Early Recovery Framework

Submitted to the Prime Minister of Samoa

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29 September 2009 Earthquake and Tsunami

ACKNOWLEDGEMENTS

In the aftermath of the earthquake and tsunami that struck Samoa on the 29th September 2009, the Government of Samoa requested the United Nations system to undertake an early recovery needs assessment and to develop an Early Recovery Framework. This is expected to provide the government with policy options to respond to the needs of the affected population. An Early Recovery Team was set up under the auspices of the Government and the UN led Inter-Agency Standing Committee (IASC)/Pacific Humanitarian Team[1] to provide guidance on the early recovery process. Subsequently, an integrated and multidisciplinary team under the joint leadership of the Government of Samoa and the United Nations conducted an Early Recovery Needs Assessment with the participation of a wide range of partners from the IASC/PHT including government ministries, UN agencies, multilateral and bilateral partners, CROP agencies and international and national NGOs.

A number of key priorities were identified from the early recovery needs assessment. These were presented to the Chief Executive Officers of the Government on 9 October for their validation and comments. Based on the feedback received, key strategic areas were developed along the following lines: resettlement and access to basic social services and infrastructure, livelihoods, disaster risk reduction, environmental management and climate change. Cross cutting issues on gender and human rights have also been integrated into the Early Recovery Framework. The overall objective of the Early Recovery Framework is to provide the Government with strategic policy options for the short, medium to long term development interventions.

We would like to acknowledge the leadership provided by the government and the outstanding partnerships and support provided by our international and national humanitarian and development partners in the development of this Early Recovery Framework. We note that this framework was developed under the guidance from the government and the support provided through all the government ministries and corporations to ensure the early recovery process reflects the priorities of government and, in particular, the needs of the affected communities. We would also like to thank all the national, regional and international partners who participated in the Early Recovery Team and the Early Recovery Needs Assessment. It is the intention of the Government to coordinate its development partner's support to Samoa's early and longer term recovery efforts through this framework.

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Acronyms and Abbreviations

ADB	Asian Development Bank
AusAID	Australia Agency for International Development
CEO	Chief Executive Officer
CI	Conservation International
CIM	Coastal Infrastructure Management Plan
CROP	Council of Regional Organizations in the Pacific
DAC	Disaster Advisory Committee
DaLA	Disaster and Losses Assessment
DRR	Disaster Risk Reduction
EIA	Environmental Impact Assessment
EPC	Electric Power Company
FAD	Fish Aggregation Devices
FAO	Food and Agriculture Organization
FD	Fisheries Division
GDP	Gross Domestic Product
GoS	Government of Samoa
HDI	Human Development Index
HIES	Household Income and Expenditure Survey
IASC	Inter Agency Standing Committee
ICT	Information and Communications Technology
IFRC	International Federation of the Red Cross
IPA	Isikuki Punivalu & Associates
JICA	Japan International Cooperation Agency
KVA	Kolone Vaai Associates
LDC	Least Developed Country
m	Million
MAF	Ministry of Agriculture and Fisheries
MCIT	Ministry of Communication, Information and Technology
MCO	Multi-Country Office
MESC	Ministry of Education, Sports and Culture
MNRE	Ministry of Natural Resources and Environment
MoF	Ministry of Finance
MPA	Marine Protected Area
MWCSD	Ministry of Women, Community and Social Development
NAPA	National Adaptation Programmes for Action
NDC	National Disaster Council
NDMO	National Disaster Management Office
NGO	Non-Governmental Organization
NIP	National Implementation Plan for Persistent Organic Pollutants
NZAID	New Zealand Agency for International Development
OHCHR	Office of the High Commissioner for Human Rights
OXFAM	OXFAM Pacific
PDNA	Post Disaster Needs Assessment

PECL	**Pacific Environmental Consultants**
PHT	**Pacific Humanitarian Team**
PIGGAREP	**Pacific Island Greenhouse Gas Abatement through Renewable Energy Project**
PUMA	**Planning and Urban Management Agency**
RoU	**Rest of Upolu**
SAT	**Samoan Tala**
SDS	**Strategy for the Development of Samoa**
SHA	**Samoa Hotel Association**
SHC	**Samoa Housing Corporation**
SPREP	**Secretariat for the Pacific Regional Environment Programme**
SOPAC	**Pacific Island Applied Geo-Science Commission**
STA	**Samoa Tourism Authority**
SUNGO	**Samoa Umbrella for Non-Governmental Organizations**
SWA	**Samoa Water Authority**
UN	**United Nations**
UNDAC	**United Nations Disaster Assistance Committee**
UNDP	**United Nations Development Programme**
UNEP	**United Nations Environment Programme**
UNESCAP	**Economic and Social Commission for Asia and the Pacific**
UNESCO	**United Nations Education, Science and Culture Organization**
UNICEF	**United Nations Children's Fund**
UNISDR	**United Nations International Strategy for Disaster Reduction**
US	**United States dollar**
USA	**United States of America**
USP	**University of the South Pacific**
VAGST	**Value Added Goods and Services Tax**
VCFM	**Village Community Fisheries Management**
VDMP	**Village Disaster Management Plans**
WB	**World Bank**
WHO	**World Health Organization**
WIBD	**Women in Business Development**

Executive Summary

The goal of the Early Recovery Framework is to present clearly to Government, donors and the wider community costed options designed to bring about an early recovery process that is both effective in meeting the needs of the population affected by the 29 September 2009 earthquake and subsequent tsunami, and sustainable in the long-term development of affected communities and the economy of Samoa. The Framework takes into account the longer-term rehabilitation and reconstruction plans of the Government and local communities with an aim to capitalize on opportunities to reinvigorate existing policies and plans for disaster risk reduction and to rebuild communities better. Opportunities for economic revitalization outside the normal scope of livelihood options in the affected areas could not only be good for the changed environment and resource base in these areas, but also may act as a catalyst for the active participation of all age groups and genders amongst the affected populations.

Designed to address the issues surrounding resettlement, livelihoods and the cross cutting-issues of climate change, disaster risk reduction and the environment, the purpose of the Early Recovery Framework is to assist in bridging the transition period from the relief phase to the recovery phase and minimize the impact of future disasters.

Experience shows that following the relief phase, investment in affected communities drops considerably. It is essential this does not occur, not only because people need to be able to live in a dignified manner, with proper housing, adequate opportunities to provide for their families and decent local services, but also in light of the cyclone season, which is now in effect and future consequences of the adverse impacts of climate change such as sea level rise. Secondly, it is imperative that the positive momentum created by relief operations is carried forward into rebuilding the livelihoods of people living in affected communities. The Government of Samoa has been presented with the opportunity to provide people with cyclone-resistant houses located at a suitable elevation above sea level and sustainable options for alternative livelihoods. It is also important that public services such as health, education, water and power are accessible and rebuilt at an acceptable standard. The construction of proper evacuation centres in the resettled areas may need to be addressed sooner rather than later, in order to provide villagers with a safe refuge in times of tropical cyclones or future tsunamis.

The Early Recovery Framework encompasses a detailed assessment of a range of sectors and activities that take into account the capacity, strengths and resilience of both local communities and the Government. The key areas of strategic intervention covered are 1) Resettlement and access to basic social service and infrastructure 2) Livelihoods 3) Disaster Risk Reduction and Climate Change and 4) Environment. Cross cutting issues on protection, gender and human rights as well as a section on the health sector have also been integrated into the Early Recovery Framework. Needless to say, there are synergies and cross-linkages across sectors and strategic interventions.

Formulated with the fundamental understanding that the Government of Samoa will take the lead in early recovery work, interventions outlined within this framework are designed to complement existing Government projects, programmes and policies. With this in mind, each of the strategic interventions was developed in close collaboration with Government, development partners, non-governmental organisations and community-based organizations.

The proposed Early Recovery Framework is targeting the needs of approximately 5,274 affected people and 1,049 school children in an area comprised of a total population of 12,406 located from the South-West coast/South coast to the East coast of the Upolu Island as well as Manono Island. Based on close consultation with relevant line ministries and departments of the Government[1], the overall cost of the present framework amounts to between SAT $181.2m and $333.2m (US $72.5m to $133.3), which ranges from 10%-20% variation depending the final policy decision taken by the Government of Samoa, with the following breakdown: resettlement and access to basic social services and infrastructure (which ranges from: SAT $140m/US $56m to SAT $208m/US $83), livelihoods (SAT $31m/US $12.4m), disaster risk reduction, governance and climate change (SAT $7.2m/US $2.9m) and environment (SAT $3m/US $1.2m).

It is to be underlined that the related cost of the resettlement and access to basic social services and infrastructure component is based on the fact that a significant number of the affected population have already moved to their inland plantations located on higher and more hazard safe areas. It is also based on the opportunity to stabilize the resettlement of the targeted population in line with the provisions of Government policies relating to the comprehensive Coastal Infrastructure Management Plans (CIM Plans). It is also important to mention that international/regional experience with post-disaster resettlement programmes have often shown mixed results.

This framework proposes three broad strategic options for resettlement which have: (a) different overall costs to Government and communities; and (b) most importantly, significantly different levels of disaster risk reduction measures and thus protection of lives arising from future natural disasters. **The three options are as follows:**

Option 1 - This option provides the highest level of safety and reduces disaster risks and is less costly than Option 2. It is based on the fact that (a) a sizable population has already spontaneously relocated; (b) Government is already providing essential services to support relocated communities; (c) there is an opportunity to capitalize on the on-going resettlement and stabilization of affected populations; (d) aligns with existing policies and programmes such as Coastal Infrastructure Management (CIM) Plans; and finally (e) the provision of services inland will provide incentives and a safer environment for both affected and un-affected populations.

Option 2 - Allow individual affected households to choose between resettlement and rebuilding in situ. This option is the most expensive option because major social infrastructure has to be provided both in current coastal settlements and newly settled upland areas. It would require for example major sea wall construction to make the population remaining on the coast safer and the upgrading of the existing road and the inland roads required for the relocated population. Primary school locations would pose a problem and may entail more than one school for each village – at least in some locations. On the other hand the level of possible disaster risk mitigation and protection available to the population remaining in situ on the coast is limited.

[1] The Early Recovery Team conducted extensive consultation with the following line ministries and departments: Ministry of Finance (MoF), Ministry of Agriculture (MoA), Ministry of Natural Resources and Environment (MNRE), Ministry of Women, Community and Social Development (MWCSD-Internal Affairs Division), Samoa Water Authority, Electric Power Company (EPC), Samoa Tourism Authority, Samoa Bureau of Statistics and the Private Sector – including the Commercial Bank, hotel operators, etc.

Option 3 - Rebuild in situ and do not provide services for resettlement. This option offers the least protection of the people – probably an unacceptable level of risk – and while it is the cheapest option it none the less requires considerable expenditures on infrastructure. There is also a potential serious trade-off needed to be made between building a high and strong sea wall to try and protect the population. It would also entail maintaining existing sandy beaches, which are essential for the tourist industry.

As previously referenced, the vast majority of affected families have relocated to their family plantation lands inland from the coast. The question facing Government and affected villages is whether people will want to remain in these upland areas or move back to the coast later on. The answer to this question will, in part, depend on the package of social services and other incentives offered to the relocated families. A failure to provide an adequate package of social services in a timely manner will probably result in families moving back to the coast by default, as a result of inadequate living conditions – not withstanding this will mean living in an unsafe environment.

It must be noted that land issues are a potential major constraint on whether either Option 1 or 2 are feasible. There is a need for Government and village communities to consult and determine whether there are any major land ownership issues arising from individual family resettlement or if there are land requirements for public infrastructure such as roads, power lines, schools, health facilities, etc.

The following Table summarizes the costs of providing resettlement and access to basic social service infrastructure (housing, roads, power, water, education and health) by affected zones and proposed options (Options 1, 2 and 3) and associated totals.

Option/Zone	Zone 1	Zone 2	Zone 3	Zone 4	Total (SAT in millions)
Option 1	70.38	65.43	34.73	3.37	**173.80**
Option 2	74.35	94.76	34.95	3.49	**207.55**
Option 3	47.33	67.74	21.73	3.49	**140.30**

Note: *These cost estimates are subject to 10%-20% variation. Detailed design and final agreement on the standards for specific infrastructure will impact final cost estimates.*

Lastly, given that a significant number of people have resettled inland this has provided a necessity and an opportunity to adapt income generating activities and restore livelihoods as well as to build back better through disaster risk reduction, climate change adaptation and environmental management interventions.

****Recommended immediate actions to be taken by sector can be referenced in the first paragraph of Section II: Early Recovery Framework***

I. Introduction and Overview

Country Background

The Independent State of Samoa is located within the Polynesian Triangle in the South Pacific Region at 13.35^{o} S latitude and 172.20^{o} W longitude. Samoa consists of two large volcanic Islands, Savai'i and Upolu respectively, as well as smaller volcanically formed islands. In general, the soils are relatively shallow, stony and have coarse textual properties resulting in high infiltration rate, affecting the amount of water that is retained in the soils despite high rainfall rates per annum. The total population is 182,000 (Census 2006) with an estimated 140,000 Samoan Nationals residing in New Zealand and roughly 100,000 split between Australia, American Samoa, the Continental USA, and Hawaii. This represents a significant source of income for families in Samoa, with remittances being the highest contributor to the Gross Domestic Product (GDP) annually, reaching an estimated amount of SAT $365.2m per annum (2008/9, Central Bank). Tourism is the second contributor and a narrow band of exports consist of car parts manufactured by YAZAKI, tinned coconut cream, Vailima Breweries products and some agricultural products. About 20% of the population falls under the Basic Needs Poverty Line (2002) and mostly reside in the rural areas inclusive of the areas affected by the tsunami. Although a popular tourist destination due to its tropical weather and lush rain forests and pristine sandy beaches, Samoa is vulnerable to natural hazards such as tropical cyclones, earthquakes, tsunamis, flooding, drought and bush fires. The impact of climate change and natural disasters on the country's economy is a threat to economic growth and stability and has been one of the primary factors in maintaining its status as a Least Developed Country (LDC) for many decades; however, Samoa will be transitioning into a formal Middle Income Country status by the end of 2010. Natural disasters such as tropical cyclones have occurred in the past and the country can expect to be struck at least every 15-20 years. The last Category 5 cyclones occurred in 1990 and 1991 respectively, costing millions of Tala in damages to infrastructure and the economy from which the country is just beginning to emerge; however, the threat of increased frequency and intensity of tropical cyclones due to climate change is being carefully monitored by concerned authorities in the country. The cyclone season stretches between the months of October to April annually.

It is important to note that prior to the earthquake and subsequent tsunami that occurred on 29 September 2009, basic services in Samoa such as reticulated water and power were accessible to a large majority of the population. In general, water quality was very good and health services were reasonably accessible. A detailed assessment of the damages occurred to these services will be presented in a Damages and Losses Assessment (DaLA), which will compliment this framework.

The Earthquake-Tsunami

The tsunami wave that struck the south eastern coastal villages of Upolu Island just after 0700 am on Tuesday morning 29 September 2009, occurred in 2 surges only about 10-20 minutes after the earthquake impacted and left in its wake 143 dead (mostly women, children and the elderly – including 10 tourists,). In total, 19 villages were impacted spreading between Aleipata and Falealili villages with wave run-ins reaching 400 metres inland. All beach *fale* tourist operators along the coastal stretch were completely demolished - affecting livelihoods and social welfare. The popular tourist operations in the area accounted for an estimated 20% of

hotel tourist room capacity. It is therefore an important area for rehabilitation and reconstruction should people wish to return to this kind of livelihood.

Humanitarian Response

The response from the Government and international humanitarian community was immediate, swift and efficient under the overall coordination of the Disaster Advisory Committee (DAC) supported by the National Disaster Management Office and other Government line ministries. Roads were cleared immediately with only 'light' vehicles permitted into the areas whilst search and rescue efforts continued. The search and rescue efforts continued up to Saturday 4 October 2009 with a National Burial and Memorial Service organized and funded by the Government held on Thursday 8 October 2009.

Number of people killed: 143
Missing: 5
Affected population: approx. 5,274
Affected households: approx. 685
Affected area: South/South-eastern Upolu & Manono-tai
Overview of damages: SAT $162m (US $65m)
Overview of losses: SAT $97m (US $39m)

Note: See *Annex A for breakdown*

The Inter-Agency Standing Committee (IASC), under the leadership of the United Nations, activated the cluster approach by 1 October 2009. The IASC was comprised of humanitarian and development partners – both national and international, and its' objective was to ensure coordinated humanitarian support to the Government. As of 6 October 2009, there were a total of 35 UN and non UN agencies participating actively in the cluster system (15 UN agencies, 17 international and national NGOs and 3 bilateral partners). An United Nations Disaster Assistance Committee (UNDAC) team was deployed to Samoa by 30 September 2009 to assist the UN system and the Government of Samoa in coordinating of the national and international response. The UNDAC team also provided coordination support to the National Disaster Management Office.

Transition from Relief to Recovery Process

The efficiency of the response phase of the disaster led by the Government of Samoa and coordinated by the National Disaster Management Office, coupled with the localized impact in a finite number of villages mainly on the south eastern coastal regions of Upolu Island, allowed for an early transition into an early recovery phase. The customary land tenure system meant that a majority of the people affected had access to plantation lands inland from the coast where they moved to immediately after the disaster, and where 90% of those interviewed so far in various assessments, have expressed a strong determination to remain. Make-shift shelters made of tarpaulins that were distributed by the Government through NGOs and the Red Cross, were erected and gradually people are starting to build more semi-permanent houses such as the traditional *fale.*

On 3 October 2009, four days after the earthquake-tsunami event, the Government of Samoa requested an early recovery framework to be drafted and submitted to the Prime Minister. An Early Recovery Team was formed, under the aegis of the Government and the UN led IASC to undertake the task. The Early Recovery Team consisted of representatives from the United Nations (UNDP (lead), Office of the Resident Coordinator of the United Nations, UNEP, UNESCO,

FAO, OHCHR, UNESCAP, UNISDR), World Bank, ADB, IPA, NGOs, and Government of Samoa Ministries and Corporations.[2]

An early recovery needs assessment was conducted on the 7th and 8th of October 2009 by the Early Recovery Team in the affected areas, which provided a general overview of the current situation. The assessment focused on identifying actions that will make the shift from life saving interventions to life sustaining ones, and restoring the basic foundations that will allow people to rebuild their lives. The Early Recovery Team, under the leadership of the Ministry of Women, Community and Social Development, has worked closely with the local communities and their leaders, to identify opportunities for livelihoods and income generating activities as well as support for the early delivery of social services, such as health, education water and sanitation that have been disrupted due to the tsunami. Long term food security along with infrastructure development will be critical in long-term recovery efforts. Capacity development of communities and local level institutions will form the basis for ensuring sustainability in the early recovery process and the strengthening of self-help capacities.

Principles of the Early Recovery Framework

Designed to address the issues surrounding resettlement and livelihoods as well as the cross cutting-issues of climate change, disaster risk reduction and environment, the purpose of the Early Recovery Framework is to assist in bridging the transition period from the relief phase to the recovery phase and minimize the impact of future disasters. Experience shows that following the relief phase investment in affected communities drops considerably. It is essential this does not occur, not only because people need to be able to live in a dignified manner, with proper housing, adequate opportunities to provide for their families and decent local services, but also in light of the imminent cyclone season rapidly approaching and future consequences of the adverse impacts of climate change. Secondly, it is imperative that the positive momentum created by relief operations is carried forward into sustainably rebuilding lives and communities. It is critical that the opportunity for people to have cyclone-resistant houses located at a suitable elevation above sea level and sources of alternative livelihoods is taken. It is also important that public services such as health, education, water and power are accessible and rebuilt at an acceptable standard.

The Early Recovery Framework encompasses a detailed assessment of a range of sectors and activities that take into account the capacity, strengths and resilience of both local communities and the Government. The key areas of strategic intervention covered are 1) Resettlement and access to basic social service and infrastructure 2) Livelihoods 3) Disaster Risk Reduction and Climate Change and 4) Environment. Needless to say, there are synergies and cross-linkages across sectors and strategic interventions.

Key Principles: The options, interventions and overall strategy presented within the Early Recovery Framework are grounded in the following key principles:

- **Alignment with Key Government Plans, Policies & Priorities:** The Early Recovery Framework is a distillation of the Strategy for the Development of Samoa (SDS) 2008-2012, Government of Samoa Community Sector Plan 2009-2012, Coastal Infrastructure Management (CIM) Plans, National Adaptation Programmes of Action (NAPA) and the

[2] A detailed list of the Early Recovery Team is referenced in Annex Q.

National Disaster Management Plan. Proposed strategic interventions and related activities were developed in collaboration with the Government by individual ministries and departments and through cluster/sector coordination.

- **Community-centred & Inclusive:** The effective reconstruction and resettlement efforts from natural disasters are characterized by a closely coordinated multi-sectoral approach that emphasizes systematic consultation with affected communities as well as close collaboration between Government and non-Governmental agencies. The full integration of communities, taking special measures to ensure that the poor and most vulnerable groups are included, in reconstruction and resettlement strategies, including decision-making and implementation processes, is essential for ensuring equity, ownership, transparency and accountability.
- **Informed Decision:** The affected population should be able to make an informed decision regarding whether to return to their home communities, relocate or integrate if they are staying in host communities. To the extent possible, information should be made available on rights to voluntary, safe and dignified return, resettlement or return; the situation in areas of return and resettlement with regard to medical and education facilities, water and sanitation services, availability of food, shelter/housing options, livelihood opportunities and disaster risks and management; and support that will be available for the different options (from the Government, UN, NGOs, etc).
- **Human Rights Based & Protection Approach:** Efforts must be responsive to the diverse needs of communities and individuals in a way that recognizes and appreciates their integrity, dignity and basic rights. At the same time, development interventions should address core issues that result in the equal improvement in the quality of life for boys, girls, men and women. Additionally, the Government shall enable the displaced and affected communities to return, relocate or integrate locally under conditions of sustainability, safety and dignity and to ensure that: (1) resettlement areas are assessed as stable and safe by the competent authorities; (2) new constructions are culturally acceptable and meet building safety codes and international standards on adequate housing; (3) resettlement areas have safe and ready access to all basic services, as well as to employment and appropriate livelihood opportunities and markets; (4) special housing, services and support are provided to groups with particular needs; (5) a compensation/restitution package is made available for those whose land might be affected by the resettlement operations; and (6) in order to prevent inter-community tension and to ensure a targeted and equitable response, the needs of non-affected or indirectly affected communities should be assessed.
- **Disaster Risk Reduction & Climate Change**: Disaster risk reduction/management needs to be considered as a key cross-cutting issue throughout the recovery process. In particular, enhancing safety standards and avoiding the rebuilding of previous vulnerabilities and the creation of new risks must be factored in the rehabilitation and reconstruction of houses, infrastructures and livelihoods. Over the long term, measures to reduce risks associated with the adverse impacts of climate change such as cyclones, increased instance of draught, flooding and sea level rise as well as non-climate change related hazards like earthquakes and tsunamis need to be factored into the recovery process.

- **Gender Sensitive & Equitable Distribution of Resources**: The recovery and rehabilitation phases provide opportunities to promote gender equality within communities, more evenly distribute ownership of assets, and improve the condition and position of women and other vulnerable groups.
- **Adequate Shelter:** Shelter clearly remains a problem in early recovery that has serious humanitarian concerns. The scale of the damage and destruction to homes is estimated at SAT $31,460,000. Urgent attention must be focused on re-building better and resettling vulnerable families that cannot rebuild for themselves – particularly in light of the fact that reports indicate that many families that are reportedly rebuilding by themselves, often with sub-standard materials and design.

Note: *Protection is a cross-cutting issue that needs to be considered across sectors in all aspects of early recovery plans, policies and activities. In particular, ensuring that the affected population, in particular those who were displaced, will meaningfully participate in all aspects of early recovery activities, be fully informed of Government plans and policies, NGO, UN and donor responses, and able to make informed decisions on their own durable solutions related to place of residence, housing, livelihoods and access to basic services.*

Economic Impact

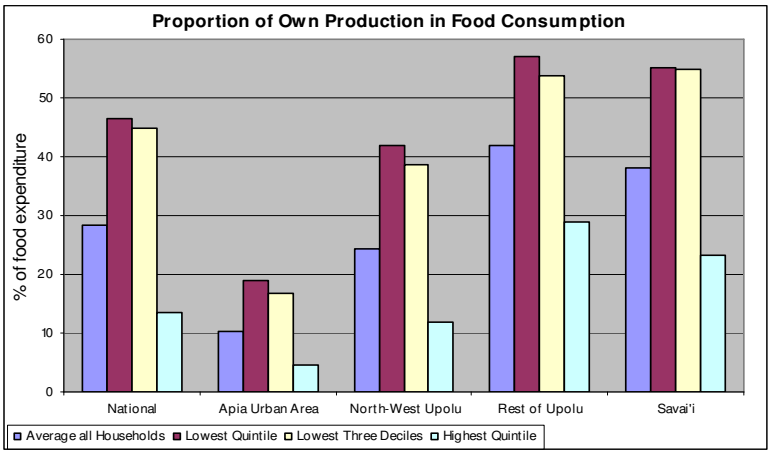
Samoa is presently classified as one of the forty-three poorest and least developed countries. In the early 1990s the country experienced two damaging cyclones (1990 & 1991), a leaf-blight which destroyed the nation's primary food and export crop of taro (1993) and a financial crisis at the national airline (1994/95). Following these events the Government implemented a programme of substantial economic reform during the decade to 2007/08. Largely as a consequence of this Samoa has enjoyed a period sound economic growth and fiscal stability. The growth rate of GDP over the period between 1997 and 2007 averaged approximately 4% per annum.

