNRE to continue to identify specific sites for inshore/inland sustainable sand/rock mining to meet demand without compromising riverbanks Undertake assessments of identified sites Undertake consultation with villages affected by proposed sand/rock mining Develop and register District bylaws to include managing and monitoring domestic sand/rock mining of rivers	Draft Soil Resource Management Bill
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	Soft coastal protection measures will support and strengthen existing and new infrastructure along the coast Reduce impact from coastal erosion and natural disasters	Develop an integrated land management plan for Vaisigano 1 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	Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020 Forestry Management Act 2011

	wave barrier, a minimum distance of 200m of vegetation is needed ***Responsibility: MNRE/ MAF/Villages***	Implements an Ecosystem Based Approach	MNRE Forestry, DEC and MAF to collaborate on supply of climate resilient crops	
Governance	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Strengthen the governance of natural resources and land use through Bylaws	Update and/or develop bylaws to manage the use of natural resources, and to control land use impacts; such as drainage maintenance, rubbish dumping, sand mining, stray animals and unregulated developments in water catchment areas and near boreholes. Collaborate with Sui o Nuu to monitor the use of and impact on natural resources Facilitate continuous awareness raising programs with the villages ***Responsibility: MWCSD /Village***	Strengthen implementation of all national sector plans Strengthen monitoring of all National Acts, Regulation, Strategies, Plans and Policies Improve ability of communities to adapt, respond and recover quickly in the long term Improve accountability and enabling environment of communities	Develop and register district/village bylaw to protect all district/ village and government assets, environment, livelihood and food security especially activities affecting water catchment areas and coastline Utilise Sui o Nu'u monthly meetings to monitor progress of district/village bylaws	Village Fono Act (Amendment Bill 2016) Community Sector Plan Community Development Plan 2016-2021

Vaisigano 1 District Map

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

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

5. Asau Village Interventions

CIM Plan Solutions

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

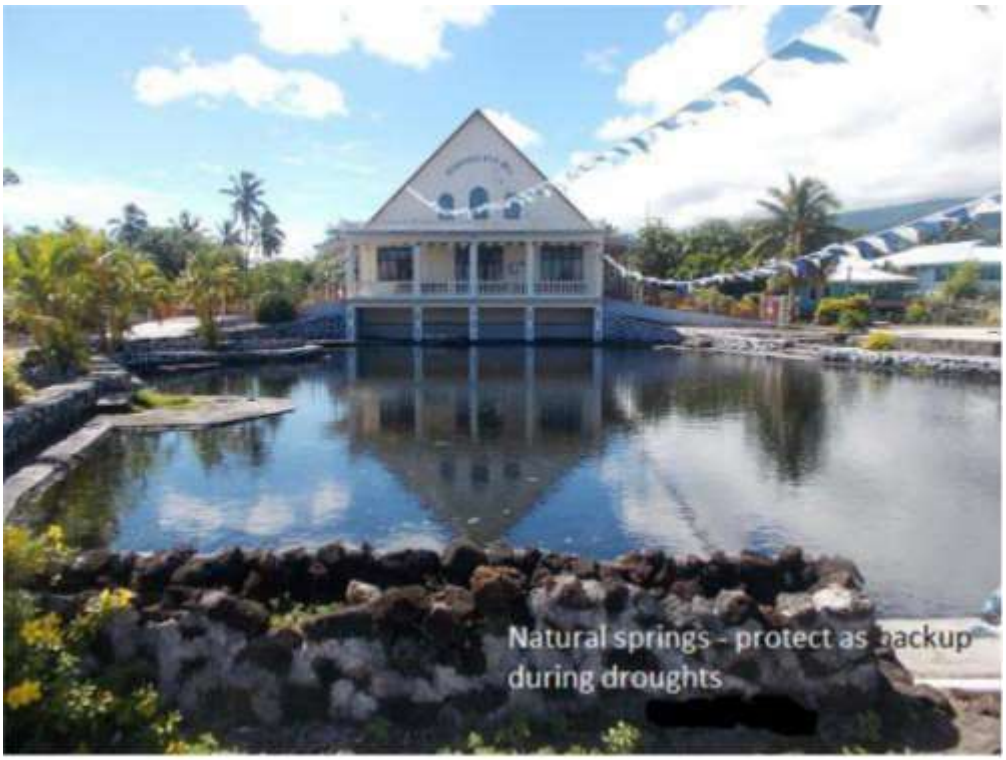
	and consent ***Responsibility: Village / Families /MWTI/ MNRE***			
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter Develop a Village Climate Disaster Management Plan (VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement CDCRM program Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters Where no suitable houses exist, build emergency shelter(s) outside the hazard zones Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter ***Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD***	Improve resilience of public infrastructure Improve preparedness and readiness response to natural disasters	Enforcement of National Building Code 2017 Utilise hazard maps and Geomorphologist findings to inform location and designs	National Disaster Management Plan 2017-2021 National Building Code National Policy for People with Disabilities

Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting rainwater harvesting systems for vulnerable families as a short term solution District and villages to support SWA water rationing programs during times of drought District to support SWA efforts at exploratory boreholes in district ***Responsibility: SWA /MNRE/ District /Villages/ CSSP***	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply Reduce impact from inland flooding	Develop/Update and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA (2016) 10year investment plan to improve water supply network to support all inland families without access to drinking water Include in budget programming design, and extension costs of water supply and procurement of rainwater harvesting systems Utilize Hazard Maps and Geomorphologist findings to inform location and design Utilize Sui o Nu'u monthly meetings to monitor progress of village programs and responsibilities	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan(2016) Community Engagement Plan
Natural Resources and Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Village pool located in high risk hazard zones (coastal erosion and flooding from fluvial inundation, wave impacts and storm surges)	Village pool is currently in the hazard zone with an assessment needed for options to protect it. 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***	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

Marine Reserve and inshore fishery resources	Village to restock marine reserve with suitable species Collect and dispose of crown-of-thorns (alamea) on a regular basis to prevent major outbreaks Continue to ban the use of dynamites, herbal poisons (avaniukini), chemicals and other unsustainable fishing methods including sand mining and extraction Enforce village bylaws on ban on rubbish dumping in coastal areas ***Responsibility: Village/ MAF/ CSSP***	Protect coral reefs and inshore fisheries Protect marine biodiversity Protects and enhance local species diversity Sustains ecosystem services and functions	MAF Fisheries to support implementation and provide technical backstopping and monitoring Develop Village Bylaws to include management of natural resources (spring pools, marine reserve, forest etc)	Agriculture Sector Plan 2016-2021 Community Engagement Plan
District/ Village Deforestation of Upland Forest	Formally declare Vaisigano District Upland Forest a Key BiodiversityArea (KPA) Village councils to support KBA through banning of cultivation and clearing of forests on steep slopes to minimize the risk of erosion and land slips Conduct campaign for public awareness of KBA and establish a "neighbourhood watch" agreement with district to monitor and report on illegal deforestation District/village councils to help promote the development of the agroforestry sector by encouraging relevant land use practice and where possible resolve any associated land	Protects and enhance local species diversity Sustains ecosystem services and functions Reduce contamination of water supply Reduce impact from inland flooding	Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and ecosystems of the area Develop a Forestry Conservation Programme / Implementation Plan for Vaisigano 1 District Update and register Asau 1999Village bylaws to include penalizing illegal deforestation in district lands	Forestry for Sustainable Development Policy Logging Code Vaisigano 1 District Plan Asau Village Bylaws Village Fono Act(Amendment Bill 2016) Community Engagement Plan

