Community Integrated Management Plan

Aleipata-Itupa I Luga - Upolu

Implementation Guidelines 2018

Foreword

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

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

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

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

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

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

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

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

Thank you

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

Participants in the Plan

The Community Integrated Management (CIM) Plan is a Partnership between the Government of Samoa and the villages within the plan. The Plan area starts from the ridge extending to the reef broadly covering four thematic areas; Infrastructure; Environment and Biological Resources; Livelihood and Food security; and 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 Constituency of Aleipata-Itupa I Luga (Vailoa, Lalomanu and Ulutogia) District

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

Date of Signing 22nd June 2018

Representatives	Signature
Vailoa Village	
• Taputoa Simanu	
• Taputoa Limatasi	
• Foai Faanoi	
• Amiaitutolu Uiato Pelupelu	
• Faanoi Malama Vaosā	
Lalomanu Village	
• Seuala Patone Seuala	
• Unasa Iulia Seuala	
• Le'ele Tavita	
• Matavai Samuelu Vave	
• Aulaumea Etisone Pouvī	
Ulutogia Village	
• Filiuae'e Tuiolo	
• Faiumu Muagututi'a	
• Maseiga Taulia	
• Timuia Iosua	
• I'umalo Joe Tui	

The Government of Samoa adopts the Community Integrated Management Plan for the Alii and Faipule of Aleipata-Itupa I Luga (Vailoa, Lalomanu and Ulutogia) 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 Ministries 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 2015.

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Ulu Bismarck Crawley
Chief Executive Officer, MNRE

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Acronyms

ASCH	Areas Sensitive to Coastal Hazards
BCA	Benefit Cost Analysis
CBFMP	Community Based Fisheries Management Plan
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
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
SOE	State of Environment
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

Glossary

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

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

1. Introduction to the CIM Plan

1.1 The Strategic Vision

The District CIM Plan for Aleipata-Itupa I Luga has been prepared under the Government of Samoa's Pilot Programme for Climate Resilience (PPCR) - Enhancing Climate Resilience for Coastal Resources and Communities Project. The CIM Plans is the primary means of implementing the CIM Strategy, which was formally approved by the Government of Samoa in February, 2001, and revised in August 2015, to provide Strategic direction for the management of government and community resources within the districts and villages.

The Strategy has as its central vision "Resilience – Communities and their resources are Resilient to Natural Hazards". The CIM Plan takes this vision and provides the practical tools with which the communities and the government, in partnership, can implement the Strategy.

To be resilient is to be adaptive, responsive and quick to recover so that communities are environmentally, socially and economically sustainable.
(CIM Strategy, August 2015)

1.2 The Aim of the CIM Plan

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

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

1. Enhance awareness of hazard risks from the ridge to reef;

2. Improve climate resilience planning and development

3. Better adapt, respond and recover from natural disasters and other extreme events

1.3 The Structure of the Plan

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

- ***Plan Development,*** which describes the process undertaken to prepare the CIM Plan in conjunction with representatives of the Communities involved, the Government and other stakeholders with interests in the Plan area.

- ***Implementation Guidelines,*** which describes the Plans and Actions recommended as outcomes of the process, together with the partner responsible for implementing these outcomes.

2. Implementation Guidelines

2.1 Purpose of the Implementation Guidelines (IG)

The Implementation Guidelines describe the solutions proposed to increase the resilience of communities as identified in the CIM Plan consultation and site assessments. The solutions are presented under four broad themes; Infrastructure; Environment and Biological Resources; Livelihood and Food Security; and Governance Institution in the District/village. Implementation of solutions is considered to be the joint responsibility for both the villages and the government in partnership as follows.

The CIM Plan Solution Matrix, shows five columns each correlates to the solution identified:

- Column 1: Indicates the issues or problem identified during the CIM Plan consultation and site assessments
- Column 2: Solutions – these are the interventions/ solutions identified by the CIM Plan team and village community representatives. The government agency or village as indicated in Column-2 under each action will be the lead agency or village responsible for implementing the said solution;
- Column 3: "Other benefits", where one solution indicated in Column 2, will provide benefits to other items;
- Column 4: Provides guidance on how the solution is to be implemented and noting the relevant government action plan, policy, code of ethics, regulation or act to follow by the responsible government agency or district/village during implementation of the solution;
- Column 5: Provides an overall summary of how the solution being implemented supports or achieve the objectives or goals set-forth in the relevant government sector plans and linking them up to the Strategy for the Development of Samoa.

It is therefore worth noting that climate change adaptation and mitigation actions or interventions identified in the CIM Plan solution demonstrates the national commitment to enhancing Samoa's climate resilience portfolio.

2.2 Funding options to support CIM Plan Implementation

Implementation of solutions that were identified from the CIM Plan consultations with each district communities will not be possible without the availability of funds. Like the previous CIM Plans infrastructural related solutions to protect government assets located in the coastal area are executed by the government through bi-lateral or multi-lateral donor funded projects. For example the NAPA (National Adaptation Programme of Action) project that supported the implementation of rock revetment or seawalls in most of the coastal villages, which is an outcome from the generation-1 CIM Plans were funded under multi-lateral donor. At the village level some villages were successful in sourcing small grants from existing mechanisms in country.

Similarly it is expected that funding support for the implementation of the updated revised CIM Plans during its 10 year lifespan, will be sourced from different development partners including the government of Samoa. All solutions and activities in the CIM Plans that have identified a government agency as the responsible agency for that particular action as outlined in the "CIM Plan Solution Matrix" will take up the responsibility for these activities as part of their on-going workplan and priorities for each districts/villages. Funding of these activities will be sourced either from their local budget or multi-lateral donors such as UNDP, FAO, World Bank, ADB, and GEF to name a few, as well as bi-lateral donors like New Zealand, Australia, Japan, USA and China. Implementation of activities that are under the responsibilities of village communities will source support from small grants opportunities available from the following programs and agencies: CSSP, the UNDP-GEF SGP, Global Green Grant and Discretionary Funds from different Diplomatic Mission in country like New Zealand High Commission, Australia, Japan and China.

2.3 Duration of the Plan

The CIM Plan is reviewed every ten years. During the Plan period, the solutions implemented are monitored to ensure that they are effective in improving resilience. Some solutions are likely to take longer than the original five years for implementation.

The review of the Implementation Guidelines and the solutions proposed the following:

1. The CIM Plan full review will be undertaken every 10 years or decade;

2. Once implemented, the solutions will be monitored on a bi-annual basis for progress and updated every five years in accordance with the Strategy for the Development of Samoa;

3. Detailed implementation of the solution will determine the monitoring requirements and Key Performance Indicators (KPI).

3. Description of Aleipata-Itupa I Luga District Environment

3.1 Physical and Natural Resource Setting

Aleipata-Itupa I Luga is located on the eastern most part of Upolu Island. It comprises of villages, from north to south: Vailoa, Lalomanu and Ulutogia. The district has a gently graded mid slope hinterland that rises steadily from the east to steeper ravine country about 2-3kms inland. For the north-east areas the coastal plateau is thinner with very steep country close to the sea. The flat coastal areas are subject to hazard influences from run-off from the mid hinterlands to steeper ranges inland. Some areas inland are extremely steep and integrated catchment management measures would be beneficial.

The District has a gently graded mid slope hinterland that rises from the east coast. However on the southern area along the coast there is a very very steep escarpment of approximately 80m. It squeezes the main coast road near the beach berm and negates any inland access, other than via extremely steep tracks. The three district villages of Ulutogia, Vailoa and Lalomanu are located along the east coast. The largest and southern-most village,
Lalomanu, is more elevated than the other two, as it is located on a prominent low headland. There are several small rivers that meander eastward across the district. These often flood the surrounding lowland and houses bringing down silt from plantations and work roads and depositing it along the main road or in the adjacent lagoon.