There were also significant improvements in Samoa's human development status. Globally Samoa was ranked 96th in 2006 on the new HDI series with its global HDI index value rising from 0.682 in 1985 to 0.760 in 2006. Consequent on its generally high level of human development and its recent growth in GDP per capita, Samoa has been put on the LDC graduation list and will be transitioning into Middle Income Country status by the end of 2010. However, the Government has challenged the graduation process arguing that the country is extremely vulnerable to external shocks such as those recently experienced through the global economic recession and the tsunami.

The tsunami affected areas of the east, south-east and southern coastal regions of Upolu comprise approximately one-quarter the Rest of Upolu (RoU) sub-region, as included in the 2008 household income and expenditure survey (HIES). The following section analyzes the estimated economic impact of the tsunami on the affected areas and the national economy largely using data derived from the HIES.

The HIES data indicate that the average size of households in the RoU sub-region including the affected areas was 7.7 persons, of which 3.1 were children and 3.7 females. This is slightly higher than the national average household size of 7.3 persons, including an average of 2.9 children and 3.5 females. For the poorest affected households, those in the bottom three

deciles of per capita expenditure, the average household size was 10.0, of which 4.8 were children and 4.8 were females.



Household Expenditure: The data from the HIES indicate that the affected areas had amongst the lowest average weekly per capita household expenditure, SAT $95.64 per capita per week, being some 18.5% below the national average (SAT $117.34) and approximately 21.5% below the average for north-west Upolu. For the poorest households, those in the bottom 30%, the average per capita weekly household expenditure amounted to only SAT $39.93.

According to the both 2002 and 2008 household surveys, the general area of the RoU sub-region experienced the lowest rate of increase in household income/expenditure between the two surveys; average per capita household expenditure rose by only 8.1% (approximately 1.4% per annum) between 2002 and 2008 compared with a national average increase of 54.1% (average annual growth rate of approximately 8%). Amongst the poorest 30% of households in the affected areas weekly per capita expenditure increased by 16.8% over the period compared with an increase of 56.6% in expenditure on average amongst the bottom 30% of all households.

Thus, although Samoa as a whole experienced a significant increase in household income many of those in the tsunami affected areas were being left behind and this is reflected in the increase in the incidence of poverty in this area of the country that is suggested by the 2008 survey.

Incidence of Basic Needs Poverty: In 2002 the incidence of basic needs poverty in the RoU sub-region was estimated to affect 13.4% of households and 15.1% of the population. At the time this was below the national average of 19.1% of households and 22.9% of the population. However, in the period since 2002 there appears to have been a marked deterioration in the poverty status of the tsunami affected sub-region.

The preliminary analysis of the 2008 household survey suggests that the RoU sub-region has seen a significant increase in the incidence of poverty. It is estimated that in 2008 around 20.5% of households and 26.6% of the population fell below the basic-need poverty line. This represents an increase of 7.1 percentage points in the proportion of households and 11.5 percentage points in the proportion of the population falling below the basic needs poverty line. This contrasts with a fall in the level of poverty incidence of 1.5 and 2.7 percentage points respectively in the level of poverty incidence in the population of Apia Urban Area and North-west Upolu respectively.

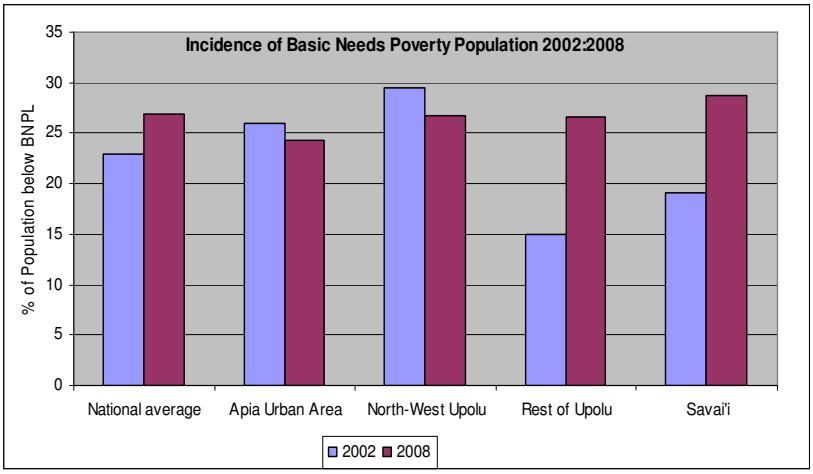
Disaggregating the tsunami affected areas of the RoU sub-region suggests that the tsunami affected areas have in fact fared even worse than the rest of the Rou sub-region. The HIES survey data for the villages in the tsunami affected areas indicate that 23.5% of households

comprising 31.3% of the population of the affected areas had per capita weekly expenditure less than the basic needs poverty line.

The chart illustrates the estimated levels of the population falling below the basic-needs poverty across the four sub-regions in 2002 and 2008. This clearly indicates the sharp increase in basic needs poverty that has been experienced by those in the tsunami affected sub-region of the Rest of Upolu.

Food Security and Subsistence Production: Households in the tsunami-affected parts of the RoU sub-region produce a higher proportion of their own food than any other part of the country. According to the 2008 HIES an average of about 43.8% of food consumed was home-produce, this compares with only 29.4% on average across the country as a whole. For households in the bottom 30% of per capita weekly expenditure the proportion of home produce in food consumption was 55.9% compared with 45% nationally amongst the poorest 30% of households. The chart illustrates the comparison of own-food production/ consumption across the main sub-regions in Samoa.

The survey indicates that in the tsunami-affected areas the average weekly household value of home produced food amounted to SAT $139.54, equivalent to an annual value of approximately SAT $7,256. Thus the total value of subsistence production from tsunami-affected households would have amounted to approximately SAT $5m per annum. On the basis of the report submitted by MAF/FAO it is estimated that about 10% of subsistence production has been lost in the immediate short-term through the destruction of small livestock, loss of agricultural tools and equipment and the destruction of close-to-household gardens and food trees. The estimated loss of subsistence production in the short-term therefore amounts to approximately SAT $42,000 per month. In the medium to longer term subsistence production is expected to recover completely, and if the resettlement programme occurs then production is likely to surpass the pre-tsunami levels as households will be living closer to their plantations. With the loss on cash incomes there may also be a greater reliance on subsistence production even in the short-term.



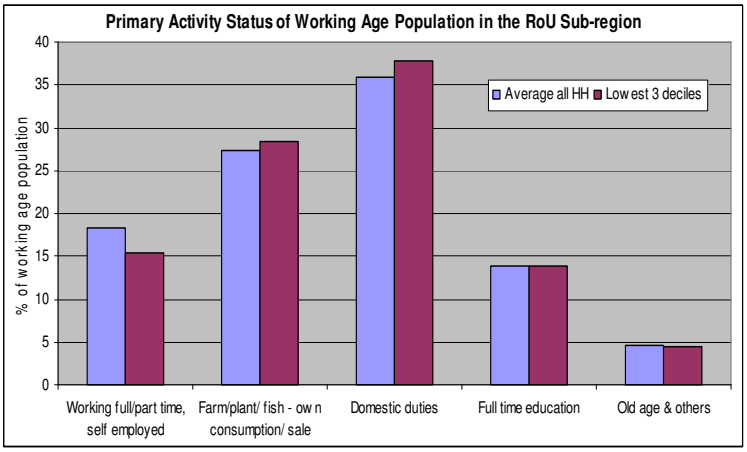
Amongst the poorest thirty-percent of households in the tsunami-affected areas of the RoU sub-region approximately 58.1% of weekly expenditure (including the value of home production) was on food with around 42% of expenditure being made on non-food items. Affected communities therefore had a greater reliance on their own production, but now in the circumstances of the tsunami which has destroyed many home gardens and food trees they are highly vulnerable having limited or no cash resources with which to purchase food.

Employment/Economic Activity Status: On average only 15% of working age people in the affected sub-region were in full or part time employment in 2008. Amongst the poorest three deciles the proportion was only 12.9%. An additional 3.3% on average and 2.5% amongst the poorest households were in self employment.

Many of those in employment would have been engaged in the tourism related activities associated with the beach-fale and other resorts located along the southern coast. Others would have been employed in the automotive wiring-harness manufacturer based in Apia but which recruited workers from the rural parts of both Upolu and Savaii. Many of these workers may have lost their jobs as the global economic slowdown impacted on the demand for wiring harnesses and the factory in Apia reduced its workforce during 2008 and 2009. Those employed in the tourism sector in the tsunami-affected resorts and businesses would also have lost their jobs. Although no specific data on employment in the affected businesses is available it is estimated that approximately 300-350 persons would have been employed overall.

Average weekly household income for those in the tsunami-affected areas is estimated from the 2008 HIES as SAT $605m. Of this SAT $139m is estimated to be derived from home produced food and SAT $75m from remittances received. Thus average HH cash income is estimated at SAT $391m. Assuming that all the affected HH have lost the cash-earned part of their incomes the net income loss would amount to SAT $227,000 per week or SAT $11.8m per annum. This would be equivalent to around 0.8% of household expenditure.

The rural and subsistence nature of the tsunami-affected areas is demonstrated by the fact that around 28% of working age people were engaged in farming/fishing activities, either for domestic consumption (23%) or for produce sale (5%). This is primarily a male-dominated activity with females being primarily engaged in domestic duties; overall around 36-37% of working age people were engaged in these domestic duties. Amongst females approximately 70% were engaged in domestic duties with only about 10% in employment. For males approximately half were engaged in farming and fishing with 20% in either full or part-time employment.



Impact of the Tsunami on the Macro-economy: As indicated in the preceding analysis the area of the country devastated by the tsunami is amongst the least well-off in Samoa. It has a lower than average income level, a lower than average level of employment and a higher than average reliance on home produced food.

In addition to the impact of the tsunami Samoa has also experienced significant adverse impacts from the affects of the global recession. Many jobs have been lost in the domestic economy, primarily in the export manufacturing sector, and other jobs and associated remittances have been lost through the closure of a large tuna canning plant in neighboring American Samoa. The country has therefore been in need of a fiscal stimulus to

assist the economy to replace the economic activity lost through the global downturn. The implementation of a fiscal stimulus has not been possible with the recent weakening in the Government's fiscal position as a result of the global economic impact.

The impact of the tsunami has however created an opportunity for such a stimulus to occur provided that external funding can be mobilized to meet the costs. In response to the tsunami the donor community has already indicated the availability of approximately SAT $20m for support humanitarian relief, rehabilitation and recovery. The implementation of a full programme of recovery will however cost perhaps ten times that which has already been made available. The Government therefore needs to be able to mobilize substantial additional resources.

The budget is likely to come under increasing pressure in the current year as the Government's immediate response to the tsunami is met from current expenditure. This will not be sustainable and therefore additional support will be essential if the fiscal position is to be sustained.

In relation to the immediate impact of the tsunami on economic activity, apart from the tourism activities which may generate VAGST, trade tax and excise duty revenues for Government the contribution of this area of the country to overall macroeconomic performance is relatively small.

Most of the tourism infrastructure in the south-east around Lalomanu and Aleipata was of the "back-packer" and "beach-fale" type, only a few of the resorts such as Sinalei, and Coconuts Resort were more up market. Thus most of the village-based businesses were quite small and probably not registered for VAGST; since their turnover was not large their tax contributions at the macro-level would have been small. Being also focused more on back-packer tourists the expenditure per capita by tourists on other local purchases would not have been large and would not have contributed much to the macro-economy.

The affected areas are estimated to have included between 20-25% of the tourism rooms/bed stock of Samoa. If this were to be carried straight to the GDP the loss would be equivalent to 0.7 – 0.8% of GDP on an annual basis. However since the immediate loss of revenues at those facilities destroyed in the tsunami have been offset by an increase in family visits and recovery and relief missions the net loss to the GDP is estimated, in practice, to have been much less than this.

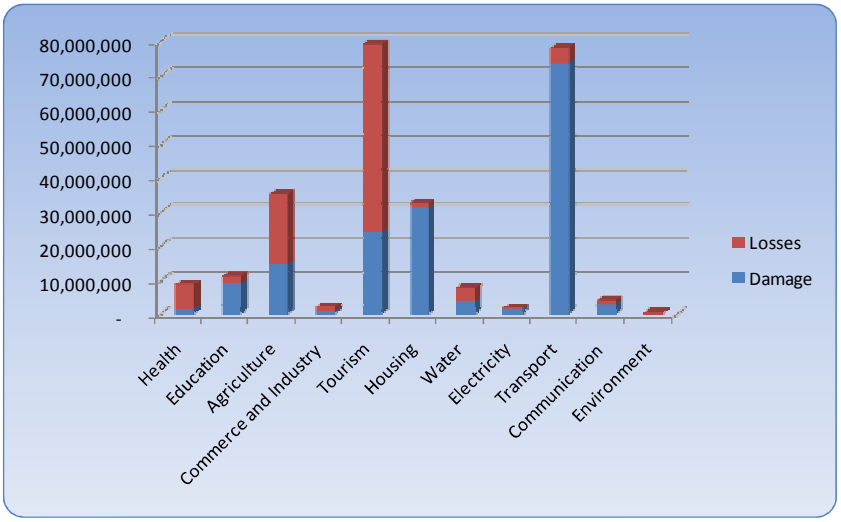
The loss of public and private infrastructure and assets is significant at the local level; however, the estimated loss of GDP value in terms of "ownership of dwellings" is estimated at only 0.09% per annum. The immediate expenditure on relief, rehabilitation and early recovery will feed directly into GDP and will offset these losses. The longer term rehabilitation and recovery expenditure, if it can be financed, will provide a "fiscal stimulus" for the Samoa economy. Given that donors have already pledged almost SAT $20m to the recovery and rehabilitation efforts, additional private remittances have probably matched these flows, plus the fact that some of the damaged assets may have been insured, there will be a significant boost to the construction and commerce sectors as rebuilding gets underway and replacement assets are purchased. Such reconstructions will it is hoped have a positive impact on GDP and will constitute the equivalent of a fiscal stimulus package. Care will however need to be exercised by Government to ensure that the fiscal position is not weakened further.

Summary Economic Impacts of Tsunami	
Negative Impacts	**Positive Impacts**
Loss of hotels & restaurants contribution to GDP from affected areas estimated at SAT $10m on annual basis; equivalent to 20% of relief & recovery contribution to GDP, or 0.7 – 0.8% of total GDP on annual basis	Additional visitor arrivals from families and relief & recovery missions will offset this loss at the macroeconomic level
Loss of value in "ownership of dwellings" in affected area; impact on GDP = -0.09% annual basis	Reconstruction programme will restore the loss of value incurred as a result of the tsunami
Loss of subsistence agriculture production from damage to home gardens & livestock = SAT $0.54m annual basis; equivalent to 0.08% of non-monetary agriculture production	Resettlement of households away from coastal areas may lead to an increase in subsistence production as families will be living closer to main plantation areas.
Loss of contribution to monetary fisheries from damage to alia fleet based at Aleipata wharf; estimated at SAT 5m; equivalent to approx 6.3% of fisheries GDP or 0.03% total GDP, annual basis	Loss of fisheries effort will be partially offset by increased efforts on part of remaining fleet. Lost vessels will be replaced in medium term and fisheries capacity will be restored
Loss of wages & salaries income from employment in destroyed enterprises; estimated at SAT $0.227m per week, SAT $11.8m per annum. Equivalent to approximately 1.5% of total household income, annual basis The loss of employment and income is likely to cause significant hardship and increasing poverty for the least well-off and most vulnerable	Some loss of income will be replaced by additional remittances
Balance of payments; revenues will be lost from reduced tourist arrivals otherwise scheduled to stay at affected sites	Revenue will be generated from arrival of additional family members and aid and relief missions. Cost of imported emergency relief supplies will be offset by inflows of assistance and additional remittances
Fiscal position; immediate relief and recovery expenditure is being met by the budget, this will put additional pressure on the fiscal balance	Additional donor support, if it can be mobilized may provide resources for a "fiscal boost" to the economy that will assist in overcoming the adverse impacts of the global economic situation.

Damages and Losses

Based on figures compiled by the Damages and Losses Assessment (DaLA), this report estimates that the damage to individual, community and Government infrastructure as SAT $162m (US $65m) and losses to the economy at approximately SAT $97m (US $39m) for a combined total of SAT $260m (US $104m).[3]

The damage and losses estimates contained in this report represents the best documentation at this time of the costs of the destruction by the tsunami of physical assets of the Government, communities (village owned assets), private individuals and businesses. The damage and losses estimates provide a range within where the final estimates will fall. For some damaged buildings and infrastructure more detailed engineering assessments will determine how much of existing damaged structures need to be condemned on safety grounds or can be refurbished. In other cases, (e.g. roads, power, wharf, etc.) the extent of damage will depend on further detailed assessments[4]. The estimates have been built up sector by sector following discussions between team members and relevant Government agencies as outlined in Annex A.



The damage estimates include: (a) the destruction of physical assets; (b) estimates occurred at the time of the natural event and not after; (c) as a cross-cutting measure, the costs of appropriate disaster risk mitigation (e.g. resettlement of the population) or "building back better", which is designed to ensure individuals and individual assets (e.g. a home) or Government or community owned infrastructure (e.g. sea walls, roads, schools health facilities and water) are able to survive or withstand, to a reasonable degree, typical disasters (e.g. cyclones, earthquakes and tsunami's) likely to confront Samoa; and (d) are measured in physical units and at **replacement** value.

The losses estimates include: (a) changes in economic flow; (b) costs that may occur over a long period of time; and (c) are expressed in current values.

[3] See *Annex A*.
[4] The estimates for the wharf vary hugely on what the final costs will be to remove the large equipment which fell into the sea and needs to be removed in order to make it operational again.

Key Government Policies

The options and recommendations presented in the framework are aligned to recommendations and policies represented in key Government documents, including the Government of Samoa Community Sector Plan 2009-2012; Coastal Infrastructure Management (CIM) Plans; National Disaster Management Plan; and National Adaptation Programmes of Action (NAPA); but most importantly the Strategy for the Development of Samoa (SDS) 2008-2012.

The framework also takes into account disaster risk reduction and the potential future adverse impacts of extreme weather events caused by climate change. As stated in the SDS 2008-2012, "the vast majority of the population living on the coastal fringes of Upolu and Savai'i could experience increased coastal erosion, storm surges and inundation as the sea level rises, and the intensity of cyclones could well increase" (SDS 2008-2012). In turn, disaster mitigation and risk-reduction measures can be expected to become more urgent. It is under this assumption that the Government of Samoa adopted the following policy, "*Government will promote the integration of the principles of sustainable development into policies, programs and projects, and has established this as a target for MDG Goal 7: Ensure Environmental Sustainability"* (SDS 2008-2012).

Following the Government's policy, this framework aims to build both community and national resiliency to the adverse impacts of climate change through directly addressing coastal management and adaptation options for affected and inherently vulnerable communities through the promotion of sustainable resettlement, where necessary, as well as efficient building design renewable energy and environmentally-friendly waste management systems.

Additionally, the emphasis of the SDS 2008-2012 on the role of women, through village women's committees, as one of two primary conduits for communicating and implementing government programmes in village communities (the other one through the Pulenu'u of which many too are women) places women in a high priority level for immediate to longer-term support to restore their traditional networks and communication channels as quickly as possible. "MWCSD through the Pulenu'u and women representatives will also continue to be the official two way conduit of government programmes into communities as well as being the information agents for Government in relation to food security, community security and cultural preservation/revitalization" (SDS 2008-2012).

The 'protection of the rights and wellbeing of children, youth and women' as highlighted in the SDS 2008-2012 provides the framework with the opportunity to pursue and support some of the key avenues highlighted in the SDS such as: 'access to credit facilities; support for agricultural development; improved access to basic services and infrastructure, particularly water supply; access to quality education; and better roads, and market access for identified disadvantaged communities.' The framework will pay particular attention to these options in light of possible resources (technical and financial) to make these a reality in the early to longer-term recovery of these populations in the affected areas.

II. Early Recovery Framework

Rationale of Strategic Early Recovery Modality

The Early Recovery Framework proposes an integrated and multi-sectoral approach to support affected communities get back to normalcy as well as to support the national economy. It is composed of four components: a) Resettlement & Access to Basic Social Services; and b) Livelihoods; c) Disaster Risk Reduction and Climate Change; and d) Environment. Cross cutting issues on protection, gender and human rights as well as a section on the health sector have also been integrated into the Early Recovery Framework. The framework also takes into account the capacity and strengths of both local communities and the Government to implement, monitor and evaluate policies presented in this section.

Immediate Actions to be taken by Sector

Agriculture and Livestock: • Provision of Agriculture inputs such as farming tools, seed and planting materials as well as machinery and support services • Provision of Livestock
Fisheries: • Replacement of fishing boats (paopao) • Provision of fishing gear
Tourism: • Replacement of accommodation and associated structures • Marketing initiatives • Clean up of Beaches
Income Generating Activities: • Mobilizing community support for recovery • Small grants for new and existing business development particularly for small and medium-sized enterprises in the affected areas, with a focus on women and young members of households • Highlight the use of appropriate Information and Communications Technologies (ICTs) as an aid to early recovery of the economic, social and psycho-social life of the affected populations of men, women, youth and children.
Disaster Risk Reduction and Climate Change: • Raise awareness and demand for reconstruction of disaster resilience public and private infrastructure including evacuation centres; • Training on disaster resilient building techniques for local carpenters; • Information and communication – develop a comprehensive system of collating, analyzing and disseminating information to monitor inputs, progress and delivery of

recovery programmes

- Launch Village based consultations as soon as possible

Environment:

Clean-up:

- Undertake offshore aerial check of debris and removal of any items posing risk to shipping or the coast.
- Undertake lagoon debris removal manually in impacted areas. Do not use dredging as this will cause further impact. Find and remove lost diesel fuel drums in the vicinity of the Aleipata Wharf.
- Beach and foreshore area clean ups are required in partnership with communities and after salvage of useful materials by owners.
- Stabilization of immediate beach and foreshore areas and associated infrastructure (e.g. roading to prevent further impact to the marine environment e.g. from sediment run-off).
- Mangrove and wetland clean up of debris including solid waste required.

Assessments:

- Undertake more detailed impact assessment of MPA and Fisheries no take zones and their potential for recovery and/or need for resettlement. Note pre impact information for many of these sites is available (MNRE, Fisheries)
- Undertake an assessment for marine food source supply including specific recommendations for possible substitute sources and rebuilding fishing capacity in a manner that does not significantly compromise marine area recovery e.g. first focus on rebuilding offshore capacity that can benefit entire village, ban outside commercial fishing in an offshore area to maximize local access.
- Detailed assessment of tsunami impact and the ongoing risk, costs and benefits of the wharf and its widened channel to nearby coastal villages.
- Detailed assessment on the terrestrial impact and restoration
- Assessment of the differential impacts of environment depletion and degradation on the different groups in the communities

Capacity Development for local communities:

- Building community resilience to impacts of disasters and climate change

Health:

- Provide mobile medical and public health services to the affected population
- Provide facility-based medical and public health services to the population
- Resupply the health system
- Revise/expand short, medium and long-term plans for health services in the affected areas
- Replace some lost/missing equipment

Resettlement & Access to Basic Services

Situation: It is clear that the Government and the humanitarian community are in agreement that resettlement is the core issue in the early recovery phase. Approximately 5,274 people were directly affected[5] by the tsunami – roughly 685 households, 7 schools and 1,049 school children. Most of the 685 households were located in a high-risk coastal area, which directly contributed to the damages and the loss of life and assets.

There is a need for a strategy to ensure durable solutions are found for sustainable return and/or resettlement, i.e. return/resettlement is likely to be sustainable when the affected communities feel safe and secure, with no further risks posed by the effects of a natural disaster; they have been able to repossess their properties or homes, and these have been adequately reconstructed or rehabilitated, or they have received compensation for property lost/damaged; and they are able to return to their lives as normally as possible, with access to services, schools, livelihoods, employment, markets, etc. without discrimination – as the composition of these households includes men, women, youth and children who will be affected differently by the move from a coastal to an in-land lifestyle and it will be imperative to take these differences into consideration in the change. It is clear that the Government and the humanitarian community are in agreement that communities are informed, consulted and provided the opportunity to participate in the process of deciding on settlement options.

It is widely recognized that the relief phase was successfully implemented and managed by the Government with the support of bilateral aid from New Zealand and Australia as well as the Red Cross, UN system and NGO community. Almost all affected households lost their houses and a significant number have relocated to inland areas, which they consider as safer and less-hazard prone. Most have either been provided or constructed their own temporary shelter. However, this shelter is not adequate for either the early recovery period or the mid-term. With the cyclone season rapidly approaching it is vital that immediate more durable shelter assistance is provided to affected families.

Strategy: This framework proposes three broad strategic options for resettlement which have: (a) different overall costs to Government and communities; (b) most importantly, significantly different levels of disaster risk reduction measures and thus protection of lives arising from future natural disasters taking into consideration their differential impacts on men and women and vulnerable groups; and (c) impacts on both the affected and non-affected populations specific to each zone.

Preceding any long term decision on the three options the Government is advised to conduct a risk assessment of the coastal area and determine its habitability. The results of the risk assessment should be disseminated to the communities through a public information campaign.

