



Federated States of Micronesia  
Yap Joint State Action Plan for  
Disaster Risk Management  
and Climate Change





Federated States of Micronesia

# Yap Joint State Action Plan for Disaster Risk Management and Climate Change



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# FOREWORD

Yap State has been experiencing the impacts of climate change related disasters more than any of the three other states in the Federated States of Micronesia. The patterns of typhoons are changing, bringing uncertainty regarding local impacts such as heavy rainfall and storm surges which affect the fragile environment that has sustained our past generations.

Our strong social and cultural systems, which have been an important source of our resilience, is under immense pressure, partly due to increased frequency and magnitude climate change impacts and climate variability events, thus contributing to accelerated resource depletion, as seen in various sectors in Yap. The salt water intrusion into taro patches, the damages sustained to breadfruit and coconut trees are examples of impacts that have limited the sharing of such food crops.

The State needs to act now and identify activities that will reduce the potential negative impacts in the future since scientific predictions show that that the changing climate cannot be reversed but will continue in its current trend resulting in sea-level rise, increased sea-surface temperature, intense rainfall and less frequent but more intense typhoons.

I commend the Joint State Action Plan (JSAP) for Disaster Risk Management and Climate Change for all our communities and population. Our joint effort in its implementation is vital so that our future generations can continue to enjoy a resourceful and sustainable and safer place.

Let us all mainstream disaster risk management and climate change adaptation through integrated risk approaches in our families, communities, decision making and work places to ensure a resilient and safer Yap.



Hon. Tony Ganngiyen

Governor

# ACKNOWLEDGEMENTS

The State leadership is forever indebted to the efforts of all those who contributed to the development of this Joint State Action Plan for Disaster Risk Management and Climate Change.

The active participation of the various segments of our community was encouraging and reaffirms the concerns they are now facing and the eagerness of enhancing their safety and resilience. The contributions made by the government representatives, chiefs, mayors, church leaders, women groups, youth groups and persons with disabilities were very valuable and ensuring that the plan is realistic and relevant.

The leadership displayed by the FSM's national Office of Environment and Emergency Management (OEEM), Secretariat of the Pacific Community (SPC) and the International Organisation for Migration (IOM) is commendable. Their professional input and guidance had been captivating and engaging hence encourages the full participation of the stakeholders in developing the plan.

The funding support from the European Union through the EU ACP Building Safety and Resilience in the Pacific (BSRP) project being implemented by SPC is greatly appreciated without which the development of the plan would have been impossible. We would also like to acknowledge the Secretariat of the Pacific Regional Environment Programme (SPREP) for reviewing of this plan.

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## ACRONYMS

ADB	Asian Development Bank
CCA	Climate change adaptation
COM	College of Micronesia
COP	Council of Pilung (Yap's Council of chiefs for Yap Proper)
COT	Council of Tamol (Yap's Council of neighbouring/outlying Islands chiefs)
DCO	Disaster Coordination Office
DRM	Disaster risk management
DRR	Disaster risk reduction
DY&CA	Department of Youth and Civic Affairs
ENSO	El Niño–Southern Oscillation
EOC	Emergency Operations Centre
EPA	Environment Protection Authority
FEMA	Federal Emergency Management Agency (US)
FSM	Federated States of Micronesia
HFA	Hyogo Framework for Action 2005 - 2015
HPO	Historical Preservation Office
GDP	Gross domestic product
IOM	International Organisation for Migration
JSAP	Joint State Action Plan
M&E	Monitoring and evaluation
OEEM	Office of Environment and Emergency Management
OPB	Office of Planning and Budget
PIFACC	Pacific Islands Framework for Action on Climate Change 2005 – 2015
PIFS	Pacific Islands Forum Secretariat
PW&T	Public Works and Transport
RFA	Pacific Disaster Risk Reduction and Disaster Management Regional Framework for Action 2005 – 2015
R&D	Resources and Development
SBDC	Small Business Development Centre
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Program
USD	United States dollars
YSPSC	Yap State Public Service Corporation
YCC	Yap Chamber of Commerce
YINS	Yap Institute of Natural Science

# EXECUTIVE SUMMARY

Yap’s Joint State Action Plan for Disaster Risk Management and Climate Change (JSAP) was developed in February-March 2015, led by the Yap State Office of Planning and Budget (OPB), and supported by the FSM Office of Environment and Emergency Management (OEEM) and the Secretariat for the Pacific Community (SPC) Geoscience Division. The Secretariat of the Pacific Regional Environment Programme (SPREP) provided technical support through the review of this plan.

The development of the Yap JSAP acknowledges a recognition and shift of focus at the national and Pacific regional levels to address ‘risks’ in a holistic, integrated way. The Federated States of Micronesia’s (FSM’s) Nation Wide Integrated Disaster Risk Management and Climate Change Policy provides an overarching framework for FSM to address risks, requiring state governments to develop plans of action to address disaster and climate change risks. At the regional level, the development of the Strategy for Climate and Disaster Resilient Development in the Pacific – an integrated framework to address risk and vulnerability for the Pacific region – is an example of such an approach. Yap’s JSAP therefore supports these national and regional efforts, and provides the people of Yap with strategic, prioritised actions for the coming years to address risks across all sectors and parts of the community.

Through a participatory, consultative approach, the development of the JSAP included a range of stakeholder views concerning risk management, vulnerability, and actions to enhance Yap’s resilience to disaster and climate risk into the next 5 years.

This document provides both an overview of the current risk and vulnerability context in Yap, as well as the strengths Yap has, including its strong traditional culture and rich natural resources. By drawing on such as assessment of strengths and weaknesses, Yapese stakeholders developed actions across seven Priority Areas, representing the main elements of their livelihoods they wished to sustain and strengthen in years to come.

The Priority Areas, and objectives under each, are found below. The full Action Matrix can be found in Section 8 which details the specific actions under each objective.

<p><b>1. Health</b></p> <p><b>Objective 1.1:</b> Strengthen Yap health sector policy and technical capacity to cover risk assessment and planning</p> <p><b>Objective 1.2:</b> Raise the level of public education and technical awareness about health-related risks and the links to climate change events, trends and disasters</p> <p><b>Objective 1.3:</b> Improve health programs for people with special needs in Yap</p>
<p><b>2. Education</b></p> <p><b>Objective 2.1:</b> Develop and implement an ongoing climate change and DRM education and awareness program through the formal education system</p> <p><b>Objective 2.2:</b> Develop and implement an ongoing climate change and DRM education and awareness program for communities</p> <p><b>Objective 2.3:</b> Promote and encourage student enrolment in technical vocational training to include risk assessment and planning</p> <p><b>Objective 2.4:</b> Develop DRM and CC technical capacity of Consulting Resource Teachers (CRT) and mobility personnel for evacuation preparedness</p>
<p><b>3. Resources and Development and Environment</b></p> <p><b>Objective 3.1:</b> Improve data and knowledge management to better support disaster risk management and climate change adaptation</p> <p><b>Objective 3.2:</b> Provide more effective management of natural resources through understanding of integrated approaches such as ecosystem based or whole of island/state approaches</p> <p><b>Objective 3.3:</b> Strengthen policy and technical capacity, and community awareness of invasive species management in various climate and disaster scenarios</p> <p><b>Objective 3.4:</b> Address and improve management of solid waste, sanitation and hazardous waste</p> <p><b>Objective 3.5:</b> Address food security issues in Yap and the risks provided by climate change and other events</p>
<p><b>4. Private Sector</b></p> <p><b>Objective 4.1:</b> Strengthen the business environment in Yap to ensure it is conducive to a robust private sector</p> <p><b>Objective 4.2:</b> Improve collaboration between private sector and businesses for effective and sustainable partnerships for climate change awareness and disaster preparedness</p> <p><b>Objective 4.3:</b> Enhance the tourism sector in Yap and to promote conservation areas</p>

## **5. Social and Cultural**

**Objective 5.1:** Develop a strategy that considers options for relocation and migration from outlying islands

**Objective 5.2:** Promote and strengthen cultural and traditional practices to enhance socio-cultural resilience

## **6. Infrastructure**

**Objective 6.1:** Review existing building codes and improve awareness of appropriate standards for all infrastructure

**Objective 6.2:** Strengthen technical and policy capacity to address infrastructure issues in Yap

**Objective 6.3:** Improve critical infrastructure in Yap to withstand disasters and climate change

**Objective 6.4:** Enhance sustainable energy use in Yap through promotion of renewable energy and energy efficiency programmes

## **7. Coordination of Disaster Risk Management and Climate Change activities**

**Objective 7.1:** Strengthen policy environment for disaster risk management and climate change

**Objective 7.2:** Improve coordination on disaster risk management and climate change adaptation

**Objective 7.3:** Strengthen climate and disaster risk preparedness and response capacity



# COUNTRY AND STATE CONTEXT

## 1.1 GEOGRAPHY

The Federated States of Micronesia (FSM – see Figure 1) consists of a total of 607 islands in the western Pacific Ocean, with an exclusive economic area of 2,980,000 km<sup>2</sup> and a total land area of 701 km<sup>2</sup>. These islands include small islets that disappear at high tide, coral atolls and large volcanic islands of more than 80 km<sup>2</sup>. FSM is comprised of four states: Chuuk, Kosrae, Pohnpei and Yap, which each have a considerable degree of autonomy.

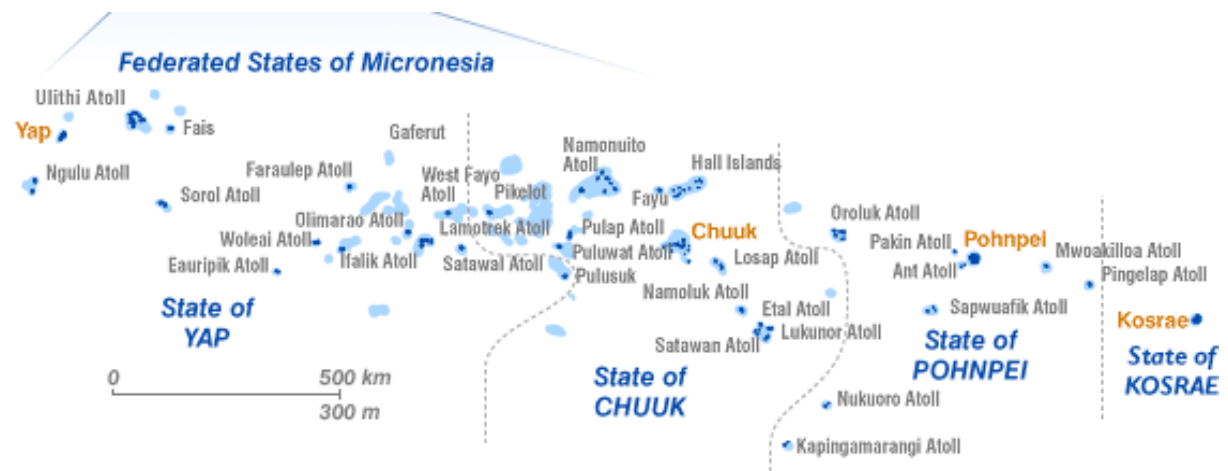


Figure 1: Map of the Federated States of Micronesia.

Yap is the westernmost state of FSM, located 885 km southwest of Guam. Yap consists of a total of 134 islands, 22 of which are inhabited, with four major islands. The state’s landmass is a total of 102 km<sup>2</sup>. Yap is spread across nearly 1000 km of the North Pacific Ocean.

Four of the islands of Yap have geology of inactive volcanic origin, with others being outlying islands and atolls. The four main islands are connected by a coral reef, and each of the islands have shores populated with mangroves. Yap is characterised by gentle slopes and substantial swampy lowlands, unlike the other states of FSM which have rugged highlands.

The capital of Yap State is Colonia, located on Yap Proper (also called “Wa’ab” – Figure 2) the main island of the state. Yap Proper has a gentle topography, rising to an elevation of 175 m above sea level.

## 1.2 POPULATION AND CULTURE

The total population of the FSM is approximately 102,843 persons. The population of FSM is predominantly Micronesian but there are some Polynesian enclaves, primarily in Pohnpei state. English is the official language of FSM; however, eight indigenous languages are spoken in FSM.

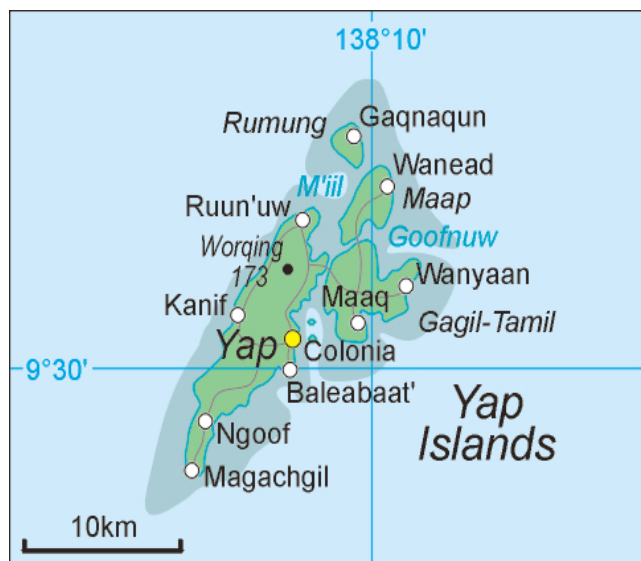


Figure 2: Map of Yap’s main islands.

Each of FSM's states, being separated by large expanses of water, has maintained their own distinct culture, traditions, customs and languages. However, some centuries-old economic and cultural bonds between the states exist.

Yap has a population of 11,376 (2010 Census), and is the only state of FSM that experienced population growth in the 10 years to 2010. A little over half of the population of Yap State live on the main island, Yap Proper.

Yap's indigenous cultures and traditions are reportedly still strong compared to neighbouring states. Handmade seaside houses, huge ancient stone money, stone money banks and handicrafts represent the cultural life of the Yapese. Four languages are spoken in Yap State – Yapese, Ulithian, Woleaian and Satawalese. Yapese is the language spoken in Yap Proper, while the other languages are spoken in outlying islands. Generally, Yapese youth speak English as their second language.



Figure 3: Traditional dancers in Yap.

## 1.3 ECONOMY

In 2011, FSM's GDP was US\$310 million. Annual growth was at -3.2% while inflation was at 2.8%. Around 70% of households across FSM have an annual income below US\$15,000, and the unemployment rate across FSM is at 22%. The unemployment rate in Yap in 2010 was 6% – significantly less than for the other states of FSM.

The incidence of families with incomes below the poverty line in FSM is among the highest in the Pacific region, as is inequality of income. Yap has the lowest proportion of households where expenditures are below the Food Poverty Line – the threshold at which household resources cannot provide members with nutritionally adequate diets. Approximately 10% of people in FSM are below the Food Poverty Line; however, only 4% of the population of Yap falls below this threshold. Real wages have fallen across Yap by 12% in the five years to 2009. Remittances in Yap are not a significant source of income, averaging only 0.5% of average household income.

FSM runs a large trade deficit, with imports being around ten times larger than exports. Food and fuel represent a significant proportion of this, comprising 46.6% of total imports to FSM in 2007. FSM is highly and increasingly



Figure 4: Traditional Yapese houses.



dependent on these food imports, and total food imports showed a steep increase from US\$17 million to US\$43.6 million in the nine years to 2009 (FSM Agriculture Policy). Rising global food and oil prices means the costs of imports will continue to rise, and will have serious implications for FSM's terms of trade.

Traditional economic activities in Yap include sailing, weaving, subsistence farming and fishing. Unlike other parts of the Pacific, tourism income is limited due to a lack of access and facilities; however some tourists are attracted to Yap for its marine life. People from Yap are commonly involved in subsistence home production, with 33.6% of the population involving in subsistence activities.

The vast majority of FSM's exports are tuna fish, as FSM has one of the largest tuna fisheries in the Pacific. Agricultural exports from FSM include betel nuts and kava. Yap is responsible for the production of a large proportion of FSM's agricultural exports through its betel nut industry.

National and state level governments in FSM employ over half of the country's workers. Government services and public enterprises account for 38% of GDP. In Yap, almost half of total employment is in the public administration sector. Private sector employment mainly consists of employment in the wholesale and retail trade. There exists a substantial wage differential (37%) between the public and private sectors, with public sector employees enjoying much higher real wages.

The FSM public sector is highly dependent upon development funding. USAID and compact funding provides about 65% of revenue for national government and 75% of revenues for the states.

## 1.4 GOVERNANCE

FSM was administered by Spain, Germany, Japan and the USA before establishing a constitution and achieving independence in 1986. It joined the United Nations in 1991. The FSM is a constitutional democracy in free association with the United States. The FSM entered into a Compact of Free Association with the United States with the first funding period being 1986-2003 (worth US\$1 billion), and the second being 2004-2023 (worth US\$1.8 billion).

The FSM has three levels of government: national, state, and municipal. The national congress is comprised of 14 representatives from the states, and the President and Vice President are elected from amongst the elected congressmen to lead the executive arm of the national government. The President then will appoint his Cabinet members from reputable and educated nationals of FSM. The national government exercised only certain powers expressly delegated to it by the constitution.

The four state governments of Chuuk, Kosrae Pohnpei, and Yap are relatively autonomous. A Governor is elected to head each of the four states. The Governor heads the Executive branch of the government, and appoints cabinet members to head the government departments and offices. Each state has its own legislatures comprising of senators who are elected by the state population every four years.

Legislation is a shared responsibility between the national and state governments and the respective Attorney Generals would provide advice where the jurisdiction over certain environmental issues is unclear, such as:

- ecosystem protection (such as reefs and mangrove swamps);
- land use, land management; and
- agriculture, forestry and watershed protection.

