Coastal Infrastructure Management Project: CIM Strategy

Prepared for

Government of Samoa

By

Beca International Consultants Ltd

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The CIM Strategy has been prepared by:

Beca International Consultants Ltd and the Coastal Environmental and Institutional Services Project Team.

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Foreword

As part of the Government of Samoa's Infrastructure Asset Management Programme, the Department of Lands, Surveys and Environment is developing a Coastal Infrastructure Management Strategy (CIM Strategy) to provide national guidance for infrastructure development, protection and maintenance in the coastal environment.

The CIM Strategy, for the first time in Samoa, 'sets the scene' for promoting better coastal infrastructure management at a national, district and local level. The strategy has as its central vision *"Resilience – Coastal Infrastructure and Communities Resilient to Natural Hazards"*. I think the word "resilience" is very appropriate to the philosophy of better coastal management because it encourages all of us to be adaptive, responsive and quick to recover from damage resulting from coastal hazards ensuring greater environmental, social and economic sustainability. 'Resilience' includes many hazard management concepts, e.g. education and awareness, preparedness and sustainable land use practices as well as the concept of protection. In this regard, resilience recognises that, while protection may be an efficient option (particularly in the short term), taking this approach alone may lead to a premature and often inappropriate decision to intervene with physical defences and works, which in the longer term can be both costly and environmentally unsustainable.

The CIM Strategy provides a series of national and local principles for coastal management within a setting of partnership. The Strategy develops objectives, policies and implementation methods for coastal hazard and environmental information gathering and monitoring, education and awareness raising, use and management of resources and for undertaking coastal defences and works. The CIM Strategy also sets out the need for Coastal Infrastructure Management Plans (CIM Plans). CIM Plans will be developed for five trial districts during 2001 and preparation of Plans for additional districts will follow. These Plans will be prepared in close consultation with stakeholders and through partnerships with districts and villages. We hope the Plans will provide a sound basis for reducing hazard risks and improving coastal and environmental management for many years to come.

Beca International Consultants Ltd (Beca) is undertaking the Coastal Environmental and Institutional Services project for DLSE and the CIM Strategy is one part of this. You may recall throughout 2000, the Study Team was involved in consultation for the preparation of the CIM Strategy. It is now time to focus on the adoption and implementation of this Strategy and the preparation of local CIM Plans.

I urge you all to get involved in this challenging project by reading the CIM Strategy and participating in its implementation, through the upcoming programmes and the preparation of district CIM Plans.

Thank you for your commitment to this important national Strategy.

Tu'u'u Luafatasaga Dr. Ietitaia Setu Taule'alo
Director, Department of Lands, Surveys and Environment

The Vision


RESILIENCE
Coastal infrastructure and communities resilient to natural hazards.

To Be Resilient Is...

"to be Adaptive, Responsive and Quick to Recover…

CIM Strategy

National Principles for Management *Page 10*

Local Principles for Management *Page 12*

An Ethic of Partnership

Information, Evaluation and Monitoring *Page 14*

Education and Awareness *Page 16*

Management and Use of Land and Resources *Page 18*

Defences and Works *Page 20*

Tools and Actions

Gathering information and data on coastal hazards

Raising awareness of coastal processes through training

Monitoring and planning where activities and resource use may be appropriate

Identifying areas where works are required and designing these appropriately

…so that communities are environmentally, socially and economically sustainable."

What the Strategy is for...

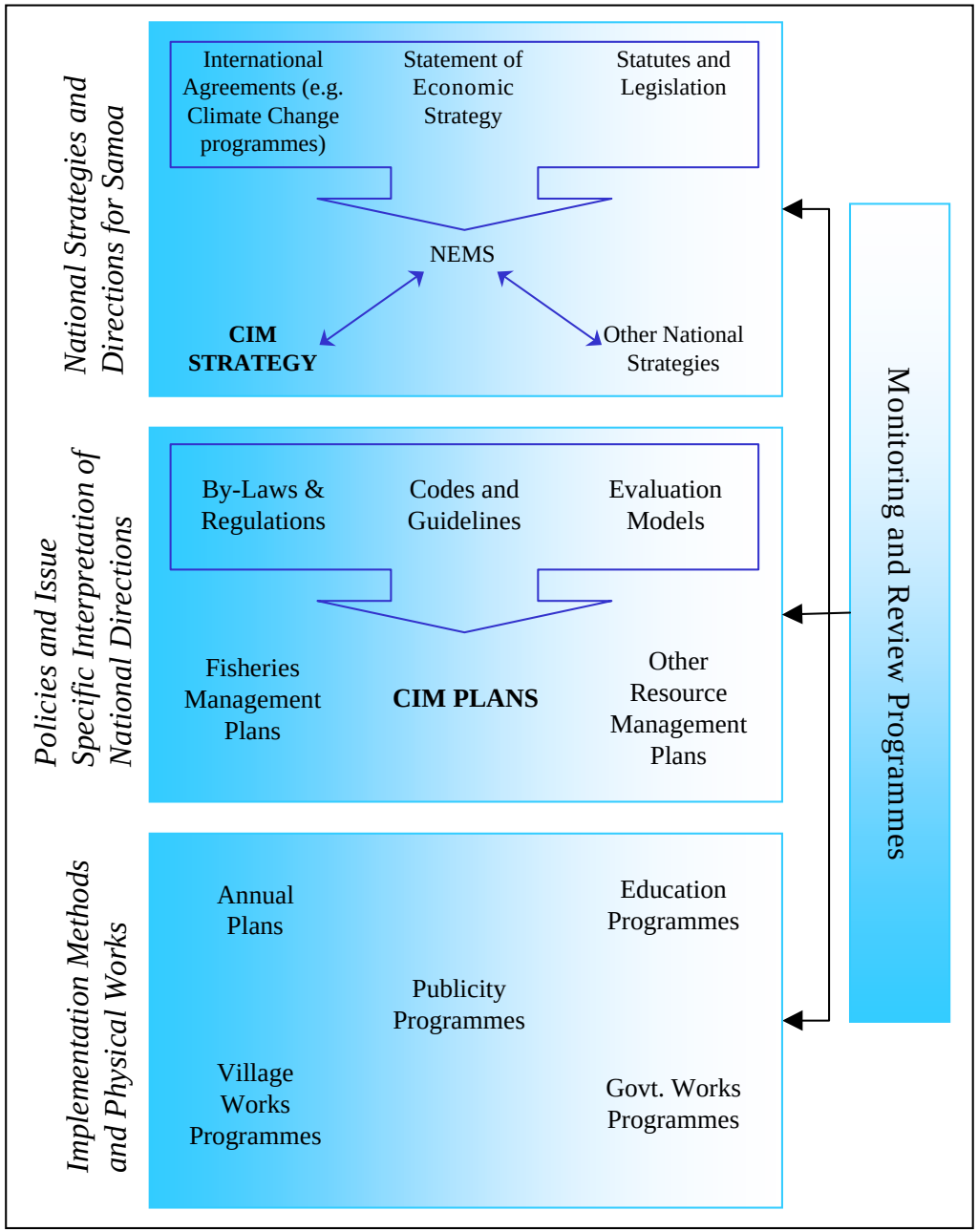
The CIM Strategy, 'sets the scene' for promoting better management of coastal infrastructure at a national, district and local level to develop greater hazard resilience for the Samoan community. The Strategy includes many hazard management concepts and provides guidance for their implementation. The vision or overall goal of the Strategy is - *'Coastal Infrastructure and Communities Resilient to Natural Hazards'*.

