

*Tuvalu Government*

*Tropical Cyclone*

**KELI**

*10th - 13th June 1997*

**REPORT**

*on the extent of damage*

*Damage Assessment Team*  
*(on behalf of the National Disaster Committee)*

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## PREAMBLE

This report attempts to present a chronological sequence of events from the early announcement of cyclone Keli to the subsequent meetings and activation of National Disaster Emergency Centre (NDEC) operations and the final collation and compilation of reports on damages obtained from Niulakita.

It further provides a list of recommendations based on a thorough analysis of data and information available.

Provided below is a summary of the major components of the report:

- [A]. Introduction: It provides a general overview on the preliminary precautionary measures activated during any event of disaster and the logical sequence from preparedness, mitigation, operations, relief and rehabilitation.
- [B]. Action Taken: Highlights emergency and relief programmes undertaken, including its accompanying cost.
- [C]. Damage Survey Report: A compilation of report on damages recorded and categorised under the three major sectors namely; housing, vegetation and coastal erosion.
- [D]. Analysis of Damage Survey Report: It aims to quantify and measure the relative extent of damages caused by cyclone on Niulakita by sector, which should provide a basis for recommended future actions on the Disaster Management Phases of Emergency, Relief and Rehabilitation.
- [E]. Recommendation: It is hoped that the suggested recommendations reflect a balanced and an unbiased proposition based solely on information and data provided to the Damage Assessment Team (DAT) who conducted the survey.

A. INTRODUCTION:

1. Cyclone Keli was located at about 211 miles Northeast of Niulakita at 6 a. m. on Wednesday 10 June 1997 and was moving southwest heading straight towards Niulakita at a speed of 10 knots. The cyclone center had a wind speed of 50 and momentary gusts up to 80 knots. It was expected to hit the island at mid day posing a real threat to the people on the island. From this time a destructive storm warning was issued for Niulakita; a gale warning for Nukulaelae and a strong wind warning for the rest of the group.

2. The cyclone consistently moved southwest the same day until its center hit the island and then headed straight west. By Thursday morning, the cyclone moved northwest for few hours and then moved south. At approximately 10 a. m. it moved eastward again at a distance of 40 miles from Niulakita and intensified to a hurricane with a speed of 75 knots and gust to 115 an hour. It curved upward at 3 p. m. at the same distance of 40 miles to the northwest of the island.

3. On Thursday morning, Keli was at north of Niulakita maintaining the same distance and wind speed. By mid day it moved further away east-northeast, and in the afternoon it was 80 miles east with its intensity downgraded to gale at a speed of 35 and gusts to 45 knots an hour.

4. By the last special weather bulletin No 17 which was on early Friday morning, Cyclone Keli was 150 miles southeast of

ANNEX 5

RELIEF SUPPLIES FOR NIULAKITA

PROVIDED BY

TUVALU RED CROSS

Nos	Qty	Items
1	35	20 litres Plastic Containers
2	20	Tents
3	7	First Aid Kits
4	20	Plastic Bowls
5	1	Bale of Blankets
6	1	Carton Powdered Soap
7	20	Bush Knives
8	4	Hammers
9	1	Axe
10	3	Bundles of White Materials (100 mtrs)
11	21	Mosquito Nets
12	1	Outboard Motor Tank
13	21	5 litre plastic bottles
14	1	Bundle of 4 inches Nails
15	40	Cooked Bread

**RELIEF SUPPLIES FOR NIULAKITA - CYCLONE "KELI"**

ITEM	QNTY	U/PRZE	TOTAL
Rice	64 x 10 kg	\$ 9.00	\$ 576.00
Flour	13 x 50kg	\$ 40.00	\$ 520.00
Sugar	1 x 50kg	\$ 47.50	\$ 47.50
Biscuit	14 x 18kg	\$ 44.29	\$ 620.06
Soya Bean Oil	4 ctns	\$ 67.00	\$ 268.00
Comed Beef	26 ctns	\$ 75.60	\$ 1,965.60
Tinned Fish	22 ctns	\$ 50.36	\$ 1,107.92
Salt	3 ctns	\$ 18.60	\$ 55.88
Bathing Soap	3 ctns	\$ 57.61	\$ 172.82
Washing Soap	7 ctns	\$ 38.40	\$ 268.80
Kerosene	200 ltr	\$ 150.00	\$ 150.00
Tea	42 pkts	\$ 2.35	\$ 98.70
Milk	6 ctns	\$ 77.00	\$ 462.00
Cordial	7 ctns	\$ 28.20	\$ 197.40
Milo	6 ctns	\$ 72.00	\$ 432.00
Matches	52 doz	\$ 0.50	\$ 26.00
Benzine	200 lts	\$ 170.00	\$ 170.00
Battery (dry cell)	1 ctn	\$ 105.60	\$ 105.60
Irish Cake	2 tins	\$ 39.50	\$ 79.00
<b>TOTAL</b>			<b>\$ 7,323.28</b>