Regulatory authority is transferred to the national government in instances where issues have a visible effect on foreign or interstate commerce or concerns public health.

Some states have devised their own strategies for development, while an integrated perspective for the federation is provided by the national government.

Executive agencies performing a variety of functions in Yap, including resource and development, health, education, public safety, public works, public affairs, finance, planning and budget, and personnel.

Yap's constitution recognises a role for traditional leaders and customs in governance. Yap Proper has ten municipalities, while the outlying islands are separated into four precincts, each of which consists of several islands or atolls with one mayor or chief. Municipalities are most often led by the village chief, although they can sometimes be elected officials.

In Yap State, the Office of Planning and Budget (OPB) is the designated entity for the formulations of development plans, reviews recommendations on projects and programs of the State Government. OPB is also responsible for the coordination of all financial grants and assistance to the State Government, all of which is described under Section 129 of Title 3 of the Yap State Code.

## 1.5 RISK AND RESILIENCE CONTEXT

### 1.5.1 Natural vulnerability

As the westernmost state of FSM, Yap is exposed to a range of threats that create significant vulnerabilities for the state. Yap is located in 'Typhoon Alley', likely to be disturbed by earthquakes and tsunamis, and suffers droughts due to the impact of El Niño Southern Oscillation (ENSO). ENSO is also the cause of both excessive and below average rainfall.

Yap State is regularly hit by typhoons (especially in June – December), with between three and five typhoons hitting the state each year.

Yap is drier than the other states of FSM, and is highly susceptible to drought. While Yap Proper possess adequate groundwater sources, during prolonged droughts such as the 1997/1998 El Niño, these water sources have been known to dry up. The lack of adequate water storage capacity on the outlying islands increases the habitant's vulnerability to the impacts of drought.

Yap State, being located near the Yap Trench and the Mariana Trench, is vulnerable to earthquakes, with four significant earthquakes recorded in recent times. Yap also has a high probabilistic tsunami hazard; however no recorded instances of significant tsunami damage have occurred. In the event of a tsunami, Yap State would likely suffer a great deal of damage due to it being largely low-lying.

The distances between islands makes it difficult to get much-needed food, water and medical supplies to residents after a disaster, meaning Yap is more vulnerable to health and other secondary impacts of disasters than the other FSM states.

Yap is very vulnerable to flooding during typhoons and storm surges. The state does not regularly receive large amounts of rain and thus the damage from extreme surge and rainfall events is usually much more intense.

The main island of Yap has also experienced wildfires in years with dry periods such as that of 1997/1998.

### 1.5.2 Human-induced vulnerability and resilience

#### Development impacts

Development practices, such as building in hazardous areas, can enhance levels of vulnerability and even worsen the impacts of coastal hazards. In Yap, where much of the critical infrastructure is located close to the coast particularly around the harbour, key human-induced drivers of vulnerability include:

- Sand and coral rubble removal from the reef flat.
- Beach mining (removal of sand, gravel and cobbles) from the beach, primarily for construction aggregates.
- Dredging of the reef flat.
- Stream outlet repositioning, or changing swamp drainage patterns and flows.
- Inappropriate building of seawalls, exacerbating erosion elsewhere or resulted in further development in high risk areas.
- Land reclamation in areas already prone to flooding.
- Road development across wetland/mangrove areas and reclaimed land.

Climate change also has the potential to enhance these hazards in Yap – see Section 2.

#### Socio-cultural resilience in Micronesia

Micronesians demonstrate significant socio-cultural resilience and resourcefulness through their culture and their understanding of the environment and weather upon which they have traditionally been dependent. Kinship and exchange networks between islands of varying vulnerability enable communities to deal with extreme events and natural disasters. In the past, mechanisms such as travel, migration and formal ceremonial exchange systems served communities well in dealing with extreme events. Today, the heritage practice of keeping 'exchange paths' active through kinship relations can be seen as a source of resilience and a strategy to cope with climate change (see Henry and Jeffrey, 2008). For example, in Yap formal ceremonial exchange systems are called the sawai system, which allows for migration of communities between vulnerable islands.

Another traditional source of resilience in Micronesia is through food preservation for offsetting seasonal variations in food availability, to provide nourishment in times of disasters when crops are likely to be destroyed or damaged. As noted by Campbell (2006), such methods in Micronesia include:

- Fermentation of breadfruit in pits.
- Creating pandanus and arrowroot flour.
- Leaving yams in the ground.

Food production, especially on the outlying atolls, is vulnerable to climate change impacts such as sea-level rise, storm surges and salt-water intrusion, which are already occurring. The migration of outlying islanders to mainland Yap has already begun and is increasing pressures on the resources of Yap Proper.

Observations suggest that the traditional food production system of mainland Yap has been reduced in extent and productivity with recent high waters damaging and destroying taro production areas in low-lying areas. The current deterioration of food security is expected to be exacerbated by climate change.



Figure 5: A sign for organic local produce on Yap main island.

### 1.5.3 Recent damaging events

Yap has experienced five major typhoon disaster declarations in recent years, typhoons Mitag (2002), Lupit (2003), Sudal (2004), Haiyan (2013) and Hagupit (2014) as detailed in Table 1 below. In addition to these, two major drought declarations were made in 1998 and 2007.

Table 1: Recent known damaging events affecting Yap.

Damaging event	Known impacts
<b>Typhoons</b>	
Typhoon Mitag (2002)	Tidal surge inundated up to 1640 ft inland that destroyed nearly all food crops in low-lying areas and brought many low-lying areas including the main town under water for several hours. Approximately 150-200 people lost their homes. Coastline was extensively damaged.
Typhoon Lupit (2003)	Storm surge went as far as 3900 ft inland and resulted in contamination of potable water sources, destruction of food crops in low-lying areas, damage to public utilities and commercial properties.
Typhoon Sudal (2004)	Storm surge damaged and destroyed most homes in low-lying coastal areas, the state hospital sustained structural damage including severed pipelines and damage to the refrigeration system.
Typhoon Bopha (Nov 2013)	Across FSM, most of the impacts from the typhoon were fairly limited with only three islands of Chuuk state (Kutu, Lukunor and Ta) reporting damage to property and livelihoods. Some impacts were felt in Yap although these were minor.
Typhoon Haiyan (Nov 2013)	Typhoon Haiyan was upgraded to 'super typhoon' status as it passed over the islands of Yap in November 2013. The islands of Ngulu in Yap State was completely inundated by approximately half a metre of water and sustained damage, while on Yap island, the villages of Epibnaw, Weloy, Fanif and Colonia reported minor damage, although most fruit-bearing trees were destroyed. Inundation was mainly on the eastern side of the island, including the main bridge and a hotel in Colonia. Power and telecommunications services were restored and there was no significant damage reported from Woleai and Eauripik.
Typhoon Hagupit (Dec 2014)	Outlying islands including Ngulu Atoll, Eauripik Atoll, Woleai Atoll and Ifalik Atolls sustained significant damage from Typhoon Hagupit. Wind and inundation damage were experienced, affecting food crops, infrastructure, communications and coastal areas particularly on atolls closer to the centre of the storm.
<b>Drought</b>	
1997/1998	Major drought disaster declaration in 1998, associated with El Niño event which caused a reduction in rainfall and highly compromised water supply for Colonia on Yap main island and for outlying islands.
July 2007	Emergency drought declarations in 2007 also associated with El Niño.

Sources: FEMA, UNOCHA, Yap DCO.



## 1.6 SECTOR AND POLICY CONTEXT

### 1.6.1 National policy context

Key national policies of relevance to disaster risk management and climate change are found in Table 2, with key policy goals and/or priority actions highlighted.

Table 2: FSM's national policies and key goals/priority actions.

National sector policy for FSM	Key policy goals/Priority actions	
National Strategic Development Plan (2004-2023)	<p>The National Strategic Development Plan has four main objectives:</p> <ul style="list-style-type: none"> <li>• Stability and security – to maintain economic assistance at levels that support macroeconomic stability; achievement of this objective requires levels of funding close to prevailing levels, to avoid the large periodic step downs in funding that were a characteristic of the first 14-year Compact funding package.</li> <li>• Improved enabling environment for economic growth – to be achieved through the FSM commitment to economic reform and the provision of an enabling environment to support open, outward-oriented and private sector-led development.</li> <li>• Improved education and health status – use of the annual Compact grant to support the provision of basic services in education and health.</li> <li>• Assured self-reliance and sustainability – to be achieved through establishment of a Trust Fund that would, after a period of time, replace the annually appropriated transfers from the US.</li> </ul>	
Nation Wide Integrated Disaster Risk Management and Climate Change Policy (2013)	<p>Strategic outcomes:</p> <ul style="list-style-type: none"> <li>• Economic resilience</li> <li>• Food, water and energy security</li> <li>• Infrastructure and settlements</li> <li>• Waste management and sanitation</li> <li>• Health and social protection</li> <li>• Education</li> </ul>	<p>Strategic Objectives:</p> <ul style="list-style-type: none"> <li>• Capacity building and public awareness</li> <li>• Disaster risk management</li> <li>• Climate change adaptation</li> <li>• Greenhouse gas emissions reduction</li> <li>• Enabling environment</li> </ul>
Agriculture Policy (2012)	<ul style="list-style-type: none"> <li>• Achieve national food security, safety and nutritional health.</li> <li>• Improve farm incomes and livelihoods with particular focus on gender and vulnerable groups.</li> <li>• Strengthen socio-cultural safety nets.</li> <li>• Preserve and protect culture, traditional knowledge and practices.</li> <li>• Support sustainable economic growth and improve the balance of trade.</li> <li>• Improve natural resource management.</li> </ul>	
Energy Policy (2012) and State Energy Action Plans	<p>Vision: To promote the sustainable social and economic development of FSM through the provision and utilisation of cost-effective, safe, reliable and sustainable energy services.</p> <p>Goals:</p> <ul style="list-style-type: none"> <li>• An effective, coordinated, resilient and dynamic joint states and national energy sector.</li> <li>• A safe, reliable, cost-effective and sustainable energy supply.</li> <li>• An efficient, attentive, responsive and competitive energy sector.</li> <li>• A diversified energy resource base.</li> <li>• The environmentally sound and efficient use of energy.</li> </ul>	
Framework National Water And Sanitation Policy (2011)	<p>Vision: To ensure that the people of the Federated States of Micronesia's right to secure access to safe and clean drinking water is met, and that the use of the nation's freshwater resources is planned in a manner that maximises the benefits of this scarce and fragile resource for island communities, now and in the future.</p> <p>Goals:</p> <ul style="list-style-type: none"> <li>• To create an environment at the national level, in which collaboration and partnership in addressing water resource and wastewater management issues, between all stakeholders, and at all levels is fostered and encouraged.</li> <li>• To enhance the mainstreaming of Integrated Water Resource Management and Water Use Efficiency Principles into National and State Development Planning.</li> </ul>	

National sector policy for FSM	Key policy goals/Priority actions
<p><b>Infrastructure Development Plan FY2004-FY2023 (2004)</b></p>	<ul style="list-style-type: none"> <li>• Electric Power: ensure that all areas of the country are provided with electric power in an efficient and effective manner.</li> <li>• Water/Wastewater: Meet the demand for water supply and wastewater infrastructure in an effective and efficient manner.</li> <li>• Solid Waste Management: Meet the demand for solid waste infrastructure in an effective and efficient manner.</li> <li>• Roads and Pedestrian Facilities: To provide the infrastructure to enable transportation facilities to be adequate in terms of condition, capacity, reliability and safety to enable market opportunities to be realised for all areas of the country, including labour market opportunities.</li> <li>• Maritime Transportation: To provide the facilities necessary to enable market opportunities to be realised for all areas of the country, including labour market opportunities.</li> <li>• Education: To ensure that the learning experience is enhanced and diversified.</li> <li>• Health: To construct modern and efficient hospital facilities to meet the health needs of the nation.</li> <li>• Government Administrative Buildings: To construct modern and efficient facilities required for government personnel to effectively undertake their functions.</li> </ul>
<p><b>National (and States) Biodiversity Strategy and Action Plan (2002)</b></p>	<p>Eleven strategic themes, each with strategy goals:</p> <ul style="list-style-type: none"> <li>• Ecosystem management</li> <li>• Species management</li> <li>• Genetic resource use</li> <li>• Agro biodiversity</li> <li>• Ecological sustainable industry development</li> <li>• Biosecurity</li> <li>• Waste management</li> <li>• Human resources &amp; institutional development</li> <li>• Resource owners</li> <li>• Mainstreaming biodiversity</li> <li>• Financial resources</li> </ul>
<p><b>Information, Communication &amp; Technology Policy (2012)</b></p>	<p>Vision: Secure, efficient and affordable ICT to achieve equitable communication for the people of FSM.</p> <p>Goals:</p> <ul style="list-style-type: none"> <li>• Achieve accessible and affordable communications for all.</li> <li>• Strengthen ICT Human Resources and increase human resource development opportunities through ICT.</li> <li>• Improve economic growth and sustainable development through ICT.</li> <li>• Utilize ICT for good governance.</li> <li>• Create an enabling ICT environment through policy reform and improvements in legal frameworks.</li> </ul>
<p><b>Multi-State Multi-Hazard Mitigation Plan (2005)</b></p>	<p>National goals:</p> <ul style="list-style-type: none"> <li>• Promote disaster resistant existing and future development.</li> <li>• Increase public understanding and support for effective hazard mitigation.</li> <li>• Build and support local capacity and commitment to become less vulnerable to hazards.</li> <li>• Improve hazard mitigation coordination and communication with federal, state, and local governments.</li> <li>• Reduce the possibility of damage and losses to existing assets, including people, critical facilities/infrastructure, and public facilities due to all identified hazards.</li> </ul>
<p><b>Five Year Environment Sector Plan (2008)</b></p>	<p>Strategic goals:</p> <ul style="list-style-type: none"> <li>• Mainstream environmental considerations, including climate change, into national policy and planning as well as in all economic development activities.</li> <li>• Improve/enhance human environment and pollution control.</li> <li>• Reduce energy use and convert to renewable energy sources/Minimise emissions of GHG.</li> <li>• Enhance the benefits of sustainable use of the FSM's genetic resources and ensure benefits are fairly shared amongst stakeholders.</li> </ul>

National sector policy for FSM	Key policy goals/Priority actions
	<ul style="list-style-type: none"> <li>• Manage and protect the nation’s natural environmental; protect, conserve and sustainably manage a full and functional representation of the FSM’s marine, freshwater and terrestrial ecosystems.</li> <li>• Improve environmental awareness and education and increase involvement in citizenry of FSM in conserving natural resources.</li> <li>• Establish biosecurity (border control, quarantine) programs to effectively protect FSM’s biodiversity from impacts of alien species.</li> <li>• Create sustainable financial mechanisms for environmental and sustainable resource initiatives.</li> <li>• Enhance and employ in-country technical capacity to support environmental programs.</li> </ul>
<p>National Climate Change and Health Action Plan (2012)</p>	<p>Key recommendations include:</p> <ul style="list-style-type: none"> <li>• Review, discuss and consider implementation of the adaptation strategies.</li> <li>• Emphasise importance of community engagement and involvement with adaptation activities.</li> <li>• Initial focus should be on diseases considered to be “high risk” with respect to climate change in FSM (vector-borne and water-borne illnesses and malnutrition/food security).</li> <li>• The FSM EpiNET team should mainstream climate change and health issues into their program activities, with the Environmental Health Coordinator acting as the key contact for climate change and health, with input from representatives from OEEM, R&amp;D, WSO and other national agencies and Offices as needed.</li> </ul> <p>See National Climate Change and Health Action Plan for the Federated States of Micronesia for details.</p>

## 1.6.2 State sector policy context

Table 3 has specific policies and plans for Yap State, and describes the key goals and priorities for each policy.

Table 3: Sector policies and key goals/priority actions for Yap State.