To achieve this, the strategy sets out objectives, policies and methods to direct infrastructure and community management and help communities to adapt and respond to, and quickly recover from the damage to infrastructure resulting from coastal hazards.

Where the Strategy fits...

The CIM Strategy is part of the Government's national level policy planning and management. The National Environment and Development Management Strategies (NEMS), in particular, set out a number of national policy directions for Government. The CIM Strategy will sit alongside strategies identified in NEMS, (e.g. policies about waste management, biodiversity and water resources) to establish an overall structure for the sustainable management of natural and physical resources and the environment. In particular, the CIM Strategy will work with the Integrated Coastal Zone Management Project identified in NEMS. Some objectives and policies in the CIM Strategy provide direction for Government planning and project development within the coastal environment. These will need to be reflected in the development of the national guidelines for wider land and resource management within the integrated coastal zone.

Following from the Strategy, the CIM Plans provide guidance on the local level implementation of the principles and directions of the Strategy. Both the Strategy and Plans will provide guidance for education, defences and works, other resource programmes and Government's annual planning processes.



Guide to the Strategy

The CIM Strategy provides goals, objectives, policies and implementation methods to achieve the Strategy Vision, for better coastal management and resilience to coastal hazards. The relationship of the CIM Strategy with CIM Plans and the framework for implementation are provided on page 23.

Goals

Goals are what the CIM Strategy is trying to achieve. They describe the desired 'scene for the future' and provide direction for the objectives and policies. Success in implementing the Strategy will be measured by these goals. The vision of 'resilience' is the overall goal for the CIM Strategy (see page 4).

OBJECTIVES

Objectives state how the Strategy will respond to specific issues to achieve goals.

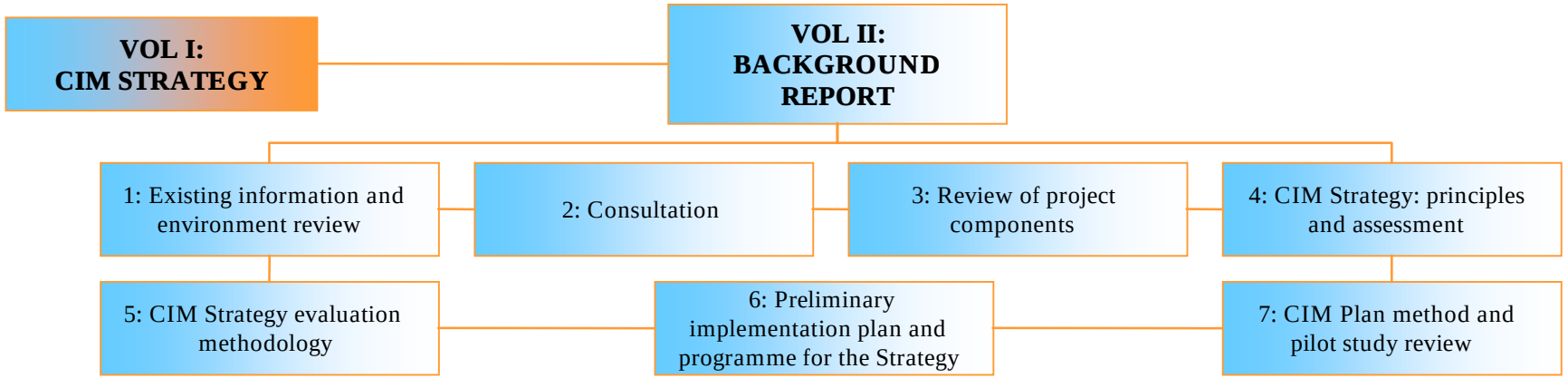
Policies

Policies are broad plans of action needed to achieve a specific objective or objectives and define the tools to be used in coastal management.

Implementation Methods

Implementation methods are specific actions required to achieve the policies. These can include: specific research tasks; monitoring and education programmes; provision of services or incentives; rules/controls, charges or levies; purchasing land or resources. It is envisaged that the Implementation Methods outlined in this Strategy will be implemented over the five-year period: 2001-2006.

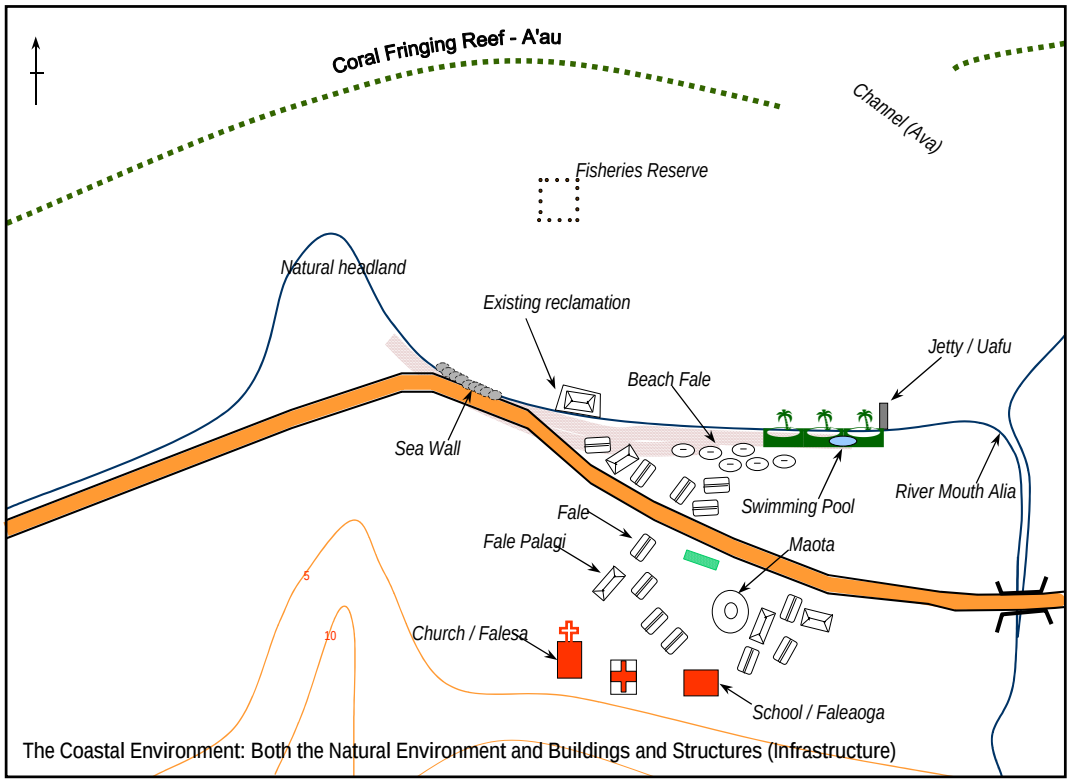
The Strategy document summarises the strategic and policy directions for the implementation of the Coastal Infrastructure Asset Management Project. The Background report provides technical information and detailed assessment of various components of the project, as outlined below.



