

REPORT OF THE  
NATIONAL DISASTER MANAGEMENT  
ADVISORY COMMITTEE

ASSESSMENT OF DAMAGES  
BY  
TROPICAL CYCLONE CORA  
AND  
PROPOSED RELIEF  
AND  
REHABILITATION PROGRAMME

Ministry of Works and  
Disaster Relief Activities

4th December 1999

# CONTENTS

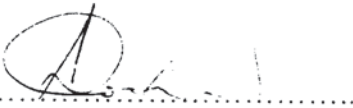
LIST OF APPENDICES	-	ii
LIST OF TABLES	-	iii
LIST OF FIGURES	-	iv
1. Introduction	-	1
2. Cyclone Reporting	-	I
3. Damage Assessment	-	2
• Dwellings		
• Agriculture		
• Health		
• Schools and Government Buildings		
• Transport Infrastructures		
• Public Utilities		
• Fisheries		
• Others		
4. Disaster Relief and Rehabilitation Programme	-	4
5. Conclusion	-	5
6. Recommendations	-	5
7. Photographs		
8. Appendices		

## ACKNOWLEDGEMENTS

The Ministry of Works and Disaster Relief Activities (MOW) wishes to express its appreciation and gratitude to the Prime Minister, Baron Vaea, The Deputy Prime Minister, Hon. Hu'akavameiliku, Ministers, Governors, Heads of Government Ministries and Departments, Statutory Boards, Non- Government Organisations, District Officers, Town Officers and the general public for all their efforts and cooperation in the provision of the information relating to damages caused by Tropical Cyclone CORA.

The MOW also wishes to express its appreciation for the valuable contributions of the Meteorological Center in Nadi, Fiji, the Australian Meteorological Office and the Radio New Zealand International in the timely relaying of the Weather Bulletins during the Cyclone.

Special thanks is due to the members of the National Disaster Advisory Committee and its Working Sub- Committee for their efforts in compiling this report.



Hon. James Cecil Cocker  
Minister of Works and Disaster Relief Activities



## **LIST OF APPENDICES**

### APPENDIX

- 8.1 Tonga Defence Services
- 8.2 Tonga Broadcasting Commission
- 8.3 Tonga Telecommunication Commission
- 8.4 Tonga Water Board
- 8.5 Tonga Electric Power Board
- 8.6 Tonga Association of Non- Government Organisation (TANGO)
- 8.7 Ministry of Agriculture and Forestry
- 8.8 Ministry of Civil Aviation
- 8.9 Ministry of Education
- 8.10 Ministry of Fisheries
- 8.11 Ministry of Health
- 8.12 Ministry of Lands, Survey and Natural Resources
- 8.13 Ministry of Marine and Ports
- 8.14 Ministry of Police
- 8.15 Ministry of Works
- 8.16 Governor of Ha'apai
- 8.17 List of Attendance- National Disaster Advisory Committee (NDAC) Meetings

## LIST OF TABLES

### TABLE

1	Damage Assessment (by Sector)	-	6
2	Priority 1- Demanding Immediate Relief and Requiring Assistance • over the next Four Weeks	-	8
3	Priority 2- Requiring Assistance After Four Weeks ( Tentative)	-	9

REPORT OF THE  
NATIONAL DISASTER ADVISORY COMMITTEE  
ASSESSMENT OF DAMAGES  
BY TROPICAL CYCLONE CORA AND PROPOSED RELIEF AND  
REHABILITATION PROGRAMME

•

1. INTRODUCTION

Tropical Cyclone CORA struck the Kingdom of Tonga on Saturday 26 December 1998. The Cyclone accompanied by heavy rain was passing seventeen (17) miles north of Nuku'alofa with winds gusting up to 160 kmlhr and travelling at seven (7) knots later on increasing to eleven (11) knots, reaching 15 knots at times.

The destructive force of the wind affected mainly fruit trees and plantation crops. Public utilities suffered minimal structural damages. Major damages were caused to the environment and dwellings by the substantial flooding and storm surge created by the Cyclone. Tongatapu, 'Eua, Ha'apai and Vava'u were affected with no serious damages to the two Niuas.

The National Disaster Advisory Committee (NDAC) under the chairmanship of the Hon. James Cecil Cocker, Minister of Works and Disaster Relief Activities requested relevant sectors in Tonga to undertake their respective disaster assessments and submit to the Committee for consideration and coordination of national disaster relief activities.

The NDAC first met on the 28<sup>th</sup> December 1998 immediately after the Cyclone and a Working Sub- Committee was selected to follow up on the assessment reports of the various sectors. It then met again on the 30<sup>th</sup> December 1998 followed by the final meeting on the 4<sup>th</sup> January 1999. The attendance in the NDAC meetings is appended in Appendix 8. 17. •

2. CYCLONE REPORTING

The first Special Weather Bulletin for Tonga on Tropical Cyclone CORA was issued from the Tonga Meteorological Office (TMO) relayed from Nadi at 0615 hrs on the 25<sup>th</sup> December 1998 . The TMO continued to update the progress of the Cyclone until it failed to receive further Special Weather Bulletin from Nadi at 1200 hrs on the 26<sup>th</sup> December 1998. The Tonga Defense Services (TDS) then quickly established its International Maritime Satellite System and thereby made contact with Nadi. From then

on, the Special Weather Bulletin was issued through TDS until services was reinstated through TMO up to the lifting of the Cyclone alert at 0000 hrs on the 27<sup>th</sup> December 1998.

Radio Tonga AM Station went off the air on the 26<sup>th</sup> December 1998 at about 1300 hrs as a result of the electricity shut down. It did not resume broadcasting until 27<sup>th</sup> December 1998 at 1630 hrs when electricity was reinstated.

Cyclone CORA was located about 250 miles to the northwest of Vava'u at 0400 hrs on the 25<sup>th</sup> December 1998 and was moving southeasterly towards the Tongatapu group at 7 knots. At 1800 hrs on the 26<sup>th</sup> December 1998, it was located about 45 miles south-southeast of Nuku'alofa and continued maintaining its current path at 11 knots. It continued on for 5 hours before it abated slowly during the night.

Figure 1 shows Tropical Cyclone CORA's path as on the 25<sup>th</sup> to 27<sup>th</sup> of December 1998.

### **3. DAMAGE ASSESSMENT**

The damage assessment focuses on Tongatapu, Vava'u, Ha'apai and 'Eua, the regions affected while minor damages were reported from the two (2) Niuas. The damages inflicted by Tropical Cyclone CORA is estimated at \$19.6 million. The cyclone caused serious damages to the following sectors based on preliminary damage assessments attached to this report;

#### **Dwellings**

Damages reported were mainly uplifting of roof sheeting of dwellings and buildings.

The strong winds and heavy rain brought by Cyclone CORA caused storm surge and substantial flooding to low lying areas of Tongatapu in particular Nuku'alofa and the Hihifo areas. Sea water overflowed inland up to 30 meters at the Hihifo and Fanga'uta coastal areas.

At the low lying areas of Nuku'alofa, storm surge flooded up to 900 millimeters above normal High Water Level (HWL), causing substantial flooding and inconveniences to some residential houses and commercial enterprises. In the Hihifo area, the height of the storm surge was about 1500 millimeters above normal HWL.

Damages caused by the storm surge and flooding is estimated at \$ 800,000.

#### **Agriculture**

Extensive damages were caused to agriculture and to the major sources of food supply in the Kingdom. The destructive force of the winds damaged the fruit trees (particularly mangoes, bananas and breadfruit trees) which were just beginning to harvest. Cassava was seriously damaged to a large extent. The other root crops such as yams, taro, kumara and kape were damaged by the strong wind, salt sprays and fallen trees. It is

expected that food supply in the Kingdom will be affected in the next 3-4 weeks for more than six months. Of the affected regions, Tongatapu suffered the most.

To worsen the situation, it should be noted that Ha'apai and Vava'u were already experiencing food shortages due to the drought prior to Cyclone CORA and were relying on Tongatapu for supply of food. The damages to agriculture due to Cyclone CORA and the prior food shortage in Ha'apai and Vava'u is now expected to be critical and calls for special attention for immediate relief measures and replanting.

### **Health**

There was no death reported after the Cyclone. Nevertheless, injuries and emergency cases were reported to nearby hospitals. The destructive force of the Cyclone damaged some village water supplies putting them out of operation. The very heavy rain caused flooding in the low lying areas. There is an urgent need of mosquito control in the flooded areas especially with the increasing threat of Dengue Fever in Fiji. High peak density of refuse left by the Cyclone calls for proper management in particular the disposal site in Tukumonga. Food sanitation needs also to be addressed as there is an expecting problem of refreezing meat and other food products due to the power shut down.

### **Schools and Government Buildings**

Damages to school buildings and equipment, Public buildings and Government buildings were reported. Ministry of Education reported a number of schools to be damaged and need maintenance before the beginning of the new academic year. Several Government buildings were also damaged including the main office and geology building of the Ministry of Lands, Survey and Natural Resources.

### **Transport Infrastructures**

There were no serious damages reported from the roads and airports except for the Foa Causeway in Ha'apai. Some of the marine navigation aids were missing. Damages occurred to the surfaces and cargoes at the Nuku'alofa Port. Nafanua (Eua) Harbour was slightly damaged. Ha'afeva (Pulotu) wharf suffered damages to the causeway and wharf fill. The southern ramp and rock armour of the Taufu'ahau (Ha'apai) wharf suffered slight damages.

### **Public Utilities**

#### *Tonga Water Board (TWB)*

Damages to TWB was minimal and is estimated at about \$1000. The operation of TWB was affected by the electricity shut down. In Ha'apai it was all shut down. In Tongatapu, it affected the booster pump and high elevation areas.

#### *Tonga Electric Power Board (TEPB)*

All electric network systems (Tongatapu, Vava'u, Ha'apai and 'Eua) were damaged by the Cyclone to various degree of severity. Most damages were caused by falling trees. TEPB estimated the total cost of the damages to \$ 430,000. All four (4) power networks were switched off during the cyclone and owing to various degrees of damages, some



have been reinstated with on-going maintenance underway. Both Vava'u and Ha'apai have been restored up to 98% of the damages and both systems should be fully operational by end of December 1998. Tongatapu and 'Eua are currently scheduled to be completed by the third and first week of January 1999 respectively.

#### *Tonga Telecommunication Commission (TTC)*

Reports from the outer islands namely Vava'u and the Niuaus indicated the damages caused by Cyclone CORA were minimal while 'Eua and Ha'apai experienced some problems. Tongatapu experienced problems to the Aerial External Plant, which accounts for about 10% of the system being out of service temporarily. Radio services including antennas and aerial wires also broke down and some customer equipment such as cellular phones, faxes and computer connected to telephones ceased operation. Total cost of damages to the system is estimated at \$ 150,000. Work to rehabilitate the services are underway should weather permits due to safety reasons.

#### *Tonga Broadcasting Commission (TBC)*

The services of the AM band of the national radio, which is critical for communication and information on the cyclone went off the air at about 1300 hrs of the 26<sup>th</sup> December 1998, during the cyclone as a result of the electricity failure and damages to the standby generator. Radio services were then relayed on the FM band which has restricted signals to Nuku'alofa areas only. The AM band remained non operational until 1630 hrs on the 27<sup>th</sup> when electricity was restored.

The Satellite Receiver at the broadcasting studio was also damaged.

Total costs for the damage is estimated at \$ 38,000.

#### **Fisheries**

Reports from Ministry of Fisheries indicated that damages inflicted on the Head Quarter in Sopa was limited to minimal roof damages to stores, boatyard and nursery buildings. No damages to the Aquaculture section was reported. No report on other fisheries installations has been received.

No report from the Outer Islands was received due to communication problems.

There was one report of a fishing vessel being sunk in Ha'apai. Two vessels owned by Sea Star Fishing Co. went aground on the reef west of Vuna Wharf.

#### **Others**

No other reports have been received from other sectors including the private sector and some Non Government Organisations (NGO).

#### 4. DISASTER RELIEF AND REHABILITATION PROGRAMME

The National Disaster Management Committee propose to divide the types of needed relief and rehabilitation activities into two (2) levels of priorities in accordance with their level of urgency;

- Priority **One** demanding immediate relief and requiring assistance over the next four (4) weeks. This will include food aid, water supply restoration, health related activities and temporarily shelter. (Refer *Table 2*.)
- Priority **Two** requiring assistance after the four (4) weeks and are of longer term rehabilitation. This will include restoration of all public utilities and public infrastructures and buildings and continued food supply and replanting. (Refer *Table 3*.)

#### 5. CONCLUSION

It is clear from the damage assessment reports that Tropical Cyclone CORA not only caused major damages particularly to agriculture which affects the Kingdom's food supply, but also created major storm surge and flooding particularly in Tongatapu low lying areas (Nuku'alofa and Hihifo District). This caused considerable damages to the environment and qualitatively to dwellings.