State sector policy for Yap	Key policy goals/Priority actions
<p>Infrastructure Maintenance Plan (2011-2013)</p>	<p>Priority sectors:</p> <ol style="list-style-type: none"> <li>1. Education</li> <li>2. Health</li> <li>3. Transportation</li> <li>4. Government</li> <li>5. Energy</li> </ol>
<p>Tourism Development-Five Year Plan for Yap State (2008-12)</p>	<p>The basic goal of this plan is to develop strategies that will eventually cause Yap to generate increased number of visitors, and in so doing significantly increase revenue to Yap. The goal of the Yap tourism industry is not to develop mass tourism, but rather to create sustainable tourism that is balanced to benefit the local residents.</p>
<p>Yap Energy Efficiency Action Plan (2012)</p>	<p>Short-term priorities of the EEAP include:</p> <ul style="list-style-type: none"> <li>• Energy Management Service (EMS) – Team             <ul style="list-style-type: none"> <li>o Establishment of the EMS</li> <li>o Capacity development for personnel</li> <li>o Government energy efficiency implementation program</li> <li>o Capacity development of Energy Efficiency Officer(s)</li> </ul> </li> <li>• Awareness &amp; Practices in Energy Conservation and Consumption             <ul style="list-style-type: none"> <li>o Promote energy efficiency and conservation measures /practices through educational and awareness programs.</li> <li>o Strengthened Legal and Regulatory Frameworks.</li> <li>o Promote the use of alternative energy and energy efficient technologies.</li> <li>o Electricity consumption reduction program.</li> <li>o Community workshops on energy efficiency and home energy audits.</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>o Strengthen partnerships between key stakeholders including the community, on electricity data and relevant projects.</li> <li>• Implementation of Recommendations             <ul style="list-style-type: none"> <li>o Continuation of energy audits.</li> <li>o Demonstration of energy efficient and conservation measures and practices.</li> <li>o Lighting retrofits for government buildings.</li> <li>o Roof painting of government buildings.</li> <li>o Window and door sealing and upgrades of government buildings.</li> <li>o Replace and service air conditioners.</li> </ul> </li> <li>• Purchase Policy             <ul style="list-style-type: none"> <li>o Develop a Standard and Appliance Labelling Project.</li> <li>o Develop a Policy for Purchase of EE Appliances.</li> </ul> </li> </ul>
Yap State Biodiversity Strategy and Action Plan (2004)	<p>The seven action areas included in the 2004 YBSAP reflect prioritisation of the national biodiversity strategy specifically for Yap, and include:</p> <ol style="list-style-type: none"> <li>1. Institutional arrangements (“Getting our act together”).</li> <li>2. Secure and enhance traditional knowledge (Secure and build on what we already know).</li> <li>3. Inventory and monitoring (“Counting our blessings and identifying problems”).</li> <li>4. Biosecurity (Addressing invasive species, wildfires and climate change).</li> <li>5. Addressing pollution (Earthmoving activities, solid waste and hazardous materials).</li> <li>6. Environmental awareness, research and capacity building.</li> <li>7. Developing stewardship programs and ecologically sustainable industries (making a living without killing Yap).</li> </ol>
Yap State Disaster Plan 1989	<p>The purpose of the plan is to define the measures to be taken at the Yap State Government level to ensure that effective disaster preparedness, response, relief and recovery are carried out accordingly. FSM is currently updating its National Disaster Plan, and once finalised, the states will each update their state-specific disaster response plans to be in line with national priorities.</p>
Yap Law No. 2-38§11 (Section 129 of Title 3 of the Yap State Code)	<ul style="list-style-type: none"> <li>• The Office of Planning and Budget (OPB) is composed of the Divisions of Planning and Budget and formulates development plans, review and recommendations on projects and programs of the State Government. OPB also coordinates all financial grants and assistance to the State Government, coordinates and prepares annual and long term budgets, compiles statistical data, coordinates and mobilises all government resources, projects and programs, and monitors and reports on the implementation of development plans and provide for disaster relief.</li> </ul>

Yap State lacks current and detailed policies to define the majority of its sectoral aims and actions. Furthermore, the lack of a state-wide strategic development plan leaves sectors to develop and implement programs without aligning to any broader goals or outcomes. The JSAP will assist in bringing climate change and disaster sectoral interests together into one action plan, allowing for collaboration, cooperation and reducing the duplication of activities.

### 1.6.3 Key sectors – background context

#### Water resources and sanitation

Reliable treated and filtered potable water is accessible to most people in Yap. The Yap State Public Service Corporation (YSPSC) Water System, the Gagil/Tomil Water Authority (GTWA) and Southern Yap Water Authority (SYWA) maintain these water systems. There are four known water tanks/catchments on the main islands in the state of Yap. No inundation zones have been mapped, and there is no data available to determine the probability or magnitude of a dam failure event.

A 2012 audit of Yap’s water access recommended that state plans should be developed to support access to safe drinking water for the residents of Colonia.



Figure 6: Yap’s only dam.

Most of the residents (86.3%) of Yap do not have plumbing, and the most common source of drinking water in Yap is water catchment tanks or drums, as well as public and community water systems. Sewerage connections are not common for households in Yap.

The number of households in Yap that had toilet facilities increased greatly between 1994 and 2005, with the number of houses without access to toilets halved throughout that decade.

### Agriculture

Agriculture is an important economic activity in Yap, with around 30% of Yap household income derived from subsistence agriculture activities. Yap's most important and sustainable food production system is the traditional taro patch agroforestry system, which maintains high biodiversity and is important for food security. Arable land per capita in Yap is 0.8 ha (the second highest in FSM, with 0.95 ha in Kosrae).

According to FSM's Strategic Development Plan (2004), of the four FSM states, Yap is the least reliant on imported food, and women do most subsistence agriculture work. The preferred agricultural method in Yap is slash and burn; however, intercropping is still used, with betel nut often grown amongst food trees (e.g. coconut and breadfruit). Such traditional systems are a means to manage risk and vulnerability, particularly to typhoons and severe storms.

Free range chickens and pigs are the main livestock in FSM, including in Yap.

Food production on Yap's outlying atolls is dominated by agroforestry and taro patch culture. Atoll taro patches are vulnerable to sea-level rise, storm surges and salt-water intrusion.

Alternative sources of income are increasingly drawing people away from agriculture into other professions, as is the younger generation's preference for imported (rather than traditional) foods and the fact that agriculture as a career has a low status. However, the cost of imported food is increasing, so people may need to turn to traditional food production to ensure food security.

Yap lacks an explicit Agriculture Policy at State Level and with the decreasing regard for local foods, policy makers have tended to overlook subsistence agriculture development. An additional challenge for farmers is their inability to access capital for loans, as the amounts required usually fall below the minimum threshold for financial institutions; however, the Yap Small Business Development Centre does provide small loans on a monthly basis.

### Human health

As for other FSM States, Yap maintains its own health services and also maintains a centrally located hospital that provides a minimum range of primary- and secondary-level services, both preventive and curative. Yap State has a major hospital facility on the Yap main island as well as four community health centres and the fifth to be open soon. These community health centres are being staffed by a doctor, a nurse and community health workers. In the outlying islands, only Ulithi has a community health centre while others only have dispensaries being manned by a nurse and community health workers.

A report on progress towards the Millennium Development Goals (MDGs) revealed that progress is needed to further reduce the infant mortality rate, which is currently 8.5/1000. Maternal health is also an area requiring improvement; however, increased access to reproductive health care services is helping the state move towards better maternal health outcomes.



Figure 7: Yap's hospital (left), community health centre in Maap/Rumuung (right).



Immunisation rates are improving in Yap State, and positive work has been carried out to halt the spread of HIV/AIDS, though other diseases such as tuberculosis and non-communicable diseases still require further reduction in order for Yap to meet MDG targets in those areas.

Yap is vulnerable to outbreaks of vector borne diseases, and has had such outbreaks over recent year, e.g. dengue in 2004, 2007 and 2011, and a Zika outbreak in 2007.

**Fisheries, coastal ecosystems and biodiversity**

Fishing is a significant economic activity in Yap, with the tuna fishery contributing significantly to the state’s economy. This is unsurprising given 25% of the world’s tuna resources are located within the FSM Exclusive Economic Zone (EEZ). However, there remains a lack of policy or action plans at State level to manage this resource effectively. The Yap Fishing Corporation has started its operations and onshore processing plants.



Figure 8: Black tip sharks – an example of Yap’s marine biodiversity. (Photo: Yap EPA).

Yap State’s marine and terrestrial biodiversity is unique, and many of the species found in the state are endemic (e.g. three endemic birds and the Yap flying fox). However, areas of intact native forest are limited in Yap and invasive species are a threat to biodiversity.

In Yap, almost all land and aquatic areas are owned or managed by individual estates and usage is subject to traditional control. Customary management of natural resources remains; however, as populations grow, this approach is not without problems. Yap has established significant conservation areas in response to these threats, and is engaged in supporting communities affected by associated changes.

Yap has the most diverse mangroves and agroforests in the FSM. Mangroves are harvested for firewood for the production of lime, and to open boat channels. Mangroves are also threatened by the construction of roads and by changes in composition caused by sea-level rise.

**Energy**

Yap is highly dependent upon imported diesel for energy generation, making it extremely insecure with regards to energy generation, and highly vulnerable to fuel price shocks due to its remoteness. Half of the imported fuel is used for power generation in Yap, with electricity generated and supplied by Yap State Public Services Corporation (YSPSC), a 100% state-owned corporatised utility. Currently, approximately 50% of the population of Yap State has access to the electricity supply.

Yap State has had village electrification projects using solar power, including a project for 50 homes on Satawal and two solar micro-grids in Fadarai and Assor in Ulithi Atoll in 2006. Some private solar installations exist. Two major solar projects were planned for Yap in 2013 – including the EU Energy Facility which planned to electrify 10 outlying islands with solar home systems and North-REP providing mirco-grid solar PV systems (total 279 kW) for Mogmog, Falalop,



Figures 9: Yap’s energy is transitioning to incorporate solar power.

Fais, Wolea and Satawal. It is anticipated that once all these installations are completed, Yap State will have close to 100% access to electricity.

### Education

State governments in FSM have responsibility for education. All children in FSM are required by law to attend school through to eighth grade, and many continue to college after graduating high school. As a result, FSM has a high literacy rate. All students learn English as it is the official language of FSM.

The national Infrastructure Development Plan earmarked US\$135.4 million for education infrastructure spending across the 20 years between 2004 and 2023.

The national Infrastructure Development Plan describes issues relating to education infrastructure including poor maintenance (including failure of water and power supplies); a number of schools in a highly deteriorated state; a shortage of supplies includes furniture, equipment, books and tools; a lack of diverse facilities (such as music rooms, auditoriums, vocational training facilities); inadequately qualified teachers; inappropriate school curricula; and a lack of vocational training.

Grants and US education programs are used to support many FSM students to attend the College of Micronesia, the University of Guam and US colleges.

Yap State has 30 elementary schools and three secondary schools in addition to two private institutes (primary & secondary) and also hosts the FSM Fisheries and Marine Institute and the College of Micronesia extension campus.

Approximately 68% of elementary aged students are enrolled in school in Yap, with 83% of high school aged students enrolled in school. Yap still has an unequal ratio of females-to-males enrolled in schools, with many females not completing education.



Figure 10: Yap Early Education Centre in Maap.

### Transport and Infrastructure

Roads and pedestrian facilities are a key priority sector for expenditure under the Infrastructure Development Plan, with USD\$120.9 million earmarked for spending in the sector in the 20 years to 2023. An additional USD\$88.5 million investment for maritime transportation and USD\$68.4 million for air transportation has also been planned.

Most residents of the main islands of FSM own vehicles, making roads a crucial infrastructure sector. Poor transportation was identified in the FSM Agriculture Strategic Action Plan as a key limiting issue for agriculture, resulting in limited market opportunities for farmers in FSM. Several paved roads exist throughout Yap, which are mostly well developed and maintained. Roads there are 32 miles of paved road and 20 miles of unpaved road on Yap Proper, provided through the Japanese Road Project. The Japanese government is currently funding additional road construction.



Figure 11: Bridge in Colonia – Yap's capital.

Public buses provide transportation between the capital, Colonia, and outlying villages.

FSM depends heavily upon maritime transportation, and potential tourism income derives strongly from exploitation of marine resources – for which adequate maritime transportation infrastructure is required. Yap has transport challenges that isolate it from other FSM states and makes collaboration and interaction with other states more costly. Transport between the islands of Yap State is difficult, and the state operates a vessel that provides the only transportation link to 45% of the population in the outlying islands.

Each of the four FSM states has a small international airport. Generally, facilities at these airports are inadequate for accommodating cargo, and interface with public transportation is poor. Yap has an international airport on Yap Proper which is in need of upgrade. Small airports also operate on the islands of Ulithi, Fais and Woleai.

### **Private sector**

Yap has a relatively limited private sector.

FSMs Strategic Development Plan identifies the following sectors as key priorities for economic development: agriculture, fisheries and tourism and energy. All States have also identified human resources development as a priority to be addressed; meaning that investors who contribute to addressing HR issues are particularly welcomed.

The 2013 FSM Investment Guide highlights that for Yap State, investors are actively encouraged to do business in:

- Tourism around preservation and promotion of culture and traditions of the people of Yap; and
- production and marketing of fish.

Foreign direct investment in the FSM is regulated by both the State and National Governments and as such, banking, insurance, international and interstate transportation, fishing in the Exclusive Economic Zone (EEZ), and exploitation of any resources (other than fishing) within the EEZ and in or beneath the seabed and the continental shelf beyond the territorial sea are regulated by the FSM Foreign Investment Act, which was amended by Public Law 14-32 of November 02, 2005, and foreign investment regulations of January 06, 2006.

All the other sectors not regulated at the national level are under the jurisdiction of State Governments. For Yap this is the Yap State foreign investment Act of 2001, as subsequently amended in 2002 and 2012, and Yap State foreign investment Regulations of January 1st, 2006.

There is currently no national minimum wage level stipulated by law that is applicable to workers in the private sector. Presently, Pohnpei State is the only state that implements a minimum wage set at US\$1.75. Other states are in the process of reforming their wage laws.

Foreign businesses are automatically granted one Expatriate Worker Authorisation (EWA) for a Senior Management Position. One or more additional EWA can be issued subject to certain conditions provided by the Law.





# CLIMATE CHANGE IN YAP

## 2.1 CLIMATE CHANGE PROJECTIONS FOR KOSRAE

### 2.1.1 Observations

Sea-level rise has occurred in the ocean surrounding FSM at a rate of 10 mm per year since 1993. This rate is above the global average of 2.8-3.6 mm/per year. The ocean has also become more acidic as a result of the ocean's absorption of carbon dioxide.

Yap is drier than the other FSM states and is vulnerable to droughts related to ENSO. The West Pacific Monsoon affects Yap, with decreased rainfall in instances of La Niña when the Monsoon is pushed further west. As a result of the influences of the Intertropical Convergence Zone and ENSO, Yap experiences significant year-to-year rainfall variation.

FSM climate sees little seasonal variation in temperature, with less than 1.5 °C between the average hottest and coolest months.

Yap is located in 'Typhoon Alley', a region of the Pacific Ocean particularly exposed to typhoons and tropical storms. Storm surges, coupled with sea-level rise, have caused damage to housing, infrastructure and ecosystems on the islands of Yap.

FSM has experienced increases in annual and seasonal maximum and minimum temperatures since 1952, with temperature rising by around 0.1 °C per decade.

### 2.1.2 Future climate

#### Temperature

Projections indicate that the air temperature and sea-surface temperature will increase into the future for the FSM. This is likely to be between 0.2 °C and 2.2 °C (for the low emission scenario) and 0.4 °C – 3.5 °C (for the high emission scenario) in the western states of FSM, where Yap is located. An increase in hot days and a decrease in cool weather has also been predicted.

#### Rainfall and drought

Rainfall projections from global climate models carry some uncertainty, with inconsistent results more common than for temperature.

Despite this, almost all models predict an enhanced hydrological cycle, with increases in annual and seasonal rainfall and a reduced frequency of droughts. Rainfall patterns are also linked closely to ENSO cycles; however, there is considerable uncertainty in how climate change will affect ENSO in the future.

Extreme rainfall days are likely to occur more often across the FSM. No changes in rainfall have been observed for Yap, unlike Pohnpei which has had an observed decrease in rainfall.

#### Severe weather

Projections for typhoon frequency and severity in FSM show a decrease in typhoon frequency by the last 21st century as well as a decrease in the proportion of severe storms. Again, considerable uncertainty surrounds such projections and there remains a chance for typhoons and severe storms to affect Yap.

#### Sea-level rise

Sea level is expected to continue to rise across FSM consistent with current trends. Figure 12 shows projections for FSM up to 2070 for the low and high emission scenarios while Figure 13 shows observational data up to 2005 and projections to 2100.

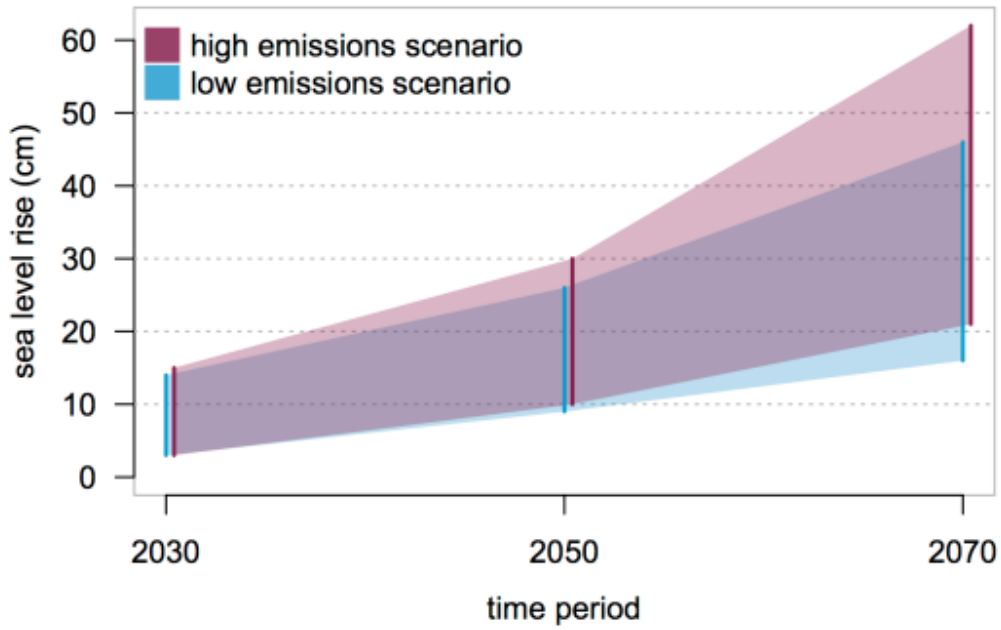


Figure 12: Sea-level rise projections for FSM under two emission scenarios and three time periods.  
 Source: Australian Government Bureau of Meteorology (2011).