[5] Directly affected essentially means loss of housing and/or incomes due to the Tsunami. There will be significant indirect affects felt by families who have taken in relatives and friends to their existing homes. It is evident from surveys, including by the Ministry of Health, that not all of the directly affected families have relocated inland. Currently, many have, in fact, spread across Upolu and to Apia.

The three options are as follows:

i. **Option 1 -** This option provides the highest level of safety and reduces disaster risks and is less costly than Option 2. It is based on the fact that (a) a sizable population has already spontaneously relocated; (b) Government is already providing essential services to support relocated communities; (c) there is an opportunity to capitalize on the on-going resettlement and stabilization of affected populations; (d) aligns with existing policies and programmes such as Coastal Infrastructure Management (CIM) Plans; and finally (e) the provision of services inland will provide incentives and a safer environment for both affected and un-affected populations. However, it must be noted that land issues are a potential major challenge with this option. There is a need for Government and village communities to consult and determine whether there are any major land ownership issues arising from individual family resettlement or for land requirements for public infrastructure such as roads, power lines, schools, health facilities. These issues are beyond the scope of this framework, but are critical to the sustainability of the resettlement options.

ii. **Option 2 -** Allow individual affected households to choose between resettlement and rebuilding in situ. If households choose to rebuild in situ a comprehensive and rapid assessment of risks and environmental impacts must be conducted and the coastal areas and places of origin have been determined safe for habitation and modifications of infrastructure and disaster risk mitigation strategies before initiated. This option is the most expensive option because major social infrastructure has to be provided both in current coastal settlements and newly settled upland areas. It would require for example major sea wall construction to make the population remaining on the coast safer and the upgrading of the existing road and the inland roads required for the relocated population. Primary school locations would pose a problem and may entail more than one school for each village – at least in some locations. On the other hand the level of possible disaster risk mitigation and protection available to the population remaining in situ on the coast is limited.

iii. **Option 3 -** Rebuild in situ and do not provide services for resettlement - provided a comprehensive and rapid assessment of risks and environmental impacts has been conducted and the coastal areas and places of origin have been determined safe for habitation and modifications of infrastructure and disaster risk mitigation strategies initiated. This option offers the least protection of the people – probably an unacceptable level of risk – and while it is the cheapest option it none the less requires considerable expenditures on infrastructure (infrastructure costed based on adopted building codes, standards and regulations). There is also a potential serious trade-off needed to be made between building a high and strong sea wall to try and protect the population and the efficacy of such sea walls given the experiences in the recent tsunami, versus maintaining existing sandy beaches, which are essential for the tourist industry.

As previously referenced, the vast majority of affected families have relocated to their family plantation lands inland from the coast. Although resettlement to plantation land may result in a considerable reduction of the affected population's exposure to *coastal hazards*, the

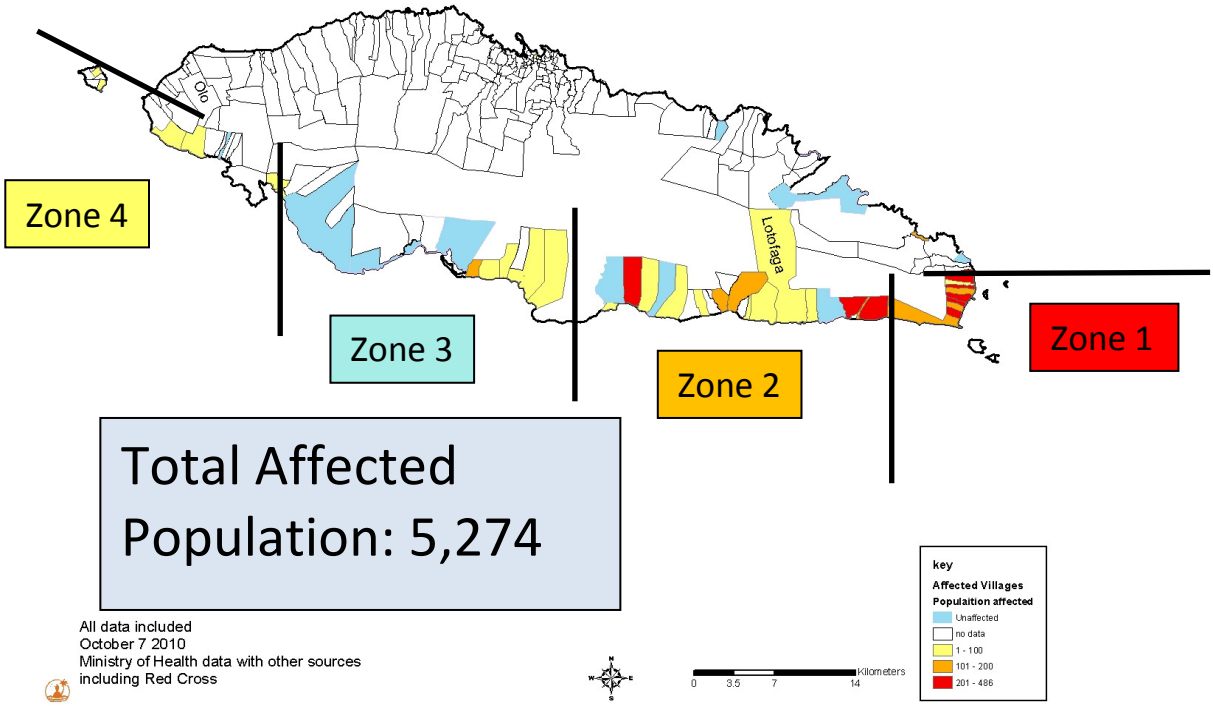
international experience has shown that resettlement programmes triggered by disasters have not always led to sustainable solutions. In many cases, populations have returned to their original homes within a few years. Thorough consultations and careful planning are prerequisites, of which there has been only one early recovery needs assessment. Annex M provides a compilation of relevant experiences and lessons learned for consideration.

The question facing Government and affected villages is whether people will want to remain in these upland areas or move back to the coast later on. The answer to this question will, in part, depend on the package of social services and other incentives offered to the relocated families. Approximately 90% of those interviewed in the socio-economic assessment that was carried out, indicated a strong desire to remain in the upland areas and not to return to the coastal areas. The global experience however, shows that a failure to provide an adequate package of social services in a timely manner will probably result in families moving back to the coast by default, as a result of inadequate living conditions – not withstanding this will mean living in an unsafe environment.

Lastly, displaced as well as non-displaced affected people whether they return or relocate must receive security of tenure and equal access to land in order to stabilise communities, and encourage sustainable recovery and development. Host communities that provide land for resettlement should also receive secure rights to land. Traditional public access and uses of the land and shoreline should also be taken into account.

Map of Affected Zones

Following the map referenced above, this framework divides the affected area into four geographical zones as follows:



Zone 1: South-east coast of Upolu comprised of Sale'aumua, Mutiatele, Malaela, Satitoa, Ulutogia, Vailoa, Lalomanu.

Zone 2: South coast comprised of Lalomanu, Vailoa, Ulutogia, Aufaga, Vaigalu, Siupapa, Saleapaga, Leatele, Lepa.

Zone 3: South-coast comprised of Matatufu, Lotofaga, Vavau, Salani, Salesatele, Sapunaoa, Malaemalu, Tafatafa, Mata-utu, Vaovai, Poutasi, Ili-ili, Siumu, Maninoa. However only the villages of Salani, Poutasi, Siumu, Maninoa (970) were significantly affected by the tsunami.

Zone 4: Manono Island and surrounding areas, which was moderately affected by the tsunami (20% of the population), does not allow for inland resettlement. However, there were damages upwards of SAT $1.5m in the housing sector and significant damage to the water system (fixed by the New Zealand military).

Population by Zone

Zone 1	*Sale'aumua (pop. 648), Mutiatele (pop. 295), Malaela (pop. 181), Satitoa (pop. 606), Ulutogia (pop. 169), Vailoa (pop. 359), Taivea-Tai, Lotope* **Total Population: 2,258**
Zone 2	*Lalomanu (pop. 791), Aufaga (pop. 468), Vaigalu (pop. 95), Siupapa (pop.56), Saleapaga (pop. 503), Leatele (pop. 137), Lepa (pop. 170)* **Total Population: 2,220**
Zone 3	*Matatufu (pop. 420), Lotofaga (pop. 1089), Vavau (pop. 356), Salani (pop.562), Salesatele (pop. 350), Sapunaoa (pop.469), Malaemalu (pop. 249), Tafatafa (pop.201), Mata-utu (pop. 332), Vaovai (pop. 568), Poutasi (pop. 379), Ili-ili (pop.13), Siumu (pop. 1092), Maninoa (pop. 473), Utaluelue* **Total Population: 6,553**
Zone 4	*Manono-tai (pop. 1372)* **Total Population: 1,372**

Summary of Affected Population per Zone

	Zone 1: Option 1	Zone 2: Option 1	Zone 3: Option 2	Zone 4: Option 3	TOTAL
TOTAL POPULATION	2,258	2,220	6,553	1,372	**12,406**
TOTAL AFFECTED POPULATION	2,032	1,998	970	274	**5,274**

Summary of Resettlement and Basic Social Services Costs per Zone and Policy Option

The following Table summarizes the costs of providing resettlement and access to basic social service infrastructure (housing, roads, power, water, education and health) by affected zones and proposed options (Options 1, 2 and 3) and associated totals.

Option/Zone	Zone 1	Zone 2	Zone 3	Zone 4	Total (SAT in millions)
Option 1	70.38	65.43	34.73	3.37	**173.80**
Option 2	74.35	94.76	34.95	3.49	**207.55**
Option 3	47.33	67.74	21.73	3.49	**140.30**

Note: *These cost estimates are subject to 10%-20% variation. Detailed design and final agreement on the standards for specific infrastructure will impact final cost estimates.*

Under Option 1 (complete resettlement) the total costs are estimated to be roughly **SAT $174m**. Under Option 2 (mix of resettlement and settlement in situ) the costs are estimated to be **SAT $208m**. Under option 3 (settlement in situ) the costs are expected to be **approximately SAT $140m** (only SAT $34m more than option 1 which provides the highest level of safety for the population and infrastructure protection). *Refer Annex B for the details of the costs for resettlement.*

Livelihoods

Situation: Approximately 685 households were affected by the earthquake and tsunami. The livelihoods base for the majority of these affected households includes subsistence agriculture, livestock for self-consumption, artisanal/subsistence fisheries and tourism related activities. The Tsunami led to widespread loss of livelihoods assets such as fishing boats, pigs, poultry, business premises, trading stocks, vehicles, tools, and has affected a much larger number of people along the coastline. Key impact areas include:

- ***Agriculture, livestock and fisheries:*** main damage is to productive assets such as agricultural inputs, tools, boats and fishing equipment. Damage to agricultural land is minimal given that much of this is on higher ground;
- ***Tourism:*** significant structural damage along the coastline in terms of accommodation and associated services;
- ***Adapting and new sources of livelihood:*** resettlement has meant that families have had to consider adapting or finding new sources of livelihood.

Strategy: The strategy for early recovery interventions focusing on livelihoods are primarily based on **restoring** original sources of livelihoods e.g. tourism, agriculture and fisheries. However, given that a significant number of people have resettlement upland this has provided a necessity and an opportunity to **adapt** income generating activities and the possibility of introducing **alternate** livelihood options for example in traditional and cultural art and crafts, weaving and some IT and tradesmen related services, which open up the options for younger people to get involved in as early as possible. In some cases there is also the need or the opportunity to develop alternative or new sources of livelihoods. There is also an opportunity to initiate mechanisms to support social welfare structures and functions.[6] Opportunities to recover and improve livelihood are explored through the following key sectors:

- **Agriculture, livestock and fisheries:** the main strategy is to provide critical agricultural and fisheries inputs and equipment (including boats) for families, particularly those that are resettling to other sites. These can commence **immediately**. There are also opportunities to enhance agricultural skills for more income generating agricultural activities. In the fisheries sector, measures to incorporate disaster risk reduction are also being proposed.
- **Tourism:** the Samoa Tourism Authority (STA) has recently commissioned a study to assess the damages and provide advice on a roadmap for the complete rehabilitation of the tourism sector (through KVA Consult LTd). The proposed recovery strategies will therefore be modified on completion of this study (anticipated around November 2009). Additionally, it is recommended that relevant disaster mitigation measures to reduce disaster and climate related risks be taken into account through a risk assessment before a number of interventions such as the replacement of small-to-medium scale accommodation facilities can be implemented; however, some interventions can be implemented **immediately** such as the clean-up of beaches and marketing campaigns to reinvigorate demand (this is based on experience from the **2004 Asia Tsunami**) for those

[6] This is contingent on the understanding that the Government has decided to create a 'social welfare division' within the Ministry of Women, Community and Social Development.

who wish to return to this type of business. Furthermore, some operators are adapting their operations e.g. day fales will remain on the coastline whilst accommodation is moved to higher ground, or developing more land-based tourism operations as disaster risk reduction measures. Lastly, lessons learned from the Indian Ocean Tsunami show that the private sector can often market its tourism as incorporating safer construction techniques, having accommodation in safe areas and having improved early warning and evacuation procedures in place.

- **Income generating activities:** In order to help families rebuild their livelihoods grants for existing and new business development can be provided **immediately**. Furthermore, in order to help develop alternative income generating activities training will be provided for new business development, particularly for women members of households in the affected areas. Early recovery interventions will support existing programmes aimed at enhancing small-scale business operations in the communities.
- **Alternative livelihoods:** immediate possibilities include arts and handy-crafts, ICT (e.g. internet services through the MCIT with women and youth), construction and trades with a focus on youth; higher end value chain of agricultural food production (for domestic and exporting markets). These will be supported through feasibility studies.
- **Related Support to Education and Health Centre (material and supplies):** this will be used for the functioning of schools and health centres, which are not fully covered in this framework, but will be further detailed in successive drafts. However, it is to be indicated that within the initial framework includes as annexes recovery needs requirements for health and education. (Referenced in Annex F and D respectively)
- **Information and Communications Technologies (ICT);** the opportunity to use appropriate ICTs (e.g. cell phones, computers, radios, TVs, etc.) to break down barriers of distance and restart 'normal' life, is vital during the early recovery phase. There is an opportunity to expand the application of cell-phones for financial transactions through phone banking for instance, thus eliminating the expense of travel to the business centre in Apia. Specialized IT software for easing the access of rural populations to health and educational services could be piloted. The provision of free computers to schools to restart their computer training and computer-based learning has good potential. Providing free computers to women and youth who might be interested in establishing and running e-learning centres should be explored further in order to open up communication channels with the outside world and recommencement of and businesses in the communities. The use of ICTs in early recovery has a strong psycho-social element as it serves to connect people and the wide possibilities for the birth of new ideas as well as the reconstruction of shattered lives amongst the affected populations.

Key Recommendations

Agriculture and Livestock:

- Provision of Agriculture inputs such as farming tools, seed and planting materials as well as machinery and support services (immediate)
- Provision of Livestock (immediate)
- Training on diversifying agriculture (for income) plus organic farming practices (to

reduce pesticides (for income) plus use of resilient crops during times of disaster (medium) • Training on livestock diversification and management (medium)
Fisheries: • Replacement of fishing boats (paopao) (immediate to medium) • Provision of fishing gear (immediate) • Private sector grant/credit mechanisms could be activated (via bilateral channels) to support the rehabilitation/replacement of Alia fishing vessels and provision of lost equipment and fishing gear (medium) • Training for fisheries on DRR: integrate EWS into their processes; how to maintain their fishing vessels in terms of disaster prep (medium).
Tourism: • Marketing initiatives (immediate) • Clean up of Beaches (immediate) • Building of access pathways up the hills behind the beaches (immediate) • Replacement of accommodation and associated structures (medium) • Development of accommodation further inland (medium)
Income Generating Activities: • Mobilising community support for recovery (immediate) • Small grants for new and existing business development (immediate to medium) particularly for small and medium-sized enterprises in the affected areas, with a focus on women and young members of households • Training for new business development with particular focus on women and youth in affected areas (medium to longer term)

Table: Summary of Costs for proposed Early Recovery Interventions

Livelihoods	**SAT $**
Agriculture & Livestock	$9,103,154
Tourism	$21,300,000
Income Generating Activities	$547,700
TOTAL	**$30,950,854**

Refer to Annex C for the details of the livelihood costs.

Disaster Risk Reduction, Governance and Climate Change

This cross cutting section is based on the findings of the socio-economic assessment of early recovery needs in tsunami affected areas which was carried out by the Early Recovery Cluster from 6-7 October 2009. This section incorporates 'protection of human rights' language and implicit climate change adaptation and mitigation measures.

Disaster Risk Reduction Situation: It is clear that losses and damages were sustained on a scale that had not been experienced before in the Samoa.

Response: The initial response to this disaster by the Government of Samoa under the leadership of the National Disaster Council (NDC) and the coordination and implementation of the Disaster Advisory Committee (DAC) has been exemplary and well supported by swift assistance from the international community and the United Nations. There have been sporadic accounts of uneven distribution of relief items. Some delays were experienced with the finalization of damage and needs assessment reports by ministries.

Recovery Preparedness: In accordance with Samoa's National Disaster Management Plan (NDMP), the DAC is responsible for establishing appropriate structures to monitor and coordinate disaster recovery, and report to the NDC as required for strategic direction. However, the NDMP does not make detailed provisions for early recovery and recovery, and the government is faced with a vacuum regarding national recovery standards, principles and priorities, and clear recovery roles and responsibilities of authorities at all levels.

Tsunami Warning and Community Preparedness: The warnings from PTWC were received and on the national level acted upon. The implementation of preparedness measures was not fully achieved. The analysis clearly shows that for the Samoa case of near-field tsunamis, and possibly other South Pacific islands, intensive awareness and preparedness programmes have to be strengthened.

Communication: Most communication devices such as AM/FM radio and television sets were lost during the event making it difficult for the affected population to stay informed on the progress of the relief operations as well as the planned assistance of the government for the recovery process. The lack of communication equipment and access to information also poses a challenge for the dissemination of warnings on new threats emerging.

Displacement: Almost the entire population affected, approximately 5,274 people, has been displaced and is residing in emergency shelters in plantations which are located on elevated grounds bordering the coastal areas. Almost all displaced families own plantation land and many families expressed a demand for safer reconstruction techniques and measures that mitigate the impacts of future disaster events.

Trauma: The affected population is still under shock, traumatized and scared to move back to their original village sites. The overwhelming view of people is not to rebuild their homes and livelihoods in the coastal areas to prevent similar tragedies in the future. A final decision,

however, can only be expected after extensive community consultations and thorough assessments of disaster and climate risks.

Climate Change Risks: The adverse impacts of climate change[7] are set to worsen the high state of vulnerability of the communities, the population and the environment directly affected by the tsunami. A cross-sector and multi-hazard approach is considered optimal in recovery so that human development interventions can be included that sustain livelihood and environment for current and future generations. Climate change risks for the affected areas include increasingly intense cyclones, increasing intensity of rainfall events in short periods; intense coastal flooding and inundation; prolonged periods of drought; accelerated erosion of coastlines and steep cliff areas; accelerated sea level rise and coral bleaching. Socio-economic risks include land displacement, less human rights protection, and limited sources livelihood.

Strategy: The proposed strategy for early recovery interventions focusing on reducing disaster risks and climate-related risks consists of the following **four-pronged approaches** that are supported by a mix of immediate and medium to long-term strategic actions.

(1) Transition Interventions from Relief to Recovery: Measures to ensure the smooth handover from relief to recovery interventions by addressing the residual humanitarian needs of the affected population by avoiding gaps in the provision of vital services to the affected communities. This includes the provision of culturally appropriate psycho-social support, and the screening and retrofitting of public buildings that may have incurred seismic damages from the earthquake.

(2) Governance Arrangements for Recovery: Measures to put in place the overall governance arrangements for recovery by setting the national policy framework for recovery and by strengthening institutional capacities of national and local authorities to facilitate the effective design, planning and implementation of early, medium and long-term recovery programs. This also includes the strengthening of the existing National Disaster Management Plan and reviewing existing disaster risk management plans, policies, programs and legislation (see box below)

(3) Building Back Better: Measures to ensure that opportunities for building back better address reduction of immediate to long term vulnerabilities of village communities, ecosystems and the environment. That these are grasped in the planning and implementation of recovery and reconstruction programmes in all sectors to avoid re-establishing previous or even new disaster risks. This will be achieved through disaster risk assessments; climate-proofing design and guidelines of utility reconstruction services; hazard safety construction standards; and the promotion of alternative livelihoods that are less vulnerable to the impacts of prevalent natural hazards. Opportunities to develop alternative lifestyles such as sustainable energy living are also explored.

(4) Community Awareness & Resilience: Measures to raise community level disaster awareness and community resilience by strengthening participation and mobilization; providing

[7] Physical impacts of climate change for coastal communities in Samoa include (but not limited to) – accelerated sea level rise, frequent tidal surges, prolonged drought, sporadic rainfall, floods, intense and frequent tropical cyclones (NAPA 2005, National Climate Change Synthesis Report, 2004,

information on hazards and risks, climate change impacts, adaptation and mitigation options; government policies and programmes; developing village preparedness plans and organization; and through training and capacity building in disaster response, preparedness and mitigation.

The above interventions will not be implemented via a 'business as usual' approach that rebuilds previous vulnerabilities or creates new risks. Instead, the focus will be on enhancing safety standards through the integration of appropriate measures that reduce disaster risk and the adverse impacts of climate change as early as possible in the redevelopment process of the affected areas.

Samoa has in place strategies and planning programs aimed at reducing disaster and climate related risks which are linked to the Strategy for the Development of Samoa 2008-2012. In particular the comprehensive climate change adaptation and mitigation programme provides "entry projects" that can bridge the continuum from immediate recovery to longer-term poverty reduction and climate-proofed socio-economic development.

Key Recommendations

National policy and institutional arrangements:

- Clarify national policy and institutional arrangements to guide the post-tsunami recovery process;
- Carry out well targeted participatory institutional capacity building interventions for recovery programs;
- Explicit development of National Recovery Preparedness Plans; review of Tsunami Response Plan;
- Development Tsunami Preparedness and Response Plans; and
- Review National Building Code

Comprehensive and rapid assessment of hazard risks:

- Carry out comprehensive assessment of all hazard risks in coastal areas and areas of resettlement (immediate);
- Conduct rapid assessment of seismic and tsunami risks;
- Integrate new projections on impacts of global climate change on hydro-meteorological events;
- Carry out forest-fire risk assessment in new settlement plans

In-depth assessment of environmental impacts:

- Conduct in-depth EIA to determine impacts on new land due to increased density and livelihood activities and develop a follow-up system of its recommendations;

Climate change and disaster risk integration measures:

- Develop climate-proof and disaster reduction guidelines that support and direct existing reconstruction guides of all infrastructures (shelters, roads, education and health facilities, communal buildings, tourism facilities and more);
- Demonstrate reconstruction activities using the guidelines that which ensures inland and coastal ecosystems become more resilient to climate change risks;
- Re-design and carry out incremental climate-proof activities over already installed

utility services (electricity, water, roads, etc) with the aim to reduce vulnerability of ecosystems; • Provisions for grid extensions and installing solar photovoltaic to provide electricity access to off-grid households and solar PV street lighting in new access (inland) roads and settlement areas; • Carry out coastal replanting and re-vegetation program along coastlines and at the same time inland re-vegetation and protection in particular for watershed areas
Village Based Consultations on settlement options: • Carry out gender-sensitive and inclusive village consultations that discuss settlement choices and clarify government's recovery policy, assistance and contributions of affected population
Disaster and Climate Change awareness and community mobilization: • Carry out comprehensive climate change and disaster awareness programmes to take advantage of the receptive planning and mobile organization of village communities;
Development of Village Disaster Preparedness Plans: • Accelerate implementation of VDMPs into the tsunami affected areas; • Provision for rain water harvesting tanks for key communal facilities and new shelters
Training on disaster resilient building techniques: • Provisions for training on disaster resilient building techniques for local carpenters; • Provisions for an incentive based system to increase acceptance and compliance by affected population

Table: Summary of Costs for proposed Early Recovery Interventions

DRR, Governance & Climate Change	SAT $
From Relief to Recovery	778,000
Governance Arrangements	825,000
Building Back Better	4,936,500
Community Awareness & Resilience	615,000
TOTAL	**$7,154,500**

Refer Annex D for the details of the costs for disaster risk reduction, governance and climate change.

Environment

Situation: A rapid assessment of the environmental impacts of the 29 September tsunami was conducted by a multi-agency team from 3 to 14 October, 2009. Fourteen "green" and 10 "brown" environmental variables were selected and measured based on the experience of the survey team and similar reports from elsewhere. During a tour of the affected area on Upolu by car and on foot those "assessable" variables were scored "high" (over two thirds affected), "medium" (over one third, less than two thirds affected), "low" (less than a third affected) or zero (unaffected). Manono and Savaii were surveyed by air with the former showing evidence of some damage and the later apparently none or very little. The most affected areas in Upolu were villages in the Aleipata, Lepa and Falealili villages with the most obvious indicators of the tsunami's impact being solid waste (sometimes resulting from the complete destruction of a village), erosion of the beach and fore-shore and the (expected) impact on marine resources. Other environmental variables assessed also showed similar patterns. Impacts on a wharf/dry dock facility are also described (including lost fuel drums) as are the possible environmental implications of new settlements created by displaced persons (mainly revolving around sanitation, drainage and water supply). A full report is attached in Annex N.

Strategic Recommendations

A number of recommendations were identified and categorized as being needed in the short (<3 months) or medium to long term (> 3 months).