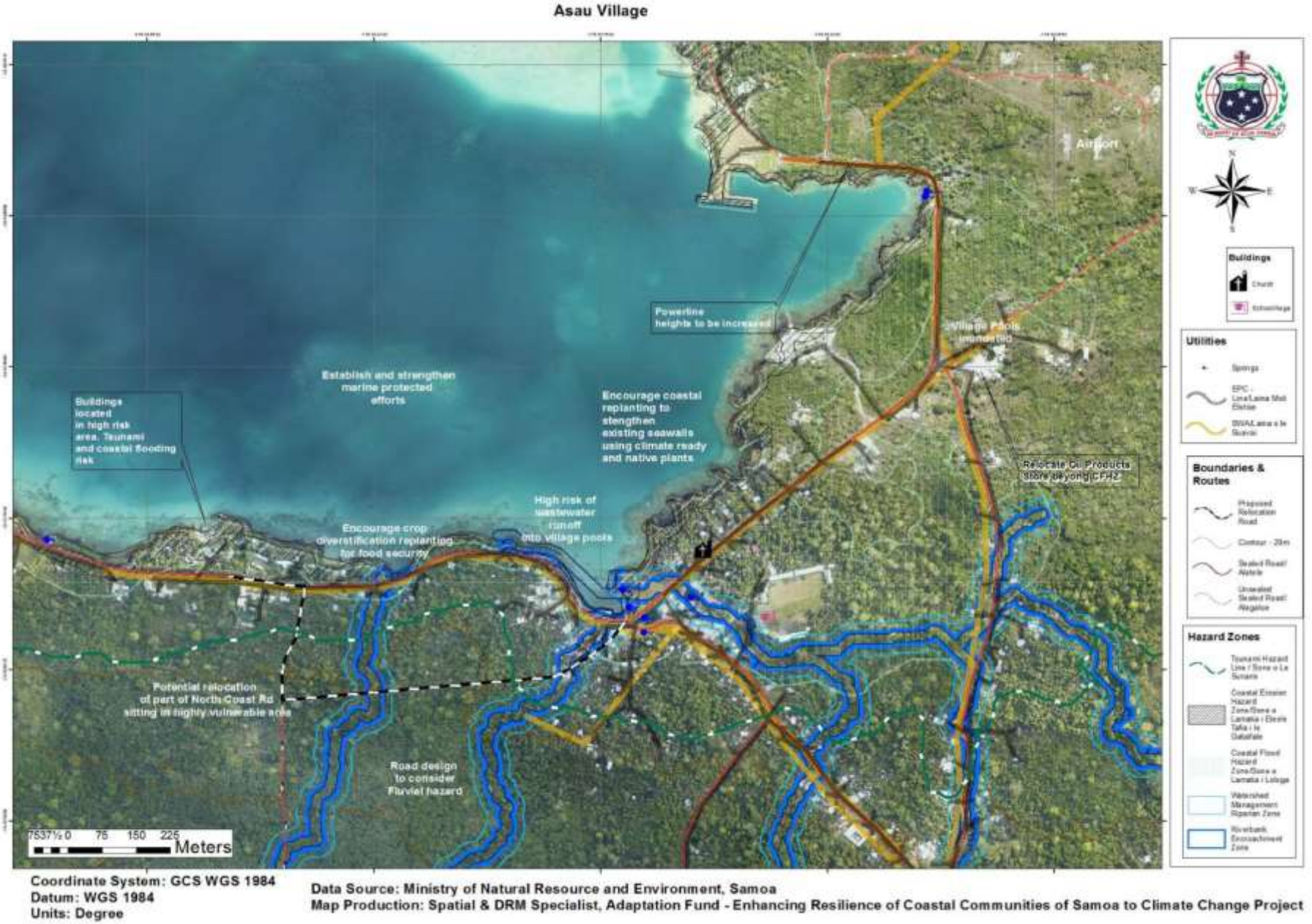
	disputes Government, district and villages to monitor, report and apply penalty on offenders ***Responsibility:MNRE/ District/Village / CSSP***			
Livelihood and Food Security	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Pest management; invasive species	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	Maintains natural ecosystem Builds resilience of community livelihood and food security Reduce forest loss and land clearance	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 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)	Agriculture Sector Plan 2016-2021 Draft NESP 2017-2021 Samoa's National Invasive Species Action Plan (NISAP)

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


Natural springs - protect as backup
during droughts


community development

Asau Village Map



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

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

6. VaisalaVillage Interventions

CIM Plan Solutions

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

	district to manage processes by requiring villagers to get the appropriate permits and consent ***Responsibility: Village / Families /MWTI/ MNRE***			
Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter Develop a Village Climate Disaster Management Plan (VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement CDCRM program Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters Where no suitable houses exist, build emergency shelter(s) outside the hazard zones Retrofit identified and approved schools or churches outside hazard zones and designate as	Improve resilience of public infrastructure Improve preparedness and readiness response to natural disasters	Enforcement of National Building Code 2017 Utilise hazard maps and Geomorphologist findings to inform location and designs	National Disaster Management Plan 2017-2021 National Building Code National Policy for People with Disabilities

	evacuation shelter ***Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD***			
Seawall: Coastal protection for most vulnerable area	Upgrade or strengthen existing rockwalls in areas where road sits less than 5mtrs from the tsunami shore exclusive and immediate inundation zones as **short term solution** Implement beach replenishment at critical locations along the beach to protect coastal road and infrastructure against inundation and coastal erosion Where reclamations, sand mining or other major coastal works are proposed Government and village to manage processes by requiring villagers to get the appropriate permits and consent ***Responsibility: LTA /MWTI/ MNRE/ Villages/Families***	Minimise expenditure on damaged properties & personal assets Mitigate potential damage from coastal erosion and flooding accommodating the hazard Maintain lifeline access for all of Savaii Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters Safer villages, houses and roads	Use existing information for guidance but not limited to: *"Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)"* Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Community Sector Plan
Reticulated water supply, quality and network to be improved	Extend the water supply to families inland with no access to water Procure rainwater harvesting rainwater harvesting systems for vulnerable families as a short term solution	Increase adaptation during drought periods Improve infrastructure resilience and rate of recovery Improve health and sanitation Reduce contamination of water supply	Develop/Update and register District/Village bylaws to include regulating developments around catchment areas and boreholes Implement SWA (2016) 10year investment plan to improve water supply network to support all inland families without access to drinking water Include in budget	CIM Strategy 2015 Water and Sanitation Sector Plan SWA 10 Year Investment Plan(2016) Community Engagement Plan

