Community Integrated Management Plan

Gagaemauga I -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

District Representatives:

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 Gagaemauga I (Samalaeulu, Mauga, Patamea and Leauvaa)

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

Date of Signing: 15 June2018

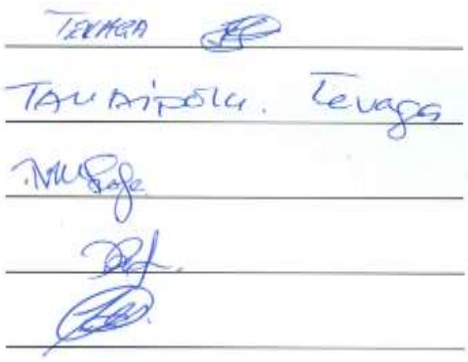
Representatives: **Signature**

Mauga Village

- Vaifale Taeuma
- Tevaga Malagamalii
- Tupai Pale
- Tuimaseve Aite
- Koreti Vaifale

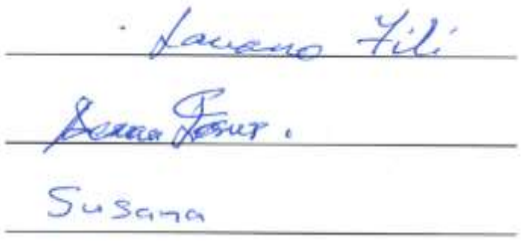
Samalaeulu Village

- Tevaga Ioane
- Tauaipolu Tevaga
- Tevaga Vaifale Sofe Iopu
- Failagi Sofe
- Aukusitino Ulugia



Patamea Village

- Lauano Fili
- Semau Ioasua
- Susana Semau



Leauvaa Village

- Fiapule Sefo
- Taulipago Nimo
- Suitauloa Tauloa

The Government of Samoa adopts the Community Integrated Management Plan for the Alii and Faipule of Gagaemauga I (Savaii Island) 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.

_____

Ulu Bismarck Crawley
CHIEF EXECUTIVE OFFICER MNRE

Table of Contents

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 Gagaemauga I have 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

: 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 Gagaemauga I District Environment

3.1 Physical and Natural Resource Setting

Gagaemauga 1 is made up of the three villages in Savaii of Samalaeulu, Patamea and Mauga as well as the village of Leauvaa in Upolu. Lealatele was the traditional village before the lava flows of the early 1900's when some of the families relocated and settled in Leauvaa on Upolu (see sub-section 3.1.1 for Leauvaa – Upolu description) while the rest resettled in the three sub-villages of Samalaeulu, Mauga and Patamea.

The coastline for Gagaemauga 1 is made up of over 20km of lava rock from the 1911 lava flow and part of the Puapua volcanic. The rocky coastline extends from Saleaula to Puapua in northern Savaii. Solamea is the only small black sand beach which people can get into the sea for fishing while for the rest of the coastline, only line fishing is possible. For several years a century ago, lava flowed from the interior of Savaii down between the Gagaemauga villages of Samalaeulu and Mauga, filling in the coastal lowland and lagoon and forcing coastal villages to either move inland or to Upolu where the village of Leauva'a was established. The village of Mauga, itself built inside a crater, is now half surrounded by black lava and all that remains of the historic Catholic Mission site on the coast is a large monument. The Maliolio River flows intermittently though the main farming area of the district and enters the sea east of Samalaeulu. Although often dry it can flood during the rainy season cutting off access to village plantations and vehicle access along the main road.

The Gagaemauga 3 district has extensive land holdings, due mostly to the nature of the land which is predominantly young lava rocks from the Puapua volcanics and the Saleaula eruptions. As such, the main vegetation types present are the young volcanic shrubs on mostly barren lava flows of the Saleaula eruptions and the forested areas in the Puapua volcanic soils.
Along the Maliolio River are some of the more fertile soils. Along the flood plains inland from Patamea village although has been left fallow are remnants of old plantations, while towards the river mouth on the coast are remnants of old settlements, predating the 19011 lava flows. Much of the land along the access roads and plantations roads for all three villages of Patamea, Samalaeulu, and Mauga has been cleared and now either left fallow and populated with shrubs and invasive trees such as guava, tamaligi mixing with secondary forest trees such as tavai. The plantations roads extend beyond 500m altitude where new clearings have been planted with mostly taro. A few families have commercial plantations while most of the plantations are around acres which are mostly for domestic use. Very few plantations can be found around the village settlement areas.

The Gagaemauga 1 forest has in vast expands still untouched by human activity nevertheless, the forests are opened either due to cyclone damage or forest fires. The area is now a mixture of old native forest trees such as tava, mamalava, magaui, asi, along with secondary forest trees such as tavai and invasive species such as tamaligi, pulu vao, pulu mamoe, and the fue lautetele that seem to have dominated most of the open forest areas.

Due to the vastness of still untouched forest extending from the coast all the way into the watershed and upland montane forests, it is important that some form of conservation program is developed for the area noting this is one of the best locations for a forest corridor and refuge for native plants and animals along the north of Savaii. The volcanic succession vegetation of the Matavanu eruptions is also very important area for conservation. Preliminary bird assessments of the area noted a high density for native birds such as manuma, fiaui, manutagi as well as suspected presence of manumea closer to the village of Mauga. A more detailed survey of the area will undoubtedly result in an even higher diversity and density of native birds and sea birds nesting along the coastal area.

The invasive trees and shrubs are present along the logging access roads throughout the district. Tamaligi trees seem to only dominate the lava field edges were not found to be venturing deeper into the native forests yet. Stands of pulu vao and pulu mamoe were found along the village of Samalaeulu and in some opened forested areas that were damaged from the 1990's cyclones and 2014 forest fire. Myna birds were found in abundance along the whole northern Savaii especially closer to settlements. Goat farming in Patamea is an area of concern because there is potential for these goats escaping into the wild and can do much damage to the native forest.

3.1.1 Leauvaa (Upolu Island)

The inshore reef and lagoon for Leauvaa in Upolu is part of the reef system from Apia all the way to Aana extends out to over 2km which. Much of the reef closer to land has been damaged over the years due to siltation from land-based pollution, cyclone wave damage and destructive fishing methods such coral crushing and dynamiting. Bordering Leauvaa and Tuanai village is a small mangrove stands that has left from the reclamation of for the Tofamamao Compound. Much of the coastline is now populated by residences and cleared by families living along the area thus changing what was previously a mangrove stands that acted as border between the sea and the rocky shoreline. Overfishing, loss of coral habitats and land-based pollution can be attributed to the decline of the fish and fisheries stocks that were once abundant in the area.

Leauvaa village's inland area is a mixture of secondary forest vegetation, coconut plantations and alien invasive species due to the area being heavily quarried. The old quarries that litter inland Leauvaa show regrowth in some areas but in others, the land is still barren. An exercise in replanting or conserving these areas will have positive influence on the native regeneration and also for native birds.

3.2 Social and Economic Setting

The Gagaemauga I District on Savaii currently has a population of 1,865 persons (2016 census), and development is largely focused around the three inland villages of Patamea, Samalaeulu and Mauga.

The main road does not follow the coast through this district. It goes inland through Samalaeulu and close to Mauga. Patamea lies two kilometers west of the main road around Savaii, on the northern end of the Vai'a'ata Road. The main road is considered "life-line" infrastructure as it provides the only access for District residents to schools, churches and shops as well as to other districts (and the regional hospital at Tuasivi). It is generally well maintained, but where it passes through Samalaeulu, it crosses a deep ford at the Maliolio River where vehicles can be stopped by flooding.

Vai'a'ata Road is an alternative route through the southern portion of the district and could become an alternative route for the main road in emergencies if it were better maintained and fully sealed. It is now sealed only as far as Patamea.

From the main road, work/access roads to village plantations extend both inland and toward the coast. They are generally unsealed, and have no power or telephone services along them. After storms they can become flooded and impassable, even on foot, as several require crossing the Maliolio River. Loss of access to village plantations during and after floods can have a major impact on both the health of villagers and on the economy of the villages.

Primary services such as water and power generally follow the main road, and are not affected by storm surges. The water supply for the three villages is through the Independent Water Scheme (IWS) and there were issues raised by one of the villages regarding unreliable water availability as there are occasion that the water is switch off by the village who holds the water reservoir. Mobile phone network works well in all the villages and most services for communication are provided by Digicel and Bluesky phone companies.

The cash economy of the District is dominated by traditional work, largely in local plantations, with a few families doing vegetable gardens. There are some families who have cattle farms and poultry farming and many own a piggery farms, other people have employment outside the district, even in Apia. Fishing is not a major activity as there is no easy access to the coast. The District supports a large primary school and a number of churches. In addition, there are a number of small shops and home occupations throughout the area. Other small scale business in the district include a black sand mining operation mainly in the Maliolio River at the ford and also on the coast, and a cement block making operation south of Samalaeulu.

3.2.1 Leauvaa (Upolu Island)

Although this part of the district is very small in area and contains only one village, it is not small in population. According to the last census (2016), it contains 3,274 people, nearly twice as many as in the whole of the district on Savaii. Virtually everyone lives in or near the intensively developed coastal community of Leauva'a.

The main road passes through the centre of Leauva'a and lies close to the coast. It provides the primary means for villagers to get to schools, shops, health care, employment, other districts, the airport and Apia, and is considered

life-line infrastructure. It passes through both the erosion hazard zone and the flood hazard zone, and in other areas has poor drainage along and under it, which puts it at high risk and susceptibility.

Work roads extend inland from the main road. One is paved and two are not, although all have overhead power and telephone services and underground water service at least part way along them. Unfortunately, near the coast all services pass through the coastal hazard zones and are at risk of damage during a natural disaster. Further inland parts of the work roads can seriously flood after heavy rain, and make it difficult for villagers to go in and out of the area.

