



Tuvalu Tropical Cyclone Pam Recovery: Vulnerability Reduction Plan

19 May 2015

*Prepared by the Government of Tuvalu with support from the
humanitarian and development community*

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Acronyms

ADB	Asia Development Bank
AU	Australian
CC	Climate Change
C&T	Communications & Transport
DALA	Damage and Loss Assessment
DFAT	Department of Foreign Affairs and Trade
DRM	Disaster risk Management
FAO	Food and Agriculture Organisation
GDP	Gross Domestic Product
IEC	Information Education Communication
IFRC	International Federation of the Red Cross and Red Crescent Societies
MFAT	Ministry of Foreign Affairs and Trade
NACCC	National Advisory Council on Climate Change
NAPA	National Adaptation Plan of Action
NDC	National Disaster Committee
OPM	Office of the Prime Minister
PWD	Public Works Department
SWAT	Solid Waste Agency of Tuvalu
TC	Tropical Cyclone
TRCS	Tuvalu Red Cross Society
UAE	United Arab Emirates
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
WB	World Bank
WHO	World Health Organisation



Foreword

The New Government Visitations to Affected Areas

Deeply concerned by the damages inflicted on the islands of Tuvalu by TC PAM, the newly elected Cabinet Ministers decided as a national priority to visit and witness for themselves the damages and the situation on the ground, so as to establish a proper appreciation of the damages and the needs for recovery and rehabilitation.

The Honorable Ministers, visited all the outer islands and the outlying islets of Funafuti, and held extensive consultations with communities and Government officials.

Main reflections

Most of the islands of Tuvalu are seriously impacted in terms of damage to sources of food supply, fresh water, sanitation and debris and waste. This is proving beyond any doubt that Tuvalu is already suffering from the impacts of climate change and sea level rise, and that the need for concrete actions of adaptation, recovery and rehabilitation support, displacement, and compensation of loss and damages is URGENTLY required.

On empirical account the whole situation is critical, particularly the following:

- Severe erosion, displacement of lands, shift of lands boundaries, and loss of islets;
- Sources of food supply including pulaka, breadfruits, coconuts, are destroyed;
- Water catchment and storage have been damaged, need proper repairs/cleaning;
- Sanitation issues are acute: flies, ants, and other harmful insects must be addressed;
- Health issues are also bad and can be worsened if sanitation is not improved;
- Debris and waste is hampering progress of recovery work, these need to be cleared;
- Infrastructure like roads and ramps must be rebuilt, and passages cleared of boulders;
- Living houses, cooking houses, sheds, pig-pens, and other properties should be rebuilt;
- Telecommunications services for the islands, and electricity must be improved;
- People are agile: despite the havocs, they are strong to remain and rebuild in Tuvalu;

Urgent actions of response

Unless urgent actions are put in place to ensure appropriate responses, it would be quite difficult to expect the island communities to be able to make progress in the overall social and economic development of Tuvalu. The overarching actions are vital:

- A disaster coordination unit must also be established either under the OPM or Home Affairs to help coordinate the dispatch and delivery of response work.
- Delivery must also be guided by the oversight from the National Advisory Council on Climate Change (NACCC), the National Disaster Committee (NDC) and the Cabinet;
- The newly established National Advisory Council on Climate Change (NACCC) unit must start short term review of these PAM assessment reports and others, review of the NAPAs, and the drafting of project proposals for long-term adaptation of Tuvalu, focusing in particular on the urgent construction of coastal protection on all the islands of Tuvalu – a review of the NAPA management must be carried out without delay;

- A climate change survival fund must also be earnestly pursued to coordinate all disasters relief donations to PAM and in the future, and to save Tuvalu.

The following responses are also recognised:

Short term response

- Continue short term relief supply of food, water, protein and medicine to all the islands – noting for some islands the need is more pressing than for others;
- Short term clearing of debris and waste in the villages -there is a pressing need to provide for tools and equipment to help the communities;
- Water supply and sanitation must be cleaned and improved as a matter of urgency, water pumps must be supplied, and brackish water in tanks should be removed;
- It is also important to provide, as appropriate, for heavy equipment such as bulldozers and loaders, at least one for each island – for relief work and future development work;

Medium term responses

- Follow up surveys are important: surveys of lands shifts, erosion, boundaries and aggregate lands loss must be carried out throughout the islands; surveys of sanitation, food security, water supply, must also be carried out;
- Damaged houses, kitchens, pigs-pens, and other properties need to be properly verified and restored/repared – the NDC may need to verify the number on each island and categorise the levels of relief and compensation to be offered;
- Improve communications on all islands and Funafala – request the Ministry of C&T;

Long term rehabilitation

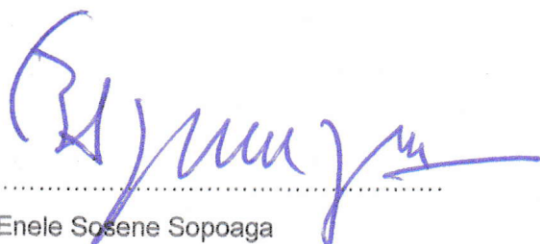
- Rationalise the reports to verify, and IMPLEMENT recovery and rehabilitation works;
- NACCC and NDC with the support of NAPA and PWD to assess the aggregate requirements of coastal protection for the whole country, with the view of identifying design options of seawalls, water-breakers, lands reclamation, etc. to protect the islands of Tuvalu – may use the NAPA 1 data – BUILD SEAWALLS URGENTLY;
- The NACCC and NDC to develop long term adaptation: protective, restorative, and loss compensation project proposals to seek funding from the international community;
- Establish the NIE capability and capacity of Tuvalu to enhance accessibility to international climate change and disasters funding, and replace middle-man funding;
- Mainstream climate change impacts into national sustainable development strategies.

Way forward for Tuvalu

- Present these reports to Parliament in June.
- Advocate the reports in the UN in New York and other regional and international chapters for friends' and development partners' responses.

- Incorporate these reflections in the new Government Roadmap and the national sustainable development strategy to be developed in a national summit later in the year to replace the Kakeega II Strategy.
- Consider Climate Change contingency plans, including possible damage and loss, for Tuvalu.

The government of Tuvalu is grateful to the international community for the invaluable support received during the response and looks forward to working with the development partners towards lasting and sustainable recovery.



Hon. Enele Sosene Sopoaga
Prime Minister of Tuvalu

Date 11 June, 2015

Executive summary

Between 10 and 11 March 2015, strong winds and high sea waves caused by Tropical Cyclone Pam (TC Pam) a Category 5 Cyclone whose eye passed through Vanuatu Islands swept across the low-lying islands of Tuvalu. The sea waves, estimated to be from three to five metres in height, caused significant damage to agriculture and infrastructure on the islands of Nanumea, Nanumaga, Niutao, Nui, Nukufetau, Nukulaelae and Vaitupu. Water supplies were contaminated by seawater and hundreds of people were temporarily displaced, food crops were damaged and boulders, coral and other debris were deposited inland. Significant land losses due to coastal erosion were also experienced with some islands reporting as much as 20-50 metre sea encroachments. Although it is hard to attribute a single cyclone event to climate change and the attendant damage and losses, there is general consensus that Tuvalu is losing land due to coastal erosion not only cyclone effects but the rising sea levels. The effects of TC Pam are however a further demonstration of the vulnerability of Tuvalu to climate risks.