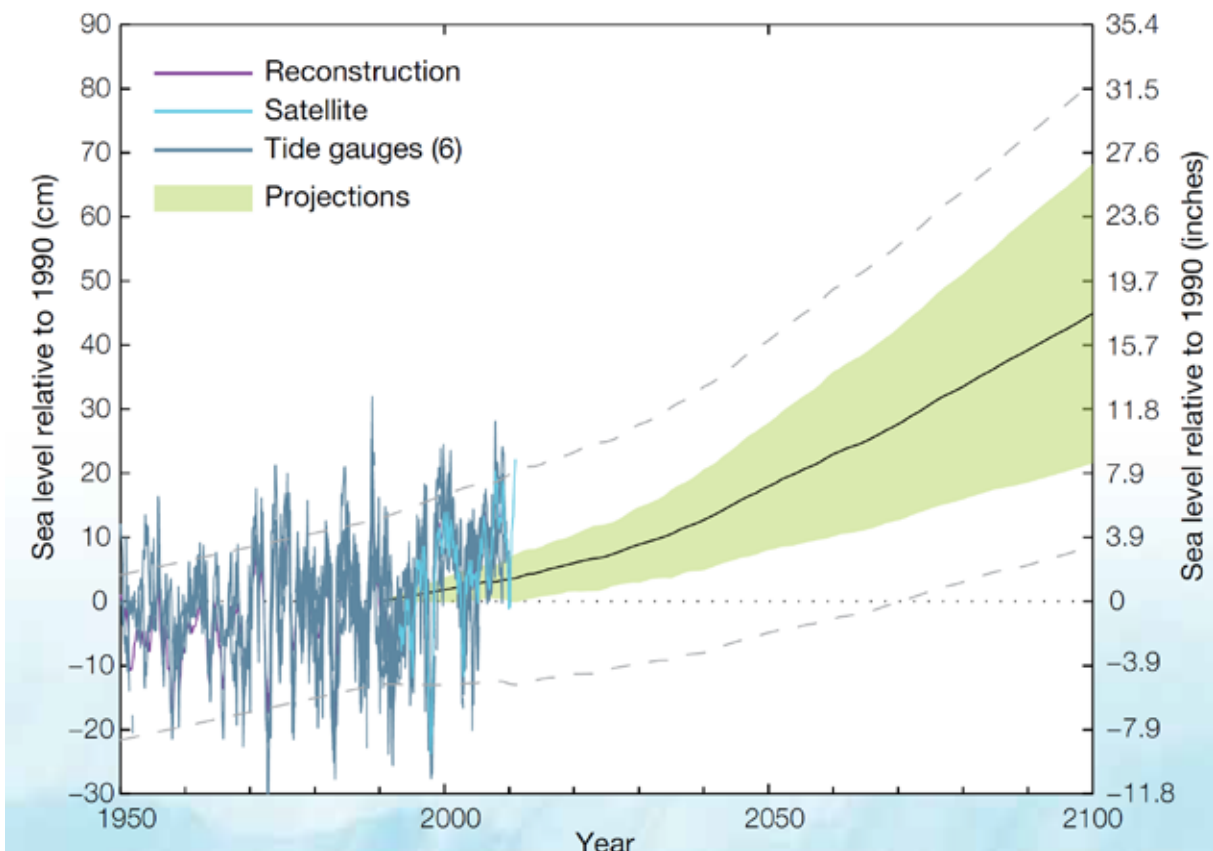


Figure 13: Observed and projected sea-level rise near Federated States of Micronesia.  
 Source: Australian Bureau of Meteorology (2011) Figure 6.


### Ocean acidification

Increased ocean acidity is predicted under all three emission scenarios for FSM. Reef ecosystem health is likely to be affected by such changes, with additional pressures such as coral bleaching and storm damage compounding the impacts.

## 2.2 SECTOR VULNERABILITIES

Table 4 describes how Yap’s key sectors are vulnerable to climate change. JSAP Actions (see Appendix D) provide details of how Yap stakeholders plan to address these vulnerabilities and challenges moving forward.

Table 4: Yap’s key sectors and their vulnerabilities to climate change.

Sector	Projected climate change impacts
<p><b>Water resources and sanitation</b></p>	<p>Yap is vulnerable to periods of low rainfall (sometimes associated with El Nino events), with past drought events providing examples of such challenges. Climate change, and potential alterations to rainfall patterns, therefore poses a moderate risk to water resources through enhanced or prolonged drought. Yap’s outlying islands often have limited groundwater, thus any reduction in rainfall leaves them prone to water shortages.</p>
<p><b>Agriculture</b></p>	<p>As noted in the Agriculture Policy, food and farming systems do not address the impacts of climate change sufficiently with gaps relating to biodiversity, sufficient skilled labour and supporting infrastructure.</p> <p>It is likely that sea-level rise will result in salinisation of agricultural land, with outlying islands and coastal areas of Yap Proper vulnerable to high seas and storm surge. Land loss via erosion is also likely, particularly in the low lying outlying islands, further reducing the availability of suitable land to grow crops and affecting food security.</p> <p>A useful video documentary was produced by SPC on the issue of food security in FSM – it can be viewed here: <a href="https://www.youtube.com/watch?v=7ggydf89Et0">https://www.youtube.com/watch?v=7ggydf89Et0</a></p>
<p><b>Human health</b></p>	<p>Climate change is likely to enhance the risks for the potential of outbreaks of vector-borne diseases such as dengue fever, Zika and Chikungunya due to an increase in mosquito breeding sites associated with a warmer climate and potentially higher rainfall conditions.</p> <p>Higher temperatures may also lead to increased transmission of water-borne diseases; for example, prolonged periods of high temperatures can enhance the conditions favourable to some types of diarrheal diseases and gastroenteritis. There is also an enhanced risk of outbreaks of diseases such as typhoid and cholera with contaminated water during and after flooding.</p> <p>As noted in FSM’s National Climate Change and Health Action Plan, there is also a growing concern that climate change-induced impacts on crops and fisheries will exacerbate poor nutrition amongst FSM’s populations. Furthermore, projected high temperatures may decrease the degree of physical activity, potentially increasing non-communicable diseases such as heart disease and diabetes. The rate of hospitalisations and deaths of the very old, very young and those with non-communicable diseases and other chronic illnesses such as cancer and cognitive impairment may also be impacted.</p>
<p><b>Infrastructure</b></p>	<p>Coastal erosion, driven by the combined effects of sea-level rise and development practices, will continue to threaten coastal infrastructure in Yap. Sea-level rise, combined with storm surges associated with typhoons and tropical storms (as experienced in the recent past) pose a risk to infrastructure, much of which is built with little/no regard for construction standards. A poor history of infrastructure maintenance and non-adherence to the state’s building code leaves public buildings and private dwelling even more at risk to damage through hazards such as typhoons, storms and sea-level rise.</p> <p>In Yap Proper, the central business district is built around a harbour, with the shoreline protected by walls and revetments with top elevation of most of this coastal protection being 0.3 – 0.6 m above high tide. As noted in the Climate Change Profile for FSM, by mid-century or earlier, this coastal protection will need upgrading to protect the critical roads, fuel depots, buildings, and freight handling facilities lining the harbour.</p> <div data-bbox="459 1756 1040 2072">  </div> <p>Some of Yap’s roads are highly exposed to coastal hazards</p>

<p><b>Fisheries, coastal ecosystems and biodiversity</b></p>	<p>Climate change stress will adversely affect Yap's natural protective functions provided by coral reef systems, seagrass beds, mangrove strands, wetland areas and the coastal berm.</p> <p>Substantial negative impacts on coastal and marine ecosystems are likely. Rising ocean temperatures and ocean acidification (via increased concentration of carbon dioxide) may have significant adverse impacts upon coral reefs, coastal ecosystems, and migratory fish stocks such as tuna, which represent a substantial economic resource for Yap.</p>
<p><b>Private sector</b></p>	<p>Yap's private sector stakeholders represent a diverse cross section of the economy, thus climate change impacts vary on Yap's businesses. Tourist operators are concentrated in the coastal zone with a focus on diving and snorkelling, with sea-level rise, warming ocean temperatures and changed in heavy rainfall and severe weather posing the greatest threat to their businesses. Climate change impacts on marine ecosystems, in particular coral reefs and the marine biodiversity they support – often a drawcard for tourists visiting Yap – are likely to be negatively impacted by rising sea-surface temperatures and ocean acidification.</p> <p>Additional impacts include the potential of typhoons and storms to disrupt commercial transport access, posing a risk to both incoming people and supplies for the island.</p>

## 2.3 FSM'S INSTITUTIONAL RESPONSE

### 2.3.1 Disaster and climate change policy context

Actions to address risks associated with climate change and disasters have already been taken through the development of legislation, policies and plans in FSM and Yap and these are described below.

Nation Wide Integrated Disaster Risk Management and Climate Change Policy (2013) – superseding the Nation Wide Climate Change Policy of 2009

As noted in Section 1 (Governance Arrangements) and also due to the cross cutting nature of disaster and climate risk management, implementation of the national policy for climate change and DRM is a shared responsibility between government, private sector, civil society and communities. The policy notes that national and state governments will lead the promotion, coordination and monitoring of the implementation of the policy.

Due to the constitutional arrangements in FSM, the state governments are responsible for implementing the Disaster Risk Management and Climate Change Policy.

The Office of the Governor under the Disaster Assistance Act 1989 is specifically mentioned to be responsible for disaster mitigation, preparedness, response and recovery at the state level. In Yap, that responsibility is delegated by the Governor through an executive order to the Office of Planning and Budget. As of February 2015, the incoming Governor is yet to produce the executive order which will set the institutional arrangements for both disaster risk management and climate change.

Local government, private sector, civil society and development partners are also noted to have roles to play in implementing the policy.

#### **Climate Change Act (2013)**

The Climate Change Act introduces legal obligations for certain national government departments and agencies of FSM. The Act states that by 1 October, 2014 certain departments must prepare plans and policies on climate change (consistent with the National Wide Integrated Policy) and the Office of Environment and Emergency Management is responsible for its overall implementation. Annual progress reporting of implementation of the policy is also stated under the Act.

#### **Disaster Relief Assistance Act (1989)**

This Act provides details of roles and responsibilities for times of disaster, including presidential authority, national government authority and state responsibilities. States are required to develop state disaster plans to qualify for national assistance. States wishing to request overseas support must first submit their request to the President. The Act also describes the Disaster Relief Fund, with contributing funds from the Congress of FSM, State legislatures, US grants and international organisations. Funds can be drawn upon after formal declaration of a disaster by the State Governor, and authorisation by the President.

#### **Disaster Mitigation Act (2000)**

The Disaster Mitigation Act 2000 emphasises the importance of disaster mitigation and planning for disasters prior to their occurrence. The act reinforces a comprehensive and enhanced mitigation plan prior to disaster occurring.

### State Resolution No. 8-9 (2011)

A resolution was passed by the Yap State Legislature in 2011 that requires the State to develop a Climate Change Policy and Plan. This JSAP fulfils the requirements of this resolution, providing specific actions across sectors and across the community for prioritised actions to address both disaster and climate risk in Yap.

### 2.3.2 Disaster risk management and climate change responsibilities

In 2008, USAID assumed responsibility for disaster assistance (response and reconstruction) to FSM from the US Federal Emergency Management Agency (FEMA). This change aims to reflect the transition of FSM to an independent country. As part of this shift in responsibilities, USAID contracted the International Organisation for Migration (IOM) to manage disaster risk management coordination and implementation in FSM. This contract was renewed in 2014.

A Nationwide Climate Change Policy was adopted by FSM in 2009, and overseen by the Office of Environment and Emergency Management. The focus is to mitigate climate change – especially at the international level – and adaptation at the national, state and community levels to reduce the FSM’s vulnerability to climate change impacts. In 2013, a Nationwide Integrated Disaster Risk Management and Climate Change Policy was put in place which, amongst other things, focuses on adaptation at the national, state and community levels to reduce FSM’s vulnerability to climate change and disaster risks.

Governance of disaster risk management and climate change is delivered through the FSM Climate Change Country Team and the FSM National Disaster Committee. These structures are complemented by the divisions of Emergency Management and Environment and Sustainable Development in the Office of Environment and Emergency Management.

The FSM National Disaster Committee (NDC) is made up of Secretaries of the Departments, and Directors of offices and agencies that comprise Cabinet. This committee serves as an advisory body to the President on policy matters pertaining to the dispensing of the national government disaster assistance to the state(s) stricken by disaster. The NDC is responsible for guiding and supporting the development and implementation of disaster management programmes. A disaster risk management (DRM) ‘network’ exists amongst the Government of FSM and its main disaster risk reduction (DRR) partners.

Each FSM state has its own set of environmental laws and regulations geared to protect the islands from the effects of climate change. The Governor of each state has primary responsibility for the formulation of policies and procedures to deal with natural disasters and mitigation activities within their state. The Governor’s Disaster Committee for each state includes all department, office and agency heads. The Committee serves as an advisory body to the Governor in the formulation of policies and coordination of the disaster response efforts.

### 2.3.3 Gaps in Yap’s institutional response to disasters and climate change

A key gap in the institutional response to climate change and disaster management in FSM has been the lack of coordinated state based activity to improve disaster response and to address climate change. The decision to develop JSAPs at the state level goes some way to address this gap, by engaging relevant stakeholders and developing specific actions to address key risks. The JSAP also provides an overarching, cross-sectoral approach to dealing with climate change and disasters.

## 2.4 LINKAGES TO NATIONAL, REGIONAL AND INTERNATIONAL POLICIES AND FRAMEWORKS

Yap’s State Action Plan for Climate Change and Disaster Risk Management represents the operational plan for action, which fits into the nested hierarchy of policy instruments to address climate and disaster risk from local to global level (Figure 5).

At the regional level, work is being undertaken to integrate strategies for climate change and disasters through the Strategy for Climate and Disaster Resilient Development in the Pacific that will replace the RFA and PIFACC, post-2015. Yap’s State Action Plan will support this strategy through its integrated approach of addressing local disaster and climate change risks. As noted in FSM’s National Wide Integrated Policy for Climate Change and Disaster Risk Management, instruments such as Yap’s Joint State Action Plan will assist in meeting regional and international treaty obligations and objectives to which the Government of FSM has agreed.

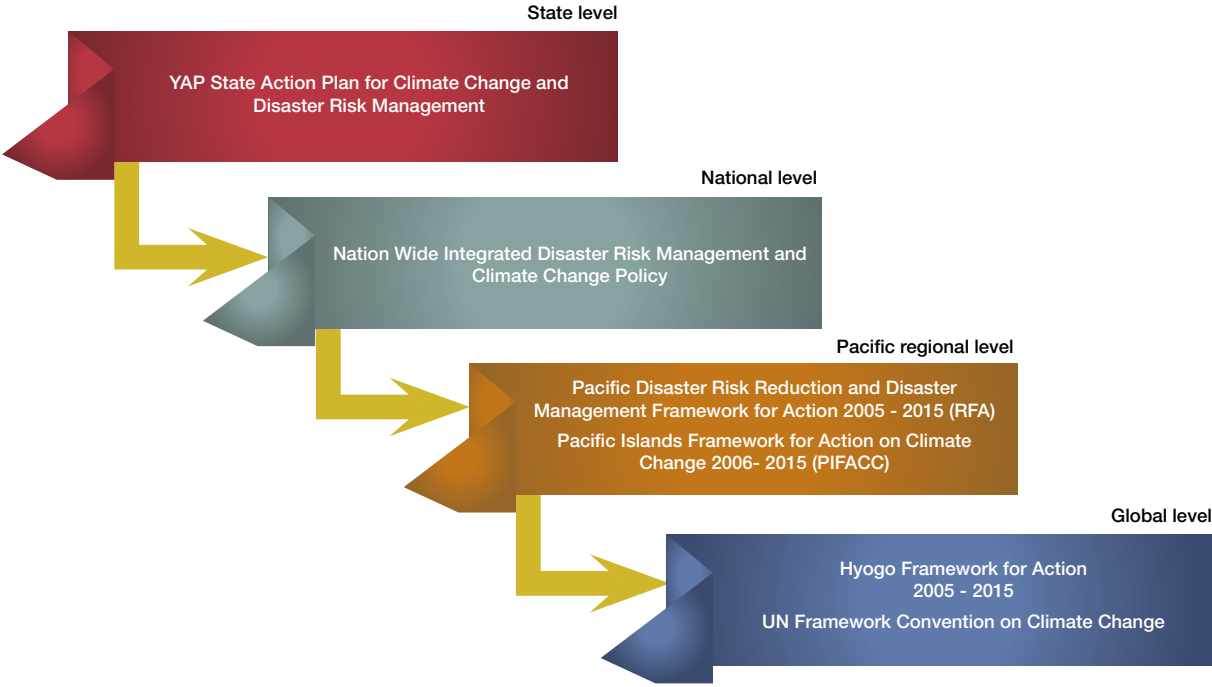


Figure 14: Links between Yap's JSAP and national, regional and global frameworks.



# APPROACHES TO RISK REDUCTION

## 3.1 CURRENT AND RECENT APPROACHES

Current and recent projects relating to disaster risk management and climate change in Yap include:

- Climate Adaptation, Disaster Risk Reduction and Education (CADRE), 2011-2014 USAID Disaster Mitigation (USAID & AusAID/DFAT, implemented by IOM): Aims to build resilience of vulnerable communities to natural hazards particularly those that are climate induced. It targets students at up to 50 schools in both the FSM and the Republic of the Marshall Islands (RMI) with climate adaptation, disaster risk reduction and education programs.
- Geospatial Analysis for Food Security Adaptation, 2013-2015 (U.S. Forest Service): Aims find suitable places to relocate the agricultural areas (particularly taro) with the help of geospatial analysis.
- Pilot Program for Climate Resilience (SPREP, SPC, PIFS, ADB and the World Bank): piloting and demonstrating ways in which climate risk and resilience may be integrated into National, Sectorial and Local development planning and action.
- Global Climate Change Alliance (GCCA) – Pacific Small Island States 2011-2015: Addressing water security Fais Island.
- Solar Energy Projects (EU and ADB funded): Includes North Pacific ACP Renewable Energy and Energy Efficiency Project (North-REP) 2010 –2015.
- Yap Landfill Improvement Project (supported by Embassy of Japan, JICA, J-PRISM, SPREP).
- Equipping the Emergency Operations Centre (EU): Recent efforts to operationalise the EOC include telecommunications access, enabling the EOC to be functional for times of disaster.