Strategically the key recommendation for marine habitats is to implement actions that foster the natural recovery and resilience of these areas.

Strategically the key recommendation for terrestrial habitats is to implement actions that focus on restoration based on ecological and resilience principles, such as replanting affected coastlines with native wave resistant species and ensuring that all developments, rebuilding and associated infrastructure (e.g. villages, tourism) are undertaken cognizant of both the ongoing risk from tsunami, cyclones, sea level rise and other coastal hazards and follow appropriate planning processes and codes of environmental practice to minimize environmental impact to sensitive terrestrial and marine habitats.

Relevant National Policies and Strategic Plans:

- National Biodiversity Strategic Action Plan
- Biodiversity Policy
- Waste Management Policy
- National Adaptation Programme of Action (NAPA)
- National Disaster Management Plan
- Coastal Infrastructure Management Plan (CIM Plan)
- National Implementation Plan (NIP) for Persistent Organic Pollutants
- Land, Surveys and Environment Act 1989

General Recommendations:

- The existing village Coastal Infrastructure Management Plans developed in full consultation with village governance systems (e.g. village fono) are an appropriate planning mechanism for participatory planning of the restoration of villages on the impacted coast.
- Consideration should be made to revise the Coastal Infrastructure Management Plans to include the management of coastal natural resources such as coral reefs, lagoon, sea grass beds, beaches, swamps, mangrove areas, etc as well as built infrastructure. Such CIM plans could be rephrased "Coastal Asset Management Plans" to reflect the fact that all coastal assets are included.
- The national coastal hazard zone maps and the CIM plans for affected districts should be revised to include a specific tsunami vulnerability layer and the likelihood of a repeat tsunami and areas most at risk from it must be factored into all planning.
- Relevant planning processes and codes of environmental practice should be followed for all rebuilding and restoration work including new developments.
- Those recommendations endorsed by the Government of Samoa should identify clear decision making lead agencies, develop clear and costed terms of reference and invite partnerships for resourcing and needed expertise in these from local and overseas organizations.
- Work carried out in the recommendations above should follow normal protocols in Samoa for village and district approvals and participation. Existing governance structure e.g. MPA District Committees, CIM committees should be used effectively.
- Every effort should be made to capitalize on local expertise and supplement with overseas expertise where needed.
- Development of new settlements for displaced communities should follow relevant codes of environmental practice and be planned in a participatory manner to mitigate potential environmental impacts.
- Every effort should be made to collaborate with partners in American Samoa to maximize benefits and sharing of knowledge and experiences.

Note: *Specific recommendations for marine and terrestrial habitats follow.*

Marine:

Short term:

- Clean up activities;
- Undertake offshore aerial check of debris and removal of any items posing risk to shipping or the coast;
- Undertake lagoon debris removal manually in impacted areas. Do not use dredging as this will cause further impact. Find and remove lost diesel fuel drums in the vicinity of the Aleipata Wharf;
- Beach and foreshore area clean ups are required in partnership with communities and after salvage of useful materials by owners;
- Stabilization of immediate beach and foreshore areas and associated infrastructure e.g. roading to prevent further impact to the marine environment e.g. from sediment run-off;
- Care taken in the clean-up of debris including solid waste in sensitive areas such as mangrove and wetlands so as not to damage these sites;
- Aleipata Wharf clean up and immediate stabilization of sources of further pollution e.g. sediment run off;

- Potential food source contamination;
- As a precaution, warn local villages of potential food source contamination particularly shellfish, sea slugs and other near shore species in highly impacted areas including in marine areas surrounding the Aleipata wharf;
- Assays of key food species e.g. shellfish in heavily impacted areas to assess safety for consumption. Based on results advise villagers accordingly;
- Marine Rapid Assessment (MRA); and
- Undertake an in-water marine rapid assessment with focus on expected highly damaged areas and those where previous information exists e.g. Aleipata and Safata MPAs.

As part of the MRA:

- Assess impact/vulnerability of key coastal features e.g. channels and embayments;
- Identify sites for longer term recovery monitoring;
- assess loss of ecosystem function and impact on services e.g. food sources for people in affected areas;
- A joint team should be lead by MNRE/Fisheries combined with local and overseas expertise where needed. Expertise should include resource economist and at least one marine surveyor with marine tsunami impact experience;
- MPA and Fisheries no take zones;
- Undertake more detailed impact assessment of MPA and Fisheries no take zones and their potential for recovery and/or need for resettlement. Note pre impact information for many of these sites is available (MNRE, Fisheries);
- Based on consultations and agreement with villages and districts remark no take zones;
- Marine Food Source Supply;
- Using the results from the above undertake an assessment for marine food source supply including specific recommendations for possible substitute sources and rebuilding fishing capacity in a manner that does not significantly compromise marine area recovery e.g. first focus on rebuilding offshore capacity that can benefit entire village, ban outside commercial fishing in an offshore area to maximize local access;
- Aleipata Wharf;
- Detailed assessment of tsunami impact and the ongoing risk, costs and benefits of the wharf and its widened channel to nearby coastal villages;
- Other marine stressors; and
- Remove/reduce other stressors and impacts to the coastal marine systems e.g. ban on sand mining, commercial fishing, and new reclamations to allow the best chance for recovery.

Medium- long term:

- Other marine stressors;
- Remove/reduce other stressors and impacts to the coastal marine systems e.g. ban on sand mining, commercial fishing, new reclamations to allow best chance for natural recovery;
- Aleipata Wharf;
- Comprehensive assessment of long term risk, costs and benefits of rebuilding the wharf assessed, including with local community input, before wharf rebuilding actioned beyond the immediate stabilization and clean up recommended above;
- Recovery Monitoring;

- Based on the MRA results institute a monitoring programme to understand recovery of marine habitat from tsunami impacts; and
- Include in the recovery work monitoring of fishing capacity and ongoing need for any substitution measures for marine food supply that were used in the short term.

Terrestrial:

Short term:

- Clean up activities;
- Undertake clean up and removal of solid waste from terrestrial, wetlands, river habitats and village areas. Care to be taken in clean up so that sensitive ecosystems are not damaged e.g. by earth moving equipment;
- Maximize reusing and recycling materials and sort and remove remaining material into disposable and hazardous rubbish. Link with JICA Clean Up project;
- Specific focus on clean up and proper disposal of waste from illegal/improper dumps exposed by tsunami e.g. Tuialemu, Lalomanu;
- Review and update plan for effective local waste collection;
- Stabilization of land based sources of sediment from wetlands, streams, infrastructure e.g. roading to prevent further impact to the marine environment e.g. from sediment run-off;
- Terrestrial Impact and Restoration Assessment;
- Perform a comprehensive assessment of impacts on sensitive coastal habitats such as marshes and swamp areas and environmental impacts of new settlements;
- Assess restoration options for key terrestrial habitats made with costs clearly identified; and
- Build into these assessments a recognition of the ongoing tsunami risk and related coastal area vulnerability/hazard zones e.g. from channels and embayment areas. This should inform patterns of rebuilding and new development.

Medium- long term:

- Replanting coastlines and river banks with native plants;
- Plant buffer zones of native salt resistant trees (e.g. niu, talie, fetau, milo, pu'a, mangrove tree species etc) along the impacted coastline to reduce coastal erosion, hold together the foreshore and protect infrastructure;
- Plant buffer zones of native salt resistant trees along impacted river banks to reduce river bank erosion and protect infrastructure;
- Restoring and conserving sensitive coastal habitats;
- Sensitive coastal habitats (swamps, mangrove areas etc) should be restored and protected from development and further degradation. Such areas provide multiple ecosystem services including the protection of the coastline from erosion and adjacent settlements from wave damage;
- CIM Plans – Updating and Implementation;
- Ensure that findings from incoming geo-science teams are fed into planning processes including revision of CIM plans as required;
- Add a specific tsunami risk layer to the existing coastal hazard zone maps;
- Seawall rebuilding should follow proper standards according to codes of environmental practice as appropriate – in some areas natural alternatives may be preferable;
- Restoration actions identified above should be included in a revision of the CIM plans; and

- Ensure that a mechanism for implementing CIM plans including partner roles and identification of resources needed is developed and then fully implemented.

Capacity development of environmental management and sustainability for local communities and targeted groups:

Short term:

- Capture and document lessons learnt from the tsunami in audio and written formats and disseminate widely;
- Involve and conduct training for local communities as part of all the immediate marine and terrestrial recovery interventions;
- Educate communities in the new resettlement areas of sound environmental practices such as on sustainable land management methodologies, waste management, and biodiversity conservation;
- Raise awareness of the communities on the critical functions of ecosystems as barriers/protection from natural disasters and extreme events; and
- Conduct a detailed assessment on the impacts of damages on the environment caused by the tsunami on women, men and vulnerable groups in the community.

Medium to Long Term:

- Undertake educational and awareness programmes on conservation and sustainable environmental management practices that can be implemented as part of the early recovery and rebuilding processes;
- Undertake specific training on participatory environmental monitoring tools pre and post disaster;
- Integrate early warning systems and vulnerability assessment methodologies into environmental management processes;
- Strengthen environmental governance at all levels in the community in particular the impacts of environment depletion and degradation on the different groups in the communities; and
- Use the findings and recommendations from the impacts of environmental damages on communities to develop appropriate interventions for the communities.

Summary of costed activities for immediate environmental detailed assessments

Cost item	Estimated Cost (US $)
• Clean up and appropriate disposal of waste and pollutants from impacted coast • Detailed waste and pollution assessments	$750,000.00
• Detailed assessment of impacts and options for mitigation and restoration (marine and terrestrial)	$350,000.00
• Capacity development on environmental management and sustainability for local communities and targeted groups	$100,000.00
Total	**US $1,200,000 (SAT $3,000,000)**

Refer Annex N to reference the Environmental Needs Assessment.

Health Sector

Situation: The TTM National Hospital's response to the Tsunami during day zero to day five, the acute phase, was to resuscitate, retrieve and triage. This was initially carried out by the Samoa Disaster Organisation and the clinical and health allied staff of the TTM National Hospital. This was followed by the Australian Rapid Response team, primarily trauma and surgical. The New Zealand Disaster and Emergency Response team took over from the Australian team on day six.

Samoan volunteer Doctors (Specialists and GPs) and Nurses from New Zealand began arriving on the second day after the Tsunami and were part of the TTM Hospital's acute phase response. There were also Samoan volunteer Doctors from America and Canada.

The third day after the Tsunami saw continuing admissions of a large number of survivors with multiple fractures, soft tissues injuries and aspiration pneumonia from near drowning. The survivors were swept by the Tsunami waves and inhaled salt water contaminated with sand, mud, foreign bodies and potential pathogens. The medical team asked all the Tsunami patients with aspiration pneumonia if they remembered where they were found. Some were found amongst upturned pigsties, rubbish tips, septic tanks and cemeteries.

Strategy: The strategy is three fold: strengthen the system to meet the current needs of the population; short-term improvements in the level of service delivery; and longer-term policy following directions and health system rationalization to the changed situation.

Immediate Priorities

- Restoration of priority public health and curative care services
- Provision of temporary outreach (mobile clinic) services
- Enhanced surveillance systems to ensure effective and efficient response to conditions and diseases of public health importance (prevention of disease outbreaks)
- Enhanced information system to track the impact and progress of recovery
- Immunization – measles campaign

Summary of proposed (and existing) strategies to address the key early recovery needs	
Health Services Continuity & Emergency Response Plan	2006
National Health Service Disaster Management Plan	2008
Samoa Health Sector Plan	2008-2018
Samoa Mental Health Policy	
Avian/Pandemic Influenza Preparedness & Response Plan	2008
National Health Account Reports	1998-2007 (successive yearly reports
Medium Term Expenditure Framework	
MOH Monitoring & Evaluation Framework'	–
Draft NCD Policy & Strategy	2004
Refer Annex E for the details of the costs for the health sector.	

A Glance Ahead: A Damage, Loss, and Needs Assessment for the Medium to Long-Term Recovery

The framework presented in this report identifies an **early recovery framework**, based on key impacts and vulnerabilities to the affected communities. Early recovery focuses on restoring the basic foundations that will allow people to rebuild their lives in the next three to eight months.

To undertake a full Post Disaster Needs Assessment (PDNA) the Government of Samoa has requested support of the World Bank, Asian Development Bank and the United Nations to conduct a quantitative analysis of the tsunami impact and provide recommendations for the **medium and longer term recovery and reconstruction**. Three dimensions will be addressed in the Damage and Loss Assessment (DaLA) which are: the evaluation of (a) physical ***damage***, (b) economic ***loss***, and (c) the medium to longer term ***needs***. The objectives of this **damage, loss, and needs assessment** are to:

1. Estimate the overall impact of the disaster per sector and the overall economy
2. Identify the needs for medium to long-term recovery and reconstruction
3. Define and cost specific risk management activities associated with recovery and reconstruction

Experience shows that recovery and reconstruction programmes are more successful when they are based on a sound understanding of impact and needs. Combining the DaLA with the early recovery framework arriving at a full PDNA will enable a comprehensive evaluation of the impact of the disasters from the community level up to national level, combining financial, economic and social aspects of the effects of the disasters.

Annex A: Table of Estimated Damages and Losses

Sector	Sub-Sector	Disaster Effects				Total
		Damage	Losses	Public	Private	
Social Sectors		10.37	9.50	19.87	-	**19.87**
	Health	1.30	7.37	8.67	-	8.67
	Education	9.07	2.13	11.20	-	11.20
Productive Sectors		**39.45**	**77.33**	**1.00**	**115.77**	**116.77**
	Agriculture	14.45	21.01	-	35.45	35.45
	Commerce	0.90	1.32	-	2.22	2.22
	Tourism	24.10	55.00	1.00	78.10	79.10
Infrastructure		**113.14**	**10.78**	**88.00**	**35.92**	**123.92**
	Housing	31.46	1.01	1.01	31.46	32.47
	Water	3.94	3.63	7.56	-	7.56
	Electricity	1.43	0.29	1.72	-	1.72
	Transport	73.35	4.76	75.26	2.85	78.11
	Telecommunication	2.96	1.10	2.44	1.61	4.06
Cross-sectoral		**-**	**0.32**	**0.32**	**-**	**0.32**
	Environment	-	0.32	0.32	-	0.32
Total		**162.96**	**97.93**	**109.19**	**151.70**	**260.88**

Sector	Sub-Sector	Build back			Build Back + Relocate		
		Public	Private	Total	Public	Private	Total
Social Sectors		**19.87**	**-**	**19.87**	**32.38**	**-**	**32.38**
	Health	8.67	-	8.67	11.25	-	11.25
	Education	11.20	-	11.20	21.13	-	21.13
Productive Sectors		**1.00**	**115.77**	**116.77**	**1.00**	**115.77**	**116.77**
	Agriculture	-	35.45	35.45	-	35.45	35.45
	Commerce	-	2.22	2.22	-	2.22	2.22
	Tourism	1.00	78.10	79.10	1.00	78.10	79.10
Infrastructure		**88.00**	**44.05**	**132.05**	**192.03**	**45.92**	**237.95**
	Housing	1.01	39.59	40.60	1.01	39.37	40.38
	Water	7.56	-	7.56	15.53	-	15.53
	Electricity	1.72	-	1.72	28.75	-	28.75
	Transport	75.26	2.85	78.11	139.73	2.85	142.58
	Telecommunication	2.44	1.61	4.06	7.01	3.70	10.71
Cross-sectoral		**0.80**	**-**	**0.80**	**0.80**	**0.20**	**1.00**
	Environment	0.80		0.80	0.80	0.20	1.00
	Disaster Risk Management	4.18		4.18	4.80		4.80
Total		***109.67***	***159.82***	**269.49**	***226.21***	***161.89***	**388.11**

Annex B. Details of Cost Calculation for Resettlement & Basic Social Services

Zone 1[8]**:** Sale'aumua to Lalomanu

Total Population: 2258 (2006 Census) or 293 Households (based 7.7 persons per household)

Total Affected Population: 2032 (approx. 90% of total population) or 264 Households

Recommendation: <u>Option 1: Resettle Total Affected Population into Inland Plantations</u>

- **Roads: Total Cost:** SAT $38.1 million
  - **Provisions**[9]**:** re-shaping, drainage, gravelling, sealing of plantation roads to access resettlement sites
    - **Cost:** SAT $30 million (SAT $2 million per kilometer x 15 kilometers)[10]
  - **Provisions**[11]**:** Repair and maintenance of existing main east road
    - **Cost:** SAT $8.1 million (SAT $4.5 million for road rehabilitation and 3.6 for sea wall reinforcement)[12]

- **Power:**
  - **Total Cost:** SAT $15 million (Future resettlement works include: construction of distribution lines and underground HV and LV cables)

- **Water:**
  - **Total Cost**[13]**:** SAT $6,800,000
  - **Provisions (short-term):** 2 additional water trucks
    - **Cost:** SAT $600,000 (over 6 month period)
  - **Provisions (short to medium-term)**: rain tanks, roofing irons to collect rain water (5 per family)
    - **Cost:** SAT $600,000
  - **Provisions (medium to long-term):** water source development, storage, disinfection/treatment
    - **Cost:** SAT $5,600,000 million (Samoa Water Authority)

- **Education:**
  - **Total Cost:** SAT $5,236,000
  - **Provisions (short-term):** transport, water/sanitation, temporary learning centres, furniture
    - **Cost:** SAT $1,261,000

[8] **Zone 1 consists of the following villages:** Sale'aumua, Mutiatele, Malaela, Satitoa, Ulutogia, Vailoa, Lalomanu
[9] This provision does not include land acquisition for road reserve.
[10] **This figure includes the villages of:** Sale'aumua, Mutiatele, Malaela, Satitoa, Ulutogia
[11] This provision does not include land acquisition for road reserve.
[12] **This figure consists of the coastal road from:** Sale'aumua to Lalomanu
[13] This figure applies to both Zone 1 and Zone 2.

Provisions (medium-term): disaster risk reduction training for teachers and implementation of disaster risk reduction curriculum in schools

- **Cost:** SAT $50,000

Provisions (long-term): number of primary schools, secondary schools and teacher housing to be constructed up to adopted standards of safe construction – including sex desegregated urinals and latrines

- **Cost:** SAT $3,925,000 (4 x SAT $700,000 per primary school and 1 x SAT $875,000 per secondary schools and 1 x SAT 250,000 for teacher housing)

❖ **Health**:

Total Cost: SAT $0

Provisions: 1 health centre

- **Cost:** SAT $0 (health centre located in Lalomanu not affected and appropriately located to the resettlement option)

❖ **Housing**[14]**:**

Total Cost: SAT $15,840,000

Provisions: 264 houses

- **Cost:** SAT $15,840,000 (cost of 1 house and installation of household latrines is SAT $60,000)

Provisions (short-term): materials only, potential technical assistance

Provisions (long-term): hazard safe construction design for traditional Samoan fale with extension to be provided in a plan and costing required for infrastructure material is provided

Zone 2[15]**:** Lalomanu to Lepa

Total Population: 2220 (2006 Census) or 288 Households (based 7.7 persons per household)

Total Affected Population: 1998 (approx. 90% of total population) or 295 Households

Recommendation: <u>Option 1: Resettle Total Affected Population into Inland Plantations</u>

❖ **Roads: Total Cost:** SAT $46.21 million

Provisions[16]**:** re-shaping, drainage, gravelling, sealing of plantation roads to access resettlement sites

- **Cost:** SAT $28.75 million (SAT $2.5 million per kilometer x 11.5 kilometers)[17]

Provisions[18]**:** Repair and maintenance of existing main south road

- **Cost:** SAT $17.46 million (SAT $9.7 million for road rehabilitation and

[14] Provisions for housing are contingent on Government policy on housing subsidies for affected families.
[15] **Zone 2 consists of the following villages:** Lalomanu, Vailoa, Ulitugia, Aufaga, Vaigalu, Siupapa, Saleapaga, Leatele, Lepa.
[16] This provision does not include land acquisition for road reserve.
[17] **This figure includes the villages of:** Lalomanu to Lepa.
[18] This provision does not include land acquisition for road reserve.

SAT $7.76 million for sea wall reinforcement)[19]

- **Power:**

  Total Cost: SAT $11.5 million (Future resettlement works include: construction of distribution lines and underground HV and LV cables)

- **Water:**

  Total Cost: SAT $8,800,000

  Provisions (short-term): 2 additional water trucks
  - **Cost:** SAT $200,000 (over 6 month period)

  Provisions (short-term): rain tanks, roofing irons to collect rain water (5 per family)
  - **Cost:** SAT $200,000

  Provisions (medium to long-term): water source development, storage, disinfection/treatment
  - **Cost:** SAT $8.4 million (Samoa Water Authority)

- **Education:**

  Total Cost: SAT $2,261,000

  Provisions (short-term): people, transport, water/sanitation, temporary learning centres, furniture
  - **Cost:** SAT $1,261,000

  Provisions (medium-term): disaster risk reduction training for teachers and implementation of disaster risk reduction curriculum in schools
  - **Cost:** SAT $50,000

  Provisions (long-term): number of primary schools, secondary schools and teacher housing to be constructed up to adopted standards of safe construction – including sex desegregated urinals and latrines
  - **Cost:** SAT $950,000 (1 x SAT $700,000 per primary school and 1 x SAT $250,000 for teacher housing)

- **Housing[20]:**

  Total Cost: SAT $15,540,000

  Provisions: 259 houses
  - **Cost:** SAT $15,540,000 (cost of 1 house and installation of household latrines is SAT $60,000)

  Provisions (short-term): materials only, potential technical assistance

  Provisions (long-term): hazard safe construction design for traditional Samoan fale with extension to be provided in a plan and costing required for infrastructure material is provided

Zone 3[21]: Matatufu to Maninoa

[19] **This figure consists of the coastal road from:** Sale'aumua to Lalomanu.
[20] Provisions for housing are contingent on Government policy on housing subsidies for affected families.
[21] **Zone 3 consists of the following villages:** Matatufu, Lotofaga, Vavau, Salani, Salesate, Sapunaoa, Malaemalu, Tafatafa, Mata-utu, Vaovai, Poutasi, Ili-ili, Siumu, Maninoa.

Total Population: 6553 (2006 Census) or 851 Households (based 7.7 persons per household)

Total Affected Population: 970 (approx. 15% of total population) or 126 Households

Recommendation[22]**: Option 2 –** Some of the Affected Population Resettled

- **Roads: Total Cost:** SAT $16 million

  Provisions[23]**:** re-shaping, drainage, gravelling, sealing of plantation roads to access resettlement sites

  - **Cost:** SAT $16 million (SAT $2 million per kilometer x 8 kilometers)[24]

- **Power:**

  Total Cost: SAT $8 million (Future resettlement works include: construction of distribution lines and underground HV and LV cables)

- **Water**[25]**:**

  Total Cost: SAT $400,000

  Provisions (short to medium): repair of existing reticulation system

  - **Cost:** SAT $200,000 (Samoa Water Authority)

  Provisions (medium to long-term): new reticulation scheme

  - **Cost:** SAT $200,000

- **Health**:

  Total Cost: SAT $2,400,000

  Provisions: 1 district hospital - District hospital was located in Poutasi and was inundated and staff housing destroyed, therefore, it is recommended that a district hospital and staff housing be relocated

  - **Cost:** SAT $1,200,000

  Provisions: Health centre situated in Fusi to be relocated inland and west, and for service reasons upgraded to district hospital

  - **Cost:** SAT $1,200,000

- **Education:**

  Total Cost: SAT $2,436,000

  Provisions (short-term): people, transport, water/sanitation, temporary learning centres, furniture

  - **Cost:** SAT $1,261,000

  Provisions (medium-term): disaster risk reduction training for teachers and implementation of disaster risk reduction curriculum in schools

[22] Most of the public infrastructure and social services (roads, schools, water, power, etc.) in this zone are already located inland in a safe area.
[23] This provision does not include land acquisition for road reserve.
[24] **This figure includes the villages of:** Salani, Salesate, Sapunaoa, Malaemalu, Tafatafa, Mata-utu, Vaovai, Poutasi, Ili-ili, Siumu, Maninoa.
[25] Vavau Village only.

- **Cost:** SAT $50,000

Provisions (long-term): number of primary schools, secondary schools and teacher housing to be constructed up to adopted standards of safe construction – including sex desegregated urinals and latrines

- **Cost:** SAT $1,125,000 (1 x SAT $875,000 per secondary school and 1 x SAT $250,000 for teacher housing)

❖ **Housing**[26]**:**

Total Cost: SAT $7,560,000

Provisions: 126 houses

- **Cost:** SAT $7,560,000 (cost of 1 house and installation of household latrines is SAT $60,000)

Provisions (short-term): materials only, potential technical assistance

Provisions (long-term): hazard safe construction design for traditional Samoan fale with extension to be provided in a plan and costing required for infrastructure material is provided

Zone 4: Manono-tai

Total Population: 1372 (2006 Census) or 178 Households (based 7.7 persons per household)

Total Affected Population: 200 (approx. 20% of total population) or 36 Households

Recommendation[27]**: Option 3: None of the Affected Population Resettled**

❖ **Housing**[28]**:**

Total Cost: SAT $2,160,000

Provisions: 36 houses

- **Cost:** SAT $2,160,000 (cost of 1 house and installation of household latrines is SAT $60,000)

Provisions (short-term): materials only, potential technical assistance

Provisions (long-term): hazard safe construction design for traditional Samoan fale with extension to be provided in a plan and costing required for infrastructure material is provided

❖ **Education:**

Total Cost: SAT $50,000

Provisions (medium-term): disaster risk reduction training for teachers and implementation of disaster risk reduction curriculum in schools

- **Cost:** SAT $50,000

[26] Provisions for housing are contingent on Government policy on housing subsidies for affected families.