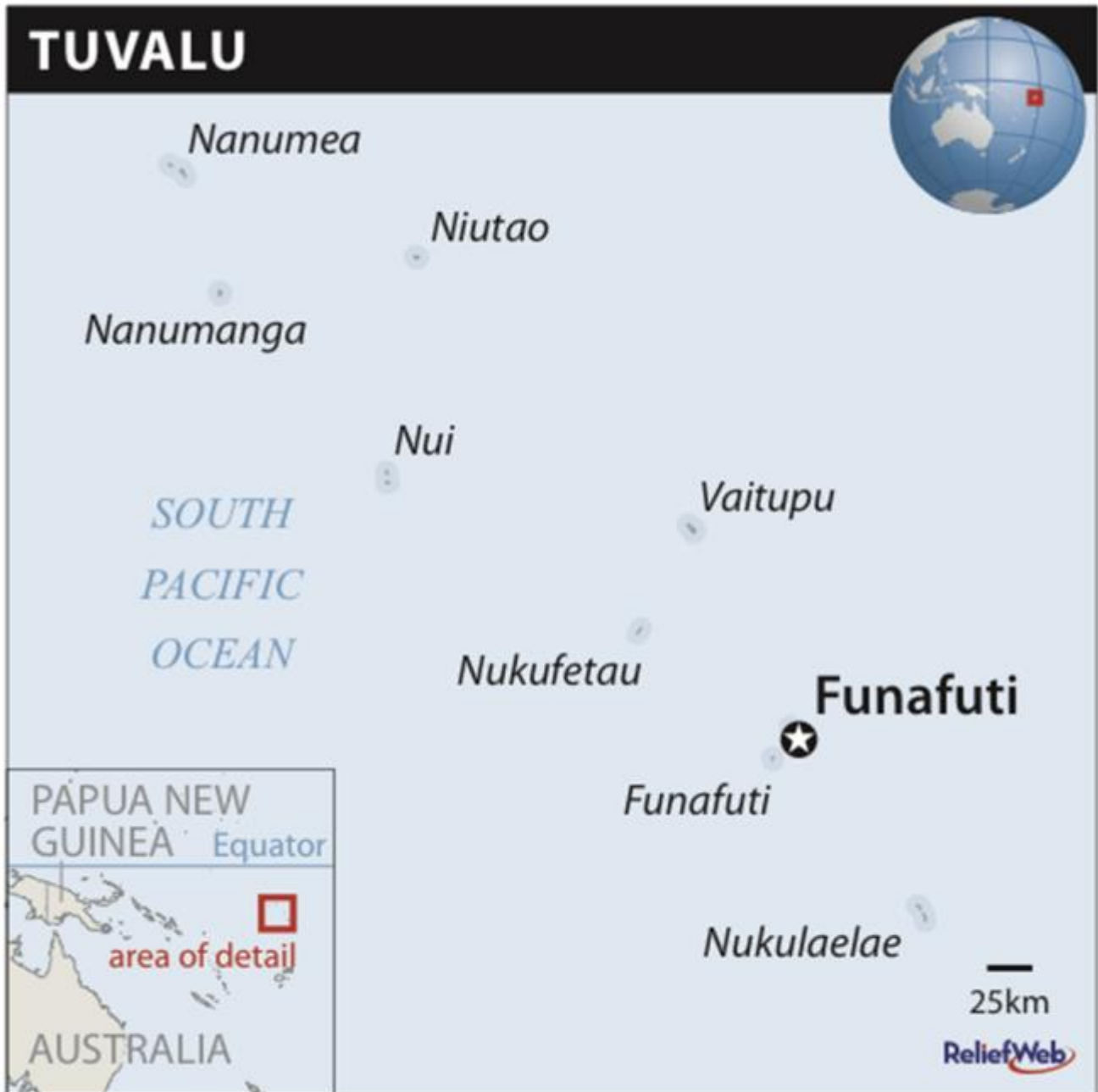
Following the initial disaster response to TC Pam, the Tuvalu government and its partners are now focusing on the recovery process and have developed the ***Tuvalu Recovery and Vulnerability Reduction Plan***. Building resilience and reducing vulnerability underpin the whole package of the recovery plan. All sectors have prioritised the most vulnerable of the affected communities and work needed to build the resilience of communities and local authorities, support recovery, reduce risk and prepare for future disasters.

Recovery activities will be coordinated through the following sectors: Agriculture and Food Security, Education, Health, Water Sanitation and Hygiene, Debris Management, Public Infrastructure and Utilities, Environment and land issues and Disaster Risk Management. Gender component although not having a specific budget and activities, has been included in the various recovery projects and will be more explicitly reflected in the individual recovery projects.

The plan has been divided into 3 phases i.e. the short term (up to 6 months), medium term (6-12 months) and long term (beyond 12 months).

The plan with a total budget of AU\$99.2 million aims to support affected islands to recover from the effects of TC Pam and to ensure resilience to increasing and projected threats of climate change and climate variability. Government has committed **AU\$1.3 million** towards residual emergency response and to support communities to recover and from the pledges made by the international community **AU\$3.1 million** is available and current commitments by the international community stands at **AU\$20.5m**. A financial gap of **AU\$74.3 million** however exists and the Tuvalu government is therefore requesting the international community to support in covering the financial gap in the recovery and vulnerability reduction plan.

Reference Map



Map Sources: UNCS, Gov't of U.S.A..
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations. Map created Jun 2010 – www.reliefweb.int

TROPICAL CYCLONE PAM

Recovery and Vulnerability Reduction Plan

TUVALU

11 June 2015



Prepared by the Government of Tuvalu with the support of humanitarian partners.

PERIOD:

17 June 2015 – 31 December 2017

11,206

est. total population

4,630

people directly affected, in need of food assistance and safe drinking water

>25%

of GDP damage and loss

90%

damage to food crops in Nui Nukulaelae and Nanumaga

30%

damage to food crops in Nanumea, Nukufetau, Vaitupu and Niutao

AU\$ 99.2m

required to deliver the humanitarian aid and recovery and future vulnerability reduction assistance in this plan

AU\$20.5m

Funding commitments from international community as at 9 June 2015

Overview of the crisis

Tuvalu, a Small Pacific Island Country situated north of Fiji made up of nine low lying atoll islands all of which are inhabited and in total make up a land area of around twenty-one square kilometers. It is one of the most vulnerable countries in the world to the impacts of climate change, perhaps even the most vulnerable. Tuvalu's atolls are extremely exposed to projected sea-level rise, increases in the severity of cyclones, increases in ocean temperatures and ocean acidification. When combined with considerable development challenges, a narrow resource base economy and chronic capacity constraints, the extremely high levels of vulnerability are likely to have severe long term effects on sustainable development.