Hazard Resilience in Samoa

Communities and Infrastructure

Infrastructure includes the built structures and networks that support village and district communities (district and village infrastructure) and Samoan society as a whole (National infrastructure). The diagram to the right shows an idea of how infrastructure and natural features relate in the coastal environment in Samoa. There are many coastal villages in Samoa and as a consequence, there is a high level of development (infrastructure) in these areas. These areas continue to be popular for development. The amount of significant infrastructure along the coast raises the importance of integrated management for the coastal environment and coastal resources.



The Coastal Environment: Both the Natural Environment and Buildings and Structures (Infrastructure)

Coastal Hazards

Erosion - Winds generate waves that create currents which move sediment to, from and along the coast. Sediment movement in the coastal environment is a natural process but it is a hazard when long-term loss of sediment (or erosion) results in damage to land and property as the shoreline moves landward.

LANDSLIP – Erosion, combined with high rainfall, waves or flooding (which saturates the ground) can result in the collapse of coastal slopes. These landslips are a hazard when there is potential for loss of land, property, infrastructure or human life.

FLOODING – Low lying coastal areas, including many areas of settlement and infrastructure, may be flooded due to bigger tides and larger, more powerful waves during storms.

Severe Events **(e.g. Cyclones or Tsunami) –** Tropical storms, or cyclones, are a hazard in Samoa. The high wind and wave conditions in cyclone events often increase erosion rates, increase landslip and cause flooding in low-lying coastal areas (see photograph on page 9). Tsunami resulting from earthquakes can also cause flooding. Tsunami hazard is difficult to predict and manage.

Erosion, landslips, flooding and severe events are the key natural coastal hazards in Samoa. The **Coastal Hazard Zone** defines areas landward from the coast which are or are likely to be subject to the effects of natural coastal hazards. The coastal hazard zone is specific to a particular hazard assessment period. The identification of a Coastal Hazard Zone assists with planning and management of coastal communities and infrastructure by helping to assess what infrastructure may be 'at risk' from hazards.

The high winds and flooding in cyclones Val & Ofa had devastating effects on roads and other infrastructure

Natural Resilience

There are a number of coastal types in Samoa and these respond differently to coastal processes. Coastal types are generally defined as 'hard' or 'soft'. In Samoa, hard coast includes cliffs (e.g. Taga), lava flows (e.g. Mauga) and rocky headlands (e.g. Salepaga). Hard coasts have some resilience to erosion hazard as they are slow to erode. However they may be prone to the hazard of landslips. Soft coast includes the sandy beaches, wetland and mangrove areas (e.g. Apolimafou). Soft coasts are more vulnerable to erosion. Fringing reefs and coastal vegetation (including vines and mangroves) help enhance natural resilience by reducing wave energy and binding sediments.

Community and Infrastructure Resilience

The Samoan coastline is densely populated, with many villages and some larger urban areas (such as Apia) established along the coast. Some villages have both inland and coastal settlements, which improves community resilience. However, inland areas are often used for plantations, leaving coastal settlements with their roads, power and water supply, churches, schools, hospitals, fale / houses, commercial and industrial development vulnerable to coastal hazards.

Also many coastal areas have been cleared of forest and other vegetation, modified (e.g. by reclamation) and are used for resources such as sand and gravel. These land uses can reduce natural, and thus community, resilience to hazards.

Another element that contributes to community resilience is the ability to restore infrastructure and communities after hazard events. In some cases, this may be physically difficult to achieve, or very costly.

Coastal hazard zones have been defined for the coastline of Samoa. The CEHZ identifies areas of erosion hazard. The CFHZ identifies areas of flooding hazard and the CLHZ identifies areas of potential landslip hazard.
This information will be a valuable planning tool for the preparation of CIM Plans.

National Principles for Management

GOAL:

A national system and structure for integrated coastal management.

Objectives

ON.1 TO DEVELOP AND STRENGTHEN GOVERNMENT'S CAPABILITY FOR COASTAL MANAGEMENT AND PLANNING.

ON.2 TO PROMOTE PARTNERSHIP AND COORDINATION AMONG LOCAL COMMUNITIES, GOVERNMENT AND OTHER AGENCIES FOR BETTER COASTAL MANAGEMENT AND HAZARD RESILIENCE.

ON.3 TO MAKE ASSESSMENT OF THE ENVIRONMENTAL IMPACTS OF DEVELOPMENT AND RESOURCE USE IN THE COASTAL ENVIRONMENT CENTRAL TO DECISION MAKING.

ON.4 TO ENSURE A PHILOSOPHY OF 'WORKING WITH NATURE' IS FUNDAMENTAL TO COASTAL INFRASTRUCTURE MANAGEMENT IN SAMOA.

ON.5 TO ADOPT A PRECAUTIONARY PRINCIPLE FOR COASTAL HAZARD MANAGEMENT, RECOGNISING THAT SAMOA CAN MITIGATE BUT NOT ELIMINATE COASTAL HAZARDS.

ON.6 TO ESTABLISH CLEAR AND EFFECTIVE PROTOCOLS FOR THE FUNDING OF WORKS AND ACTIONS TO ENHANCE HAZARD RESILIENCE IN THE COASTAL ENVIRONMENT (INCLUDING SUCH WORKS IDENTIFIED IN CIM PLANS).

Policies

PN.1.1 Develop and strengthen legislation for Government to manage coastal development and coastal hazard resilience.

PN.1.2 Identify, establish and mobilise resources and teams for the management of hazards and infrastructure within the coastal environment.

PN.1.3 Establish clear and transparent responsibilities for DLSE, MAFFM and PWD as primary Government agencies implementing and operating within this Strategy.

PN.2.1 Foster networks and co-operation between coastal management agencies to integrate coastal management by sharing information, technology and professional expertise.

PN.2.2 Establish clear linkages and accountabilities for Government agencies involved in management and provision of infrastructure in the coastal environment (including disaster avoidance).

PN.3.1 Develop statutes and provide resources for EIA procedures and sustainable coastal management.

PN.3.2 Promote environmentally sustainable operating procedures and practices in public and private agencies which are active in infrastructure development or management in the coastal environment.

PN.4.1 Establish a hierarchy of options (commencing with planning and soft structural approaches) for the management and development of the coastal environment and infrastructure.

PN.4.2 Establish a robust Evaluation Model for decision making associated with infrastructure development and management.

PN.5.1 Recognise the inherent uncertainty in defining coastal hazards and the limited understanding of the coastal marine environment.

PN.5.2 Ensure that a precautionary approach is adopted towards the development of infrastructure in the coastal environment, recognising that the adverse effects of such development on coastal processes are often poorly understood.