[27] Most of the public infrastructure and social services (roads, schools, water, power, etc.) in this zone are already located in a safe area, and only some need to be rebuilt.

[28] Provisions for housing are contingent on Government policy on housing subsidies for affected families.

Annex C. Details of Cost Calculation for Livelihoods

Agriculture, Livestock and Fisheries: Breakdown of Activities and Related Costs

Agriculture and Livestock

Target population of 500 households across all zones:

1. **Provision of Agriculture inputs** such as farming tools, seed and planting materials as well as machinery and support services.
   - **Inputs**: farming tools, seeds, planting material, machinery, support services
   - Farming tools, seeds and materials: SAT $1,920,000; Machinery: SAT $29,000; Support Services: SAT $388,000
   - **Total Cost:** SAT $2,337,000

2. **Provision of Livestock.**
   - **Inputs**: pigs, poultry, pig and chicken fencing, pig and chicken feed
   - **Total Cost:** SAT $3,479,000

3. **Training on diversifying** agriculture (for income) plus organic farming practices (to reduce pesticides (for income) plus use of resilient crops during times of disaster
   - **Inputs**: training in affected villages
   - **Unit Costs**: SAT $1,000 (travel and material costs)
   - **Total Cost:** SAT $30,000

4. **Training on livestock** diversification and management
   - **Inputs**: training in affected villages
   - **Unit Costs**: SAT $1,000 (travel and material costs)
   - **Total Cost:** SAT $30,000

TOTAL: SAT $5,876,000

Fisheries

Target population of 105 households across all zones:

5. **Replacement of fishing boats (paopao).**
   - **Inputs**: replacement of fishing boats
   - **Unit Costs**: SAT $5,000
   - **Total Cost:** SAT $1,630,000

6. **Provision of fishing gear.**
   - **Inputs**: complete set of fishing gear; canoe; dinghy for 105 households
   - **Unit Costs**: between SAT $300 to SAT $8,000
   - **Total Cost:** SAT $981,650

7. **Private sector grant / credit mechanisms** could be activated (via bilateral channels) to support the rehabilitation / replacement of Alia fishing vessels and provision of lost equipment and fishing gear.
   - **Inputs**: grants for replacement of fishing vessels, equipment, gear (12 vessels)
   - **Unit Cost:** SAT $51,042
   - **Total Cost:** SAT $612,500

8. **Training for fisheries on DRR:** integrate EWS into their processes; how to maintain their fishing vessels in terms of disaster prep
   - **Inputs**: **Unit Costs**: SAT $1,000 for each Zone
   - **Total Cost:** SAT $3,000

TOTAL: SAT $3,227,154

Tourism: Breakdown of Activities and Related Costs

Tourism

Zones: ALL
Number of Affected Tourism Operators: 20 (Samoa Tourism Authority)

9. **Rebuilding of accommodation and associated structures**.
   - **Inputs**: replacement of beach fales and medium-to-higher end accommodation facilities, as well as associated structures such as dining and washroom facilities.
   - **Costs**: KVA initial cost estimates = SAT $20,000,000

10. **Accommodation (upland)**.
    - **Inputs**: 10 new accommodation facilities upland
    - **Costs**: Unit cost SAT $60,000
    - **Total Cost:** SAT $600,000

11. **Clean up of Beaches**.
    - **Inputs**: equipment and vehicles for clean-up at the 20 sites

- **Costs**: Unit cost SAT $10,000
- **Total Cost:** SAT $200,000

12. Marketing initiatives.

- **Inputs**: Budget of SAT $500,000 so far for marketing activities aimed at reviving tourism demand
- **Costs**: Unit cost SAT $100,000
- **Total Cost:** SAT $500,000

TOTAL: SAT $21,300,000

Income Generating Activities: Breakdown of Activities and Related Costs

Income Generation

Zones: ALL
Total Affected Population: 5,274 (approx. 90% of total population in affected areas)
Equivalent to 685 Households

13. Mobilising community support for recovery (immediate):

- **Inputs**: one person per household (685 households) to dedicate their time for 10 days recovery activities for their community – allowance and material
- **Unit Costs**: SAT $300 allowance
- **Total Cost:** SAT $197,700

14. Small grants for new and existing business development (immediate to medium): particularly for small and medium-sized enterprises in the affected areas, with a focus on women members of households.

- **Inputs**: small grants provided to small to medium size enterprises (through Private Sector Support Facility – category B applicants)
- **Unit Costs**: SAT $10,000 (Cat B: SAT $500 to SAT $20,000)
- **Total Costs:** SAT $300,000

15. Training for new business development with particular focus on women and youth in affected areas (medium to longer term):

- **Inputs**: training on new business development in affected areas, including purchase and training is ICTs in schools and for business.
- **Unit Costs**: SAT $1,000 (travel and material costs)
- **Total Cost:** SAT $30,000

16. Feasibility study for developing options for alternative livelihood activities (medium):

- **Inputs**: feasibility study exploring alternative livelihood strategies for affected (and other) communities, including high-value end tourism products (such as traditional and cultural art and crafts, weaving and ICT and tradesmen related services).
- **Cost**: SAT $20,000

TOTAL: SAT $547,700

Annex D. Details of Cost Calculation for Disaster Risk Reduction, Governance and Climate Change

Disaster Risk Reduction, Governance and Climate Change: Breakdown of Activities and Related Costs

Disaster Risk Reduction and Governance

All Zones[29]

17. Ensure effective hand-over from humanitarian to early recovery interventions

Immediate

- **Meet residual humanitarian needs** of the affected population, especially food, water, emergency shelter, local transport, radios and phones, and basic social services. **Unit Cost: ST$240,000**
- **Introduce transparency and accountability measures** in the delivery mechanisms of humanitarian and recovery assistance**: Unit Cost ST $50,000**
- **Ensure that culturally appropriate psycho-social assistance is available** to all members of affected communities and integrated into long-term programmes: **Unit Cost ST$ 120,000**
- **Provisions for rain water harvesting tanks for key communal facilities and new shelters. Unit Cost ST $368,000**

TOTAL COST 1: SAT $778,000

18. Strengthen overall governance arrangements for recovery by setting national policy framework for recovery and by strengthening institutional capacities of national and local authorities

Immediate

- **Clarify national policy and institutional arrangements** to guide the post-tsunami recovery process, including the setting of national recovery standards, principles and priorities, roles and responsibilities of authorities at all levels and other stakeholders: **Unit Cost: SAT $50,000**
- **Institutional capacity building at national and local level** to facilitate the effective design, planning and implementation that allows the full participation of the affected communities; **Unite Cost: SAT $200,000**
- **Establish a comprehensive system** of collating, analyzing, monitoring and disseminating information on the recovery operations and inputs of different partners involved in the relief and recovery process: **Unit Cost SAT $25,000**

Total Cost: SAT $275,000

Medium to Long Term

- **Operation debriefs of the response to and recovery from** the tsunami and humanitarian assistance as a basis for lessons learning and reviewing existing plans:

[29] All Zones include Zones 1 to 4. Specific reference is made where applicable to those activities that pertain to particular zones.

Unit Cost: SAT $25,000

- **Preparation of a Climate-Proofed National Recovery Preparedness Plan and Policy** for Samoa based on the findings of operational debriefs. **Unit Cost: SAT $25,000**
- **Strengthening the national and community based tsunami early warning system and climate early warning systems,** with focus on dissemination of warning messages to high risk coastal areas. **Unit Cost: SAT $375,000**
- **Preparation of climate-proofed tourism preparedness and response plans**, backed by legislation. **Unit Cost: SAT $125,000**

TOTAL COST 2: SAT $825,000

19. To ensure the sustainable redevelopment of affected areas by considering climate change risks, disaster risks and adhering to hazard safety construction standards in the reconstruction of all infrastructure and buildings

Immediate

- **Comprehensive review of existing natural hazard and risk assessments for the sites** where people have chosen to permanently resettle and carry out risk assessments for gap areas (focus on tsunami, climate change impacts, cyclones, earthquakes) in order to identify mitigation measures for inclusion into all recovery programmes; **Unit Cost: SAT $475,000 (immediate to long-term)**
- **In-depth assessment of expected environmental impacts if affected population chooses to resettle permanently** in plantation land and mitigate potentially negative impacts of an increased density of people and livelihood activities in plantation land; **Unit Cost: SAT $150,000**
- Strengthen local capacity with tools, building materials, and know-how for the establishment of temporary shelter (i.e. Samoan Fale) that is safe during the upcoming rainy and cyclone season. **Unit Cost: (addressed in above strategies)**
- **Raise awareness at national and local level of the existing national building standards and codes, and strengthen enforcement capacity** when erecting temporary shelter as these will remain in place when more permanent housing is built. **Unit Cost: ST $25,000**
- **Provide training on safe construction techniques for local carpenters** to be able to build temporary shelter (fales) in a disaster resilient manner. **Unit Cost: SAT $125,000**
- **Assess all major public facilities and infrastructure** to determine structural damages caused by the earthquake tremors and retrofit as required. **Unit Cost: Assessment $ST 125,000; retrofitting as recommended**
- **Develop climate-proof and disaster reduction guidelines of utility reconstruction services.**
    - **Inputs**: vulnerability and adaptation specialists, engineers (civil), planners, decision makers, contractors
    - **Costs: SAT $ 122,667**

- **Demonstrate reconstruction activities using the guidelines** that which ensures inland and coastal ecosystems become more resilient to climate change risks**. For example, Improving the flood clearance capacity** of the wetland ecosystem and improving species habitat through climate-proofing design and building of access roads over wetland ecosystems (applicable to Zones 1,2 and 3 only)
    - **Inputs**: vulnerability and adaptation specialists, engineers (civil), planners, decision makers, contractors
    - **Costs: SAT $ 122,667**
- **Re-design and carry out incremental climate-proof activities** over already installed utility services (electricity, water, roads, etc) with the aim to reduce vulnerability of ecosystems
    - **Inputs**: vulnerability and adaptation specialists, engineers (civil), planners, decision makers, contractors
    - **Costs: SAT $ 122,667**
- **Provisions for grid extensions and installing solar photovoltaic** to provide electricity access to off-grid households and solar PV street lighting in new access (inland) roads and settlement areas;
    - **Inputs**: EPC, solar PV for household level electricity generation, solar PV for street lighting, energy efficiency light bulbs for HH and streets, renewable energy technology, renewable energy and energy efficiency technology and awareness campaigns, community-based monitoring, incentive maintenance schemes
    - **Costs: SAT $ 3,456,000**
- **Provision of coastal defenses strengthened,** including replanting of wetland vegetation along edges and tsunami-proof coastline protection to reduce the impacts of flooding and cyclonic waves on coastal zone areas.
    - **Inputs**: wetland vegetation plants (coconuts, pacific-almond trees, *fau,* pandanus, *Rhysophora* and *Brugiera* mangrove species, littoral forest); re-designed tsunami-proof coastline protection; active community participation and ownership
    - **Costs: SAT $ 200,000**

<u>Medium to Long Term</u>

- **Review of the National Building Code** based on existing hazard and risk assessments. **Unit Cost: SAT $ 12,500**

<u>Long Term</u>

- **Carry out** full hazard and risk assessments and update and improve seismic information. Unit Cost: (see related costs of immediate actions in Activity 3)

TOTAL COST 3: SAT $ 4,936,500

20. To raise community level climate change adaptation, disaster awareness and strengthen community resilience

Immediate

- **Carry out gender-sensitive and inclusive village consultations** on resettlement choices and clarify government's recovery policy, assistance and contributions of affected population. **Unit Cost: SAT $175,000**
- **Carry out comprehensive climate change and disaster awareness programmes, VDMPs**. **SAT $125,000**
- **Community based information centres to provide information** on relief, recovery and reconstruction policies, plans and projects, compensation packages and citizens rights. **Unit Cost: SAT $50,000**
- **Community mobilization and organization for effective participation** in the design, implementation and monitoring of recovery and reconstruction programmes. **Unit Cost: SAT $125,000**

Total Cost: SAT $475,000.00

Medium to Long-term

- **Development of comprehensive village disaster preparedness plans and committees** with a focus on first aid, warning and safe evacuation, response, adaptation initiatives, traditional disaster mitigation practices. **Unit Cost: SAT $125,000**
- Disaster Preparedness Plans and drills for Schools. **Unit Cost SAT $15,000**

TOTAL COST 4: SAT $ 615,000

Annex E. Details of Cost Calculation for Health Sector

Situation and Needs

Statement of priority needs for the recovery process in the health sector: Following the tsunami, the health sector, suffered serious losses meeting the unexpected health needs of the population. All other health services were largely halted and resources diverted to serve the affected population.

Consequently the priority needs of the health sector are to recover from, as well as sustain capacity to meet the increased and new mix of demand for services, supplies and equipment Workforce numbers augmented by volunteer overseas based personnel in the immediate period following the tsunami, need sustaining at an appropriate level commensurate with the sustained demand for services. Similarly specialties unavailable locally that have also been catered by volunteer assistance in the immediate term need to sustaining until the demand for their services have subsided. Supplies depleted during the immediate response need restocking and augmentation and additional equipment procured.

Adequate water, food, shelter and sanitation are basic prerequisites to health that have been seriously compromised following the tsunami, and it is acknowledged that their address is shared with several other sectors. A rapid needs assessment conducted by the health sector showed a high proportion (~200 households) of the displaced population in urgent need of pit latrines to address basic sanitation, and a further 70 households need urgent work on proper general waste disposal. Over 180 households were living under basic tarpaulins as shelter. The permanent resettlement or rebuilding options undertaken by the Government will address the waste disposal and sanitation requirements effectively in the longer term, however the address of basic measures for sanitation and waste disposal need to be in place now in order to prevent subsequent disease and infections.

Last but not least, Poutasi District Hospital, one of three district health facilities servicing the immediate needs of the affected area, sustained damages with staffing quarters completely destroyed. Given the clear vulnerability of its current location and the obvious need for the facility to be in as safe and as accessible a location in times of disaster, there is a distinct need to relocate this hospital.

In summary, the first priority is to return the health sector to its pre-tsunami effectiveness. Secondly, the improvement and expansion of health services is needed to meet the population's post-tsunami demands for appropriate health care, responsive to an affected population whose access to health services has been seriously impaired. Thirdly and subsequent to the above is the rationalisation of the health sector now required relevant to the altered environment and circumstances.

Pre and Post-Tsunami Situational Analysis

Health Infrastructure and Workforce: Three district health facilities provide immediate health care to the impacted area: Lalomanu District Hospital, Poutasi District Hospital and Fusi Health Centre. Prior to the tsunami, the two hospitals were exclusively staffed by nurses with a referral system to the TTM Hospital. Fusi Health Centre had been closed but was reopened after the Tsunami to accommodate demand whilst the damaged Poutasi was given emergency temporary repairs[30].

Staffing is at a minimum normally with two nurses on duty at any one time for the hospitals which are open 24 hours seven days a week. A second nurse attends to "mobile" outreach services for the community.

Following the tsunami, a large contingent of doctors and nurses, both from the local workforce and overseas based volunteer and humanitarian response groups, were deployed to the impacted area and worked from the three district health facilities, as well as providing mobile clinics.

In the two weeks post-tsunami, over 100 medical, nursing, public health and other health professions have augmented the local workforce to cover mobile services, the district facilities and the increased demand on TTM Hospital. At least one doctor continues to be assigned to each of the 3 district health facilities.

Health-care Demands for medical consultation pre and post tsunami

Average patients seen per day:	**2009**	**2008**
Lalomanu	38	17
Poutasi	16	31
Fusi HC	12	11
Mobile Clinics	56	0
All fixed sites and mobiles	**122**	**59**

At Lalomanu Hospital, the demand for medical consultations has gone from an initial 215 patients on the first day, to an average of 38 a day in the last week. Poutasi District Hospital and Fusi Health Centre currently average 16 and 12 patients per day respectively. For Lalomanu this represents double the usual workload compared to last year. There is no change in the effect on workload for Fusi however Poutasi is showing half the usual utilization. There is concern that this is directly associated with the stigma of association with dead bodies found in its immediate vicinity after the tsunami, as well as its vulnerable location.

A significant proportion of the medical care that has been delivered to the population was by the mobile clinics. With access to the district health facilities greatly impaired for the majority of the population, this service has been invaluable and continues to be vital due to the resettlement and current circumstances of the affected population.

At TTM Hospital over 300 patients have been referred for secondary / tertiary care. 100 people have required admission and 115 operations have been completed mostly for wound debridement and orthopedic procedures.

[30] Poutasi reopened on 7th October 2009

The services of an infectious disease specialist have been invaluable, as well as specialist wound care management nurses. They have been provided exclusively to date from volunteer/overseas mission assistance, but needs to be continued for the next 3-6 months.

Leading Medical Conditions Post-Tsunami: Soft-tissue wounds and respiratory conditions account for half the current medical consultation needs. This represents a threefold increase in the presentation rate for wounds compared to the same period in the previous year. The injuries and wounds post-tsunami are more complicated however requiring expert wound nursing care management and clinical oversight. Post-tsunami respiratory illnesses are also more severe and intensive medical and nursing care and follow-up.

Chronic Illness and skin-conditions equally account for the next 25% of current consultations. Chronic illnesses such as diabetes and hypertension have been exacerbated by issues such as loss of medication, anxiety and other psycho-social factors.

There has without a doubt been a heavy toll on the psychosocial and mental health status of the affected population. Mental health issues of post traumatic stress type symptoms – hypervigilance, insomnia and anxiety have been identified.

There is an ongoing need for psychosocial support and monitoring of mental health needs, and it will be important to ensure medical and nursing staff with linguistic and cultural competence, and good referral processes for specialist assessments are in place in the medium term as these issues emerge.

Emerging health issues: New problems are emerging in displaced populations, related to the unsafe living environments in camp settlements. There are new injuries due to children standing on nails or rusty corrugated iron and injuries related to rebuilding homes. Infected scabies and skin rashes have been highlighted as a major pre-existing problem in children, that will now be exacerbated without medical treatment and addressing the underlying public health issues. Public health surveillance is closely monitoring the incidence of diseases such as measles, dengue and typhoid due to the impaired living conditions.

There is also a burden of unmet need for chronic diseases like diabetes, hypertension and cardiovascular disease. Patients require follow up who have lost their medication in the Tsunami. Our teams have also reported high numbers of chronic, infected skin ulcers which need good wound care management.

Ongoing access to enhanced primary health care: Continuing high quality comprehensive primary care made available through the District Hospitals and some mobile medical team capacity will be required in the disaster areas to meet these identified needs and support the process of recovery.

An estimated 150 patients were seen daily by the PHC team by the end of week 2 and week 3 post-Tsunami. An additional 100 patients per day were treated by mobile primary nursing teams working in the disaster area (sometimes with the support of our medical teams where people needing more medical treatment were identified).

This represents a substantial increase in access to primary care in the disaster area, - two hundred plus consultations daily, compared to 200 patients per day seen at the TTM OPC/ED for the rest of Samoa.

It is likely that without the enhanced primary medical care model, that many of these people would not have been able to access effective early primary health care, which may have led to further morbidity and complications and increased demand for secondary care services.

Summary of Key Impacts and Vulnerabilities

1. Loss of access to key public health services and primary health care for some of the affected population
2. Loss of access of some of the population to prerequisites for health (food, shelter, water, sanitation)
3. Overwhelming of capacity of health sector to meet urgent curative care needs
4. Stress and anxiety of health staff, and exposure to hazardous environments
5. Health staff were also victims and have support needs
6. Damage to health infrastructure and loss of utilities
7. Impaired capacity to track foreign assistance and to verify the qualifications of those delivering direct assistance

Existing Strategies and Programmes

The proposed strategy follows plans and strategies established and under consideration prior to the tsunami. Post-tsunami these plans are still viable and contribute to the rationalization of health services under the altered circumstances. The strategy is to increase the level, qualitative and quantitatively in the areas needed to provide better access to the population. In addition, with the population relocated those areas need to be served using revised strategies – mobile clinics, increased public awareness campaigns, vaccination campaigns and heightened surveillance.

Breakdown of Costs:

Proposed Strategy / Action: Provide mobile medical and public health services to the affected population Public Health Surveillance & Environmental Health, Primary Health Care mobile/outreach teams and Red Cross

Inputs required: Vehicles, personnel, supplies, pharmaceuticals and support costs
Costs USD $140 000

Proposed Strategy / Action: Meet specific tsunami-related health needs
Inputs required: Support Personnel: Infectious disease specialist, Microbiologist, Nurse specialist in wound management/care

Costs USD $75 000

Proposed Strategy / Action: Monitoring & Coordination for health sector response & recovery Public Health Program Information & communication
Inputs required: Personnel, materials communication and transportation
Costs: USD $30 000

Proposed Strategy / Action: Provide facility-based medical and public health services to the population
Inputs required: Reconstruction, refurbishment, equipment, supplies
Costs: USD $120 000

Proposed Strategy / Action: Resupplying the health system
Inputs required: Medical, surgical, dental, pharmaceutical supplies and medication
Costs: USD $100 000

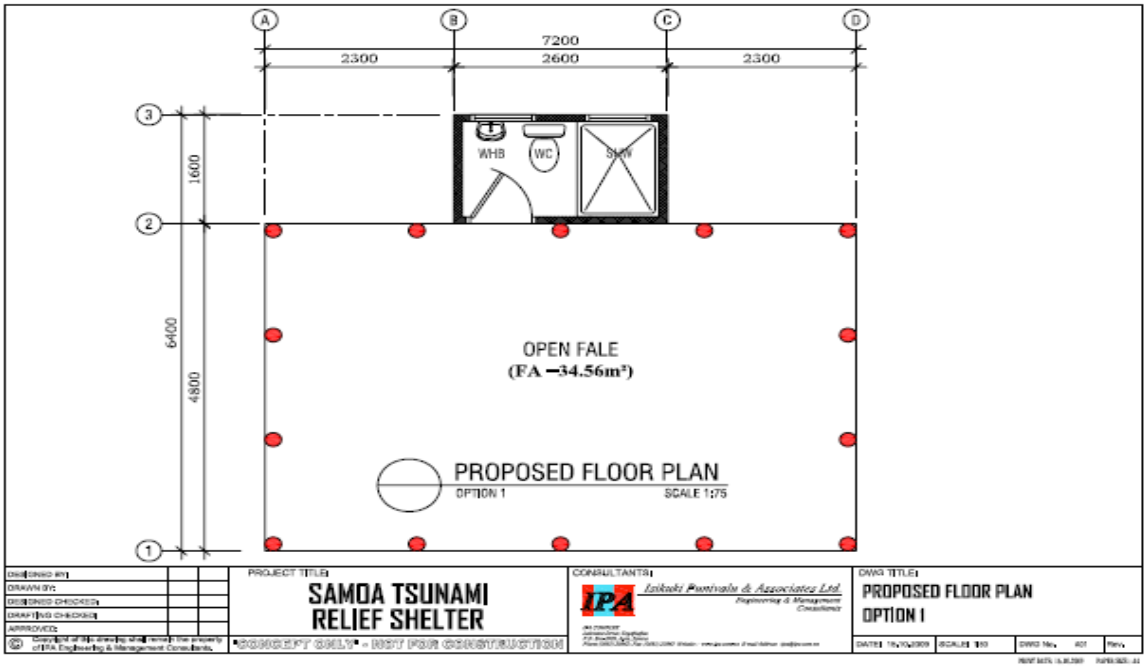
Proposed Strategy / Action: Replacing lost/missing/required equipment
Inputs required: Medical, surgical, dental, pharmaceutical, laboratory and administration equipment
Costs: USD $100 000

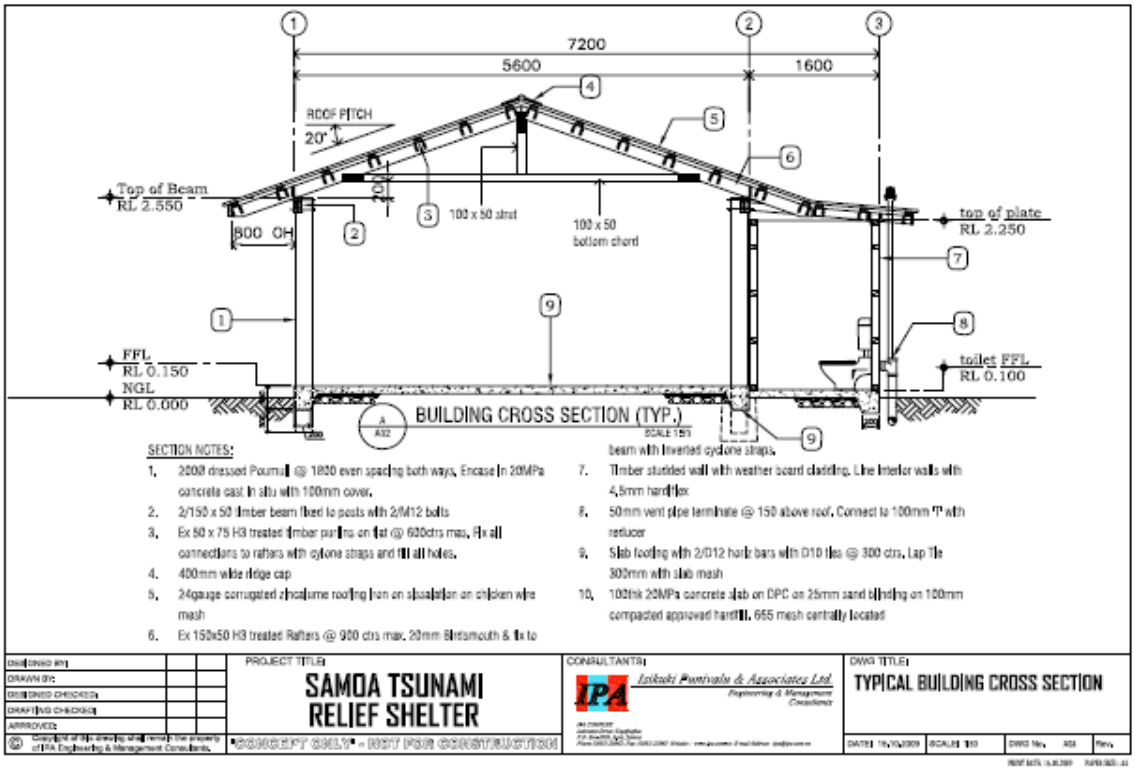
Proposed Strategy / Action: Installation of basic pit latrines for 200 families
Inputs required: Personnel, reconstruction, equipment, supplies
Costs: USD $5 000