## ESTIMATED DAMAGE COSTS INCURRED DURING CYCLONE "KELI"

prepared by the Tuvalu National Disaster Committee

1	estimated cost for local dwelling house is approximately based on Vaitupu cost	1000.00
2	estimated cost for local kitchen house is approximately based on Vaitupu cost	500.00
3	vegetation cost as advised	
	by Lands & Survey	
	coconut	25.00
	breadfruit	20.00
	pandanus	15.00
	banana	10.00
	pawpaw	3.00
	pulaka/talo	15.00

	Island / Recipient	Description	Nos	Total
	<b>NIULAKITA</b>			
1	Faifeau	local dwelling house - felt		1000.00
2	Pelosa	local dwelling house - felt		1000.00
		local kitchen - felt		500.00
		tank shed with permanent roof - felt		300.00
3	Fepuali	local dwelling house - felt		1000.00
		local kitchen house - felt		500.00
4	Tia	local dwelling house - felt		1000.00
		tank shed - felt		300.00
5	Kaapui	local dwelling house - felt		1000.00
		local kitchen - felt		300.00
6	Tealiki	local dwelling house - felt		1000.00
		local kitchen house - felt		300.00
7	Vaelei	local dwelling house - felt		1000.00
		local kitchen - felt		500.00
8	Nukulasi	local dwelling house - felt		1000.00
		local kitchen - felt		500.00
9	Faie ote Neesi	local dwelling house - felt		1000.00
		tank shed - felt		300.00
10	Fale o tamataene	local dwelling house - felt		1000.00
		tank shed - felt		300.00
11	Met. Officer	local kitchen house - tilted		500.00
12	Copra Shed	permanent material shed - felt		5000.00
		150 bags of 50kg Portland Cement		
		destroyed (stored within shed)		2550.00
13	Primary School	permanent roof and ceiling completely		
		destroyed with windows linings blown off		4230.00
				26,280.00
		<b>VEGETATION</b>		
		coconut	150	3750.00
		breadfruit	5	100.00
		pandanus	20	300.00
		pawpaw		
		pulaka/talo		
		banana	1000	10,000.00
		other trees (tausunu)	30	60.00
				14210.00
	<b>COASTAL EROSION</b>	* erosion was noted no to be the case		
	* \$1300 per acre/4047sq.mtr	however it was noted that beach sand had		
	* Cost evaluation to seawall	been deposited inland, above and over		
	damaged at \$150/sq.mtr	highest water mark.		0.00
				0.00
		<b>TOTAL DAMAGED COST</b>		<b>40,490.00</b>