The district is part of the wider Aleipata Marine Protected Area. The majority of the coral reef system was damaged by the tsunami but is showing signs of recovery with some patches of corals repopulating part of the lagoon and outer reef. Aleipata inshore reef systems is comprised of a wide inner lagoon dominated by recovering mixed corals and fine sandy bottom. The reef crest and outer reef once had a vibrant mixed coral assemblages and seagrass beds which was decimated by the 2009 tsunami. The lagoon supports a rich fish and bivalve's populations along with the hawksbill and green turtles that forage in the area. There is regrowth but it will take many years for it to get back to its previous pristine state.

The outer islands of Aleipata are a significant key biodiversity for Samoa both for marine and terrestrial biodiversity. The Aleipata Islands include Fanuatapu and Namua in Aleipata Itupa I Lalo and Nuutele and Nuulua in Aleipata itupa I Luga are important hawksbill turtle nesting grounds while the Aleipata lagoon is an important foraging area for the turtles especially in the seagrass beds. Furthermore, the islands are important nesting grounds for the sea birds such as frigate birds, boobies, noddies, terns, and tropic birds. Off the coast of Aleipata is a feeding ground for migrating humpback whales that are regulars during the southern hemisphere winter months from June to October.

Despite the fact that the majority of the lowlands of the Aleipata district has been cleared for farms, plantations and settlements, significantly important pockets of terrestrial ecosystems are present. These important ecosystems are rich in lowland rainforest plants as well important avifauna such as several fruit bat roosts, the presence of some of endangered and threatened birds of Samoa such as the tuaimeo and manumea. Additionally, the Aleipata islands are important refugia for the avifauna which regular migrate to the islands during the day for feeding because of the pristine condition that still exists due to the absence of human settlement.

The remaining lowland areas of the district is covered by mixed vegetation of plantations, farm lands and fallow lands from old plantations during the height of taro export during the 1980-1990s before the taro blight. These fallow lands are now mostly dominated by a mixture of secondary forests and exotic invasive species.

The invasive trees and shrubs are present around the village settlements as well as along the access roads throughout the district. *Spathodea campanulate* (African tulip) *Merremia peltata,* pulu vao *Funtumia elastica*; and pulu mamoe *Castilla elastica* are the common one's present. Myna birds and red-vented bulbuls were found in abundance in open areas.

Myna birds and red-vented bulbuls were found in abundance along the whole northern Savaii especially closer to settlements.

3.2 Social and Economic Setting

The Aleipata-Itupa I Luga has a population of 1,238 persons according to the last census (2016). New developments in the district include the tar sealing of all inland roads and shifting of key infrastructure such as electricity and water to accommodate for the many families that have moved on higher grounds and away from coastal area after the 2009 Tsunami, which devastated much of the eastern side of the country.

All other primary services have also moved inland such as shops, schools and health facilities. The main district hospital and police station are in Lalomanu as well as the location for most of the beach fale resorts. The windmill power and cash power is located inland Vailoa, which provides power supply to the whole district/villages and neighboring districts. The cash economy of the District is dominated by traditional work. In all villages, the majority of residents are largely sustained by plantation work and fishing. The District supports several primary schools and as well as a number of denominations / churches. In addition, there are a number of small shops and home occupations throughout the area.

3.3 Climate Risk and Resilience

There is an urgent need for communities to understand the changes in Samoa's climate and future projection. A study has been completed in 20111 which summarizes changes in Samoa's climate at present and in the future, from 1990 -2030 up to 2090. The assessment showed that: Samoa's temperature will increase with very hot days; more extreme rainfall days expected; there would be a decrease in number of tropical cyclone but increase in intensity; sea level rise will continue and ocean acidification is increasing in Samoa's water threatening coral reef ecosystems and marine biodiversity.

The Main East Coast Road is important district infrastructure. It lies almost entirely within the Coastal Flood Hazard Zone (CFHZ) and the Coastal Erosion Hazard Zone (CEHZ), generally within a few metres of the sea along the east coast, with only a low revetment separating it from the coastal lagoon. Along the south coast the sea is generally 15 to 20 metres away, however, the road still lies within both hazard zones. The 2007 Aleipata Itupa I Luga District CIM Plan mapped out all vulnerable areas along the coast and the lowland coastal areas identifying them as hazard zones given the exposure to natural disasters, climate change and extreme events causing flooding and erosion. There are changes in the catchment areas and land use hence the severe flooding downstream is caused by the concentrated flows from upland-catchment areas. As such the update of the CIM Plan considers a broader landscape hazards, climate risks and likely responses.

Coastal Hazards and Risks: The flooding in the lower coastal area is exacerbated because of increase surface and subsurface flows from the top shelf (high elevation inland roads without roadside drainages) onto the beach environment below the escarpment as shown in Figure 1. There is a heightened need for local drainage works along the coastal main road, but also amongst the dwellings, out-buildings and fale along the beach. Erection of concrete footings and building platforms on sand bases also creates further drainage and flooding issues.

Poor road alignments (directly downhill) and poor road shoulder drainage, hinterland land use change and poor land management practices place pressures on the flooding of coastal area, and leads to pollution of the lagoons. Reclamation areas along the coast also add to the pressures of coastal hazard zone.

[1] Pacific-Australia Climate Change and Adaptation Planning Program Partners (2015) Current and Future Climate of Samoa, Government Australia and Government Samoa.

Figure 1 Shows flooding and erosion problems on the coastal area of Aleipata Itupa I Luga exacerbated by inland development: **Photo credit:** Matt MacIntyre, 2017

According to Fepuleai (2017), the narrow coastal area between Aufaga and Lalomanu is a result of downthrown of up to 150m of the Lepa Fault to the south (Fig 2). The Lepa Fault could be still active and will generate rockfall hazard along this narrow coastal passage in the near future, indicates by an orange oval in Figure 3. More tsunami occurs in the area will damage the road infrastructure. There will be an increased in erosion activity if these thick deposits will be proposed to mine in the near future. A high content of bethic foraminifera in beach sand composition indicates, a present of deep sources that could correspond with collapsed seafloor at this part of the island.

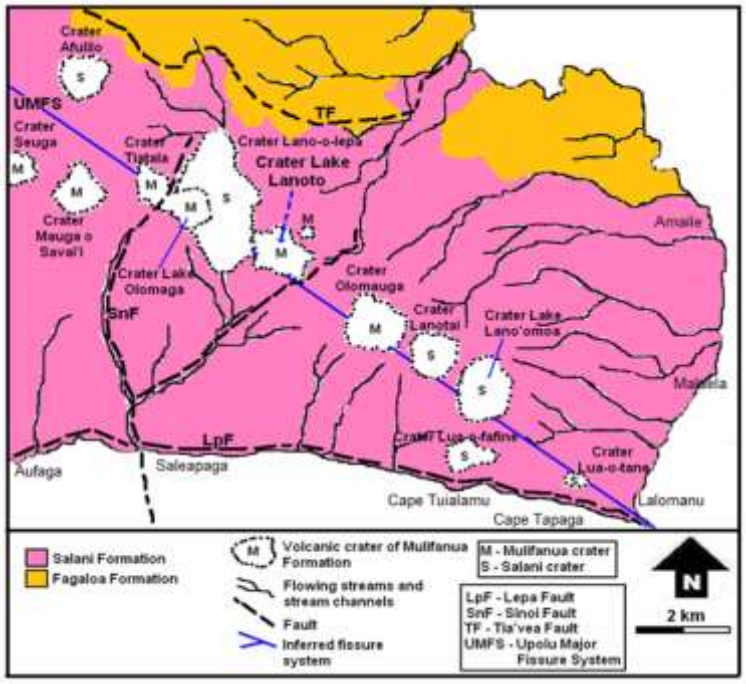


Figure 2 Geology of the easternmost part of Upolu, with the Lepa Fault expanding from Lepa to Lalomanu Aleipata Itupa i Luga. High risk coastal landslide hazard.
Map credit: Aleni Fepuleai, 2017