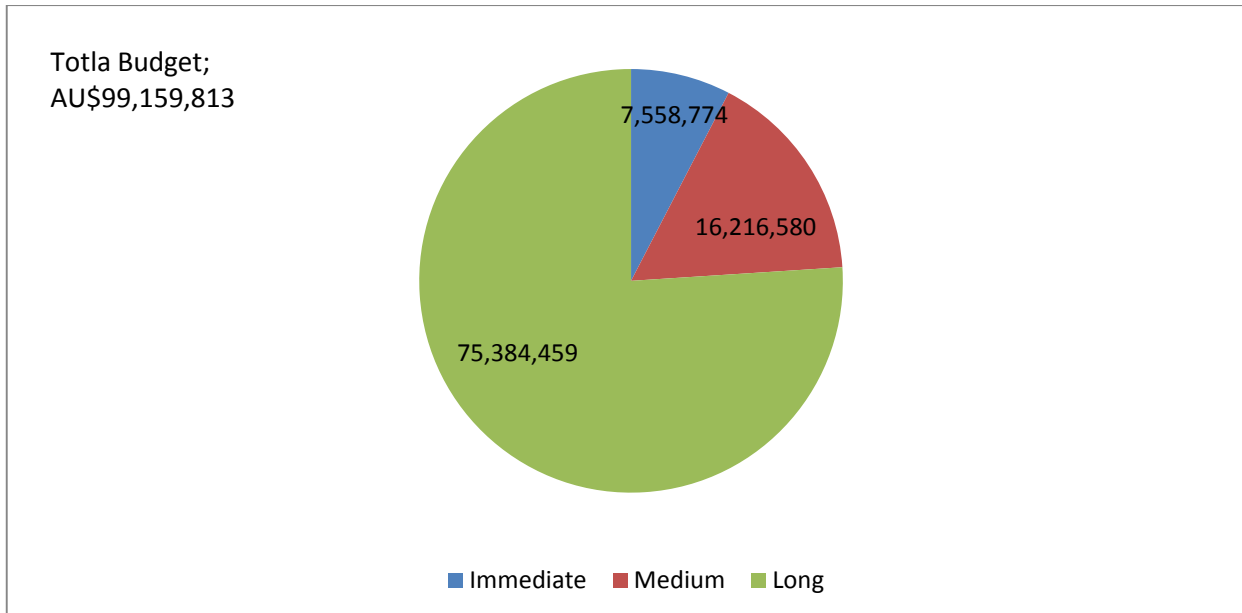
Between 10 and 11 March 2015, waves caused by Tropical Cyclone Pam-category 5- swept across the low-lying islands of Tuvalu. The sea waves, estimated to be from three to five meters in height, caused significant damage to agriculture and infrastructure on the islands of Nanumea, Nanumaga, Niutao, Nui, Nukufetau, Nukulaelae and Vaitupu. Water supplies were contaminated by seawater and hundreds of people were temporarily displaced. The Government declared a state of emergency from 14 to 27 March 2015.

Although the situation is normalising, the Government and humanitarian partners continue to deliver food, water and medical supplies to the affected islands.

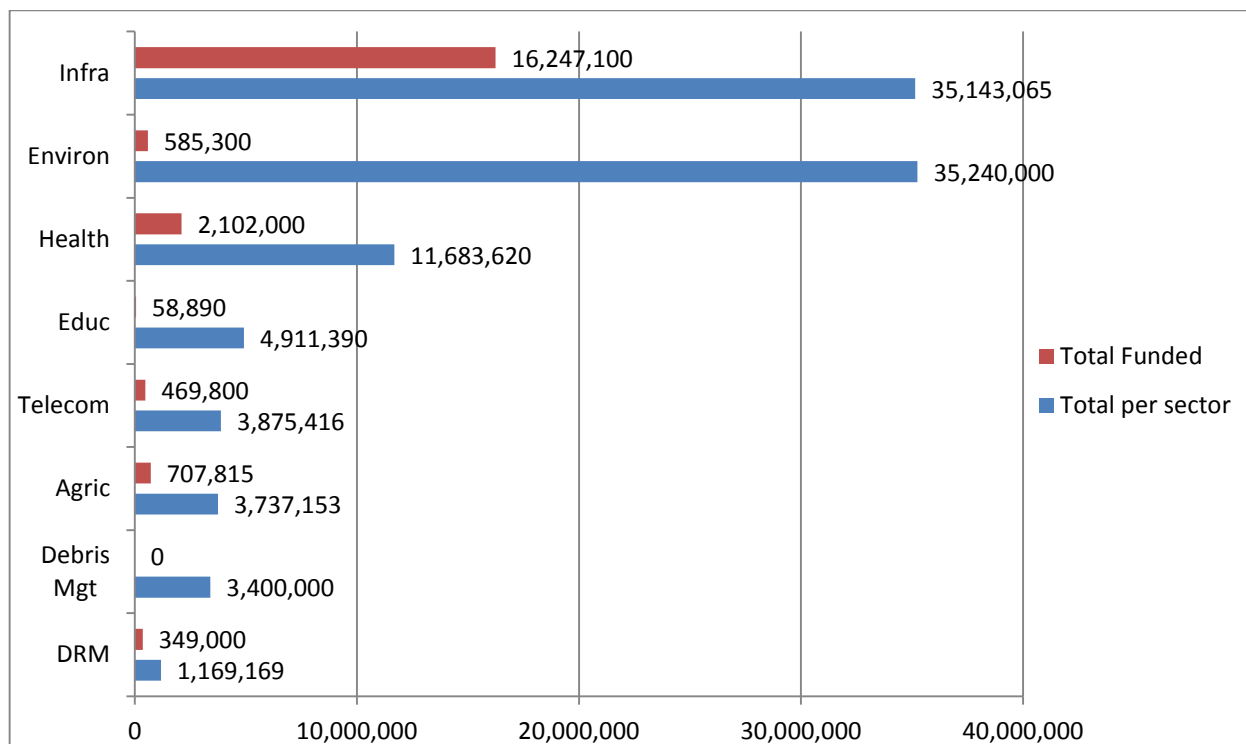
Budget by Sector in AU\$

Sector	Immediate	Medium	Long	Total
Agriculture	2,125,913	411,240	1,200,000	3,737,153
Environment	30,000	910,000	34,300,000	35,240,000
Education	311,390	1,000,000	3,600,000	4,911,390
Health	1,523,620	9,325,000	835,000	11,683,620
Infrastructure	2,723,000	2,955,000	29,465,065	35,143,065
Debris	450,000	750,000	2,200,000	3,400,000
Telecom	205,616	330,000	3,339,800	3,875,416
DRM	189,235	535,340	444,594	1,169,169
Total	7,558,774	16,216,580	75,384,459	99,159,813

Budget distribution by phase in AU\$



Total budget by sector and total funding committed as at 9 June 2015



Of the total budget of AU\$99,159,813, the international community committed AU\$20,519,905 as at 11 June 2015. Government of Tuvalu has committed AU\$1.3 million, existing pledges amount to AU\$3.1 million and there therefore a funding gap of AU\$74.3 million. **For details on activities and funding commitments please refer to attached matrix.**



The Impact of Tropical Cyclone Pam (TC Pam)

Damage and losses

In the aftermath of Tropical Cyclone Pam disaster, the Government of Tuvalu conducted rapid disaster assessments to assess the level of damages and losses incurred as a result of the flooding, high seas and strong winds. Upon these assessments, the Government led an effort to provide recovery and reconstruction options that could provide the affected population with a safer environment in the face of future disaster events

The population of Tuvalu- a total of 11,206 - is highly reliant on subsistence farming for food security and livelihoods. TC Pam caused severe damage to food crops with islands experiencing between 30-90% losses of food crops. The loss of food crops from the impact of TC Pam will have significant long term social and economic impacts.

As in other Small Pacific Island Countries, Tuvalu's food security is being threatened by declines in traditional crop production, increased dependence on imported foods, growing vulnerability to the effects of climate change, overfishing and illegal fishing, volatility in international commodity prices, and failure to enact and enforce food safety and quality standards. Collectively, these and other threats hinder productivity, trade and development and contribute to greater risk of chronic diseases (such as type 2 diabetes and hypertension), vitamin and mineral deficiencies, child malnutrition and food-related diseases. Further preliminary assessment by assessment teams indicated increased coastal erosion and subsequent land losses resulting in complete loss of a total of 3 islets after TC Pam.

