



Initial Damage Assessment (IDA Report)

HUNGA TONGA – HUNGA HA'APAI VOLCANIC ERUPTION
AND TONGA TSUNAMI (HTHH DISASTER)
JANUARY 2022



Pic: 'Atataa Island post HTHH Disaster 2022

National Emergency Management Office (NEMO)

*Ministry of Meteorology, Energy, Information, Disaster Management,
Environment, Climate Change, Communications, and CERT (MEIDECC)*

ACKNOWLEDGEMENTS

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This report includes the information from different clusters namely

- Food Security and Livelihood Cluster through the Ministry of Agriculture, Food and Forestry and the Ministry of Fisheries);
- Economic and Social Recovery Cluster through Ministry of Trade and Economic Development (MTED) and the Ministry of Tourism (MOT)
- Health, Nutrition, Water, Sanitation and Hygiene (HNWASH) cluster through the Ministry of Health
- Emergency Shelter Cluster through Ministry of Infrastructure

We would like to extend our special thanks to the technical support provided by Geospatial Information Service (GIS) Division, Ministry of Lands and Natural Resources and also to our regional partner United Nations Office for the Humanitarian Coordination (UNOCHA).

Generous Support coming from our international development partners has always played a crucial role in all the emergency response coordination in the past and present in Tonga. We are thankful to the support coming from Australian Government through DFAT and technical assistance through RedR and support from New Zealand Government through NEMA.

We are grateful for the support, participation and engagement of non-government and civil society organizations including of Tonga Red Cross Society, Tonga National Youth Congress, Talitha Project throughout this IDA process.

The collection of information wouldn't have been possible had there not been dedication and commitment from the assessors who went house to house in tsunami affected areas. Our sincere thanks to all the assessors including town officers and the Tongan community who took part in this process.

FOREWORD

Kingdom of Tonga, our beautiful nation has been challenged yet again by a disaster- this time with the combine effect and impact of volcanic eruption and Tsunami. The resiliency of Tongan people, country's preparedness and our capacity to respond to such an unprecedented event is on test.

Tonga witnessed a historical and violent eruption of Hunga Tonga-Hunga Ha'apai (HTHH) undersea volcano on the 15th January 2022 which generated a powerful tsunami with the waves reportedly up to 10 meters high and battered the low-lying coastal areas of Ha'apai, 'Eua and Tongatapu resulting in 4 deaths and a devastating impact on our lands, houses, communities and our people.

In coordinating the immediate relief distribution and emergency response, Government of Tonga, as a standard practice, commissioned an Initial Damage Assessment (IDA) to assess the level of damages and the immediate needs of the people and communities affected by the disaster. This report covers the initial damages assessed by the national team led by National Emergency Management Office. I am hopeful this report will guide our collective effort, both of government and non-government actors, in reaching out to the people and community who are in urgent need of help and support and will lay down the path for early recovery.

While destructive volcanic eruptions and tsunamis are not a common occurrence, the explosion of HTHH volcano on the afternoon on Saturday 15 January, the subsequent tsunami and series of devastating waves following the eruption until next morning, will remain forever etched in our memory and will work as a stark reminder of our need to enhance our preparedness and response capacity to save individuals' lives, protect livelihoods and properties of Tongan people and safeguard public services and infrastructures.

Tongan lives and the economy were already constrained by the COVID-19 and border restrictions since March 2020. The physical destruction caused by the tsunami and the subsequent loss as well as long term negative impacts of the tsunami and the volcanic eruption will sure further aggravate the adversity, and undermine our progress towards our growth and sustainable development.

Thankfully Tongan Government's effort in preventative, mitigating and preparedness measures taken through improved hazard assessment, capacity building, monitoring, and installing multi-hazard early warning systems in past years have collectively contributed to reduce the amount of loss, especially loss of Tongan lives Tonga would have faced otherwise. We are grateful to our partners, donor agencies, regional and international government partners, non-government organizations, private sector, faith- based organizations and Tongans living abroad for their continuous support in our effort to better prepare for and respond to disaster.

On behalf of the Government of Tonga, I welcome your support and partnership in our effort in coordinating the response and our path to recovery to build back Tonga better and a safer place to live in.

A handwritten signature in blue ink, appearing to be 'P. Mataele Tei', written over a horizontal line.

Hon. Poasi Mataele Tei

Deputy Prime Minister and Minister for MEIDECC and Public Enterprises

EXECUTIVE SUMMARY

Hunga Tonga- Hunga Ha'apai Volcanic Eruption and Tsunami

A historic eruption of undersea Hunga Tonga-Hunga Ha'apai (HTHH) volcano on 15th Jan, 2022 at around 5.15pm generated a powerful tsunami with the wave reportedly up to 10m high. A tsunami wave of 1.2-2 m high hit the capital Nuku'alofa on Tongatapu Island, situated about 65 km south of the volcano at around 5:30pm local time damaging the city's coastal areas. The 'Eua and Ha'apai Islands groups were also badly hit by the tsunami. The tsunami waves and flood water has completely swept away houses and infrastructure in many small outer islands, especially Mango and Fono'i in Ha'apai and 'Atataa in Tongatapu. Mass evacuations had taken place across Tonga, especially in the coastal areas in Tongatapu, 'Eua and Ha'apai. Island groups of Vava'u and the two Niua's- Niuatoputapu and Niuafo'ou were not directly affected but indirect effects such as shortage of fuel and consumer goods due to transportation and communication breakdown have been witnessed.

Summary of damages and impacts

Human Casualties- Tragically there were *four deaths (3 females and 1 male)* reported, three as a direct result of the tsunami, and one reported as due to the trauma of the event. One person reported missing but was later found and 10 people have been officially reported injured.

Evacuation & Displacement- All coastal communities across Tongatapu, 'Eua and Ha'apai evacuated their homes for safer areas (community halls, family and friend's residences, schools and office buildings) in higher zones and further inland to keep themselves and their families safe and protected from the tsunami waves. Around *1.9% of the total population* in the Kingdom of Tonga were displaced immediately after the event due to the damage on their households, including resort owners whose residence was also their business. All residents of Mango and 'Atataa Island are displaced and are currently living in Tongatapu.

Affected Population- All the population from islands of Tongatapu, 'Eua and Ha'apai are affected which is around 84% of total population in Tonga. The disruption of the system and services, especially the communication and transportation has impacted whole of population of Tonga. Total 2507 people (770 man and 828 women, 390 boys and 351 girls and 168 babies under the age of 5) have been directly affected by the tsunami generated by as a result of the HTHH volcanic eruption. Among the affected people, the IDA has identified total of 61 people, 18 female and 43 male having some form of disability.

Damage to the households- IDA team reaches total of 476 houses out of which 468 houses have reported varying level of damage-169 completely destroyed; 117 severely damaged; 101 moderately damaged; and 81 with minor damages. These households were based in low lying coastal areas and low lying islands. Out of total damaged houses, 113 houses, around 35%, are women headed houses.

Damage to Water and Sanitation Facilities- A total of 310 houses has reported complete or severe damage to their sanitation facilities which combines both toilets and sewerage system.

The houses which have been damaged by the tsunami have also some level of damage into their water system, mainly on the gutter and tanks build to harvest rain water. The IDA at this stage has focused only on physical damages. The impact of deposition of volcanic ash to the water reserve across Tongatapu, 'Eua and Ha'apai Island Groups is much wider and extensive than covered by this IDA.

Damage to Food Items and Crops- A total 170 houses which is 36% of total houses surveyed in the IDA reported not having fresh food at home. Around 42% of total houses surveyed have mentioned their crops, standing crops have been damaged by the tsunami water.

Damage to household utilities and non- food items- The houses which were either completely destroyed or severely damaged, i.e. total of 284 houses consequently have all the household utilities damaged by the tsunami and flood water. The houses with minor or moderate damages have also limited access to Non Food Items (NFIs) and volcanic ash deposition have further damages household utilities of not only directly Tsunami affected houses but also of the houses which are near the HTHH eruption site.

Damage to Public Infrastructure and Critical Service Facilities- There is heavy damages to the public infrastructure at the coastal areas across Tongatapu, 'Eua and Ha'apai. The Fua'amotu International Airport was not operational for a week due to the ash cover. Queen Salote Wharf and Vuna Wharf were affected by the debris from the tsunami. Vaiola Hospital was affected by the ash fall as the backup generators were not functioning. More importantly the violent eruption of HTHH undersea volcano broke away the undersea communication cable disconnecting Tonga to/with the outer world.

QUICK NUMBERS BY ISLAND GROUPS	
A TOTAL OF 468 HOUSEHOLDS ACROSS TONGATAPU, HA'APAI AND 'EUA WERE SURVEYED (fit the criteria for IDA)	
Ha'apai	<ul style="list-style-type: none"> • 93 households completely or severely damaged • There are 31 female headed households, of these 16 were completely destroyed, 2 were severely damaged, 4 were moderately damaged and 8 with minor damages. • A total of 5 households with various level of damages has vulnerable people dwelling in it. • 131 households reported damage to their toilets and 68 in 'Otu Mu'omu'a, leaving almost 50% of the households in 'Otu Mu'omu'a with inappropriate sanitation
Tongatapu	<ul style="list-style-type: none"> • 157 houses were severely damaged or completely destroyed, 73 moderately damaged and 48 reported minor damage. • Of the 278 households damaged, 85 are female-headed household. Out of the 85 household, 20 were completely destroyed, 27 severely damaged, 26 moderately damaged and 11 with minor damage. • There are eight households with different levels of damage, with vulnerable people residing there. • 324 households reporting damage to their toilets whereas 102 are from Kolovai District
'Eua	<ul style="list-style-type: none"> • 30 houses have been completely destroyed and 6 houses severely damaged, 6 moderate damage and 5 houses reported with minor damage. • There are 9 female headed households, with 6 completely destroyed, 2 severely damaged, and 1 with minor damage

Need and Recommendations

Urgent need for up to one month



Urgent need to provide **appropriate housing** (*family tents for completely and severely damaged houses and tarps and shelter kits for moderate and minor damages*) to meet the shelter needs of affected households in particular for the displaced families



Urgent need of supply and the continuity until reliable solution is found of **clean drinking water**, together with appropriate response for **the sanitation and hygiene need** to ensure there are no further health risks to the affected communities. Urgent continued support with the provision of clean drinking water supporting the communities to harvesting for self- reliance.



Provision of NFIs- hygiene and/or dignity kits and water containers is urgent to all households who have sustained some level of damages. Beddings and clothing is required for completely and severely damaged houses. Community and houses closure to the HTHH Eruption site also need NFIs because ash deposited after eruption has made bedding, clothing and other NFIs not usable.



Urgent requirement to ensure **persons with disabilities and elderly including women and young girls** needs are being met, especially those who have been displaced. Noting, any temporary shelter provided will need to recognise that this is still the Tropical Cyclone season and COVID19 pandemic, so medium to long term safety and security needs to be considered, especially for vulnerable populations.



Supply and continue to provide **food** especially to remote islands and to urgent need to ensure food delivered are healthy and nutritious and are suitable for children, pregnant and lactating women as well as for elderly.



Psychosocial support is strongly recommended for all affected households, with extra support for communities that have been severely **impacted, specifically those displaced** and those whose communities and houses were completely destroyed



Urgent support is required for the families with **school going children** for them to be able to commence school.



Urgent assessment of displaced population as a result of the HTHH disaster, based on recognised criteria, including highlighting needs and priority focus for this population.



Urgent need to develop a **waste management strategy and provide response**. The response strategy should consider the clean-up of debris from the tsunamis and volcanic ash fall and for the disposable relief items such as plastic bottles and containers that have been delivered to the outer islands.



Urgent need to **preposition stock** as currently still in the 2021/2022 Tropical Cyclone season and with the added complexity of **COVID19** in the community which has further stretched the resources and personnel.

In the immediate to midterm- For the purpose of recovery and reconstruction, further verification of information is required. More detail damage and need assessment through Post Disaster Need Assessment (PDNA) is required to identify the economic and social cost of damages and loss including impact on gender, disability and the displacement. The PDNA should also lead to the development of HTHH Disaster Recovery Strategy for Tonga.

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1. INTRODUCTION

This Initial Damage Assessment (IDA) report has been prepared by the National Emergency Management Office (NEMO), Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications (MEIDECC) to provide information to the National Emergency Management Committee (NEMC), key partners and stakeholders on the level of damages and impact due to the recent eruption of HTHH volcano at approximately 05:13 pm local time on the 15th January, 2022 and subsequent tsunami that battered Tonga immediately after. The combined effect of abrupt and violent eruption of the HTHH volcano and the tsunami generated by this event has devastated life and livelihood of the Tongan people, destroyed properties and infrastructure and disrupted the government services in Tonga, the situation will be referred to as **HTHH Disaster** here in after.