#### 6. RECOMMENDATIONS

1. That the total damage inflicted by Tropical Cyclone CORA amounted to TOP\$19.6 million be noted.
2. That the Ha'apai and Vava'u Group of Islands be declared as an area of emergency in relation to food relief, immediately and to be followed by 'Eua and Tongatapu as a result of the impact of Cyclone CORA.
3. That Priority One, as outlined in *Table 2*, demanding immediate relief and assistance over the next four (4) weeks be implemented as soon as possible.
4. That Priority Two, as outlined in *Table 3*, requiring assistance after the four (4) weeks and are of longer term rehabilitation items to include restoration of all public utilities, public infrastructures, buildings and continued food supply and replanting be approved.
5. That the appropriate Ministries follow up recommendation (3) and (4) above.

TABLE 1: DAMAGE ASSESSMENT ( by sector )

SECTOR	DAMAGES INCURRED	DAMAGE COSTS (T\$)	REMARKS
1. Dwellings and other community buildings	a) Dwellings (Tongatapu) 37 Residential totally destroyed 202 Residential partly destroyed	592000	MOW Report MOW Report
		292000	
		<u>884000</u>	
	b) Dwelling ('Eua) 7 Residential totally destroyed 27 Residential partially destroyed	209200	MOW Report MOW Report
		61120	
		<u>270320</u>	
	c) Community (Tongatapu) 1 community totally destroyed 94 Community partly destroyed	162000	MOW Report MOW Report
		322000	
		<u>484000</u>	
	d) Community ('Eua) 1 Community totally destroyed 3 Community partly destroyed	40000	MOW Report MOW Report
70000			
<u>110000</u>			
e) Damages due to storm surge and flooding	800000	MOW Advice	
	800000		
	<u>2548320</u>		
2. Agriculture	Damages to food crops	14900000	MAF Advice
		<u>14900000</u>	
3. Health	a) Village Water Supplies b) Refuse Collection	10170	MOH Report MOH Report
		19000	
		<u>29170</u>	
4. Schools and government building	a) Schools Various degree of damages to buildings including text book, computers, etc.	807920	MOE Report
	b) Other Government Buildings Various degree of damages to offices and other essential buildings.	189400	MOW Report
		<u>997320</u>	
5. Transport Infrastru.	a) Roads Debris on roads	11600	MOW Report
	b) Wharves and Navigation Aid Various damages to wharves and NavAid	445100	MOW & MMP Report
		<u>456700</u>	

6. Public Utilities	a) Tonga Water Board (TWB) Damages to pumping capacity and minor damages to essential buildings	1000	TWB Report
	b) Tonga Electric Power Board (TEPB) Damages to power lines and poles	430000	TEPB Report
	c) Tonga Telecommunication (TTC) Damages to Aerial External Plant Radio Services	150000	TTC Report
	d) Tonga Broadcasting Comm (TBC) Damages to Stand-by generator and Sattelite Receiver	38000	TBC Report
		619000	
7. Fisheries	Sunk fishing vessel and aground fishing vessels	15000	MMP Report
		15000	

TOTAL DAMAGES INCURRED BY CYCLONE CORA      T\$      19565510

SAY T\$19.6m



TABLE 2: Priority 1- Demanding Immediate Relief and Requiring Assistance Over the Next Four Weeks

		ESTIMATED COST (T\$)	REMARKS
1. Water Supply	* Building materials for pump house damages at Mataki'eua Well Field	650	TWB Report
		650	
	* Replacement of roofs at 3 villages water tanks in Tongatapu	900	MOH Report
	* Replacement of pump sheds fro 9 villages in Tongatapu	4500	MOH Report
	* Standby generators for 9 villages at Tongatapu	4500	MOH Report
	* Pipes and fittings for 2 villages in Tongatapu	270	MOH Report
	* Water treatment chemicals	2500	MOH Report
		12670	
2. Refuse Collection	* Upgrade road to dump area	2000	MOH Report
	* Upgrade sludge bed and access road	3000	Figures Up-graded
	* Excavation	5000	ditto
	* Bulldozing and levelling	4000	ditto
	* Soil to cover refuse	2000	ditto
	* Transport and labour	3000	ditto
			19000
3. Insect Control	* 6 insect spraying machines	5400	ditto
	* 1000 litres of insecticides	24000	ditto
		29400	
4. Temporary Shelter - No shelter- 37 Tt - 7Eua - Part damage - 202 Tt - 27Eua	44 No. 20' x 20' Tents	132000	MOW Report
	229 Tarpaulins	229000	MOW Report
	750 Blankets	4000	
		365000	
	5. Food Aid	Food supply for 4 Months	1404700
		1404700	
6. Replanting	Seedling, chemical ,etc	510000	Advised by MAF
		510000	

TOTAL PRIORITY 1 T\$ 2341420

1. Drainage Low Lying Areas	Drainage study of low lying areas of Nuku'alofa and Hihifo	50000	MOW Advice
		50000	
1. Defence	* Defence buildings damages (not covered in Item 5)	3100	Defence Report
		3100	
2. Lands and Surve	* Geology Section Office Roof restoration ( covered in Item 5)		Lands Report
3. Police	* Damages to Police Stations ( not covered in Item 5)	66640	Police Report
		66640	
4. Civil Aviation	* Miscellaneous damages at Fuaamotu Airp ( not covered in Item 5)	10000	MCA Report
		10000	
5. Food Aid	Continue Food supply for 2 months	2121020	Advised by MAF
		2121020	
6. Replanting	Seedlings,chemicals,etc	510000	Advised by MAF
		510000	

TOTAL PRIORITY 2	T\$ 5,816,500
------------------	---------------



16

17

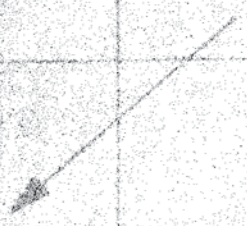
18

19

20

21

Fig. CYCLONE CORA TRACK  
25 - 27 DEC. 98



Vava'u

Malapa

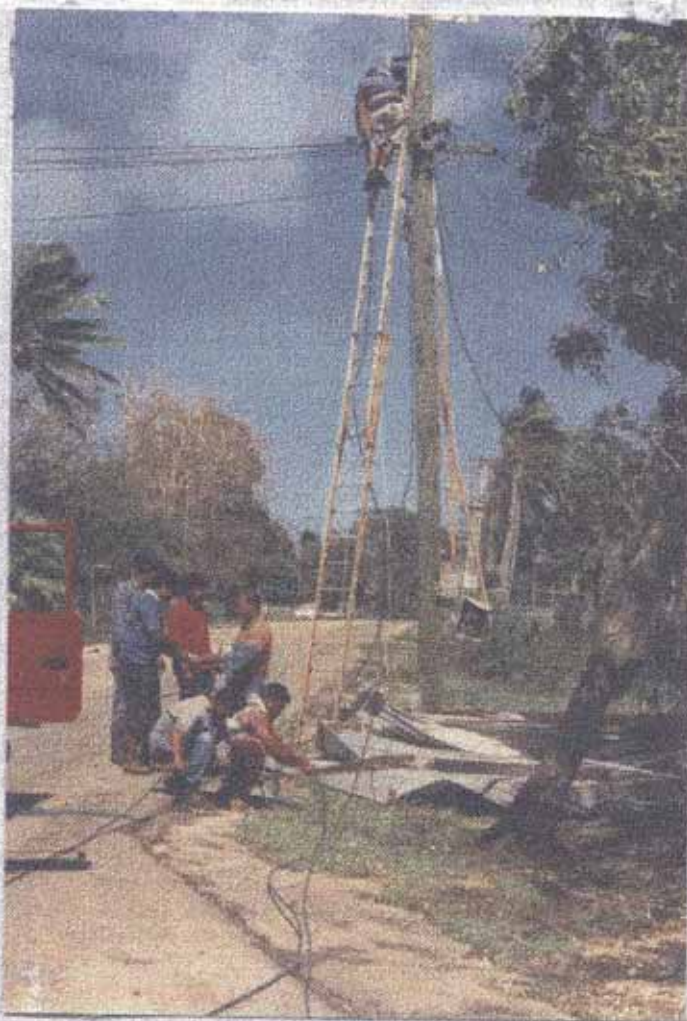
Tongatapu

## **7. PHOTOGRAPHS**





TOP - Fatumu church with roof uplified.



RIGHT - Nuku'alofa showing typical damages to power line.





HA'APAI - . Damages to Pulotu wharf, Ha'afeva viewing from the south east.



HA'APAI - Pulotu wharf damages looking from the east.





TOP & BOTTOM - Damages to Hango Agricultural College's buiddings.







TOP - Beulah College classroom block with roof uplifted.



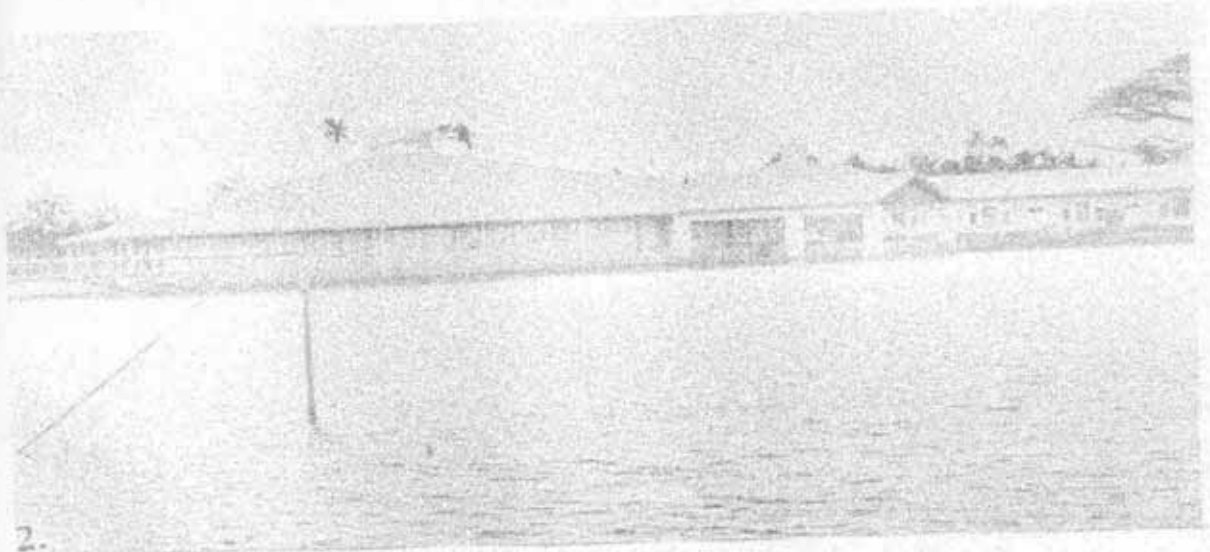
BOTTOM - Tropical residential roof damages due to absence of cyclonic ties.



Above and below shows typical flooding of home at low lying areas including roof upliftings.







2.

'Apifo'oy College flooded by the heavy rain accompanying Cora.



3.

Fanga residence wading to drier refuge.

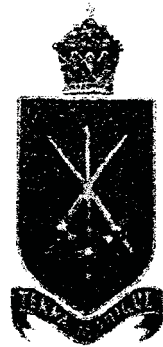
## 8. APPENDICES

APPENIDIX 8.1  
TONGA DEFENCE REPORT



INITIAL GROUND AND AERIAL DAMAGE SURVEY  
ASSESSMENT REPORT CONDUCTED

BY



TONGA DEFENCE SERVICES ON THE  
AFTERMATH OF CYCLONE CORA

TO

TONGATAPU, VAVAU, HA'APAI AND 'EUA

27 -28 DECEMBER, 1998

## CONTENTS

<u>SERIAL</u>	<u>ITEMS</u>	<u>PARAGRAPHS</u>
1	Summary Report on TOS Operational and Emergency Procedures	3
2	Damage Assessment of the Hihifo General Areas	7
3	Damage Assessment of the Hahake General Areas	9
4	TDS Report of the Flight Survey to Vava'u and 1 Ha'apai	1
5	Ground Survey Report conducted by IDS VOEA Savea and Pangai to Ha'apai Lulunga	15
6	Damage Assessment to 'Out Mu'omu'a	17
8	Damage Assessment to Ha'apai Hahake	18
9	Aerial Survey of 'Eua Island	20
10	Track of the Tropical Cyclone Cora	21.
11	IDS Disaster General Expenses during the period 26 - 28 December, 1998	22

## SUMMARY REPORT ON TROPICAL CYCLONE CORA

### General

1. The first Special Weather Bulletin for Tonga on Tropical Cyclone CORA was issued from Tonga Meteorological Services relayed from Nadi at 250615 hrs December 1998. Tropical Cyclone CORA was located near 16 Decimal 07 South, 178 Decimal 0 West or about 250 miles to the Northwest of V A V A'U at 250400hrs.
2. As at 261800hrs December 98, Tropical Cyclone CORA was located near 21 decimal 3 South 174 Decimal 5 West or about 45 miles South-Southeast of NUKU' ALOF A or about 15 miles east of 'EUA at 261800hrs December 98. The centre of the Cyclone was moving Southeast at about 11 knots.
3. The Cyclone was accelerated slightly in the last 5 hours and on the current track, it was expected to be located about 120 miles to the Southeast of Nuku'alofa around 270100hrs. Winds was abated slowly Saturday night.