The Tofamamao Cultural Centre on the reclaimed mangrove swampland east of Leauva'a is exposed to erosion and flood damage from most directions, and the primary school and church in the centre of Leauva'a are on the edge of both hazard zones and are somewhat susceptible to damage as well. The cash economy of the District is driven by a mixture of traditional work and paid employment. Many people commute to work in Apia, and others find work in nearby shops, tourist facilities, schools and industry. Some are employed locally in quarrying, at the cultural centre and in a variety of home occupations. In addition, most local villagers are involved in fishing and in working their plantations.

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 2011which 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 2007 CIM Plan for Gagaemauga I, 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. Unlike most coastal villages, the three villages are located further inland along the main road and away from the coast, the infrastructure along the main road are the lifeline for the district in terms of commuting to Salelologa township, Tuasivi national hospital and to other villages. However most of these villages are vulnerable to flash flooding from Maliolio River which runs through Patamea and Samalaeulu village. As such the update of the CIM Plan considers a broader landscape hazards, climate risks and likely responses to increase resilience of communities.

Coastal Hazards and Risks: Coastal area at this part of Savaii is also referred to as an iron-bounced coastline of Aopo Formation to the north (east of Mauga village) and a broad Puapua Formation on the south (Solomea area – Samalaeulu village) referred to Figure 1 (Fepuleai, 2017[1]). High energy wave-dominated activity triggers the coastline to continue shift inland at up to 30 to 40 metres. A rapid inland shift (green arrows) of the coastline is associated with numerous of deeply dissected jointed networks. A rapid shift of the coastline at this part of Savaii is seen in the deteriorating of the old road along the coast of Solomea. The black sand and boulder sand mining along Solomea (for brick industry and construction purposes) contributes to coastal erosion in the area.

[1] Fepuleai, Dr. Aleni (2017); Geomorphology Assessment of the Districts under PPCR- Enhancing Climate Resilience Project

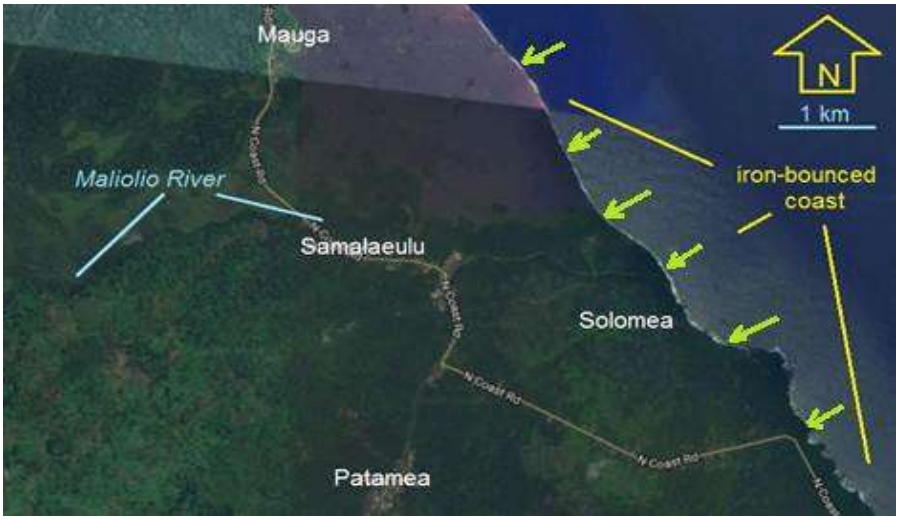


Figure 1 *Iron-bounced coast section between Solomea and the eastern part of Mauga village. Rapid shift of the coastline indicates by green arrows*

In the case of Leauvaa village, most of the mangrove area on the coast has been reclaimed for residential area and the biggest reclamation is where the Tofamamao Centre is located as seen in the Leauvaa Village map. There are thick patches of sedimentation and sand deposits along the coast and if there is any proposed mining in the future this could cause coastal erosion and severe adverse impact on coastal environment.

Inland Hazards and Risks: Dug well (vai eli) at Mauga village is a good basal groundwater source, exposes through fracture and joint networks of the Mulifanua and Salani rock formation (Fig. 2). An increase in fractures and joints of Mulifanua and Salani lava suites, based on rapid development associates with seismic activity could cause a sinking of the dug well source to a further depth. Groundwater contamination is an issue, based on the dug location along the water table and surrounding village plantation.

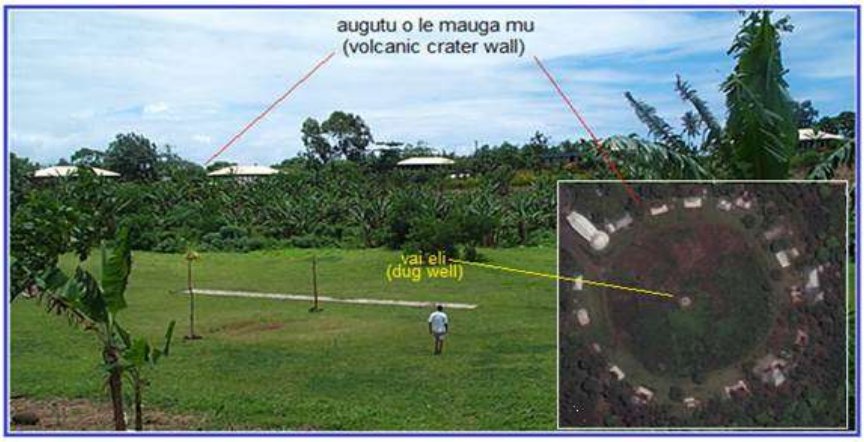


Figure 2: Dug well at centre of Mauga Village - part of a volcanic crater of Mulifanua rock formation (Photo credit: Fepuleai, 2017)

In Figure 3, it shows flood plain of Maliolio River and Puna Spring to the south of Patamea village. Erosion scarps of the Puna Spring drainage system cover an area of up to 1.5 km in width, in comparison to the Maliolio River. A river conjunction zone of up to 50 m wide to the south of Patamea (Fig. 3) could extend during every flood season. This can cause the river to shift closer to the Patamea village and high risk of flooding. Several river bank sections associate with fractures and joints networks of Salani Formation at the Patamea village, indicates that, a width of the river is continuing to extend toward the village. This could threaten many parts of the main road infrastructure in the near future.

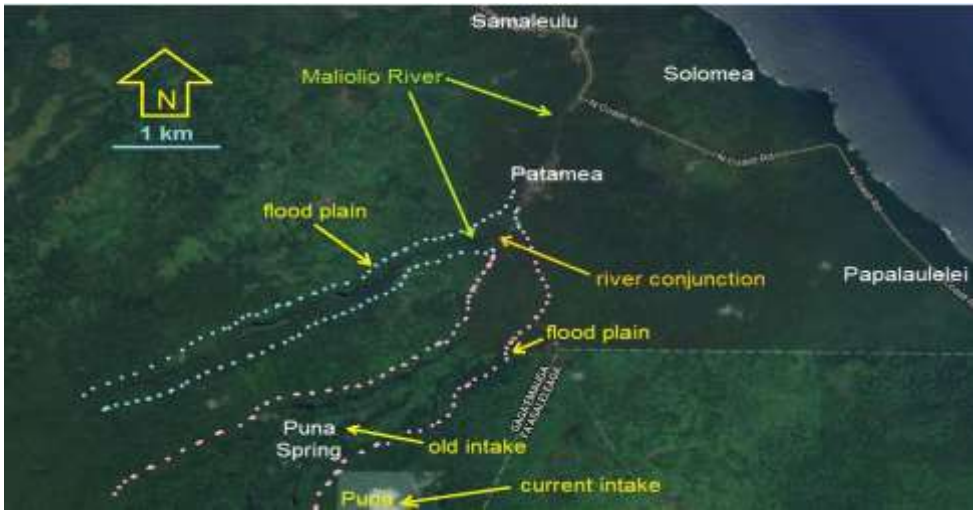


Figure 3 Approximate flood plain of the Maliolio River (blue dots) and Puna Spring (pink dots). Scarp erosion of the Puna Spring spread wider compare to Maliolio River posing inland flood hazard for Patamea village (Fepuleai, 2017)

Inland of Leauvaa village, a basal groundwater quarry is currently used as a rubbish dump, located about 2.5 km inland of Leauvaa, and a serious issue at this part of Upolu (Fig 4). Like Sagaga Le Usoga district (Tuanai village quarry), the groundwater source at this part of Leauvaa without doubt, is high contaminated water source.

Figure 4 Basal groundwater quarry about 2.5km inland used as rubbish dumped - ground water contamination (Photo credit: Fepuleai, 2017)

An open-cut mining about 2.5 km inland of Leauvaa, is producing more problems associated with groundwater resource, not only Leauvaa itself but it can affect nearby districts (Fig. 5). Thinning of the Mulifanua and Salani rocks during this open-cut mining activity, would increase exposure of groundwater source and can lead to accelerated evaporation resulting in the dry out of water source. Additionally, this will allow a contaminated water to rapidly spread widely, through groundwater, surface water, coastal springs and the sea via fractured and jointed lava suites (Fepuleai, 2017). The potential risk of the open cut mining is the strong probability of increase in joint and fracture networks of rocks in the area that can cause the groundwater source to sink further deeper, and it can trigger a dry-out of boreholes, surface water and coastal springs in the region. Given the adverse impact of climate change causing periods of drought, human induced activities in extractive mining can intensify the problem.

Figure 5 *Open-cut mining in Leauvaa village inland - high risk of groundwater sink holes and evaporation causing drying up of natural water source, (**Photo credit:** Fepuleai, 2017)*

Overall, proposed solution requires the identification of areas along Solomea coastline with thick sand deposits for mining to compact the longshore littoral drift and to help improve and managed coastal erosion activities. The Gagaemauga I area is ideal for a Geopark and conservation site given the exceptional geology features which can contribute to boosting Savaii island nature tourism.