	District and villages to support SWA water rationing programs during times of drought District to support SWA efforts at exploratory boreholes in district ***Responsibility: SWA /MNRE/ District /Villages/ CSSP***	Reduce impact from inland flooding	programming design, and extension costs of water supply and procurement of rainwater harvesting systems Utilize Hazard Maps and Geomorphologist findings to inform location and design	
Electricity supply	Provide underground lines in the long term Install and connect power supply for inland residents Relocate overhead lines to a more resilient location when being replaced Install streetlights along the roads where needed for community safety Install and connect to solar power supply if made available Families to limit building and developments near electricity posts ***Responsibility: EPC/ MWTI/ Village/ Families***	Maintain electricity supply at all times including natural disasters Avoid accidents from fallen electricity posts	Monitor distribution networks to avoid overloading poles and contributing to line failures	EPC Strategic Plan

Natural Resources and Environment	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant Sector Plans, National Strategies & Policies
Coral reefs, lagoons and inshore fishery	Collect and dispose of crown-of-thorns (alamea) on a regular basis to prevent major outbreaks Ban the use of dynamites, herbal poisons (avaniukini), chemicals and other unsustainable fishing methods. Implement awareness program on marine resources ***Responsibility: Village, MAF / MNRE***	Protect coral reefs and inshore fisheries Protect marine biodiversity	MAF Fisheries to support implementation and provide technical backstopping and monitoring Update and register Vaisala 2007 Village bylaws to include management and maintenance of natural resources	Agriculture Sector Plan 2016-2021 Vaisala Village Bylaws
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 Vaisigano 1 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	Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020 Forestry Management Act 2011
Livelihood and Food Security	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Pest management; invasive species	Implement an eradication programme to eradicate, contain or exclude invasive species	Maintains natural ecosystem Builds resilience of community	Develop an integrated land management plan with the aim of reducing any unnecessary actions that may adversely affect the natural habitats and	Agriculture Sector Plan 2016-2021 Draft NESP 2017-2021