PN.6.1 Establish clear funding protocols to assist in determining funding assistance for implementation of the Strategy. Generally funding will be prioritised on the basis of likely public benefits from the proposals (e.g. projects of greater public benefit would be more likely to be funded, would receive a higher proportion of their funding from Government (as opposed to private funding) and would likely be funded first).

PN.6.2 Establish clear guidelines on Government funding contributions for projects (including relocation programmes and/or works) relating to private infrastructure, including cost sharing schemes that may be considered by Government.

Implementation Methods

- *Through the Corporate Plan define the DLSE's role in promoting, regulating, monitoring and enforcing the CIM Strategy.*
- *DLSE to promote and assist in preparation of National Plans complementary to the CIM Strategy and CIM Plans (e.g. plans for the development and management of national infrastructure, including works programmes). Such Plans will provide clear direction for national infrastructure and its development.*
- *Undertake Stage II of the Institutional Review of the DLSE (including a review of its statutory legislation), to identify capacity and capability requirements for DLSE to manage and monitor the CIM Strategy.*
- *Establish, through Annual Plans and budgets, funding requirements for the implementation of the CIM Strategy, including project prioritisation.*
- *Establish a Coastal Management Working Group with representation from Government, NGOs and other community spokespeople to facilitate networking, information sharing and better management practices.*
- *Establish formal procedures for the participation of agencies (including government infrastructure providers) with the teams managing, preparing and implementing CIM Plans.*
- *Develop, endorse and incorporate Codes of Environmental Practice in Government work contracts for coastal infrastructure and promote the adoption of these Codes for private infrastructure works.*
- *Identify, through the EIA regulations, projects of such a scale, extent, or impact on sensitive environments that they will require evaluation and approval through those regulations.*
- *Complete the legislative review of the EIA procedures and seek endorsement of amended legislation through Cabinet.*
- *Review the Lands Surveys and Environment Act including refinement of the definitions, responsibilities and linkages to other legislation.*
- *Provide continuing training on EIA procedures for Government and non-Government infrastructure providers.*
- *Adopt the CIM Strategy Evaluation Model for Government funded coastal projects and monitor its ongoing effectiveness.*
- *DLSE to encourage and facilitate the adoption of the CIM Strategy Evaluation Model for by infrastructure providers and other agencies involved in the development and management of infrastructure.*
- *Government to develop protocols and criteria for national funding priority, on the basis of the likelihood of hazard, infrastructure significance, and evaluation of public benefit resulting from proposed projects.*
- *DLSE to establish proforma for funding assistance applications, recognising the role of Government in funding projects with identified 'public good' and the need for any cost sharing with private interests.*

Local Principles for Management

GOAL:

Objectives

OL.1 TO ENHANCE HAZARD RESILIENCE THROUGH COMMUNITY LEADERS ADVOCATING AND, WHERE APPROPRIATE, ENFORCING COASTAL MANAGEMENT.

OL.2 TO ENCOURAGE VILLAGES TO WORK WITH GOVERNMENT TO PROMOTE SUSTAINABLE USE OF COASTAL RESOURCES.

OL.3 TO ENHANCE HAZARD RESILIENCE THROUGH LOCAL DECISION MAKING FOR INFRASTRUCTURE AND COMMUNITY.

OL.4 TO PROMOTE AND FACILITATE CIM PLAN PREPARATION AND IMPLEMENTATION BY DLSE WORKING WITH LOCAL COMMUNITIES AND OTHER LAND OWNERS AND OCCUPIERS.

Policies

PL.1.1 DLSE to encourage the establishment of local committees to advocate and implement CIM Strategy and facilitate the CIM Plan preparation.

PL.1.2 Encourage local managers of land and resources to adopt village rules for the appropriate use and development of the coastal environment.

PL.2.1 DLSE to promote the sustainable use of fisheries, sand, vegetation and water resources through CIM Plans.

PL.2.2 DLSE to provide opportunities for community leaders to network and co-operate in building better practice through sharing of information, experience and where practicable resources.

PL.2.3 DLSE to ensure that villages participate directly in CIM Plans, encouraging ownership of these Plans by the local community and facilitating partnership between Government and local management.

PL.3.1 Promote EIA principles in local decision-making and land use management.

PL.3.2 Promote the adoption of the CIM Strategy Evaluation Model in local decision making for infrastructure development and management.

PL.4.1 Develop and establish guidelines and a suggested framework for the CIM Plan.

PL.4.2 DLSE to ensure that villages and other land owners and occupiers work together with Government to prepare, endorse and implement CIM Plans for the management of coastal infrastructure.

Implementation Methods

- *Promote the establishment of local committees to advocate the CIM Strategy and work with government and other stakeholders in the preparation of the CIM Plans. These committees will be established by the* Fono a Matai.
- *DLSE to bring together local committees, infrastructure service providers and representatives of other local land owners and occupiers (including tourist operators) in the preparation of CIM Plans.*
- *Ministry of Internal Affairs to be represented on the Coastal Management Working Group and liase with Pulenu'u.*
- *Resource DLSE to identify and promote case studies of 'good coastal management' and to bring village leaders and community committees together to study and review these, providing a forum for sharing information.*
- *In the CIM Plan identify roles, responsibilities and action plans for village stakeholders, other land owners and occupiers, Government and infrastructure service providers.*
- *In the CIM Plan clearly identify the jurisdiction of Government, local community resource managers, other land owners and occupiers, and infrastructure providers, recognising the responsibility of local communities and* Fono a Matai *in managing village lands and resources*
- *DLSE to facilitate (particularly through CIM Plan preparation) better communication and discussion between village leaders and other land owners and occupiers on resource use and its wider consequences.*
- *Use the CIM Plan template included in the CIM Strategy as a guide to the structure and content of local CIM Plans.*

Information, Evaluation and Monitoring

GOAL:

Better management of information to assist communities and government in improving hazard resilience.

Objectives

OI.1 TO IMPROVE ACCURACY IN THE DEFINITION OF SAMOA'S COASTAL HAZARDS.

OI.2 TO NOMINATE RESPONSIBILITIES AND ACCOUNTABILITIES FOR THE MANAGEMENT AND COLLECTION OF COASTAL HAZARD DATA.

OI.3 TO IMPROVE THE ACCURACY OF DATA COLLECTION AND THE PRESENTATION OF INFORMATION.

OI.4 TO RECOGNISE THE DIVERSE SOURCES OF INFORMATION AND THE BENEFITS OF OPEN AND EASY INFORMATION ACCESS FOR ALL INTERESTED PARTIES AND PERSONS.

OI.5 TO ESTABLISH A FRAMEWORK FOR MONITORING AND EVALUATING THE CIM STRATEGY.

OI.6 TO COMPILE ECONOMIC DATA RELATING TO COASTAL INFRASTRUCTURE MANAGEMENT AND MAKE IT ESY TO OBTAIN.

Policies

PI.1.1 Undertake coastal hazard mapping and ongoing monitoring and review of mapping data.

PI.2.1 Improve data management through the application of Geographic Information Systems.

PI.2.2 Identify dedicated Government resources for the collection of coastal hazard data and for DLSE to analyse, manage and release this data.

PI.2.3 Integrate coastal hazard data with other land information systems.