As for Leauvaa village there is a strong need for coastal replanting activities to mitigate coastal erosion from the long-shore littoral drift process and at the same time consideration for a rock revetment to protect coastal land area and reduce erosion. Inland there is an urgent need for water quality testing to determine the level of groundwater contamination and exposure. Close monitoring and regulation of open-cut mining is recommended to avoid future risk of dry-up groundwater sources that can affect more than one village and district.

4. Gagaemauga I District Interventions

CIM Plan Solutions

Infrastructure	Best Solutions	Benefits	Guidelines to assist with Implementation	Relevant Sector Plans
Main road including ford at Maliolio River and road side drainage	Replacement of ford crossing Maliolio River with a bridge and new road will be implemented under the ERAP (Enhancing Road Access) project - Construct drainage along and under the main road to facilitate the overland flow of storm-water and reduce flooding **Responsibility: LTA / MWTI**	Improve infrastructure resilience Climate proof and improve the road transport network Improved rate of recovery Reduce potential for flooding in village areas Safer village houses and roads Improved safety community and resilience	Implementation of the bridge to replace ford crossing Maliolio river and road side drainage should apply the following guidelines: 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 programme Programme drainage in budget and work programme 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
Water Distribution Network (IWS)	Improve water supply infrastructure (Independent Water Scheme) for distribution of water to all families in the district: - Upgrade and repair IWS piped water network - Implement community education and	Community resilience strengthen as a result of improved water security Improve infrastructure resilience Improve rate of recovery Improve provision of reliable, clean,	Develop a pre-assessment survey of existing water supply pipeline systems and identify leaks and faults Independent Water Scheme Workplan program for FY17/18 Environmental and Social Safeguard Policies apply MoH Water Quality Standards – Water quality	Community Integrated Management Strategy, August 2015) Water and Sanitation Sector Plan 2012-2016 Community Development Sector 2016-2021

	awareness program on water conservation and management - Conduct water quality testing **Responsibility: MWCSD-IWS / MNRE / MoH/ District & Villages**	and affordable water supplies for families including vulnerable households Increase access to improved basic sanitation and hygiene practices	compliance with National Drinking Water Standards	
Electricity / streetlights	Provision for underground electricity line installed or maintenance of existing lines. Implement the installation of power supply for residents inland and streetlights for safety **Responsibility: MWTI / EPC**	Safeguard electricity lines during time of storms and extreme events – natural disasters. Reduce vulnerability and avoid accidents due to fallen electricity posts.	EPC to installed underground electricity lines along main road Coordinate distribution networks to avoid overloading poles and contributing to line failures	Samoa Energy Sector Plan 2017-2020 Development of a Renewable Energy and Energy Efficiency Framework, 2016
Old Quarry sites and existing Open-cut mining site Leauvaa	Rehabilitation of old sites turning them into reserves and replant with native trees Design appropriate drainage system to flush out pools of water in the quarry and to channel influx of rainwater directly to the coast Conduct massive clean-up of rubbish dumped into the old quarry sites Need to undertake EIA for future proposed quarries prior to approval for extraction. Implement and monitor specific guidelines into the depth allowed for companies doing open cut mining Extractive companies to undertake recovery	Restore ecological balance of ecosystem Reduce impact of flooding onto coastal area Improved environmental management of natural resources Reduce impact on groundwater source exposure and contamination	MNRE-PUMA to develop guidelines into appropriate depth for open-cut mining to mitigate future land degradation issues; MNRE-PUMA and Land Management to regulate and ensure that extractive companies are held responsible for the rehabilitation or restoration of mining areas Implementation of mining activities to follow national guidelines in place: Environmental and Social Safeguard Policy National Infrastructure Strategic Plan (NISP) 2011 NBSAP 2015-2020 National Action	National Environment Sector Plan 2017-2020 Water and Sanitation Sector Plan: Framework For Action 2016 - 2020

	plans for the restoration of lands that they have used for extractive mining **Responsibility: MNRE / District / Private Sector / MWTI**		Programme: To combat land degradation and mitigate effect of drought, 2015-2020 Samoa Code of Environmental Practice (2007) PUMA Act 2004 Waste Management Act 2010	
Environment & Natural Resources	**Best Solution**	**Benefits**	**Guidelines to assist with Implementation**	**Relevant Sector Plans**
Sand mining – riverbanks and coastal area for commercial and domestic use affecting the marine and coastal environment	Assess and identify sustainable sources of sand for domestic and commercial use Village, government and the private sector to collaborate on designated areas for sand mining Strengthen sand mining monitoring and enforcement Mass media awareness on sustainable sand mining practices Develop sand mining regulation **Responsibility: MNRE / Village**	Improve the sustainable management of sand as a natural resource Minimize impacts of coastal inundation and erosion Reduce impact to natural coastal protection mechanism via control of scale and site of extraction	Secure relevant permits before any sand mining occurs Incorporate environmental and social safeguards concerns including consultations with any affected community For access to sites, obtain written consents from Alii Faipule and landowners. Alii Faipule and landowner provide consent Develop sand mining regulation Follow existing MNRE guidelines for sand mining or extracting such as: PUMA Act 2004 Lands and Survey Environment Act 1989 (draft) |Sand Mining Policy	National Environment Sector Plan 2017 - 2021

			2001 Draft Soil Resource Management Bill, 2018 NAP Sustainable Land Management Plan 2015-2019	
Water Catchment Area rehabilitation	Restore watershed areas: - Conduct comprehensive characterization of Gagae'mauga I Watershed Area - Undertake rehabilitation and restoration interventions Provide protection measures for district watershed management - Implement ridge to reef conservation Conduct consultation and awareness on the proposed catchment area Conduct Water Quality testing **Responsibility: MNRE / MoH/ District & Village**	Enhanced water resources resilience from ridge to reef Improve ecological services and resilience of watershed areas Health hygiene and sanitation benefits	MNRE to undertake an Ecosystem-based Adaptation Approach for catchment/landscape measures: Community to request through Forestry Division MNRE seedlings under their 2million tree replanting project National Action Programme: To combat land degradation and mitigate effect of drought, 2015-2020 National Water Resources Management Strategy 2007-2017 NBSAP 2015-2020 Water Resources Act 2008 Forestry Restoration Operational Plan 2016-2020	National Environment Sector Plan 2017-2020 Water and Sanitation Sector Plan 2012-2016 Community Development Sector 2016-2021
Invasive species	Implement bio-control and eradication programme to remove all invasive shrubs and trees: - From areas that were previously used for logging and plantations; - Control and manage the spread of invasive plants from moving upland to areas with good intact forest.	Improve resilience of native forest and biodiversity Reduce the spread of invasive species	MNRE-DEC to provide guidance on effective ways to remove invasive plants from watershed area NBSAP 2015-2020 National Invasive Species Action Plan 2008-2011 Two Million Tree Planting Strategy 2015-2020	