Table I below shows the summary of damage and losses following TC Pam disaster. The information is based on the initial and follow-up damage and loss assessments conducted by the World Bank between March and May 2015 for the Infrastructure, Fisheries and Agriculture sectors only which in turn relied on the rapid appraisals conducted by the Government immediately after the cyclone as well as other assessments.

Table I: Summary of damages and losses

Sector/Subsector	Extend of damages	Damage and Losses AU\$[1]
Agriculture and Food Security		
Crops and home gardens		957,729
Livestock		1,408,442
Fisheries		489,912
Infrastructure		
Housing totally destroyed	24	768,000
Housing partially damaged	17	174,080
Houses with minor damages	206	527,360
Local kitchens	117	350,720
Community kitchens	51	326,400
Community halls	9	416,000
Kaupule houses	5	12,800
Demolition, rubble removal		76,800

Sector/Subsector	Extend of damages	Damage and Losses AU\$[1]
Seawalls metres	1,970	7,168,909
Water Supply, Sanitation and Hygiene		
Water tanks	30	90,880
Toilets	61	58,560
Septic tanks	9	28,800
Septic tanks damaged	48	30,720
Health/Education		
Hospitals/Clinics damaged	3	211,200
Incinerator	1	96,000
Schools damaged	5	54,400
Electricity/Communications		
Communication		171,962
Electricity		38,400
Transport		
Harbour/boat ramps	5	160,000
Roads kilometres	10.5	336,000
Total		13,954,076

Source: World Bank Disaster and Loss Assessments: May 2015.

Considering that the above is only damages for agriculture, fisheries, and infrastructure and is not including some losses, the economic impact of TC Pam is estimated to be well above 25 percent of 2015 projected GDP (43 million dollars). While the total economic impact in dollar terms in any single year may not be an exorbitant amount at a regional or even national scale, if one were to total the damages and losses from continued coastal damages from high tides and other extreme events such as flooding, saltwater intrusion and droughts over the past five to ten years, the total overall economic impact would be more significant.

Given that Tuvalu is prone to potential threats of sea level rise (SLR) flooding and droughts, it is likely that the economy will sustain damages and losses in the future as well. This additional cost will become a bigger and bigger burden to Tuvalu whose small population size and dispersion over vast areas present challenges of the diseconomies of scale, which hamper development efforts. Transport costs are high and markets are small. Industrialization remains minimal. Specialist human resources are few.

Sector Impacts

Agriculture and Food Security



Browning taro patches affected by salt water intrusion

TC Pam disaster impacted the agriculture and food security in 7 of the 9 Tuvalu islands with the exception of Funafuti and Niulakita.

Nui, Nukulaelae and Nanumaga being the most affected suffered between 70-90% damage to food crops. Moderate damages around 30% were experienced on Nanumea, Niutao and Vaitupu islands. The lesser impact at or under 25% of crop damage was noticed on Nukufetau island. Salt water intrusion damaged pulaka (swamp taro), taro, breadfruit, bananas, paw paws, coconut, nurseries and home gardens. Livestock losses were also experienced. Households lost chickens and some pigs were drowned and over 200 pig pens were damaged. The island fisheries were also not spared. 30 fishing boats and 44 canoes were damaged while 5 fish aggregating devices and 1 fishing gear were also lost.



Pig pens flooded on Nui Island

Tuvalu's population is highly dependent of subsistence farming and thus the damages by TC Pam will have significant short and longer term socio-economic impacts. Further, due to food crop damage, affected people will be required to purchase expensive imported food items.

The damage of food crops and livestock in the affected islands means 4,630 people (nearly 41% of Tuvalu's population) will require food assistance for at least the next 3-6 months or more. The current food insecurity has further compounded the existing burden of non-communicable diseases. As people now rely on processed food (tinned foods and rice particularly) there is potentially risk of increased incidences of non-communicable diseases – cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases

(such as chronic obstructed pulmonary disease and asthma), diabetes, raised blood pressure, increased blood glucose, elevated blood lipids, and obesity.

Environment

Coastal zones and small islands are characterized by highly diverse ecosystems that are important as a source of food and as habitat for many species. They also support a variety of economic activities that support island livelihoods. Many studies indicate that overexploitation of resources, pollution, sediment starvation, and urbanization have:

- led to a decrease in the resilience of coastal systems to cope with natural climate variability;
- adversely affected the natural capability of these systems to adapt to changes in climate, sea level, and human activities and led to increased hazard potential for coastal populations, infrastructure, and investment.



Coastal erosion due to TC Pam in Nanumaga Island

Tuvalu continues to experience land losses due to tidal waves and TC Pam contributed to the acceleration of coastal erosion that resulted in land losses. Although detailed studies on the coastal erosion have not been conducted, preliminary assessments have showed that all the 9 islands of Tuvalu lost valuable land due to coastal erosion and the trend is likely to continue if no measures are taken to arrest current coastal erosion progression. The main settlements of Nanumea, Nanumaga, Niutao, Nui, Vaitupu, and Nukulaelae suffered erosion and damage to littoral vegetation. According to the national TC Pam Rapid Assessment Report (30 March 2015) 5-20 meters of inland erosion exist in most areas but is worse at certain points where there is no littoral zone and/or thick coconut plantations. Nukufetau, Funafuti and Niulakita Islands although they suffered limited erosion of 15% at main settlements, other parts of the islands are heavily impacted. Three islets were totally lost while another three from the islands of Nukufetau, Funafuti and Nukulaelae were partially destroyed.

We strongly believe that these environmental disasters and related damages are caused and accelerated by the effects of climate change and sea level rise as predicted by the Intergovernmental Panel on Climate Change (IPCC) particularly in its Fourth and Fifth Assessment Reports.

Public Utilities and Infrastructure

Boat ramps and Port Harbours



Boat ramp totally destroyed in Nanumaga Island

Sea transportation is the only form of transport that provides inter-island linkages in Tuvalu. It is the only means of transferring passengers and cargo to/from the outer Islands. Shipping services is essential to sustaining the daily life and livelihood of people on the outer Islands. It is therefore vital to keep it operational at all times and in particular during and after any major disasters.

The impacts of TC Pam on the marine transport were more significant on boat ramps where channels were damaged and blocked by boulders and debris from broken sea walls and ramps. Four boat ramps on Nui, Nanumaga, Nanumea and Niutao were totally damaged while those in Nukufetau, Nukulaelae were heavily silted and navigational signals were damaged. The port harbour on Vaitupu was also heavily silted and the

passenger and cargo shed was totally destroyed. The main wharf in Funafuti experienced coastal erosion and the warehouse roof was partly damaged and the fender and navigation lights need to be replaced.

The damage to the boat ramps has resulted in limited access for working boats to load and offload goods from ships causing delays and longer turnaround for the shipping schedules. Due to damaged navigational lighting, loading and offloading ships has been limited to day operations further causing shipping and commodity supply disruptions. The sector is considering providing more resilient port harbours that have the capacity to withstand future disaster damages.

Housing

Damage to infrastructure included total destruction of 24 homes, partial damage to 223 houses leading to temporary displacement of 521 people. Currently 180 people are still sheltering with close relatives creating overcrowding conditions in host households. Additionally 117 local kitchens and 51 community kitchens were also damaged compromising food preparations for the affected households. Homes on the western coast experienced severe damages due to the strong winds as well as flooding from high storm surges. Communities whose homes were damaged are



Home destroyed in Nui Island



reluctant to rebuild homes in the same location and were considering relocating to safer locations. Government is considering the relocation of whole villages or to alternatively provide designs that are capable to withstand future disaster damages.