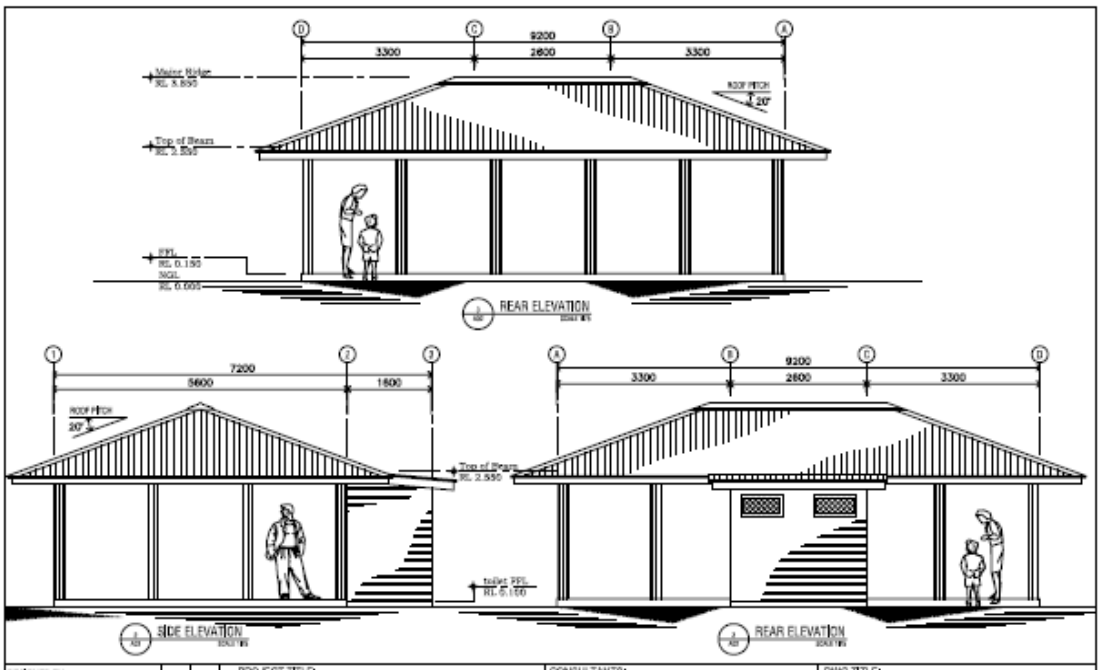
Proposed Strategy / Action: Establishing short, medium and long-term plans for health services in the affected areas
Inputs required: Personnel, operational costs
Costs: USD $25 000

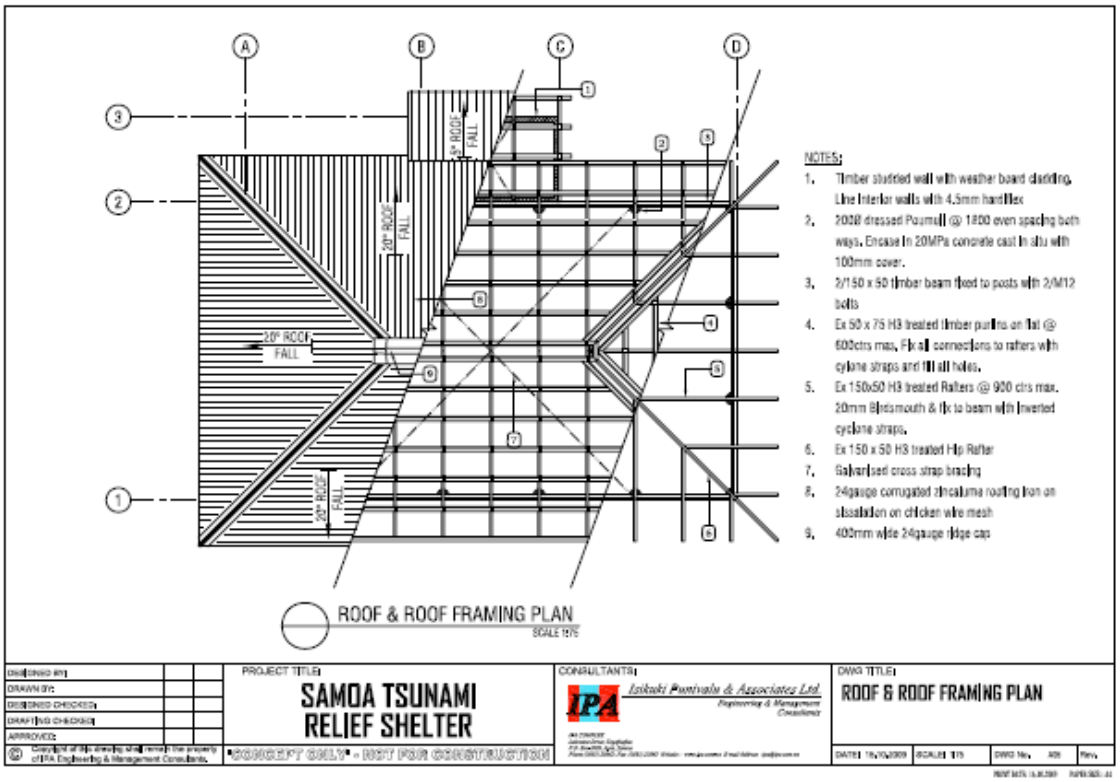
Annex F. Tsunami Relief Shelter/House

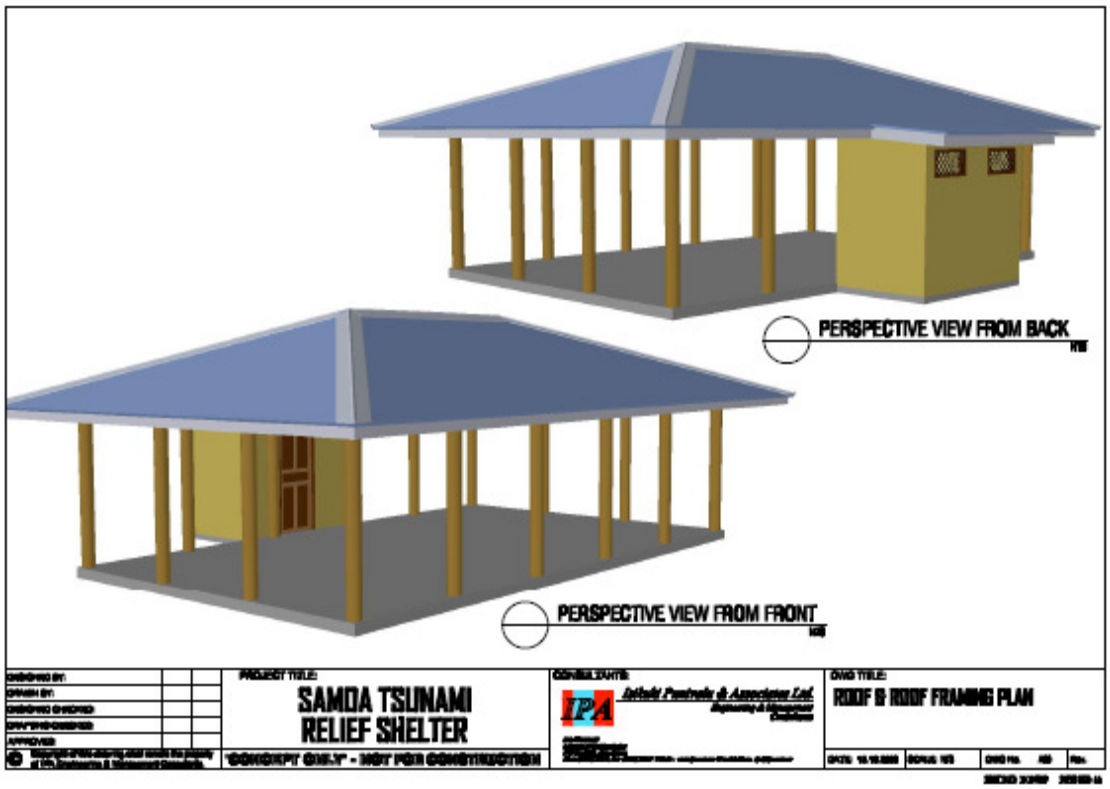
Design of National Disaster Council Approved Shelter/House






REAR ELEVATION
SIDE ELEVATION
REAR ELEVATION
PROJECT TITLE:
SAMOA TSUNAMI RELIEF SHELTER
CONSULTANTS:
Isikuki Puniviale & Associates Ltd.
DWG TITLE:
BUILDING ELEVATIONS 1, 2 & 3


20° ROOF FALL
NOTES:
1. Timber studded wall with weather board cladding. Line interior walls with 4.5mm hardflex
2. 200Ø dressed Poumuli @ 1800 oven spacing both ways. Encase in 20MPa concrete cast in situ with 100mm cover.
3. 2/150 x 50 timber beam fixed to posts with 2/M12 bolts
4. Ex 50 x 75 H3 treated timber purlins on flat @ 600ctrs max. Fix all connections to rafters with cyclone straps and fill all holes.
5. Ex 150x50 H3 treated Rafters @ 920 ctrs max. 20mm Birdsmouth & fix to beam with Inverted cyclone straps.
6. Ex 150 x 50 H3 treated Hip Rafter
7. Galvanised cross strap bracing
8. 24gauge corrugated zincalume roofing iron on sisalation on chicken wire mesh
9. 400mm wide 24gauge ridge cap
ROOF & ROOF FRAMING PLAN
PROJECT TITLE:
SAMOA TSUNAMI RELIEF SHELTER
CONSULTANTS:
Isikuki Puniviale & Associates Ltd.
DWG TITLE:
ROOF & ROOF FRAMING PLAN


PERSPECTIVE VIEW FROM BACK
PERSPECTIVE VIEW FROM FRONT
SAMOA TSUNAMI
RELIEF SHELTER
ROOF & ROOF FRAMING PLAN

Open 'Fale"	Trade	No.	Item	Unit	Qty	Unit Price $	Total $	Comments
"Fale" &	**Concrete work**	1	Cement (40 kg)	Bags	30	18	540	6bgs/m^3 Footings & Floor Slab
Toile block		2	D10 rebar	Length	12	14	168	Ties at 300 ctrs
(34.6 sq.m)		3	D12 rebar	Length	12	20	240	Horizontal
		4	665 mesh	Shts	4	100	400	Slab reinforcing
		5	Polythene DPC	Roll	1	120	120	Under floor slab
		6	Tie wire	Lbs	10	2	20	General
		7	Screened sand	m^3	10	80	800	Concrete mix
		8	Aggregate	"	10	80	800	Concrete mix
	Carpentry	9	150x50x6m	Length	40	40	1,600	Rafters/top plates/door & window frames
		10	100x50x6m	Length	24	32	768	Collar ties, wall framing
		11	75x50x6m	Length	24	28	672	Purlins
		12	200x25x6m	Length	22	40	880	Fascia
		13	Galv. Nails 2"	Lbs	10	5	50	
		14	Galv. Nails 4"	Lbs	40	5	200	
		15	Galv. Nails 6"	Lbs	20	5	100	
		16	Galv. Nails 20mm clouts	Lbs	10	5	50	
		17	Malthoid DPC	Roll	1	80	80	100mm x 10m wide
		18	Nail plates	Roll	2	120	240	Galv. 75mm wide x 10m
		19	Cyclone straps	Roll	8	80	640	Galv.30mm wide, pre-drilled x 10m
		20	6mm Hardiflex	Sheet	8	40	320	Toilet block interior wall lining
			ex 200 x 25 weather board	Length	22	40	880	
		21	200 Ø Dressed timber pole	Item	14	100	1,400	3m long

		22	Louvre carriers	Pairs	2	50	100	
		23	6mm glass blades	Item	8	30	240	
	Roof	24	Roofing iron (3.5m long)	Sheet	22	60	1,320	Corr.galv.
		25	Roof fasteners	Box	8	70	560	Type 17 x 100 per box with washers & rubber seals
		26	Ridge cap (5m long)	Lgths	5	55	275	Galvc.
		27	Sisalation	Roll	2	150	300	1.2m x 20m long
		28	Chicken mesh	Roll	2	150	300	Ditto
	Plumbing	29	Toilet Set (p-trap)	Item	1	250	250	Inc. cisterns, seats
		30	Hand basin	Item	1	150	150	Inc. trap, tap, mounting brackets & fittings
		31	Stop cock	Item	2	16	32	Hand basins, toilet cistern
		32	100 Ø pvc pipe (6m)	Length	2	80	160	Sewer line
		33	100 Ø pvc 90º elbow	Item	2	22	44	Sewer line
		34	100 Ø pvc tee-junction	Item	2	22	44	Ditto
		35	100 to 50 T-junct cap reducer	Item	1	12	12	For terminal waste pipe
		36	50 Ø pvc pipe (6m)	Length	3	40	120	Waste water & terminal vent
		37	50 Ø pvc 90º elbow)	Item	6	12	72	Ditto
		38	50 Ø pvc tee-junction	Item	2	12	24	Ditto
		39	50 Ø pvc vent cowl	Item	1	10	10	Terminal vent
		40	50 to 40 pvc reducer	Item	1	10	10	
		41	50 Ø pvc saddles	Item	4	3	12	Terminal vent
		42	15 Ø pvc pipe (6m)	Length	4	10	40	Water supply
		43	15 Ø pvc 90º elbow	Item	10	5	50	
		44	15 Ø pvc tee-junction	Item	2	5	10	
		45	15 Ø pvc female sockets	Item	2	5	10	
		46	15 Ø pvc saddles	Item	10	2	20	Water supply

		47	PVC glue	Ltr.	0.1	20	2	
		48	Floor Waste	Item	1	50	50	For shower. Inc trap, grate
		49	Shower rose	Item	1	30	30	
		50	Septic tank	Item	1	1,500	1,500	Prefab polyurethane
	Electrical	51	1.5mm cable	Roll	1	100	100	Lighting wiring
		52	2.5mm cable	Roll	1	150	150	Power outlet wiring
		53	Single light switch	Item	2	15	30	
		54	1200 long tube light	Item	4	50	200	
		55	Distribution box	Item	1	50	50	
	General	56	Solid Core Exterior door	Item	1	350	350	Off the Shelf + Hinges & lockset
		57	Toilet roll holder	Item	1	15	15	Vandal resistant and lockable
		58	Shower curtain	Item	1	15	15	Shower cubicle
		59	Curtain rail (20mm Ø timber)	Item	1	15	15	With end holding brackets
		60	M12 x 250 long galv. Bolts	Item	30	10	300	Including washers & nuts
	Painting	61	Under Coat / Primer (10ltr)	Item	1	100	100	
		62	Finishing Coat (10ltr) 1	Item	1	100	100	All weather paint.
		63	Finishing Coat (10ltr) 2	Item	1	100	100	Ditto
						Total	**$18,240**	

Annex G: Water Sector Repairs and Development

SAMOA WATER AUTHORITY REPAIRS AND NEW DEVELOPMENT AS RESULTS OF TSUNAMI			
REPAIRS & DEVELOPMENT			**Total Cost Estimate (SAT)**
1	**Short Term Emergency Repairs**		2,228,608.50
		Repair & reconnect House Connections of all houses still unaffected	
		Internal Plumbing	
		Repair Reticulation Mains	
		Assess Leakages	
		Water Truck Hire and SWA truck services	$ 400,000.00
		3 New Water Trucks	$ 450,000.00
2	**Medium Term Repairs**		1,464,100.00
		House Connections of Beach Fales that were affected (assumed that they will be back)	
		Replace destroyed distribution mains and connect to better sources	
		3 standby Generators for boreholes	$ 600,000.00
3	**Long Term Development**		14,930,600.00
		New Development Water Supply to accommodate all the new resettlement at higher elevated areas (Lepa, Saleapaga & Aleipata)	
TOTAL			**$ 20,073,308.50**

Annex H: Water Sector Short/Medium Term Repairs

AFFECTED VILLAGES	Pipelines Reticulations Re-construction								House Connections				TOTAL URGENT REPAIR COST	TOTAL MEDIUM COST
	100mm - 80mm dia.				50mm - 25mm dia.				15mm/20mm					
	Short Term		Medium Term		Short Term		Medium Term		Short Term		Medium Term			
	(m)	Estimate Cost	(m)	Estimate Cost	(m)	Estimate Costs	(m)	Estimate Cost	(m)	Estimate Costs	(m)	Estimate Costs		
Saleaumua – Lalomanu	4,063	406,300.00		-	306	24,480.00	1,491	149,100.00	6830	424,889.50	2000	120,000.00	855,669.50	269,100.00
Saleapaga - Lepa	2,642	264,200.00	1,088	163,200.00	161	12,880.00		-	5275	302,729.00	1200	72,000.00	579,809.00	235,200.00
Sapoe		-		-		-		-	180	9,000.00	210	12,600.00	9,000.00	12,600.00
Utulaelae		-		-	280	22,400.00		-	270	16,285.50	134	8,040.00	38,685.50	8,040.00
Salani		-		-		-	256	25,600.00	210	12,666.50	250	15,000.00	12,666.50	40,600.00
Salesatele		-		-	255	20,400.00		-	180	10,857.00	120	7,200.00	31,257.00	7,200.00
Sapunaoa		-		-		-	477	47,700.00	225	14,035.50	210	12,600.00	14,035.50	60,300.00
Satalo		-		-		-	516	51,600.00	150	9,047.50	120	7,200.00	9,047.50	58,800.00
Tafatafa		-		-	586	46,880.00		-	100	5,000.00	90	5,400.00	51,880.00	5,400.00
Vaovai									150	10,595.00	120	7,200.00	10,595.00	7,200.00
Matautu									210	12,666.50		-	12,666.50	-
Poutasi		-		-	1,117	89,360.00	195	19,500.00	750	45,237.50		-	134,597.50	19,500.00
Siumu		-		-		-	1,392	139,200.00	150	9,047.50	350	21,000.00	9,047.50	160,200.00

Tafitoala		-		-	789	63,120.00	376	37,600.00	110	9,523.50	450	27,000.00	72,643.50	64,600.00
Sataoa		-		-		-	1,212	121,200.00		1,547.50	208	12,480.00	1,547.50	133,680.00
Saanapu Tai		-		-		-	1,438	143,800.00		3,714.00	480	28,800.00	3,714.00	172,600.00
Lefaga		-		-	840	67,200.00	1,468	146,800.00		7,428.00	520	31,200.00	74,628.00	178,000.00
Manono Island	3,000	300,000.00		-		-		-		7,118.50	518	31,080.00	307,118.50	31,080.00
TOTAL	**9,705**	**970,500.00**	**1,088**	**163,200.00**	**4,334**	**346,720.00**	**8,821**	**882,100.00**	**14,790**	**911,388.50**	**6,980**	**418,800.00**	**2,228,608.50**	**1,464,100.00**

Annex I: Water Piping Details

Villages	Number of Affected Connections	House connection & internal plumbing 15mm PVC pipes	House Connection 20mm PVC pipes
		(meters)	(meters)
Saleaumua	48	1200	2000
Mutiatele	16	400	
Lotopue/Malaela	35	875	
Satitoa	61	1525	
Ulutogia	35	875	
Vailoa	5	125	
Lalomanu	61	1830	
Saleapaga	81	4045	1200
Lepa	41	1230	
Utulaelae	9	270	
Salani	7	210	
Salesatele	6	180	
Sapunaoa	9	225	
Satalo	5	150	
Vaovai	10	150	
Matautu	7	210	
Poutasi	25	750	
Siumu	5	150	800
Tafitoala	13	390	
Total	**479**	**14790**	**4000**

Annex J. Early Recovery Needs Assessment

CLUSTER TEAM	IMPACTS & VULNERABILITIES *Summary of key impacts & vulnerabilities*	NEEDS *Overview of key early recovery needs*	CAPACITIES *Summary of available capacities in affected areas*	SOLUTIONS & STRATEGIES *Proposed solutions / strategies for early recovery*	PARTNERS *Interested in supporting early recover efforts of the Government*
EARLY RECOVERY TEAM 1	**RESETTLEMENT**	**Region: East Upolu**	Villages covered: Utufaalalafa, Sale'aumua, Mutiatele, Lotopu'e, Malaela		
	▪ Most have relocated inland ▪ Most do not want to return to previous place of habitation due to – fear of another tsunami; infertile soil, debris ▪ Average number of families want to rebuild in both areas with permanent living inland ▪ Education impacted – children not going to school (distance, safety concerns) ▪ Post disaster trauma will	▪ Immediate support for building permanent dwelling inland in new locations; ▪ Require materials and tools for rebuilding ▪ Need servicing of basic utilities such as water, electricity, roads and infrastructural services	▪ Land is available and owned by the displaced people and families; ▪ Land used mainly for agriculture and livestock prior to disaster ▪ Coastal land will still be utilized for village and family purposes (visitors, family occasions, etc) ▪ Men of the village now focused on clean up, collecting	▪ Environment Impact Assessments required for development of dwellings ▪ Integrated approach to sustainable planning and development of basic utility services along the new locations (water, road, electricity) ▪ Explore with	▪ Government (MWCSD, MWTI, MNRE in particular NDMO, Met, RED; SWA, MOF, MOH, MESC, MFAT, MCIL, STA) ▪ NGOs (Habitat for Humanity, SUNGO, Save the Children's Foundation, etc) ▪ Red Cross Society Incorporated

	affect decision-making ability & capacities	▪ Many needed concrete ▪ Building standards and codes are required ▪ Transport needs for those who lost their vehicles	building materials and rebuilding ▪ Women and children assist by supporting elderly in new areas.	partners and donors new alternative sustainable services (renewable energy, IT capacities, entrepreneurship)	▪ UN Agencies (UNDP, UNEP, OHCHR, OCHA, WHO, WMO, UNESCO, UNFPA, UNIFEM, ILO, etc) ▪ Church organizations
	VULNERABILITIES				
	▪ People now suffer from limited or no access to basic utility services such as roads, electricity, water supply (quantity) and water quality, safe sanitation, and safe shelter from heat, wind, dust and lateral rainfall ▪ Noted high occurrence of mosquitoes in new settled areas and that could lead to influx in vector borne diseases (dengue fever) ▪ Looting and security issues on the rise	(refer above)	▪ Village specific and focus group specific labour exists in all villages (village council, untitled men, youth, women's committees) ▪ Systemic capacity in social structures of villages is available but may require active consultation and involvement ▪ Lalomanu hospital	▪ Labour-based infrastructure development based on participatory community approach ▪ Strengthening coordination at local level of community leaders, village focus groups and private contractors ▪ Mobilize NHS and	▪ Government (MWCSD, MWTI, MNRE in particular NDMO, Met, RED; SWA, MOF, MOH, MESC, MFAT, MCIL, STA) ▪ NGOs (Habitat for Humanity, SUNGO, Save the Children's Foundation, etc) ▪ Red Cross Society

			is the nearest medical evacuation point. ▪ Police center located in Lalomanu ▪ New international wharf to re-open to accommodate incoming building resources	MOH preventative measures and resources against water and vector-borne diseases. ▪ Engage law & justice sector stakeholders to jointly coordinate and monitor security issues (looting, counseling)	Incorporated ▪ UN Agencies (UNDP, UNEP, OHCHR, OCHA, WHO, WMO, UNESCO, UNFPA, UNIFEM, ILO, etc) ▪ Church organizations
EARLY RECOVERY TEAM 1	**LIVELIHOOD**	**Region: East Upolu**	Villages covered: Utufaalalafa, Sale'aumua, Mutiatele, Lotopu'e, Malaela		
	▪ IMPACTS				
	▪ Coastal plantations significantly affected (salination, inundation) ▪ Fishing highly impacted (unknown implication on protein source for diet) ▪ Tourism affected; ▪ Small businesses seriously damaged, destroyed (e.g. shops, rent business –	▪ Capital ($) is required to start small businesses that existed before disaster ▪ Equipment and resources – to rebuild businesses ▪ Fertilizers	▪ Entrepreneurship (hireage business – canoes, boat, sound equipments, selling some handicrafts; small convenience shops) ▪ Agricultural farming, some livestock, piggeries	▪ Explore alternative income generating activities (IT capacity, high-end weaving and handicraft) (refer also to above)	▪ Government (MWCSD, MWTI, MNRE in particular NDMO, Met, RED; SWA, MOF, MOH, MESC, MFAT, MCIL, STA) ▪ NGOs (Habitat for Humanity,

	sound equipment, boats, canoes) ▪ Unemployment for the few – impacting on source of income for livelihood		▪ Fishing (canoe and line fishing, reef and outer) ▪ Tourism (beach fales, transportation, hiking, food supplies) ▪ Handicrafts, flower and ornament making (women)		SUNGO, Save the Children's Foundation, etc) ▪ Red Cross Society Incorporated ▪ UN Agencies (UNDP, UNEP, OHCHR, OCHA, WHO, WMO, UNESCO, UNFPA, UNIFEM, ILO, etc) ▪ Church organizations
	▪ VULNERABILITIES				
	▪ Families access to water has been significantly affected ▪ Almost absolute reliance on remittances ▪ Families not relying on remittances are highly dependent on Government for any support	▪ Continuous water supply ▪ Potable water supply ▪ Water containers to store water	▪ Salaried jobs in towns ▪ Remittances as resilient measure ▪ Environmental aspects – borehole drilling for fresh ground water sources.	(refer above)	▪ Government (MWCSD, MWTI, MNRE in particular NDMO, Met, RED; SWA, MOF, MOH, MESC, MFAT, MCIL, STA) ▪ NGOs (Habitat