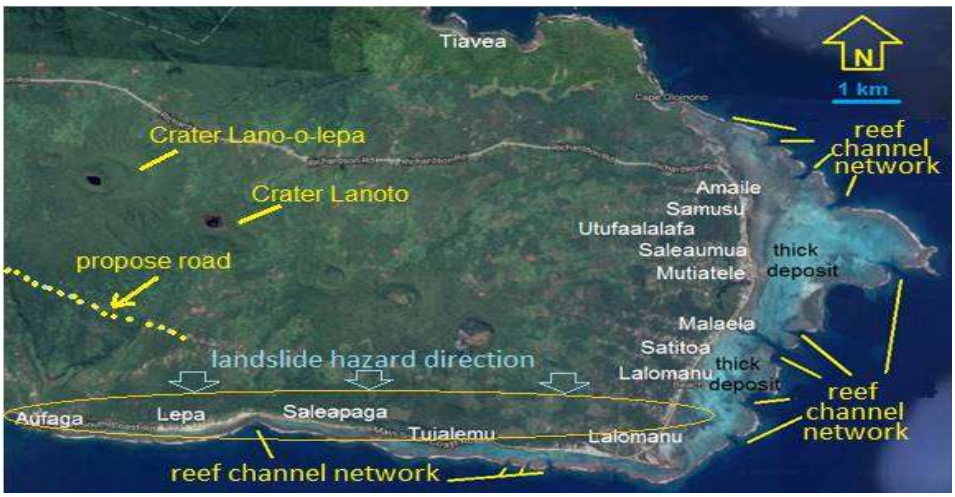


Figure 3 Coastal section between Aufaga of Lepa District to Lalomanu Aleipata Itupa I Luga as shown in the orange oval the most vulnerable area susceptible to generate landslide and rockfall during an earthquake. Blue arrows indicate the landslide direction and yellow lines shows reef channel associated with coastal erosion.
Map and description credit to: Aleni Fepuleai, 2017

Inland Hazards and Risks*:* Due to the narrow coastal passage between Aufaga and Lalomanu (Figure 3) highly vulnerable to rockfall hazard and tsumani, it is recommended to construct a new road (yellow dots) to the south of Saleapaga (ibid). This proposed new road will be part of Saleapaga and Lalomanu existing tsunami new road and will have the new extension to connect to Vavau. This proposed new road will provide an escape route in the event that the coastal passage between Aufaga and Lalomanu collapsed in the future, however resilience infrastructure already put in place such as the proposed new road direction will enable to regular flow of transportation and it will not block access from Aleipata-Itupa I Luga to Lepa district.

Groundwater sources between Lalomanu and Amaile is threaten by the rapid inland development in these areas. This corresponds with previous water boreholes in the area were commonly contaminated with saline zone intrusion. Exposure of the Salani rocks in many areas, triggers an increase in fracture and joint networks that can result in deeply sinking of the groundwater sources (Fepuleai, 2017).

Overall activities such *as* coastal replanting in several sections, rebuilds of reef resilience and sustain the extension in marine habitats of the area, will help in erosion reduction. Groundwater resource is needed to be sustained through good management between villages and governments. Crater Lanoto'o Lake is a good source of water and does not necessarily indicate that water is not drinkable. Colour can be removed by typical water filters, however slow sand filters can remove colour.

Communities live along narrow coastal areas like those between Aufaga and Lalomanu (Figure 3) are very vulnerable to tsunami in the near future, relocation is highly recommended. Seismic study is a better option to determine the activity along the interconnection of fault and fissure network in the area, where predicted to be a high potential vent zone. This will also provide valuable information for landslide and rockfall hazards in the Lepa district, Aleipata-Itupa-I-Luga district and Aleipata-Itupa-I-Lalo district.

4. Aleipata Itupa I Luga District Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Other Benefits	Guideline to assist Implementation	Relevant Sector Plans
Poor drainage system	Address drainage system issues by: Implementing proper routine maintenance of existing culverts drainage channels on roadside and ensure surface runoff is properly channeled to the ocean; Install new properly sized outlets and drainage channels resulting from inland development Implement district/village drainage/ culvert clean-up and awareness program ***Responsibility: MWCSD / District / Village / MWTI and LTA***	Improved rate of recovery Reduce potential for flooding in village areas Safer village houses and roads Improved safety community and resilience	MWTI to provide advice and guidance using the following documents and work programme to support the management of drainage system through application of: Environmental and Social Safeguard policy Samoa Code of Environmental Practice (2007) Review of National Road Standards in Samoa (2016) National Infrastructure Strategic Plan (NISP) 2011 Programme road safety activities into budget and work program Prepare assessment of road drainage systems Prepare a local education programme on need for keeping drainage systems clean	Community Integrated Management Strategy, August 2015 Transport Sector Plan 2014-2019
SWA	Extend SWA the existing piped water network to cover all remaining families without access to piped water inland of Ulutogia village ***Responsibility: SWA***	Improve infrastructure resilience Climate proof the road transport network.	SWA to assess the possibility of connecting families without access to water and applying existing guidelines as follows: Environmental Code of Practice - West Coast Road (2012), LTA Environmental and Social	Water and Sanitation Sector Plan 2016-2020