The purpose of the IDA is to identify the damages and needs of the affected population, following the HTHH disaster. The IDA used the IDA Form, which was developed by NEMO in close consultation with Cluster Leads following Tropical Cyclone Gita. The form was used in previous disaster and gradually been adapted as required. Data is based at the household level assessments with the questions on the level of damages on houses, status of water and sanitation facilities, non- food items (NFIs), food security, and other immediate needs. This report has also used the information provided by different Clusters of the damage by HTHH disaster on their sectoral responsibilities. The report and analysis provide a snapshot based on the feedback from the affected persons and seeks to provide further advice on next steps to assist with early recovery efforts. For the purpose of recovery and reconstruction, further verification of information as well as more details damage and need assessment is recommended.



Pic: Royal Sunset Resort at 'Atataa (Source: MEIDECC)

1.1 IDA Process and Time Frame

The IDA is a household-focused rapid assessment that is designed to capture the initial damages to residential households as a direct result of the disaster. It assesses different levels of household damages, disaggregated data of the directly affected population, damage to non-food items as well as damage to food sources and supplies. Information on damages to water and sanitation facilities at these residences are also captured. The IDA will assist the Government and the humanitarian partners taking part in emergency response with the identification of urgent needs of the affected population. Damage to properties and infrastructures were also noted for recovery and reconstruction planning.

The IDA, as designed, has also collected disaggregated data on gender, age and disability. This disaggregated data will help respondent to recognize special needs of the people of different groups and hence design a appropriate response mechanism to cater their needs.

The IDA team worked closely with the Town Officers and District Officers who provided valuable information on the damages and guidance and support to the IDA Team when they were in the field. The IDA team was composed of both male and female assessors, some of the female assessors also leading the sub-team in the field. Data has been collected and cross-verified through different sources across the Island groups. NEMO will still continue to assess and accept information if anything missing and reported and update the information in IDA once verified.

On Sunday 16 January 2022, it was assessed that it was safe to mobilize the IDA team to commence assessment. The data collection process had itself been hindered by the damage to the national communication network, disruption to the power supply and impeded air and sea travel to and from the affected areas because of HTHH disaster.

This report also includes damage and loss information that has been collected through other Departments and Ministries (Clusters), based on their respective technical focus. As IDA stands, assessments and information in this report are aimed to accurate information for immediate response and early recovery purposes. A post disaster needs assessment (PDNA) for the HTHH disaster shall be conducted at a later stage, to cover the details cost of damages and loss and identify the mid to long-term recovery need.

1.2 Challenges

The nature, level and scale of damages of the HTHH disaster, especially the disruption to both national and international communication networks and restriction on travel and transportation with in and across the islands groups had greatly impacted the capacity of IDA team to reach to the affected community and collect and verify the information. Following are some of the challenges IDA team encountered during the IDA.

- Due to the communication network issue, information was recorded manually so the timeframe for the process of inputting and cleaning the data for appropriate analysis took longer.
- Due to the initial transportation issue caused by the pollution from ash fall, collection and verification timeframes were also lengthened.
- The IDA team couldn't use the online IDA survey for example Kobo Toolbox because of communication breakdown. Manual data input and analysis delayed the result.
- Data verification continued longer than initially anticipated due to travel and communication issues. Disaggregated data was collected though not all respondents provided responses to these questions clearly
- The recent COVID19 community transmission and lockdown also impacted the IDA process as mobility was very restricted.

2. OVERVIEW OF THE HTHH ERUPTION AND SUBSEQUENT TSUNAMI

The Hunga Tonga–Hunga Ha’apai (HTHH) volcano is located at approximately 65 km NW of Tongatapu and 70 km SW of Mango, Nomuka and Fonoï islands in the Ha’apai Group, refer to as the ‘Otu Mu’omu’a (and Mu’omu’a District). ‘Eua is situated approximately 15km SW of Tongatapu.

On 14 January 2022, the HTHH volcano began to re-erupt. The eruption reached a powerful climax on the next day on 15th January. The satellite imagery of the eruption indicated a 5km wide plume of ash, steam and gas rising into the air 20km above the volcano. The eruption was one of the biggest in Tonga in the past 30 years. The eruption caused tsunamis in Tonga, Fiji, American Samoa, Vanuatu, and along the Pacific Rim, including in New Zealand, Japan, the United States, the Russian Far East, Chile, and Peru.

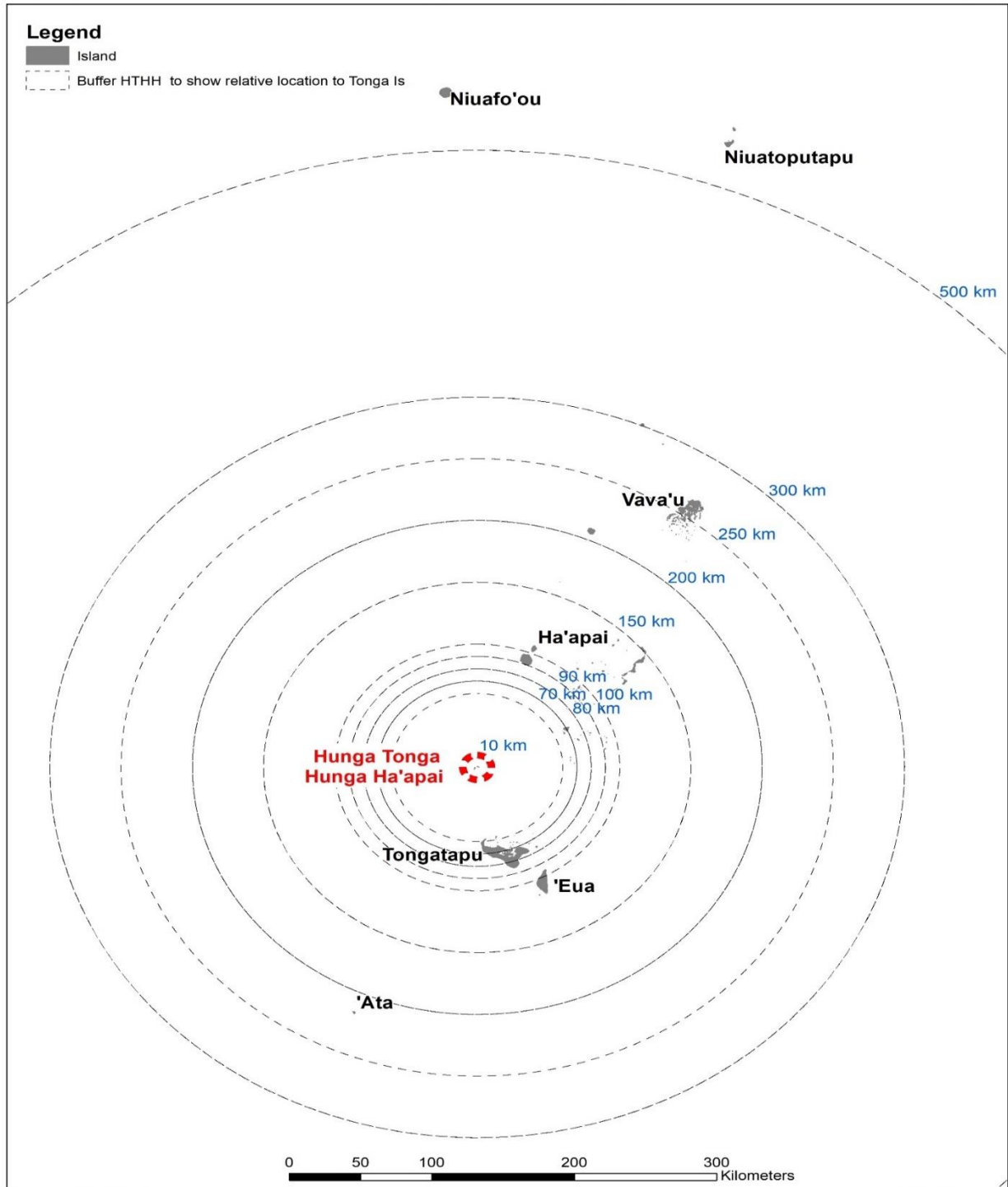
The abrupt eruption of the powerful volcano generated tsunami waves reportedly up to 10 m high. These waves hit the islands in the Kingdom of Tonga, especially coastal areas in Tongatapu, ‘Eua and Ha’apai island groups and caused widespread damages to life, livelihood and properties. Up to 2 cm of volcanic ash deposition was observed in the main Island of Tongatapu and islands nearby HTHH volcano. Ash deposition, damages to houses and utilities caused by the tsunami wave and inundation of houses of flood water has rendered existing water sources unsuitable for drinking, damaged food reserves, and other non-food items required in daily life.

It was reported that there was lesser ash fall in Vava’u and the far Northern islands of Niuatoputapu and Niuafu’ou (Ongo Niua). Vava’u and the Niua are reported to have been less affected and considered only as impacted areas. The volcano, submarine landslide and tsunami in Tonga snapped the 872km long fiber-optic cable connecting the island to the rest of the world cutting Tonga off from international communications and connections.

This event has been referred to as the Hunga-Tonga-Hunga-Ha’apai (HTHH) volcanic eruption and Tonga tsunami (HTHH Disaster) in this document and other document produced by NEMO.

1:2,500,000

Kingdom of Tonga



Source : NEMO/MLNR-LGIS

Disclaimer : For National Emergency Management Office Use ONLY

Date: 5/02/2022

Map: of the Kingdom of Tonga – distance of Hunga-Tonga-Hunga-Ha'apai Volcano from Island Districts

3. EVENT TIMELINE

14 January	<ul style="list-style-type: none"> The NEMO's National Emergency Operations Centre (NEOC) was activated as a result of Tonga Geological Services warning Tonga Geological Services issued a public notice of the increase in Hunga-Tonga-Hunga-Ha'apai (HTHH) volcanic activity The National Tsunami Warning Centre (NTWC) issued a tsunami marine warning at 11.12am The Joint National Emergency Management Committee (NEMC) and National COVID19 Taskforce (Taskforce) meeting was held at 1pm
15 January	<ul style="list-style-type: none"> NEMO sent a team out to Mango and Fonoifua with water supply at 06:00am and sail back in the afternoon The HTHH volcano erupted at 05.20pm displaying clouds of plume and ash A tsunami was triggered as a result of this eruption, completely and severely destroying houses along coastal communities NTWC issued a tsunami warning at 5.45pm, with communities evacuating to higher ground, further inland and away from the coast and to the closest evacuation centres The eruption and related ash and pumice fall continued for over an hour affecting all communities mainly across Tongatapu, 'Eua, and Ha'apai The Right Honourable Prime Minister of Tonga, Honourable Hu'akavameiliku addressed the nation at approximately 7pm The National Emergency Operations Centre (NEOC) commenced distributing water to evacuation centres, community halls, schools, family residences and to families in cars stuck on roads
16 January	<ul style="list-style-type: none"> NEMO and first responders set out with first lot of relief supplies to Mu'omu'a and Lulunga Districts in Ha'apai The Joint NEMC/Taskforce met at 11.30am to discuss the HTHH volcanic eruption and tsunami disaster (HTHH disaster) and plans for immediate relief and response efforts An Initial Damage Assessment (IDA) team was deployed to directly affected coastal communities in Tongatapu to assess the initial damage and loss A Restrictions Directions notice was issued to the public prohibiting entry to Kanokupolu, 'Atata, Patangata and Nukunukumotu in Tongatapu, from Sun 16 January 2022 to Sun 13 February 2022 'Eua District Emergency Operations Centre (DEOC) Manager reported in to NEOC
17 January	<ul style="list-style-type: none"> Ha'apai DEOC Manager established communication and reported in to NEOC, the initial damage and loss on Ha'apai and the community's needs
18 January	<ul style="list-style-type: none"> Vava'u Vava'u DEOC manager established communication and reported in to NEOC, the initial damage and loss on Vava'u and the community's needs A full Inter- Cluster meeting was held at 11am
19 January	<ul style="list-style-type: none"> The State of Emergency for the HTHH volcanic eruption and tsunami was declared for all land and sea areas, commencing from 8am Sun 16 January 2022 to 8am Sun 13 January 2022 Second lot of relief supplies sent out to Mu'omu'a and Lulunga District
20 January	<ul style="list-style-type: none"> Mango Island residents chose to be evacuated to Tongatapu from Nomuka Island. The Joint NEMC/ Taskforce met at 12pm First two international humanitarian flights landed at Fua'amotu International Airport
21 January	<ul style="list-style-type: none"> A restriction Directions notice was issued on Friday 21 Jan 2022 commencing at 8pm until 8pm Sunday 13 Feb2022 for Mango, Mu'omu'a District. First international humanitarian ocean vessel arrived at Vuna Wharf
22 January	<ul style="list-style-type: none"> A Restrictions Directions notice was issued on Saturday 22 January 2022 commencing at 8pm until 8pm Sunday 13 Feb 2022 for Mango, Mu'omu'a District
24 January	<ul style="list-style-type: none"> Release of first international humanitarian relief items, following completion of COVID19 72 hour quarantine
25 January	<ul style="list-style-type: none"> Fuel supplies has been provided to Haapai, 'Eua and Vava'u Distribution to Mango and 'Atata Island residents based in Tongatapu

Table: key events/activities and timeline of HTHH Volcano and subsequent Tsunami

4. INITIAL DAMAGE ASSESSMENTS - REPORT

4.1 Assessment of Damages

From the initial observation and preliminary reports from the field, Tongatapu, 'Eua and Ha'apai are the three island groups mostly affected from the HTHH volcanic eruption and the tsunami. Hence the IDA was focused on these three island groups as the most affected areas. The groups of islands closer to the HTHH volcano, for example 'Atataa in Tongatapu and islands of Nomuka, Mango, Fonoi in Ha'apai are the most affected, battered both by and the volcanic ash deposits and the powerful tsunami as they are near the HTHH volcano. Though Vava'u and the two Niua are not directly affected, the disruption on the communication system as well as transportation to and from the islands has seriously impacted the availability and accessibility of goods and services in those islands.