Roads

According to the World Bank report (May 2015) an estimated 10.5kilometres of road was damaged in the affected islands.

Telecommunication

Flooding caused damage to telecommunication equipment and fittings resulting in disruption of services between Funafuti- the capital- with the outer islands. The impacts of TC Pam are beginning to be felt in the sector as the connections in the flooded telecommunication pits are beginning to give in. Further, telecommunication hubs in all the islands were flooded and require either to be relocated or raised to prevent future damages. Telecommunication cables on Nanumea Island were washed away while access to cables in the other affected islands have been covered by boulders and debris limiting access for maintenance.



Repairing damaged telecommunication equipment in Nui

Health



Damaged clinic in Nanumaga: Courtesy of Red Cross

The health sector suffered significant damage to its infrastructure. Nanumaga clinic suffered the worst damage as the clinic was totally flooded and the clinic wards and nurses' quarters were totally destroyed. Niutao Island clinic was partially damaged while the clinics in Nunumea, Nui and Nukufatau were temporarily evacuated due to flooding and experienced minor damages. Health records in the affected islands were damaged and health delivery services were severely limited during the first 2 weeks following TC Pam disaster. Nanumaga clinic is currently operating from temporary facilities while clinic staff is being temporarily accommodated in a private home. It was evident that all island clinics are located in areas vulnerable to high storm surges and the damaging westerly winds and it is recommended to relocate clinics in the affected islands to safer locations, or that they be retrofitted to ensure the facilities are able to withstand future disaster damages.

TC Pam disaster caused severe stress among the affected communities and there is high risk of post-traumatic stress disorder. Of particular concern are the traumatic events resulting from the damages to the graveyards that exposed human remains and the process of recollecting recently buried bodies and skeletons for reburial. Further the fear instilled by the strong winds, flooding, attendant infrastructure damage and losses experienced will linger in the affected people's lives for a long time.

Water supply

30water tanks destroyed and require replacement. Water cisterns that serve as back up water sources were contaminated by salt water and require to be drained and re-filled with fresh water.

Sanitation facilities

61toilets were damaged and 9 septic tanks were totally destroyed and 48damaged.

Debris/Waste

The destructive impact of TC Pam resulted in the generation of big quantities of debris on the 7 affected islands. The strong winds and high sea storm surges significantly damaged the coastline and existing coastal infrastructures (see walls, ramps), spreading huge quantities of boulders, corals and sand inland. The vegetation was also severely impacted with numerous uprooted trees (mainly coconut trees). The debris also includes building rubble from damaged houses. There are reports of asbestos from old derelict buildings which may require specialized handling to prevent negative health impacts. Island are already experiencing problems handling waste and the additional debris from TC Pam is posing an extra burden that will require long term measures and equipment to reduce the buildup of waste that include recyclable waste.



Debris piled up throughout Niutao Island

Electricity

Electricity supplies were disconnected during the TC Pam as a precaution to prevent damages. 200 electrical poles were brought down during the disaster and electrical distribution boxes as shown in picture below were flooded compromising electrical connections. Replacement of damaged electrical equipment will need to consider more robust protection from future disaster damages.



Electricity distribution box flooded in Nui

Education

Seven schools experienced some damage requiring minor repairs. 4 teachers' quarters and 10 school toilets were damaged. Five out of the eight schools (63%) acted as evacuation centers during the disaster. During the time of assessment, a total of 48 households comprising of 197 individuals were temporarily residing in schools on five different islands. Reports show that approximately 157 students (of the approximate total of 887 students) were severely impacted by the disaster. Reports show that out of the 73 teachers employed, 12 teachers (16%) were directly affected by the disaster. Interviews with the affected communities indicated a need for psychosocial support among school children due to the stress resulting from TC Pam disaster.

Cross Cutting Issues

Disaster Risk Management

TC Pam exposed some underlying capacity gaps in the National Disaster Management system. The response mechanisms particularly the conduct of initial disaster assessment left a lot to be desired. Information flow from rapid assessments will require to be adequately structured to facilitate targeted emergency response for all the sectors. There is also a lack of standard operations procedures when a disaster has occurred. Furthermore the NDMO is critically understaffed with only one person responsible for disaster risk management coordination among other activities.

However, the new Government has recently established a disaster relief coordination unit to rationalize and coordinate the delivery of TC Pam relief responses to the affected communities.

Gender

Preliminary findings from post disaster assessments conducted by the Gender Affairs Department indicates particular concern for households who have taken in the 95 people displaced by the cyclone whose homes were totally damaged. The hosting families have to extend their support to the displaced households and the burden once more lies with women. Concerns have been expressed of the impact on the women whose local kitchens and water tanks have been damaged. The local kitchens are the common food preparation areas and with damaged water tanks, the women in affected areas are experiencing additional challenges in food preparations and access to safe water.

Interviews conducted in the affected islands raised concerns about the difficulties faced by women in food preparation during period after TC Pam disaster. Firewood for cooking was wet from the flood and combined with the shortage of fuel and cooking gas and the windy weather food preparation became a challenge especially for households whose kitchens were damaged and cooking took place outside. There is therefore need to for contingent measures such as pre-positioning of emergency cooking facilities before disasters.

Disaster response

Although the situation is normalising, the Government and humanitarian partners continue to deliver food, water and medical supplies to the affected islands. Construction materials and tools are also being provided to the affected communities. Teams from the Public Works Department (PWD) and Solid Waste Agency of Tuvalu (SWAT) have been deployed to assist with clean-up operations and assist communities rebuild partially destroyed homes and government properties.

The first round of food distribution targeting 4,630 people in the affected islands was completed and all the affected islands received one month of food rations. Government had to purchase available food items in the shops on the islands and sometimes at inflated prices. Even normal food supplies to outer islands are affected by high transport costs and irregular supplies due to unpredictable shipping schedules compounded by the long distances between islands.

Government expenditure on disaster response as of 15 May 2015 was AU\$397,866 of which AU\$298,430 was spent on purchasing food supplies and AU\$108,411 was used to purchase building materials.

Australia, New Zealand and Samoa provided logistical support during the acute phase of the disaster. The government of Samoa dispatched a patrol boat, the Nafanua, which was used to transport the rapid assessment team and emergency supplies to the outer islands. The government of Australia provided fuel for the Nafanua patrol boats and for other emergency operations. The New Zealand government through its ongoing solar project, made available the Komawai boat to support with the transportation of emergency supplies. New Zealand also provided fuel for the boat.

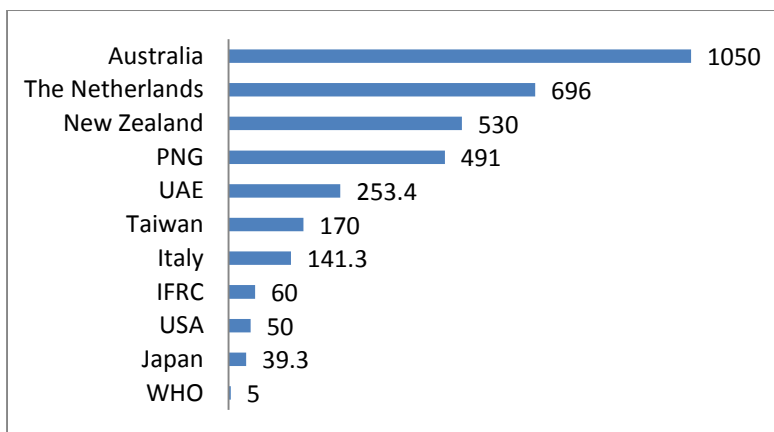
The Government was supported by a number of emergency response, humanitarian, and development organizations as shown in Table II below.