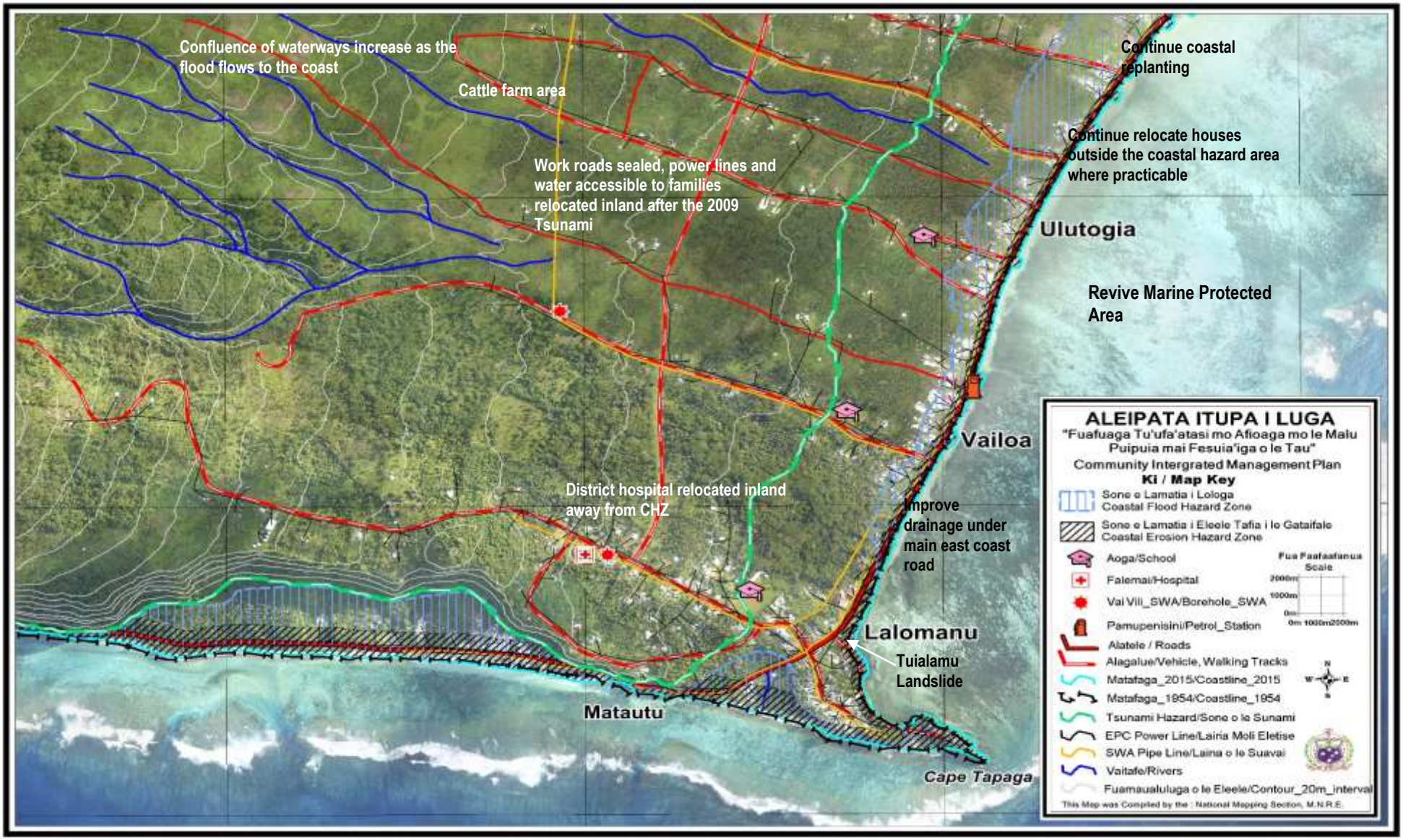
			Safeguard policy SWA Investment Plan for FY17-18	
Environment & Natural Resources	**Best Solution**	**Other Benefits**	**Guidelines to assist Implementation**	**Relevant Sector Plan**
Marine Environment	Revived the Aleipata marine protected area that includes fish reserves, and mangrove, wetland rehabilitation: Implement an integrated coastal resource management program for the district covering all coastal communities Conduct community education and awareness program on the importance of marine ecosystems (coral reef, wetlands and mangroves) Strengthen existing village marine management plan with an over-arching district marine protected area management plan ***Responsibility: MAF / MNRE / District & Villages***	Improve sustainable livelihood and food security Natural barriers and protection from storm surges Increase biodiversity Improve ecological resilience of marine ecosystems Reduce impact of land-based pollution Reduce impact of coral bleaching Improve resilience of coral reef ecosystem to combat climate change Reduce loss of marine habitats	MAF –Fisheries Division and MNRE-DEC to work in collaboration with the district to revive the MPA for improved marine biodiversity and food security by implementing existing action plans such as: Community-based Fishery Plan NBSAP 2015-2020 Update existing Management Plans for Marine Protected Area Implement the revival of the MPA by taking an Ecosystem-based Adaptation approach	Agriculture Sector Plan 2016-2020 National Environment Sector Plan 2017-2021
Forest and Watershed (loss of indigenous forest due to cyclone damage and land clearing)	Replant native forest and promote regeneration in fallow lands Conduct agro-forestry practices to utilise fallow lands and old cattle-farm lands	Increase biodiversity of forest ecosystem Improve ecological resilience of forest area Reverse land degradation	MNRE – Forestry and Environment and Conservation Division to work with district / village to implement national action plans that addresses reforestation programs and biodiversity such as:	National Environment Sector Plan 2016-2021

	Utilize previously used lands closer to the villages for plantations Replanting or allow of natural regrowth along riparian areas Develop a district wide (Aleipata) integrated watershed and forest management plan that can cover forests, craters, and watershed areas ***Responsibility: MNRE / District***	Increase number of plants to reach the 2milion tree planting goal	NBSAP 2015-2020 Operational Restoration Plan 2016-2020 National Water Resource Strategy 2007-2017 2 Million Tree Planting Strategy 2015-2020	
Livelihood & Food Security	**Best Solution**	**Other Benefits**	**Guidelines to assist Implementation**	**Relevant Sector Plan**
Disturbed forests and plantation areas / invasive pests	Restore and utilize fallow lands closer to the village with plantations rather than clearing inland and upland forests Promote and facilitate planting of rootcrops (i.e yams, sweet potato which are more resilient to cyclones, droughts and floods. Implement sustainable land management practices. Implement integrated pest management programme Promote agro-forestry and mixed planting including fruit trees species to reduce crop	Improve food security and healthy living and increase community resilience and adaptive response to climate change	MAF CROP Division to support farmers through guidance and trainings from Agricultural experts and awareness programs on crop diversification to suit the prolonged periods of drought or rainy season Provide tools and planting materials to improve crop diversification and resilience – address pest issues etc. This will lead to improve food security Strengthen partnership with farming NGO's such as the: Samoa Farmers Association; Samoa Federated Farmers Incorporated ; Women in Business Inc. and private sector to support rural farmers through training opportunities and marketing productivity	Agriculture Sector Plan 2016-2020

	vulnerability to pests and diseases. Diversify into other cash crops and fruit trees i.e cocoa, coconut, lemon and plant in suitable areas outside hazard zones Implement a control program to manage invasive pests both flora and fauna impacting on plantations – crops. ***Responsibility: MAF MNRE /villages***		Implementation of solutions are guided by the following: Draft Soil Resource Management Bill 2018 Samoa National Action Programme to combat Land Degradation and to mitigate effects of drought 2015-2020 National Invasive Species Strategy and Action Plan 2008-2011 2 Million Tree Planting Strategy 2015-2020	

Governance	**Solutions/ Issues**	**Guidelines to assist Implementation**	**Comment**
Village By-laws	Implement village by-laws for community to follow and include protection of natural resources both marine and terrestrial ***Responsibility: Village / MWCSD***	MWCSD to provide assistance to district /village in developing by-laws Community Development 2016-2021	Support the development of district / village by-laws that can guide governing structure of village and the implementation of government and non-government programs including CIM Plans.

Aleipata District Map



4.1 Lalomanu Village Interventions

Infrastructure	Best Solutions Proposed	Other Benefits	Guidelines to assist Implementation	Relevant Sector Plan
Village infrastructure in hazard zones include: Households Schools Churches Businesses, Women's Committee House	Relocate outside hazard zones Investments within the hazard zone adopt appropriate mitigation measures such as: Raise building foundations at a level that takes into account the CFHZ in the vicinity ***Responsibility: Village/Families / MWTI/MWCSD***	Reduce cost in ongoing maintenance mitigate potential damage from coastal erosion and flooding accommodating the hazard.	Village voluntary relocation should follow the following guidelines: Application of the National Building Code (2016) and permit compliance Application of National Building Code 2002 PUMA Act 2004	CIM Strategy (2015)
Poor drainage system	Address poor drainage systems by: Implementing proper routine maintenance of existing culverts drainage channels on roadside and ensure surface runoff is properly channeled to the ocean; Install new properly sized outlets and drainage channels resulting from inland development Implement district/village drainage/ culvert clean-up and awareness program ***Responsibility: MWCSD / Village / MWTI and LTA***	Improved rate of recovery Reduce potential for flooding in village areas Safer village houses and roads Improved safety community and resilience	MWTI to provide advice and guidance using the following documents and work programme to support the management of drainage system through application of: Environmental and Social Safeguard policy National Infrastructure Strategic Plan (NISP) 2011 Samoa Code of Environmental Practice (2007) Review of National Road Standards in Samoa (2016) Programme road safety activities into budget and work program	Community Integrated Management Strategy, August 2015 Transport Sector Plan 2014-2019