### Aim

4. To provide a summary report on the emergency and operational procedures conducted by the Tonga Defence Services during and on the aftermath of the tropical Cyclone Cora

### Planning/Preparedness Measures

4. To minimise the loss of life, disruption, and damage the following actions were taken:
  - a. Warning order was issued to all military establishments for standby, activation of the IDS Disaster Operation Centre, formulation of counter - disaster plans, development of effective communication,
  - b. IDS personnel on Christmas leave recalled,
  - c. Navy PBs were directed to sail out through PlliA passage to the east and south towards 'EUA, heading Northwest 20 degree 53 mins S - 175 degree 45 mins West, Heading towards NNW.
  - d. Dispositions of PBS as at 261800 hrs were as follows.
    - (1) VOEA Neiafu and Savea, Position 20degree 10. 7mins S, 176 degree 08.1mins W,

- (2) VOEA Pangai, Position 20 degree 06.8 mins S, 175 degree 50 min W,
  - (3) Position of VOEA Lomipeau, as at 252300hrs Dec 98 NW of New Caledonia.
  - (4) MY Late was secured at Touliki Naval Base.
- e. AW-01 aircraft was secured inside the Hangar at Taliai Military Camp.
- f. Nation's Vital Installations (NVD).IDS had sent teams to secure the following NVIs:
- (1) Royal Palace at NUKU' ALOFA and FUA' AMOTU,
  - (2) Tufumahina, Vila, Mahina Fekite and Liukava Royal residences,
  - (3) Fatai and 'Utumoteka Royal residences, and
  - (4) The diplomatic residences.

#### Emergency Phase

5. Communication. IDS communication network was established at 251100hrs Dec 98 .. As at 261200hrs Dec 98, Tonga Meteorological Centre failed to receive further Special Weather Bulletin from RSMC NadLTDS had quickly established its International Maritime Satellite System (IMSAT), thereby contact with RSMC Nadi was made. From then onwards, Special Weather Bulletin issued through IDS.
6. Tonga Telecommunication and Cable and Wireless were unable to operate local and overseas calls. The only means of overseas communication was the IDS IMSAT System.
6. IDS continues to monitor its resources which includes Navy PBs, VOEA Lomipeau, MY Late and A W - 01 aircraft. Immediate relief and debris clearance.
7. Royal Residences and other National Vital Installation are closely monitored.

#### Restoration Phase.

8. National Disaster Management Working Committee (NDMWC). Co-ordination with members of the NDMWC were made regarding initial restoration phase as follows:

- a. AW- 01 aircraft to conduct post-cyclone survey flight Sunday 27 December, 1998 to the Northern Groups. The survey team consisted members of IDS and the Disaster Relief Office (MOW).
  - b. IDS offered to conduct the Survey flight on behalf of the Honourable Minister of Works and his Disaster Office, General Survey Assessment
9. The general survey assessment regarding the impact of the Tropical Cyclone in terms of social, economic, environmental, and structural damages were as follows:
- a. Environmental Damages.
    - (1) Substantial flooding to low lying areas ofTongatapu in particular, Nuku'alofa areas,
    - (2) Minimum damages to government/community infrastructures,
    - (3) Substantial damages to fruit, root crops and vegetation,
    - (4) Two Sea Stars Fishing Vessel wrecked at Barrier Reef opposite Seaview Restaurant
  - b. Nation Vital Installations. The following central services were out of order
    - (1) Tonga Telecommunication/Cable and Wireless,
    - (2) Electric Power Station,
10. Vava'ulHa'apai Navy PBslAw-Ol aircraft were undertaking damage survey to the following areas:
- a. VOEA Savea in Ha'afeva, Kotu, Tungua, Matuku and 'O'ua.
  - b. VOEA Pangai, Nomuka, Fonoï and Mango,
  - c. VOEA Neiafu conducted SAR between 'Uhiha and Pangai.
11. 'EUA Damage Survey for 'Eua will be conducted 28 December 1998.
12. Niuafu'ouINiuatoputapu. Based on survey at Vava'u and the path of Cyclone Cora, the survey can comfortably assume that Niuatoputapu and Niuafu' ou were not affected by Cyclone Cora. Hence, the cancellation of the aerial flight survey of the two Niuas.

**Conclusion**

9. IDS had continued to make contact with Australia's National Weather Report Centre for special weather bulletin for Tonga. Simultaneously, conducting its local damage survey assessment and awaiting government decision.

DAMAGE ASSESSMENT OF THE  
HIHIFO GENERAL AREAS AFTER CYCLONE CORA

ON25n6DECEMBER1~8

General

1. This immediate damage assessment was undertaken twelve hours after the issue of the final Special Weather Bulletin for Tonga on 262300 hrs December 1998 by the RSMC Nadi. The assessment is intended to cover the extent of damage to buildings, essential services, and crops and fruit-trees of the general area from Sia'atoutai to Haatafu, and from Kala'au to 'Utulau.; and the extent of flooding in the low-lying areas of Hihifo district.

Buildings

2.
  - a. Very few buildings in the general area of Hihifo were damaged or destroyed - few retail shops at Fatai, Nukunuku and Te'ekiu; town hall of Nukunuku; the Methodist and the Free Church of Tonga church building of Ha'atafu and Kanokupolu were damaged.
  - b. Damage to buildings in the general area from Sia' atoutai to Ha' atafu was minimal, and lesser in the general area from Kala'au to 'Utulau.
  - c. No family has come forward or been identified during the assessment was homeless or as being in need of shelter.

Essential Services

3.
  - a. Very minimal fallen power lines in the general area , except the area between Kanokupolu and 'Ahau, and between Kanokupolu and Ha'atafu. The power in the general areas of Hihifo was down.
  - b. No water supply problem been identified in the general areas.
  - c. Telephone service within the general area was down.

Crops and Fruit Trees

4.
  - a. Damage to all the crops in the general areas especially bananas, tapiocas taros and yams were substantial.

- b. Losses of fruits of breadfruit, mango and coconut trees are substantial.

### **Flooding**

- 5. a. The sea swept over many low-lying areas especially from Foe to Kanokupolu. To date no small fishing boat was reported sunk or aground.
- b. No death or missing boat in the general area was reported.

### **Conclusion**

- 6. Cyclone Cora did not produce much damage to the buildings and general

services

- but it produces a lot of damages to crops and fruit trees. It also generated storm surge the low-lying areas of Foui to Kanokupolu.



**DAMAGE ASSESSMENT REPORT OF**  
**VAHE HAHAKE**

**General**

1. Immediate assessment of the impact of the cyclone Cora was carried out to the Hahake District.

**Aim**

2. To give a brief report on environmental and structural damages in the Hahake District.

**Township**

3. **From Vaini to Tatakamotonga**

- a. Structural damages to few buildings at Malapo and Vaini, roof buildings were blown off, Beulah College School Building roof was one quarter damaged
- b. Considerable damages to electric poles and electric wires,
- c. Substantial damages to forestry, fruit and root crops.
- d. Holonga is quite satisfactory.
- e. 'Alaki and Tatakamotonga, Few Houses were damaged and few with roof being blown off.

4. **Flooding/Local Water Supply.** No flooding in these areas. Local water supply was satisfactory

5. **From Tatakamotonga to Navutoka**

- a. Considerable number of buildings were torn.
- b. Substantial damages to forestry, fruit and root crops.
- c. Fallen Electric poles and damaged electric wire,
- d. Mormon Church Building's Tower damaged at Talafo'ou,

- e. Few Houses were damaged and torn away,

6. **From Navutoka to Niutoua**

- a. One Electric Pole at Kolonga damaged,
- b. Few Buildings partly damaged,
- c. Substantial damage to forestry , fruit and root crops

7. **Halaliku**

- a. Free Church of Tonga Building at Haveluliku was partly damaged as well as Catholic Church Hall,
- b. Few Buildings were partly damaged,
- c. Free Wesleyan Church Building at Fatumu was partly damaged
- d. Roof of the FWC at lavengatonga has been blowtl off
- e. Few Buildings at Ha'asini were partly damaged, Bread Fruit Trees were largely damaged.
- f. Few Building at Nakolo were partly damaged including FWC Building, Forestry and other fruit crops were commonly damaged,
- g. Few retail Sores at Fua'amotu were damaded, Electric Power Poles and wires were damaded. Substantial damages to forestry, Breat Fruit Trees and other fruit crops.

**Conclusion**

8. In general, the Halaliku District seems to suffer from lack of electricity, Not all buildings suffer from the cyclone however, damages to forestry, fruit and root crops seem to be the commonalities. It is therefore likely that these areas will shortly suffer from lack of food in the next few months.

**TDS REPORT OF FLIGHT SURVEY TO  
VAVA'U AND HA'APAI**

**General**

1. As Cyclone Cora eased off on the evening of 26<sup>th</sup> December, 1998, the Commander TDS directed that a flight survey be conducted on 27<sup>th</sup> December, 1998 to the northern islands. The flight survey was offered to be conducted on behalf of the Disaster Relief Office. An invitation was made and Sifa Mafile'o came and represented the Disaster Relief Office. An invitation was also extended to Oceania Broadcasting (TV 7) and one cameraman, Sione Sinipata, also joined the survey team. The TDS team consisted of Maj Tone and W01 Mafile'o.
2. As December 2ih was a Sunday, clearance was successfully obtained from the Ministry of Police prior to the flight. The aircraft used for the survey was the TDS's Beech 18 (AW-01).
3. The Beech 18 maintained an altitude of 500 feet in order for the survey team to take photographs and visually observe. This written report is supported by video tapes and photos.
4. The survey team's concept for their survey flight to the northern islands is in two phases:
  - a. Phase 1: Survey Vava'u and Ha'apai on Sunday 2ih , and
  - b. Phase 2: Survey Niuafu'ou and Niuatoputapu on Monday 28<sup>th</sup>.

**Aim**

5. To give a brief report on the flight survey conducted at Vava'u and Ha'apai on Sunday 2ih December, 1998.

**Report on Vava'u**

6. The visit to Vava'u had two objectives:
  - a. deliver the Commander's report on TDS's activities before, during and after Cyclone Cora to the Minister of Foreign Affairs and Defence; and

b. Conduct a brief survey of Vava'u.

7. The Commander's report was successfully delivered to the Minister of Foreign Affairs and Defence at Fangatongo Palace.

8. The aerial survey of Vava'u revealed no damages to forestry and crops. The team spent approximately one hour on the ground at Vava'u. When the team travelled by vehicle from the Lupepau'u Airport to Fangatongo, their observation was that there were virtually no damages at all to buildings, vegetation, and crops. Staff Sergeant Toumolupe verbally informed the team that essential services (electricity, telephone, and water) were only minimally •disrupted during the day of the cyclone but they were back to normal either in the afternoon of the cyclone day or the very next day.

### **Report on Ha'apai**

9. The survey team were met by the Governor of Ha'apai and TDS personnel at Salote Pilolevu Airport. Governor invited the team for a brief at the terminal followed by a short tour by vehicle.

10. Summary of his brief is as follows:

a. Likely affected areas are 'Out Mu'omu'a and part of Lulunga;

b. Governor convened meeting with his town officers and district officers earlier in  
the day;

c. The drifted boat travelling from Pangai to Nomuka and holding 6 adults and one  
baby have been found and arrived safely at Nomuka. VOEA NEIAFU assisted.

d. Damages:

- 1) Great damage to crops-to include breadfruit trees;
- 2) Taufa'ahau Wharf is damaged (no report received yet on condition of wharves at Faleloa, 'Uiha, Matuku and Pulotu);
- 3) 'Ahanga at Foa is damaged but MOW in Ha'apai has sufficiently cleared it for vehicles. Proper repair should still needs to be done.

e. Essential services:

- 1) Water is fine, considering recent rain and water distribution by TDS.  
At Pangai, however, five water pumps work while five aren't;
- 2) Telephone is dead except at 'Uiha and Ha'ano; and
- 3) Electricity works on most part of Pangai.

11. The Governor then took the team for a short tour. Time only allowed a visit to Foa. The survey team's main observation and estimate are as follows:

- a. No significant damages to buildings and residential houses;
- b. There is significant damage to trees. Many trees, especially breadfruit trees have been browned (after only two days!) by salt sea spray during the cyclone one. There is implication for long term effect;
- c. Crops like manioke, yams, corns are damaged.

12. The result of aerial survey by the team above Lulunga East and 'Otu Mu'omu'a is as follows:

- a. Ha'afeva
  - Pulotu Wharf is three quarter damaged or virtually damaged
  - Buildings and housing OK
  - Vegetations OK
- b. Tungua and 'O'ua
  - Fine
- c. 'Otu'Mu'omu'a
  - 1) Mango Island
    - Buildings OK
    - Vegetations OK
    - Tall aerial structure still standing
    - Not many crops grown
  - 2) Nomuka
    - Buildings OK
    - Vegetation seems to be brownish from sea water spray
    - Not many crops grown
  - 3) Fonoifua

- Buildings OK
- Vegetation OK
- Some crops are grown
- A few small boats appear to be OK on the shallow waters. One was seen to be securely tied by a number of ropes in radial fashion

## **Conclusion**

13. The survey team successfully conducted its mission on 27th December, 1998. Vava'u was not significantly affected by Cyclone Cora. Ha'apai has damages mainly to crops and some infrastructure like wharves and causeways. Damages to buildings are minimal. While essential services like electricity and telephone can quickly be rectified, there is a longer effect of damaged plantations and breadfruit trees.