4.1.1 Damages to Houses

The tsunami has seriously damaged the households in the coastal areas in Tongatapu, 'Eua and Ha'apai.

The IDA questionnaire categorizes damages of houses at four levels.

- Completely destroyed- the house which has completely fallen down
- Severely damaged- the house which is no more liveable
- Moderate damage- the house which needs major repair and
- Minor damage- the house with some damages which can be repaired with minimal effort

The IDA team targeted areas which was observed as directly affected by the tsunami. The IDA team reached 476 houses in total for the assessment out of which 468 have been reported with varying degrees of damages. The damage assessment to the houses in affected areas have been presented in the table below.

Island	District	Village	1 minor damage	2 moderate damage	3 severely damage	4 completely destroyed	Grand Total
'EUA	'Eua	'Ohonua	5	6	6	30	47
'EUA Total			5	6	6	30	47
Ha'apai	Lifuka	Hihifo	7	3	2	5	17
	Lifuka Total		7	3	2	5	17
	Lulunga	Ha'afeva	1	2	1	3	7
		Kotu	1	0	1	4	6
		Matuku	0	1	0	0	1
		Tungua	4	10	6	11	31
	Lulunga Total		6	13	8	18	45
	'Otumu'omu'a	Fonoifua	0	0	1	17	18
		Mango	0	0	0	14	14
		Nomuka	11	6	4	24	45
	'Otumu'omu'a Total		11	6	5	55	77
	'Uiha	'Uiha	4	0	0	0	4
	'Uiha Total		4	0	0	0	4

HA'APAI Total			28	22	15	78	143
TBU	Kolofo'ou	Fasi	0	1	1	2	4
		Nukunukumotu	2	1	10	1	14
		Pangaimotu	0	0	1	0	1
		Fafaa	0	0	0	1	1
		Popua	0	6	0	0	6
		Tukutonga	1	17	14	2	34
	Kolofo'ou Total		3	25	26	6	60
	Kolomotu'a	Kolomotu'a	14	6	13	5	38
		Sopu	7	18	11	6	42
	Kolomotu'a Total		21	24	24	11	80
	Kolovai	'Ahau	4	6	4	0	14
		'Atataa	2	0	3	20	25
		Fo'ui	0	0	0	1	1
		Kanokupolu	1	9	34	20	64
	Kolovai Total		7	15	41	41	104
	Lapaha	'Eueiki	0	0	3	3	6
		Manuka	8	7	1	0	16
		Navutoka	8	1	0	0	9
		Talafo'ou	1	1	1	0	3
	Lapaha		17	9	5	3	34
TONGATAPU TOTAL			48	73	96	61	278
Grand Total			81	101	117	169	468

Table: Numbers of households and level of damages in each district across the affected Islands

Fonoifua and Mango and Nomuka Islands in Ha'apai; 'Ohonua in 'Eua; Kanokupolu; 'Atataa Island, Kolomotu'a and Sopu villages in Tongatapu were the most affected with the highest number of households that were severely and completely damaged.

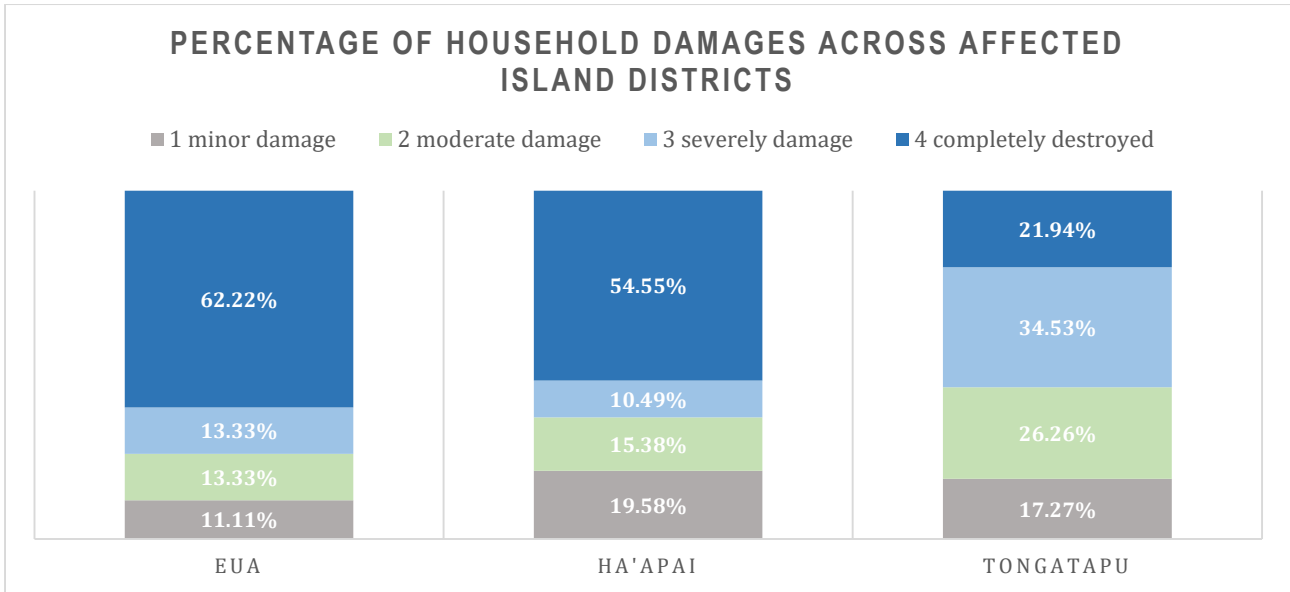
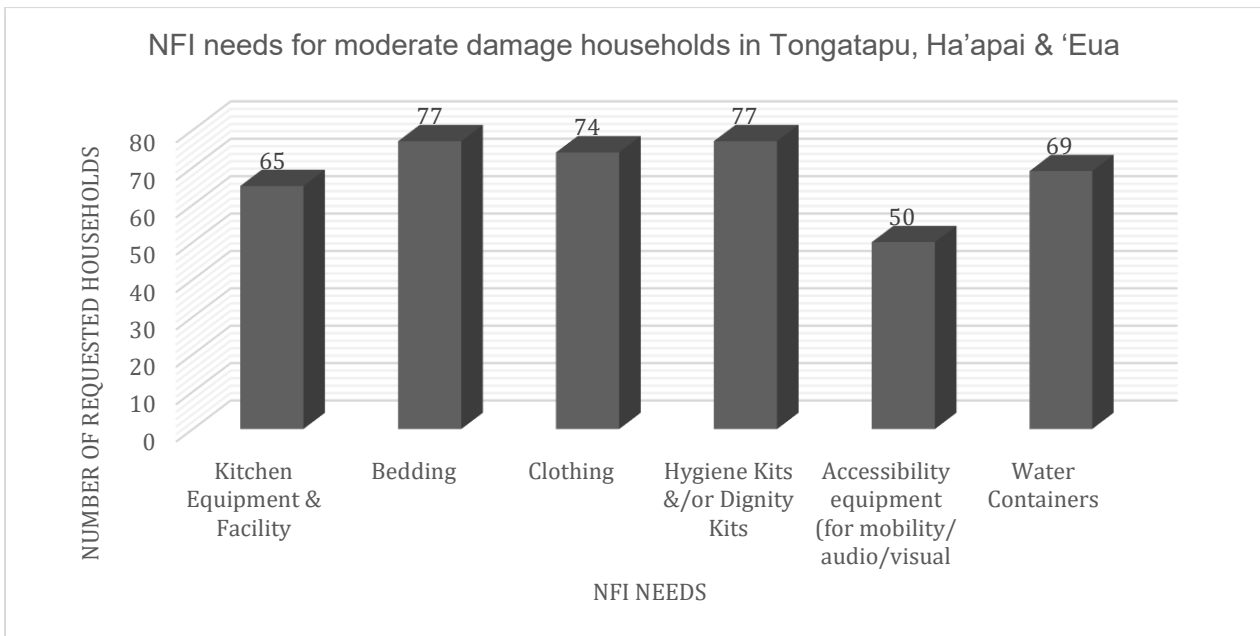
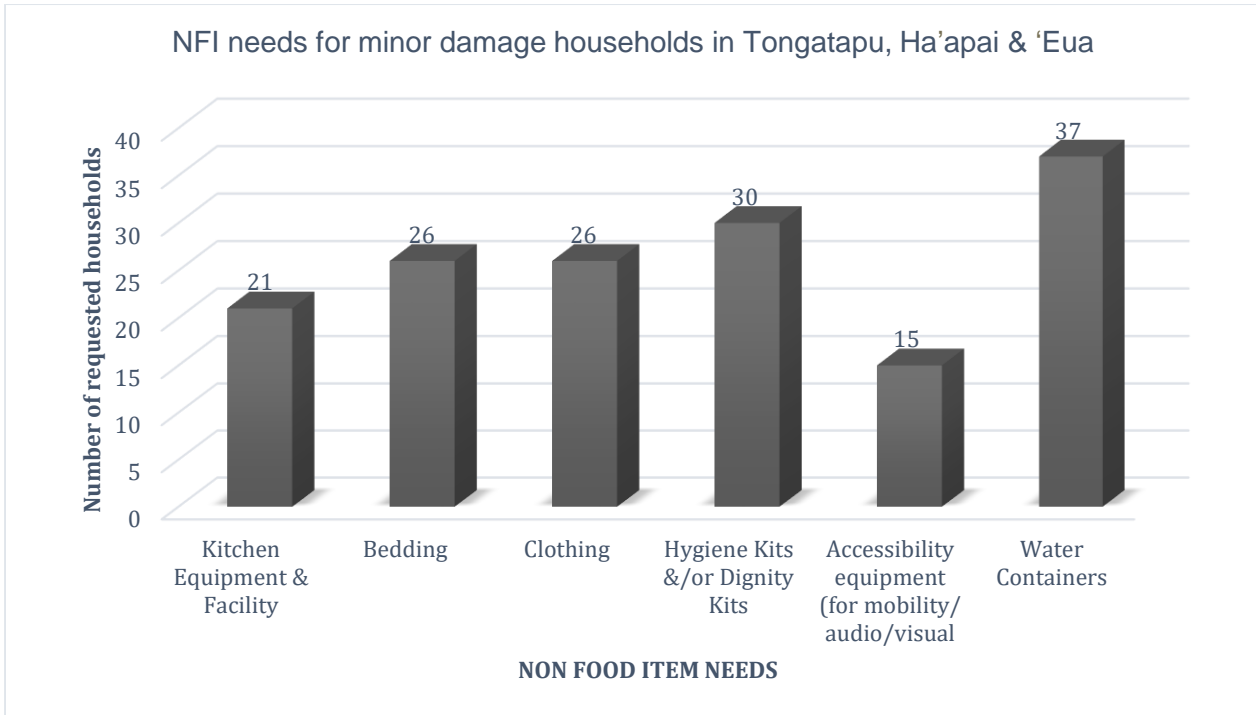


Chart: shows the percentage of affected households and the level of damage identified, as a result of the HTHH disaster.