	▪ Selling subsistence goods for income risking food availability for entire (extended) family ▪ Fishing as a source seriously affected due to damaged / lost equipment – fishing boats, equipments				for Humanity, SUNGO, Save the Children's Foundation, etc) ▪ Red Cross Society Incorporated ▪ UN Agencies (UNDP, UNEP, OHCHR, OCHA, WHO, WMO, UNESCO, UNFPA, UNIFEM, ILO,
	▪ Small businesses (bakeries, shops) vulnerable due to no capital and equipment				
EARLY RECOVERY TEAM 1	**DISASTER RISK REDUCTION**				
	IMPACTS				
	▪ Villagers did not experience receiving warnings for tsunami early ▪ Mixed level of awareness on disaster preparedness and planning before and	▪ Require communication equipments (radios, cell phones) ▪ Need tsunami	▪ Some school children were able to warn their parents. ▪ Some schools carried out tsunami	▪ Support and upscale the existing Village-based disaster risk management program currently	▪ NDMO, Met, MNRE, MWCSD, SWA, Fire Services, MESC ▪ Red cross

	after tsunami ▪ Elderly and adults were more vulnerable because they did not practice tsunami drills versus children	awareness raising an drill programs in the medium to long run especially for elderly and adults	drills	carried out by the NDMO and MNRE	▪ UNDP, UNESCO, WMO, ISDR ▪ SPREP ▪ SOPAC ▪ Media outlets ▪ Other international and local NGOs
EARLY RECOVERY TEAM 1	**GENERAL**				
	▪ Gender Issues - Some men did not let women express themselves during interviews ▪ Incomplete / untrue information portrayed by some of the respondents	▪ Re-clarify early recovery objectives to communities	▪ Social polities / focus groups exist amongst women, men, youth in villages to streamline gender-sensitive information on early recovered	▪ Government and affected communities to agree on expectations of recovery process ▪ Clarification of support to non-affected in high risk areas ▪ Gender mainstreaming and gender sensitization of all early recovery programs	▪ MWCSD, MFAT, MNRE, MOH, NHS, MPMPC ▪ UNDP, UNESCO, UNIFEM, UNFPA, ILO ▪ SAVE THE CHILDREN ▪ OCHR ▪ OCHA / ISDR

EARLY RECOVERY TEAM 2	RESETTLEMENT	Region: E & SE Upolu	Villages covered: Satitoa, Ulutogia, Vailoa, Salani (SE), Salesatele (SE), Sapunaoa (SE)		
	▪ IMPACTS: ▪ High number of affected and unaffected village people have relocated inland (range 80-100% of the population of each village) ▪ Some have migrated to urban Apia and other villages ▪ Post-trauma (psycho social) impacts persists in the areas as well – fear of returning ▪ No impact for some who wish to stay in affected coastal lands – cultural and security reasons ▪ Some undecided and relying on Government for assistance ▪ VULNERABILITIES ▪ People settling in new	▪ Potable water and water storage equipments ▪ Sanitation supplies (toilets, water for waste) ▪ Human resource support in terms of specialized skills (carpentry, plumbing, electricians, masonry, etc) ▪ Building materials and tools (brick, cement, timber, hammers, spades, etc) ▪ Food storage & cooking utensils	▪ Land available for resettlement for all families (customary land); ▪ Some families have already existing small *fales* assisting immediate shelter needs (thatched roof houses) ▪ Specialized skills available but very few and not all fully qualified (carpenters, plumbers, etc) ▪ Independent family initiatives to rebuild have already started; ▪ (refer to notes above)	▪ Psycho-social support in general (morale boosting) ▪ Guidance / assistance in decision-making for resettlement and future ▪ Cyclone and rain-proof shelter ▪ Upscale supporting and supply systems for the supply of water to the displaced from during recovery phase to subsequent rehabilitation phases ▪ Implement community-based sustainable	▪ Government (MWCSD, MWTI, MNRE, SWA, MOF); ▪ NGOs (Habitat for Humanity, Caritas, Save the Children Foundation) ▪ Red Cross ▪ UN Agencies (UNDP, UNICEF, WHO, WMO, UNFPA, UNEP, UNESCO, etc) ▪ Church Organizations (refer to notes above)

	areas feeling brunt of lack of quick access to basic services – water supply, electricity ▪ Cannot rebuild or slow to rebuild because of lack of materials and tools; ▪ No systematic communication of information from Government on support they will or will not receive; ▪ Possibility for conflict over land rights and needs monitoring; ▪ Looting and security issues on the rise; ▪ No local sources of income	▪ Need quick support for basic social services (utilities) (refer to above)		waste management activities (refer to notes above)	
	▪ Families who borrowed from the SHC to build house which has not been destroyed	▪ No house but continuing to pay SHC	▪ Remittances ▪ One family working in the Government		

EARLY RECOVERY TEAM 2	LIVELIHOOD	Region: E & SE Upolu	Villages covered: Satitoa, Ulutogia, Vailoa, Salani (SE), Salesatele (SE), Sapunaoa (SE)		
	IMPACTS ▪ Coastal plantations significantly affected (salination, inundation) ▪ Fishing, tourism, small business significantly affected (completely wiped out, destroyed or lost) VULNERABILITIES ▪ Degree of absolute reliance on remittances ▪ Selling subsistence goods for income risking food availability ▪ Selling relief supplies ▪ Health & nutrition of displaced people settling inland	▪ Require working tools to work plantation (spades, machetes, hammers etc) and rebuild small businesses (canoes, boats) ▪ Fishing boats and canoes (for subsistence and semi-subsistence fishing) ▪ Capital to restart tourist businesses and small businesses (pool table, small convenience shops, handicraft making) ▪ Employment	▪ Mainly plantations and livestock; ▪ Remittances ▪ Reef and Ocean fishing (frequent) ▪ Skills in the tourism industry ▪ Handicrafts, flower and ornaments (women) ▪ Small businesses (small convenience stores) ▪ Salaried jobs in town		

EARLY RECOVERY TEAM 2	**DISASTER RISK REDUCTION**		Data Not Available (survey abruptly ended due to Tsunami Warning 07/10. Questions on DRR were available on second day of assessment)
EARLY RECOVERY TEAM 2	**GENERAL**		
	Communities felt that ▪ Safe haven a priority - protecting from heat, dust, wind, rain (lateral rainfall), ▪ Livelihood is second priority than resettlement. ▪ Employment was secondary to clean up and resettlement		

EARLY RECOVERY TEAM 3	RESETTLEMENT	Region: East Upolu	Villages covered: Lalomanu, Saleapaga, Lepa,		
	IMPACTS:				
	▪ 4000 people relocated ▪ Approximately 2000 lost their homes (50%) ▪ Majority of the community have decided to relocate upland ▪ Psycho-social impacts persists here as well (fear of another tsunami and rising sea level) ▪ Some wanted to stay and rebuild businesses ▪ Minimal impact on electricity		▪ Most of the displaced families own land and have resettled in these lands upland; ▪ Ability to work the land for crops, livestock, vegetables and others ▪ Some qualified carpenters exist		

Annex K. Education Needs Assessment

Education Sector Assessment

The Education team visited the most severely affected districts including: i) Aleipata (Zone 1), ii) Lepa/Lotofaga (Zone 2), and iii) Falealii (Zone 3). A total of 4 primary and 2 secondary schools are destroyed or damaged by the tsunami and an estimated 1,591 pupils/students have no access to formal education. (See below table) This includes over 1, 091 pupils/students whose schools are destroyed/damaged and additional 400 children whose schools are not damaged but closed due to recovery operations.

District	School Name	# of Pupil	# of Teacher	Extent of Damage
Aleipata (Zone 1)	Vailoa Primary	70	3	Destroyed
	Satitoa Primary	159	5	Destroyed
	Saleaaumua Primary	120	4	Damaged
	Aleipata Secondary	240	8	Damaged
Lepa/Lotofaga (Zone 2)	Sale'apaga Primary	124	4	Damaged
Falealii (Zone 3)*	Falealili Secondary	255	10	Destroyed
	Manono-uta Primary	243	8	Destroyed
Total	**6**	**1,211**	**42**	

** Due to school construction already started prior to the tsunami, Manono-uta Primary students were studying in classes conducted in village homes. However, as these homes are destroyed by the tsunami, students will need temporary learning spaces until the full completion of the school.*

Education Cluster Coordination

As designated by the Inter-Agency Standing Committee (IASC), UNICEF and Save the Children are the Education Cluster Lead to assist the Ministry of Education, Sports and Culture (MESC) to respond to the humanitarian crisis where the education sector is concerned. The IASC coordination mechanism for humanitarian response stood up immediately after the tsunami struck and Education Cluster was activated. To date, the Education Cluster[31] has met on several occasions to share data, assessment findings, and other information. Furthermore, the Education Cluster members agreed to coordinate the respective agency's support for an urgent education response, particularly to those education needs and priorities identified and agreed upon by MESC. Additionally, MESC has discussed with AusAID/NZAID/ADB to determine if an on-going education project[32], co-funded by the above three donors, can be reallocated to support emergency recovery efforts including the reconstruction of all schools. JICA has shared its preliminary education assessment of the tsunami-affected schools as well intention to undertake the necessary rehabilitation and construction work in the medium and long term.

Recommendations

The following recommendations are applicable to all Zones where the Education sector is affected by the tsunami.

[31] The Education Cluster is comprised of MESC, UNICEF, Save the Children, UNESCO, NZAID, AusAID, JICA, ADB, Red Cross, Caritas Samoa and Salvation Army.

[32] ESPII Project

Short Term (up to Three Months) - **(US $325,075)***
The immediate resumption of schooling for children is the priority for the Education sector. The Education Cluster seeks to ensure that children, including girls and excluded children have access to quality education opportunities in safe and secure learning environments that promote the protection and well-being of learners. Psychosocial support for students and teachers are also vital in the education response. In order to immediately respond to the needs of affected students and teachers, it is necessary to relocate students in destroyed or damaged schools with nearby host schools which are not affected by the tsunami. A national examination is scheduled on 9 November 2009 and the priority of the Ministry of Education, Sports and Culture is to enable the immediate resumption of schooling in a safe and protective environment for Grade 8 students so that they may study and be well prepared for the exam to take place within several weeks' time. As such, the school environment, be it in host community schools or other temporary learning space, must be made safe and protective to allow students to resume schooling.

The following recommendations are to support the tsunami-affected schools, students and teachers in the **short-term period requiring a total budget of US $325,075**.

1. **Provision of transportation** for children who require commuting from current location (whether undestroyed homes or temporary shelter to the nearby host school (3-5 km. distance per way). (**US $32,000** = 4 chartered buses x US $4,000 x 2 months)
2. **Provision of water tanks and sanitation facilities** to affected schools (**US $70,000** = 7 schools x US $10,000)
3. **Provision of temporary learning spaces**, e.g. school tents. (**US $44,000** = 22 tents x US $2,000.
4. **Provision of teacher's and student's furniture** (**US $161,875** = 42 sets of teacher's furniture x US $250 + furniture sets for 1,211 students x US $125)
5. **Provision of additional education supplies** such as teacher's and student's stationery materials, first aid kits and recreation kits for students and teachers of both tsunami-damaged schools as well host schools (**US $7,200** = 12 School-in-a-Box x US $300 and 12 Recreation Kits x $300)
6. **Provision of psychosocial support training for teachers** to be able to identify signs of trauma in children and provide support as required in order to promote children's emotional recovery. (**US $10,000)**

Medium to Long Term Recovery (Three to Nine Months) **- (US $1,750,000)***
In the medium and long term, support to the Education Sector include the rehabilitation and construction of primary and secondary schools, construction of teacher's dormitories and the development of a curriculum on disaster risk reduction to create awareness and prepare students and teachers for what they can do to reduce disaster impacts for future natural disasters in Samoa.

The following recommendations are to support the medium and long-termed recovery of the tsunami-affected schools, students and teachers which **requires a total budget of US $1,750,000**.

1. **Rehabilitation and Reconstruction of 4 Primary Schools** (7 Classrooms/1 Teacher's Room/Water Facilities/Pit Latrine/PC Laboratory/Science Room/Field) (**US $880,000*** = 4 Primary Schools x US $ 220,000)
2. **Rehabilitation/Reconstruction of 4 Secondary Schools** (10 Classrooms x 1 Teacher's Room x Water Facilities x Pit Latrine x PC Laboratory x Science Room x Field) (**US $700,000*** = 2 Secondary Schools x $350,000)
3. **Construction of Teacher's Dormitories** in each Zone (**US $150,000** = $50,000 x 3 Zones)
4. Development of Disaster Risk Reduction Education as part of both Primary and Secondary school curriculum (**US $20,000**)
5. Alignment of AUSAID/NZAID/ADB-funded (regular) education sector project with emergency education. Coordination with JICA.

***Figures are indicative and based on the agencies' past projects** experience **and consultation with private engineering** firms based in Apia.*

Annex L. Health Needs Assessment

1. **Summary of Key Impacts and Vulnerabilities:**
    - loss of access to key public health services for some of the affected population
    - overwhelming of capacity of health sector to meet urgent curative care needs
    - Loss of access of some of the population to prerequisites for health (food, shelter, water, sanitation)
    - Stress and anxiety of health staff, and exposure to hazardous environments;
    - Health staff were also victims and have support needs
    - Damage to health infrastructure and loss of utilities
    - Lack recognition and compliance by aid agencies and overseas volunteers of health regulatory systems in place (accreditation and certification).

2. **Summary of Available Capacities:**
    - Capacities for service delivery planning are available but lack resources and expertise to support the recovery planning process.
    - Capacity for service delivery is available but constrained

3. **Overview of key early recovery needs:**
    - Complete assessment of structural integrity of health infrastructure;
    - Reconstruction of damaged and destroyed health infrastructure
    - resettlement of infrastructure in hazard prone areas and infrastructure with poor access
    - restoration of electricity, water and sanitation services to infrastructure
    - management of medical waste
    - Mapping of access to health care facilities against current and projected future population distributions
    - Supplementing of human resource capacity in key areas e.g. outreach teams, transport, laboratory capacity, information management and reporting, health sector planning, health financing.
    - Campaigns of health promotion and public information to support recovery programmes
    - Need for proper processes to be put in place to ensure accountability of foreign assistance. A regulatory system is necessary to ensure predictably high quality, international, disaster response. One mechanism for such regulatory system would be through an accreditation and certification system for aid agencies.
    - Need to incorporate public health standards into national building codes especially the design for shelter construction.

Proposed Solutions or Strategies for early recovery: <u>The Need for Health and Sustaining of Good Health:</u> Restoration of priority public health services

Immediate Needs:

- Prevention and control of any disease outbreaks (refer to Summary of Environmental Health Assessment of Tsunami Affected Areas)

i. Need for immediate construction of at least temporary homes for affected / displaced families. Main public health concerns:
    1. Displaced families moved in to relative's homes – issue of overcrowding, hygiene & sanitation needs such as latrines & rubbish disposal systems, easy spread of disease outbreaks.
    2. Families living under tents or tarpaulins – issue of hygiene & sanitation, water safety, secure from rain, proper food storage etc.
        a. Need to raise house platforms off the ground to ensure safe and secure food & water storage.

ii. Continuation of environmental / public health assessments & surveillance for affected areas and new settlements – assisting displaced families with hygiene behavioural adaptation and change.

iii. Continuation of general health promotion via mass media and targeted IEC materials especially for affected areas until the sanitation, hygiene and environmental health issues have subsided.

- Inspection of Food Relief Supplies (quality & safety for consumption)
- Supplementing Human Resource Capacity in priority areas of environmental health and public health surveillance.

Medium to Long Term:

- Strengthening of emergency surveillance systems in place e.g. EWARS
- Surveys to document nutritional status and disability

Restoration of priority treatment / curative care services

Immediate Needs:

- Access to treatment / curative services
    - Continuation of outreach / mobile teams for the next 1-2 months.
        - Supplementing of these services by overseas/outside assistance due to the shortage of local staff we have already experienced.
    - Activation of Village Based Centres that were already identified during the Pandemic H1N1 crisis.
        - Effective coordination by the MWCSD for the mobilization of these Village Centres.
        - Consider appropriate placement of these VBCs for ease of access of the affected / displaced populations.
    - Supplementing of human resource capacity in laboratory, and medical specialised areas.

Medium to Long Term:

- Reconstruction of damaged and destroyed health infrastructure
- Restoration of health services in the affected districts back to the ordinary and ensuring accessibility of these areas to health services as it was before.
- Resettlement of infrastructure in hazard prone areas and infrastructure with poor access
- Restoration of electricity, water and sanitation services to health infrastructure
- Strengthening emergency response capacity of the main Laboratory

4. **Parties interested in supporting early recovery efforts of the Government**
    - World Health Organisation
    - UNICEF
    - World Bank
    - IFRC
    - Samoan Red Cross

Annex M. Agriculture and Fisheries Needs Assessment

Early Recovery Needs Assessment
This reporting template has been prepared by the Early Recovery Cluster to seek inputs from other clusters on the early recovery needs and solutions for preparing the Early Recovery Framework. Please use information collated in your sectoral assessments and report in a concise manner.

5. Cluster Name: Agriculture and Fisheries Working Group

6. Cluster Head: Asuao Kirifi Pouono (CEO, Ministry of Agriculture and Fisheries); Mr. Vili A. Fuavao (Sub Regional Representative FAO-SAP)

7. Summary of Key Impacts and Vulnerabilities

Food security: agriculture, livestock, and artisanal/subsistence fisheries:
The livelihoods' base for the majority of affected households includes subsistence agriculture, backyard pig and poultry production for self-consumption, and artisanal/subsistence fisheries. Supplying the tourist resorts in the tsunami affect areas with fruit and vegetables livestock and fisheries had been the main source of cash income for most households around the resorts. In addition to tourism, which was the main source of cash income, these activities represent the main pillars of the family food security strategy.

The main plantations of taro, banana, cassava and other root crops are usually located on higher grounds at a relevant distance from the sea. As a result, the damages caused by the tsunami have been in general limited. However, most of the farming tools and equipment has been lost and affected farmers may not be able to carry out essential farming works in the coming weeks. The home gardens around the houses, where breadfruit trees and other fruit trees, some bananas and taros and vegetables were grown, have been totally destroyed by the direct impact of the waves or by the salt accumulated in the soil. These home gardens have a relevant importance for a nutritionally balanced family diet as most of the nutritious foods use to come from there. Finally, large numbers of pigs and poultry have been lost, as well as fishing gears and canoes, so families lost most of the protein sources for their diets. It is not expected that artisanal/subsistence fishing will be revived soon since the reef areas were severely damaged by the tsunami, with accumulation of large quantities of sediment and debris. It will take time for these areas to recover and be again a healthy environment for fish resources.

The human and material losses have also changed the priorities of affected households. The loss of family members, the destruction of the houses and all households' goods, and the scale of the disaster, have caused deep trauma. Many victims are not willing to move back to the coastal areas and when land is available, they are considering the option of resettling on higher ground.

In this context, family food security is extremely fragile. Most victims are at the moment relying on external food assistance or moved to live with relatives and/or friends, putting additional pressure on the limited food availability. Restoring the key lost assets essential for food security and enabling rural households to resume food production is an urgent priority.

MAF officers with the support of FAO and WIBDI conducted an assessment for a sample of 413 households in 6 villages the affected areas. Out of which 223 households reported that they were planting some crops, vegetable and fruit crops. Destruction by the tsunami is recorded at 100 percent in these villages. All households reported loss of poultry and 323 reported that they loss their backyard piggery. In table 1 in annex M is the list of requirement for early recovery and medium to long term rehabilitation process for agriculture and livestock.

In the same survey damage to traditional fishing were assessed in the 6 villages. These traditional fishing boats are not repairable due to safety concerns.

Besides the damage to traditional fishing boats, most of household surveyed lost the commonly used gear for traditional fishing, these are fishing nets (cast nets and set nets), fishing lines, spear guns, free dive gear, underwater light for night fishing, knife and cooler box. While the fishing grounds on the affected areas are recovering, there is a need for replacement of fishing equipments for an estimated 210 households, who could use them to fish at the unaffected areas. The repair of damaged FADs and the placement of new FADs may be considered in order to create alternative opportunities for artisanal/subsistence fishermen who cannot fish inside the reef anymore in the affected areas.

It is should be noted that at this stage that some households have been completely displaced and moved either upland or to relatives in other districts not affected. The household that have moved out of the district and are not replaced by relatives during enumeration is not captured here, but they may move back once the initial shock is over.

Small-scale commercial fisheries and mariculture:
The small-scale commercial fisheries sector in Samoa is based on longline tuna fishing, trolling and bottom fishing. Tuna and bottom fishing is a major contributor to Samoa's economy. Out of a total of 54 active Alia fishing vessels, 30 are engaged in longline tuna fishing mostly for export purposes and didn't suffer any damage being based in the Apia Fisheries Warf. The other 24 Alia fishing vessels are engaged in trolling and bottom fishing mostly for the local market and are scattered around the islands of Upolu and Savaii. Of these, 12 vessels (50% of the total fleet) have been damaged or destroyed by the tsunami and therefore currently out of commission. As a result, the current fish supply for the local market in Samoa is reduced by approximately 50% (or more if artisanal/subsistence fishing is considered). The total cost for the repair and/or replacement of damaged/destroyed vessels, engines, fishing gear and equipment is estimated at about SAT $612,500 (approximately US $241,000). The 12 vessels not damaged have immediately resumed fishing, because these type of fisheries activities are carried out outside the reef area, where the tsunami have not caused any damage. The repair/replacement of lost vessels is an immediate priority, to restore income generating activities and food availability in Samoa.

The Village Community Fisheries Management (VCFM) has been one of major activities of the MAF Fisheries Division (FD) in the sound management and sustainable development of coastal fisheries and aquaculture resources in Samoa, as a model community-based fisheries management practice in the region. Giant clam nursery has been one of key field activities at village community level under the VCFM as an alternative means of income, livelihood and managing their coastal fisheries. The eye observation from the shore was conducted at the giant

clam nursery sites and the fish reserve establishments in the southern and south-eastern part of Upolu Island on Monday, 5 October. Since it was not possible to conduct a free dive survey due to limited conditions (lack of water visibility, many and various debris in the water, on-going search and rescue operations), the FD has planned to conduct the detailed field damage assessment at the sites next week as priority.

8. Summary of Available Capacities

- Existing and well established cooperation networks and channels of aid to vulnerable and food insecure rural households in the communities affected by the tsunami.
- Some financial resources are being made available by FAO from ongoing projects to address the most immediate early recovery needs.
- In depth knowledge and work experience in the affected communities, through MAF network of extension and field workers.
- Availability of labor force for agriculture activities needs to be assessed in detail: in certain cases, the human losses would have reduced the labor available to some families, however in other cases; the loss of employments in the tourist sector would have made more labor force available to agriculture.

9. Overview of key early recovery needs

The most urgent needs identified for the early recovery of agriculture and fisheries sectors and restore food security are:

Food security, agriculture, livestock, and artisanal/subsistence fisheries:

- Rehabilitation/reestablishment of damaged and lost home gardens and plantations to increase food supply for self consumption and reduce dependency on food assistance.
- Restocking of lost small backyard livestock (poultry and pig) to increase availability of proteins for self-consumption.
- Provision of suitable fishing alternatives to artisanal/subsistence fishers who cannot fish within the reef anymore due to tsunami damages.

Small-scale commercial fisheries and mariculture:

- Rehabilitation of damaged Alia fishing vessel fleet, repair/replacement of lost/damaged engines, fishing gear and other equipment to allow for early resumption of fisheries activities to ensure adequate supply to the local market and minimize risk of price increase.
- Training of mechanics to build capacity of repair and maintenance of out-board engines.
- Rehabilitation of damaged giant clam nurseries.

10. Proposed Solutions or Strategies for early recovery

Food security: agriculture, livestock and artisanal/subsistence fisheries:

- It is essential that prior to the development of food security activities, and any other recovery effort in that sense within these affected areas, clearing of twisted metal, roofing iron, broken glass, damaged utilities such as fridges, freezers, washing

machines, vehicles, etc, be removed and buried in a place well away from areas of human activities. This will allow much quicker recovery of the land for rebuilding farms and living quarters. Local services can be sourced for this difficult task[33].