Organisations with responsibility and interest in disaster and climate change related issues in Yap include the following:

- Office of Planning and Budget, which incorporates the Disaster Coordination Office (DCO).
- Resources and Development (incorporating agriculture, land services, fisheries, and marine divisions, and overseeing the GCCA project).
- Environment Protection Authority (EPA).
- Public Works and Transport (PW&T).
- Micronesia Red Cross Society.
- College of Micronesia (COM – Yap campus).

Recent disaster risk reduction and climate change-related achievements are presented in Box 1 below.

### Box 1: Recent achievements for FSM

- Nation Wide Integrated Policy for Climate Change and Disaster Risk Management and Climate Change Act to institutionalise mandatory consideration of climate and disaster risks.
- A Climate Change Tool Kit developed by the Micronesian Conservation Trust and The Nature Conservancy offers a standardized methodology for addressing vulnerability and adaptation participatory assessment research and planning.
- IOM has developed a standardized template for collection of data relevant for contingency planning (logistical).
- Increased use of sector-specific risk assessments (e.g. agro-forestry, mangrove management, coastal erosion, coral bleaching and in-shore sedimentation).
- The FSM Infrastructure Policy and Implementation Committee (IPIC) developed design criteria in 2006 for use by engineers designing projects funded under the Compact Infrastructure Sector Grant. The design criteria address increased wind speed, seismic vulnerability, flooding from both rainfall and tidal surges.
- Yap State has drafted a State building code as well as land zoning plans to guide the work of construction projects.
- State-Wide Assessments and Resource Strategies (SWARS) were carried out for each state in 2010. They include a focus on cross-cutting issues such as food security, watersheds management, production and sustainable harvesting and coastal stabilisation.

Source: HFA Consultation (2012).



As part of the Hyogo Framework for Action 2005-2015 consultation process in 2012, an assessment was made regarding the factors contributing to the achievements listed in Box 1. These include:

- Growing political appreciation for the importance of disaster risk reduction and climate change.
- Increased engagement of regional and international development organisations on issues of disaster risk management and climate change.
- Multi-sector nature of disaster risk management and climate change ensures that awareness of these issues is raised in a broad range of national agencies, mostly through their sectoral channels of regional and international cooperation.
- Importance attributed to disaster risk management and climate change as a development issue at the regional and international level.

## 3.2 GAPS AND FUTURE NEEDS IN YAP

The evaluation of FSM’s progress towards the goals within the Hyogo Framework for Action (HFA), undertaken in 2012, provides a useful snapshot of how FSM is faring with regards to reducing risks across a range of issues. Table 5 consolidates some of these findings from the HFA Review as well as one relevant finding from the national Agriculture Policy, including prioritised actions that may be addressed in Yap’s State Action Plan for Climate Change and Disaster Risk Management.

Table 5: Areas for action to address current and future risk in Yap.

Area for improvement/action	Source of information
<b>Community-level action needed:</b> Greater focus on implementation of community level activities and need for a dedicated government budget to support activities at the community level. The need to provide communities with good examples of risk reduction activities; and adopt whole-of-community approaches where the population at large must assume responsibility for such change.	HFA Review Process 2012
<b>Increased awareness and understanding of CC and DRM:</b> Improve understanding of DRR and climate change among government planners to enhance recognition of DRR and CC as a core government development function. Reinforce the integration of DRR and CC into development planning and reporting through regular formal reminders during the annual planning cycle. Strengthen accountability through improved community monitoring and participation; and climate change is viewed as having its origins in developed countries and the feeling was that developed countries should pay for the negative impacts on small island countries.	HFA Review Process, 2012
<b>Strengthen the governance capacity:</b> Support for the under-resourced National and State Disaster Management Offices in terms of core operating budget, staff and equipment; and National and State Disaster Management Offices are under-resourced in terms of core operating budget, staff, and equipment; and no dedicated government budget for community-level DRM and CC activities.	HFA Review Process 2012
<b>Development and infrastructure planning:</b> Strengthen the integrity of the development consent process and environmental impact assessments; and the need to rigorously apply land use planning and actively enforce building codes.	HFA Review Process 2012
<b>Improved understanding of decision makers:</b> Simplification and clarification of the concepts and terms used in the post-2015 regional and global DRR and climate change frameworks and the need for awareness raising on and dissemination of regional and global DRR and climate change frameworks at national level. In a highly competitive environment, government planners do not see DRM and CC as a core government development function, preferring to rely on funding from development partners. A greater emphasis on how to achieve sectoral integration as DRR does not yet feature strongly in sectoral planning. DRM and CC are exploited for political gain – politicians are quick to respond after a disaster, often with unrealistic promises of assistance.	HFA Review Process 2012
<b>Private Sector Development:</b> Small Business Development Centres (SBDCs) that assist the development of small businesses are located in each of the four states. They provide business advisory services and training and in some cases help clients to prepare loan applications. Chuuk, Kosrae, and Yap SBDCs have become part of the University of Guam’s Pacific Island Small Business Centre Development Network and are partially financed by the United States Small Business Administration under cooperative agreements. SBDCs have generally recorded increases in the annual number of trainees and community awareness programs, but the agriculture sector has not yet managed to take full advantage of these services.	Agriculture Policy (page 31)





# JSAP DEVELOPMENT PROCESS

JSAP development in Yap began with a broad suite of consultations with key stakeholders in February 2015. The consultation process was coordinated by the Office of Planning and Budget, with support from the national Office of Environment and Emergency Management and SPC.

Consultation consisted of briefing meetings with the Governor, the Cabinet and traditional leaders, followed by various workshops with key groups to facilitate the development of actions to address outstanding vulnerabilities for Yap. A diversity of individuals and groups included in the consultations ensured a range of perspectives were included, as seen in Figure 15 and photos in Figure 16.



Figure 15: Organisations consulted in the JSAP development process.



Figures 16: Photos from Yap JSAP consultations (February 2015).

Given the relevance of the Nation Wide Policy on Disaster Risk Management and Climate Change, the JSAP development process was framed in such a way that clear links to the National Policy were made constantly. This alignment allowed the stakeholders to see how their efforts at the state level contribute to national policy. This is seen in Figure 17 below.



Figure 17: Links between Nation Wide Policy and JSAP.

Furthermore, links between the Yap JSAP Priority Areas are made between the Strategic Priorities of the National Policy, as seen in Table 6 below.

Table 6: Links between JSAP and National Policy.

Thematic Areas for Yap JSAP	National Policy Strategic Outcomes
Health	Health & social protection
Education	Education
Resource, Development & Environment	Food, water & energy security waste management & sanitation
Social & Cultural	Social protection
Infrastructure	Infrastructure & settlements
Private Sector	Economic resilience

Consultation with all groups consisted of a series of steps to ensure discussions were framed with the disaster and climate change lens, while at the same time considered in terms of sectors present, and actions already identified in their own sector plans. The steps taken consisted of the following:

**Step 1**

**Identification of key hazards affecting Yap** (from literature, and from personal experience). Overall results from participants are seen in Figure 18, showing typhoons and severe storms dominating as the key hazard as identified by stakeholders.

**Step 2**

**Identified key strengths/capacity in communities and government** (considering key hazards and climate change projections for Yap).

**Step 3**

**Identified key vulnerabilities** (considering key hazards and climate change projections for Yap).

**Step 4**

**Ranking the five elements of capacity, given vulnerabilities and strengths.** This step involved stakeholders using a matrix which included the five elements of capacity (human, social, natural, physical, financial – see also Appendix C), and individually rating how they saw each element in Yap. Combined results for all stakeholders revealed where the strengths and gaps were for the development of actions (see next step, and results in Figure 18).

**Step 5**

**Development of key actions to address gaps, and identification of responsible agencies to lead the action.** This step was undertaken in two phases, firstly in small groups during group consultations, and secondly at the multi-stakeholder workshop through a visioning exercise (using ‘back-casting’ techniques).

The government’s Emergency Taskforce then met to verify and validate actions and leading agencies, and to review objectives under each sector. Sub-actions were also identified to allow for estimated costs to be developed for each activity.

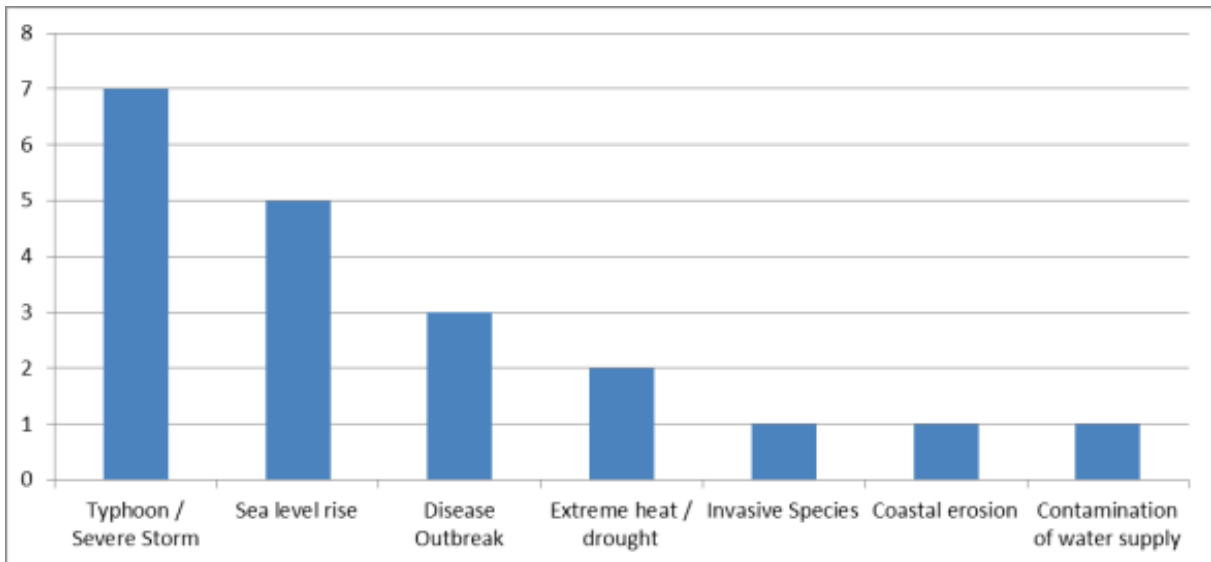
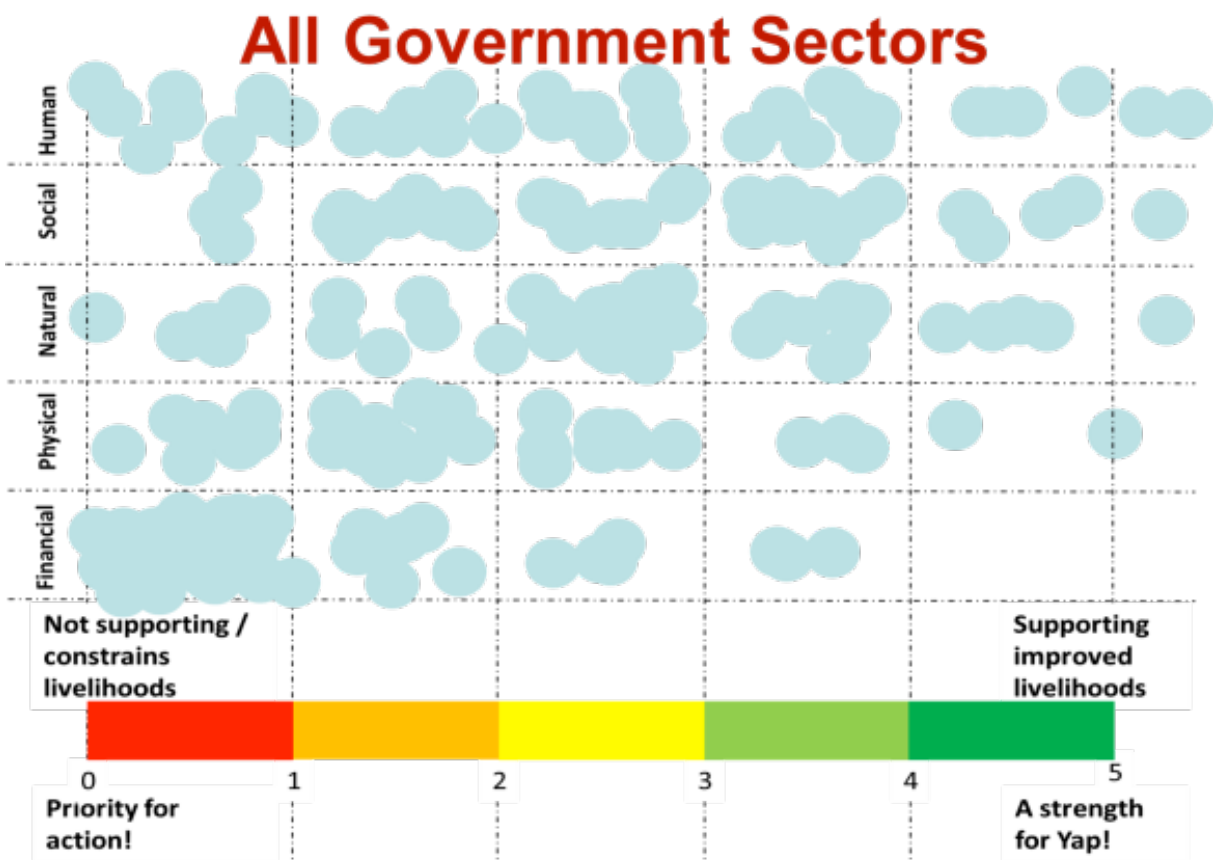
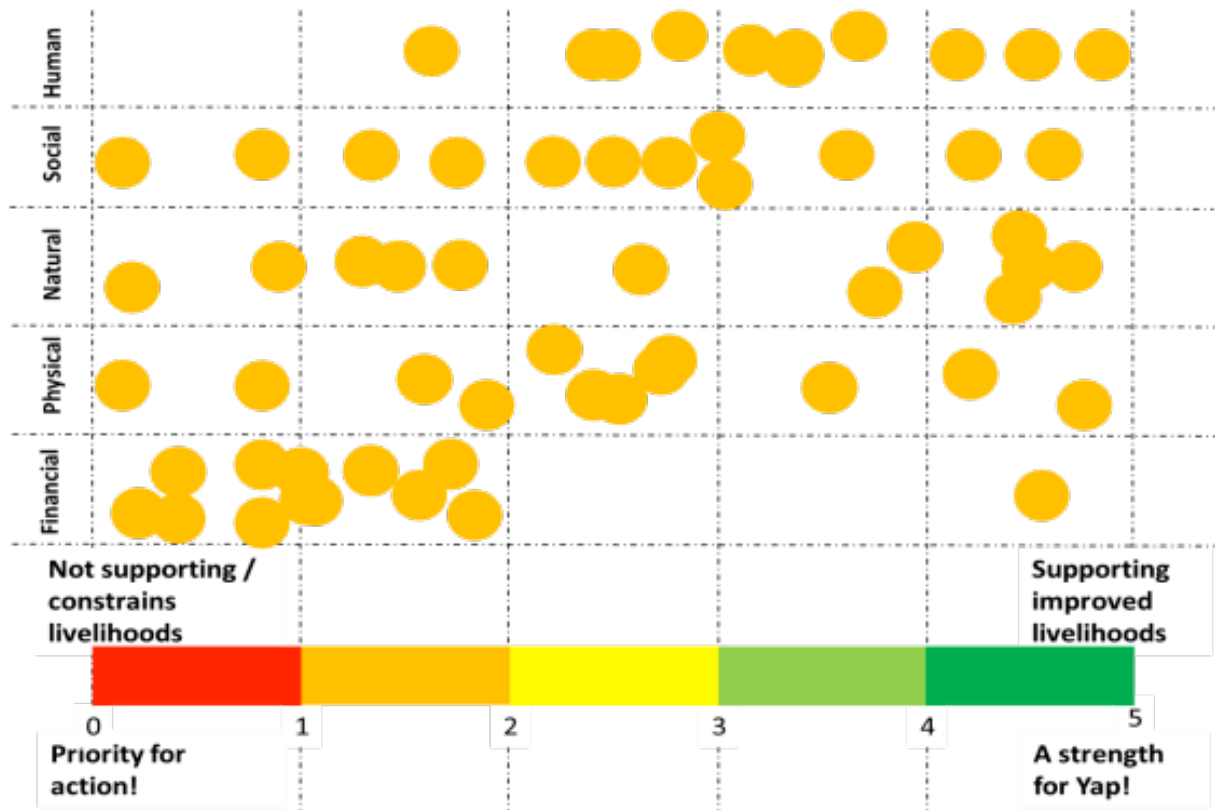