4.1.2 Non-food items

The Assessment has found the house who have been completely destroyed or severely damaged have consequently their Non Food Items (NFIs) either damaged or not usable. There is an urgent need of NFIs to those households. The standard NFIs in Tonga includes hygiene/dignity kit, kitchen set, water containers and bedding and clothing. The need of NFIs including of accessibility equipment among moderate or minor damaged houses has been identified as presented in in the chart below.





The IDA did not cover the houses that are not directly affected by the tsunami. Household/houses which are closely located to the HTHH volcano site have witnessed thick layer of volcanic ash deposition not only to the roofs and yards but also inside the rooms, on beddings, clothing and other utilities. There has been request of NFIs coming from these houses but the level of damages to NFIs and household utilities on these households and actual need on ground should further be assessed.

4.1.3 Damage to Water, Sanitation & Hygiene

The houses which have been completely destroyed or severely damaged had their water system destroyed as well. Significant damages also occurred to sanitation facilities such as toilets (and septic tanks) and other WASH facilities in private households, schools and health centers and other areas used by the public such as community halls. Rainwater harvesting system is Tonga's main source of drinking water was significantly affected with most of the rainwater tanks in all of Tonga's impacted areas contaminated with ash fall.



Pics: the fiber water tanks that has been damaged at Nomuka by the tsunami

The IDA found underground water sources/tanks of the impacted individual households in Nuku'alofa, 'Eua and Ha'apai suffered minimal damages. The tsunami waves, flooding and later on volcanic ash deposition damaged the city water supply system including access to the main reservoirs in low lying coastal areas. The main damage to the village water supply was from the damage to the generators as electrical water pumps were covered and damaged by volcanic ash deposition.

Attention is urgently needed to isolated islands in Ha'apai ('Otu Mu'omu'a & Lulunga) with no ground water system thus relying only on rainwater for drinking and other domestic use.

Island Group	District	Number of households with damaged WASH Facilities
Tongatapu	Kolovai	83
	Kolofo'ou	32
	Kolomotu'a	34
	Lapaha	10
Ha'apai	Pangai	6
	Mu'omu'a	62
	Lulunga	36
'Eua	'Eua	47

Table in the right shows the number of affected households that have reported their WASH facilities either completely destroyed or have suffered major damages.

The Ministry of Lands and Natural Resources had conducted tests to determine the level of contamination in the Ha'apai Island groups. The result from the tests has been presented in the table below which shows serious issues of drinking water in many island groups.

Island Name	Drinking Water Quality Status	Groundwater Status	Comments
Nomuka	Very Poor	No Groundwater	Possible contamination of water tanks from solid waste brought in by the waves
Fonoifua	Very Poor	No Groundwater	Possible contamination of water tanks from solid waste brought in by the waves
'O'ua	Very Good	No Groundwater	More than 90% of the drinking water tanks were covered and the water quality of tested samples came back good. No drinking water tanks were destroyed.
Ha'afeva	Good	Groundwater	Around 10% of the water tanks were destroyed and the samples tested were good
Tungua	Very Poor	No Groundwater	Around 37% of the water tanks were destroyed by the wave
			The remaining tanks were tested high in salinity which there was a possibility that inundation affected the water tanks
			Possible contamination of water tanks from solid waste brought in by the waves

Kotu	Poor	No Groundwater	Low water quality in terms of pH and 30% of the tanks were destroyed
Matuku	Very Good	No Groundwater	More than 90% of the drinking water tanks were covered and the water quality of tested samples came back good. 0 drinking water tanks were destroyed
Fotuha'a	Good	No Groundwater	Low water quality in terms of pH and ~30% of the tanks were destroyed

Table: sample of the water status in the affected area of Ha'apai. Immediate water contamination concerns were mostly noted in the directly affected areas. Source: Ministry of Lands & Natural Resources.

4.1.4 Damage to Agriculture Sector – Food Security

Damage to the agricultural sector was due to tsunami waves in coastal communities and the excessive cover of ash over the crops across Tongatapu, Ha'apai and 'Eua. Damage is total or partial destruction of crops, forests, livestock and the fisheries sub-sector. Crops grown in the low-lying coastal areas were destroyed by the tsunami, with more than 80% of crops in the affected areas destroyed. Livestock in these areas were reported dead, including cows, horses and pigs. The agricultural survey result indicated that the 'Otu Mu'omu'a's current source of crops will only last for about a month from the time of the disaster.

The Food Security & Livelihood (FSL) Cluster assessment of crops, livestock, and farmlands across the affected communities in Tongatapu, Ha'apai and 'Eua have quantified the level of damages from the combination of the tsunami waves and the ash fall. Preliminary results from affected communities of Tongatapu showed approximately 1030 acres of crops across four (4) villages have been damaged/destroyed. As per the information provided by Food Security and Livelihood Cluster, there are over 800 allotment farms reported to be in the directly affected areas

The table below shows the damages to the number of tax allotments and farms as well as damage to the coconut trees.

Tsunami Damage Villages/Islands	Tax Allotment Farms	Tsunami Damaged Farms	Damaged Coconut Trees
'Ahau	52	37	1,850
Kanokupolu	61	26	1,300
Ha'atafu	29	19	950
'Atataa Island	18		12

Table: damage to the agricultural sector due to HTHH disaster in 4 villages in Tongatapu. Source: MAFF- Food Security & Livelihood Cluster Response Plan HTHH

The Fisheries sub-cluster assessed their aquaculture sector and reported severe damages to their marine protected areas in Ha'apai. Also included was an assessment of privately owned boats by residents who use it as a means of livelihood for fishing and aquaculture purposes. Results showed 90 boats in 'Otu Mu'omu'a were either damaged or lost, as a result of the HTHH disaster, which is a significant loss for those that also live ajoroff the ocean.

4.1.5 Damage to Public Infrastructure and Critical Service Facilities

Public Infrastructure along Tongatapu, 'Eua and Ha'apai coastal areas also suffered major damages. One of the major damages and then subsequent impact of volcanic eruption to the critical services was breaking of

undersea communication cable which connects Tonga to the outer world. The broken undersea cable completely disconnected Tonga from the outside world for many days. The damages to public infrastructures and other facilities per Island groups have been presented in the table below.

Island Groups	Damages
Tongatapu	<ul style="list-style-type: none"> • The Fua'amotu runway was non-operational for a week, due to the ash cover • Queen Salote and Vuna Wharf were affected by the debris from the water. • Boats were found washed up on the roads and the ropes were tethered • Vaiola Hospital was affected by the ash fall as the backup generators were not functioning
'Eua	<ul style="list-style-type: none"> • Nafanua Wharf was severely damaged and not operational • The Tonga Police building and Tonga Development Bank office were severely damaged • The small bridge connecting 'Ohonua and Ta'anga were damaged and have been temporary fixed. • Coastal Road from Tufuvai to 'Ohonua and Makaunga Cemetery are completely destroyed. • The graves along these coastal areas severely damaged • Ministry of Finance, Justice, Finance Accommodation, Police Accommodation, Ministries of Fisheries, Ministry of Trade and Economic are all completely destroyed. • Bank of South Pacific and Tonga Development Bank severely damages and need major renovations • Private Sector businesses have been completely destroyed (these are Pacific Energy, Eua Ferry Transportation Office, Ovava Tree Resort, Vakata Beach Resort, Tofa Ramsay Shipping Office)
Ha'apai	<ul style="list-style-type: none"> • The airport was non-operational for a week due to ash cover on the runway • Other buildings were severely damaged or completely destroyed in Nomuka included the ministerial residents, police office, hospital administration building, fisheries office, Free Wesleyan Church (FWC) and community halls. • The main Health centre for 'Otu Mu'omu'a in Nomuka is completely destroyed

Table: Public infrastructure Damages by Affected Island District

Renewable Energy system installed in Nomuka in Ha'apai has suffered big damages. The table below shows the proportion damages to different areas of use of solar energy in Ha'apai districts.

Solar System	Percentage Damaged
Solar Street Lights	~ 60%
Solar Housing System	~ 40%
Solar Freezer System	~ 30%

Table: Estimation of proportion of damages to renewable energy sector in Ha'apai

Source: Department of Energy, Ministry of MEIDECC

4.1.6 Damage to Tourism sector

The Economic & Social Recovery Cluster through Ministry of Tourism advised that nine (9) resorts were completely destroyed on the west coast of Tongatapu as well as 3 resorts on the smaller islands, 'Atataa, Fafaaa and Pangaimotu off Nuku'alofa. Around, 24 resorts were partially damaged. 'Eua resorts in the coasts

of 'Ohonua and Tufuvai were also severely damaged. The impact of the ash fall on restaurants and other tourism businesses varies.



Pic: Aerial view of Vakaloa Beach Resort post HTHH disaster. Source: MLNR

4.1.7 Damage to Health sector

The Health, Nutrition, Water, Sanitation and Hygiene (HNWASH) Cluster conducted an initial damage assessment on the health sector. The Nomuka Health Centre suffered heavy damage and is not operational. The Niu'ui Hospital (in Hihifo) had minor damage but operational. Fortunately, there is less damage to hospital infrastructure. The Vaiola hospital in Nuku'alofa in Tongatapu and the hospital in 'Eua were mildly affected with layers of volcanic ash on premises, water tanks and rooftops but remain operational. Fortunately, comparing to other sectors, health facilities and infrastructure have suffered minor damages in this disaster.

The Tonga Emergency Medical Assistance Team (TEMAT) is conducting health assessments to address immediate and critical health needs.



Pic: Damage from the tsunami on Fafaa Island. Source: MEI DECC



Pic: Damage from the tsunami on 'Atataa. Source: MORDI Trust Tonga



Pic: Damage from the tsunami in Tongatapu



Pic: Damage from the tsunami in 'Ohonua 'Eua



Pic: Mango Island residents' shelter from the HTHH disaster, January 2022. Source: Ministry of Lands and Natural Resources, Government of Tonga



Pic: Hon Deputy Prime Minister and Minister for MEIDECC looking at damages to Tupoto'a College (Source: MEIDECC)

4.2 Assessment of Impact

4.2.1 Impact on people

4.2.1.1 Casualties

The HTHH disaster has taken four lives, 3 deaths directly related to the event and one indirect.

Two females (aged 49 from Nomuka and aged 51 from Kanokupolu) and one male (aged 65) from Mango Island passed away, due to the HTHH disaster. One female (aged 40 from Nomuka), as a result of the related trauma from the HTHH disaster, passed away a week later. The real impact of loss of life, especially the loss imposed upon the bereaved families, relatives and friends can never be measured. The loss will impact on every aspect of the children and relatives of the deceased.

4.2.1.2 Evacuation and Displacement

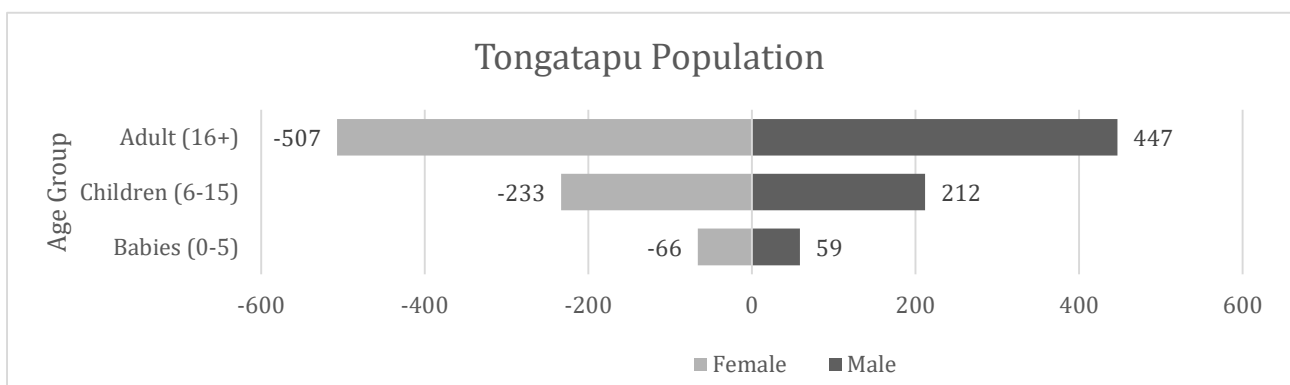
In Tongatapu, 'Eua and Ha'apai, coastal communities sought immediate shelter at evacuation centers (including community halls, schools, local businesses/ offices) while trying to evacuate to higher ground and move further inland away from the coast in response to the tsunami.