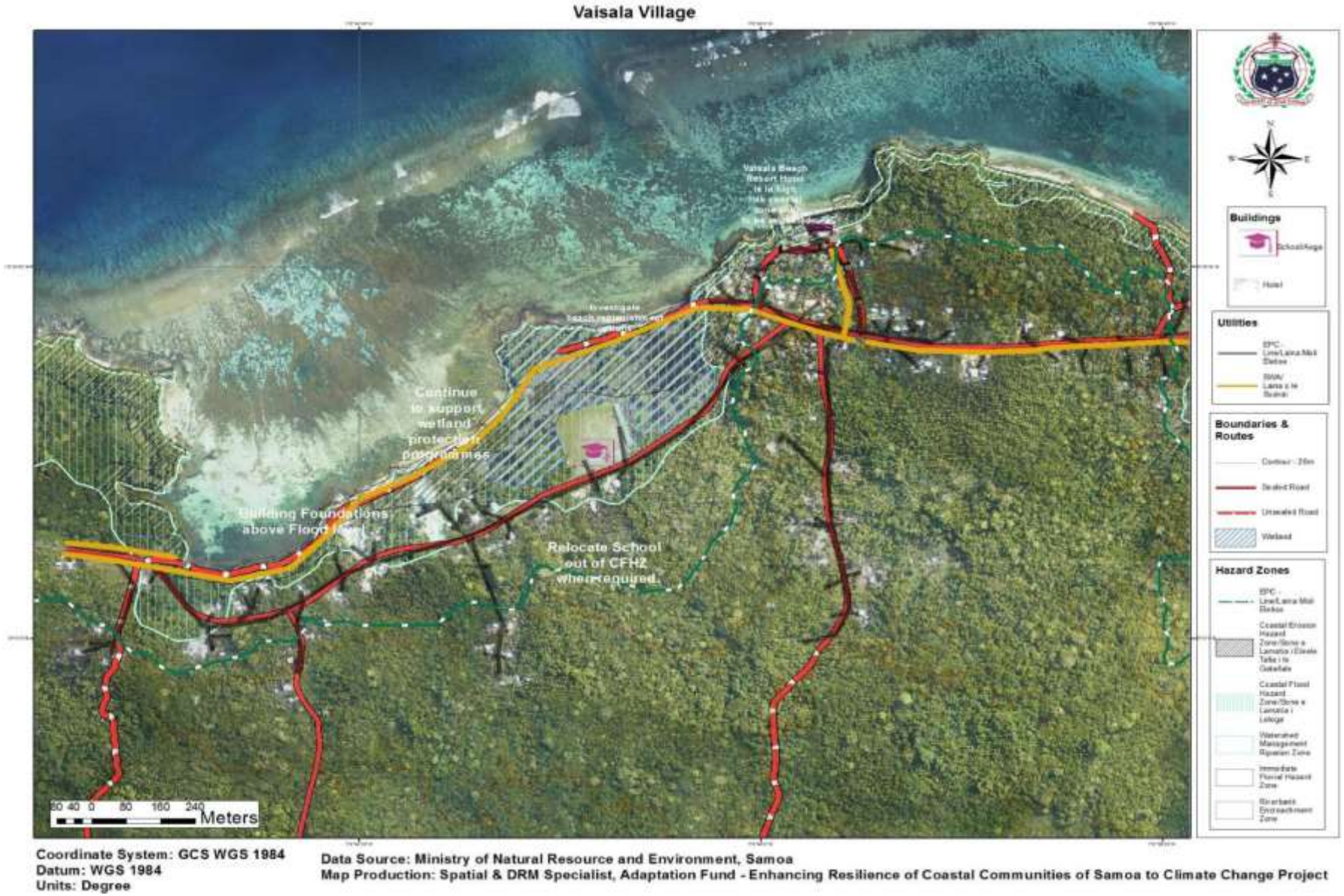
	Replant with climate resilient native species Implement an inventory of invasive species and include information on their past, present and potential future distribution, as well as impacts and possible actions that can be taken Conduct education and awareness programmes on the impacts of invasive species 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 ***Responsibility: Villages /District/ MNRE/MAF/ SROS***	livelihood and food security Reduce forest loss and land clearance	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	Samoa's National Invasive Species Action Plan (NISAP)

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


Unsealed inland access road


Exposed main waterline

Vaisala Village Map



7. Auala Village Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guideline to assist with the implementation	Relevant National, Sector Plans and Strategies
Village houses, Churches, tourist facilities and other village assets located in high risk hazard zones	Relocate outside of high risk hazard zones when building/infrastructure requires replacement Investments within the hazard zones to adopt appropriate mitigation measures Conduct awareness raising campaign on flood resilient building practices and designs for at risk communities living in and near high risk hazard zones Design infrastructure to take into account the immediate hazard zones; for example, raise floor levels of houses in flood prone areas Develop landuse planning and development controls to restrict developments within high risk hazard zones such as CEHZ and CFHZ Families and village to limit building and developing on natural overland flow paths exacerbating inland flooding and storm water surges ***Responsibility: Village / Families /MWTI/ MNRE/ MWCSD***	Minimise expenditure on damaged properties and personal assets Safer villages, houses and roads Increases awareness for insurance	Planning provisions to be guided by the Planning and Urban Management Act 2004 Enforcement of National Building Code 2017 Encourage insurance of significant investments and assets within hazard zones Utilise hazard maps and Geomorphologist Drainage Infrastructure Database to determine safe areas for relocation purposes Designation of the IFHZ, CEHZ and CFHZ as an “at risk” zone with appropriate landuse planning controls and restrictions	CIM Strategy 2015 National Building Code