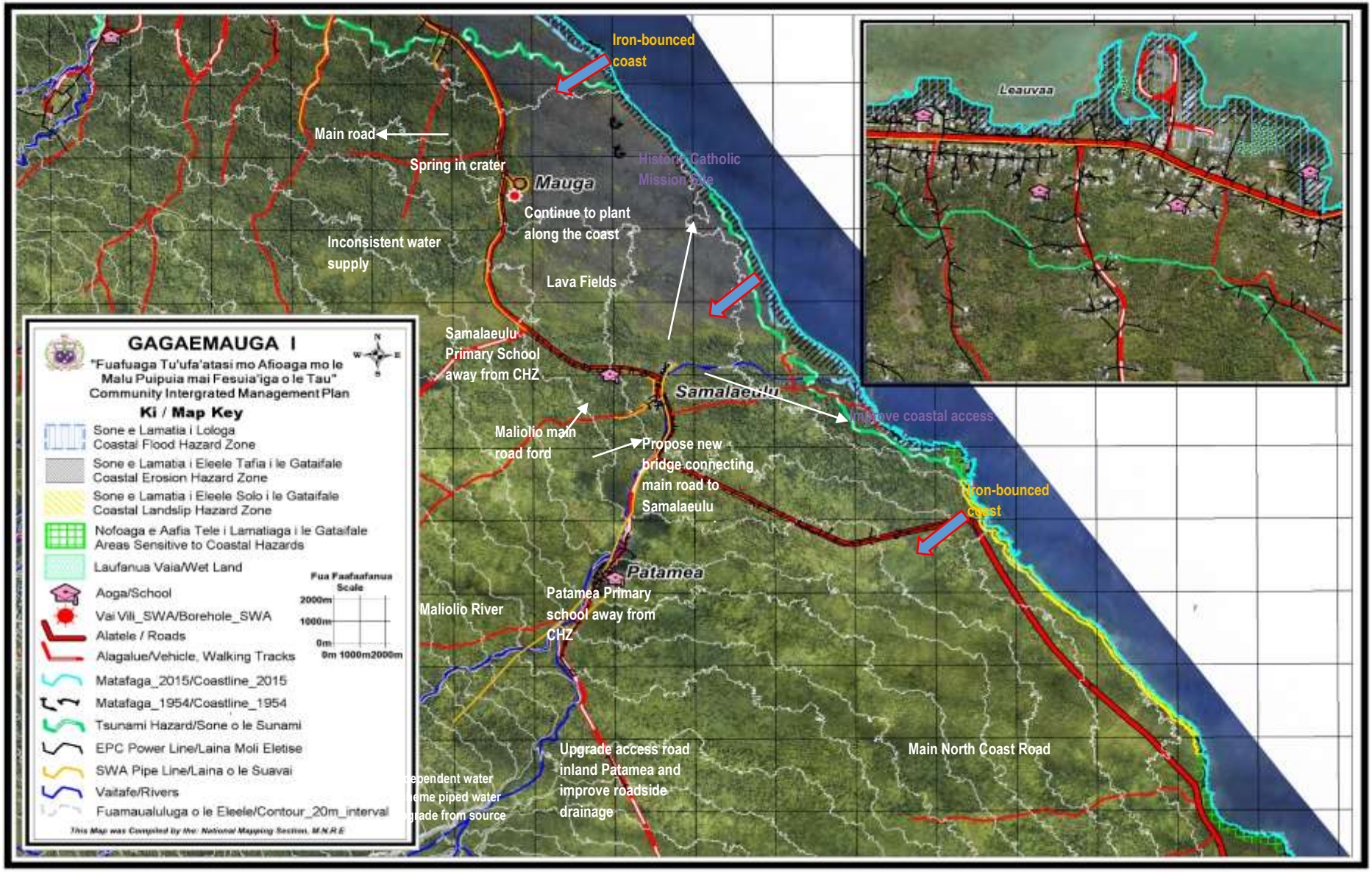
	Responsibility: MNRE / villages			
Governance	**Best Solution**	**Other Benefits**	**Guidelines to assist with implementation**	**Relevant Sector Plans**
District Water Committee	Strengthen water governance at district and village level: - Facilitate workshops to promote dialogue and coordination between the village level water committee and an over-arching District committee; - Identify management gaps and potential sources of support to water committee. Review and formulate Water governance frameworks to improve implementation and enforcement. **Responsibility: District/villages/MNRE/MWCSD-IWS**	Improve coordination and support for management of water resources Strengthen district governance on water resource management	MNRE to provide guidance to District Water Committee for: Development of a Watershed Management Plan Gagaemauga I; Review and implement the Patamea Water Safety Plan Develop Water Resources Village By-laws Use existing MNRE national guidelines to implement activities: National Water Resources Management Strategy 2007-2017 Village Fono Amendment Bill 2016	Community Development Sector 2016-2021 Water and Sanitation Sector Plan 2012-2016 National Environment Sector Plan 2017-2021
Village bi-laws and institutional setting	Develop and enforce related village by-laws to support implementation of CIM Plans **Responsibility: MWCSD / Villages**	Improve village council management	The Amendment allows for the village to establish their own governing constitution and have it registered with MWCSD and in this way village by-laws to manage community and public asset as well as natural resource management can be part of the village constitution. Village Fono Amendment Bill 2016, allows the villages to have their own faiga faavae " refer Clause 5 Amendment".	Community Development Sector 2016-2021
Village drainage inspection	Undertake village inspection of culverts along inland / main roads; - maintenance of road side drains and regular inspection of drainage system; - Implement	Reduce potential for flooding in village areas Safer village houses and roads Improved safety community and resilience	Prepare a local education programme on need for keeping drainage systems clean National Infrastructure Strategic Plan (NISP) 2011 Village beautification committee to conduct	Community Integrated Management Strategy, August 2015 Transport Sector Plan 2014-2019

	district/village drainage/ culvert clean-up and awareness program **Responsibility: MWCSD / District / Village / MWTI/MNRE and LTA**		monitoring of waste disposal and clean-up of drainage and culverts Waste Management Act 2010	

Other CIM Plan Issues Identified	**Comment**
Geo-Park Conservation Area	It was noted from the technical assessment of the district the potential of developing a Geo-Park Conservation Area within Gagaemauga I taking a ridge to reef approach. This is due to its exceptional geology features which very much shape the outlook of the district. A Geo-Park conservation area can also contribute to eco-tourism development on Savaii Island.
Road safety signs	Implement road safety signs in-front of churches and schools such as road humps to reduce speeding and billboards.

Gagaemauga I District CIM Plan Consultation Workshop at Bayview Resort, Saleaula Savaii January 2017

Gagae'mauga I District Map



5. Mauga Village Interventions

Infrastructure	Best Solution	Other Benefits	Guidelines to assist with implementation	Relevant Sector Plans
Water Distribution Network	Upgrade and repair IWS piped water network Implement awareness and education programme on community water conservation and management Conduct water quality testing ***Responsibility: MWCSD-IWS / MNRE / MoH / Village***	Improve access to water for all Improve quality of drinking water Improve safety and resilience Increase adaptation approach	*Develop a pre-assessment survey of existing water supply pipeline systems and identify leaks and faults* *Independent Water Scheme Workplan program for FY17/18* *Environmental and Social Safeguard Policies apply* *MoH Water Quality Standards – Water quality compliance with National Drinking Water Standards*	Community Integrated Management Strategy, August 2015) Water and Sanitation Sector Plan 2016-2020 Community Development Sector 2016-2021
Rain-water harvesting	Implement the installation of rain-water harvesting system: - All families in the village to have access to clean affordable water. ***Responsibility: Village / CSSP / UNDP-GEF SGP / MNRE***	Improve community adaptation actions Increase basic sanitation and hygiene	MNRE to provide guidance to community on opportunities available for small village project: *Conduct assessment to identify vulnerable families in village suitable for rainwater harvesting priority*	Water and Sanitation Sector Plan 2016-2020 Community Development Plan 2016-2021
Village Well (center crater)	Assess feasibility of the re-establishment of the existing village well for back-up support to community when there is water shortage or rationing from IWS	Improve alternative source of water supply	SWA or independent consultant to conduct study on the re-activation of village well and provide sound advice on useage Environmental and	Water and Sanitation Sector Plan 2016-2020

	Conduct investigation into designing a pump system to consist of a submersible pump to extract water and possibly pump to a designated location outside of the catchment area for residents to pump water into water tanks. Water quality testing by MoH if water meets national standards compliance ***Responsibility: MNRE-WRD/Village / / MoH***		social safeguard policy	
Electricity	Implement the installation of power supply for residents inland and streetlights along the roads for safety ***Responsible: EPC/MWTI***	Safeguard electricity lines during time of storms and extreme events – natural disasters. Reduce vulnerability and avoid accidents due to fallen electricity posts.	*EPC to installed electricity lines for access inland families and streetlights maintenance* *Coordinate distribution networks to avoid overloading poles and contributing to line failures*	*Samoa Energy Sector Plan 2017-2022* *Development of a Renewable Energy and Energy Efficiency Framework, 2016*
Evacuation Shelter	*Conduct assessment to identify a school building, women's committee house or church located away from crater as emergency house for the village.* *Implement retrofitting school buildings that are suitable for emergency shelters*	Improve public facility used by communities for safety during times of natural disasters Improve survivors during natural disasters Improve adaptive capacity and	*Emergency house or shelters priority are given to existing buildings within the village that suits the criteria for a Evacuation Shelter (provided by DMO) and are retrofit for this purpose, and most targeted are school buildings.*	*National Disaster Management Plan 2017-2021*

	Request building an Evacuation Shelter house further inland to be managed by the Women's Committee away from the hazard zone and use during times of natural disasters and emergency. ***Responsibility: MWTI MNRE-DMO / MWCSD / Village***	resilience of community to respond to natural disasters		

Other Solutions and Issues Considered

Infrastructure	**Solutions/ Issues**	**Comment**
Local road	Request to tar seal the grass-dirt road around the rim of the crater	The current grassy road is in good condition and no need for upgrade as it will generate adverse environmental impact from dust etc. Both request for road improvement are not CIM Plan priority. However they are included for the purpose of LTA to address community needs for improved village infrastructure
National Road	Request to put in place humps and road safety signs	

Environment & Natural Resources	**Best Solution**	**Other Benefits**	**Guidelines to assist with Implementation**	**Relevant to Sector Plan**
Reforestation of disturbed fallow lands or open forest space	Restoration of disturbed open forest areas: Extend forestry replanting program on fallow lands currently dominated by invasive weed *(Merremia sp)* Replant with native tree species open disturb forest areas	Increase resilience of ecological services of native forest	MNRE – Forestry to provide guidance on replanting of native tree species for restoration of degraded open forest. 2Million Tree Planting Strategy 2015-2020 Forestry Management Act 2011	National Environment Sector Plan 2017-2020 Water and Sanitation Sector Plan 2016-2020

	Responsibility: Village/MNRE		Forestry Restoration Operational Plan 2016-2020	

Livelihood and Food Security	**Best Solutions and Other Solutions Proposed**	**Other Benefits**	**Implementation Guidelines**	**Prioritization immediate actions**
Invasive animals	Request for fencing to protect plantation and farmland from invasive; wild boars or domesticated pigs ***Responsibility: Village / CSSP/ UNDP-GEF SGP / MAF***	Increase crop production	Village to seek assistance from existing small grants opportunities to protect their plantations National Invasive Species Act 2008 National Invasive Species Strategy and Action Plan 2008-2011	Agriculture Sector Plan 2016-2020
Sustainable Land Management and Soil quality	Implement sustainable land management practices Request MAF to undertake soil testing to help understand ways to restore soil fertility for increase crop productivity ***Responsibility: MAF /SROS / village***	Increase soil fertility will improve crop resilience	MAF-CROPs to provide farmers with training and advice on soil management Draft Soil Resource Management Bill 2018 Samoa National Action Programme to combat Land Degradation and to mitigate effects of drought 2015-2020	National Environment Sector Plan 2017-2020
Vegetable Gardening	Implement women's committee vegetable gardening and replanting of native tree species:	Improve healthy living Increase ecological	MAF-CROPs provide training for women on vegetable gardening	