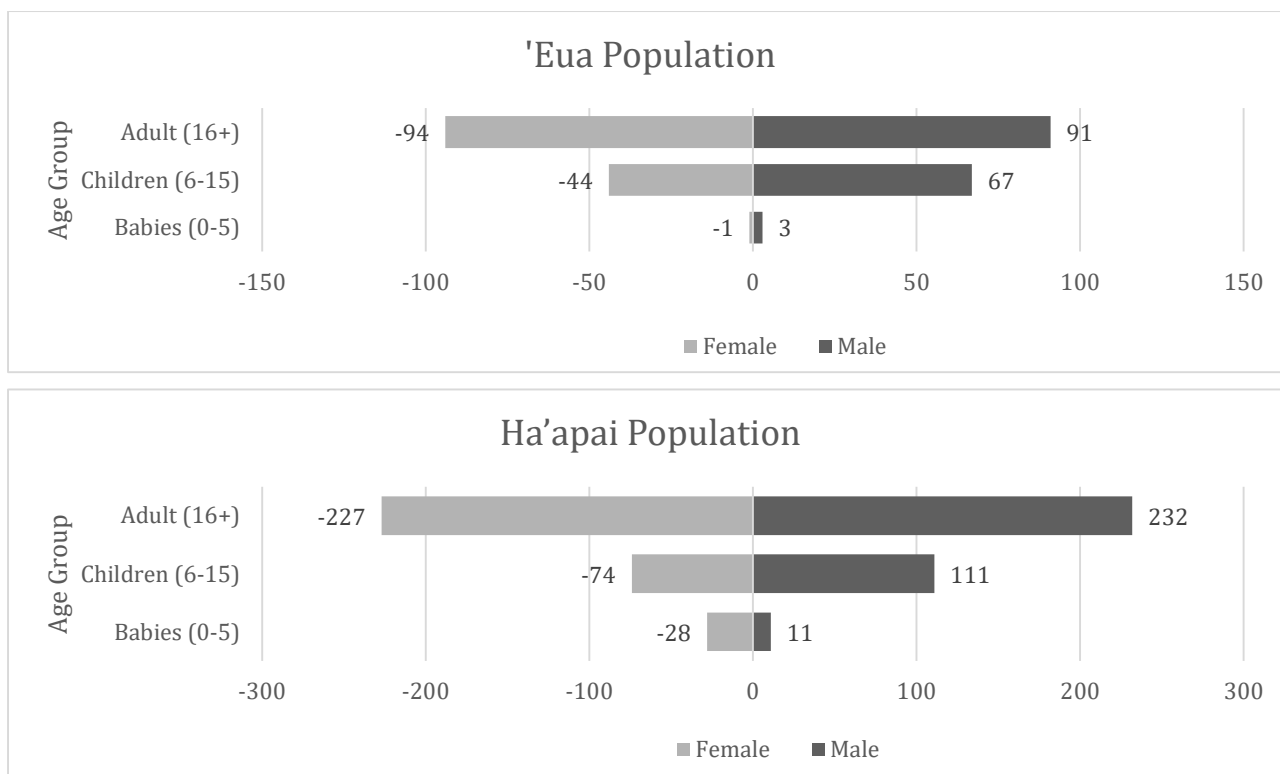
Residents of 'Atataa, Fafaa, Pangaimotu and Makaha'a islands were evacuated from their island in the early hours of the morning on Sunday 16 January 2022. Mango residents were evacuated to Nomuka and have now been relocated to Tongatapu. These residents are now displaced.

More than 3000 people evacuated and took shelter in different places including in community halls, designated evacuation centers and in house of relatives and friends. Some people even slept in their vehicles overnight until the eruption calmed down the next day.

4.2.1.3 Affected population - Disaggregated data by Island/Districts

The whole of the population of Tongatapu, 'Eua and Ha'apai, which is 84% of total population of Tonga have been affected by the HTHH disaster. As a result of the disruption to the communication and other services, all of the Tonga's population have been impacted. Table/chart below shows the disaggregated data of the directly affected people, the people who have their physical infrastructure damaged, per Island groups.





4.2.1.4 Impact on women

Of the 468 affected households a total 125 female members of the households participated in the IDA and provided their response on behalf of their family as the Head of Household as identified.

According to the Tonga Household Listing 2021 (Tonga Statistics Department), 22% of the households were led by women. In this IDA, 26.7% of the affected households were led by women. This rate is slightly higher than the recent pre-census survey. Also noting that there might be other reasons to this increase including the head of the household may be participating in the Regional Seasonal Worker schemes in Australia or New Zealand, reflecting a higher than the average rate in this assessment. All disaster would have disproportionate impact on the women, and especially when house is headed by female members and have been damaged by disaster, there is an extra burden she need to put on her shoulder which makes her and entire family dependent on her more vulnerable.

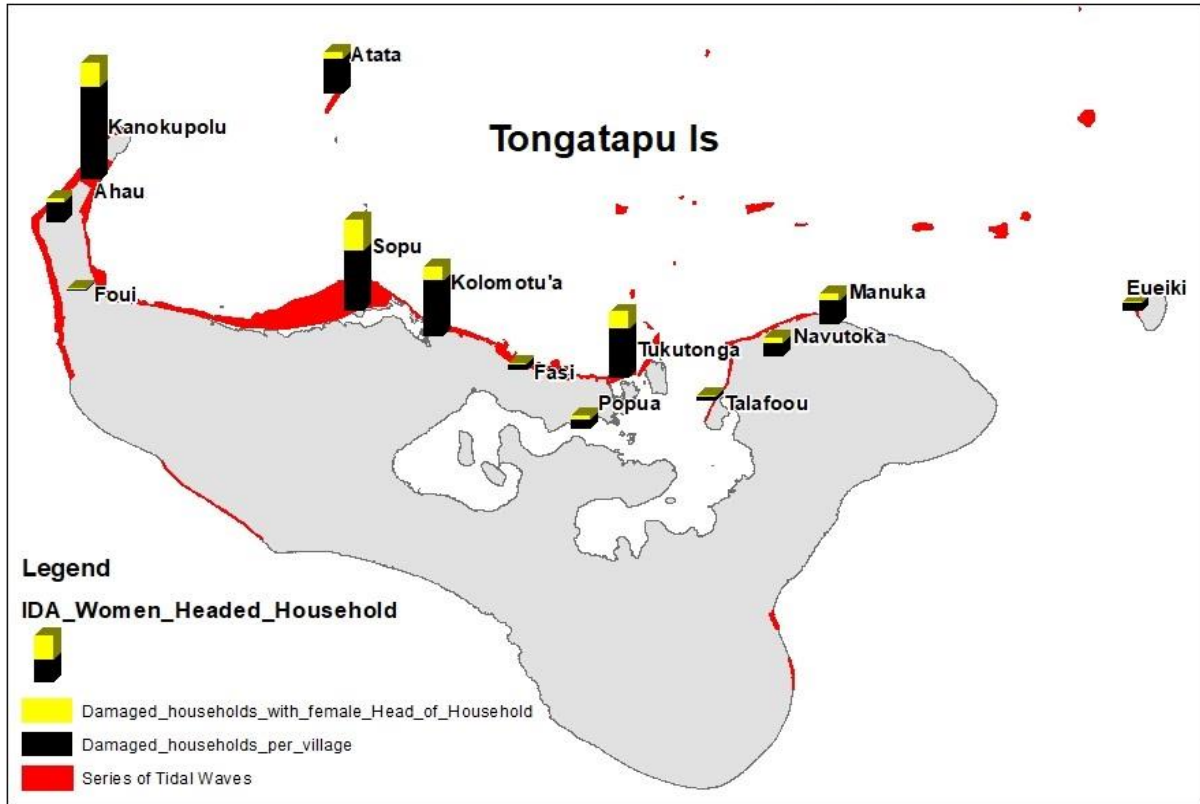
Island	Number of female respondents (as Head of Household)
Tongatapu	85
Ha'apai	31
'Eua	9

Table: number of female respondents in the affected island group also identified as the head of the household.

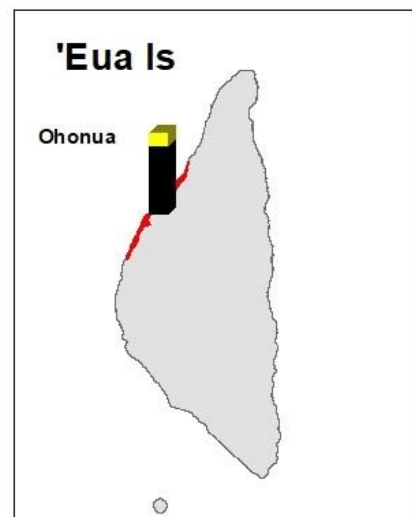
The map on page 27 and 28 shows the number and location of females as head of households as identified in this IDA process against the number of affected households.

IDA Results - Women Headed Household vs Affected Household per Village

Not to Scale



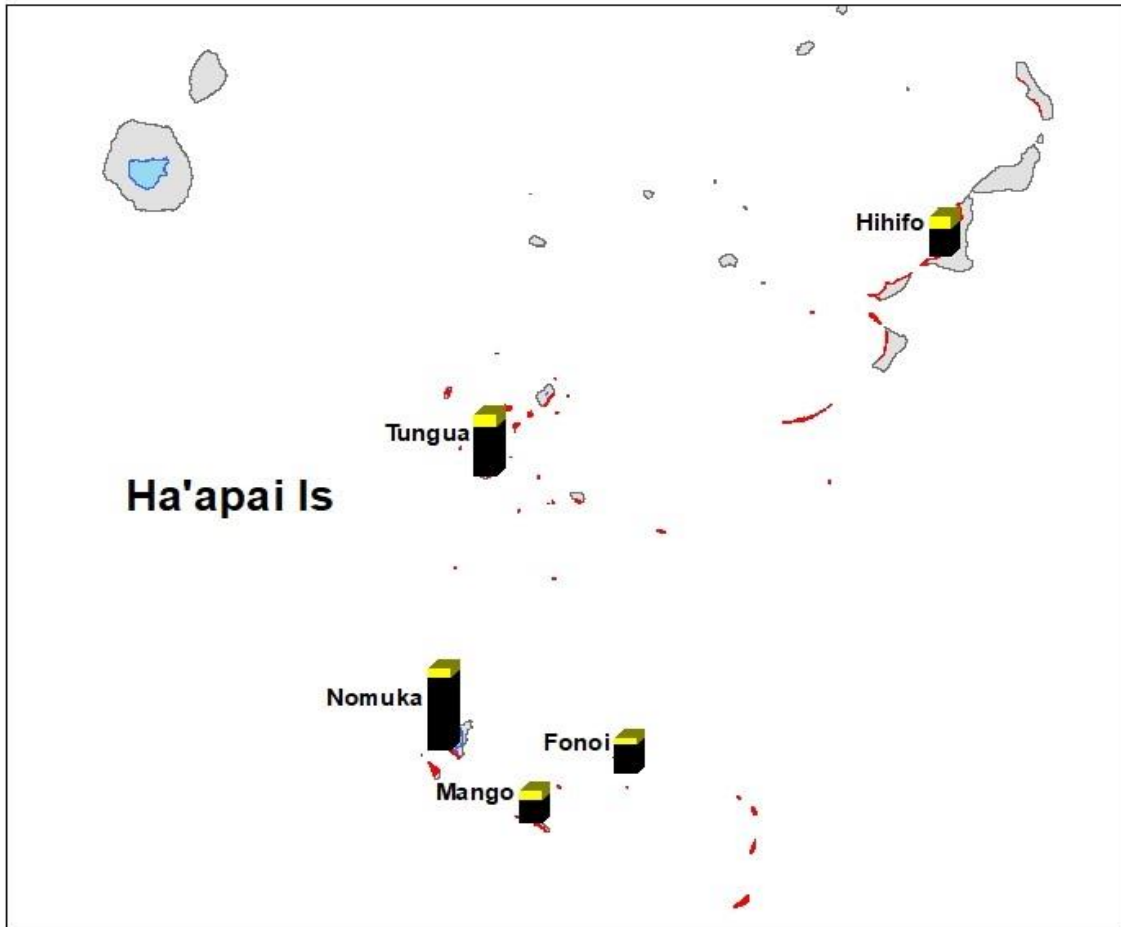
Tongatapu			
Village	Total # of damaged households with female Head of Household	% of women headed HHs	Total # of damaged households per village
Ahau	3	21.43%	14
Atata	5	20.83%	24
Eueiki	1	16.67%	6
Fasi	1	25.00%	4
Foui	1	100.00%	1
Kanokupolu	17	26.56%	64
Kolomotu'a	10	26.32%	38
Manuka	5	31.25%	16
Navutoka	4	44.44%	9
Popua	3	50.00%	6
Sopu	21	50.00%	42
Talafoou	1	33.33%	3
Tukutonga	12	35.29%	34