Evacuation Shelter and a connected escape route needed for emergency preparedness and response	Assess and/or select location for either an existing or new evacuation shelter, including safe access routes to the shelter Conduct evacuation shelter assessment and mark on CIM Plan hazard maps Develop a Village Climate Disaster Management Plan (VCDMP) Conduct trainings for People With Disabilities (PWDs) on emergency and disaster response strategies Implement CDCRM program Install relevant signs to guide the community on emergency response procedures and to locations of evacuation shelters Where no suitable houses exist, build emergency shelter(s) outside the hazard zones Retrofit identified and approved schools or churches outside hazard zones and designate as evacuation shelter ***Responsibility: MNRE /DMO/ MWTI/Village /CSSP/Council of Churches/MWCSD***	Improve resilience of public infrastructure Improve preparedness and readiness response to natural disasters	Enforcement of National Building Code 2017 Utilise hazard maps and Geomorphologist findings to inform location and designs	National Disaster Management Plan 2017-2021 National Building Code National Policy for People with Disabilities
Seawall: Coastal protection for most vulnerable area	Upgrade or strengthen existing rockwalls in areas where road sits less than 5mtrs from the tsunami shore exclusive and immediate inundation zones as **short term solution**	Minimise expenditure on damaged properties & personal assets Mitigate potential damage from	Use existing information for guidance but not limited to: *"Vulnerability Assessment of the Samoa Road Network (2017)"; "Review of National Road*	CIM Strategy 2015 TSP2014-2019 Goal 2 KO 1 Community Sector Plan

	Implement beach replenishment at critical locations along the beach to protect coastal road and infrastructure against inundation and coastal erosion Where reclamations, sand mining or other major coastal works are proposed Government and village to manage processes by requiring villagers to get the appropriate permits and consent ***Responsibility: LTA /MWTI/ MNRE/ Villages/Families***	coastal erosion and flooding accommodating the hazard Maintain lifeline access for all of Savaii Improve recovery to create more resilient villages Improve preparedness and readiness response to natural disasters Safer villages, houses and roads	*Standards in Samoa (2016)"; "Samoa Code of Environmental Practice (2007)"* Undertake a Cost Benefit Analysis to weigh options for funding Incorporate environmental and social safeguards concerns in the design and undertake consultations with affected communities Apply for necessary permits as required by law Utilise hazard maps and Geomorphologist Infrastructure Drainage Database to inform designs	
Village spring pools protection	Test the quality of the water source before any further investment on the pool is undertaken (eg: fence/repair works) Upgrade cement fence around pool(s) to protect it from wave overtopping and contaminants from nearby village houses sitting in fluvial hazard zones Enforce use of proper septic tanks for latrines in homes near village pools to protect pools from wastewater effluent Separate drinking water from bathing and washing sections of spring pools ***Responsibility: Village/ Families/ CSSP***	Increase adaptation during drought periods Improve health and sanitation Reduce contamination of water supply	Include in budget programming design, and supply and procurement of material Update Auala 1998 Village Bylaws to include management of natural resources (spring pools, marine reserve, forest etc)	CIM Strategy 2015 Community Engagement Plan Health Sector Plan

Natural Resources and Environment	**Best Solutions**	**Benefits**	**Guideline to assist with the implementations**	**RelevantSectorPlans, 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 Vaisigano 1 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	Two Million Tree Planting Strategy 2015-2020 Restoration Operational Plan 2016-2020 Forestry Management Act 2011
Livelihood and Food Security	**Best Solutions**	**Benefits**	**Guideline to assist with the implementation**	**Relevant Sector Plans, National Strategies & Policies**
Food security: threatened by changes in climate and inadequate soil for planting	Promote and facilitate planting of rootcrops (i.e yams, sweet potato) which are more resilient to cyclones, droughts and floods Promote agro- forestry and mixed planting including fruit trees species to reduce crop vulnerability to pests and diseases Implement the Integrated Pest Management Programme Implement Sustainable Land Management (SLM) practices Conduct pilot site trials for climate ready plant varieties ***Responsibility: MAF/ MNRE/villages/CSSP***	Maintains natural ecosystem Builds resilience of community livelihood and food security Improve preparedness and readiness response to natural disasters	MAF to provide trainings, awareness raising and support in supply of nursery trees, technology and infrastructure MAF to provide trainings and awareness on crop diversification to suit the prolonged impacts of climate change such as drought or rainy seasons MAF to assist in establishment of pilot sites to trial climate ready plant varieties 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	Agriculture Sector Plan 2016-2021 Community Engagement Plan Two Million Tree Strategy 2015-2020 Restoration Operational Plan 2016-2020

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

Non-CR issues raised during consultations	**Proposed Solution**	**Comments**
School entry ***Responsibility: Village/MESC***	Provide proper entry into school road from main North Coast Road	Not a CR issue. Village school committee to seek assistance from MESC or other donor with education as a portfolio priority


New development in coastal hazard zones


Low overhanging powerlines susceptible to strong winds
endangering lives of residents and travelling public

Auala Village Map

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

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

8. Savaii AF Districts Overview Map of Coastal Inundation Zones