PI.3.1 Establish standards and protocols for the accurate and meaningful presentation of coastal hazard data.

PI.4.1 Make appropriately costed information outputs relating to coastal hazards, coastal infrastructure and the natural environment widely available.

PI.4.2 Participate in international studies and programmes and share data relating to coastal hazards, sea level and global climate changes where relevant to Samoa.

PI.4.3 Establish efficient and clearly defined systems for the ordering, purchase and timely delivery of coastal hazard information.

PI.4.4 Promote the use of information collected in environmental impact assessments for better understanding of coastal hazards and the coastal environment.

PI.5.1 Establish measures for the assessment and review of the ongoing effectiveness of the CIM Strategy.

PI.6.1 Establish regular records of location-referenced economic data relating to CIM evaluation (e.g. land and asset values, values of economic activities in coastal hazard zones and insurance claims etc).

Implementation Methods

- *DLSE to accept, maintain and review the Coastal Hazard Zone Mapping data provided as part of the Infrastructure Asset Management Programme.*
- *Procure appropriate GIS software and hardware in accordance with an agreed GIS specification at the completion of the Stage II Institutional Review.*
- *Implement and resource the proposed development of the Land Information System within DLSE, including customer service facilities.*
- *Prepare standard specifications for the presentation of land information and published mapped material.*
- *Publish a Map Series at an appropriate scale (e.g. 1:5,000) illustrating the Coastal Hazard Zones mapped as part of the Infrastructure Asset Management Programme.*
- *Release this Map Series for sale to the public, at a price which covers printing and production costs, except in those cases below.*
- *Provide the Map Series free to Government Departments (e.g. DLSE, PWD, and MIA) and the National Libraries in Upolu and Savai'i to ensure maps are available for free public perusal.*
- *Provide free maps of the relevant districts from the Map Series to Secondary Schools and Tertiary Education facilities.*
- *Present free laminated map/s for each village (at a practical scale and including an aerial photograph, contour lines and the Coastal Hazard Zones) to assist CIM Plan preparation.*
- *Prepare and publish a list of DLSE and other Government services, products and associated charges for coastal hazard data and information.*
- *DLSE to participate annually in international programmes of direct and practical relevance to Samoa with respect to the enhancement of coastal hazard resilience.*
- *DLSE to prepare and complete an environmental and hazard monitoring plan to assess and review the CHZ Mapping and the effectiveness of the CIM Strategy policy implementation.*
- *Through DLSE's Annual Plans, identify yearly programmes for the Implementation Methods and review these plans and the effectiveness of the CIM Strategy policy implementation every 5 years.*
- *Compile broad level asset valuations of village infrastructure and dwellings, amalgamating information to provide confidentiality.*
- *DLSE to monitor and respond to the implementation plans, action plans and programmes of infrastructure providers, government departments, NGOs and developers. The aim of this service will be to ensure that the policy directions and outcomes in such documents are compatible with the CIM Strategy and CIM Plans.*

Education and Awareness

GOAL:

A community that is aware of, and responds to, the hazards of the coast and the consequences of their activities and actions.

Objectives

OE.1 To raise community awareness of natural coastal hazards and hazard resilience.

OE.2 community leaders and spokespeople advocating enhanced hazard resilience.

OE.3 To enhance capacity for communities to plan and prepare for hazards (improving their resilience).

OE.4 To enhance capacity for infrastructure providers and developers to plan and prepare for hazard resilience.

OE.5 To educate generations of Samoan children who, in the future, will lead CIM Strategy and CIM Plan implementation.

Policies

PE.1.1 Plan and conduct widespread communication and publicity campaigns for the release and implementation of the CIM Strategy.

PE.1.2 Raise awareness of the interrelationships between the environment, human activities and community resilience to coastal hazards.

PE.2.1 Promote local committees for the CIM Strategy and CIM Plans to disseminate awareness of coastal hazards and hazard resilience.

PE.3.1 Provide education and information programmes on coastal processes and potential coastal hazards.

PE.3.2 Provide education and information programmes on the management options for coastal hazard resilience.

PE.4.1 Provide training programmes on coastal processes and potential coastal hazards to infrastructure providers, emergency service providers and developers.

PE.4.2 Provide training programmes and technical assistance on the management and development options for hazard resilience to infrastructure providers, emergency service providers and developers.

PE4.3 Provide training programmes and technical assistance on the use of EIA principles and the CIM Strategy Evaluation Model for contracting and engineering consulting professions who are operating in Samoa's coastal environment.

PE.5.1 Promote the inclusion of coastal and environmental management education programmes in the school curriculum.

Implementation Methods

- *Launch the CIM Strategy, after Cabinet approval, in a multi-media publicity campaign (including but not limited to) television, radio and newspaper releases, release of free copies of the CIM Strategy to NGOs, community leaders and education providers.*
- *Establish a web-site providing an electronic copy of the CIM Strategy and background information and explore opportunities to establish interactive tools for the sharing and dissemination of material (e.g. 'an e-mail user group' or live communication sites).*
- *DLSE to promote 'holistic' environmental management in their publicity and education programmes to raise awareness of the interrelationship of issues such as water quality, functioning ecosystems, and natural defences.*
- *Issue regular media releases highlighting successes with the CIM Strategy and CIM Plan process.*
- *DLSE to establish an annual award for Best Implementation of a CIM Plan, focussing at the village level actions and implementation measures.*
- *Develop resource and information packs for CIM Plan Committees and other interested parties for the CIM Strategy, including training and display material.*
- *Through the Infrastructure Asset Management Programme, provide training and technical advice for the development of the Pilot CIM Plans.*
- *In the Stage II Institutional Review, identify the need for resources for ongoing DLSE services training and technical advice in the development of local CIM Plans.*
- *Through the Infrastructure Asset Management Programme, provide Coastal/Environmental Advisory Services to Government and non-Government infrastructure service providers.*
- *Undertake targeted information campaigns with respect to gravel and sand extraction and actively promote the adoption of Codes of Environmental Practice to improve contracting and engineering works.*
- *Through Stage II of the Institutional Strengthening, identify appropriate resources and funding for DLSE on-site technical advice. In general assistance from DLSE will be free for the preparation of the CIM Plans. Funding structures for advisory services beyond the CIM Plans will be further considered during the Institutional Review. However the principle for Government cost-sharing should be consistent with policy PN.6.1: in that any financial contribution from Government should be based on identified public benefits*
- *Seek resources and funding for the development of education materials to support the Department of Education's Curriculum Development Office for inclusion of coastal processes and hazards and coastal land and resource management in the geography/social studies Secondary School curriculum.*
- *Seek resources and funding for the development of education materials to support the Department of Education's Curriculum Development Office for inclusion of coastal processes and hazards in the general studies programme in the Primary School curriculum.*

Management and Use of Land and Resources

GOAL:

Objectives

OM.1 TO FULLY ASSESS AND TAKE INTO ACCOUNT THE ADVERSE EFFECTS OF RESOURCE AND LAND USE IN DECISION MAKING.