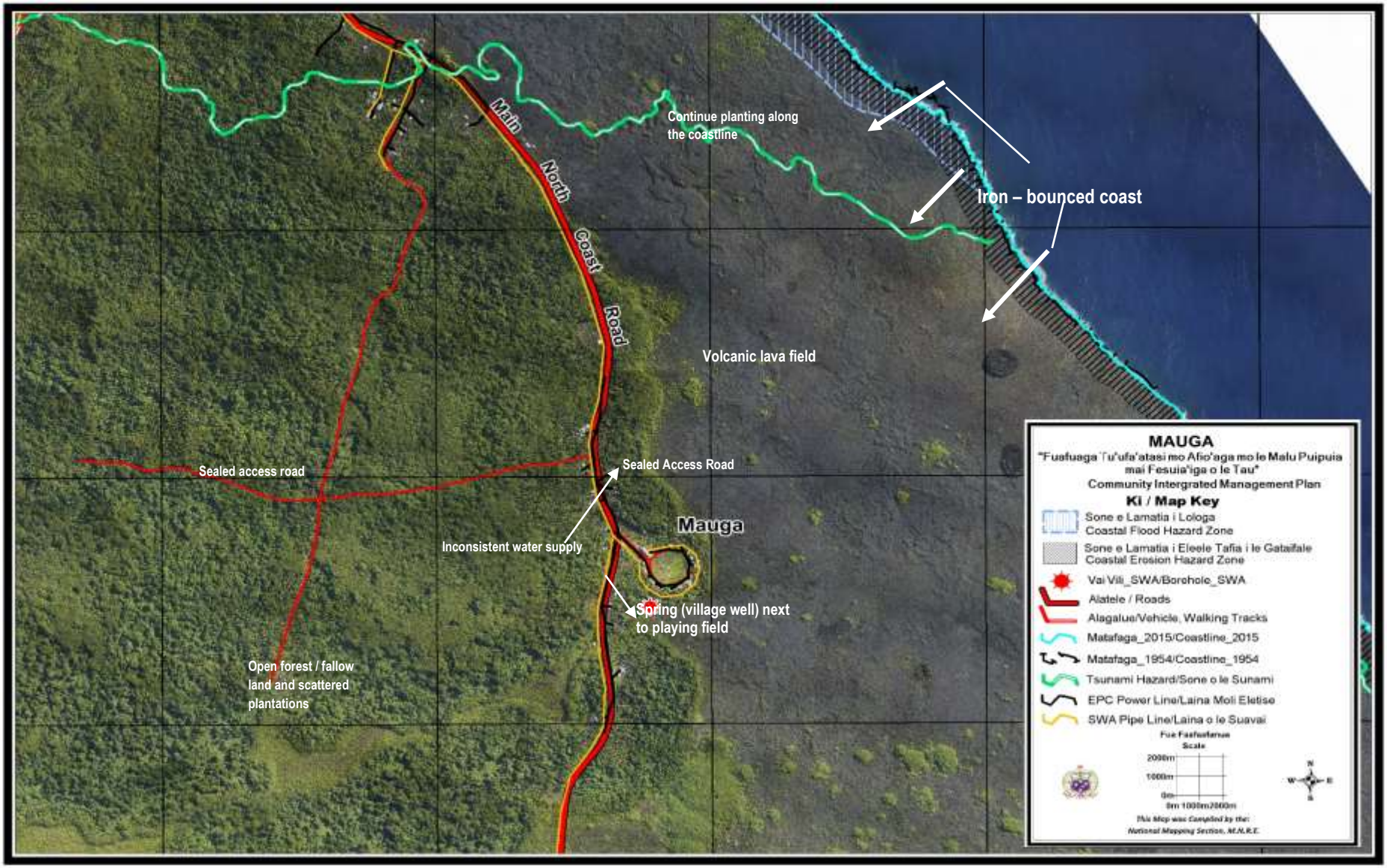
	Disseminate seedling to women for replanting and setting up vegetable gardens in their households Responsibility: Village / MAF / MNRE	services of forest land	MNRE-Forestry to support women's committee with native tree seedlings as part of the 2 million tree campaign Forestry Restoration Operational Plan 2016-2020 2 Million Tree Planting Strategy 2015-2020 Forest Management Act 2011	

Village Governance	**Best Solutions**	**Guidelines to assist with Implementation**	**Comments**
Banned use of pesticides	Re-establishment of the village well includes the banning of pesticide use from around the crater to protect groundwater source ***Responsibility: Village /MNRE***	MNRE to provide guidance to community and village council on the need to banned the use of pesticides around the water catchment area	If the village well is resurrected to provide water supply for community, the village has agreed no pesticides are used in their plantations in order for water well to be free of contamination.
Dynamite fishing	Enforce monitoring of fishing and implement punishment on village people that are caught doing dynamite fishing ***Responsibility: Village / District***	Enforcement of village council laws on the banning of dynamite fishing	From the CIM Plan consultation it as confirmed the strong banned on the use of dynamite for fishing in the inshore area of the marine environment of the village.
Village Disaster Management Program	Installed warning siren and emergency escape signs in designated areas for evacuation during time of natural disaster or emergency Implement the CDCRM Program	MNRE-DMO to provide guidance to village on their CDCRM program National Disaster Management Plan 2017-2021	Request confirmation from MNRE-DMO and it can be part of small sub-project including CDCRM program

	Responsibility: MNRE-DMO / village & district		
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 village in developing by-laws Community Development 2016-2021	Support the development of village by-laws that can guide governing structure of village and the implementation of government and non-government programs including CIM Plans.

Mauga Village crater and in the center is the old village well not in-used surrounded by community plantations.

Mauga Village Map



6. Samalaeulu Village Interventions

Infrastructure	Best Solutions	Other Benefits	Guidelines to assist Implementation	Relevant Sector Plan
Maliolio Ford	Implement the replacement of ford crossing Maliolio River with a bridge and new access road from the bridge **Responsibility: LTA / MWTI**	Improve resilience of road infrastructure	Implementation of the bridge and new road (ERAP World Bank Project) to replace ford crossing Maliolio river should apply the following guidelines: 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	Community Integrated Management Strategy, August 2015 Transport Sector Plan 2014-2019
Water Distribution Network	Upgrade and repair IWS piped water network Implement awareness and education programme on community water conservation and management Conduct Water quality testing **Responsibility: MWCSD-IWS / MNRE /MoH/ Village**	Improve access to water for all	Develop a pre-assessment survey of existing water supply pipeline systems and identify leaks and faults Independent Water Scheme Workplan program for FY17/18	Community Integrated Management Strategy, August 2015) Water and Sanitation Sector Plan 2016-2020

			Environmental and Social Safeguard Policies apply MoH Water Quality Standards – Water quality compliance with National Drinking Water Standards	Community Development Sector 2016-2021
Rain water harvesting	Implement the installation of rain-water harvesting system: - All families in the village to have access to clean affordable water. **Responsibility: Village / CSSP / MNRE**	Improve community adaptation actions Increase basic sanitation and hygiene	MNRE to provide guidance to community on opportunities available for small village project: Conduct assessment to identify vulnerable families in village suitable for rainwater harvesting priority	Water and Sanitation Sector Plan 2016-2020 Community Development Plan 2016-2021
Drainage	-Maintenance of road side drainage and regular inspection of drainage system; **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	Implementation of road side drainage should follow existing guidelines: 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)	Community Integrated Management Strategy, August 2015 Transport Sector Plan 2014-2019

			Programme road safety activities into budget and work programme Programme drainage in budget and work programme Prepare assessment of road drainage systems Prepare a local education programme on need for keeping drainage systems clean.	
Evacuation Shelter	Conduct assessment to identify a school building, women's committee house or church located away from crater as emergency house for the village. Implement retrofitting school buildings that are suitable for emergency shelters Request building a Evacuation Shelter house further inland to be managed by the Women's Committee away from the hazard zone and use during times of natural disasters and emergency. **Responsibility: MWTI MNRE-DMO / MWCSD / Village**	Improve public facility used by communities for safety during times of natural disasters Improve survivors during natural disasters Improve adaptive capacity and resilience of community to respond to natural disasters	Emergency house or shelters priority are given to existing buildings within the village that suits the criteria for an Evacuation Shelter (provided by DMO) and are retrofit for this purpose, and most targeted are school buildings.	National Disaster Management Plan 2017-2021

Electricity	Install streetlights along the main road and access road and a security light at the crossing to the Catholic Church and at the Primary School. **Responsibility: EPC/MWTI**	Safeguard electricity lines during time of storms and extreme events – natural disasters. Reduce vulnerability and avoid accidents due to fallen electricity posts.	EPC to installed electricity lines along main road for pedestrian protection Coordinate distribution networks to avoid overloading poles and contributing to line failures	Samoa Energy Sector Plan 2017-2022 Development of a Renewable Energy and Energy Efficiency Framework, 2016

Other CIM Plan issues identified and solutions

Infrastructure	**Solutions/ Issues**	**Comment**
Inland road	Tar sealed the inland road that goes to village plantation to 2km Installed road safety humps and signs in front of the Primary School on the main road The reconstruction of Village access/plantation road with a length 1.5km estimated cost from LTA to be SAT $545,200.00 ***Responsibility: LTA / village***	Note not CIM Plan priority but they are important to the village for easy access to plantation and road safety for school children to be considered in LTA programs.
School water tank	Installed new water tank to replace the existing water tanks in the Primary School as it is leaking and wasting water ***Responsibility: MESC / Village / CSSP***	Replacement of a water tank for the school which is currently leaking and not safe for school children to drink.
National Geo-Park Conservation Area and Nature Tourism	Develop a protected area either as a National Geo-Park or an integrated conservation and development area in collaboration with the villages or the district. Develop eco-tourism activities utilizing the lava flows, the old village settlements and native forests. Inland treks along the river can be developed as well. This will contribute to improve livelihood and incentive for the village	The technical site assessments during the CIM Plan consultation noted the exceptional geology of the district which shapes the current outlook and landscape.