ANNEX 2

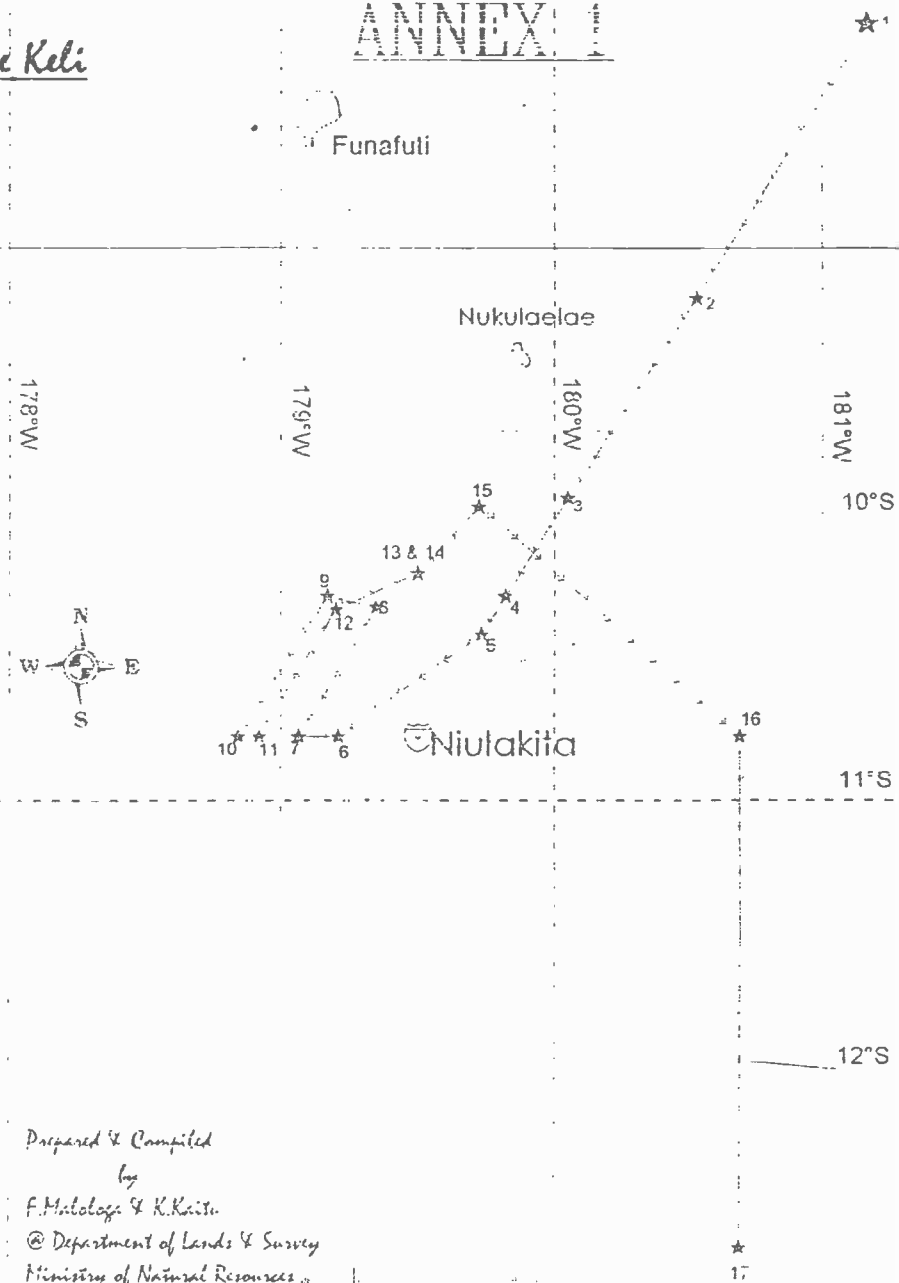
RELIEF SUPPLIES FOR NIULAKITA  
PROVIDED BY  
ADVENTIST DISASTER RELIEF AGENCY  
(ADRA)

No	Item	Qty
1	Bags of Flour	10
2	Bags of Brown Sugar	5
3	Cartons of Ox & Palm corned beef (24 x 340g)	10
4	Cartons of deep spring water	20
5	Cartons of Soya Bean Oil	2
6	Cartons of Home Bran Cocoa (12 x 375g)	2
7	Cartons of Cordial	2
8	Cartons of Condensed Milk	2
9	Cartons of Table Salt	2
10	Cartons of HB Matches	2
11	Cartons of Bath Soap (Lux)	2
12	Cartons of washing bar soap	2



# ANNEX 1

## Track of Cyclone Keli



Prepared & Compiled  
by  
F. Mitolo & K. Kaitu  
© Department of Lands & Survey  
Ministry of Natural Resources

- 5 Government initiate a formal dialogue with the people of Niutao to determine whether or not there is a need to maintain a civilian population on Niulakita, given that the island is now fairly established as cyclone-friendly hence a national burden of increasing magnitude:

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E. RECOMMENDATIONS

It is recommended

1. That relief food supplies for Niulakita should cease at the end of three months from the date of delivery of the latest supplies (June 18, Nivaga) thus impressing on the Niulakita people that they have had sufficient time to arrange for the management of their own welfare.
2. That a Monitoring Mission from the NDC visit Niulakita before the expiry of the three months in Recommendation 1, to take stock of the status of relief supplies there.
3. That Government, if agreed to take up rehabilitation work, to apply as far as is practicable, the policy of self-help concept which is 1/3 : 2/3 ratio illustrated at section D paragraph 10 under the heading Analysis.

DAT further recommend the design outlined in section D paragraph 11 under the same heading to be used for the rehabilitation programme

It is also further recommended that

4. Government urgently consider and decide whether or not it should be responsible for any costs of private homes or residences damaged during a disaster, and to publicise its decision.

visits, any new construction need to bear this in mind. In fact the Niulakita people expressly requested the DAT to request Government to conduct a new survey to determine the best site for locating the village as well as a good hurricane-proof design for houses.