### 14. Recommendations:

- a. Based on survey at Vava'u and the path of Cyclone Cora, the survey can comfortably assume that Niuatoputapu and Niuafu'ou were not affected by Cyclone Cora. Hence, it is recommended that the planned survey flight to Niuafu'ou and Niuatoputapu (i.e. Phase 2) be aborted; and
- b. A specialist on ecological damages, particularly on agriculture, be taken to Ha'apai to look at the problem especially the long term effect.

GROUND SURVEY REPORT CONDUCTED BY VOEA SAVEA TO  
HA' APAI LULUNGA

The report from VOEA Savea is quoted as follows:

KOE LIPOOTI MEI HE VAKALE'O SAVEA KI HE TU'UNGA 'OE MAUMAU  
SAIKOLONE CORA KI HA'APAI LULUNGA

1. HA'AFEVA
2. MATUKU
3. KOTU
4. TUNGUA
5. 'O'UA

Na'e tu'utu'uni 'ehe Pule Tautahi ke mavahe 'ae VOEA Savea me he taulanga Nuku'alofa ke kumi ha toitoi'anga 'I Kao mo Tofua pe ko Vava'u. Koia 'I he taimi 0800hrs 'aho Tokonaki ko hono 26 Tisema 1998, na'e mavahe ai 'ae vaka ni ke fakahoko 'ae tu'utu'u ni. 'I he mahino koia kuo paasi 'ae Saikolone Cora me he 'otu motu Tonga, ne fekau'i ai 'ae vaka ni ke fai ha savea ki he tu'unga 'oku 'iai 'a Lulunga.

TU'UNGA 'OE MAUMAU SAIKOLONE CORA KI HA'APAI LULULUNGA

1. Ko Ha'afeva kuo maumau lahi ho nau uafu ko Pulotu 'oku peseti 'e 80, pea 'ikai ke toe fe'unga ke ngaue'aki. Koe ngoue kuo maumau lahi 'ae Pata, hopa moe Siaine. 'Oku 'iai ha 'amanaki ki ha ki'i hongehonge. Na'e hao pe 'ae ngaahi fale nofo'anga 'o 'ikai holo tukukehe pe 'ae ngaahi peito moe fale 'aisi 'ae toutai na'e maumau.
2. Ko kotu 'oku mo'ui lelei pe si'i kainga ni tukukehe cae fale 'e tolu moe sima vai 'e taha na'e maumau'i 'ehe matangi. Koe ngoue kai kau ai 'ae siaine, mei, pata, hopa, meo manioke kuo maumau hono kota. Koe ki'i toenga me'atokoni he motu 'oku fe'unga ki he mahina 'e taha.
3. Koe motu ko Matuku ne maumau ai e fale nofo'anga 'e taha moe Falelotu siasi Tonga. Kau ai moe ki'i uafu ki he vaka iiki na'e maumau, pea koe telefoni

kuo motuhi. Koe ngoue 'anga, ne maumau moia pea koe toenga me'akai 'e te'unga ki he uike nai 'e ua pea 'osi.

4. 'Oku mo'ui lelei pe 'ae kainga 'I Tungua hili 'ae matangi. Koe Falelotu Siasi Tonga Tau'ataina ne holo moe fanga ki'i *tale* Tonga moe peito iiki. Koe toenga me'atokoni 'I he motu ni 'e fe'unga ki he uike pe ua'.

5. Ko 'O'ua na'e hao pe ngaahi *tale* 'o 'ikai holo ka koe tetu'utaki teletoni kuo motuhi. Koe ngoue'anga pe ne lahi hono maumau'i hange koe manioke moe mei. Koe ki'i toenga me'atokoni he taimini 'e fe'unga nai ki he 'aho 'e fa.



## TU'UNGA 'OE MAUMAU SAIKOLONE CORA KI HE 'OTU MUOMU' A

1. NOMUKA
2. MANGO
3. FONOI

1. Na'e hao mo'ui pe kainga 'I Nomuka 'o Ikai ha mo'ui 'e mole. Koe fale nofo'anga 'e ua na'e maumau'i kae hao lelei pe 'ae toenga. Koe ngoue'anga kuo maumau hono kotoa.

2. Ko Mango ne maumau kotoa 'ae 'akau fua pea koe siaine, hopa, moe pata kuo holo kotoa. Koe ki'i vaka ne ngaue'aki 'e he motu kuo mole ia. 'Oku mo'ui le lei pe cae kakai ka koe me'a tokoni 'oku fakafuofua ki he uike ua pea 'osi.

3. Koe mnotu ko Fonoi na'e maumau pe fanga ki'i peito kae hao kotoa pe cae falenofo'anga. Mo'ui lelei pe kakai ka koe ngoue'anga kuo maumau kotoa. Fakafuofua 'ae toenga me'atokoni ki ha 'aho 'e fa pea 'osi.

TU"UNGA 'OE MAUMAU 'OE SAIKOLONE CORA KI  
HA' APAI HAHAKE

1. LOFANGAIFOTUH'A
2. 'UIHA MO FELEMEA
3. MO'UNGA'ONE
4. HA'ANO
5. FOA
6. L1FUKA

1. Lofanga. 'Oku mo'ui lelei pe 'ae kakai 'o Lofanga 'o 'ikai ha tu'utamaki lolotonga cae Saikolone Cora. 'Oku 'ikai ha maumau ki he 'u fale nofo'anga. Koe ngoue'anga na'e maumau fakataha moe manioke, hopa, pata moe siaine, pea pehe ki he mei moe mango. 'Oku fakafuofua ki he uike pe 'e tolu mei heni te nau kai ai mei he toenga 'o 'enau ngoue'anga.

2. Fotuha'a 'Oku mo'ui lelei pe Cae kakai pea hao pe moe ngahi falenofa'anga, koe ngoue pe ne maumau moe siaine.

3. Uiha 'Oku mo'ui lelei kotoa pe 'ae kakai 'oe motu ni. Pea 'oku 'ikai ha fale 'e maumau tukukehe pe 'ae fale telefoni na'e haveki. Koe ngoue manioke, mei, pea moe mango 'oku maumau lahi.

4. Felemea 'Oku mo'ui lelei kotoa pe 'oe kakai 'o Felemea. Na'e hao kotoa pe cae 'u fale nofo'anga koe fale tonga pe na'e holo. Koe ngoue hange koe manioke, hopa, pea moe koane ne maumau'ia 'ehe matangi. Koe mango moe mei ne 'osi he ngangana. Tu'unga 'oe me'akai 'oku hange pe koia kimu'a pea toki to 'ae matangi, 'oku fu'u faka'ofa 'aupito.

5. Mo'unga'one Ko Mo'unga'one 'oku sai pe 'ae motu ni tukukehe 'ae ngoue kuo maumau lahi.

6. Ha'ano Koe Kauvai Ha'ano kauai 'a Muitoa, Pokotala mo Fakakai 'oku nau mo'ui lelei pe. Koe ngaahi Fale ne lahi hao 'o mei takitaha pe 'ae fale ne maumau ki he kolo. Koe ngoue'anga 'oku mahino pe 'ene ta'e'aonga. Koe me'akai 'oku fu'u fiema'u lahi ki he motu ni.

7. **Foa** 'Oku tatau pe moe kauvai Foa, 'Oku kei hao kotoa pe 'ae fale nofo'anga pea mo'ui lelei pe 'ae kakai. Tukukehe pe 'ae ngoue 'oku 'I ha tu'unga fakatu'utamaki hili e matangai pea koe fakaakeake eni ka fuoloa.

8. **Lifuka.** 'Oku\_ 'ikai ke 'iai ha tale noto'anga 'e haea 'I he 'u Kola 'oe

motu

ni. Pea 'oku moui lelei pe 'ae kakai hono kotoa. Pea uesia 'ae ngaahi 'akau lalahi.

### **Vaka Luavaila**

9. Na'e ma'u 'ae kau kauvaka ki Fotuha'a pea "oku nau mo'ui lelei pe 'aia

ko

kinautolu eni:

a. 'Eikivaka, Feleti Uata ta'u 31,

b. Kau Crews, 'alingatoni Lani ta'u 22, Viliami Mosa'ati ta'u 43, Sione Taufu ta'u 24, pea 'oku nau foki mai ai pe he VOEA Neiafu. Fakaikiiki 'e ma'u he foki mai cae Neiafu.

## FLIGHT SURVEY TO 'EUA

### General

1. The flight survey to 'Eua Island was conducted from 1100 - 1200 hours on 27th December, 1998. The result is as follows:

### Structural Damages

Ta'anga and 'Ohonua appear to be the only two towns with some structural damages. Some of these damages are torn or partially torn roof tops. The main damages at 'Ohonua occur at the MOW's workshops and Hango. Roofs at both these places were either blown away or torn.

### Crops

Banana trees at almost every plantation appear flattened to the ground. It is difficult to judge the condition of root crops on the ground from an altitude of 500 feet above but given that bananas are flattened, it would seem that root crop plantations are similarly affected as in many areas of Ha'apai and Tongatapu.

A ground survey team would give a better estimate.

### Infrastructure

Roads and 'Ohonua Wharf appear to be safe and sound.







**TDS DISASTER EXPENSES DURING CYCLONE CORA**  
**26 - 28 DEC '98**

1. Mobilisation and Operating Cost:

a.	Fuel for vehicles and Aircraft	-	\$ 1,846.00
b.	Ration	-	\$ 1,677.00
c.	Aerial photography	-	\$ 110.00
d.	Operation Centre's stationary	-	\$ 50.00

2. TDS Cyclone effected structural damages:

a.	Building	-	\$ 1,600.00
h.	Solar Heating System	-	\$ 1,500.00

APPENIDIX 8.2  
TONGA BROADCASTING COMMISSION

2nd January, 1999

Honourable Chairman  
Disaster Management Committee

Sir,

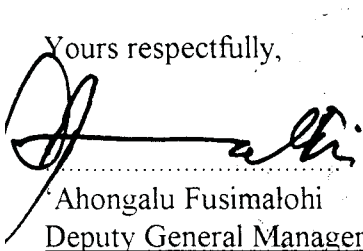
**Subject : Damages caused by Cyclone Cora**

This is to confirm that Radio Tonga's AM Station went off the air on Saturday December 26th at about 1300 hrs during Cyclone Cora as a result of the electricity shut down and damages to the Commission's stand-by generator at the Popua Transmitter site. The AM station provides a universal coverage of the entire Tonga group and is the main broadcaster delivering to the people information, education and entertainment at the highest professional level. It did not resume broadcasting until Sunday evening, December 27th at 4.30pm when normal electricity was reinstated. The damaged stand-by generator that would have provided back up electricity to the Transmitter is a 40kva 3 face generator and the estimated cost is about T\$23,000.

Further, the Commission's satellite receiver situated on the rooftop of the broadcasting studio also suffered damages as a result of cyclone Cora. The mesh screen of the satellite dish was completely destroyed and has an estimated cost of about T\$15, 000. The mesh screen provides the pick up signal for all overseas broadcast of news such as the ABC and Radio Australia as well as Radio New Zealand.

The total cost of damages therefore of the Commission's facilities and equipment's as a result of cyclone Cora is estimated at T\$38,000. I shall be grateful if you would kindly include this in the list of submissions to donor agencies by your committee.

Yours respectfully,



Ahongalu Fusimalohi  
Deputy General Manager

APPENIDIX 8.3  
TONGA TELECOMMUNICATION COMMISSION

# **TONGA TELECOMMUNICATIONS COMMISSION**

## **REPORT ON DAMAGES AND REHABILITATION OF TELEPHONE SERVICES FOLLOWING CYCLONE CORA**

### **I. Introduction**

This report was primarily prepared as a result of the Meeting of the National Disaster Advisory Committee (NDAC) on Monday 28 December 1998 which directed that a status report pertaining to the damages caused to the Kingdom's telecommunication services be submitted to the NDAC secretariate on Wednesday 30 December 1998.

Telecom staff are currently working on a rehabilitation program, and more specifically on the following areas; Aerial external plant, Radio services and Exchange stations. Preliminary observation suggest that the damage caused to Tonga's telecommunication services by Cyclone Cora is significantly less than Cyclone Hina in March 1997.

### **2. Damages caused by Cyclone Cora**

Reports from the outer islands namely Vava'u and the Niua's indicate that the damage caused by Cyclone Cora were minimal whereas 35 and 50 subscribers experienced problems in Eua and Ha'apai (Foa) respectively. In contrast , the damages experienced in Nuku'alofa were as follows:

- a) Aerial External Plant- the main areas adversely affected are the following aerial cables, drop wires, terminal boxes, connectors. The damage to the Nuku'alofa, Mu'a, Pea and Masilamea telephone exchange is estimated to be 10 per cent or 670 telephone lines are temporarily out of service. It should be noted that most of the damage is experienced in the Nuku'alofa telephone exchange and therefore all available human resources will be concentrated in this zone.
- b) Radio Services: Antennas and aerial wires of some radio stations were broken or blown off direction.
- c) Customer Equipment's: Exchange systems, fixed cellular telephones, faxes and computers connected to telephones ceased operation.