Table II: Response actors to TC Pam

Level	Number	Countries/Organizations
Foreign countries	12	New Zealand, Australia, Papua New Guinea, Taiwan, Samoa, Fiji, Italy, Netherlands, USA, UAE, Japan and France
International Organizations	11	Australian Department of Foreign Affairs and Trade (DFAT), New Zealand Ministry of Foreign Affairs and Trade (MFAT), IFRC, Asia Development Bank (ADB), UNDP, UNOCHA, UNICEF, WHO, FAO, EU and World Bank.
Regional	1	Secretariat for Pacific Community (SPC)
National	9 Gvt. Depts.	National Disaster Management Office, Agriculture, Environment, Health, Education, Public Works, Transport and Communication, Marine and Fisheries, Solid Waste Agency of Tuvalu.
Local	7	Kaupule-Island Councils and Island Disaster Management Committees.
National Not for Profit	1	Tuvalu Red Cross Society
National Private	2	Tuvalu Telecommunication and Tuvalu Electricity
Academic Institution	1	Fiji National University

The government of Papua New Guinea made a cash pledge, Taiwan government pledged 50-100 metric tonnes of rice and made a cash pledge, the governments of New Zealand, Australia, UAE, Italy, Netherlands, USA also made cash pledges to be channelled either through government or the Tuvalu Red Cross Society. The EU pledged €500,000 for the second phase of FALEVATA (compost toilets) for the outer islands. For more details see Table III below:

Cash pledges to Tuvalu TC Pam in Australian Dollars



Key interventions to date

The Government has so far spent AU\$397,866 for humanitarian response and recovery efforts.

1 Agriculture and Food Security

- Completed first round of food distributions targeting 4,630 people.
- Engaged MFAT and DFAT to develop an agriculture and food security recovery plan.
- New Zealand and Taiwan government and the Tuvalu community in New Zealand donated food items for distribution to the affected people.
- 8 metric tonnes of fresh fish donated by fishing companies distributed to beneficiaries in Nui Island.
- Government has plans to provide food assistance to the affected communities for a period of 6 months.
- Various partners have made commitments to support food security recovery and are in the process of engaging government on prioritising recovery projects. The Department of Agriculture has developed a relief and recovery plan detailing the recovery activities.

2 Education

- Assessment on the impact of the schools was conducted.
- Teachers whose residences were damaged were offered alternative accommodation.
- UNICEF provided 899 school bags with stationery supplies for students in lower and upper primary classes schools affected by the disaster
- UNICEF provided support to 9 Early Childhood centres in seven outer islands that included 1,000 drawing books, 119 exercise books and 214 packs of colour pencils
- A relief and recovery plan has been developed detailing the activities to support the recovery of the education sector.

3 Health



- 1 emergency health kit was distributed as back up.
- Medicines, medical equipment and medical consumables including oral sachets were also distributed to all affected islands.
- 400 mosquito nets were distributed.
- A midwife, 2 medical officers, trauma counsellor, intensive care nurse, public health nurse and pharmacist from the Fiji National University deployed to Funafuti and outer islands.
- De-worming exercise was carried out on Nui.

4 Public Utilities and infrastructures

- Government procured building materials and delivered to the outer islands to support with reconstruction of damaged homes.
- A team from the Public Works department carried out some minor repair works on damaged community hall in Nui
- The Tuvalu Red Cross Society (TRCS) distributed 170 tarpaulins to affected islands.
- TRC also distributed non-food items including blankets, kitchens sets as well as hygiene kits.

5 WASH

- WHO provided IEC materials for public health messaging, and 300 emergency water testing kits for water quality monitoring in affected communities.
- UNICEF in collaboration with SPC and Red Cross is facilitating information dissemination for the Ministry of Health to advise communities on measures to protect their health.
- Rapid assessment teams tested water samples for salinity and E-coli and follow up water testing was conducted.
- UNICEF provided 5,000 water water-purifying tablets distributed through the Tuvalu Red Cross Society (TRCS). TRCS also provided advice to communities on how to utilize the tablets.

6 Early Recovery and Coordination

- The National Disaster Management Committee (NDC) coordinated all the emergency response activities and met regularly to review the disaster situation and provide policy guidance.
- TC Pam foreign relations Sub Committee (of the NDC) was established with on-ground partners who actively helped coordinate the response and collate assessment information.
- UNDP provided 3 technical advisors for Early Recovery, Debris Management and Donor Coordination.
- UNDP also has ongoing livelihoods, environmental protection, economic recovery projects that are set to be scaled up in support of Tuvalu TC Pam recovery and long term vulnerability reduction.

Recovery and Vulnerability Reduction Plan

Government and its partners is refocusing efforts on the recovery process through seven key sectors: (1) Agriculture and Food Security; (2) Education; (3) Health including WASH; (4) Public Utilities and Infrastructure; (5) Debris and Waste Management (6) Environment and land issues and Disaster Risk Management. The sectors developed plans that have been integrated into the Tuvalu TC Pam Recovery and Vulnerability Reduction Plan. The plan has been developed as a holistic approach to recovery and reconstruction efforts, and also aimed to provide the Government with options for working towards longer term, sustainable disaster risk reduction and climate change adaptation.

Building resilience and reducing vulnerability underpin the whole package of the plan. All sectors have prioritised the most vulnerable of the affected communities and work needed to build the resilience of communities and local authorities, support recovery, reduce risk and prepare for future disasters.

Building-back differently

Early Recovery recommendations across all sectors are formulated with a view to capitalizing on opportunities to build better services and infrastructure than existed before the TC Pam reduced inherent vulnerability and promote diversity. Building back differently should not just be applied to infrastructure but needs to be interpreted in the broadest sense to ensure that the social and economic fabric of the affected areas is rebuilt stronger and better.

The plan is aimed at not only to address the damage and losses that occurred as a result of TC Pam disaster, but also to include more sustainable and development responses to the country vulnerabilities. All the phases of the plan will take advantage of local resources and knowledge to maximize engagement on the community level, and to build on existing practices that minimize negative environmental impacts.

The Recovery and Vulnerability Reduction Plan targets the entire population of Tuvalu (11,206). It builds on the rapid assessments carried out by the Government from 13 March to 22 April 2015 and complemented by the Damage and Loss Assessment conducted by the World Bank and follow up assessments conducted with support from development partners, the humanitarian community and the Fiji National University. This plan covers 3 phases (short term - up to 6 months, medium term - from 6 to 12 months, and long term - beyond 12 months) and requests AU\$90,658,302.