OM.2 TO ENSURE THAT SIGNIFICANT LAND USE AND INFRASTRUCTURE IS SET BACK FROM AREAS OF COASTAL HAZARD, WHERE THIS IS PRACTICABLE.

OM.3 TO RECOGNISE THE VALUE OF SAMOA'S COAST AS A MAJOR EXISTING AND POTENTIAL ECONOMIC RESOURCE.

Policies

PM.1.1 Require the use of EIA principles for coastal land and resource use decision making by Government agencies.

PM.1.2 Encourage the use of EIA principles for coastal land and resource use decision making for non-Government agencies and local managers.

PM.1.3 Help direct commercial sand mining and rock and gravel extraction to locations that will not adversely impact on community and infrastructure.

PM.1.4 Discourage domestic sand mining, rock and gravel extraction that could adversely effect communities and infrastructure, by helping affected communities to identify alternative resource sources.

PM.1.5 Manage and restrict the placement of structures (including reclamation, walls, jetties and wharves) on the foreshore and in coastal waters.

PM.2.1 Ensure the use of the Coastal Hazard Zone Maps, CIM Strategy Evaluation Model and the CIM Plans as key tools in decision making for Government land and resource use (including infrastructure investment).

PM.2.2 Encourage the use of the Coastal Hazard Zone Maps, CIM Strategy Evaluation Model and the CIM Plans for decision making on the location and design of other infrastructure investment and resource use.

PM.2.3 Recognise in decision making that the cumulative effects of coastal hazards decrease (in scale, frequency and consequence) inland from the foreshore.

PM.2.4 Carefully manage and restrict the development or expansion of hazardous facilities in areas identified as being at high risk from hazards.

PM.3.1 Ensure that consideration is given to the social and economic costs and benefits of infrastructure development in the coastal environment.

Implementation Methods

- *For the DLSE to use, in consultation with village leaders and non-Government organisations, the Coastal Hazard Zone Maps in the CIM Plan Preparation and to encourage the adoption of the CIM Strategy Evaluation Model.*
- *Establish a mandate that Government departments shall use the Coastal Hazard Zone Maps and the CIM Strategy Evaluation Model (including where required an EIA) in infrastructure development and resource use.*
- *DLSE, in their licensing for sand mining and gravel and rock extraction (in coastal waters and on the foreshore), to include requirements for an assessment of need for the resource, assessment of the environmental impacts, assessment of alternative sources and provision of written approval from relevant Fono a Matai and adjacent landowners.*
- *DLSE to establish expiry/renewal dates for resource extraction permits to provide for the monitoring and review of sand mining and gravel and rock extraction.*
- *DLSE to require permits to be available for public or government inspection on site.*
- *Government to modify the Village Beautification Competition to promote beautification measures which enhance resilience (e.g. beach and backshore planting) and exclude use or extraction of sand for beautification.*
- *DLSE, in their permitting of structures (including reclamation) within coastal waters and on the foreshore, to include requirements for an assessment of the environmental impacts, assessment of alternative locations and provision of written approval from relevant Fono a Matai and adjacent landowners.*
- *DLSE to encourage, through the CIM Plan preparation, adoption of rules, by-laws and regulations to be enforced by village fono to promote land and resource use which will enhance hazard resilience (e.g. restrictions on sand mining in areas at high risk from hazards).*
- *Establish a Government environmentally based permitting requirement for hazardous facilities, including a rigorous assessment of the scale, design and location of proposed and existing facilities in regard to potential hazards. In particular, recognition will be given to the distance of the facility from the foreshore and proximity to areas at risk from hazards. In permitting such structures, Government shall retain the right to undertake physical inspections during construction and prior to operation of such facilities (to ensure compliance with any specified standards).*
- *Institute a yearly Government assessment (of structural soundness and containment and contingency measures) for any existing permitted hazardous facility within an identified Coastal Hazard Zone. Any hazardous facility not passing this assessment will need to undertake upgrading works or will be closed.*
- *Government to use the economic evaluation model (developed as a part of the CIM Strategy Evaluation Model) as a decision making tool for infrastructure investment.*

Defences and Works

GOAL:

Objectives

OD.1 TO RECOGNISE AND PROTECT NATURAL FEATURES AND ENHANCEMENT OF NATURAL DEFENCES TO PROMOTE HAZARD RESILIENCE.

OD.2 TO EVALUATE OPTIONS FOR ENHANCING HAZARD RESILIENCE, IN ACCORDANCE WITH THE CIM STRATEGY EVALUATION MODEL (WHERE INFRASTRUCTURE AND COMMUNITIES ARE THREATENED BY COASTAL HAZARDS).

OD.3 TO TAKE INTO ACCOUNT THE ENVIRONMENTAL, SOCIAL AND ECONOMIC IMPACTS OF COASTAL DEFENCE WORKS IN DECISION MAKING.

Policies

PD.1.1 Promote the retention and enhancement of existing coastal vegetation and, where appropriate, the re-vegetation of coastal areas.

PD.1.2 Promote the natural functions of coastal systems (including reefs, wetlands and barrier beaches) in recognition of their natural resilience.

PD.2.1 Use the CIM Strategy Evaluation Model (including economic evaluation where appropriate) in the identification and evaluation of alternatives for enhancing hazard resilience.

PD.3.1 Require the use of EIA procedures for evaluating specified coastal defence projects and works undertaken by Government agencies.

PD.3.2 Encourage the use of the principles of EIA for evaluating coastal defence projects and works undertaken by non-Government agencies and local managers.

PD.3.3 Ensure that proposals for coastal protection and defence works are designed in a manner sympathetic to the natural systems and, where this is not practicable, that adverse effects on these systems are mitigated.

PD.3.4 Ensure transparent evaluation of Government coastal defence projects and works by making publicly available any EIA reports or other investigations and assessments undertaken to determine the appropriateness of such projects and works and permits issued.

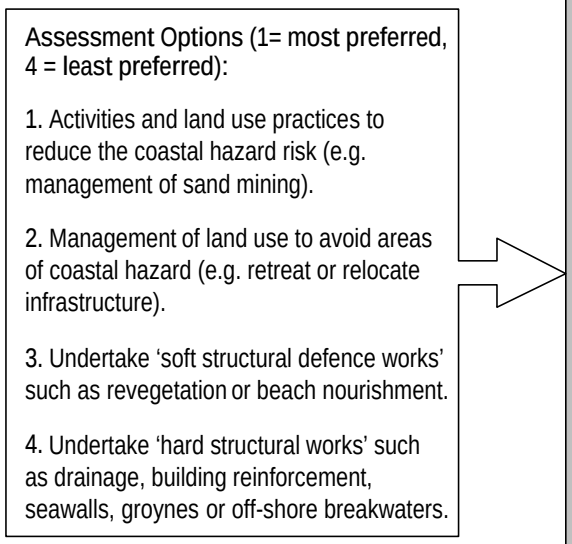
PD.3.5 Seek expert advice in the assessment of alternatives, their design and their potential effects where significant doubt exists.