### **3. Rehabilitation of Services**

*Aerial External Plant:* Telecom's priority customers were serviced first and they are as follows; Royal Family, Cabinet Ministers, Diplomatic Corp, Essential services and the remaining customers who have reported their telephone to 917 will be serviced as soon as possible. There were 6 teams working to repair the damage as of Monday 28 December 1998 and more staff have joined the rehabilitation team. Work was delayed on Tuesday 29 December 1998 because of the heavy rain experienced as technicians do not work for safety reasons.

*Radio services:* Staff are currently working to restore radio aerials but it may take a few days to be completed.

*Customer Equipment:* Staff are currently working to restore faxes and switchboard (PABX) systems

#### **4. Cost of Damage**

Preliminary cost can be roughly calculated as follows

##### Aerial External Network

• Material	\$207 • 670 subscribers	\$138,690
Labour	\$12 • 670 subscribers	\$8,040
Other	\$6 • 670 subscribers	\$4,020
	SubTotal	5150,750

Radio services \$1,200

**Approximately 5150,000**

Should you require any further information, please, do not hesitate to contact the undersign on telephone number 917 from on until the 4 January 1999 or 24999/24255 during working hours commencing on the 4 January 1999.

  
**Tai'atu 'Ata'ata-Cocker**  
**For General Manager**



**APPENDIX 8.4**  
**TONGA WATER BOARD**



Chairman  
 Committee Members  
 National Disaster Advisory Committee.

**REPORT ON THE EFFECT OF TROPICAL CYCLONE ' CORA ' ON THE WATER SUPPLY FOR NUKU'ALOFA, 'EUA, PANGAI-HIHIFO AND NEIAFU.**

**SUMMARY:**

Requested Item	Estimated Cost (TOP\$)
➤ Two (2) 3 phase, 20KVA each, diesel powered generators.	55,000.00
➤ Five (5) 3 phase, 7.5KVA each, diesel powered generators.	46,000.00
➤ Building materials.	650.00
<b>TOTAL REQUESTED</b>	<b>101,650 (say - 102,000)</b>

**NUKU'ALOFA:**

Area Affected	Duration (hrs)	Cause & Effect	Estimated Cost (TOP\$)	Recommendation
<ul style="list-style-type: none"> <li>Booster Pump Areas ie; Halaleva, Part of Ma'ofanga, 'Umusi, Houmakelikao, Popua.</li> <li>Higher elevation areas.</li> </ul>	Approx. 44	<ul style="list-style-type: none"> <li>Power Outage.</li> <li>About 17% or 1,1 ML of daily water production.</li> </ul>	<ul style="list-style-type: none"> <li>55,000 for two (2) new diesel powered generators.</li> </ul>	Two (2) new 3-phase, 20 KVA each, stand-by diesel powered generators.

**'EUA:**

Area affected	Duration (hrs)	Cause & Effect	Estimated Cost (TOP\$)	Recommendation
ALL	Approx. 23	Service main was disconnected due to: <ul style="list-style-type: none"> <li>High water flows due to heavy rain.</li> <li>Turbidity problem.</li> </ul>	None	None

**PANGAI-HIHIFO:**

<i>Area affected</i>	<i>Duration (hrs)</i>	<i>Cause &amp; Effect</i>	<i>Estimated Cost (TOP\$)</i>	<i>Recommendation</i>
ALL	Approx. 37	<ul style="list-style-type: none"> <li>• Power outage.</li> <li>• About 430,000 liters/day.</li> </ul>	<ul style="list-style-type: none"> <li>• 46,000 for five (5) new diesel powered generators.</li> </ul>	Five (5) new 3-phase, 7.5 KVA each, stand-by diesel powered generators.

**NEIAFU:**

<i>Area affected</i>	<i>Duration (hrs)</i>	<i>Cause &amp; Effect</i>	<i>Estimated Cost (TOP\$)</i>	<i>Recommendation</i>
None	-	-	-	-

**BUILDINGS & HOUSES:**

No damage to any of Tonga Water Board's Buildings except for very minor damage to the Pump Houses at Mataki'Eua wellfield.

Estimated cost (for timber, roofing & nails)

- TOP\$ 650. 00

Malo 'aupito.  
Faka'apa'apa atu.

Saimone P. Helu  
Manager  
Tonga Water Board.

APPENIDIX 8.5  
TONGA ELECTRIC POWER BOARD

Tuesday, 29 December 1998

The Hon. Chairman and Members  
National Disaster Committee  
NUKU'ALOFA

Gentlemen

### *CYCLONE CORA DAMAGE ASSESSMENT REPORT - TEPB*

This report presents the damage assessment to the electricity distribution network and restoration program for Tongatapu, Vava'u, Ha'apai and 'Eua. Post cyclone assessment shows that all four network were damage to various degree of severity. Most of the damages were cause by falling trees and the low voltage network was heavily affected. However, the high voltage network was also affected to the extend that the power was switched off in all the four stations during the cyclone.

### *RESTORATION REPORT*

Tongatapu

- ~ Power was shutdown on 26 December, 1998 at 12.30 pm to all of Tongatapu
- ~ Vaiola hospital, telephone exchange, airport and other necessary services were energised on 27 December, 1998
- ~ Village water pumps, clinics and community institutions were also energised on 27 December, 1998

### *SUMMARY OF DAMAGE:*

~ Tongatapu

- Most of the damages were in Nuku'alofa, Central and Eastern district
- Damage to the Western district was not as severe as the rest of the districts
- Damage to the high voltage network consists mainly of broken aerial cable
- Low voltage and drop services to consumers were heavily affected
- Minor damage to the distribution poles and transformer

~ Vava'uy

- All the high voltage lines were damaged including the main feeder
- Major damage to the high voltage line to Pangaimotu, Toua, Utulei and Talihau
- High voltage line at Vaipua was damage affecting supply to the rest of the Western district
- Feeder between the new and old power station was damaged causing total shutdown of power for approximately half-an-hour
- Low voltage network was damage heavily
- Low voltage distribution poles were extensively damaged

~ Ha'apai

- High voltage line connecting Pangai to Foa was damage
- Minor damage to the rest of the high voltage network
- Low voltage and drop services were moderately affected
- Few distribution poles and transformer were damaged

~ 'Eua

- No report received yet

***ESTIMATED COST OF DAMAGE***

The estimated cost is based on material issued to date and survey carried to assess the extend of the damage. The actual total cost should be available within the next few weeks.

~ Tongatapu	: \$197,000
~ Vava'u	: \$112,000
~ Ha'apai	: \$67,000
~ 'Eua	: \$
<b>Total : \$376,000 ( Eua not included)</b>	

***RESTORATION PROGRAM***

As of 29 December, 1998 both Vava'u and Ha'apai have restored approximately 98% of the damages to the distribution network. The other 2% are customers that await poles and/or rewiring of their premises. Both stations will be back to norma! operation by the end of the month. Tongatapu and 'Eua is currently schedule to be completed by third and first week of January 1999 respectively.



~ Tongatapu - Restoration Schedule

<i>District</i>	<i>27-12-98</i>	<i>03-01-99</i>	<i>11-01-99</i>	<i>19-01-99</i>
	<i>02-01-99</i>	<i>10-01-99</i>	<i>18-01-99</i>	<i>26-01-99</i>
Nuku'alofa	50%	75%	95%	100%
Western District	25%	60%	95%	100%
Central District	50%	75%	95%	100%
Eastern District	50%	75%	95%	100%

~ 'Eua          No report received yet

The restoration program for Tongatapu, Ha'apai and 'Eua started on the 27 December 1998. All technical personnel were recall back to work in restoring the distribution network. Restoration works are currently carried-out seven days and started at 6.00 am to 12.00 midnight. Details of damages will be available by the first week of January 1999.

Respectfully Yours



Paula Helu  
General Manager

## APPENIDIX 8.6

### TANGO

# TROPICAL CYCLONE CORA ASSESSMENT REPORT by TANGO, 1998

In this Tropical Cyclone Cora, TANGO does not want to duplicate the work carried out by Town Officers and District Officers due to cost and conflicting report.

With reference to Cyclone Him, in 1997, TANGO was asked to carry out a household damaged survey all over Tonga. In that household damage survey, TANGO found out that the Town Officers and District Officers under the Prime Ministers Office were doing exactly the same work, infact some were ready with their findings before TANGO arrived in the villages. The town and District Officers had reported that the household damaged report after every Cyclone were their responsibilities and they were ready for it. Infact, the Ministry of Works is doing the same on structural damages.

Reports from the TANGO headquarters in the outer islands stated that the Town Officers and District Officers are compiling the household damages in the Communities.

The concerns that were raised by the Communities were however:

- that the effects of the Cyclone be assessed according to individual households but not to generalise the effects of the Cyclone on the environment.

For example, the Sea Flooding in the low lying areas as in Hihifo, Fanga, "Umusi and Fanga'uta. When the Sea water is absorbed and is disappearing in the soil, the homes are still left with the sea impurities and are suffering for a long time.

It may not be a structural damage but on the other hand it may be a health hazards.

- that a Stand-by generator be provided to Government Ministries, Departments and Statutory Boards that provided essential services during disasters to enable the report of the Cyclone to be continuously broadcasted without a break from power interruptions.

APPENIDIX 8.7  
MINISTRY OF AGRICULTURE & FORESTRY

MAF Headquarter  
Fax : 676-24-271 or  
676-23-093  
Phone : 23-038



P.O. Box 14  
Nuku'alofa  
Kingdom of Tonga

Reference:

GOVERNMENT OF TONGA  
Ministry of Agriculture and Forestry

Date: 29 December 1998

---

The Secretary  
National Disaster Advisory Committee  
NUKU'ALOFA

Dear Sir,

PRELIMINARY REPORT ON THE DAMAGE CAUSED BY TROPICAL  
CYCLONE CORA TO THE AGRICULTURE SECTOR

Please find attached a preliminary report on the extent of the damage sustained by the agriculture sector in the wake of the recent tropical cyclone, Cora, which struck Tonga on 25-26 December.

2. The attached report is based on information received from the Ministry's offices in Vava'u, Ha'apai, 'Eua, Niuatoputapu and Niuafu'ou, and from officers working in the Eastern, Central and Western Districts of Tongatapu. As mentioned earlier, the report is only preliminary and is based on reconnaissance surveys carried out by our officers, in order to provide a qualitative assessment of the extent of the damage. A more detailed survey is being organised and will be carried out soonest, which should provide quantitative data and costs of the damage to agriculture. We hope to make available the findings of this more detailed survey before the end of next week.

3. From the attached report, it is clear that Tongatapu, Eua, Ha'apai and Vava'u suffered extensive damage while the two Niua escaped the wrath of Cora, except for minor damage to crops and fruit trees. Of the affected island groups, Tongatapu suffered the most. As reported, however, Vava'u and Ha'apai, were already experiencing food shortages prior to Cora, and were relying on Tongatapu for supply of food. The breadfruit season, which was just beginning, was expected to improve food supply in Vava'u and Ha'apai. This will no

longer the case since breadfruit, together with fruit trees (particularly mangoes), bananas were the crops that sustained the greatest damage (almost 100 percent)

With the significant damage to crops in Tongatapu, and the food situation in Vava'u and Ha'apai now expected to worsen due to cyclone Cora, a very severe shortage of supply throughout Tonga (except the two Niuas) is foreseen after one month from now, the latest. In view of this, the following actions are proposed to be taken by the Ministry:

- (i) Regular radio programmes starting today onwards, including spot messages, will be broadcasted. These programmes will be aimed at advising farmers on appropriate actions pertaining to:
  - Rehabilitation of existing plantations in order to minimise post-cyclone damage;
  - Utilisation and preservation of "excess" food created by Cora through damage to plantations/trees;
  - Replanting of food crops to minimise period of short food supply.
- (ii) A quantitative survey (sample survey) will be carried out beginning tomorrow to determine extent and cost of damage. Since there was minimal damage to the two Niuas, the survey will only cover Tongatapu, Vava'u, Ha'apai and 'Eua.
- (iii) All available staff will be recalled immediately, to assist with the survey and to provide advice to farmers on rehabilitation work to be carried out.
- (iv) Implement a crop rehabilitation/replanting programme as a matter of priority to minimise food supply problems.

**5.** Although estimates of the extent and cost of damage to agriculture, forestry and livestock will not be available until the proposed survey is completed, the Ministry is of the

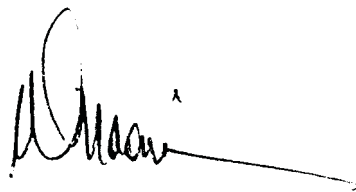


view that additional assistance both in cash and in kind (either from external sources or additional provisions from Government) will be needed as a matter of priority in the following areas:

- (i) food aid to alleviate food shortage expected to occur in the next 3-4 weeks for more than six months;
- (ii) planting materials (com, potatoes, etc.) together with other agricultural inputs (chemicals for disease control) fertiliser, etc.) in order to launch an emergency replanting programme;
- (iii) funds to cover costs of radio programmes; mobilisation of locally available planting materials; fuel cost associated with the survey, cost of land preparation in aid of farmers involved in the rehabilitation/replanting programme; repair to MAF buildings and facilities that were damaged during the cyclone; and for the implementation and monitoring of the rehabilitation programme.