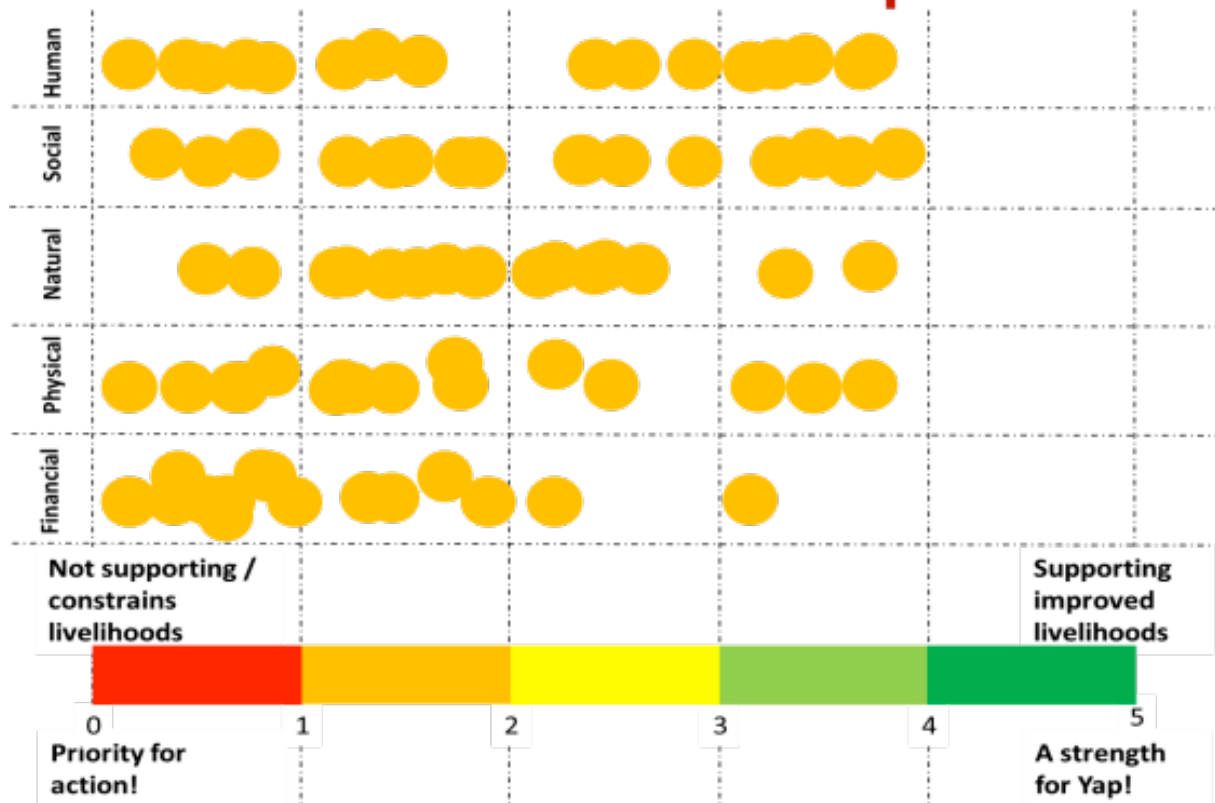
Figure 18: Key hazards identified from stakeholder consultations.



## All Traditional Leaders



## All Non Govt Groups



Figures 19: Results from consultations – rating of elements of capacity.

Table 7: Key strengths and weaknesses identified by Yap stakeholders.

Key Strengths in Yap	Key Weaknesses in Yap
<ul style="list-style-type: none"> <li>• Historical experience dealing with disasters and climate extremes</li> <li>• Traditional knowledge for managing natural resources</li> <li>• Traditional customs and cultural groups (e.g. Council on Chiefs, Women’s Groups etc.)</li> <li>• Existing government policies and plans</li> <li>• Supporting agencies from overseas</li> <li>• Rich marine environment</li> <li>• Tourism potential</li> </ul>	<ul style="list-style-type: none"> <li>• Infrastructure not maintained</li> <li>• Inappropriate land use practices e.g. land clearing</li> <li>• Location of buildings and dwellings close to the coast</li> <li>• Low lying outlying islands</li> <li>• Isolation of outlying islands</li> <li>• Limited land availability in outlying islands</li> <li>• Vulnerability to climate change impacts e.g. sea-level rise</li> <li>• Food and water security issues</li> <li>• Limited financial capacity</li> </ul>

# INSTITUTIONAL ARRANGEMENTS

The responsibility of the JSAP will reside with the Yap Risk Management Network (YRMN), comprised of members of the Yap State Government departments and offices, partners and NGOs. The YRMN will be chaired by the OPB and the Secretariat assistance provided by IOM. The membership of the YRMN reflects the belief that reducing risk and incorporating adaptation actions is the responsibility of all stakeholders and not only government.

The coordination of disaster risk management and climate change was allocated to OPB by the previous administration through an executive order. However, when the then Chief Planner was promoted to be the Assistant Director for the Department of Resource and Development, he took with him the climate change coordination, leaving disaster risk management with OPB. The incumbent has since passed on, and that responsibility is yet to be finalised by the incoming Governor. This Action Plan recommends that the climate change coordination responsibilities be returned to OPB as initially authorised by the executive order.

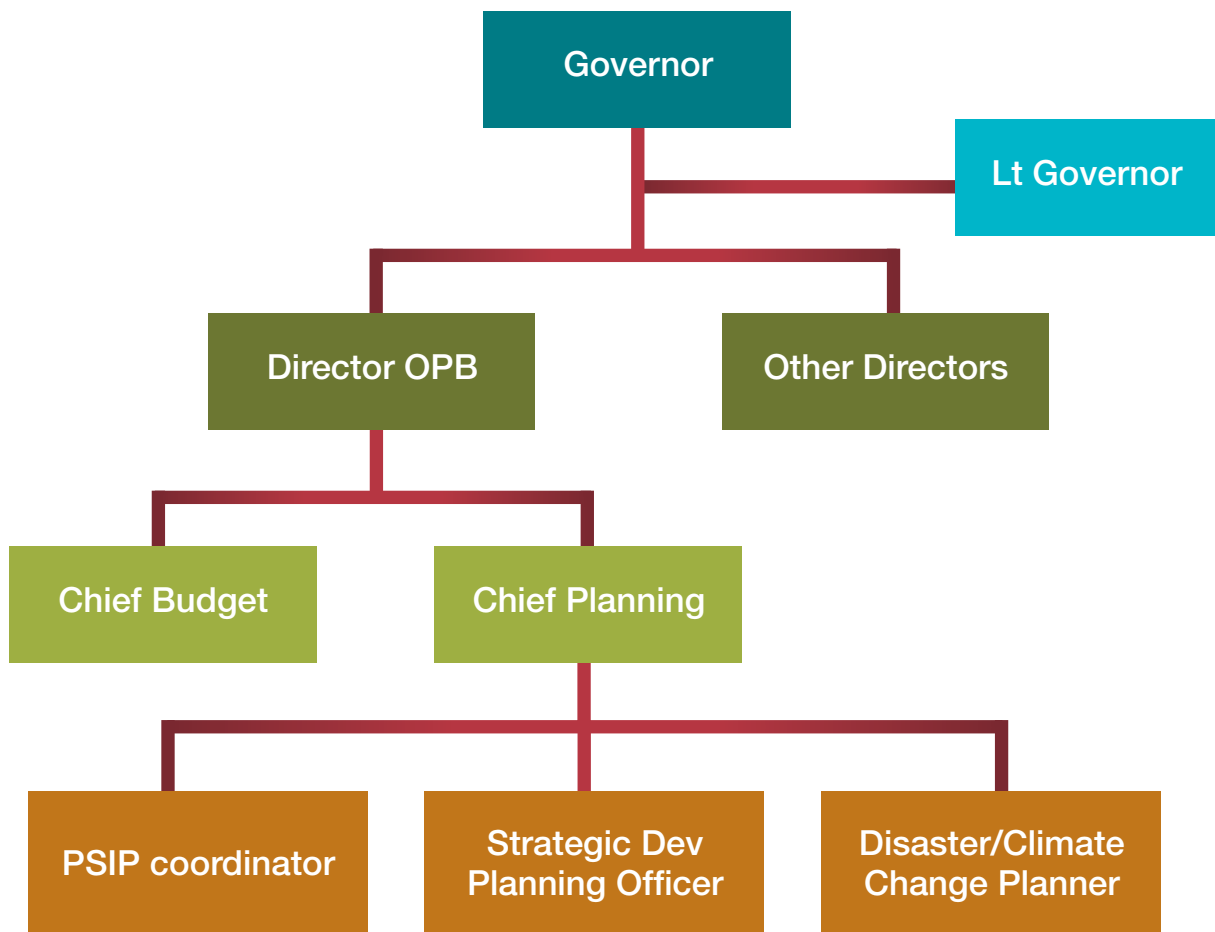


Figure 20



# MONITORING AND EVALUATION

The monitoring and evaluation (M&E) of the JSAP is intended to achieve a number of objectives:

1. To provide for regular reports to the Yap State Government on the progress of JSAP implementation.
2. In relation to 1, provide a mechanism to stimulate discussion and identify new initiatives that may evolve from the implementation of targeted actions.
3. To provide a mechanism for feedback and acquittals to donor partners and organisations of the funds used and progress made in relation to JSAP implementation.

The responsibility for monitoring and evaluation of the JSAP will be vested in the YRMN, who will work closely with OEEM at the national level, in the data gathering and analysis phase. The YRMN will develop appropriate templates for all M&E reports, however pre-existing frameworks will be drawn on to allow for close alignment of Yap's state strategies and reducing duplication in reporting requirements. Additional components of the JSAP M&E framework are as follows:

- Setting of specific, well defined, tangible goals and indicators.
- Monitoring on a quarterly basis to coincide with government budgetary requirements.
- Reviewing the M&E framework regularly to ensure it maintains feasibility and is meaningful in tracking progress.
- Including quantitative and qualitative measures of progress.
- Including innovative tools for monitoring change, and potential benefits, at the community level.
- Ensuring results of M&E are taken back to the communities.
- Regular meetings of in the YRMN to report to monitor JSAP progress.

In order to ensure that the outcome of M&E reports lead to further strategic planning in relation to climate change and disaster risk management (and thus in turn ensure that a dynamic process of planning is maintained), the YRMN will instigate a formal review of the JSAP following the first three years of implementation. The result of such a review may be adapted as the 'second phase' of a rolling JSAP program. Ultimately, the challenge is to formally mainstream or incorporate the issues related to climate change and disaster risk management into the state and national sustainable development strategy, sectoral and corporate plans and budgets.





# ACTIVITY MATRIX

The detailed description of the activities for each of the sectors for the JSAP, along with action's, sub-actions and the lead and supporting agencies and costs, are found in Appendix D.

A summary of the key Priority Areas and key objectives is provided below, with the detail found below.

<p><b>1. Health</b></p> <p><b>Objective 1.1:</b> Strengthen Yap health sector policy and technical capacity to cover risk assessment and planning</p> <p><b>Objective 1.2:</b> Raise the level of public education and technical awareness about health-related risks and the links to climate change events, trends and disasters</p> <p><b>Objective 1.3:</b> Improve health programs for people with special needs in Yap</p>
<p><b>2. Education</b></p> <p><b>Objective 2.1:</b> Develop and implement an ongoing climate change and DRM education and awareness program through the formal education system</p> <p><b>Objective 2.2:</b> Develop and implement an ongoing climate change and DRM education and awareness program for communities</p> <p><b>Objective 2.3:</b> Promote and encourage student enrolment in technical vocational training to include risk assessment and planning</p> <p><b>Objective 2.4:</b> Develop DRM and CC technical capacity of Consulting Resource Teachers (CRT) and mobility personnel for evacuation preparedness</p>
<p><b>3. Resources and Development and Environment</b></p> <p><b>Objective 3.1:</b> Improve data and knowledge management to better support disaster risk management and climate change adaptation</p> <p><b>Objective 3.2:</b> Provide more effective management of natural resources through understanding of integrated approaches such as ecosystem based or whole of island/state approaches</p> <p><b>Objective 3.3:</b> Strengthen policy and technical capacity, and community awareness of invasive species management in various climate and disaster scenarios</p> <p><b>Objective 3.4:</b> Address and improve management of solid waste, sanitation and hazardous waste</p> <p><b>Objective 3.5:</b> Address food security issues in Yap and the risks provided by climate change and other events</p>
<p><b>4. Private Sector</b></p> <p><b>Objective 4.1:</b> Strengthen the business environment in Yap to ensure it is conducive to a robust private sector</p> <p><b>Objective 4.2:</b> Improve collaboration between private sector and businesses for effective and sustainable partnerships for climate change awareness and disaster preparedness</p> <p><b>Objective 4.3:</b> Enhance the tourism sector in Yap and to promote conservation areas</p>
<p><b>5. Social and Cultural</b></p> <p><b>Objective 5.1:</b> Develop a strategy that considers options for relocation and migration from outlying islands</p> <p><b>Objective 5.2:</b> Promote and strengthen cultural and traditional practices to enhance socio-cultural resilience</p>
<p><b>6. Infrastructure</b></p> <p><b>Objective 6.1:</b> Review existing building codes and improve awareness of appropriate standards for all infrastructure</p> <p><b>Objective 6.2:</b> Strengthen technical and policy capacity to address infrastructure issues in Yap</p> <p><b>Objective 6.3:</b> Improve critical infrastructure in Yap to withstand disasters and climate change</p> <p><b>Objective 6.4:</b> Enhance sustainable energy use in Yap through promotion of renewable energy and energy efficiency programmes</p>
<p><b>7. Coordination of Disaster Risk Management and Climate Change activities</b></p> <p><b>Objective 7.1:</b> Strengthen policy environment for disaster risk management and climate change</p> <p><b>Objective 7.2:</b> Improve coordination on disaster risk management and climate change adaptation</p> <p><b>Objective 7.3:</b> Strengthen climate and disaster risk preparedness and response capacity</p>



# COSTING ESTIMATES

The overall gross indicative resources costs to implement the JSAP over the five year period is estimated to be US\$6,267,874. Of this, it is estimated that the financial cost constitute 93% of overall costs while the in-kind cost constitute 7% which is detailed in Table 8 below.

Table 8: Overall costs by goal (all in USD).

Sectors	Total Financial	Total in-kind	Overall Total
Sector 1 Health	173,100	51,250	224,350
Sector 2 Education	277,224	35,198	312,422
Sector 3 Resources and Development & Environment	811,592	130,974	942,566
Sector 4 Private Sector	33,250	12,073	45,323
Sector 5 Social and Culture	223,912	14,931	238,843
Sector 6 Infrastructure	4,029,533	121,815	4,151,348
Sector 7 Coordination of DRM & CC	303,118	49,904	353,022
<b>OVERALL TOTAL</b>	<b>5,851,729</b>	<b>416,145</b>	<b>6,267,874</b>
Percentage	93%	7%	

The single greatest financial cost arises in implementing Sector 6: “Infrastructure” which accounts for 69% followed by Resources, Development and Environment (14%), Coordination and Education (5%), Social and Cultural (4%), Health (3%) and Private Sector (1%) as in Figure 12 below.

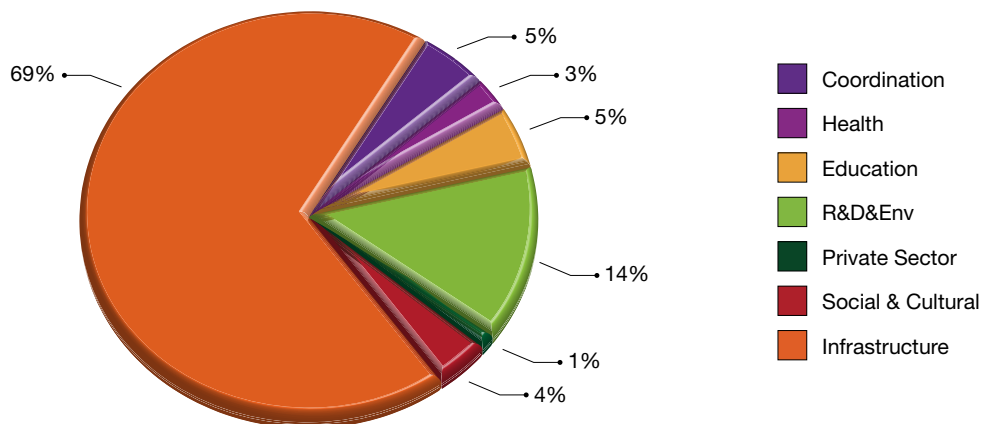


Figure 21: Distribution of financial cost.

The estimated financial costs of US\$5,851,729 fall solely on external sources which entails that the external assistance will be sought to effectively implement the priorities identified as shown in Table 9 below. The resources available in country will be provided as in-kind.

Table 9: Share of Financial Costs (all in USD).

Sectors	Total Yap financial costs	Total other financial demands	Total Financial
Sector 1 Health	0	173,100	173,100
Sector 2 Education	0	277,224	277,224
Sector 3 Resources and Development & Environment	0	477,172	477,172
Sector 4 Private Sector	0	33,250	33,250
Sector 5 Social and Culture	0	223,912	223,912
Sector 6 Infrastructure	0	952,549	952,549
Sector 7 Coordination of DRM & CC	0	303,118	303,118
<b>OVERALL TOTAL</b>	<b>0</b>	<b>5,851,729</b>	<b>5,837,389</b>

To provide flexibility in planning for implementation of JSAP activities, a contingency of 10% has been applied to all financial costs. In this case, the total financial costs would increase to a potential US\$6,436,902 as detailed in Table 10 below.

Table 10: Financial costs including contingency by strategy (all in USD).