	Responsibility: MNRE / village and district /STA	

Environment & Natural Resources	**Best Solutions**	**Other Benefits**	**Guidelines to assist Implementation**	**Relevant Sector Plans**
Reforestation of disturbed fallow lands or open forest space	Community to consider converting the open disturbed forest between Samalaeulu and Puapua village into a conservation site: - Implement forest restoration program to remove invasive weed/vine - Training on planting native plants in open degraded forest - Training on control, and management invasive weeds and trees ***Responsibility: MNRE / village***	Increase ecological resilience of forest Reverse land degradation to improve native forest cover Contribute to the MNRE 2 million tree planting	MNRE- Forestry / DEC to provide guidance and support to village: NBSAP 2015-2020 2 Million Tree Planting Strategy 2015-2020 Forestry Management Act 2011 Forestry Restoration Operational Plan 2016-2020	National Environment Sector Plan (NESP)2017-2020
Sand mining for commercial and domestic use affecting the marine and coastal environment	Assess and identify sustainable sources of sand for domestic and commercial use Village, government and the private sector to collaborate on designated areas for sand mining Strengthen sand mining monitoring and enforcement	Improve the sustainable management of sand as a natural resource Minimize impacts of coastal inundation and erosion Reduce impact to natural coastal protection mechanism via control of scale and site of extraction	Secure relevant permits before any sand mining occurs Incorporate environmental and social safeguards concerns including consultations with any affected community For access to sites, obtain written consents from Alii Faipule and landowners.	

	Mass media awareness on sustainable sand mining practices Develop sand mining regulation ***Responsibility: MNRE / Village***		Alii Faipule and landowner provide consent Develop sand mining regulation Follow existing MNRE guidelines for sand mining or extracting such as: PUMA Act 2004 Lands and Survey Environment Act 1989 (draft) |Sand Mining Policy 2001 Draft Soil Resource Management Bill, 2018 NAP Sustainable Land Management Plan 2015-209	
Water Catchment area rehabilitation	Replanting of native forest species for upland forest to restore the resilience and ecological functions of catchment area Implement mapping of watershed area for Sasina River and identify hazard areas inland as well as good farming areas Block off new tributary that currently floods the village Conduct consultation and	Restoration of native forests species increases the resilience against climate change impacts by improving the biodiversity, reducing the risk of forest fires, providing land stabilization, reducing erosion, reducing land slips and maintaining water quality Flood management Contribute to the 2	MNRE-DEC, WRD and Forestry Division to provide advice such as: Awareness and government support in supply of nursery trees, technology and infrastructure to have a sustainable mechanism for replanting Community to request through Forestry Division MNRE seedlings under their 2million tree replanting	National Environment Sector Plan 2017-

	awareness program on the proposed watershed area Implement water quality testing ***Responsibility: MNRE / MoH /MWCSD-IWS /village***	million tree planting	project NBSAP 2015-2020 Forestry Restoration Operational Plan 2016-2020 Two Million Tree Planting Strategy 2015-2020 Forestry Management Act 2011 National Water Resources Management Strategy 2007-2017	2020 Water and Sanitation Sector Plan 2016-2020 Community Development Sector Plan 2016-2021
Invasive species	Implement eradication programme to remove all invasive shrubs and trees: - From areas that were previously used for logging and plantations; - Control and manage the spread of invasive plants from moving upland to areas with good intact forest. **Responsibility: MNRE / villages**	Improve resilience of native forest and biodiversity Reduce the spread of invasive species	MNRE-DEC to provide guidance on effective ways to remove invasive plants from watershed area: NBSAP 2015-2020 National Invasive Species Action Plan 2008-2011 Forestry Restoration Operational Plan 2016-2020 2Million Tree Planting Strategy 2015-2020 Forestry Management Act 2011	

Livelihood and Food Security	Best Solutions	Benefits	Guidelines to assist with Implementation	Relevant Sector Plans
Invasive animals / pests	Request for fencing to protect plantation and farmland from invasive; wild boars or domesticated pigs MAF extension officers to train communities / farmers with tools that can assist them in the eradication, control and management of IAS ***Responsibility: Village / CSSP / MAF***	Increase crop production	Village to seek assistance from existing small grants opportunities to protect their plantations MAF-CROPs division to provide support and guidance to farmers on removing invasive pests	Agriculture Sector Plan 2016-2020
Disturbed forests and plantation areas	Restore and utilize fallow lands closer to the village with plantations rather than clearing inland and upland forests : Promote and facilitate planting of root-crops (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. Diversify into other climate resilient species cash crops and fruit trees i.e cocoa, coconut, lemon and plant in suitable areas outside hazard zones Implement Sustainable Land management	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	Agriculture Sector Plan 2016-2020

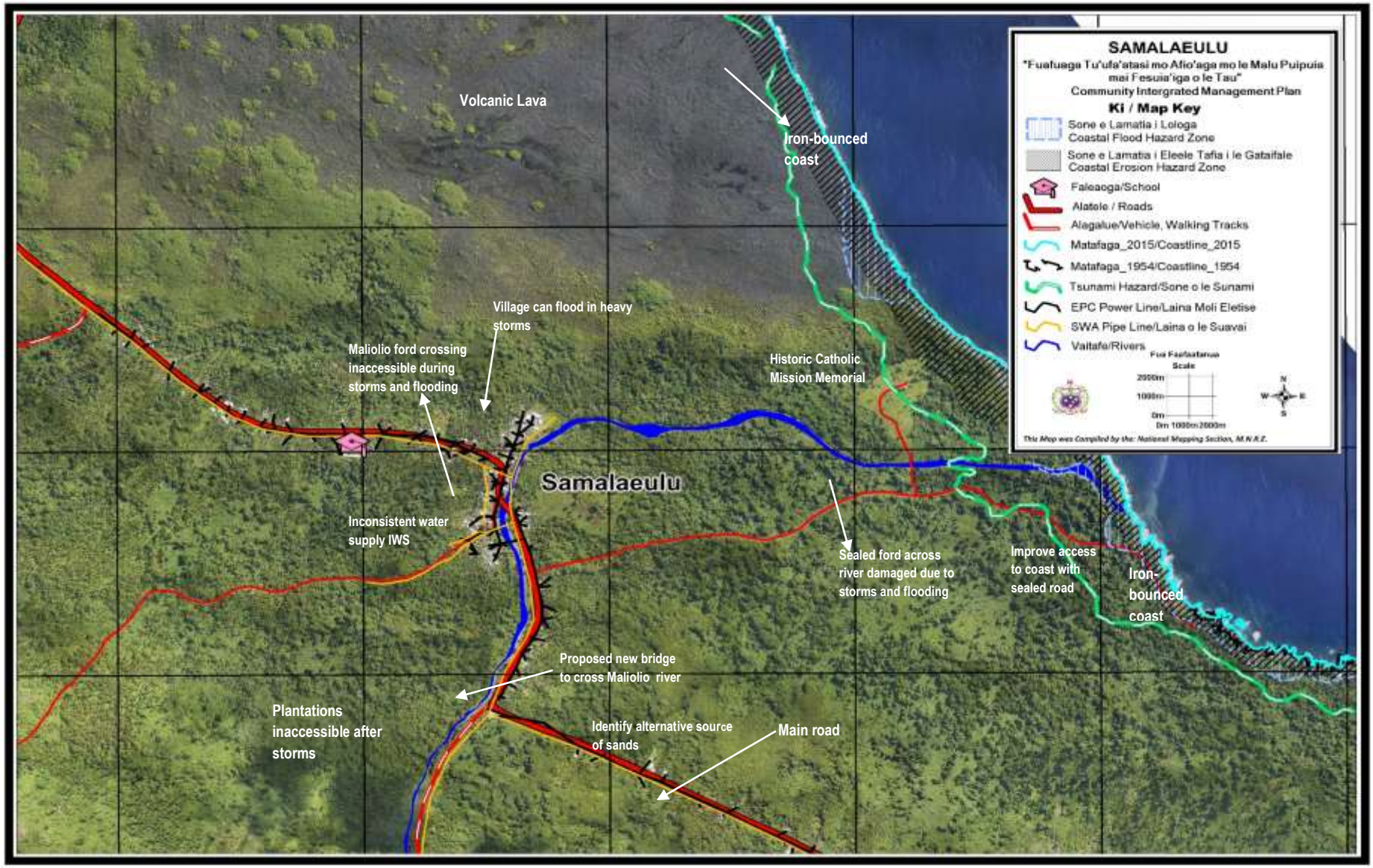
	practices Implement integrated pest management programmes ***Responsibility: MAF / CSSP/WIBDI/Farmers Association/ METI/ SBEC / UNDP-GEF-SGP/MNRE / villages***		sector to support rural farmers through training opportunities and marketing productivity Implementation of solutions are guided by the following: 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	

Village Governance	**Best Solutions**	**Guidelines to assist with Implementation**	**Comments**
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.
Enforce law on illegal logging	Reinforce the no indigenous forest logging legislation or provide appropriate requirements for sustainable portable sawmills operating in the village.	MNRE- Forestry to enforce logging regulation upon logging companies Monitor logging companies or individual portable sawmills	Community identified the continuous practice of illegal logging and need to look at options for re-enforcement to reduce the cutting down of native tree and stop

	Responsibility: MNRE/village	Forestry Restoration Operational Plan 2016-2020 2 Million Tree Planting Strategy 2015-2020 Forest Management Act 2011	logging from moving further inland.
Drainage	Undertake village inspection of culverts along inland / main roads; Implement district/village drainage/ culvert clean-up and awareness program ***Responsibility: Village / MWCSD***	Village council clean-up inspection of roadside drainage and culverts Community Development 2016-2021	Village clean-up and clearance of debris from culverts and along drainage to reduce impact of flooding during extreme heavy rain,

Picture shows the sizing of the pipe culvert across the road is in sufficient to accommodate heavy water during flash flood and makes it worse being blocked with weeds and rubbish. (Photo credit: MNRE-PUMA, 2017)