6. I trust that this report will assist the Committee in the preparation of a report to Government on the extent of the damage to the Kingdom caused by tropical cyclone Cora, and in the formulation of appropriate recommendations on the further actions to be taken to ameliorate the situation. The Ministry stands ready to assist in whatever way possible, and is willing to provide further information, if required.

Yours sincerely,



Haniteli 'O Fa'anunu

**DIRECTOR OF AGRICULTURE AND FORESTRY**

attach.

**PRELIMINARY REPORT**  
**ON THE EXTENT OF THE DAMAGE TO THE AGRICULTURE SECTOR**  
**AS A RESULT OF TROPICAL CYCLONE CORA**

The following is a compilation of reports (written and oral) received from offices of the Ministry in the outlying islands, and from officers working in the Western, Central and Eastern districts of Tongatapu.

**·NIUAFO'OU**

- Ko Niuafouu ne ikai ke fu'u uesia 'e he matangi; na'e havili pe mo 'uha ka na'e ikai 'i ha tu'unga fakatu'utamaki.
- Ko e fusi (siaine, hopa, etc.) pe ne hoko ki ai ha maumau, 'o uesia lahi taha pe 'a e lau ka na'e si'i pe ha holo ..
- Ne uesia foki mo e mei. Neongo ne si'i ha holo e 'ulu mei, 'oku 'iai e 'ilonga 'ene uesia 'i he mofesifesi e ngaahi va'a, maumau'i moe lau, pea ngali e uesia moe fua 'amui ange, 'i ha'anau kaulo'a.
- 'I he vakai ki he 'akau papa, 'akau tu'ufonua moe 'akau fua, 'oku si'isi'i 'auptio pe e maumau, ngata pe he mango kuo mei 'osi e fua he ngangana. Si'i 'aupito ke 'asi ha 'akau 'e holo.
- 'Ikai ke 'i ai ha maumau ki he 'u fale pe me'angaue 'a e Potungaue.

**NIUATOPUTAPU**

- 'Oku fakafiemalie pe 'a e tu'unga 'oku 'i ai e ngoue hili e matangi ko Cora. 'Ikai ha fu'u uesia 'o e ngaahi ngoue'anga, ngata pe he ngaahi fu'u 'ulu fusi 'e ni'ihhi ne holo.
- 'Ikai ha uesia 'o e mei mo e 'akau fua, pea pehe ki he ngoue foha (ufi, talo, etc.).
- Hao pe moe ngaahi fale moe 'u misini 'a Potungaue.

## VAVA'U

- Kirnu'a 'i he to rna'i a Cora, na'e 'i he tu'unga fusirno'orno 'a e fo 'i rne'atokoni 'i he vahefonua Vava'u. Ko e ngaahi savea na'e fai ki rnu'a 'ia Cora, na'e rnahino rnei ai 'a e fierna'u vivili ke langa'i hake fakavavevave 'a e tu'unga 'o e fo 'i rne'atokoni 'i Vava'u.
- Ko e fakafuofua leva 'eni ki he tu'unga 'o e fo'i rne'atokoni 'i Vava'u, 'o rnakatu'unga ki he vakai fakalukufua na'e fai 'i he efi'ai Sapate 26 Tiserna 1998:
  - Ko e fo'i rnanioke pe na'e kei lava ke fai rnei ai 'a e rna'u rne'atokono faka'aho neongo ko e konga lahi (70-80%) kuo karnata ke tarna'la rno ofo tupu rnei he la'ala'a lahi, pea rno ha ki'i 'uha ne toki to kirnu'a 'ia Cora. Ko e fo'i rnanioke ne teu ke faka'aonga'i kuo toe ta'e'aonga rno ia. Ne lahilahi e to rnanioke fo'ou 'o tonu ke karnata kai ki Fepueli, ka 'oku 'i ai e tui 'e uesia rno 'eni tupu rneihe rnatangi.
  - Ko e kurnala 'a e ngoue kehe ne fai ki ai 'a e fakafalala neongo ko e 'eka pe nai 'e 25- 30 'e ala faka'aonga'i. Ko e 'eka kurnala to fo'ou 'e 20-30 'oku fakafuofua e toki ala faka'aonga'i 'i Fepueli, 1999. Ko e tu'unga 'o e pulopula lau'i kurnala 'oku si'i fau, pea 'e fu'u fierna'u ha pulopula lau'i kurnala 'i he vave taha, ke fai ha langa ngoue fakato'oto'o. 'Oku fakafuofua ki he lau'i kurnala ki he fu'u furnala 'e 20,000 nai pe lahiange 'e fierna'u.
  - Ko e to'u rnei ne tornui tupu rnei he la'ala'a, Na'e 'i ai e falala na'a karnata leva ha rna'urne'atokoni rnei he fo'i rnei 'i Sanuali. Neongo ne si'isi'i pe 'a e 'ulu rnei na'e holo, 'oku fakafuofua 'e 'ikai toe 'aonga ha fo'i rnei 'i he to'ukai ko 'eni lolotonga, ko e 'uhi kuo uesia kotoa 'e he rnatangi.
  - Ko e ngaahi rna'ala ne tornui 'aupito pea uesia lahi foki tupu rneihe la'ala'a. Ko e ngaahi rna'ala kuo fai lau, ne uesia kinautolu 'e he rnatangi. 'Oku fakafuofua 'e uesia 'e he rnahunu moe lavelavea 'a e 'ufi 'o a'u ki he 50 % pe lahi ange 'o kapau 'e 'ikai fakahoko ha polokalarna fana rnalu'i rnahaki 'o e 'ufi.
  - Ko e fo 'i kape 'o e ta'u 1998'oku toe ta telau pe pea 'oku ngali na'a 'osi pe ia 'i Tiserna ni. Ko e kape to foou 'oku 'ikai ke uesia lahi pea 'oku fakafuofua 'e toe ake rna'i pe ia 'i he kongaloto 'o e ta'u kaha'u.

- Ko e vesitapolo 'oku 'i he tu'unga fakafiemalie pe, ka neongo ia ne si'isi'i hono to tupu mei he la'ala'a ne toki 'osi. 'Oku 'i ai e faka'amu ke kau e sevitapolo he polokalama langa ngoue fakavavevave ko e 'uhi ko 'ene nounou, pea mohu ivi fakame' atokoni.

Ko e ngaahi fiema'u vivili 'eni:

- Kumala -                    hoa'i lau'i kumala e 20,000 pe lahiange
- Pateta                -       tangai (20 kgs) 'e 300 pe lahiange
- Koane               -       Tangai (20 kgs) 'e 20 pe lahi ange
- Vesitapolo -               Tali lelei ha lahi pe 'e ala ma'u
- Manioke -               Koniteina (MV Olovaha) e nima pe lahi ange.

'Oku 'i ai e tui ko e ngahhi ngoue taimi nounou ko ia oku ha 'i 'olunga 'e fiema'u ke fakafolau mai mei Tongatapu pe ha motu pe 'e ala ma'u mei ai.

## HA'APAI

- Ko e lahitaha 'o e maumau 'o e matangi ko Cora ko 'ene uesia 'a e 'ulu'akau fua hange koe mei, mango moe moli, pe a pehe ki he ngoue foha pea mo e fusi.
- Koe manioke ,oku lahi taha hono uesia 'o e manioke 'osi foha pe ala kai.
- Ko e ngoue 'ufi, oku uesia 'aki hono maumau'i oe lau'i 'ufi tupu mei hono vilohi 'e he matangi e ngaahi va'a 'ufi, pea mo e holo ai 'a e 'akau moe lau'i niu.
- Ko e siaine, 'oku lahi taha 'ene maumau 'O fakafuofua ki he meimei kotoa 'O e fusi kuo nau taokoto ki lalo.
- Ko e ngaahi ngoue kehe, hange koe meleni moe kumala kuo lahi mo hono maumau'i 'O meimei kotoa e ngaahi ngoue' anga.
- Ka neon go eni, 'oku fakafuofua 'oku lahi ange pe 'a e maumau ne hoko ki Tongatapu 'i he maumau ne hoko ki Ha'apai tupu mei he matangi ko Cora. Ka ko e me'a pe ke fakatokanga'i, ne 'osi 'i he tu'unga nounou fakafuofua'atokoni pe 'a Ha'apai ia ki mu'a

pea toki hoko mai 'a Cora, tu'unga 'i he la'ala'a lahi ne toki 'osi, Koe 'uhi koe maumau ko ia ne hoko fakataha mo e uesia 'o e tu'unga me'atokoni 'i he la'ala'a, 'e 'i ai e nounou fakame'atokoni 'e hoko ki he vahefonua Ha'apai.

- 'Oku 'ikai lava ha fetu'utaki fakatelefoni pea moe ngaahi 'otumotu (Nomuka, Ha'afeva pea mo Kauvai Ha'ano) tu'unga 'i he motuhia e fetu'utaki.

## 'EVA

### *1. Crop Damage Report:*

- Maumau lahi taha - famili 'o e siaine moe hopa.
- Manioke: maumau lahi taha 'a e manioke lolotonga kai. Manioke mui ne uesia mo ia.
- Vanila: Lahi taha mata'aki mo e fiki. Ngangana mo e matala ni'ihi mo e fua kei fuo iiki.
- Kava: Lahi holo ai e 'akau, fesi moe kata. Ngaahi fu'u kava ni'ihi kuo mata'aki.
- Ma'ala: Lahi e maumau tupu mei he holo ai e 'akau, pea mo e ngangana ai 'a e louniu.
- Mei: Ngangana, pea 'e kaulo'a e toenga 'i 'olunga.
- Mango: Ne kamata momoho mo motua, ka kuo 'osi he ngangana.

### *2. Report on MIAF buildings and Equipment*

- JOCV Quarter at Molipeli roof completely blown off. JOCV has moved to OIC's quarter.
- The roof of the Home Economic Centre was also blown off.
- Machineries and other buildings were not affected.

## TONGATAPU

### 1. Eastern District:

<u>Fa'ahinga Ngoue/' Akau</u>	<u>Natula 'o e Maumau</u>	<u>Maumau (%)</u>
<b><u>Ngoue Kai</u></b>		
'Ufi moe kape	Mio'i mo kamata momoa e lau	95%
Talo	Kamata mo moa e lau	50%
. Manioke (5months and over)	Momoa e lau pea malangalanga	90%
Manioke ( 1-4 months)	Momoa e lau	100%
Kumala (3-6 months) Kumala	Momoa e lau	10%
(1-2 months)	Momoa e lau/mate	100%
Fusi (siaine, hopa, etc.)	holo/mofesi moe momoa e lau	95%
<b><u>'Akau Kai</u></b>		
Niu	Mahu'I e fua moe mofesifesi e lau	70%
	Holo	5%
Mei moe mango	Ngangana e fua, mofesifesi, momoa e lau	70%
Lesi	Holo, motumotu, momoa e lau	80%
<b><u>Ngoue Fakapa'anga</u></b>		
Pinati	momoa e lau	10%
Meleni moe temata	mate mo momoa	100%
Yanila	Motumotu e ngaahi va'a he holo ai e 'akau moe niu	30%

'Oku 'i ai e maumau ki he fale tauaki vanila 'oku tu'u 'i Ha'asini, 'a ia ko hono haea e ngaahi matapa teke 'o e fale. 'Oku 'i ai foki moe maumau ki he 'ofisi 'i he Senita 'i Ha'asini, tupu mei he holo ai ha fu'u niu 'i he fakafaletolo 'o e fale.

'Oku 'i a i foki moe maumau ne hoko ki he fale ('ofisi) 'i he Senita 'i 'Alakifonua, 'a ia ko e holo e kongā 'o e fale 'oku tu'u ai e falemalolo (toilet).

## 2. *Central District*

### **Ngoue foha**

Manioke	mofesifesi	80%
Talo	'ikai toe 'i ai ha lau	50%
Kape	'ikai to e 'i ai ha lau	75%
'Ufi	vuesia e va'a moe lau 'i hono	
	nuiki 'e he matangi	70%
Kumala	ditto	60%

### **Ngoue Fua**

Hopa, Siaine, Pata, etc.	holo	95%
Lesi	holo/momoa e lau	80%

### **'Akau Fua**

Mei	Holo/mofesifesi mo ngangana e fua	90%
Mango	ditto	85%
Niu	ditto	55%
Moli	ditto	55%
Tava	ditto	50%
Ifi	ditto	50%

'Oku 'i ai e maumau ne hoko ki he ngahhi naunau faka'ahu 'oku tu'u ko ia 'i Uafu Kuini Salote tupu mei hono laiki 'e he maka 'o e uafu ne ta'aki mai 'e he taihi. Ne hoko foki mo ha maumau ki he ngaahi naunau faka'ofisi (computers, photocopiers), pea pehe ki he falemalolo 'o e 'Ulu'i Ofisi 'o e Potungaue 'i he Hala Vuna. 'E toki ma'u hano fakama'opo'opo 'oe maumau ki he naunau mo e koloa 'a e Potungaue amui ange.