Sectors	Total Financial	Contingency (10%)	New Financial Total	Total in-kind	Overall Total
Sector 1 Health	173,100	17,310	190,410	51,250	241,660
Sector 2 Education	277,224	27,722	304,946	35,198	340,144
Sector 3 Resources and Development & Environment	811,592	81,159	892,751	130,974	1,023,725
Sector 4 Private Sector	33,250	3,325	36,575	12,073	48,648
Sector 5 Social and Culture	223,912	22,391	246,303	14,931	261,234
Sector 6 Infrastructure	4,029,533	402,953	4,432,486	121,815	4,554,302
Sector 7 Coordination of DRM & CC	303,118	30,312	333,430	49,904	383,334
<b>OVERALL TOTAL</b>	<b>5,851,729</b>	<b>585,173</b>	<b>6,436,902</b>	<b>416,145</b>	<b>6,853,047</b>

The overall estimated in-kind costs in implementing the actions is estimated at US\$416,145 of which 47% is provided by Yap State and 53% by others as detailed in Table 11 below. These costs is mainly in the staff time that will be supporting the implementation of the actions.

Table 11: Share of in kind costs (all in USD).

Sectors	Total Yap in-kind contributions	Total Other in-kind	In-kind contributions
Sector 1 Health	32,000	19,250	51,250
Sector 2 Education	13,198	22,000	35,198
Sector 3 Resources and Development & Environment	49,954	81,020	130,974
Sector 4 Private Sector	2,723	9,350	12,073
Sector 5 Social and Culture	14,931	-	14,931
Sector 6 Infrastructure	70,815	51,000	121,815
Sector 7 Coordination of DRM & CC	13,654	36,250	49,904
<b>OVERALL TOTAL</b>	<b>197,275</b>	<b>218,870</b>	<b>416,145</b>
Percentage	47%	53%	



# APPENDICES

## APPENDIX A: KEY DOCUMENTS CONSULTED

- Australian Government Bureau of Meteorology (2011) Current and future climate of the Federated States of Micronesia. Australian Government, Canberra.*
- Campbell, J.R (2006) Traditional disaster reduction in Pacific Island communities, GNS Science Report 2006/38 46.*
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## APPENDIX B: DISASTER-RELATED ROLES AND RESPONSIBILITIES FOR YAP

Table 12: Disaster-related roles and responsibilities for Yap.

Organisation/ Person	Roles and responsibilities
Governor	<ul style="list-style-type: none"> <li>• Declare a state of emergency if needed</li> <li>• Designation of a state DCO</li> <li>• Designation of a command post</li> <li>• Designation of shelters</li> <li>• Declaration of various states of warning</li> <li>• Mobilisation of the emergency task forces and initiation of necessary property and life-saving measures, evacuations, mass care, etc</li> <li>• Initiation of damage assessment as soon as feasible when a disaster occurs and communication to the FSM President when national and/or US FEMA or other foreign assistance is needed</li> <li>• Designation of a representative to work with NEMO who is the FSM point of contact on all disaster-related matters</li> <li>• Designation of a disaster application center and a disaster field office</li> </ul>
State DCO	<ul style="list-style-type: none"> <li>• Maintaining and updating the State Preparedness Plan</li> <li>• Developing public awareness and training programs in cooperation with other State departments and agencies</li> <li>• Coordinating the State sponsored training and public awareness programs with appropriate department and agency heads</li> <li>• Preparation of requests for disaster or mitigation assistance to the National government, or through the National government to foreign governments or other international organisations or agencies</li> <li>• Ensuring that warnings are issued to the public when the Governor declares different warning stages</li> <li>• Performing all other emergency coordination functions that may be necessary given the demands of the given disaster or emergency situation</li> </ul>
Emergency Operations Center/Command Post	<ul style="list-style-type: none"> <li>• Provides a point of centralized control, coordination and direction of emergency operations</li> <li>• Serves as a place for key staff to effectively work together, share information and decision-making, and assists in making the most effective use of resources</li> <li>• Staff report to the command post after a disaster has occurred or when the Governor declares that a treat has been identified</li> </ul>

Source: URS (2005).

## APPENDIX C: ELEMENTS OF CAPACITY

Table 13 provides details on the ‘elements of capacity’, used by workshop participants to gauge strengths and weaknesses across Yap State.

Table 13: Elements of capacity.

Capacity	Description
Human	Skills, health, knowledge, education, ability to labour, physical capability.
Social	Networks, social claims, social relations, affiliations, associations, land tenure.
Natural	Natural resource stocks (fisheries, forests, coastal ecosystems, fresh water) & environmental services from which resource flows must be managed.
Physical	Capital items that can include infrastructure, equipment and improvements in genetic resources (crops, livestock).
Financial	Capital base – cash, credit/debt, savings, compact funds, development partner projects, other economic assets.



## APPENDIX D: DETAILED COSTING OF ACTIONS AND SUB-ACTIONS

The tables below include details of the actions and sub-actions required to meet each sector’s objectives. Lead and supporting agencies are included (leads are indicated in bold red text) and indicative costs for each action are included, which is a combination of financial and in-kind costs. Note that a 10% contingency cost is added to those listed in the below tables, as noted in Section 9.

### Sector 1 – Health

Action	Sub-action	Lead and Supporting Agencies	TOTAL COST (USD, financial + in-kind)
<b>Objective 1.1: Strengthen Yap health sector policy and technical capacity to cover risk assessment and planning</b>			
1.1.1 Strengthen vector surveillance	Technical assistance to develop vector surveillance program	DHS, community, WHO, CDC	\$49,454
	Training in vector surveillance		\$5950
	Procure relevant equipment and upgrade facilities		\$5000
	Enhance community partnerships and support		\$ -
	Review manual of procedure on vector surveillance		\$ -
<b>Sub-total</b>			<b>\$60,404</b>
1.1.2 Strengthen Standard Operating Procedures (SoPs) on handling hazmat	Identify hazmat staff responsible for handling hazardous materials from current staff	DHS, national DOH, WHO, SPC	\$ -
	Replace personal protective equipment (PPE)		\$30,000
	Undertake training and awareness programs		\$ -
<b>Sub-total</b>			<b>\$30,000</b>
1.1.3 Develop and implement health care Capacity Development Plan (Human Resource Development)	Support existing Human Resources for Health Plan	DHS, WHO, CDC	\$ -
<b>Sub-total</b>			<b>\$ -</b>
1.1.4 Conduct regular equipment maintenance through a Equipment Maintenance Plan	Strengthen existing Equipment Maintenance Plan	DHS, national govt	\$ -
	Implement Equipment Maintenance Plan		\$ -
<b>Sub-total</b>			<b>\$ -</b>
<b>TOTAL</b>			<b>\$90,404</b>
<b>Objective 1.2: Raise the level of public education and technical awareness about health-related risks and the links to climate change events, trends and disasters</b>			
1.2.1 Develop health sector specific communication and awareness raising strategy	Existing staff	DHS, COT/COP	\$ -
	Conduct community workshops and training		\$ -
<b>Sub-total</b>			<b>\$ -</b>
1.2.2 Health curriculum strengthened at the Elementary and Secondary Schools	Joint meeting of DHS and DOE to map out areas of strengthening	DHS, DoE, OEEM	\$28,477
<b>Sub-total</b>			<b>\$28,477</b>
1.2.3 Tailor health awareness programs targeting school children and youths to increase their involvement in disease prevention & control	Develop and disseminate brochures and educational materials for schools.	DHS, DoE, DY&CA (HPO)	\$ -
	Same workshop as in 1.2.1		\$ -

<b>Sub-total</b>			<b>\$ -</b>
1.2.4 Conduct an awareness program on the nutrition value of locally grown food	Utilise SPC chart on Local food values to conduct community workshops and training, same as 1.2.1	DHS, DoE, COT/ COP	\$ -
<b>Sub-total</b>			<b>\$ -</b>
<b>TOTAL</b>			<b>\$28,477</b>
<b>Objective 1.3: Improve health programs for people with special needs in Yap</b>			
1.3.1 Develop a Behavioural Health Strategy	Engage a specialist to develop a behavioural health strategy	DHS, DoE	\$19,015
	Implement key priorities in the strategy	DHS, DoE	\$33,692
<b>Sub-total</b>			<b>\$52,708</b>
1.3.2 Assess disability health needs for Yap and develop a Disability Needs Strategy for Yap State, including education and advocacy, community education	Hire a disability specialist to undertake assessment and develop a Disability Strategy	DHS, DoE, YPDO	\$21,031
	Implement key priorities in the strategy	DHS, DoE, YPDO	\$31,731
	Enhance communication and information sharing between Special Ed and DHS	DHS, Do E, YPDO	\$ -
<b>Sub-total</b>			<b>\$52,762</b>
<b>TOTAL</b>			<b>\$105,469</b>
<b>OVERALL SECTOR TOTAL</b>			<b>\$224,350</b>

## Sector 2 – Education

Action	Sub-action	Lead and Supporting Agencies	TOTAL COST (USD, financial + in-kind)
<b>Objective 2.1: Develop and implement an ongoing climate change and DRM education and awareness program through the formal education system</b>			
2.1.1 Strengthen capacity of teachers to deliver lessons incorporating climate change and disaster risk management	Provide trainings to all classroom teachers	DoE, EPA, Yap CAP	\$23,223
	Collaborate with regional resource laboratories (SPREP, PREL, IOM, SPC, McREL, Northwest Education Laboratory, Island Research and Education Initiatives (IREI), etc.)		\$ -
	Invite environmental agencies (EPA, PW&T, Yap CAP) to conduct educational program at schools on selected topics		\$ -
	Conduct classroom observations/Feedback		\$ -
	Develop integrated lessons to include CCA/DRM		\$ -
	Review lesson plans		\$ -
<b>Sub-total</b>			<b>\$23,223</b>
2.1.2 Develop materials and resources relevant to Yap climate change and disaster context	Develop scope of work for project	DoE, EPA, OPB, YWA, OurYap	\$ -
	Engage an existing staff to support materials and resource development		\$ -
	Monitor implementation of project		\$60,985
	Evaluate end product of project		\$ -
	Publish teaching materials		\$ -
<b>Sub-total</b>			<b>\$60,985</b>

2.1.3 Review program on the use of traditional skills (relating to CCA and DRR) through education system and update if necessary	Invite senior citizens to share on traditional skills/ knowledge on CCA/DRR	DoEd, COP/COT	\$ -
			\$ -
<b>Sub-total</b>			<b>\$ -</b>
<b>TOTAL</b>			<b>\$84,208</b>
<b>Objective 2.2: Develop and implement an ongoing climate change and DRM education and awareness program for communities</b>			
2.2.1 Develop sector specific communication and awareness raising strategy for disasters and climate change	Develop a multi-sector plan for communication to communities	OPB, EPA, R&D, IOM/USAID, Yap CAP	\$16,400
	Coordinate amongst agencies/programs for implementation		\$ -
<b>Sub-total</b>			<b>\$16,400</b>
2.2.2 Incorporate CC/DRR into existing Community Awareness Programs	Request Community Awareness Groups to include CC/DRR in public awareness	EPA, OPB, IOM/ USAID	\$ -
<b>Sub-total</b>			<b>\$ -</b>
2.2.3 Provide awareness program, workshops, trainings to all stakeholders on: o Disaster & Climate Change Risk Reduction/Adaptation o State Disaster Plan o International Days for environmental and disaster management issues	Community workshops	EPA, OPB, IOM,USAID, Yap CAP, YWA, MRCS	\$17,001
	Radio talkback		\$ -
	Brochures/flyers/comic books		\$10,923
<b>Sub-total</b>			<b>\$27,924</b>
2.2.4 Ensure public awareness activities reach to disability community and their caregivers	Conduct meetings with Yap Persons with Disability Organisation (YPDO)	DoE (Special Ed), OPB, EPA, YPDO	\$2,584
	Provide available educational resources/ documents to parents		\$ -
<b>Sub-total</b>			<b>\$2,584</b>
<b>TOTAL</b>			<b>\$46,908</b>
<b>Objective 2.3: Promote and encourage student enrolment in technical vocational training to include risk assessment and planning</b>			
2.3.1 Strengthen partnership with state DoE and national DoE, focus on Career and Technical Education (CTE)	Workshop/meeting to discuss details	DoE (state and national), R&D, COM Yap Campus, community group	\$13,608
	Conduct career awareness raising at all high schools (Career Day etc)		\$905
<b>Sub-total</b>			<b>\$14,513</b>
2.3.2 Develop scholarship program for students to access, supporting education programs that lead to enhanced human resources in climate change and disaster management (e.g. engineering, science, maths etc)	Review priorities of existing scholarship program to reflect the findings of the HR Study (WED)	DoE, R&D, Chamber of Commerce	\$ -
	Engage business, NGOs, semi quasi corporation to promote scholarships for Yap students		\$1,008
<b>Sub-total</b>			<b>\$1,008</b>
<b>TOTAL</b>			<b>\$15,521</b>

Objective 2.4: Develop capacity of Consulting Resource Teachers (CRT) and mobility personnel for evacuation preparedness			
2.4.1 Capacity building training and drills to build awareness on evacuation processes and priorities	Conducting trainings for CRT on evacuation drills	IOM, Sp.Ed, DOE, OPB, DHS, MRCS	\$105,637
	Formulate tabletop exercises		\$ -
	Conduct drills to test readiness of CRT		\$60,148
<b>Sub-total</b>			<b>\$165,785</b>
<b>TOTAL</b>			<b>\$165,785</b>
<b>OVERALL TOTAL</b>			<b>\$312,422</b>

### Sector 3 – Resources and Development and Environment

Action	Sub-action	Lead and Supporting Agencies	TOTAL COST (USD, financial + in-kind)
<b>Objective 3.1: Improve data and knowledge management to better support disaster risk management and climate change adaptation</b>			
3.1.1 Strengthen data sharing and management	Collect and organise existing data and identify gaps including GIS mapping	R&D, COM, PDC, IREI, NOAA, US Forest Service	\$11,162
	Develop an agreement for data sharing		\$ -
	Consider standardising software across agencies		\$ -
	GIS Train the trainer		\$29,823
<b>Sub-total</b>			<b>\$40,985</b>
3.1.2 Assess training and equipment needs	Conduct training needs analysis on GIS	R&D, COM	\$6,462
	Assess equipment needs (e.g. GPS)		\$6,462
<b>Sub-total</b>			<b>\$12,923</b>
<b>TOTAL</b>			<b>\$53,908</b>
<b>Objective 3.2: Provide more effective management of natural resources through understanding of integrated approaches such as ecosystem based or whole of island/state approaches</b>			
3.2.1 Develop Community Management Plans for management of terrestrial and marine areas	Conduct community assessment to identify needs and priorities regarding natural resource management	R&D, EPA, OPB, Yap CAP, NGOs, OEEM, communities, SPREP	\$52,935
	Document community owned resources		\$10,235
	Development of Community Management Plan to include land use planning		\$5,692
	Include appropriate education and training on sustainable natural resource use, incorporating traditional knowledge as appropriate		\$6,850
<b>Sub-total</b>			<b>\$75,712</b>
3.2.2 Strengthen awareness programs on environmental laws and regulations	Identify most appropriate range of approaches for community awareness	EPA, R&D, COP/ COT, communities	\$ -
	Undertake awareness raising (e.g. workshops, posters, radio announcements, brochures)		\$23,054
	Awareness and enforcement training for EPA staff		\$23,092
<b>Sub-total</b>			<b>\$46,146</b>
3.2.3 Undertake feasibility study of payment for ecosystem services	Assess options for introduction of a Green/ Carbon tax	EPA	\$ -
<b>Sub-total</b>			<b>\$ -</b>

3.2.4 Develop appropriate coastal defence systems (including coastal protection as appropriate, replanting of mangroves)	Undertake modelling to identify appropriate defence systems	R&D, EPA, PW&T, Yap Institute of Natural Science (YINS), SPC	\$88,269
	Include traditional knowledge and methods for coastal protection		\$ -
<b>Sub-total</b>			<b>\$88,269</b>
3.2.5 Tree planting on coastal areas conducted at the community level	Undertake community consultations to encourage appropriate land use	R&D, EPA and community groups, NGOs	\$ -
	Mobilise community support for tree planting		\$15,032
<b>Sub-total</b>			<b>\$15,032</b>
3.2.6 Finalise, adopt, and implement readiness of Marine Contingency Plan	Conduct workshop to finalise and distribute Marine Contingency Plan	EPA, R&D, DPWT, OPB	\$23,865
	Procure equipment as per needs/gaps assessment		\$50,865
	Conduct training and exercise of Contingency Plan		\$7,396
<b>Sub-total</b>			<b>\$82,127</b>
<b>TOTAL</b>			<b>\$307,286</b>
<b>Objective 3.3: Strengthen policy and technical capacity, and community awareness of invasive species management in various climate and disaster scenarios</b>			
3.3.1 Improve surveillance and awareness of quarantine and invasive species and plant and agricultural diseases	Upgrade systems as per policy review	R&D state, EPA, FSM Quarantine, SPC	\$ -
	conduct neighbouring islands invasive species survey		\$28,000
	Engage community in invasive species management		\$6,500
<b>Sub-total</b>			<b>\$34,500</b>
<b>TOTAL</b>			<b>\$34,500</b>
<b>Objective 3.4: Address and improve management of solid waste, sanitation and hazardous waste</b>			
3.4.1 Improve solid waste management	Pilot expansion of waste collection to communities and set up of collection points	EPA, PW&T, Youth, community groups	\$99,184
	Improve waste management outreach through awareness materials and activities with youth, schools, and communities		\$24,404
	Pilot household segregation projects with communities		\$28,308
	Secure waste management coordinator for overall enforcement and monitoring of program		\$26,769
	Improve monitoring of landfill operations, community collection points, segregation etc		\$32,769
	Develop and integrate management of disaster waste into State emergency/disaster response plan		\$10,000
<b>Sub-total</b>			<b>\$221,434</b>
3.4.2 Improve sewage and wastewater systems for communities	Assess status of community toilet waste disposal and explore appropriate options and costs for communal septic tank system	EPA, Utilities, communities	\$68,261
	Conduct best practices workshop for contractors and community for septic tank system designs and construction		\$14,362
<b>Sub-total</b>			<b>\$82,623</b>
<b>TOTAL</b>			<b>\$304,057</b>