10. Tabulated as Annex 3 are the total houses damaged with their estimated cost. And should Government propose to provide a grant assistance to compensate \$2,000 for houses built with permanent materials and \$1,000 for locally built houses as previously done for Cyclones Nina and Kina, it would require a total contribution of \$12,000.

11. However, if Government wishes to use the self-help concept of 1/3 : 2/3 ratio, based on the proposed Tongan design in the GAVIN AND HINA REPORT which is \$11,386 per house, Government should be looking at the vicinity of \$84,000 towards the whole housing rehabilitation.

12. If such costs stated in paragraph 11 are considered to be relatively high, charges such as contingency and labour could be deleted or total house cost be confined to materials only. Out of the total revised costs of \$8,626, 1/3 contribution of the recipient is at the region of \$2,875.33 and the Government's 2/3 portion would be \$5,750.67.

13. Concurrently for Government to adopt the fully funded concept, the total cost after deducting the accompanying charges(contingency, labour etc.) would be \$86,260 whereas the total cost with the inclusion of the accompanying charges would be \$113,860.

[i] Emergency Food Ration

5. From its assessment of the food crop situation on Niulakita, the DAT agreed the people there should receive relief food supplies. So far supplies estimated to last for 3 months are already on the island, a list of which is at Annex 4

6. The Red Cross also provided relief supplies such as tents, clothing and blankets to the victims, a list of which is at Annex 5

7. The cost of all the relief supplies which have been delivered to Niulakita under government's expenses excluding HMTSS Te Mataili trip and Nivaga II charter costs is valued at \$7,323.28.

8. While it may not be immediately relevant to the above circumstances, this report again feel it opportune to put on record the idea of Government adopting a policy that will help ensure that emergency relief supplies are stocked in sufficient quantities on all the islands throughout the year. This will help eliminate the need to transport these supplies urgently in times of emergencies.

[ii] Housing Rehabilitation

9. The immediate need on rehabilitation, as in the past, will be concentrated mainly on housing, infrastructure and agriculture. For Niulakita, the next greater and urgent need is to return the village to its usual level of livelihood and ordinary functions. And the primary task is to provide dwelling houses for the individual families. As the island is increasingly becoming prone to cyclone

7. The attached Annex 3 categorises the damages and their cost according to the three major sectors mentioned above.

D. ANALYSIS

1. In analysing the damages, it is quite clear that the sector that was worst hit was housing at an estimated cost of \$26,280.00, representing 65% of the total cost. Secondly was the vegetation sector with an estimated cost of \$14,210.00, representing 35% of the total amount of \$40,490.00.

2. It is the humble belief of this report that it should now be noted that the run-down and rather dilapidated status of all permanent buildings on Niulakita has contributed more to their vulnerability rather than the force of the winds. This is to say that most of the buildings are more than 20 years old but have not been properly maintained during that period.

3. The amount of food relief supplies which have been shipped to Niulakita is estimated to cater for a period of three months. A further analysis of Niulakita's situation in terms of food has to be done at the end of that period.

4. The more immediate task now for Government is to determine what further action should be taken regarding the major considerations in the damage survey report which are summarised below.

windows blown away as well as approximately 95% of the roof and the ceiling is also gone. The only houses left are the church, hospital, residence of the Meteorological Observer and the Radio Operator's Office. Radio Operator's residence was partly damaged. Its roof was leaking and the ceiling gone.

3. The ferro-cement water tanks at each house were not damaged but the water was contaminated. The water at the cistern near the church and the nurse's residence was also contaminated. Leaves and sand has turned the water into a dark greenish liquid.

i] Vegetation

4. All the banana plants, breadfruit trees and approximately 35% of coconut trees were destroyed leaving the people on the island live on germinating nuts only.

[iii] Coastal Erosion

5. There was no sign of significant new erosion to the coastal areas eroded after Gavin & Hina. There were, though, new large pieces of living coral broken off the reef and washed ashore about the same area.

6. About ninety percent of the village area was buried under a 12-inch layer of sand in most places. It is believed this was caused more by the strong winds but not by the waves.

through the Tuvalu Embassy in Suva made several appeals to Australia, New Zealand, United Kingdom, France, Korea, UNDP and others to provide assistance they may wish to offer in terms of food supplies, clothing, or shelters for victims of cyclone Keli. On Sunday morning the 15 June a Royal New Zealand Air Force Hercules landed at Funafuti airport with relief supplies kindly donated by the French government. The RNZAF aircraft on its way from Nadi with the Tuvalu Ambassador to Fiji His Excellency Mr Enele Sopoaga onboard, made several rounds over the island to conduct an aerial reconnaissance.