			Prepare assessment of road drainage systems Prepare a local education programme on need for keeping drainage systems clean	
Electricity Supply	Install and connect power supply for inland residents Install streetlights along the roads where needed for community safety. Relocate overhead lines to a more resilient location when being replaced ***Responsibility: EPC / MWTI / Villages***	Maintain electricity supply at all times including during natural disasters. Avoid accidents from fallen electricity posts.	Monitor distribution networks to avoid overloading poles and contributing to line failures EPC to installed electricity lines to reach families residing inland and streetlights Consider energy efficiency developments for communities using renewable energy guided by existing framework – Development of a Renewable Energy and Energy Efficiency Framework, 2016	Samoa Energy Sector Plan 2017-2022
Rainwater harvesting systems (water tanks)	Rainwater harvesting immediate action, supported by the installation of water tanks for families residing inland without access to water for consumption and domestic use and to provide alternative water source for families receiving saline water. ***Responsibility: CSSP / MWCSD / village***	Improve community adaptive capacity to respond to climate change impacts	Conduct assessment of vulnerable families inland without access to water prior to approving rainwater harvesting system. National Water Resources Management Strategy 2007-2017	Water and Sanitation Sector Plan 2016-2020
Maintenance of Evacuation Shelter	Village to maintain existing Evacuation Shelter house located inland;	Improve community safety during times of natural disasters	MNRE-DMO monitoring program for all existing Evacuation Shelter places should follow these guidelines:	National Disaster Management Plan 2017-2021

	Conduct site monitoring of Evacuation Shelter built for villages affected by the 2009 Tsunami to ensure they are being used and not left abandoned. ***Responsibility: Village / MNRE-DMO***		Application of National Building Code 2002 PUMA Act 2004	

Other Solutions Considered or Further Issues Raised

Infrastructure	Solutions/ Issues	Comment
Seawall	Village request the continuation of the seawall to complete the shoreline protection (where village settlement is and Cape Tapana_) ***Responsibility: MWTI/LTA/Village***	Supporting the implementation of seawall is not an immediate priority in terms of long-term climate resilience outcome. However the Civil Engineer for PPCR-Project noted that seawalls protect residents and developments along the coast, as well as mitigate coastal erosion the seawall is recommended because it is a continuation of an existing one. It will protect shoreline at all cost (implementing this seawall would be less costly compared to having a new one whereby environmental impacts would have to be considered). The seawall is best referred to LTA for their assessment based on budget and feasibility, as well as continuation of design.
Coastal spring	Village wanted to upgrade three coastal springs (1) Vai Tufu, (2) Vai Tilotilo and (3) Vai Tui ***Responsibility: MWCSD / Village / CSSP / NGO/ MNRE***	Based on site assessment all three coastal spring are dried up and it would be a very poor investment for climate resilience.

Environment & Natural Resources	Best Solutions Proposed	Other Benefits	Guidelines to assist Implementation	Relevant Sector Plan
Water Catchment (Vaisuatoto)	Conduct an assessment of the natural water source / watershed area inland Develop a management plan for the Watershed Area Conduct water testing for quality of water	Improve ecological resilience of watershed area	MNRE-DEC, WRD and Forestry Division to provide advice such as: Awareness and government support in supply of nursery trees, for replanting Community to request through Forestry Division MNRE seedlings under their 2million tree replanting project	National Environment Sector Plan 2017-2021 Water and Sanitation Sector Plan 2016-2020

	Conduct consultation and awareness on the proposed catchment area ***Responsibility: MNRE / MoH / village***		NBSAP 2015-2020 Water Resources Management Act 2008 Restoration Operational Plan 2016-2020 2 Million Tree Planting Strategy 2015-2020 National Water Strategy Plan 2007-2017	
Marine / Fisheries Reserve	Expand fishery reserves Implement coral gardening Revive Marine Protected Area Program Conduct training on village based monitoring programs for marine areas Implement all activities under the village Fisheries Management Plan Implement program to remove crown of thorns from inshore area Village request for restocking with clams and seagrape for breeding and consumption ***Responsibility: MAF / Village***	Reduce impact of land-based pollution Reduce impact of coral bleaching Improve resilience of coral reef ecosystem to combat climate change Reduce loss of marine habitats	MAF-Fisheries division to provide advice following existing guidelines: Community-based Management Fishery Plan NBSAP 2015-2020 Update village Fisheries Management Plan	Agriculture Sector Plan 2016-2020 National Environment Sector Plan 2017-2021
Forest Loss (loss of indigenous forest due to cyclone damages and land clearance)	Replanting of native tree species in open fallow lands	Reverse land degradation Improve coastal and inland biodiversity	MNRE-Forestry Division to provide advice to community on reforestation / restoration program	National Environment Sector Plan 2017-2021

	Rehabilitate fallow land and degraded area Implementation of replanting program for village of native tree species Implement replanting of coastal vegetation along the coastal area ***Responsibility: MNRE / village***		by providing tree seedlings for planting. 2016-2020 National Forestry Plan NBSAP 2015-2020 NAP – Sustainable Land Management Plan 2015-2019 NBSAP 2015-2020 Restoration of the Operational Plan 2016 – 2020 2 Million Tree Planting Strategy 2015 -2020	
Waste Management	Need regular rubbish collection to collect rubbish from families Village conduct waste awareness program and clean-up regularly ***Responsibility: Village***	Improve hygiene and sanitation Reduce impact of vector borne diseases	MNRE-DEC to provide guidance and support to village through implementation of action plan such as: Waste Management Hazardous and Chemicals Policy 2012 NBSAP 2015-2020 Waste Management Act 2010	National Environment Sector Plan 2016-2021

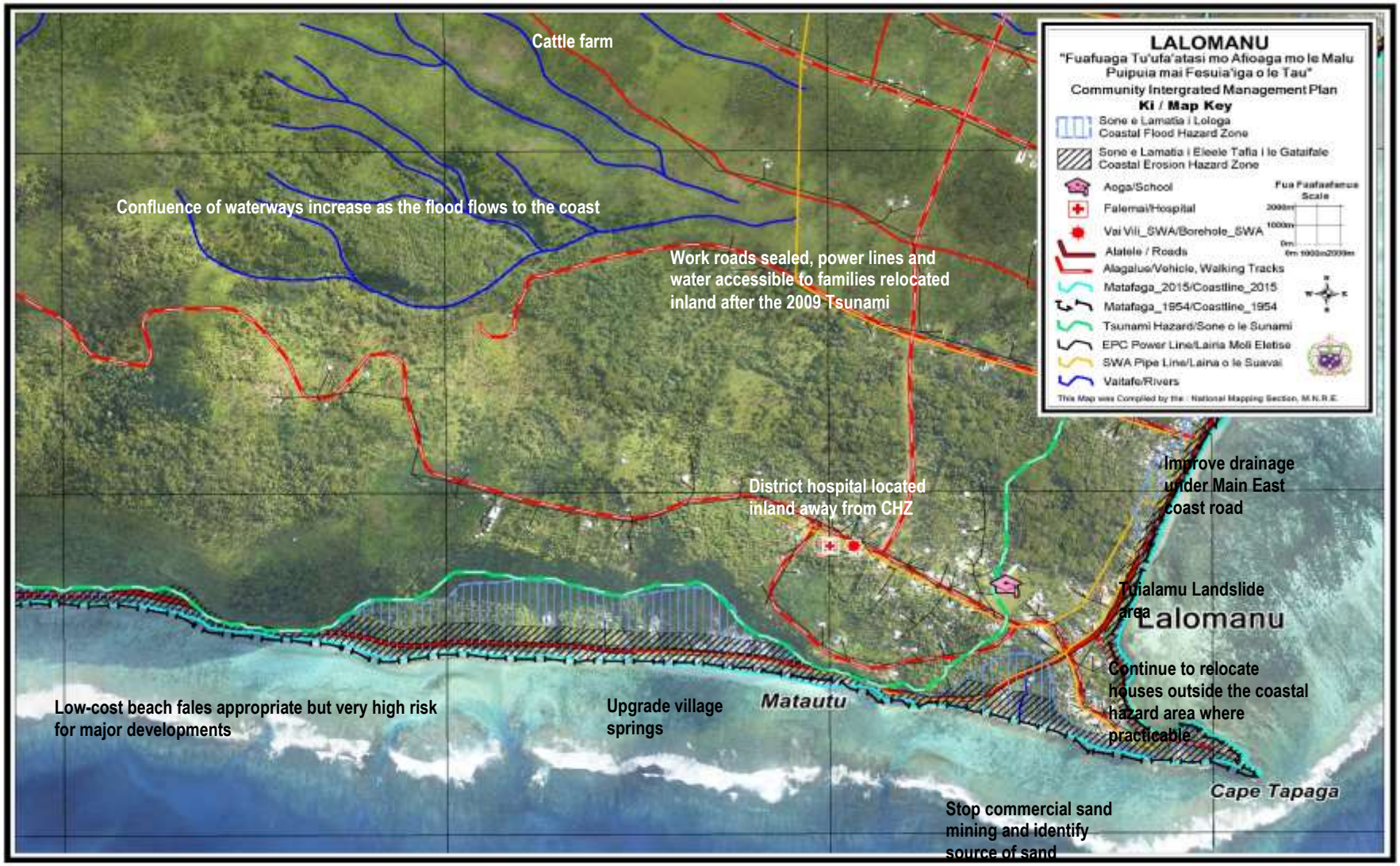
Livelihood and Food Security	**Best Solutions Proposed**	**Other Benefits**	**Guidelines to assist Implementation**	**Relevant Sector Plan**
Disturbed forests and plantation areas / invasive pests	Restore and utilize fallow lands closer to the village with plantations rather than clearing inland and upland forests Promote and facilitate planting of rootcrops (i.e yams, sweet potato which are more resilient to cyclones, droughts and floods. Implement sustainable land management practices.	Improve food security and healthy living and increase community resilience and adaptive response to climate change	MAF CROP Division to support farmers through guidance and trainings from Agricultural experts and awareness programs on crop diversification to suit the prolonged periods of drought or rainy season Provide tools and planting materials to improve crop diversification and resilience – address	Agriculture Sector Plan 2016-2020