- Agriculture inputs such as farming tools, seed and planting materials and some agrochemicals should be provided to affected farmers to enable them to rehabilitate or reestablish lost or damaged plantations and home gardens, and to maintain the ones that have not been damaged. When extra labor force and agricultural land is available, especially in the case of resettlement to higher areas, the establishment of new plantations should be supported. Inputs should be sourced as much as possible on the local market, when available. A system to ensure adequate quality control needs to be established. Supporting services such as tractor and rotor-tiller plough is essential to speed up the production of vegetable and fruits and for those who has relocated themselves in the higher ground to restart the farming.

- Provision of small livestock such as chickens for egg production and pigs, accompanied by startup kits including supplies for pig and poultry pens, feed for the initial period, training and animal health support. As for the above, small livestock could be sourced locally: as the local livestock market is extremely limited, ad hoc information and awareness campaign might be used to facilitate local procurement. It is essential that both crops and livestock production receive ample water supply, especially with the destruction of water tanks in the tsunami. The provision of water tanks is recommended[34].

- Inshore Fish Aggregation Devices (FADs) have been deployed for village communities in support of artisanal/subsistence fishing at the areas of Falealili (South of Upolu Island) and Aiga i le Tai (Manono Island). While the reef areas are not suitable for immediate fishing activities, a small-scale fishing around FADs deployed outside reefs could be encouraged if FADs have not been seriously damaged by the Tsunami. Based on preliminary environmental and socioeconomic analysis, the deployment of additional FADs in villages where tsunami damages do not allow anymore fishing inside reefs could be also considered. In this case, adequate supply of canoes/small boats and fishing gear will be required.

Small-scale commercial fisheries and mariculture:

- Private sector grant / credit mechanisms could be activated (via bilateral channels) to support the rehabilitation / replacement of Alia fishing vessels and provision of lost equipment and fishing gear.
- Inputs and technical assistance for the rehabilitation of mariculture activities.

In parallel with Early Recovery activities and interventions, in depth sub-sector assessment need to be carried out to plan medium and long term rehabilitation strategies.

11. Partners interested in supporting early recovery efforts of the Government

[33] Cost of clearing twisted metal, debris, etc are not included here.
[34] Cost of water tanks is not included in this report.

FAO remain available to provide all necessary technical support to MAF in the early recovery and medium to long term rehabilitation process. Cost for early recovery and medium to long term rehabilitation process is estimated at **SAT 8.5m** equivalent to **US $3.31 million**[35] **for a**griculture (including livestock) and fisheries.

Table 1: Agriculture and Livestock requirements

Inputs	***Sub-Inputs***	***Number of Inputs per H/hold***	***Number of Households receiving inputs***	***Unit Cost of Inputs***	***Total Cost per Input***	***TOTAL COSTS ($ local Currency)***
Agricultural Inputs						
Seeds		*3 months*	*350*	*$100/ month*	*$300*	*105,000*
Planting Material		*1*	*400*	*$200/house hold*	*$200*	*80,000*
Pigs		*4*	*350*	*$400/pig*	*$1,600*	*560,000*
Poultry		*5*	*500*	*$30/chicken*	*$150*	*75,000*
Pig Fencing		*4*	*350*	*$500/50m*	*$2,000*	*700,000*
Chicken Fencing		*4*	*500*	*$800/50m*	*$3,200*	*1,600,000*
Pig Feed		*8/2months*	*350*	*$80/40 kg*	*$640*	*224,000*
Chicken Feed		*8/2 months*	*500*	*$80/40 kg*	*$640*	*320,000*
Bush knives		*4*	*500*	*$50/bush knife*	*$200*	*100,000*
Axe		*1*	*500*	*$200*	*$200*	*100,000*
File		*1*	*500*	*$50*	*$50*	*25,000*
Knapsack Sprayer		*1*	*400*	*$500*	*$500*	*200,000*
Spades		*1*	*500*	*$150*	*$150*	*75,000*
Picks		*1*	*400*	*$200*	*$200*	*80,000*
Oso		*2*	*400*	*$50*	*$100*	*40,000*
Mata-tuai		*1*	*500*	*$50*	*$50*	*25,000*
Hammer		*1*	*500*	*$150*	*$150*	*75,000*
Plier		*1*	*500*	*$150*	*$150*	*75,000*
Chainsaw		*10*		*$3,000*	*$30,000*	*30,000*
Fertilizer		*6/4 months*	*350*	*$200*	*$1,200*	*420,000*

[35] Exchange rate: I US $ = $ 2.57 (local currency)

Herbicide Sting		*1/month*	*500*	*$180/5 l*	*$180*	*90,000*
Insecticides & Fungicides		*1*	*500*	*$200/ month*	*$200*	*100,000*
Protective clothing		*2*	*500*	*$300*	*$600*	*300,000*
Miscellaneous Costs						
Transportation fuel for Tractor		*$1,000 /month*	*6 months*		*$6,000*	*6,000*
Transportation for monitoring		*$2,000 /month*	*6 months*		*$12,000*	*12,000*
Chainsaw fuel		*$5,000*				*5,000*
Stationery for training					*$3,000*	*3,000*
Other Costs					*$3,000*	*3,000*
Support Services						
4x4 Tractor for clearing rocks		*2*		*$110,000*	*$220,000*	*220,000*
Rotor-Tiller		*4*		*$20,000*	*$80,000*	*80,000*
Vehicle for Monitoring		*1*		*$88,000*	*$88,000*	*88,000*
TOTAL in local currency						***5,816,000***
TOTAL in US $						***US $2,264,000***

Table 2: No of traditional Fishing boat damaged or missing

District	*No. Fishing Boats Damaged (paopao)*	*Unit cost*	*Total Cost (US$)*
Siumu	*35*	*5,000*	*175,000*
Falealili	*110*	*5,000*	*550,000*
Aleipata Itupa-i-Lalo	*105*	*5,000*	*525,000*
Aleipata Itupa-i-Luga	*20*	*5,000*	*100,000*
Lepa	*17*	*5,000*	*85,000*
Lotofaga	*39*	*5,000*	*195,000*
Total in local currency	***227***		***1,630,000***
Total in US $			***US $ 634,240***

Table 3: Estimated Costs per Fishing Household

No.	Gear & Boat	Estimated Costs per Household (SAT)	No. of Households	Total Estimated Costs ($)
1	Fishing gear: complete set	2,020	105	$ 212,100
2	Fishing gear: half set	1,010	105	$ 106,050
3	Canoe	300	105	31,500

4	Dinghy without outboard motor	8,000	53	424,000
5	Dinghy with outboard motor	4,000	52	208.000
TOTAL				981,650
US $	Exchange rate as of October 13, 2009, $ 2.57 = 1 US $			US $386,500

Annex N. Environmental Needs Assessment

Samoa Tsunami Rapid Environmental Impact Assessment (EIA) Recommendations (October 3rd to 7th 2009)
Contributors: Government of Samoa Ministry of Natural Resources and Environment; Pacific Islands Programme Conservation International; Secretariat for the Pacific Regional Environment Programme; UNESCO; UNDP; UNEP

Cluster: Early Recovery (Head Georgina Bonin, UNDP Apia, Samoa)

Context
Colleagues from the above organizations were tasked by the Prime Minister to do a rapid environmental impact assessment to be included in the assessment for the Rapid Recovery Cluster. Coastlines that were affected by the tsunami were visited and systematically assessed with an expert team from local offices between October 3rd to 7th 2009 – hence starting four days after the Tsunami itself. Assessments for a small section of coastline had to rely on aerial photographs. Agriculture (including horticulture) has been assessed by others and reported on elsewhere. A detailed account of the EIA is appended to the Summary Framework and available from the Apia office of UNEP (contact Dr Greg Sherley care of UNDP).

General Observations
- Significant environmental damage was sustained on the south and east coast of Upolu and Manono island including coastal erosion, salinisation of coastal areas, damage from building debris and pollution from solid waste and sewage in village areas
- Sensitive marine ecosystems including coral reefs and sea grass beds are expected to have sustained significant damage
- Environmental damage was greatest at the far eastern and southern facing coast of Aleipata and generally diminished westwards
- Coastal morphology, including distance of reef from shore and the location of channels had a major influence on the damage sustained
- More detailed environmental assessments are needed especially for sensitive marine ecosystems such as coral reefs and sea grass beds and terrestrial ecosystems such as coastal marshes and mangrove areas and offshore islands.

Initial Marine Assessment

Impact/Vulnerability	Recommendation
Submerged marine habitat - coral reefs, lagoons, sea grass, -expected high impact (physical damage) in Aleipata and Falealili	Plan and resource a comprehensive and safe in-water marine assessment. Include focus on damaged areas where previous information exists e.g. Aleipata and Safata MPAs, fish reserves.

districts and becomes patchy but still significant e.g. Tafitoala further west. Physical damage to reefs (living systems) will predispose them to disease (bacterial, fungal) and further loss of reef quality. **Ava/channels -** clear that ava (channels) funneled the wave inland causing greater damage in these areas **Beaches and foreshore –** heavily impacted, significant removal of sand and adjacent earth material	This needs to be considered in terms of rebuilding settlements as it creates permanent higher hazard zones. Requires stabilization in the short term to prevent further sand/sediment loss especially in advance of rainy season and restoration in the longer term. New impacts e.g. reclamation , sand mining should not be allowed in impacted areas. Multi-disciplinary approach to restoration required.
Debris/rubbish in lagoon and reef -significant debris from land in lagoon, possible debris on outer reefs. Some debris will pose health risk.	Manual clean-up (not dredging) of lagoon areas. Reusable and recyclable material will need to be sorted.
Debris/rubbish in mangroves and on beaches -significant debris e.g. housing material	Clean-up & remove debris post salvage of material useful by owners/villages. Recyclable and reusable materials will need sorting.
Sedimentation -high expected impact of sediment including scouring by sand and expected smothering of coral from sediments (sand and earth). Likely cause major changes in habitat/species composition and ability to support food resources.	Must be considered in marine assessment of reef and fisheries impact. Beaches/foreshore/land based sources e.g. streams need to be stabilized to reduce ongoing impact especially with advent of rainy season.
Pollution Potential contamination from sewage, hydrocarbons, possible agriculture chemicals, organic waste, pesticides	In heavily impacted areas communities should be warned against harvesting lagoon food resources particularly shellfish as these are filter feeders as they concentrate toxins until assessments have proved them safe to eat.
Marine Protected Areas and Fisheries Reserves -high impact e.g. buoys washed away	Must be considered in marine assessment many reserve areas compromised in terms of ongoing ability to support regeneration of marine food sources outside of these zones.

in most places	Early remarking of fish reserves and MPA no-take zones and assessment of these areas to be able to recover and still be functional, some may need to be relocated. Pre-impact information from these sites valuable to assess true impact (short and longer term) – should be a key focus of marine assessment. Offshore island impact should be assessed (Nu'ulua/Nu'utele) including for important marine species e.g. turtle nesting sites.
Marine Food Sources compromised in impacted areas Combined impact of the above believed to be major impact on amount/type and safety for consumption of marine food resources.	Communities will need to have the ability to replace/substitute traditional marine subsistence food sources with other food sources e.g. access to fish from outside of the district. Safety of marine food sources e.g. shellfish from contamination in impacted and vulnerable areas needs to be assessed, Boat capacity should focus initially on helping impacted villages access to offshore fish resources e.g. replacement of alias. Possible ban on commercial access to offshore resources in these areas. Inshore boat capacity i.e. pao pao need extensive rebuilding.
Aleipata Wharf High physical damage – including significant impact on only large sea grass bed in the district. Pollution e.g. hydrocarbons, diesel fuel loss. High concern re ongoing vulnerability of area with regard to wharf rebuild	Recovery of oil drums that were washed away – approx 40 x 44 gallon drums unaccounted for and any other loss of chemicals/fuels assessed. Area must be safety certified. Significant debris clean up required and stabilization of wharf. High risk of increased sedimentation of surrounding marine environment with advent of rainy season washing unstabilised sediments. Local people should be warned against harvesting lagoon food resources from the wharf area until samples have been taken and assessments done. In depth environmental risk assessment required before decision to rebuild is taken.

Initial Terrestrial Assessment

Impact	Recommendations
Solid Waste Large volumes of solid waste (including vehicles). Some waste aggregation has begun but clearing and disposal is still a significant issue	Solid waste management plan including sorting waste into disposable, hazardous and recyclable. * JICA
Illegal/improper dumps exposed by wave action with consequent solid waste pollution issues (Tuialemu, Lalomanu)	Cleanup of dumps and proper disposal of waste – has implications for human health, hygiene, vermin etc Review and write a new plan for local waste collection process. There are implications on this issue regarding revival of tourism in these areas.
Coastal Impacts Patterns of high wave impact clearly observed with implications for future land use.	Implement CIMP (Coastal Infrastructure Management Plans) for coastal areas Ensure that findings from incoming geo-science teams are fed into planning processes including revision of CIMP plans as required
Observed damage to sensitive coastal ecosystems e.g. Marshlands and river habitats. This may have impacted some fish nurseries and some of these sites house unique ecosystems.	Clean-up of trash and debris required. All sensitive areas need to be assessed. Identify potential restoration activities
Salinisation of coastal lowland areas. Some coastal trees are stressed and losing leaves but observations showed that others are resilient.	Replanting in these areas should focus on native salt tolerant species and species that are able to hold the coastline together. In addition, ability to withstand wave damage is important for replanting near settlements as shallow rooting trees can be uprooted.
Evidence of seawall rocks displaced by the Tsunami causing significant damage up to 50 metres inland	Rebuild to proper standards according to codes of environmental practice as appropriate – in some areas natural alternatives may be preferable
Waterways Riverine systems were heavily impacted along the coasts up to I km inland, due to funneling affect of valley systems	Formal and detailed assessment of impacts. Plan activities to mitigate potential future impacts
Sewerage Septic tanks were displaced/ emptied/ uncovered with obvious negative environmental and human health impacts	Pump clean at risk tanks. Replace with septic tanks that meet appropriate health and environmental standards as per resettlement protocols

Agriculture and horticulture Noted impacts on agricultural crops e.g.. Taro, bananas, breadfruit etc	MAF and FAO have surveyed this and will provide recommendations

Results of the Environmental Impact Assessment with implications and relevant information for Disaster Risk Reduction will be included in the final report.

Many of the impacts of the tsunami may have been mitigated if the CIMPs had been fully implemented. Preparation of a tsunami hazard zone map for the Samoa archipelago is required. In addition a review of the national coastal hazard zone mapping assessment is required together with a review of the content of the CIMPs and implementation requirements.

Available capacity to meet identified needs (notes - this list is not comprehensive; potential partners highlighted)
Marine related – University of the South Pacific (**USP**) and South Pacific Geoscience Commission (**SOPAC**) scientists are ready and willing to travel to Samoa. CI has funds ear-marked to support further EIA work and are prepared to assist a Samoan Government led. **SPREP** has marine pollution expertise which could be available upon request.

Solid waste (on land) – Japanese International Cooperation Agency (**JICA**) has started assessing the quantity of the solid waste and have plans to fund a clean up programme. **SPREP** has solid waste expertise which could be available upon request.

Coastal Infrastructure Management Plan - Samoan Government agencies have capacity, as do local consultants, such as the Pacific Environmental Consultants (**PECL**).

Marine protected area management – Conservation International (**CI**), **SPREP**.

Annex O: Recovery References and Resources

1. The International Recovery Platform: http://irp.onlinesolutionsltd.net/

2. Findings of ALNAP's work on humanitarian action:
www.alnap.org/alnappubs.html

3. The ALNAP Evaluative Reports Database:
www.alnap.org/database.html

4. The ProVention Consortium lesson-learning studies:
www.proventionconsortium.org/publications

5. The ProVention Consortium needs-assessment tools and manuals:
www.proventionconsortium.org/CRA_toolkit

6. A summary of the World Bank review of responses:
www.worldbank.org/oed/disasters/lessons_from_disasters.pdf

7. The World Bank's Independent Evaluation Group (IEG):
http://www.worldbank.org/ieg/

8. The work of the Tsunami Evaluation Coalition:
http://www.tsunami-evaluation.org/

9. The Shelter Library maintained by the Shelter Centre:
http://www.sheltercentre.org

10. Transitional settlement and reconstruction after natural disasters:
http://www.sheltercentre.org/shelterlibrary/publications/584.htm

12. The Humanitarian Accountability Partnership: http://www.hapinternational.org/

Annex P: Compilation of Relevant Lesson Learned

Extracted from: Learning from Disaster Recovery: Guidance for Decision Makers (UNISDR/IRP, 2007) http://www.unisdr.org/eng/about_isdr/isdr-publications/irp/Learning-From-Disaster-Recovery.pdf

Building Back Better by Reducing Disaster Risk in Recovery

Grenada – Hurricane Ivan 2007:

The systematic processes that can be followed for effective recovery were expressed well by the Government of Grenada's Agency for Reconstruction and Development following the severe damage caused to the island state by Hurricane Ivan in 2007.It stated that the Government would be guided by the following principles for mainstreaming disaster risk reduction in the reconstruction process, and in their development decision-making in general, by:

- An integrated, multidisciplinary and coordinated approach to disaster risk reduction and development planning.
- Enhancing safety standards, including strengthening of the regulatory and planning framework for disaster risk reduction.
- Promoting participatory approaches including community mobilization and active civil society involvement and engagement.
- Building local and national capacities for increased resilience, risk management and sustainable development.
- Improving the living conditions of the affected communities and sectors.
- Making appropriate information about disaster risks available for reconstruction activities.
- Promoting effective public awareness and education, taking advantages of ongoing initiatives.
- Ensuring the inclusion of gender sensitivity.
- Assuring continuous monitoring, evaluating and learning.

Rebuilding of Housing

Latur, India – Earthquake 1993:

The building code was reviewed after the earthquakes, with the risk level and corresponding building standards in Latur upgraded to the highest level of Zone 4. New building guidelines with safe seismic features appropriate to local cultural standards were promoted through information campaigns. Individual house owners were given incentives through rehabilitation grants to repair and rebuild damaged houses, but only if they conformed to safe seismic building standards. To maintain quality, independent structural engineers were required to conduct quality audits for seismic safety. They evaluated both the construction of new buildings, as well as retrofitting work on existing dwellings. Initial reports revealed many defects and construction below expected seismic standards, especially in owner-built construction. Expected cash installments were withheld for those not conforming to standards, with the desired result that expected corrective measures were taken. These measures were supplemented by an information campaign and the engagement of NGOs to demonstrate a variety of means for safer

construction. Together these methods resulted in 90 per cent of the construction supported by the reconstruction funds achieving safe standards, as verified by independent surveyors.

Indonesia – Indian Ocean Tsunami 2004:

Seismically-safer designs for houses were prepared and circulated, including plans for retrofitting undamaged but still potentially vulnerable dwellings. Construction was encouraged to be undertaken by owners with their own personal involvement guided by the technical supervision of locally based engineers rather than the work being contracted out to large or external construction companies. These measures were adopted to motivate the wide dissemination of risk reduction knowledge and to instill a direct and local ownership of hazard resistant construction. Throughout the reconstruction period public information and communication strategies were employed to widen the community's understanding of the other and various hazards they faced. This reinforced the rationale and the purpose of using alternative hazard resistant designs.

Temporary or Permanent Shelter:

A dilemma for reconstruction authorities concerns the stages of shelter leading to permanent reconstruction. Experience demonstrates that it is important to avoid the costly and almost always unsatisfactory interim process of building temporary dwellings that become "permanent by default." While they are more demanding of recovery authorities and established bureaucracies, there are other alternate strategies that can be employed. Well conceived recovery programmes guided by public dialogue can plan to extend the installation of more viable, and locally suited, immediate post-disaster shelter. Otherwise measures can be taken to accelerate the construction of permanent residential buildings. Such solutions can only be accomplished though with extensive and well-considered previous planning and the prior determination of adequate designs and effective reconstruction procedures, compete with contingent resource arrangements. Building houses and restoring shattered infrastructure is the primary requirement and the most demanding in financial terms in disaster recovery operations. Therefore, it is essential to devise ways to reduce the financial burden and maximize the involvement of the surviving communities in managing their own recovery. There are significant advantages in adopting a user-driven approach to rebuilding. Resettlement is rarely a viable policy option. One way to save resources is to invest in measures that can extend the life of initial forms of shelter in their various forms and to accelerate the building of permanent dwellings.

Zonation and Spatial Planning

Indonesia – Indian Ocean Tsunami 2004:

Spatial planning was assigned an important role in reducing the risks of future disasters. Environmentally fragile zones were designated along the coastline so that no new construction would be permitted, in order to protect mangrove regeneration. Special consideration however was provided for the fishing communities in recognition of their particular requirements, which were economically important to the overall recovery process of the area and which helped to restore individual livelihoods. The layout of towns and cities was designed to avoid the fragile coastal belt while also being able to conform with avoidance of likely tsunami risks. Similarly, road alignments were planned with obvious evacuation routes indicated and the provision of higher ground locations for escape and refuge in the time of an emergency.

Sri Lanka – Indian Ocean Tsunami 2004:

The pressure to urgently address complex, difficult decisions can result in reactive policies that may increase long-term vulnerability of affected populations. Sri Lanka in the aftermath of the 26 December 2004 tsunami represents such an example: a hastily designed coastal buffer zone policy has incited massive resettlement of affected populations and resulted in social, economic and environmental problems that threaten the well-being of poor coastal communities. The policy was ultimately revised, approximately 10 months following the disaster. The buffer zone policy gave disproportionate attention to reducing exposure to future tsunamis and, subsequently, did not address the critical social, economic and institutional factors that influenced sensitivity to the hazard. Post-disaster policies aimed at sustainable re-development should be informed by an analysis of the components of vulnerability that comprise a system and how these can be most effectively influenced during the separate short-term and long-term phases of rebuilding[36].

The Tyranny of Rush

Gujarat, India – Earthquake 2001:

The following example of reconstruction of two villages by different means following the 2001 earthquake in Gujarat, India presents some of the dilemmas that can arise in recovery approaches that place seeming efficiency against satisfaction and eventual utility. The 2001 earthquake in Gujarat, India caused severe damage in 490 towns and 8000 villages. The government instituted a village adoption programme by which NGOs and other organizations assumed a responsibility for the reconstruction of villages. Households were offered a choice of two approaches: one was to be "owner-driven" in which grants were provided so that owners or occupants could manage own reconstruction, and the other was characterized as being "donor-driven". Through this latter alternative, an NGO or other designated organization would rebuild the homes.

The village of Adhoi had 3000 households of prosperous farmers and traders and lost 354 residents in the earthquake. The government of the neighbouring state of Maharashtra offered to rebuild the new Adhoi by working through the Gujarat Earthquake Rehabilitation Project. They proposed to provide free dwellings located in a new location three kilometers from the original site. Two thousand households accepted this offer, with the houses rebuilt by contractors to a design approved by the Indian Institute of Technology and provided by an NGO based in the nearby district headquarters town of Latur.

After about five years, the relocated village of Adhoi is fully occupied, but is unpopular with its residents because of apparent lack of basic amenities such as shops. While these may develop in the course of time, there is the question of what has impeded the local people themselves from starting up the businesses, or whether an overall lack of participation in the donor-driven settlement may have contributed to the lack of identification and resulting investment or engagement by the residents.

[36] Post-disaster recovery dilemmas: challenges in balancing short-term and long-term needs for vulnerability reduction Jane C. Ingram, Guillermo Franco, Cristina Rumbaitis-del Rio[a] and Bjian Khazai, Earth Institute, Columbia University, 405 Low Library, MC 4335, 535 West 116th Street, New York, NY 10027, United States.

By contrast in the village of Vondh where 400 of its 9000 inhabitants perished in the earthquake a different procedure was pursued. As in Adhoi, the reconstruction was adopted by the government of Maharashtra programme, however Christian Aid, an international NGO based in the United Kingdom provided £772,000 for the reconstruction of 848 houses. Half of the 1700 village households accepted the offer of new homes on a relocated site about four kilometers away. The remaining residents opted to rebuild their own homes on their previous site. Although half of the original population of Vondh owns new houses on the relocated site many of them have chosen not to live in them. By January 2007, the reconstructed village of Vondh was virtually deserted apart from a few migrant workers who originated elsewhere. The houses were locked, with some being used only to store animal fodder. The remainder have rather taken pride in rebuilding their own homes in the original site.

There are various reasons why new Vondh became deserted, but they included local concerns about the length of time to rebuild the houses - even though the reconstruction was completed within about 18 months after the earthquake. Although a local newspaper suggested that the rejection of the new homes was due to a "lack of initiative on the part of the authorities to persuade the residents to occupy the new houses on the relocated site", a number of residents themselves cited a more influential cultural reason for rejecting the new locations was that the original Vondh site was the location of their ancestors.

Additional speculation suggests that the discontent in Adhoi and the rejection of the new Vondh may be due in part to the desire for rapid reconstruction by the governmental authority. This may be a consequence of inadequate consultation with the residents concerning the crucial rebuilding decisions and the various incentives or impediments associated with either donor or user-driven reconstruction. Donor-driven approaches where contractors rebuild a community may be more efficient than user-driven options, but they make a minimal contribution to the social and economic development of communities. Providing new houses at no cost to the occupants may facilitate the rehabilitation process in the short term, even as it also suggests that people do not value something they have not themselves partially invested in. In any event, the construction of 848 dwellings that remain unoccupied represents a serious and avoidable waste of resources.

Annex Q: Early Recovery Composition

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