*Western District*

'Ufi	maumau'i e lau moe va'a 'ufi	70-80%
Manioke	mofesifesi	70-80%
Talo	maumau'i e lau	40%
Kape	ditto	70%
Kumala	si'i pe 'a e maumau 'oku 'asi	
•		
Niu	ngangana e fua moe mofesifesi e lau	30-50%
Niu	holo	20%
Mei	holo	10%
Mei	ngangana e fua mo mofesifesi	95-100%
Mang	holo	3% 95-
o	Ngangana e fua mo mofesifesi	100%
Mang	holo	5% 90-
o Lesi	rnotumotu pe rnomoa e lau	100%
Lesi	holo	100%
Koane	holo	10%
Fusi (siaine, hopa, etc.)	rmaumau'i e lau	100%
Fusi		

**Note**

Ko e manioke 'a e ngoue ne lahi taha hono to 'i he Vahe Hihifo. "Oku fakafuofua ko e 'eka nai 'e 200 pea koe lahi taha 'oku 'i he 1-5 rnahina. Ne meimei uesia kotoa e ngoue ni. Ki mu'a i he to rmai 'a e matangi ko Cora, ne 'osi karnata pe ke ongo e nounou fakafuofua 'i Vahe Hihifo. Ko ia 'e toe fu'u ongo ange 'a e nounou fakarne'atokoni hili e matangi, pe a 'oku fakafuofua 'e 'i ai e honghe fakarne'atokoni 'e hoko hoko 'I he Vahe ni 'i he mahina 'e 6-12 ka hoko maio I he 'ene pehe, 'oku fierna'u leva ke fai ha langa ngoue 'i he vave taha, pea nga'i 'e fiema'u rno ha tokoni fakame'akai rnei rnuli.

REPORT ON THE DAMAGE TO THE AGRICULTURE SECTOR AS  
A RESULT OF TROPICAL CYCLONE CORA

AND

PROPOSED RELIEF AND  
REHABILITATION MEASURES TO BE TAKEN

BY

THE MINISTRY OF AGRICULTURE AND FORESTRY

3 January 1999

## SUMMARY

Tropical Cyclone Cora has caused extensive damage to the agriculture sector. The major impact is to the local food supply and on the level of agricultural export, which is expected to be completely paralysed for the next six months, at the least.

2. The total estimated cost of the damage to the agriculture sector is **T\$14.9 million**. This estimate is based on a sample survey carried out by the Ministry of Agriculture and Forestry in Tongatapu, Vava'u, Ha'apai and 'Eua. Damages to the vegetation due to salt spray, to the soil due to sea surge and erosion, and to forest trees are difficult to estimate and are therefore not included in this report.

3. In addition, there was damage to buildings and properties of the Ministry of Agriculture and Forestry, valued at approximately **T\$29, 000**.

4. As a result of the damage to crops and fruit trees combined with the effect of the long drought experienced prior to Cyclone Cora, a severe shortage of food is anticipated for the whole of Tonga except the two Niuas, with Vava'u and Ha'apai requiring immediate food assistance for a period of up to four months. The total cost of the food aid required is estimated at T\$3.5 million which includes a provision \$0.3 million to cover costs of distribution, storage and related overheads.

5. In order to return production to pre-cyclone level and to minimise the period of shortage of food supply, an emergency rehabilitation/replanting programme is proposed, with an estimated total cost of **T\$1,020,000**, which includes a provision of \$500,000 for rehabilitation work on export crops.

## INTRODUCTION

This report is a more detailed follow-up to the Preliminary Report submitted by the Ministry of Agriculture and Forestry to the National Disaster Advisory Committee on 29 December 1998, on the damage sustained by the agriculture sector as a result of Tropical Cyclone Cora which struck Tonga on 25-26 December 1998.

2. As mentioned in that Report, it was apparent from the reconnaissance surveys carried out by the Ministry immediately after the Cyclone that the two Niuas escaped the wrath of Cora except for minor damages to crops and fruit trees. It was also apparent that Tongatapu, Vava'u, Ha'apai and 'Eua suffered extensive damage, the extent of which varied between the island groups with Tongatapu being the worst affected.

3. On the basis of the above, and the need to provide Government with a quantitative assessment of the extent and cost of the damage to agriculture, the Ministry carried out a more detailed survey in Tongatapu, Vava'u, Ha'apai and 'Eua commencing on 30 December. Due to limited resources available<sup>1</sup>, and the need for the information to be made available at the earliest possible, the Ministry considered that the best possible approach would be to carry out a sample survey. The survey was therefore conducted based on a random sample of approximately 10 per cent of all tax allotments.

4. This report is divided into three main parts. The first part provides an account of the damage to agriculture/ based on the survey carried out, and the estimates of the costs of the damage. The second part gives an assessment of the food situation prior to and after Cyclone Cora, and an estimate of the amount of food aid, if any, that would be required. The third part of this report outlines measures proposed to be carried out by the

<sup>1</sup> With Government closed for Christmas and with communications being badly affected by the Cyclone, it was difficult to recall all Ministry personnel in order to carry out a full-scale survey. Further, at the meeting of the National Disaster Advisory Committee (NDAC) on 30 December, the Ministry was requested to provide cost estimates of the damage to agriculture before 9.00am Monday 4 January 1999 so that a report could be submitted to Cabinet at the earliest possible.

Ministry in an attempt to fully restore the agriculture sector to pre-cyclone level at the earliest possible, minimise post-Cyclone losses, and to preserve the "excess" food created as a result of the damage to crops during Cyclone Cora.

5. It should be noted that it is extremely difficult to give an accurate assessment of the full extent of the damage of any natural disaster to the agriculture sector for a number of reasons. Unlike buildings, equipment and infrastructure, plants and animals are living things and, as such, have the capability to recover themselves from damages they suffer. The extent of their recovery, however, is largely influenced by the extent of the damage sustained, post-disaster weather conditions and other factors. In addition, yield losses due to damage to long-term crops (e.g., coconuts, breadfruit, vanilla, etc.) cannot be accurately and, in most cases, the extent of the damage is underestimated.

1 -----

<sup>2</sup> For the purpose of this report, agriculture refers to crops, fruit trees, cash crops, forest trees and livestock.

## Part One

### ASSESSMENT OF DAMAGE TO THE AGRICULTURE SECTOR

#### INTRODUCTION

The first part of this chapter provides a descriptive account of the damage to some of the major crops. This is considered useful in understanding and appreciating the extent of the damages to the agriculture sector, and the approach taken by the Ministry to estimate the cost of these damages. The second part outlines the result of the analysis of the surveys carried out by the Ministry and the approach taken in estimating the actual cost of the damage caused.

#### DAMAGE ASSESSMENT

2. The detailed survey confirms the preliminary assessment provided by the Ministry in its Report of 29 December 1998, that Tongatapu suffered the most damage to agriculture, as compared to Vava'u, Ha'apai, and 'Eua. The nature of the damage, however, is similar in all these island groups.

3. The damage to crops, trees and the vegetation was a direct result of the destructive force of the wind; salt sprays brought about by the combined impact of the strong wind and sea surge, and flooding in some areas due to the heavy rain. The most affected crops were breadfruit, bananas, mangoes and other fruit trees, and cassava.

4. Agricultural exports are mainly root crops (cassava, taro, yams), cash crops like kava, vanilla, and squash and to a lesser extent, vegetables including papaya, and rwatermelon. With the level of damage sustained by the agriculture sector as a result of [CycloneCora, agricultural export is expected to be paralysed for the next six months.

5. The following is a brief description of the kinds and extent of damage to some of the major crops as observed during the reconnaissance surveys and the subsequent survey carried out commencing on 30 December:

(i) Breadfruit

6. The breadfruit trees suffered extensive damage in terms of loss of fruits, and broken branches, although the impact of the cyclone in terms of the number of trees totally destroyed (up-rooted) was minimal (less than 10 per cent). The breadfruit season for 1999, which was just beginning, is estimated to suffer at least 80 per cent loss due to the Cyclone. In addition, it is estimated that it would take approximately 5 years before the pre-Cyclone yield level could be restored. This is due to loss in yield as a result of the reduction in the breadfruit tree population, and damage to fruit bearing branches.

(ii) Coconut

7. Although the number of coconut trees that were up-rooted by the Cyclone is estimated to be less than 10 per cent, significant losses are anticipated. It is estimated that up to 90 per cent of the surviving coconut palms will either lose their fruits prematurely, or will suffer quality deterioration ("mata'ali") to their fruits over the next 6- 12 months.

(iii) Mangoes

8. The mango season was at its peak when Cyclone Cora struck and, thus, all the remaining fruits were blown off. The mango season normally runs until the end of January to early February but the 1998/99 season had been cut short by the Cyclone resulting in an over supply of mango experienced in the first 3-4 days immediately after the Cyclone. Damage in terms of the number of trees that were totally destroyed was minimal, however, it is anticipated that there will be a reduction of up to 25 per cent in the 1999/2000 crop yield due to the damage to mango trees caused by Cyclone Cora.



## (iv) Bananas

9. Bananas<sup>3</sup> suffered extensive damage mainly due to the destructive force of the wind. It is estimated that virtually all banana plants were blown down, most of which were either just about to bear fruits or were already bearing but not yet ready for harvest.

## (v) Cassava

10. Cassava (manioc) also suffered extensive damage as a result of cyclone Cora. It is estimated that approximately 3,000 acres of cassava, at varying stages of maturity, were already planted prior to Cyclone Cora. Although the damage was not confined to any particular age group, those of 5 months old and over were the ones that suffered the most damage. In fact, it is estimated that almost all crops under this age group will be completely destroyed. This is due to: (a) some plants being completely up-rooted; (b) some being partly up-rooted or the tubers being severed from the stems which will cause them to rot unless they are harvested immediately; and (c) some plants suffering from extensive damage to their branches which will result in deterioration to the quality (edibility) of the tubers.

## (vi) Yams

11. Yam is a very delicate crop, is susceptible to diseases and requires constant care especially during the first six months of its growth, if maximum yield is to be achieved. The destructive force of the wind, the heavy rain and salt spray in some areas combined to intensify the severity of the damage to yam plantations. Further, fallen trees and coconut leaves exacerbated the situation. Crop vines were severely twisted due to the strong wind and leaves were heavily defoliated. The cyclone came at the time when the yam crops were just beginning to form tubers and, thus, it is estimated that at this stage, the majority of the yam plantations will experience significant reduction in yield up to 80 per cent. However, post-cyclone weather conditions (continuous rain) are

<sup>3</sup> This includes all the banana families, i.e., bananas, plantain, lady's fingers, etc.

conducive to the recovery of the yams, but a spell of dry weather condition is required in the next 10-14 days to enable farmers to carry out spraying. If this occurs, it is anticipated that some plantations will be able to recover and thus lessen the extent of the damage from 80 per cent to only 50 per cent yield reduction.

(vii) Vanilla

12. Although the vanilla plants themselves appear not to have suffered any significant and direct damage as a result of Cyclone Cora, indirect damage is anticipated due to the support plants ("fiki") on which they cling being severely damaged (some totally up-rooted but most were heavily shaken by the wind). As a consequence, it is anticipated that the vanilla beans, most of which would take another two months before harvest, would fall prematurely. Thus, a crop loss of up to 50 per cent is foreseen.

(viii) Papaya

13. Papaya suffered very heavy losses as a result of the Cyclone. Damage sustained included loss of fruits, defoliation, broken stems and some plants being completely blown down. Papaya was recently developed as an export crop targeting the New Zealand market. Based on the detailed survey, it is anticipated that no further export of papaya will be made for the next 4-6 months. Although some fruits survived the wrath of Cyclone Cora, it is expected that these will not meet the quality requirements of the export market as these will tend to ripen prematurely ("momoho tea") and/or of sour taste ("kano mahi").

(ix) Other Cash Crops

14. Other cash crops like watermelon, peanut, and vegetables also suffered significant damage, however, the survey showed that not many acres of these crops were under cultivation at the time of the Cyclone. Nevertheless, the damage is estimated to be between 80-100 per cent.

(x) Timber/Forest Trees

15. Although timber/forest trees sustained some damage during the Cyclone, it is difficult to accurately assess the extent and cost of the damage for a number of reasons. Most timber trees, apart from those grown in the Government's forest plantations, are not grown in a plantation mode but mainly for shade/protection purposes, around the borders of the tax allotments. Secondly, different species have been cultivated and are at varying stages of maturity. Thirdly, the types of damage observed ranged from broken branches to damage due to salt (sea) spray to fallen trees. The Government forest plantation in 'Eua suffered extensive damage however, it is difficult at this stage to carry out a full assessment of the extent of the damage. Thus, this is not included in the final figure provided in this report.

(xi) Livestock

16. There was no loss of livestock animals recorded, although minor damage to farm structures (buildings, fences, etc.) was observed.

(xii) Other Crops/Trees of Commercial Value

17. Other crops that suffered significant damage as a result of the Cyclone include pandanus ("lou'akau"), paper mulberry ("hiapo"), coffee, "nonu", traditional fruit trees like "vi", "ifi", and "tava", and trees/plants of cultural value like "koka". While it has been possible albeit with difficulty to estimate of the cost of the damage to some of these trees/plants, others particularly the traditional fruit trees and those of cultural value are very difficult to make a fairly accurate estimates of the cost of the damage they sustained. Therefore, these crops are not included in the estimate to the total cost of damage shown below. Given this situation, the total estimated costs shown is considered to be a conservative estimated of the actual cost of damage to the agriculture sector.