Samalaeulu Village Map



7. Patamea Village Interventions

Infrastructure	Best Solutions and Other Solutions Proposed	Other Benefits	Implementation Guidelines	Prioritization immediate actions
Water Distribution Network	Upgrade and repair IWS piped water network Implement awareness and education programme on community water conservation and management Implement water quality testing **Responsibility: MWCSD-IWS / MNRE / MoH/ Village**	Improve access to water for all	Develop a pre-assessment survey of existing water supply pipeline systems and identify leaks and faults Independent Water Scheme Workplan program for FY17/18 Environmental and Social Safeguard Policies apply MoH Water Quality Standards – Water quality compliance with National Drinking Water Standards	Community Integrated Management Strategy, August 2015) Water and Sanitation Sector Plan 2016-2020 Community Development Plan 2016-2021
Rain water harvesting	Implement the installation of rain-water harvesting system: - All families in the village to have access to clean affordable water. **Responsibility: Village / CSSP / NGO's/MNRE / UNDP-GEF SGP**	Improve community adaptation actions Increase basic sanitation and hygiene	MNRE to provide guidance to community on opportunities available for small village project: Conduct assessment to identify vulnerable families in village suitable for rainwater harvesting priority	
Drainage maintenance	Maintenance of road side drains and regular inspection of drainage system; **Responsibility: village/ MWTI**	Improved rate of recovery Reduce potential for flooding in village	Implementation of activities to follow existing guidelines: Environmental and Social Safeguard	Community Integrated Management Strategy, August 2015

		areas Safer village houses and roads Improved safety community and resilience	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 programme Programme drainage in budget and work programme Prepare assessment of road drainage systems Prepare a local education programme on need for keeping drainage systems clean	Transport Sector Plan 2014-2019
Electricity	Implement the installation of power supply for residents inland and streetlights along the roads for safety **Responsibility: EPC/MWTI**	Safeguard electricity lines during time of storms and extreme events – natural disasters. Reduce vulnerability and avoid accidents due to fallen electricity posts.	EPC to installed electricity lines and streetlights along main road and inland road residents Coordinate distribution networks to avoid overloading poles and contributing to line failures	Samoa Energy Sector Plan 2017-2022 Development of a Renewable Energy and Energy Efficiency Framework, 2016
Evacuation Shelter	Conduct assessment to identify a school	Improve public facility used by	Emergency house or shelters priority are	National Disaster

	building, women's committee house or church located away from crater as emergency house for the village. Implement retrofitting school buildings that are suitable for emergency shelters Request building a Evacuation Shelter house further inland to be managed by the Women's Committee away from the hazard zone and use during times of natural disasters and emergency. **Responsibility: MWTI MNRE-DMO / MWCSD / Village**	communities for safety during times of natural disasters Improve survivors during natural disasters Improve adaptive capacity and resilience of community to respond to natural disasters	given to existing buildings within the village that suits the criteria for a Evacuation Shelter (provided by DMO) and are retrofit for this purpose, and most targeted are school buildings.	Management Plan 2017-2021

Other CIM Plan issues identified and solutions

Infrastructure	Solutions/ Issues	Comment
River crossing inland to connect inland roads	The village request to reconstruct proper crossing, at the inland river crossing about 2km from the main road existing ford. The need is to enable vehicles to cross inland versus going around at the ford. ***Responsibility: LTA / MWTI / Village***	As noted from past experiences during washout it shows intense, rapid river flows which have caused traffic stoppage as well as death to those who attempt to cross the ford during heavy rainstorms. The government is currently in the process of constructing near bridge to replace ford crossing on main road. Therefore it is not advisable to expend any money to construct any crossing inland, anything less than a bridge will always get washed out.

Main road inland (Patamea – Vaiaata)	Reconstruction of main road and upgrade drains about 1.2km and estimated cost by LTA SAT$ 434,250.00 ***Responsibility: LTA***	The main road is already tar sealed but due to past flooding events it has deteriorated the road standards. This intervention is part of LTA on-going maintenance work.

Environment & Biological Resources	**Best Solutions and Other Solutions Proposed**	**Other Benefits**	**Implementation Guidelines**	**Prioritization immediate actions**
Sand mining for commercial and domestic use affecting riverbanks inland	Assess and identify sustainable sources of river sand for domestic and commercial use Village, government and the private sector to collaborate on designated areas for river sand mining Strengthen sand mining monitoring and enforcement Mass media awareness on sustainable sand mining practices Develop sand mining regulation ***Responsibility: MNRE / Village***	Improve the sustainable management of sand as a natural resource Minimize impacts of coastal inundation and erosion Reduce impact to natural coastal protection mechanism via control of scale and site of extraction	Secure relevant permits before any sand mining occurs Incorporate environmental and social safeguards concerns including consultations with any affected community For access to sites, obtain written consents from Alii Faipule and landowners. Alii Faipule and landowner provide consent Develop sand mining regulation Follow existing MNRE guidelines for sand mining or extracting such as: PUMA Act 2004 Lands and Survey Environment Act	National Environment Sector Plan 2017-2021

			1989 (draft) |Sand Mining Policy 2001 Draft Soil Resource Management Bill, 2018 NAP Sustainable Land Management Plan 2015-2019	Water and Sanitation Sector Plan 2016-2020
Water Catchment	Replanting of native forest species for upland forest to restore the resilience and ecological functions of catchment area Implement mapping of watershed area for Maliolio River and identify hazard areas inland as well as good farming areas Conduct archaeological assessment of Maliolio river mouth for old settlements Conduct consultation and awareness on the proposed catchment area Implement water quality testing ***Responsibility: MNRE/ MoH / village / families***	Restoration of native forests species increases the resilience against climate change impacts by improving the biodiversity, reducing the risk of forest fires, providing land stabilization, reducing erosion, reducing land slips and maintaining water quality Contribute to the 2 million tree planting	MNRE-DEC, WRD and Forestry Division to provide advice such as: Awareness and government support in supply of nursery trees, technology and infrastructure to have a sustainable mechanism for replanting Community to request through Forestry Division MNRE seedlings under their 2million tree replanting project NBSAP 2015-2020 Forestry Restoration Operational Plan 2016-2020 Two Million Tree Planting Strategy 2015-2020 Forestry Management Act 2011 National Water Resources Management Strategy 2007-2017	
Forest (logging)	Close monitoring of village logging	Increase ecological resilience of forest	MNRE- Forestry / DEC to provide	National

	operation: - Limit all village logging operation to MNRE approved areas - Identify suitable areas for logging away from catchment area - Village to implement reforestation program to complement logging activities ***Responsibility: MNRE / village***	Reverse land degradation to improve native forest cover Contribute to the MNRE 2 million tree planting	guidance and support to village: Develop a Forest Management Plan NBSAP 2015-2020 Restoration Operational Forestry Plan 2016-2020 2 Million Tree Planting Strategy 2015-2020 Forestry Management Act 2011	Environment Sector Plan 2017-2020

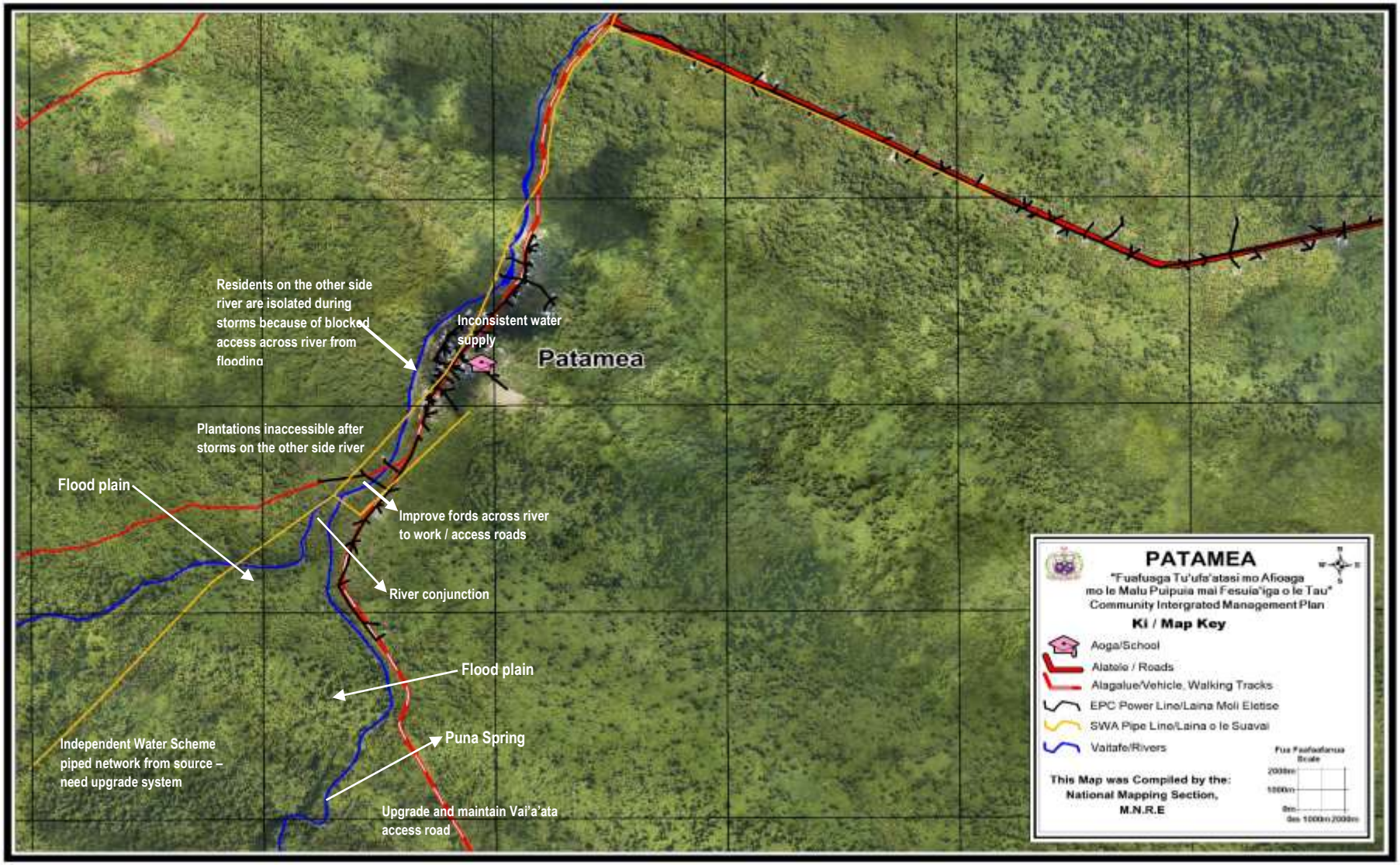
Livelihood and Food Security	**Best Solutions**	**Other Benefits**	**Guidelines to assist Implementation**	**Relevant Sector Plans**
Disturbed forests and plantation areas	Restore and utilize fallow lands closer to the village with plantations rather than clearing inland and upland forests : Promote and facilitate planting of root-crops (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. Diversify into other climate resilient species cash crops 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 opportunities and marketing productivity	Agriculture Sector Plan 2016-2020