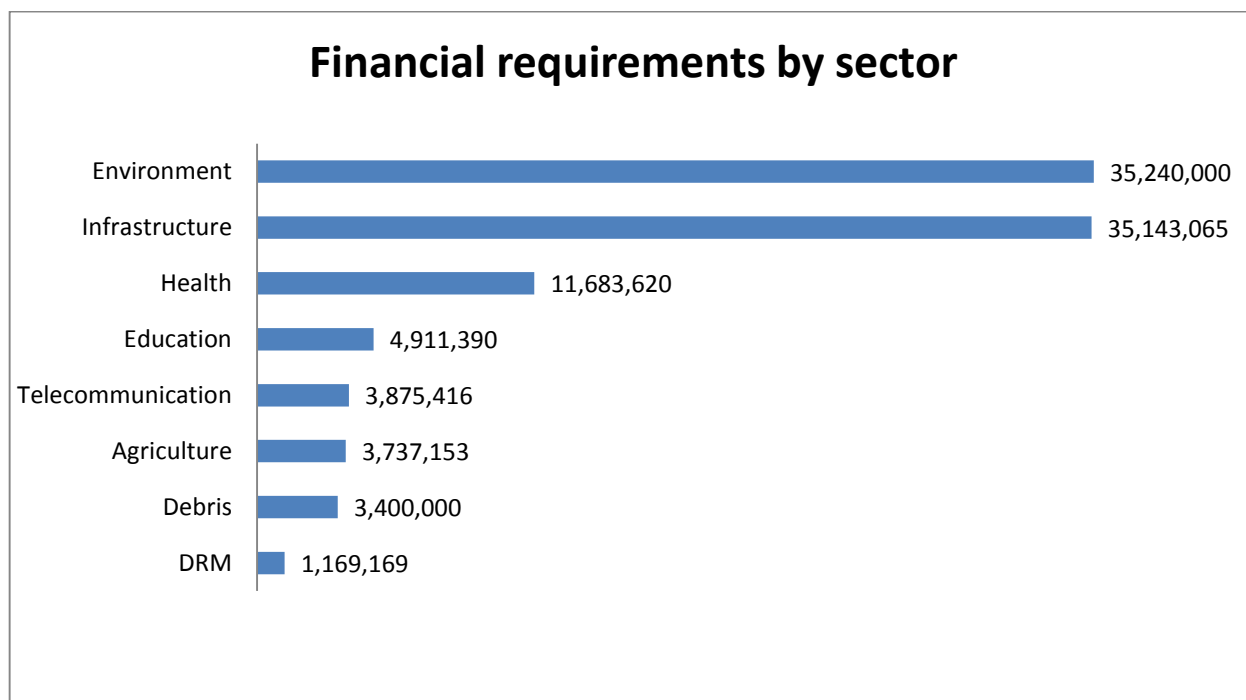
Home Garden in Vaitupu

Strategic objectives and priority actions

The recovery and development efforts in Tuvalu will be guided by the following strategic objectives:

- 1 Households are appropriately supported to recover after the TC Pam crisis**
 - Livelihoods of the people affected by crises are ensured through, inter alia, support to agriculture, income-generating activities and provision of food and conditional cash.
 - Disaster affected people have improved access to shelter, water supplies and sanitation including waste management, adequate health care and education services.
 - Nutritional status of the most vulnerable population, including children, has improved.
- 2 To support the construction and repair of damage infrastructure (coastal protection, sea walls, permanent shelters and community infrastructures)**
 - Provision of initial financial assistance to carry out reconstruction and repairs of totally destroyed homes and partially damaged houses.
 - Road repairs in all the affected islands, including the removal of sand, boulders, fallen trees and other debris.
 - Improve access and transfer of passengers and cargo on outer Islands through reconstruction of boat ramps and construction of more robust port harbours.
 - Conduct field studies and modelling of coastal dynamics and analysis of existing options in infrastructure development and their impacts on coastal dynamics.
 - Climate proofing and securing key infrastructure against climate change impacts, climate variability, disaster risks and projected climate change.
- 3 Chronic levels of food insecurity and malnutrition are addressed through integrated programming to build resilience.**
 - Sustainable livelihoods and environmental practices with the aim of mitigating and adapting to environmental shocks are ensured.
 - Positive behavioural practices, particularly in health, nutrition and sanitation, that encourage risk reduction and adaptive capacities are adopted.
 - Disaster analysis, coordination and preparedness capacities are strengthened at local and national levels.
 - Early warning and disaster risk reduction measures are implemented.

Financial Requirements per sector (in AU\$)



Total AU\$ 99,159,813

Funding

Total contributions to the emergency response have been tracked by the Ministry of Foreign Affairs. The total amount of in-kind, cash and pledge donations to relief and recovery efforts is approximately AUD\$ 3.5 million (US\$ 2.7 million). Available funds from the pledges stood at **AU\$3.1 million** as at 20 May 2015. Government has committed **AU\$1.3 million** towards residual emergency response and to support communities to recover and as of 9 June 2015. The international community financial commitments as at 9 June 2015 are **AU\$20.5million**. A financial gap of **AU\$72.6million** however exists and the Tuvalu government is requesting for international community to close the gap.

**Government
AU\$1.3m**

**Pledges
AU\$3.1**

**Financial commitments
by international
community
AU20.5m**

**Unfunded
AU\$74.2m**

Monitoring and Evaluation

Monitoring and evaluation framework details and individual project indicators will be developed for each component of the recovery plan when concrete projects are available.

Sector details

Agriculture and Food Security

Short-term

- Provide households with adequate food supply until such time they are able to be food secure.
- Rehabilitation of fisheries on 8 islands.

AU\$3,737,153

Funding requirement

AU\$707,815

Commitments by international community

Medium-term

- Re-establishment of household food production through support of home gardens for 435 households

Long-term

- Coastal protection by growing trees to serve as buffer to strong winds and high storm waves.
- Rehabilitation of Pulaka and other traditional food crops with Climate Resistant Varieties

Health including Water and Sanitation

Short-term

- To support Kaupule in the short term maintenance for minor damages caused by TC Pam.
- Distribute emergency kits to outer islands clinics.
- Provide enough water purifying tablets to outer islands
- Rehabilitate water storage tanks contaminated with salt water/debris by the procurement of mobile water pumps to drain contaminated water
- Provide resources for Island Sanitation Aides to support communities to fix their septic tanks and toilets.
- The sector will support the scaling up of health and hygiene education to ensure community hygiene, safe and hygiene handling and preparation of food.

AU\$

11,683,620

Funding requirement

AU\$2,102.000

No community have been made

Medium-term

- Carry out feasibility surveys for better sites to build new clinics on Nanumea, Nanumaga, Niutao, Nui and develop a suitable design.
- Ensure adequate medical supplies/storage and emergency kits available in all health clinics on outer islands (includes training).
- Develop at least three water reserve facilities on each island to support communities in times of disaster

- The sector will work towards ensuring that each household has access to improved sanitation by providing new or improving existing systems.
- Improve access to water on household and community level by repairing existing rainwater catchments and / or providing new systems.
- Draining cisterns that have been contaminated by saltwater following TC Pam and carrying out any major repairs to existing septic tanks.

Long-term

- Reconstruction of health infrastructure in less vulnerable locations.
- Provide adequate health staff and medical supplies to support affected communities, and safeguard medical supplies from damage during disasters.
- To develop water safety plans and systems to be used by all communities in Tuvalu to enable drought proving of communities and the use of safe water.
- Establish effective disease surveillance and health information system linking the outer islands with Funafuti.

Debris and waste management

Short-term

- Community-based initiatives for Debris Clearance (e.g. Cash for Work) – including personal protection/handwork equipment
- Procurement/hiring of additional equipment for transportation (tractor, trailer) and household waste storage (plastic bins, etc.)

Medium-term

- Procurement of equipment to scale up green waste processing (e.g.: additional shredders, composting plants, carpentry workshops and equipment).
- Technical training and awareness raising in value addition for green waste and recyclable material.
- Facilities for temporary storage of hazardous waste for future exportation for adequate treatment.