Source : NEMO / MLNR - LGIS - NRD



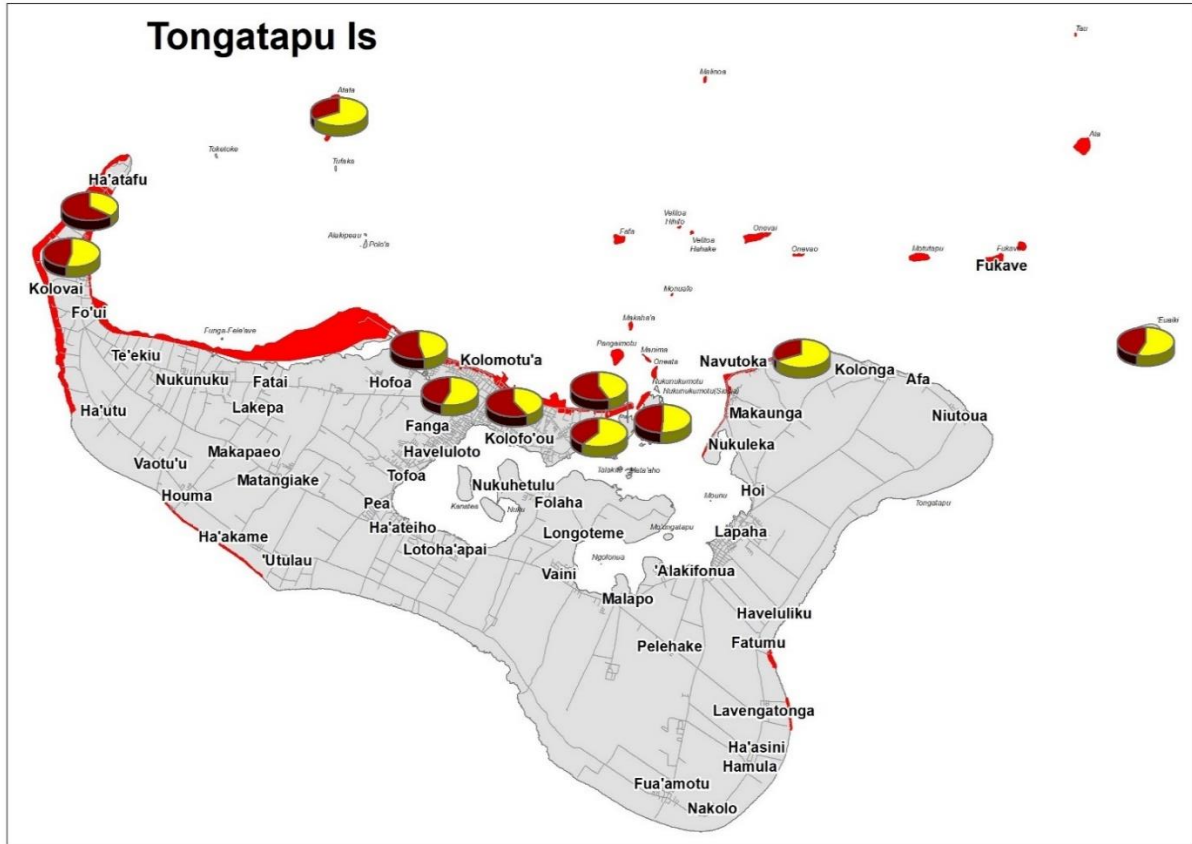
Eua			
Village	Total # of damaged households with female Head of Household	% of women headed HHs	Total # of damaged households per village
Ohonua	9	19.15%	47



Ha'apai			
Village	Total # of damaged households with female Head of Household	% of women headed HHs	Total # of damaged households per village
Fono	4	22.22%	18
Hihifo	7	41.18%	17
Mango	5	35.71%	14
Nomuka	6	13.95%	43
Tungua	7	23.33%	30

HTHH Disaster - JAN 2022 IDA Results - Children Age 6 - 15

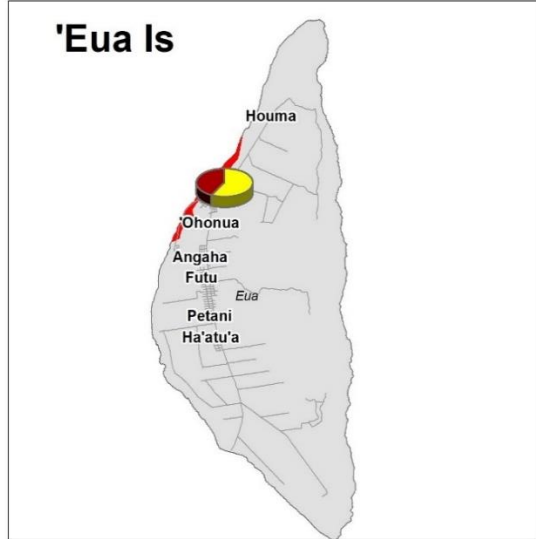
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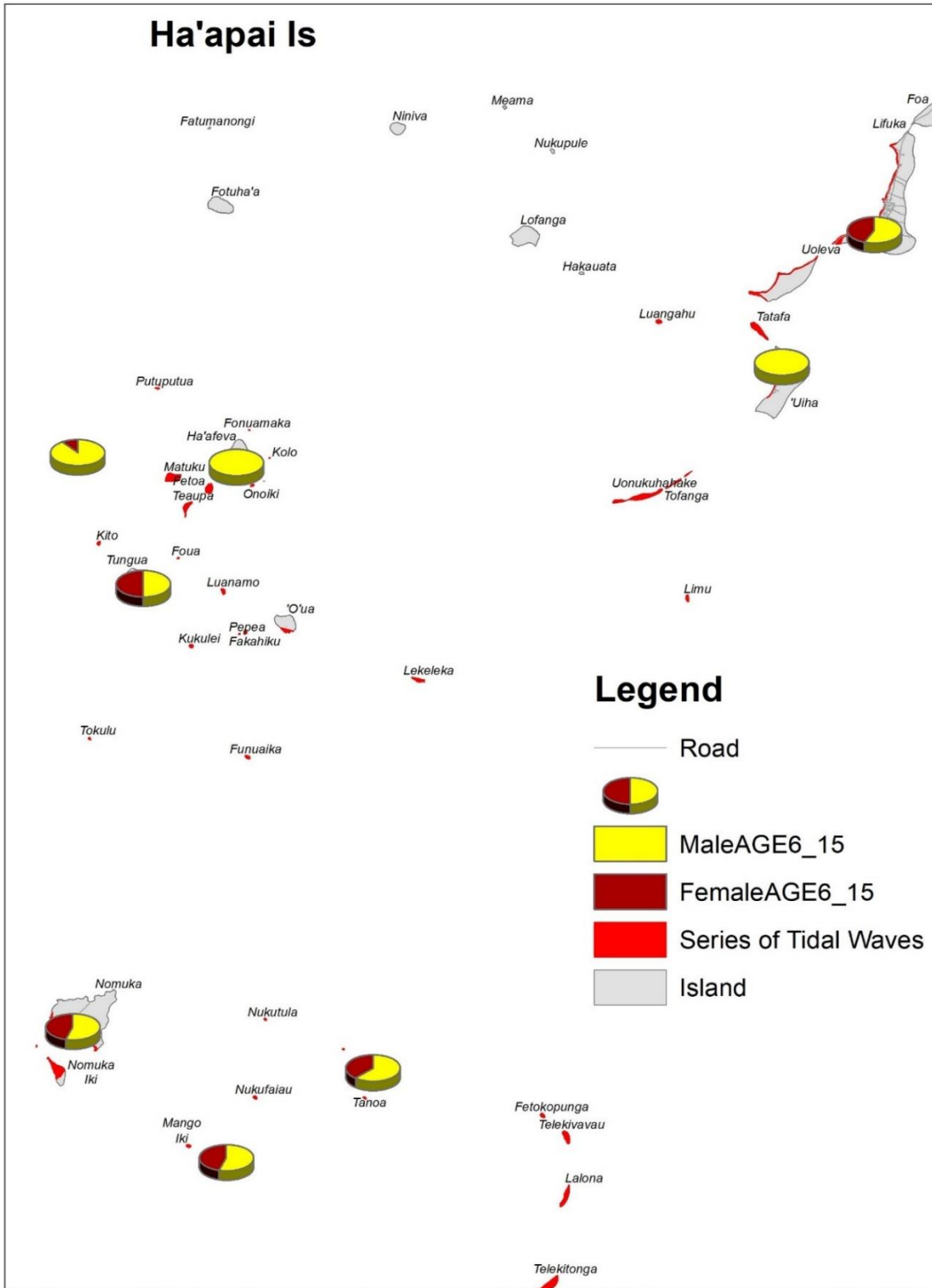
Legend