	fruit trees i.e cocoa, coconut, lemon and plant in suitable areas outside hazard zones Implement Sustainable Land management practices Implement integrated pest management programmes ***Responsibility: MAF / CSSP/WIBDI/Farmers Association/ METI/ SBEC / UNDP-GEF-SGP/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	

Village Governance	**Best Solutions**	**Guidelines to assist Implementation**	**Comments**
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.
Drainage	Undertake village inspection of culverts along inland / main roads; Implement district/village drainage/ culvert clean-up and awareness program ***Responsibility: Village / MWCSD***	Village council clean-up inspection of roadside drainage and culverts Community Development 2016-2021	Village clean-up and clearance of debris from culverts and along drainage to reduce impact of flooding during extreme heavy rain,

Village sawmill logging inland Patamea, can be a high risk or hazard due to more trees cut down leads to increase soil erosion and the degradation of catchment area.

Patamea Village Map



8. Leauvaa Village Interventions

Infrastructure	Best Solutions	Other Benefits	Guidelines to assist Implementation	Relevant Sector Plans
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 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.	PUMA Act 2004 Application of the National Building Code (Draft Sept 2016) and permit compliance	CIM Strategy (2015)
Old Quarry sites and existing Open-cut mining site Leauvaa	Rehabilitation of old sites turning them into reserves and replant with native trees Design appropriate drainage system to flush out pools of water in the quarry and to channel influx of rainwater directly to the coast Conduct massive clean-up of rubbish dumped into the old quarry sites Need to undertake EIA for future proposed quarries prior to approval for extraction. Implement and monitor specific guidelines into the depth allowed for companies doing open cut mining Extractive	Restore ecological balance of ecosystem Reduce impact of flooding onto coastal area Improved environmental management of natural resources Reduce impact on groundwater source exposure and contamination	MNRE-PUMA to develop guidelines into appropriate depth for open-cut mining to mitigate future land degradation issues; MNRE-PUMA and Land Management to regulate and ensure that extractive companies are held responsible for the rehabilitation or restoration of mining areas Environmental and Social Safeguard Policy NBSAP 2015-2020 National Action Programme: To combat land degradation and mitigate effect of drought, 2015-2020 Samoa Code of Environmental	National Environment Sector Plan 2017-2020 Water and Sanitation Sector Plan 2016-2020

	companies to undertake recovery plans for the restoration of lands that they have used for extractive mining **Responsibility: MNRE / District / Private Sector / MWTI**		Practice (2007) National Infrastructure Strategic Plan (NISP) 2011 PUMA Act 2004	
Evacuation Shelter	DMO to conduct assessment of existing buildings within the village located away from the hazard zone to identify a suitable building for Evacuation Shelter, prior to considering following request. Implement retrofitting buildings that are suitable for emergency shelters Request building a Evacuation Shelter house further inland to be managed by the Women's Committee away from the hazard zone and use during times of natural disasters and emergency. Completed CDCRM **Responsibility: MWTI MNRE-DMO / MWCSD / Village**	Improve public facility used by communities for safety during times of natural disasters Improve survivors during natural disasters Improve adaptive capacity and resilience of community to respond to natural disasters	Emergency house or shelters priority are given to existing buildings within the village that suits the criteria for an Evacuation Shelter and are retrofit for this purpose, and most targeted are school buildings.	National Disaster Management Plan 2017-2021

Other CIM Plan issues identified and solutions

Infrastructure	Solutions	Comment
Seawall	Consideration for a rock revetment behind residential area in Leauvaa will help reduce the impact of coastal erosion. The current seawall is very weak and highly eroded, upgrading of existing seawall and mixed with coastal replanting can help protect land area behind the beachfront. ***Responsibility: LTA /MNRE/ MWTI / village***	It was noted from the technical assessment that possible consideration for a rock revetment can assist residents of Leauvaa residing near the coast to protect their homes and reduce impact of coastal erosion. This is not a CIM Plan priority but identified here for ongoing work by the village and for MWTI/LTA consideration.

Environment & Natural Resources	Best Solutions	Other Benefits	Guidelines to assist Implementation	Relevant Sector Plans
Sand mining for commercial and domestic use affecting the marine and coastal environment	Assess and identify sustainable sources of sand for domestic and commercial use Village, government and the private sector to collaborate on designated areas for sand mining Strengthen sand mining monitoring and enforcement Mass media awareness on sustainable sand mining practices Develop sand	Improve the sustainable management of sand as a natural resource Minimize impacts of coastal inundation and erosion Reduce impact to natural coastal protection mechanism via control of scale and site of extraction	Secure relevant permits before any sand mining occurs Incorporate environmental and social safeguards concerns including consultations with any affected community For access to sites, obtain written consents from Alii Faipule and landowners. Alii Faipule and landowner provide consent Develop sand mining regulation Follow existing MNRE guidelines for sand mining or extracting	National Environment Sector Plan 2017 - 2021

	mining regulation ***Responsibility: MNRE / Village***		such as: PUMA Act 2004 Lands and Survey Environment Act 1989 (draft) |Sand Mining Policy 2001 Draft Soil Resource Management Bill, 2018 NAP Sustainable Land Management Plan 2015-2019	
Reforestation of disturbed fallow lands or open forest space	Restoration of disturbed open forest areas: Extend forestry replanting program on fallow lands currently dominated by invasive weed *(Merremia sp)* Replant with native tree species open disturb forest areas ***Responsibility: Village/MNRE***	Increase resilience of ecological services of native forest	MNRE – Forestry to provide guidance on replanting of native tree species for restoration of degraded open forest. 2Million Tree Planting Strategy 2015-2020 Forestry Management Act 2011 Forestry Restoration Operational Plan 2016-2020	National Environment Sector Plan 2017-2020 Water and Sanitation Sector Plan 2016-2020
Waste Management	Implement community waste management programs: Waste awareness and education programs for schools within district and women's committee; Village Council enforce the clearing of all rubbish from culverts and drainage systems;	Improve healthy living and cleanliness in communities Reduce impact of flooding during rainy season because clear culverts allows for quick flow of water into the sea	MNRE-DEC to ensure that new established roads are included in collection of rubbish Village council enforce fines upon individuals, businesses and families within village that dispose rubbish illegally. Waste Management Act 2010	National Environment Sector Plan 2017-2021 A Healthy Samoa - Health Sector " The Past, Current and the Future" 2000 - 2025 Manifesto Heath Sector Plan 2008-2018

	Include all established roads inland where there are residents in the waste collection ***Responsibility: MNRE/MWCSD /MoH / District-Village***			
Set-up marine reserve to rehabilitate coastal marine environment	Established a marine reserve that will contribute to the protection of coastal and inshore marine area, as well as coral reef ecosystem. Enforce Fisheries By-Laws ***Responsibility: MNRE / MAF / Village***	Mitigate beach coastal erosion Reduce coral bleaching Managed marine areas creates awareness the will provide biological abundance that has a spill-over effect with benefits beyond the protected area boundaries. Benefits are sustainable livelihoods, improved food security.	Establishment and maintenance of marine protected areas requires community consent and government approval along with biological surveys Fisheries Division to advice villages on the Community-based Fisheries Management Program (CBFMP) - Fisheries Management Plans NBSAP 2015-2020	National Environment Sector Plan 2017-2021 Agriculture Sector Plan 2016-2020

Livelihood and Food Security	**Best Solutions**	**Other Benefits**	**Guidelines to assist Implementation**	**Relevant Sector Plans**
Disturbed forests and plantation areas	Restore and utilize fallow lands closer to the village with plantations rather than clearing inland and upland forests : Promote and facilitate planting of root-crops (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	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	Agriculture Sector Plan 2016-2020

	to pests and diseases. Diversify into other climate resilient species cash crops and fruit trees i.e cocoa, coconut, lemon and plant in suitable areas outside hazard zones Implement Sustainable Land management practices Implement integrated pest management programmes ***Responsibility: MAF /CSSP/WIBDI/Farmers Association/ METI/ SBEC / UNDP-GEF-SGP/MNRE / villages***		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	

Village Governance	**Best Solutions and Other Solutions Proposed**	**Implementation Guidelines**	**Comments**
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 village by-laws that can guide governing structure of village and the implementation of government and non-government programs including CIM Plans.

Leauvaa coastal replanting to prevent coastal erosion, small sub-project supported by PPCR-ECR through CSSP

Leauvaa Village Map