7. The Adventist Disaster Relief Agency (ADRA) in Fiji also provided relief supplies for Niulakita. The list of items are attached as Annex 2 to this report.

8. The Government of the Republic of Korea is also providing USD\$10,000 worth of relief medical supplies for the island of Niulakita.

#### C. DAMAGE SURVEY REPORT

1. The post disaster assessment survey was conducted successfully on Sunday morning the 15 June with the invaluable assistance of the people. The DAT visited all sites and reported the following damages : -

[i] Housing

2. All the local houses on the island were flattened together with the copra shed. The Primary School building had all its



proclamation under section 35 of the Constitution declaring the whole of Tuvalu a State of Public Emergency with effect from the 12 June 1997 to enable overseas countries and organisation provide assistance to Tuvalu.

5. On Saturday 14 June, the NDC had another round of discussion and agreed that since there has not been any radio contact with Niulakita for four days, a Damage Assessment Team should be dispatched as soon as possible to try and establish contact with the island. The team travelled on the HMTSS Mataili and took with it some food supplies, tents, water, kerosene, fuel and other basic necessities. The team comprised of: -

Willy Telavi	- Commissioner of Police
Kakee P Kaitu	- Assistant Secretary (OPM)
Tuisiga Saitala	- Deputy Director of Works
Pusineli Laafai	- Chief Broadcasting & Info. Officer
Sunema Makatui	- Red Cross Representative
Neil Stanmore	- Patrol Boat Technical Adviser
Marnie Moon	- TANGO Representative
Kokea Longo	- Telecommunication Technician

Hon. Baueri Irata MP., also accompanied the DAT in his capacity as representative of the people on Niulakita.

#### B(i) Foreign Assistance

6. Following the proclamation signed by the Governor General declaring Tuvalu as a State of Public Emergency, The NDEC

also dissemination to the public through the media. All special weather bulletins were immediately faxed to the NDEC.

2. At this point, NDEC has been the mouth piece of the government and all Island Disaster Emergency Centres throughout the Nation has to report to the NDEC who will coordinate and disseminate all the information.

3. Telecommunication link between the capital Funafuti and Niulakita was out of service long before the cyclone and despite the fact that a radio set was shipped to the island by the patrol boat a week earlier. The set was not installed and a Tuvalu Telecommunication Corporation [TTC] technician had to issue installation instructions to the radio operator on Niulakita via Radio Tuvalu. The arrangement proved a success and the two and only pieces of vital information from the island throughout the period of emergency, were received via telegram and morse code.

4. Following the re-establishment of communication at 6 p. m. on Wednesday the 10 June between the island and headquarters, NDEC managed to know the situation and the extend of the devastation caused by cyclone and the urgent need of relief food supplies and shelter for the people. However, on midnight of the same day communication again breaks down until it was fixed when the Damage Assessment Team visited the island on Sunday the 15 June.

5. Owing to the very limited food supplies available on Funafuti to cater for the whole of Tuvalu plus the need to provide Niulakita with immediate relief supplies, His Excellency the Governor General upon the advise of the Prime Minister made a

Niulakita moving southward away from the island and Tuvalu. The track of cyclone KELI is at Annex 1 to this report.

5. On Wednesday, prior to the activation of the National Disaster Emergency Centre, the National Disaster Committee (NDC) convened to discuss national planning arrangements and to ascertain departments/organisations state of readiness. Throughout the discussion the following were agreed to be activated: -

- ♦ To open the National Disaster Emergency Centre and to be manned by the Assistant Secretary General Office of the Prime Minister, Commissioner of Police and Chief Broadcasting and Information Officer who will monitor the situation of the two southern islands Nukulaelae & Niulakita and update appropriate officers of the development;
- ♦ To advise all ships around the area of update of weather bulletin;
- ♦ To look at ways and means where communication between Niulakita and NDC headquarters could be re-established;
- ♦ To liaise with the outer islands as to their situations; and
- ♦ To liaise with Tuvalu Embassy in Suva for any assistance Tuvalu may need from overseas organisations and donor countries.

B. ACTION TAKEN :

1. During the preparatory stage when the cyclone alert was given for the two southern islands of the group Nukulaelae and Niulakita, the rest of the group were informed of the operating procedures, to pass all reports or any relevant information to the National Disaster Emergency Centre (NDEC) for appraisal and