	Implement integrated pest management programme Promote agro-forestry and mixed planting including fruit trees species to reduce crop vulnerability to pests and diseases. Diversify into other cash crops and fruit trees i.e cocoa, coconut, lemon and plant in suitable areas outside hazard zones Implement a control program to manage invasive pests both flora and fauna impacting on plantations – crops. ***Responsibility: MAF MNRE /villages***		pest issues etc. This will lead to improve food security Strengthen partnership with farming NGO's such as the: Samoa Farmers Association; Samoa Federated Farmers Incorporated ; Women in Business Inc. and private sector to support rural farmers through training opportunities and marketing productivity Implementation of solutions are guided by the following: Draft Soil Resource Management Bill 2018 Samoa National Action Programme to combat Land Degradation and to mitigate effects of drought 2015-2020 National Invasive Species Strategy and Action Plan 2008-2011 2 Million Tree Planting Strategy 2015-2020	
Gardening and Handicrafts	Request support for Women's vegetable garden program and handicraft activities	Increase opportunities for income benefits	Implementation and support should follow guidelines from relevant agencies	Community Development Plan 2016-2021

	for income generation ***Responsibility: MWCSD / WIBDI / Village***			
Water catchment area	Village to move cattle farms away from watershed location and upland native forest away. ***Responsibility: MNRE / village***	Reverse land degradation	Implementation of actions should follow these guidelines: National Water Resource Strategy 2007-2017	Water and Sanitation Sector Plan 2016-2020

Evacuation Shelter or house build after the 2009 tsunami located inland Lalomanu left abandoned and covered with overgrown grass.

Lalomanu Village Map



4.2 Vailoa Village Interventions

Infrastructure	Best Solutions Proposed	Other Benefits	Guidelines to assist Implementation	Relevant Sector Plan
Extend sealing of existing access road	Extend sealing of access road noted in the LTA list – reconstruction of access road: Length: 2km Estimated Cost: SAT$720,000.00 Include drainage in the design of the access road extension Request other service infrastructure ***Responsibility: LTA / MWTI / village***	Improve rate of recovery Increase number of families relocate to higher grounds Increase opportunities to utilize land for farming More lives saved during times of emergency	Construction of access roads should be guided by government requirements as stated in the following policies, strategies and action plans: Environmental and Social Safeguard policy Samoa Code of Environmental Practice (2007) National Infrastructure Strategic Plan (NISP) 2011 Review of National Road Standards in Samoa (2016) Vulnerability Assessment of the Samoa Road Network (2017) Programme road safety activities into budget and work programme	Community Integrated Management Strategy, August 2015 Transport Sector Plan 2014-2019
Poor drainage system	Address poor drainage system issues by: Implementing proper routine maintenance of existing culverts drainage channels on roadside and ensure surface runoff is properly channeled to the ocean;	Improved rate of recovery Reduce potential for flooding in village areas Safer village houses and roads Improved safety community and resilience	MWTI to provide advice and guidance using the following documents and work programme to support the management of drainage system through application of: Environmental and Social Safeguard	Community Integrated Management Strategy, August 2015 Transport Sector Plan 2014-2019

	Install new properly sized outlets and drainage channels resulting from inland development Implement district/village drainage/ culvert clean-up and awareness program ***Responsibility: MWCSD / Village / MWTI and LTA***		policy National Infrastructure Strategic Plan (NISP) 2011 Samoa Code of Environmental Practice (2007) Review of National Road Standards in Samoa (2016) Programme road safety activities into budget and work program Prepare assessment of road drainage systems Prepare a local education programme on need for keeping drainage systems clean	
Rainwater harvesting systems (water tanks)	Rainwater harvesting immediate action, supported by the installation of water tanks for the 10 families residing inland without access to water for consumption. ***Responsibility: CSSP / NGO/MWCSD / village***	Improve community adaptive capacity to respond to climate change impacts	Conduct assessment of vulnerable families inland without access to water prior to approving rainwater harvesting system. National Water Resources Management Strategy 2007-2017	Water and Sanitation Sector Plan 2016-2020
Electricity Supply	Install and connect power supply for inland residents Install streetlights along the roads where needed for community safety. Relocate overhead lines to a more resilient location when being replaced	Maintain electricity supply at all times including during natural disasters. Avoid accidents from fallen electricity posts.	Monitor distribution networks to avoid overloading poles and contributing to line failures EPC to installed electricity lines to reach families residing inland and streetlights Consider energy efficiency	Samoa Energy Sector Plan 2017-2022

	Responsibility: EPC / MWTI / Villages		developments for communities using renewable energy guided by existing framework – Development of a Renewable Energy and Energy Efficiency Framework, 2016	
Coastal Spring (Fanuaea)	Repair or patch-up side of the pool that is deteriorating Conduct water quality testing for drinking water ***Responsibility: Village / MNRE / CSSP / MWTI/MOH***	Improve water supply back-up during drought period or when natural disaster strike	MNRE / MWTI to provide guidance to community for maintenance of coastal spring bathing and drinking water by application: Environmental Social Safeguard policy NBSAP 2015-2020 National Water Resource Strategy 2007-2017	National Environment Sector Plan 2016-2021

Other Solutions Considered or Further Issues Raised

Infrastructure	Solutions/ Issues	Comment
Sealed road to EPC Windmill	Village request to sealed road to the EPC Windmill ***Responsibility: MWTI / LTA / EPC / village***	As noted from the Civil Engineer (CE) assessment the road requested by village was sealed a year ago. Failure as observed in some sections (particularly pends) due to poor drainage and channeling of surface runoff away from the sealed road. No drainage channel outlets or drywells (soakpits) implemented to relieve water velocity causing overflow and spilling onto the roadway causing scouring. About 300m needs to be sealed and CE suggest that this can be done by EPC given it is to access their work station. However as for the 10 families residing further inland it was recommended for LTA to include this road in their work program and budget to: Seal the road and at the same time include other public utilities such as: Road design SAT$140,000.00 (min. 10% construction cost) Road: SAT$720,000.00 EPC Road: SAT$300,000.00 Water installation: SAT$200,000.00
SWA water	Village requested SWA to test water quality as existing water has strong saline taste ***Responsibility: SWA / village***	It was noted that most of the concern raised by village with regards to water quality i.e. it tasted brackish and saline. Village concerned was conveyed to SWA to consider reduce cost of water metered. This is not a direct climate resilience issue but was noted for SWA to consider water quality concerns.