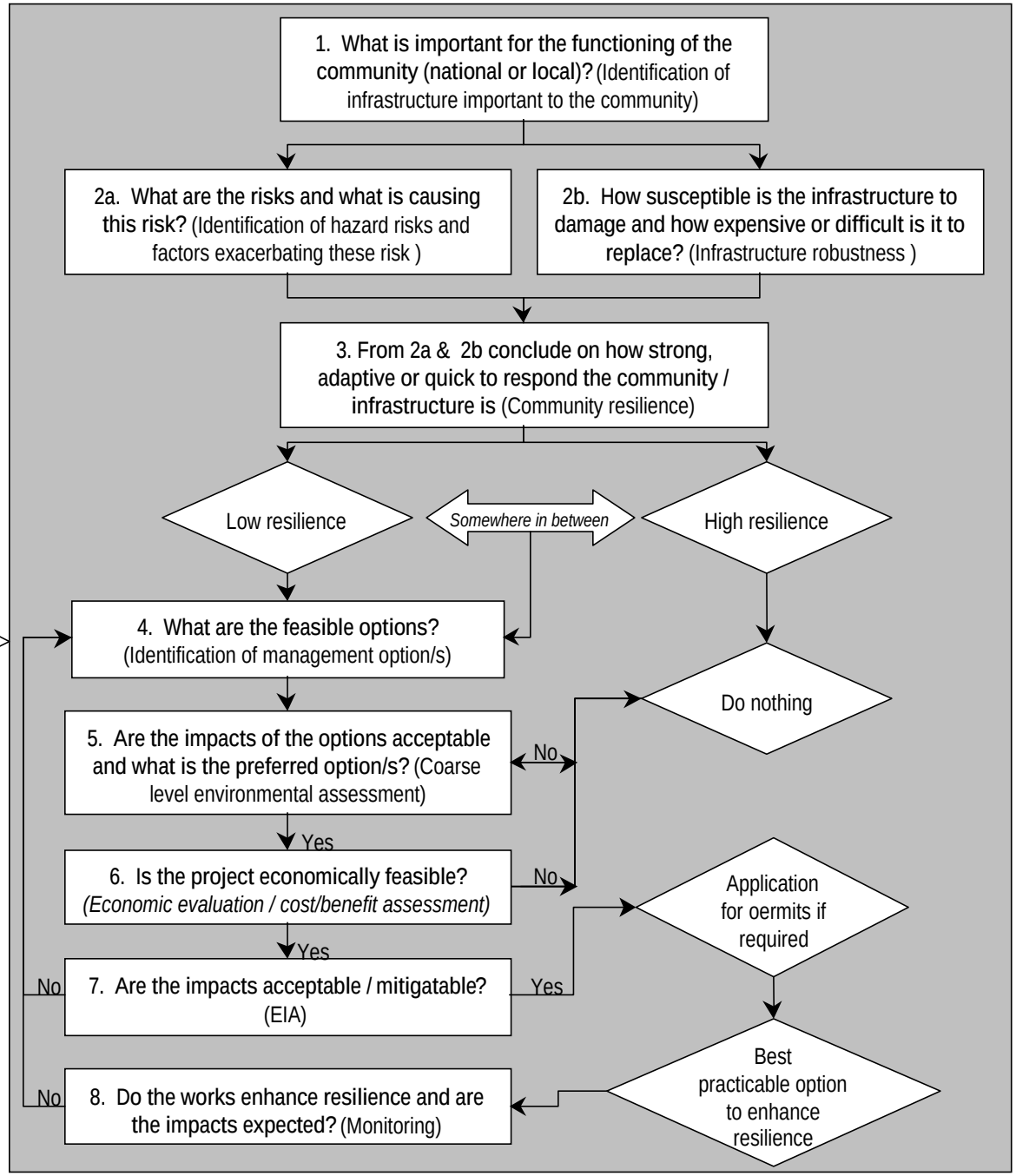
Implementation Methods

- *Government infrastructure service providers to use the CIM Strategy Evaluation Model for assessment of alternatives for coastal defence projects and works, prior to the formalisation of a District CIM Plan.*
- *Once a CIM Plan is formalised in a District, use the Plan as the primary tool for assessment of any additional coastal defence and protection projects (not already identified in the CIM Plan). This should be supported by the CIM Strategy Evaluation Model.*
- *Government to develop and implement Codes of Environmental Practice promoting 'best environmental practice' in the design of physical coastal protection and defence works and use as a guide for environmental impact assessment.*
- *DLSE to require the use of the 3 methods above when permitting defence works and structures within coastal waters and on the foreshore.*
- *DLSE to investigate (through funding sources such as the Environment Fund) options for providing plants suited to the local coastal environment and give advice on planting and maintenance.*
- *DLSE to encourage, through the CIM Plan preparation, adoption of rules, by-laws and regulations to be enforced by local community leaders for the maintenance and enhancement of those natural defences which offer resilience.*
- *Government departments to adopt the use of the EIA Regulations in undertaking defence projects and works in the coastal environment, where these are identified as requiring consent.*
- *Government to make publicly available any assessments undertaken under the CIM Strategy Evaluation Model, EIA assessments and/or other investigative documents for proposed coastal defence projects and works, including assessments undertaken in permitting of such works and the permits.*
- *Government departments to establish a list of recognised coastal specialist service providers and establish budgets and protocols for the commissioning of these resources to assist DLSE in their responsibilities.*