Long-term

- Revision of the Tuvalu Integrated Solid Waste Plan (incl. surveys and specific plans for outer islands, revision of the related regulatory acts, strategy for Hazardous waste, etc.).
- Improvement of disposal conditions on all islands (incl. design for engineered dumpsites, hiring/procurement of heavy machinery, etc.).
- Procurement of additional equipment for waste management (waste collection, maintenance, etc.) and capacity building to improve waste collection.
- Procurement of equipment to support recycling activities and hazardous waste management.
- Awareness campaigns (re-use of green waste, recycling, etc.).

AU\$4,005,000

Funding requirement

0AU\$

No commitments have been made

Education

Short-term

- Rehabilitate dysfunctional toilets.
- Increase number of toilets and water tanks.
- Damage assessments using the national minimum quality service standards (NMQSS) for schools and their communities to undertake.
- Psychosocial support for children.

AU\$4,911,390

Funding requirement

AU\$58,890

Was committed for psychosocial support

Medium-term

- Conduct a detailed assessment on:
- the school infrastructure/status of education facilities, especially in light of their preparedness to act as evacuation centers,
- condition of classrooms and sanitation situation (# of toilets, repair needs, distance of toilets to water sources, mechanisms for solid waste collection),
- sources of drinking and hand-washing water, status of power supply, availability of kitchen facilities for evacuated families and accessibility to short term medical facilities in the vicinity of the evacuation center,
- The need for additional classrooms to accommodate a bigger % of the islands' total population in schools during emergencies.

Long-term

- Construction of school buildings should comply with safety requirements and be able to withstand disaster impacts.
- Construct additional toilets, ablution facilities, kitchens and provide additional water tanks at schools used as evacuation centers.
- Secure training materials for DRM in schools. Conduct trainer of trainers in school DRM. Conduct teacher training on DRM to support integration of DRM in the Education sector.

Public Utilities and Infrastructure

Short-term

- Provision of initial financial assistance to carry out initial repairs to partially damaged houses that were severely affected by cyclone Pam
- Provision of more resilient shelters for the displaced families in the most affected islands
- Temporary measures for boat ramps in Nanumaga, Nui,

AU\$35,143,065

Funding requirement

AU\$16,247,100

Committed to boat ramps and port harbours



Nanumea and Niutao will be instituted to facilitate ease access to shores and permit a quick turnaround for scheduled ship run.

- Road repairs will be conducted in all the affected islands, including the removal of sand, boulders, fallen trees and other debris.
- Ensure that transportation continues to operate during and after disasters have occurred (repair of all navigational aids, lights and roofing that were being damaged during TC Pam; removing of remaining parts of the ramp in Nanumaga and Niutao. improve security of transferring cargo, improvement of carting of cargo from boat to shore and vice-versa.

Medium-term

- Repairing and reconstruction of completely damaged houses, household contents, community infrastructure and outbuildings.
- Removal of boulders, sand and other debris from boat channels of the islands Niu, Nanumaga and Vaitupu in order to improve carting of cargo from boat to shore and vice-versa.
- Improve and enhance communication between Funafuti and the outer-islands.

Long-term

- Build 2 new port harbours (Nanumaga, Niutao).
- Rebuild Nanumaga's ramp.
- Engage a company to bring in equipment and machineries to dredge the channels.
- Pavement of the area around the main wharf to allow for forklifts to easily move around and reduce damages on the forklifts. Reclaim land to the lagoon side of the wharf to cater for a container terminal storage and avoid congestion at the main road. Procurement of new forklifts, truck, tractor & trailer and side-lifter to assist in the transfer of cargo. Design and construct an engineering workshop that is climate proof to store spare parts and serve as a garage for vehicles. Repair passengers' terminal and warehouse.
- Design and construct sheds on Outer Islands to temporary store cargo and allow vessels to reduce turnaround time.
- Carry out feasibility studies to determine the most effective and efficient design for ramps that can withstand destructives waves and do not have detrimental environmental impact. Construct ramps as temporary measures.

Environment

Short-term

- Assessment and analysis of salt and/or heat tolerant food crops (e.g. pulaka) and tree species for coastal protection.
- Assessment and island wide consultation on appropriate coastal protection design

Medium-term

- Soft coastal protection measures including water-breakers, concrete seawalls and tree planting.

AU\$
35.240.000

Funding requirement

AU\$585,300

Has been earmarked but funding is still to be secured.



- Study the historical evolution of the shoreline on outer islands, including acquisition of satellite mapping
- Recruit TA to define and properly design of appropriate and suitable coastal protection measures on each island

Long-term

- Climate proof and secure key infrastructure against climate change impacts, climate variability, disaster risks and projected climate change.
- Physical planning and development control for Funafuti and the outer islands.
- Coastal protection for all islands (technical solutions to be defined according to studies conducted in the medium-term: offshore breakwater, beach nourishment, sea walls, etc.).
- Continue Climate Change negotiations on appropriate insurance arrangements to address loss and damage from the impacts of climate change.

Telecommunication

Short-term

- Procurement and delivery of equipment.
- Repairing of damaged equipment.

Medium-term

- Technical Advisor to conduct assessments to upgrade the telecom system.
- Relocation of telecommunication hubs in 3 islands.

Long-term

- Install internet mobile network in 7 islands.
- Raise telecommunication hubs in 7 islands.
- Upgrade all meteorological equipment.
- Introduce Radio Internet (RANET) communication on all islands to facilitate information flow.
- Procure 2 backup generators, (AC and solar powered) for Meteorological Dept. and the Media
- Improve radio HF to all islands; install in strategic offices to improve HF antennae, portable broadcast console and accessories for Radio Tuvalu; construction of a generator shelter.
- Better set up of satellite phones- procure INMARSAT system - external antennae; Purchase of 15 solar panels and sirens for "chatty beetles" (Fiji)
Purchase of 20 external antennas for iridium satellite phones (Fiji). Freight on materials from US
- Set up/installation of chatty beetles (15) in all outer islands (staff), SMS-based communication system. Organize technical training sessions for Tuvalu Meteorological Department and Radio Tuvalu for installation, use and maintenance of the communication equipment.
- Procure solar powered radio units 1300.

AU\$
3,875,416

Funding requirement

AU\$469,800

Financial commitments by the international community.



Disaster Risk Management

Short-term

- Appointment of a Special Envoy to oversee the Disaster Risk Management and Climate Change programs.
- Strengthening of capacity for the disaster risk management system through the recruitment of 2 national staff for the NDMO, procurement of office equipment.
- Contracting of Technical Advisers to review legislation, plans, and operational procedures and develop DRM training material.
- Conduct National Workshop for lessons learnt and capacity development.

AU\$1.169,169

Funding requirement

AU\$349,800

Financial commitment from international community

Medium term

- Support to budget for human resources (Special Envoy, Technical Advisors, DRR officers)
- Implement a Workshop to enhance preparedness to disaster risk management in outer islands.
- Strengthen the coordination and operational arrangements for disaster management (at national, sectorial, island and community levels).
- Engagement of partner to bring visibility on climate risk for Tuvalu.
- Procurement of stationary and equipment.
- Explore possibility of contracting a private Aviation company to provide emergency fly overs, medical evacuation and transportation of initial assessment teams during disasters.
- Conduct simulation exercises to test national plan to assess capacity for emergency operational procedures.
- Translation of Tuvalu Recovery and Vulnerability Plan into local language.

Lon term

- Support to budget for human resources (Special Envoy, Technical Advisors, DRR officers)
- Continue developing partner engagement to bring visibility on climate risk for Tuvalu
- Conduct regular simulation exercises to test national plan to assess capacity for emergency operational procedures