Environment & Natural Resources	Best Solutions and Other Solutions Proposed	Other Benefits	Guidelines to assist Implementation	Relevant Sector Plan
Water Catchment (Vaisuatoto)	Conduct an assessment of the natural water source / watershed area inland Develop a management plan for the Watershed Area Conduct water testing for quality of water ***Responsibility: MNRE / village***	Improve ecological resilience of watershed area	MNRE-DEC, WRD and Forestry Division to provide advice such as: Awareness and government support in supply of nursery trees, for replanting Community to request through Forestry Division MNRE seedlings under their 2million tree replanting project NBSAP 2015-2020 National Forestry Plan 2016-2020 National Water Strategy Plan 2007-2017	National Environment Sector Plan 2017-2021 Water and Sanitation Sector Plan 2016-2020
Marine / Fisheries Reserve	Expand fishery reserves Implement coral gardening Conduct training on village based monitoring programs for marine areas Implement all activities under the village Fisheries Management Plan Implement program to remove crown of thorns from inshore area Village request for restocking with clams and seagrape for breeding and consumption	Reduce impact of land-based pollution Reduce impact of coral bleaching Improve resilience of coral reef ecosystem to combat climate change Reduce loss of marine habitats	MAF-Fisheries division to provide advice following existing guidelines: Community-based Management Fishery Plan NBSAP 2015-2020 Update village Fisheries Management Plan	Agriculture Sector Plan 2016-2020 National Environment Sector Plan 2017-2021

	Responsibility: MAF / Village			
Forest Loss (loss of indigenous forest due to cyclone damages and land clearance)	Replanting of native tree species in open fallow lands Rehabilitate fallow land and degraded area Implementation of replanting program for village of native tree species Implement replanting of coastal vegetation along the coastal area ***Responsibility: MNRE / village***	Reverse land degradation Improve coastal and inland biodiversity	MNRE-Forestry Division to provide advice to community on reforestation / restoration program by providing tree seedlings for planting. 2016-2020 National Forestry Plan NBSAP 2015-2020 NAP – Sustainable Land Management Plan 2015-2019 NBSAP 2015-2020 Restoration of the Operational Plan 2016 – 2020 2 Million Tree Planting Strategy 2015 -2020	National Environment Sector Plan 2017-2021
Waste Management	Need regular rubbish collection to collect rubbish from families Village conduct waste awareness program and clean-up regularly ***Responsibility: Village***	Improve hygiene and sanitation Reduce impact of vector borne diseases	MNRE-DEC to provide guidance and support to village through implementation of action plan such as: Waste Management Hazardous and Chemicals Policy 2012 NBSAP 2015-2020 Waste Management Act 2010	National Environment Sector Plan 2016-2021

Livelihood and Food Security	**Best Solutions and Other Solutions Proposed**	**Other Benefits**	**Guidelines to assist Implementation**	**Relevant Sector Plan**
Disturbed forests and plantation areas / invasive pests	Restore and utilize fallow lands closer to the village with plantations rather than clearing inland and upland forests Promote and facilitate planting of rootcrops (i.e yams, sweet potato which are more resilient to	Improve food security and healthy living and increase community resilience and adaptive response to climate change	MAF CROP Division to support farmers through guidance and trainings from Agricultural experts and awareness programs on crop diversification to suit the prolonged periods of drought or rainy season	Agriculture Sector Plan 2016-2020

	cyclones, droughts and floods. Implement sustainable land management practices. Implement integrated pest management programme Promote agro-forestry and mixed planting including fruit trees species to reduce crop vulnerability to pests and diseases. Diversify into other cash crops and fruit trees i.e cocoa, coconut, lemon and plant in suitable areas outside hazard zones Implement a control program to manage invasive pests both flora and fauna impacting on plantations – crops. ***Responsibility: MAF MNRE /village***		Provide tools and planting materials to improve crop diversification and resilience – address pest issues etc. This will lead to improve food security Strengthen partnership with farming NGO's such as the: Samoa Farmers Association; Samoa Federated Farmers Incorporated ; Women in Business Inc. and private sector to support rural farmers through training opportunities and marketing productivity Implementation of solutions are guided by the following: Draft Soil Resource Management Bill 2018 Samoa National Action Programme to combat Land Degradation and to mitigate effects of drought 2015-2020 National Invasive Species Strategy and Action Plan 2008-2011 2 Million Tree Planting Strategy 2015-2020	
Gardening and Handicrafts	Request support for Women's vegetable	Increase opportunities for	Implementation and support should follow	Community Development Plan

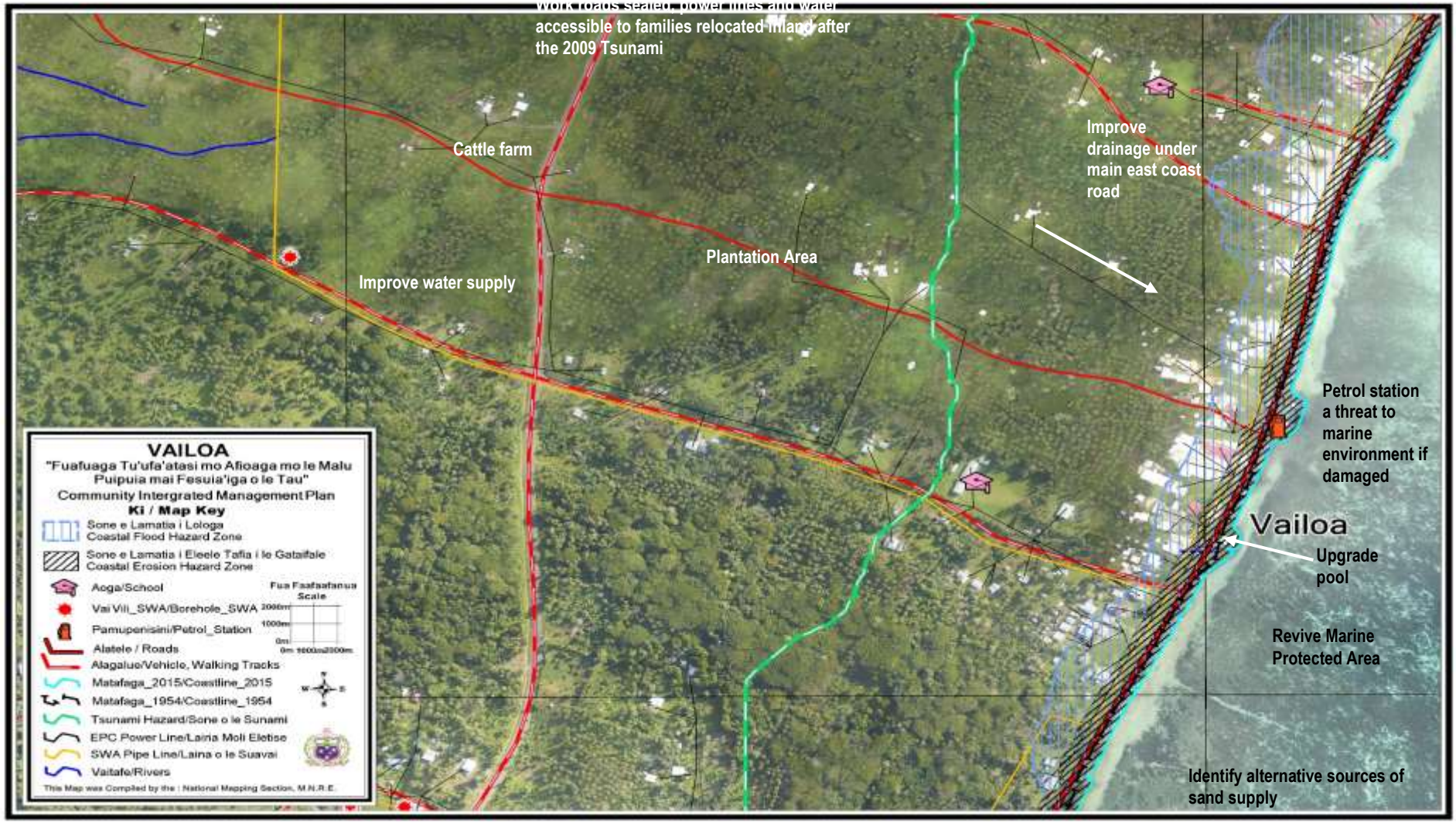
	garden program and handicraft activities for income generation ***Responsibility: MWCSD / WIBDI / Village***	income benefits	guidelines from relevant agencies	2016-2021
Water Catchment	Village to move cattle farms away from watershed location and upland native forest away. ***Responsibility: MNRE / village***	Reverse land degradation	Implementation of actions should follow these guidelines: National Water Resource Strategy 2007-2017	Water and Sanitation Sector 2017