- Road
- MaleAGE6_15
FemaleAGE6_15
- Series of Tidal Waves
- Island

'Eua Is



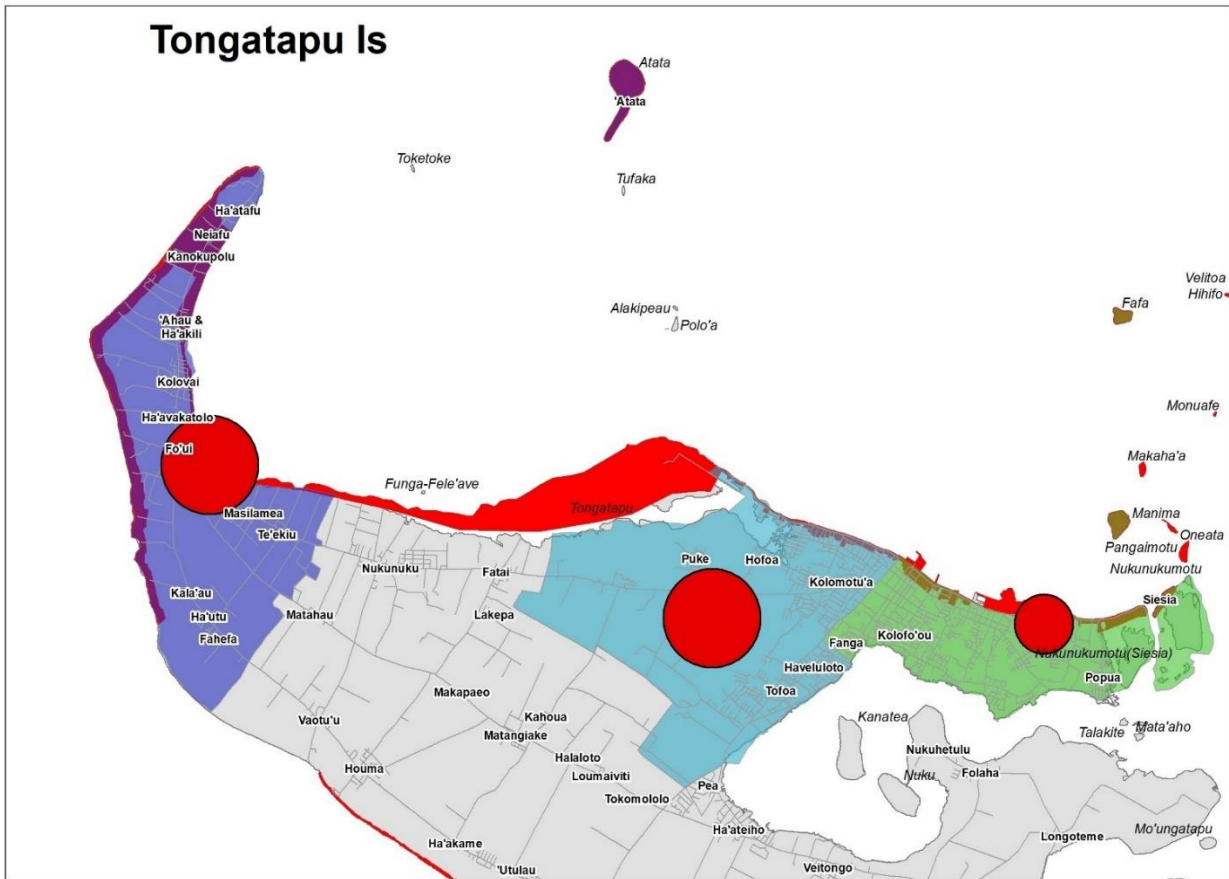
Source : NEMO / TSD / MLNR - LGIS - NRD



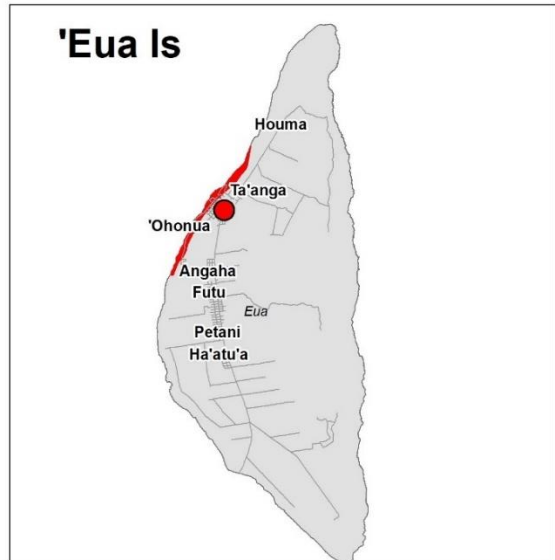
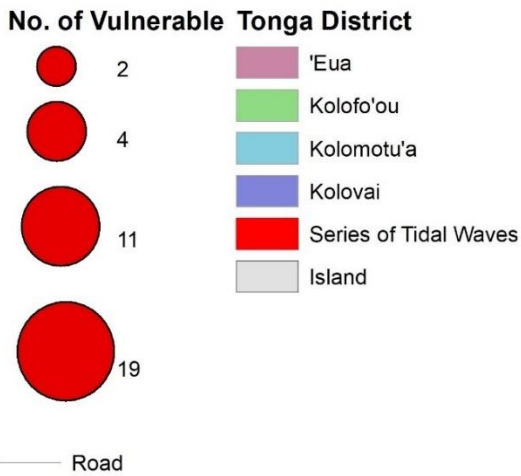
HTHH Disaster - JAN 2022

IDA Results - Identified Vulnerable Population

Not to Scale



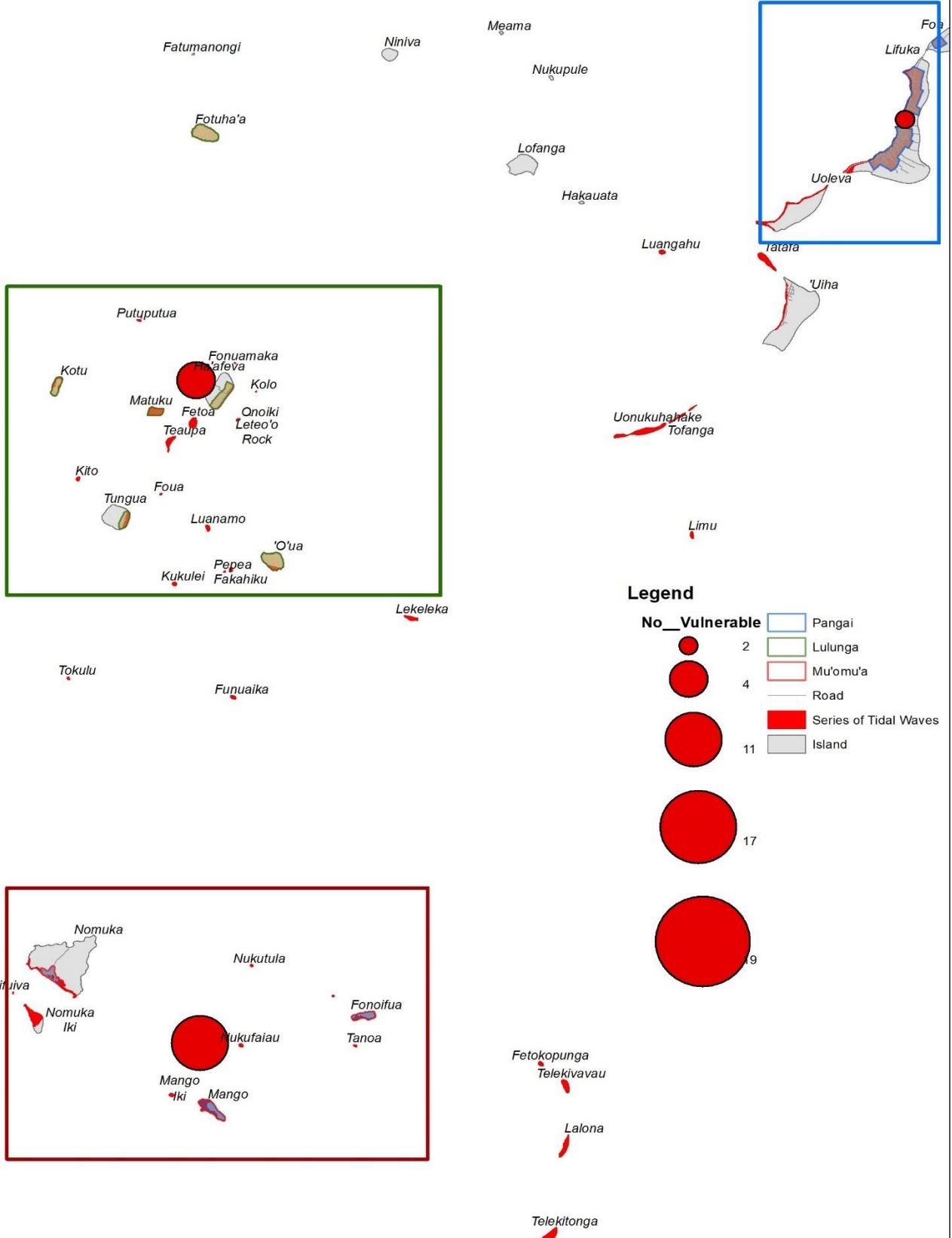
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Source : NEMO / TSD / MLNR-LGIS



Ha'apai Is



4.2.1.5 Impact on school going children

The IDA collected disaggregated data of school going children, which includes the age groups of children between 6 – 15 years. While the final senior years is over 15 years old, this data provides the information on the total number of students directly affected by the HTHH disaster and also the concentration and distribution of the school going children across the affected areas. The information is also shown by gender. The maps on pages 29 and 30 above show the spread of affected school children across the directly affected areas.

The education services, especially school education has been impacted starting the COVID-19 era in Tonga, school being closed due to lock down in many occasions. The damage to the school infrastructure by HTHH disaster will certainly take longer time especially when the construction activities are constrained due to COVID-19 spread into the community and subsequent restriction measures including closure of schools the Government of Tonga is still putting in place. The trauma of disaster on young age children will live longer and will have more long term impact on the health and growth of children.

The communication break with no access to internet after the disaster has made online education not a feasible option for Tongan students. Limited access to the radio and other communication services has consequently limited the opportunity for students to continue their education.

4.2.1.6 Impact on persons with a disability and elderly

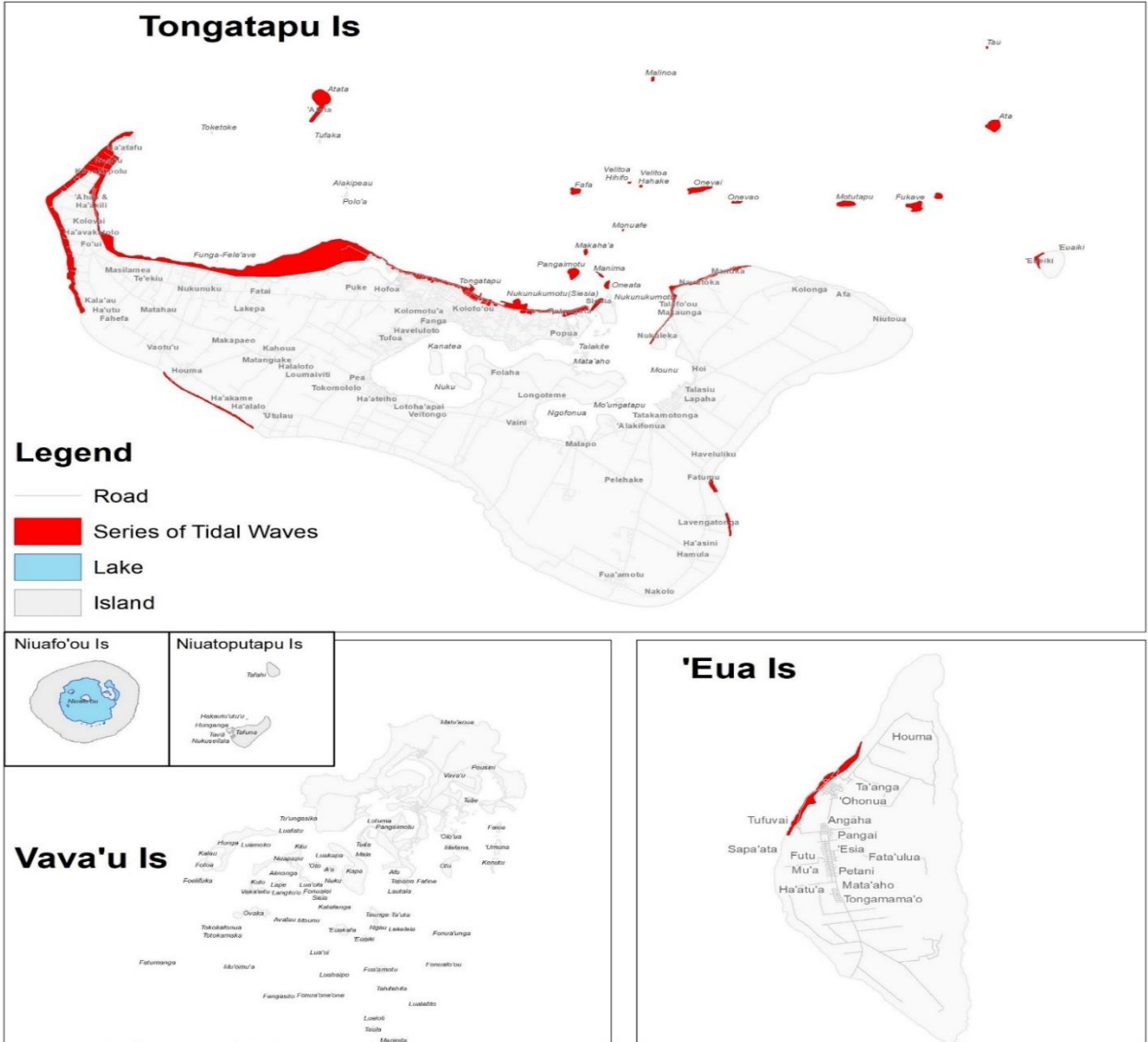
The IDA found out of the total affected people, 18 males and 43 females, have some forms of disability needing assistance for accessibility equipment. Our relief distribution and response should be able to cater the special need of the people in this group. There are equally elderly people who have been affected by Tsunami. These groups of people need special attention too. The maps on page 31 and 32 show the distribution of vulnerable people among and within the affected communities.

4.2.2 Affected areas on Map

The maps in below pages, pages 34-35 show the areas directly affected by the disaster. These areas are also vulnerable to cyclones and were affected by past cyclones. It highlights the need not only to focus our current response activities but also better targeting for preparedness and risk reduction activities in the future scenarios.