Objective 3.5: Address food security issues in Yap and the risks provided by climate change and other events			
3.5.1 Assess potential for salt resistant crops in Outer Islands and Yap Proper	Distribute seedlings of salt resistant crops	R&D, EPA, COM-CRE, SPC	\$16,155
	Establish seed banks on Yap proper and neighbouring islands		\$14,485
	Establish and maintain database on salt and drought tolerant crops		\$5,692
	Set up nurseries for raising crops on neighbouring Islands		\$4,200
<b>Sub-total</b>			<b>\$40,532</b>
3.5.2 Provide training to the community on agroforestry, aimed particularly at Youth		R&D, DY&CA, SPC, EPA, communities	\$12,692
<b>Sub-total</b>			<b>\$12,692</b>
3.5.3 Undertake an assessment for expanding aquaculture	Assessment to include species feasibility study	R&D, SPC	\$12,500
	Implement recommendations of assessment		\$8,669
<b>Sub-total</b>			<b>\$21,169</b>
3.5.4 Advocate traditional food preservation methods/practices (community)	Document practices on food preservation	R&D, DY&CA (Historical Preservation Office - HPO), Visitors Bureau, communities	\$58,208
	Undertake training and promotion		\$41,985
<b>Sub-total</b>			<b>\$100,192</b>
3.5.5 Address agricultural production needs to support local consumption and exportation	Conduct agricultural/crop surveys	R&D, Yap Chamber of Commerce (YCC), Small Business Development Centre (SBDC), SPC	\$ -
	Identify potential markets for selected crops		\$3,000
	Establish export support facility		\$25,330
<b>Sub-total</b>			<b>\$28,330</b>
3.5.6 Livestock gene pool improvement	Purchase and raise superior livestock breeds for farmers/community	R&D, COM-FSM Land Grant,	\$29,200
	Implement a piggery biogas pilot project	R&D, EPA	\$10,700
<b>Sub-total</b>			<b>\$39,900</b>
<b>TOTAL</b>			<b>\$242,815</b>
<b>OVERALL TOTAL</b>			<b>\$942,566</b>

## Sector 4 – Private Sector

Action	Sub-action	Lead and Supporting Agencies	TOTAL COST (USD, financial + in-kind)
Objective 4.1: Strengthen the business environment in Yap to ensure it is conducive to a robust private sector			
4.1.1 Consider the options for tax incentives for businesses investing in energy efficient appliances and renewable energy		YCC, YSPSC,R&D (C&I)	\$4605
<b>Sub-total</b>			<b>\$4605</b>



4.1.2 Involve the private sector in discussion regarding future energy needs for Yap to allow a competitive businesses environment beyond government utilities only		YCC,R&D (C&I) Community Leaders	\$3481
<b>Sub-total</b>			<b>\$3481</b>
4.1.3 Assess options for affordable insurance for businesses in Yap	Discussion with government for negotiations on the need for affordable insurance options to be available for private sector businesses	Yap Chamber of Commerce (YCC), OPB, SPC,R&D	\$2103
	Request SPC for assistance on risk financing through PICRAFI		\$ -
<b>Sub-total</b>			<b>\$2103</b>
<b>TOTAL</b>			<b>\$10,188</b>
<b>Objective 4.2: Improve collaboration between private sector and businesses for effective and sustainable partnerships for climate change awareness and disaster preparedness</b>			
4.2.1 Conduct regular meetings between Chamber of Commerce and OPB to relay private sector concerns to government		YCC, OPB	\$ -
<b>Sub-total</b>			<b>\$ -</b>
4.2.2 Ensure tourist operators and other private sector businesses are aware of the environmental regulations relevant to them through awareness raising activities from relevant government agencies		YCC, OPB, EPA,R&D, YVB	\$ -
<b>Sub-total</b>			<b>\$ -</b>
4.2.3 Improve collaboration between R&D and small scale farmers to allow for adaptation options to be trialled by farmers in Yap Proper and outlying islands		YCC, R&D, Yap Farmer's Organisation,	\$ -
<b>Sub-total</b>			<b>\$ -</b>
4.2.4 Develop and maintain effective flows on information from government to private enterprises on weather and climate related issues (e.g. water, seasonal patterns/trends, ENSO, tropical cyclone seasonal outlooks)		YCC, Weather Service, NOAA,SBDC	\$ -
<b>Sub-total</b>			<b>\$ -</b>
<b>TOTAL</b>			<b>\$ -</b>
<b>Objective 4.3: Enhance the tourism sector in Yap and to promote conservation areas</b>			
4.3.1 Assess options for developing a Manta Ray Sanctuary in Yap	Undertake a cost-benefit analysis of establishing a Manta Ray Sanctuary in Yap	YCC, Visitor Bureau, EPA, R&D, Hotel Association, COP, COT,	\$35,135
	Investigate the potential need for formal regulations to allow for enforcement of restrictions relating to the Manta Ray Sanctuary		\$35,135
<b>Sub-total</b>			<b>\$35,135</b>
<b>TOTAL</b>			<b>\$35,135</b>
<b>OVERALL TOTAL</b>			<b>\$45,323</b>

## Sector 5 – Social and Cultural

Action	Sub-action	Lead and Supporting Agencies	TOTAL COST (USD, financial + in-kind)
<b>Objective 5.1: Develop a strategy that considers options for migration from Outlying Islands</b>			
5.1.1 Policy to address inter-state migration	Consultation with communities to assess reasons for migration in communities of outlying islands, and main island host communities	COT/COP, AG, OPB, EPA, R&D, IOM/USAID	\$3935
	Develop a policy to address community needs and priorities and traditional arrangements	COT/COP, R&D, EPA, AG	\$ -
<b>Sub-total</b>			<b>\$3935</b>
5.1.2 Develop specific communication strategy regarding migration policy	Develop a communication plan for the migration policy	COT/COP, DY&CA, EPA, OPB, IOM	\$3761
	Implement communication to raise awareness of the policy (community meetings, brochures, radio etc.)	COT/COP, DY&CA, EPA, OPB, IOM	\$47,453
<b>Sub-total</b>			<b>\$51,214</b>
5.1.3 Consider new practices for migrating communities and individuals preparations for migration from outlying islands and relocation to main island more proactive; already happening	Provide preparedness training for migrating and receiving communities	IOM/USAID	\$17,712
	Provide ongoing support to communities receiving migrating communities from outlying islands	IOM/USAID, COP/COT	\$ -
<b>Sub-total</b>			<b>\$17,712</b>
<b>TOTAL</b>			<b>\$72,860</b>
<b>Objective 5.2: Promote and strengthen cultural and traditional practices and knowledge enhance socio-cultural resilience</b>			
5.2.1 Design and implement local skill trainings program to reflect cultural/traditional-fishing, farming, family practices etc.	Continue to enhance and encourage programs and activities run by social groups (senior citizens, women, youth) and government agencies such as R&D, DOE, Municipals govt etc	R&D, DOE, Yap Visitors Bureau (YVB), COT/COP, DY&CA (HPO), YPDO	\$ 500
<b>Sub-total</b>			<b>\$500</b>
5.2.2 Promote use of local produce/traditional food at homes	R&D to help with agriculture projects	R&D, DHS	\$11,023
	Land Grant/Sea Grant to enhance training	Land Grant/Sea Grant	\$ -
	Local channel for TV – programs on DRR and CCA		\$10,000
<b>Sub-total</b>			<b>\$21,023</b>
5.2.3 Collect and document traditional knowledge on DRM and CC for sharing amongst Yap population	Visit Outlying Islands to collect traditional knowledge from key community people	DY&CA (HPO), EPA, OPB, COP/COT	\$72,507
	Combine information, printing and distribution to all schools		\$59,992
<b>Sub-total</b>			<b>\$132,498</b>
5.2.4 Conduct leadership, advocacy and management training for youth on DRM and CC	Conduct workshops for youth groups on leadership, advocacy and management	DY&CA, EPA, OPB	\$11,962
<b>Sub-total</b>			<b>\$11,962</b>
<b>TOTAL</b>			<b>\$165,983</b>
<b>OVERALL TOTAL</b>			<b>\$238,843</b>

## Sector 6 – Infrastructure

Action	Sub-action	Lead and Supporting Agencies	TOTAL COST (USD, financial + in-kind)
<b>Objective 6.1: Review existing building codes and improve awareness of appropriate standards for all infrastructure</b>			
6.1.1 Review building code	Conduct public consultations on existing building codes	OPB, PW&T, AG	\$19,852
	Develop standards and regulations		\$19,792
	Submit endorsement of regulations to leadership		\$ -
	Publish the building code		\$11,292
	Implement the regulations beginning with public buildings and for private homes funded through lending institutions		\$35,277
<b>Sub-total</b>			<b>\$86,213</b>
<b>TOTAL</b>			<b>\$86,213</b>
<b>Objective 6.2: Strengthen technical and policy capacity to address infrastructure issues in Yap</b>			
6.2.1 Capacity building for personnel	Strengthen technical and specialised trade trainings undertaken	COM-FSM, PW&T, R&D (WED)	\$32,200
	Training of PW&T personnel on disasters and climate change	OPB, EPA, IOM/ USAID	\$21,262
<b>Sub-total</b>			<b>\$53,462</b>
<b>TOTAL</b>			<b>\$53,462</b>
<b>Objective 6.3: Improve critical infrastructure in Yap to withstand disasters and climate change</b>			
6.3.1 Assess and upgrade critical infrastructure (roads, water, utilities, telecom) to withstand disasters and climate change	Inspections and assessments of facilities	DCO, PW&T, YSPSC	\$19,292
	Implement upgrade plans		\$2,526,127
<b>Sub-total</b>			<b>\$2,545,419</b>
6.3.2 Consider options for relocation of Infrastructure, Utilities, and improvement of Access Roads, etc.	Undertake assessment for inland roads, utilities and infrastructure and develop plan	PW&T, YSPSC	\$ -
	Upgrading of inland roads to improve access		\$ -
<b>Sub-total</b>			<b>\$ -</b>
6.3.3 Ensure schools & other structures identified as shelters are certified and upgraded as needed (for typhoon)	Inspections and assessments of facilities	PW&T, DoEd	\$39,076
	Implement recommendations of assessment		\$503,150
<b>Sub-total</b>			<b>\$542,226</b>
6.3.4 Develop and implement an Operation and Maintenance Plan for Yap State public infrastructure	Finalise database of all state facilities	OAS, PW&T	\$ -
	Develop O&M Plan going forward		\$15,462
<b>Sub-total</b>			<b>\$15,462</b>
6.3.5 Retrofit existing public infrastructure and housing to be disaster and climate risk-proof	Assess current public buildings and infrastructure	OPB, PW&T	\$40,184
	Implement recommendations on retrofitting		\$500,200
<b>Sub-total</b>			<b>\$540,384</b>
<b>TOTAL</b>			<b>\$3,643,491</b>

Objective 6.4: Enhance sustainable energy use in Yap through promotion of renewable energy and energy efficiency programmes			
6.4.1 Increase the use of renewable energy (solar, wave, wind)	Assess alternate energy sources (solar, wave, wind, biogas etc.) – ongoing study	YSPSC	\$ -
	Undertake existing Energy Source Audit		\$26,988
	Technical and management training for installation, operations and maintenance of energy systems		\$11,750
	Participate in overseas training on energy, i.e. PPA		\$32,000
<b>Sub-total</b>			<b>\$70,738</b>
6.4.2 Enhance energy efficiency at customer level	Conduct Energy Demand Side Management Awareness Programs	YSPSC, EPA	\$15,269
<b>Sub-total</b>			<b>\$15,269</b>
<b>TOTAL</b>			<b>\$86,007</b>
Objective 6.5: Strengthen management of freshwater and wastewater resources			
6.5.1 Enhance Disaster-Proof Water Supplies	Assess community wells/lens	YSPSC, PW&T, municipal govt	\$89,109
	Implement recommendations to protect well water from contaminants on Yap proper and neighbouring islands		\$136,661
	Assess desalination facilities for the neighbouring islands		\$17,812
<b>Sub-total</b>			<b>\$243,583</b>
6.5.2 Enhance waste water management	Assess and improve waste water management	YSPSC	\$16,992
	Conduct technical and management training in wastewater		\$21,600
<b>Sub-total</b>			<b>\$38,592</b>
<b>TOTAL</b>			<b>\$282,175</b>
<b>OVERALL TOTAL</b>			<b>\$4,151,348</b>

## Sector 7 – Coordination of DRM and Climate Change

Action	Sub-action	Lead and Supporting Agencies	TOTAL COST (USD, financial + in-kind)
Objective 7.1: Strengthen policy environment for disaster risk management and climate change			
7.1.1 Update the Yap State Disaster Response Plan	Conduct stakeholder workshop to adapt National Response Plan to Yap context	OPB, EPA	\$17,442
<b>Sub-total</b>			<b>\$17,442</b>
7.1.2 Assess the requirements for a State Policy or regulation to supporting DRM & CCA, and the JSAP	Create awareness of state legislature resolution in 2011 requesting the Executive to develop a CC policy and plan	OPB, AG	\$ -
<b>Sub-total</b>			<b>\$ -</b>
7.1.3 Assess and monitor budget needs and options for DRM and climate change	Revitalise the Disaster Revolving Fund	OPB, Finance	\$ -
	Monitor CCA spending across sectors	OPB, Finance	\$ -
<b>Sub-total</b>			<b>\$ -</b>

7.1.4 Assess & establish appropriate institutional structure to manage JSAP	Discuss with state leadership to move back CC to OPB	OPB, Governor	\$ -
<b>Sub-total</b>			<b>\$ -</b>
<b>TOTAL</b>			<b>\$17,442</b>
<b>Objective 7.2: Improve coordination on disaster risk management and climate change adaptation</b>			
7.2.1 Coordinate/facilitate DRR/CCA related activities including JSAP coordination	Establishment and endorsement of Yap Risk Management Network (YRMN) with OPB as Chair	OPB, IOM/USAID	\$ -
	Organising meeting and launching of YRMN	OPB, IOM/USAID	\$ -
<b>Sub-total</b>			<b>\$ -</b>
7.2.2 Hold regular meetings between all sectors for coordination and discussion of DRM and CC issues	Schedule and facilitate regular meetings with OPB (Chair) and IOM (Secretariat)	OPB, IOM/USAID	\$ -
	Develop TOR for YRMN	YRMN	\$ -
<b>Sub-total</b>			<b>\$ -</b>
<b>TOTAL</b>			<b>\$ -</b>
<b>Objective 7.3: Strengthen climate and disaster risk preparedness and response capacity</b>			
7.3.1 Develop Disaster Response Plans for all sectors and ensure dissemination to all stakeholders	Assess and review existing Plans	OPB and all sectors	\$ -
	Develop Plans for sectors without plans		\$13,723
<b>Sub-total</b>			<b>\$13,723</b>
7.3.2 Provide EOC with appropriate equipment	Maintain communications with OEEM regarding EOC needs (e.g. standby generator)	OPB, OEEM	\$20,231
<b>Sub-total</b>			<b>\$20,231</b>
7.3.3 Develop evacuation routes for tsunami	Develop evacuation map (refer to existing GIS hazard maps)	OPB	\$2,273
	Publish map and conduct public awareness		\$15,369
	Conduct a table top exercise to test the map		\$4569
<b>Sub-total</b>			<b>\$22,212</b>
7.3.4 Conduct evacuation drills (included in sector Disaster Plans) o Typhoon/Tropical Storm o Tsunami	Evacuation drill conducted for all sectors	DCO and all sectors	\$1485
	Evacuation drill conducted for all communities		\$1085
<b>Sub-total</b>			<b>\$2569</b>
7.3.5 Conduct training on relief and response training for sector leaders and community leaders	Initial Damage Assessment Training	OPB, IOM/USAID, Red Cross, SPC	\$20,473
	Evacuation Shelter Management training		\$20,473
	Essential Humanitarian Assistance Training		\$20,473
	First Aid Training /Emergency First Response (EFR)		\$20,473
	Logistics/Distribution Training		\$20,473
	Training of Trainers		\$20,473
<b>Sub-total</b>			<b>\$122,838</b>
7.3.6 Undertake training for Search and Rescue operations	Support police and fisheries training	DCO, OAG, R&D	\$20,473
<b>Sub-total</b>			<b>\$20,473</b>

7.3.7 Establish and strengthen local early warning systems	Develop MoU between FSM Telecom and DCO	DCO, FSM Telecom	\$ -
	Establish a schedule for regular radio contact between OPB and Outlying Islands	OPB	\$ -
	Training for Outlying Islands on communication system and management of equipment	OPB	\$61,047
<b>Sub-total</b>			<b>\$61,047</b>
7.3.8 Assess potential for prepositioned relief supplies at outlying islands	Conduct training for response management for teachers	Red Cross, OPB	\$6,442
	Identify sites and establish prepositioning of relief supplies	Red Cross, OPB	\$66,044
<b>Sub-total</b>			<b>\$72,486</b>
<b>TOTAL</b>			<b>\$335,580</b>
<b>OVERALL TOTAL</b>			<b>\$353,022</b>