Village Governance	**Best Solutions Proposed**	**Guidelines to assist Implementation**	**Comments**
District /Village By-laws	Implement district / village by-laws for community to follow and include protection of natural resources both marine and terrestrial; Implement the CIM Plan for 2016-2028 Village has strong governance system in place and program: Community health program for clean-up around residential area to reduce spread of vector borne disease Curfew in the evening for prayers Village by laws are enforced for social issues which includes drinking, no one allowed into the Marine Reserve, monitoring work of untitled men (aumaga) at plantations (competition), encourage all village children to attend school. ***Responsibility: Village / MWCSD***	MWCSD to provide assistance to district /village in developing by-laws Community Development 2016-2021	Support the development of district / village by-laws that can guide governing structure of village and the implementation of government and non-government programs including CIM Plans.

Vailoa coastal spring and drinking water - village request support to repair the wall is deteriorating. Drinking water needs to be tested as there is strong possibility of contamination.

EPC Windmill Station in Vailoa and village request to resealed road to this station for easy access.

Vailoa Village Map



4.3 Ulutogia Village Interventions

Infrastructure	Best Solutions Proposed	Other Benefits	Guidelines to assist Implementation	Relevant Sector Plan
Access road	Extend sealing of access road (loop-road) noted in the LTA list: Length: 1.77 km Estimated Cost: SAT$637,200.00 Include drainage in the design of the access road Request other service infrastructure included such as: Proper roadside drainage included Piped water network and Electricity lines ***Responsibility: LTA / EPC /MWTI / village***	Improve rate of recovery Increase number of families relocate to higher grounds	Construction of access roads should be guided by government requirements as stated in the following policies, strategies and action plans: Environmental and Social Safeguard policy Samoa Code of Environmental Practice (2007) Review of National Road Standards in Samoa (2016) Vulnerability Assessment of the Samoa Road Network (2017) National Infrastructure Strategic Plan (NISP) 2011 Programme road safety activities into budget and work programme	Community Integrated Management Strategy, August 2015 Transport Sector Plan 2014-2019
Rainwater harvesting systems (water tanks)	Implement the installation of water tanks for families without access to water for consumption and domestic use ***Responsibility: CSSP / MWCSD / village***	Improve community adaptive capacity to respond to climate change impacts Provide alternative water source for families	Conduct assessment of vulnerable families inland without access to water prior to approving rainwater harvesting system. National Water Resources Management Strategy 2007-2017	Water and Sanitation Sector Plan 2016-2020

Water (SWA)	extend water pipeline to all families residing inland design the network based on existing and future projections Estimated cost for extending pipeline from CE notes – between SAT$100,000.00 to SAT$ 500,000.00 ***Responsibility: SWA***	Improve water quality for consumption Reduce cases of communicable diseases	SWA to provide support to communities through: Extend piped water network Monitoring water network service and supply	Water and Sanitation Sector Plan 2016-2020

Other Solutions Considered or Further Issues Raised

Infrastructure	Solutions/ Issues	Comment
Man-made outlet	Village request to fill in man-made channel to assist in flushing out water. ***Responsibility: MWTI / LTA / village***	This request was made by a single matai (owner of this said land) who wanted to fill in this land to develop (thus removing the channel); history of why channel was put there - during tsunami water had ponded there for days (foul smell of seawater and debris and govt had dug this channel during cleanup to drain away (into culvert on main road) CE observation - this channel is acting as an alternate waterway for surface runoff and is serving its purpose (especially in disaster times); the concerned land which matai wants to fill is in a natural waterway and risks either damage to his property or nearby neighbors as this will cause re-route of runoff away from the existing culvert that is at the main road. As it is his property, he may fill the land at his own risk, but government does not have to fund it. the natural channel serves its function as a drainage channel and it would be recommended to leave as it-is

Environment & Natural Resources	Best Solutions Proposed	Other Benefits	Guidelines to assist Implementation	Relevant Sector Plan
Coastal Restoration	Implement replanting of the coastal area with coastal vegetation ***Responsibility: MNRE / MAF-Fisheries /village***	Improve natural barriers and resilience of coastal area reduce coastal erosion	MNRE – Forestry to provide guidance and advice coastal vegetation for replanting NBSAP 2015-2020 2 Million Tree Planting Strategy 2015 - 2020	National Environment Sector Plan 2017-2021
Marine / Fisheries Reserve	Re-established fishery reserves	Reduce impact of land-based	MAF-Fisheries division to provide advice following	Agriculture Sector Plan 2016-2020

	Implement coral gardening Conduct training on village based monitoring programs for marine areas Develop a Fisheries Management Plan Implement program to remove crown of thorns / seaweed from inshore area ***Responsibility: MAF / Village***	pollution Reduce impact of coral bleaching Improve resilience of coral reef ecosystem to combat climate change Reduce loss of marine habitats	existing guidelines: Community-based Management Fishery Plan NBSAP 2015-2020 Update village Fisheries Management Plan	National Environment Sector Plan 2017-2021

Livelihood and Food Security	**Best Solutions s Proposed**	**Other Benefits**	**Guidelines to assist Implementation**	**Relevant Sector Plan**
Disturbed forests and plantation areas / invasive pests	Restore and utilize fallow lands closer to the village with plantations rather than clearing inland and upland forests Promote and facilitate planting of rootcrops (i.e yams, sweet potato which are more resilient to cyclones, droughts and floods. Implement sustainable land management practices. Implement integrated pest management programme Promote agro-forestry and mixed planting including fruit trees species to reduce crop vulnerability to pests and diseases. Diversify into other cash crops and fruit trees i.e cocoa, coconut, lemon and	Improve food security and healthy living and increase community resilience and adaptive response to climate change	MAF CROP Division to support farmers through guidance and trainings from Agricultural experts and awareness programs on crop diversification to suit the prolonged periods of drought or rainy season Provide tools and planting materials to improve crop diversification and resilience – address pest issues etc. This will lead to improve food security Strengthen partnership with farming NGO's such as the: Samoa Farmers Association; Samoa Federated Farmers Incorporated ; Women in Business Inc. and private sector to support rural farmers through training	Agriculture Sector Plan 2016-2020

	plant in suitable areas outside hazard zones Implement a control program to manage invasive pests both flora and fauna impacting on plantations – crops. ***Responsibility: MAF MNRE /villages***		opportunities and marketing productivity Implementation of solutions are guided by the following: Draft Soil Resource Management Bill 2018 Samoa National Action Programme to combat Land Degradation and to mitigate effects of drought 2015-2020 National Invasive Species Strategy and Action Plan 2008-2011 2 Million Tree Planting Strategy 2015-2020	

Access loop road around Ulutogia to plantation and residential that needs sealing for evacuation to higher grounds

Ulutogia Village Map