HTHH Disaster - JAN 2022 IDA Results - Affected Areas

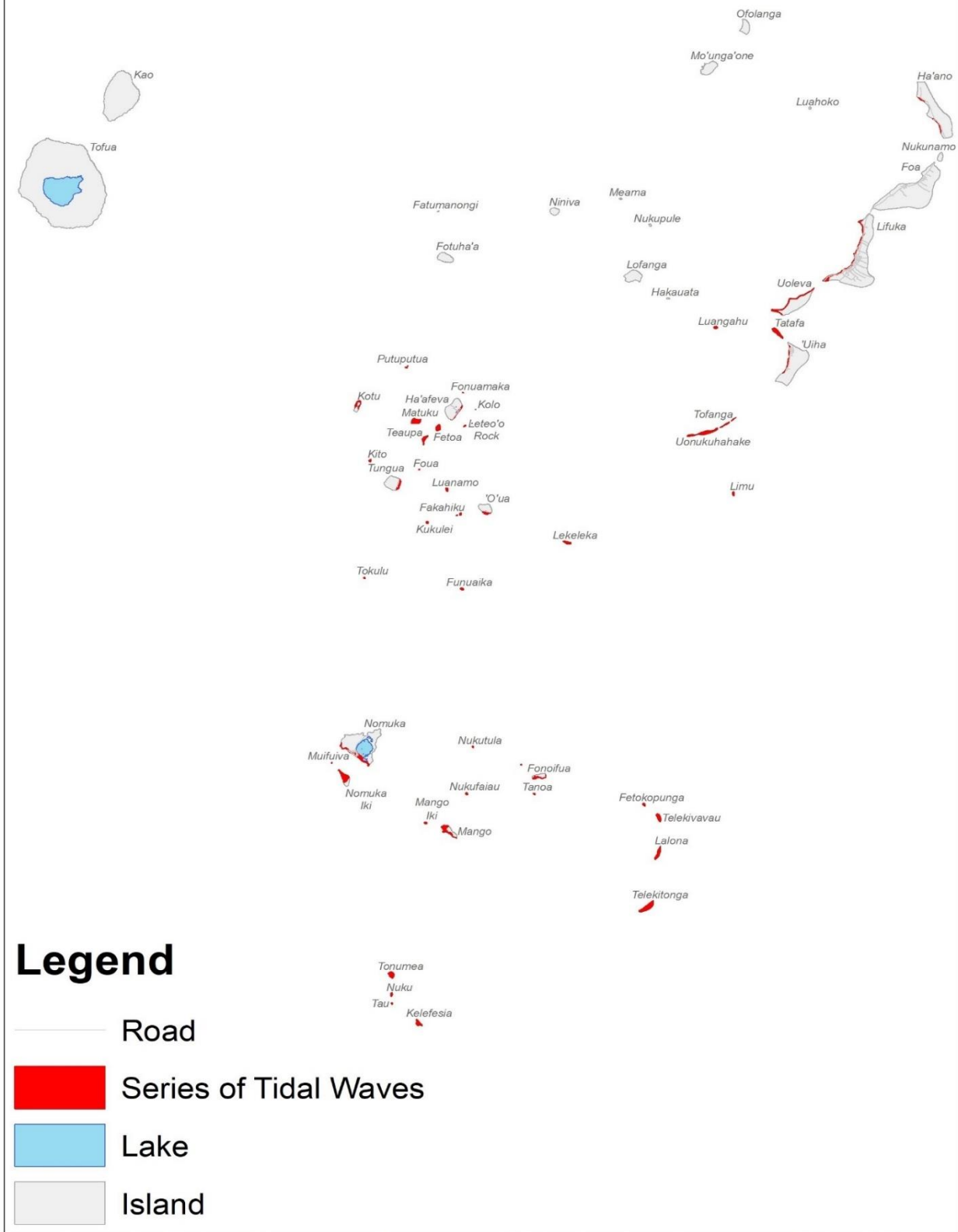
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Source : MLNR- LGIS - NRD



Ha'apai Is



Legend

- Road
- Series of Tidal Waves
- Lake
- Island

4.2.3 Impact to the Critical Services

4.2.3.1 Communication

Communication was completely disrupted across the islands and internationally, following the HTHH disaster. The break in the communication cable has disconnected Tongatapu from the outer islands, specifically the affected areas. Emergency and immediate needs are unable to be communicated in a timely manner, due to this disconnection and still remains a challenge. This breakdown of the undersea cable and Tonga's disconnection to the outer world has revealed a stark reality of vulnerability of our communication system not only of Tonga but of the whole region in the south pacific.

Communication from the outer islands to the National Emergency Operations Centre NEOC is through the High Frequency (HF) radio between Tongatapu and 'Eua; and initially via the airport control tower between Tongatapu and Ha'apai and Vava'u. The internet connectivity was initially non-operational, and is now very limited. At the time of writing of this report, it remains a challenge. Internet connectivity is only available for those who have access through the satellite and back up network systems.

Electricity was also disrupted during the eruption in Tongatapu. Tonga Power's generators were also damaged due to the ash fall. Power is slowly being restored across Tongatapu and to 'Eua and Ha'apai also.

Internet services were completely disrupted due to the damaged underwater cable (fibre optic). Tonga Communication Cooperation (TCC) has provided limited internet services (using satellite links) to public service offices. Equipment to assist in the restoration is being brought into Tonga.

4.2.3.2 Travel and Transportation

Fua'amotu International Airport in Tongatapu was closed for five days due to the thick blanket of ash on the runway from the HTHH volcanic eruption. There was no access to the outer islands, nor to Tongatapu from the outer islands by air during this time. There was also no possibility for international humanitarian support to be brought in from outside Tonga. The airport runway was later cleared of ash, enabling surveillance flights to leave Tongatapu for Vava'u and the two Niuas. International humanitarian relief supplies are able to be flown in only by second week.

Sea travel was temporarily disrupted. Due to the debris from the HTHH eruption which caused issues with the engine of a vessel that travelled from Tongatapu to Ha'apai, travel time from Tongatapu to the outer islands increases as the vessels travelled at lower speeds to minimise risk of breakdown and/ or further damage to the engine. Travelling by sea to Vava'u, Ha'apai, 'Eua and the two Niuas has recommenced.

4.2.3 Environmental impact

The volcanic eruption continued for over an hour, generating significant pumice and ash fall across Tongatapu, 'Eua, and Ha'apai. A volcanic ash blanket of 1mm to 50mm in thickness, covered all surfaces, including house



Pics: Ashes in Tongatapu on the morning of 16th January 2022

roofs, cars, plants, trees, agricultural crops was created, as a result of the ongoing eruption activity. This volcanic ash blanket, while less directly damaging, also caused considerable disruption to daily activities.



Pic: Impact of tsunami tidal waves on Tongatapu residents, in Fasi. Source: MEIDECC- NEMO



Pic: Volcanic ash deposition at the property at Patangata, Tongatapu. Source: MEIDECC-NEMO

The tsunami caused significant damage to residential and business properties as well as farms and coastal communities and lands in the affected areas along the low-lying coast, as it flooded these areas. The powerful force and drag of the waves caused damage to natural and built structures.

A series of tidal waves continuously battered the shorelines in both the developed areas of Tongatapu and less developed areas in the communities.

4.2.4 Impact by Island Groups

4.2.4.1 Tongatapu

Tongatapu was directly affected by the volcanic eruption and tsunami which triggered a mass evacuation to higher grounds and further inland, away from the coastal areas. Within the first 24 hours of the HTHH disaster in Tongatapu, there were over 3000 people from coastal communities who found temporary shelter for 12 – 16 hours at family and friend’s housing, community halls, evacuation centers, and in their vehicles as they headed to higher grounds. These people were unable to return to their homes during the volcanic eruption, and for safety purposes needed to remain where they were until it was day time and it was safe to they were able to return to their residence.

The volcanic ash created an ash blanket covering Tongatapu, with up to 50mm of ash on top of buildings, cars, trees, plants and anything exposed outdoors, unless covered. Coastal communities in Tongatapu were directly affected and significantly impacted by the tsunami. A series of tidal waves continued to directly hit these areas. Residents in coastal areas (Patangata, Kanokupolu and ‘Ahau, Kolomotu’a) directly witnessed incoming waves with limited time to evacuate. Residents in the neighboring small islands of Tongatapu in ‘Atata, Fafaa, ‘Eueiki and Pangaimotu Islands sought safe refuge at the higher grounds on their islands before being evacuated on Sunday 16 January 2022.

A restriction directions notice was issued to declare ‘Atata Island, Fafaa Island, Kanokupolu, Makaha’a, Nukunuku Motu, Patangata in Tongatapu as no – go zones to non-residents commencing immediately until the end of the State of Emergency for the HTHH disaster, Sunday 13 February 2022 to minimize further negative and unnecessary impacts



Pic: damages in Tongatapu western side- Kolovai District (Source: MORDI Tonga)

4.2.4.2 Ha’apai Islands

The Mu’omu’a District and Lulunga District are the closest group of islands to the HTHH volcano and were the most affected. Due to their close proximity to the HTHH volcano, Mu’omu’a and Lulunga Districts’ communities are more exposed and more vulnerable to risks from HTHH volcanic activity and any secondary effects. The capital of the Ha’apai group, Pangai is located on Lifuka island which was less impacted by the tsunami waves. Other districts in Ha’apai were also affected in a lesser degree.

The HTHH disaster left the islands in the ‘Otu Mu’omu’a District decimated, with close to 100% of the households completely destroyed. Three of the four deaths from the HTHH disaster were from ‘Otu Mu’omu’a District.

Sixty three (63) residents of Mango island in the 'Otu Mu'omu'a District were evacuated to Tongatapu, following their initial re-location to Nomuka island for health and safety reasons. These residents are now displaced from Mango Island.



Pic: Damaged houses and properties in Ha'apai Islands (Source MEIDECC)

A restriction directions notice was issued declaring the Mango Island as no – go zones to non-residents, commencing immediately until the end of the State of Emergency for the HTHH disaster to minimize further negative and unnecessary impacts.

The Lulunga District consisting of Tungua, Ha'afeva and 'O'ua Islands was also devastated with 58% completely and severely destroyed houses. There was minimal damage reported in Lifuka. Communication to and from Ha'apai is not directly available, with initial reports through the Fua'amotu Airport Control Tower.



Pics- show additional photos of houses damage from Mu'omu'a District

4.2.4.3 'Eua Island

'Eua was significantly affected by the HTHH disaster with coastal communities directly hit by the tsunami waves. The north-east community of 'Ohonua was significantly affected with considerable damage reported. There was extensive damage to households, Government and office buildings, the wharf, local cemetery and coastal areas. Burial sites along or close to the coast were also impacted. The runway at Kaufana airport was covered in up to 5 cm of ash, negating any immediate opportunity for air travel to and from the island. Air travel to and from 'Eua has recommenced as the runway is cleared.



Pic: the coastal residential area of 'Ohonua, 'Eua wiped out by tsunami tidal waves

The two most affected villages in 'Eua were 'Ohonua (capital of 'Eua Island) and part of Tufuvai both located on the western side of the island. Tufuvai village did not report any household damage as the village is located further back from the coast and on a hill. There are a few resorts that are located along the coastal areas and were directly impacted by the tidal waves which caused water inundation at the house.

4.2.4.4 Vava'u Islands

At the time of the development of this report, communication with Vava'u Islands was very limited. The initial report gathered through different sources advised no major damages. Petrol was reported to be in limited supply. An initial aerial assessment was conducted in the island of Vava'u, showed no significant damages. Though Vava'u Island groups were saved from direct hit of tsunami or the ash deposition, the disruption of the communication and transportation system across the kingdom also impacted life and activities in the islands.



Pic- An aerial survey picture of 'Utungake two days after the HTHH volcanic eruption indicate minimal impact of ash fall and generated tsunami waves on the island of Vava'u

4.2.4.5 Niuatoputapu and Niuafu'ou

The communication with Niuatoputapu and Niuafu'ou remained non-operational for a long period of time. A brief report was developed and submitted by the USS Sampson who conducted a surveillance flight and visited Niuatoputapu. A brief aerial report provided to His Majesty Armed Force (HMAF) from the USS Sampson advised no adverse impacts in Niuafu'ou.



Pics: Niuafu'ou few days after the HTHH volcanic eruption show minimal impact. Photos taken by the Lulutai airline survey team comprised of different key government stakeholders

5. CONCLUSION

This IDA report for the HTHH disaster provides information on the initial damages to households (residential) items including damages to their houses and basic survival items such as water, food and non-food items which translates their immediate needs in order to be able to alleviate further suffering. It does not necessarily provide information on damages to their other properties such as their vehicles. The report also captures an overview of damages to public infrastructure and other sectors that are deemed essentials for basic survival such as health.

As mentioned in the report, the directly affected areas from the tsunami tidal waves are low lying coastal areas of Tongatapu, Ha'apai and 'Eua. Among these areas, houses and properties were damaged in different levels. These damaged houses had their shelter including water, sanitation and non-food items compromised and need urgent support.

The inland areas in these islands were also impacted by the ashfall which has potentially contaminated Tonga's main drinking water source- rainwater. Subsistence food farming in private land areas were also impacted from the ashfall especially the newly grown crops which has withered away and died due to ashfall covering the leaves for almost two weeks without rain. Vava'u and the two Niuas seems to have been minimally impacted on a physical level, however, some of the residents in Vava'u and the two Niuas might have been mentally impacted especially Niuafu'ou which is also a volcanic island that had experienced eruption in the past.

When finalizing this report, COVID-19 cases have been reported in clusters and the Government has implemented a two-week lockdown in order to contain any further community transmissions. The additional burden of COVID-19 will further hinder the immediate response for the affected households due to HTHH volcanic eruption and tsunami. The State of Emergency for both HTHH disaster and COVID-19 has both been renewed for a month.