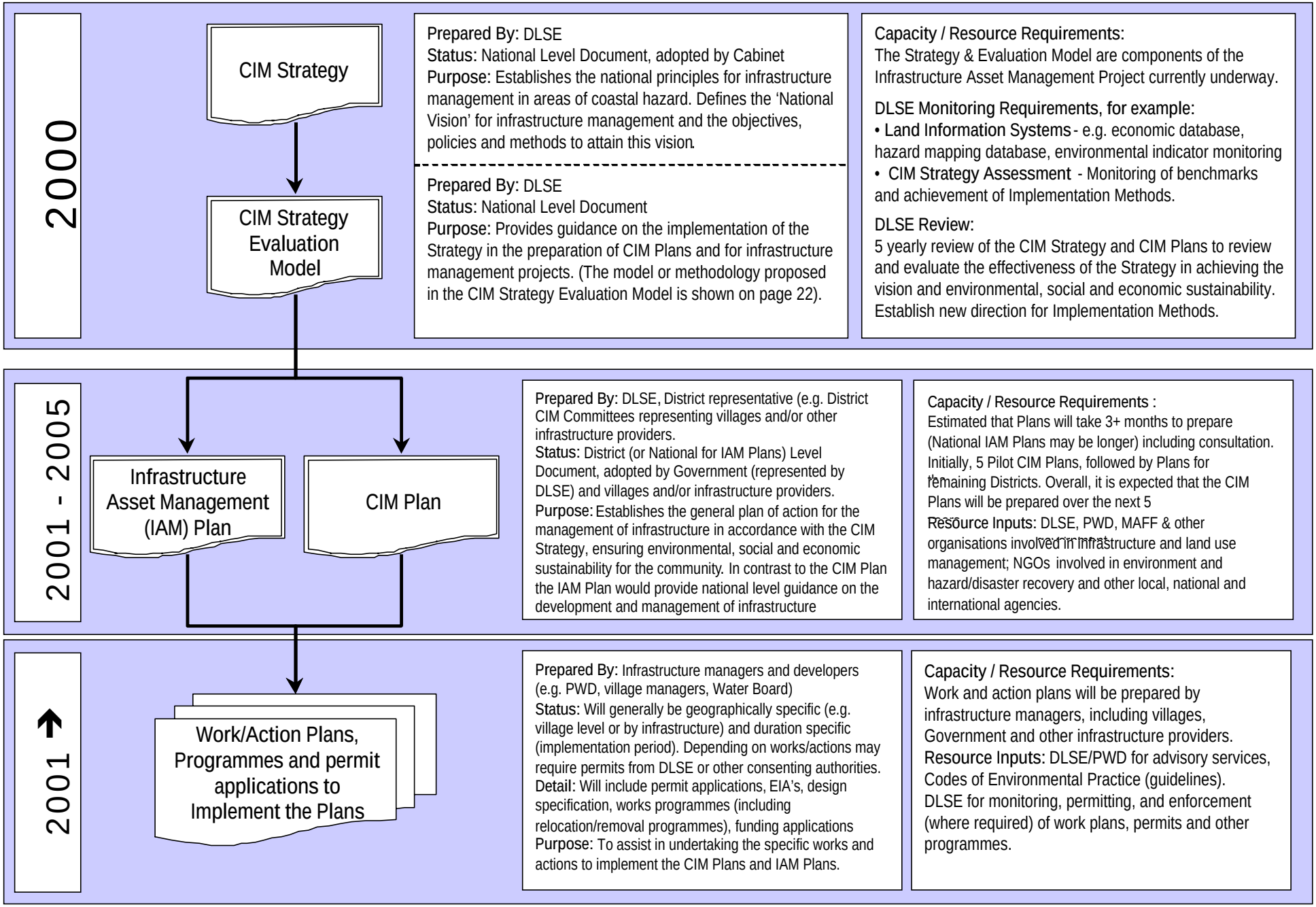
The CIM Strategy Evaluation Model

A detailed CIM Strategy Evaluation Model is set out in the Background Report, 'CIM Strategy Evaluation Model Methodology'. This diagram demonstrates the process and procedures of the evaluation model. This model will be applied both for the CIM Plans and as an interim management tool.





CIM Strategy and CIM Plan Framework – How the Strategy Works



CIM Plan Template

The following provides a preliminary guide or template for the contents of CIM Plans or national level IAM Plans to be prepared for the implementation of the CIM Strategy. It is recognised that, in some cases, villages may wish to prepare individual CIM Plans and combine these to form the district level CIM Plan. The IAM Plan would generally be a national level Plan prepared by the infrastructure providers.

Introduction

Aims of the CIM / IAM Plan;

Participants in the Plan (including Government representatives, infrastructure providers, local land owners / occupiers, village representatives and others);

The District CIM Plan Committee;

The process of preparation (e.g. meetings, formal endorsement process and signatories);

Duration of the Plan (generally 5 years from endorsement).

Description of the Environment

CIM Plan:

- Description of the District;
- Identification / location, of villages in the District;
- Identification of resources (including economic, social and natural resource);
- Identification of 'Significant Infrastructure' (from the '*CIM Strategy Evaluation Model Methodology*';
- *The maps (including aerial photographs and hazard information) will be valuable in this stage of the CIM Plan Preparation.*

IAM Plan:

- Description of the infrastructure (e.g. its location, scale);
- Description of the environment / s where the infrastructure is located;
- Identification of infrastructure significance (in the case of network infrastructure (e.g. a road) this may vary geographically.

Summary of Existing 'Resilience'

On the basis of the *CIM Strategy Evaluation Model*, identify the 'hazard risks' and 'resilience' of the infrastructure (either the important infrastructure within the District or in the case of the IAM Plan for the infrastructure specific to that Plan).

Land and Resource Use Issues

With assistance from the *CIM Strategy Evaluation Model*, identify land and resource activities / uses that are exacerbating coastal hazard risk within the District (e.g. areas of sensitivity where sand mining is increasing coastal hazard risk, or areas which are considered to be potentially at extreme coastal hazard risk).

Plans and Actions

Policies and 'Local Rules' – Set out the policies and rules adopted by the District / village or by the infrastructure providers to enhance the communities' resilience or resilience of the national infrastructure;

Defences and Works – Identify the defences and works programme (including any programmes for the removal / relocation of infrastructure) (as identified through the completion of the *CIM Strategy Evaluation Model*);

Responsibilities – if required, identify who will be responsible for the policies and rules and the implementation of coastal defence projects and works;

Physical Plans – it may be appropriate to include physical works plans.

Programme

Programme guideline for implementation, including rough order cost estimates for implementation of plan.

Review

Period and focus of review and monitoring for the Plan.

Definitions

'Best Practicable Option' – an option which is considered to best meet the physical, environmental and economic objectives. The *CIM Strategy Evaluation Model* provides a tool for the assessment of options to assist in defining which is considered to be the 'best practicable option'.

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 the Coastal Hazard Zone Mapping for Samoa 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), see page 9 of the Strategy.

Codes of Practice – Guidelines and protocols setting out 'best practice' for works and actions.

Defence Projects and Works – Actions undertaken to respond to coastal hazard risk and low coastal hazard resilience. There are a number of management options for defence projects and works as defined in the *CIM Strategy Evaluation Model*.

EIA (Environmental Impact Assessment) – A process to clearly define the potential environmental effects of a proposed work or action prior to undertaking this work or action.

Hard Structural Options – One of the management options for coastal defence projects and works which includes undertaking structural engineering works (e.g. a sea wall).

Hazard – The potential for loss of property, life or land due to natural processes.

Infrastructure – Built structures and networks which support the national, regional or local community.

Infrastructure Management – To plan, design, control, maintain, and monitor the development and use of infrastructure resources (in consultation with those parties potentially affected by that infrastructure).

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).

Management Plan – A document to guide land use and resource practices to achieve specified goals, objectives and policies and provide a framework for the implementation of defences and works.

Monitoring – Process of measuring the effectiveness or impacts of projects and works against predicted standards, levels or outcomes.

Precautionary Principle – A conservative management approach to recognise uncertainty. For example, in the design of a bridge the engineers might make it stronger than strictly necessary to cope with uncertain traffic loads or to withstand possible river flooding.

Principles (for Management) – The philosophy or over-arching ethic for the management of resources.

Protocols – Established guidelines or codes to guide a process.

Resilience – the ability to be adaptive, responsive and quick to recover. Being adaptative means taking action and being prepared before a hazard event, to minimise risk before it happens. In contrast being responsive means taking remedial action during a hazard event, while being quick to recover means taking action after damage or a hazard event that quickly restores the community and its infrastructure.

Significant Infrastructure – Infrastructure which contributes in a major way to the functioning of a community or communities.

Soft Structural Options - One of the management options for coastal defence project and works which re-establish or maintain the natural form of the coastal environment.

Strategy – Direction or course of action to achieve a defined vision.

Vision – A desired destiny.