## ESTIMATION OF COST OF DAMAGE BY CYCLONE CORA

18. As mentioned above, due to time constraint and limited resources available, it was considered that the best possible approach would be to carry out a random sample survey. The findings of this survey were then used to extrapolate the total cost of the damage. This approach presupposes the existence of baseline data pertaining to:

- (i) total area under cultivation on a crop by crop basis;
- (ii) total area of arable land available;
- (iii) market prices of produce.

19. Unfortunately, such data were either not readily available or incomplete and, hence, the analysis had to rely on the field experience of staff, secondary data and on past similar experience. On the basis of this, an error margin of  $\pm 20$  per cent should be allowed. The result of the analysis gives an estimated total cost of damage of T\$14.9 million. With an error margin of 20 per cent, the range of the damage is therefore \$12.4-\$17.9 million, as summarised below, and detailed in Annex I attached.

Island Group	Estimated Value of Damage (in T\$)
Tongatapu	8,943,171
Vava'u	2,052,545
Ha'apai	1,031,589
'Eua	2,860,249
<b>TOTAL</b>	<b>14,887,554</b>
Range ( $\pm 20$ per cent)	12,406,295 – 17,865,064

20. In calculating the above, a number of important assumptions were made which would have significant bearings on the results. Also, a number of important points should be noted. These assumptions and important points are as listed below:

- (i) Although the extent of the damage to mangoes was approximately 100 per cent, the season was already at its peak: prior to the Cyclone. On the basis of this, the per tree yield estimate was adjusted downward by 50 per cent from the average yield adopted by the Ministry for gross margin analysis purposes;
- (ii) Coconut yield loss was difficult to be estimated accurately due to the absence of any data on the total palm population. The figures used in this analysis, therefore, was based on estimates used in previous cyclones damage assessment reports;
- (iii) The extent of the damage differed from one island group to another, as indicated by the percentage of the damage to each crop. For example, Tongatapu being the worst affected area showed a level of damage to yams of approximately 60 per cent while Vava'u and Ha'apai sustained 15 and 40 per cent, respectively;
- (iv) The level of damage recorded for Vava'u and Ha'apai appears to be relatively low which could be mistakenly interpreted to be that the damage was not very severe. However, this is explained by the fact that these two island groups had already suffered from the long period of drought experienced prior to Cyclone Cora, and thus the total area of land under cultivation was significantly lower than normal;
- (v) For crops like taro and kape, although significant damage was recorded immediately after the cyclone due to severe defoliation, most of these crops are expected to be able to recover given favourable weather conditions. Thus, the estimate of the percentage of damage to these crops have been adjusted downward to account for this;

- (vi) Although kava appeared to have suffered extensive damage in terms of broken branches, the survey showed that the majority of the kava plantations were under two years old and thus, it is considered that these crops will be able to recover without any significant loss in yield.

21. There was also some damage to buildings and properties of the Ministry, which is estimated at T\$25,000, the details of which are outlined the table below.

ESTIMATES OF COST OF DAMAGE TO PROPERTIES OF THE MINISTRY  
OF AGRICULTURE AND FORESTRY

Loaction	Description of Damage	Estimated Value in (T\$)
Tongatapu	Damage to the quarantine facilities at Queen Salote Wharf	\$7,700
	Forestry nursery and structures at Tokomololo	\$3,000
	Extension Centre at 'Alaki (wall of building collapsed) and Ha'asini (verandah of building damaged due to fallen tree)	\$3,500
	MAP headquarters (damage to toilet facilities, two computers and to records due to flooding)	\$7,000
'Eua	Home Economic building at Molipeli (roof blown off and damage to interior due to rain)	\$4,000
	One accommodation Unit at Molipeli (roof blow off and damage to interior due to rain)	\$2,000
Ha'apai	Workshop at Pangai (damage to building)	\$1,500
TOTAL		T\$28,700

## Part Two

## FOOD AID AND OTHER PROPOSED RELIEF MEASURES

## INTRODUCTION

Based on the outcome of the detailed survey, a shortage of food supply is anticipated for Tongatapu, Vava'u, Ha'apai and 'Eua as a direct result of the damage caused by Cyclone Cora to food crops. The situation in Vava'u and Ha'apai, however, is expected to be extremely critical due to the fact that these two island groups experienced a long period of drought prior to Cyclone Cora and they were already relying on Tongatapu for supply of root crops. The impact of the drought was a significant reduction in the total area of crops under cultivation throughout Tonga, but more so in Vava'u and Ha'apai.

2. The period of January - March is usually a time when there is a general shortage of supply of root crops even during normal years and breadfruit usually fills in the gap until the harvesting season for yams begins. However, this will no longer be the case since breadfruit was among those that were worst affected. Given this scenario and the fact that the yam (and other) crops have been adversely affected, it is considered that the situation will be very critical.

3. As mentioned before, an "excess" supply situation is expected to be experienced as a result of damage to crops caused by Cyclone Cora. Based on the survey, it is estimated that for Tongatapu and 'Eua, this excess supply will last for 3-4 weeks after the Cyclone, followed by severe shortage of food. Unless an emergency replanting programme is launched and a food aid programme is provided, it is expected that this period of short supply will last up to four months, which is the time taken for those crops that survived the cyclone (mainly cassava, taro, and, to an extent, yams) to come to harvest. In the case of Ha'apai and Vava'u, however, such a situation is not



expected to occur. In fact, the post-Cyclone food supply situation is expected to worsen since there was already a shortage of food and the fact that there was extensive damage to breadfruit and bananas, and will last up to four months.

#### FOOD AID REQUIREMENT

4. The calculation of the total amount of food aid required was based on the energy requirement per household. In anticipation that an emergency replanting programme will be carried, the total food aid required for Tongatapu, Vava'u, Ha'apai and 'Eua is estimated at 3,600 tons valued at approximately T\$3.2 million. With cost of distribution (land and sea transportation, storage, repackaging, etc.) estimated at about 10 per cent of the total food aid programme, the total cost is therefore estimated at T\$3.5 million. Derivations of these values are summarised in the table below.

#### DERIVATION OF FOOD AID REQUIREMENT AND COST

<b>Island Group</b>	<b>Number of Household<sup>1</sup></b>	<b>Food Aid Requirement<sup>2</sup> (in Tonnes)</b>	<b>Estimated Value<sup>3</sup> (in T\$)</b>
Tongatapu	10,756	2,000	1,793,400
Vava'u	2,734	990	891,000
Ha'apai	1,159	430	386,000
'Eua	824	150	134,800
<b>TOTAL</b>	<b>15,473</b>	<b>3,570</b>	<b>3,205,200</b>

1. Based on the figures used in Ministry of Agriculture and Forestry report on Land Use and Crop Survey, 1995.
2. Based on the FAO minimum daily energy requirement of 2,200 kilocalories per person, and an estimated average of 6 persons per household. These tonnages are expected to supply 60 per cent of the total calorific requirement and the balance is expected to be derived from other energy sources, e.g. protein.
3. Based on a food aid programme comprised of flour, rice and sugar valued at \$0.80 per kg for flour and \$1 per kg for rice and sugar.

5. The total tonnage shown above is based on a food aid programme comprised of flour, rice and sugar, which are considered to be the cheapest and are easy to store due to their long shelf life. The total amount of food aid required based on this composition is as outlined below:

TOTAL FOOD AID ON A PER ISLAND BASIS

Island Group	Flour (in tons)	Rice (in tons)	Sugar (in tons)	TOTAL
Tongatapu	1,033	645	322	2,000
Vava'u	495	330	165	990
Ha'apai	220	140	70	430
'Eua	76	49	25	150
TOTAL	1,824	1,164	582	3,570

6. There are a number of important points that need to be highlighted. First, the food aid programme is based on the expectation that an emergency replanting programme will be launched at the earliest possible. Second, the food aid is expected to slow down the premature harvest of crops that survived the Cyclone. Thirdly, the timing of the food aid is very important. The assessment from Vava'u and Ha'apai shows that there is an immediate need for food relief for up to four months. In the case of Tongatapu and 'Eua, food shortage is not expected to occur until 3-4 weeks from now and is expected to last for up to two months.

Part Three

PROPOSED REHABILITATION AND REPLANTING PROGRAMME

With the extensive damage to crops in Tongatapu and 'Eua, and the food situation in Vava'u and Ha'apai now expected to worsen, a very critical situation in terms of food supply and export is foreseen. In view of this, the Ministry proposes the following actions to be taken in an attempt to restore production to nonnallevel (both for local consumption and for export), and to minimise the period of short supply of food.

(i) Radio Programmes

2. The Ministry has already commenced broadcasting regular radio programmes, including spot messages. These programmes are aimed at advising farmers on appropriate actions to be taken pertaining to:

- Rehabilitation of existing crops in order to minimise post-cyclone damage. This includes spraying, pruning, etc in order to avoid any outbreak of crop diseases;
- Utilisation/preservation of "excess" food created by Cyclone Cora through damage to crops and food trees;
- Advice on the most appropriate crops to be planted as a matter of priority in order to improve level of food supply.

(ii) Crop Replanting Programme

3. An emergency replanting programme is proposed to be carried out throughout Tongatapu, Vava'u, Ha'apai and 'Eua so that the period of shortage of food supply could be minimised. The replanting programme will focus on the planting of short-term crops such as sweet potatoes, potatoes and com, and medium term crops such as cassava. The programme will also include vegetables for nutritional purposes.

4. The Ministry considers that for locally available planting materials, fanners have already established contacts and a system, which would ensure the efficient mobilisation of planting materials without any intervention from the Ministry or Government. However, both Vava'u and Ha'apai are experiencing an acute shortage of planting materials of traditional crops such as sweet potatoes, taro and cassava. In view of this, the Ministry proposes that resources be allocated for the purpose of procuring, transporting and distributing these planting materials to these two island groups.

(iii) MAF Extension Programme

5. To ensure that the rehabilitation/replanting programme is successfully carried out, the Ministry will mobilise its staff and other available resources over the next 3-4 months so that direct advice to fanners is provided. In addition to this, work will also be carried out focusing on crops like vanilla, kava, papaya, and medium term root crops in order to redevelop the agricultural export sector.

CROP REPLANTING PROGRAMME - COST ESTIMATES

6. The total estimated cost of the proposed emergency replanting programme is T\$1,016,000. The details of the inputs required and their respective costs are outlined in the table below.

<b>Inputs</b>	<b>Quantity</b>	<b>Cost Estimates (in T\$)</b>
<b>1. Seeds</b>		<b>212,000</b>
- Potato	200 tons	200,000
- Corn	2 tons	800
- Beans	400 kg	2,000
- Cabbage	40 kg	2,400
- Lettuce	20 kg	800
- Carrots	40 kg	2,000
- Tomatoes	40 kg	4,000
<b>2. Pesticides</b>		<b>38,000</b>
- Atabron	{	
- Dipel	{400 kg	32,000
- Sevin	{	

- Manzate	900 kg	6,000
<b>3. Fertilizer</b>		<b>34,400</b>
- NPK	40 tons	24,000
- Urea	20 tons	10,400
<b>4. Spraying Equipment</b>		<b>28,800</b>
- Motorised sprayers	12 units	14,400
- Knapsack	30 units	14,400
<b>5. Machinery</b>		<b>82,200</b>
- Tractor	4 units	80,000
- Operational (diesel)	4,900 litres	2,200
<b>6. Local Planting Materials</b>		<b>1,000</b>
(for Vava'u & Ha'apai)		
<b>7. Distribution Cost (includes)</b>		<b>100,000</b>
- freight & transport		
- two distribution trucks		
<b>8. Support to MAF (includes)</b>		<b>20,000</b>
- radio programmes		
- extension work		
<b>9. Export Crop Rehabilitation</b>		<b>500,000</b>
<b>TOTAL</b>		<b>1,016,000</b>

**SUMMARY OF DAMAGE TO AGRICULTURE BY TROPICAL CYCLONE CORA**

	FRUIT TREES (In Numbers)				BANANA SPECIES (In Acres)						ROOT CROPS (In Acres)				
	Breadfruit	Mango	Coconut, Others	Banana	Plantain	Pata	Other	Yam	Talo Futuna	Kape	Manioke	Kumala			
<b>TONGATAPU</b>															
Eastern District	2,635	1,615	670,000	78	170	30	-	396	160	139	619	201			
Central District	2,068	3,000	-	20	170	13	-	450	364	-	900	624			
Western District	240	982	406,161	18	60	10	-	361	262	-	948	369			
<b>TOTAL</b>	<b>4,943</b>	<b>5,597</b>	<b>1,076,161</b>	<b>116</b>	<b>400</b>	<b>53</b>	<b>-</b>	<b>1,207</b>	<b>786</b>	<b>139</b>	<b>2,467</b>	<b>1,194</b>			
Total area/number surveyed	4,943	5,597	1,076,161	116	400	53	-	1,207	786	139	2,467	1,194			
Area/Number damaged as per survey	4,943	5,597	1,076,161	116	400	53	-	1,207	786	139	2,467	1,194			
Average/Mean Damage (%)	0.80	0.80	0.70	0.90	0.90	0.90	-	0.60	0.15	0.40	0.50	0.15			
Average Yield/Area	223	100	-	5	3	3	-	5	4	2	5	4			
Average price/kg	0.3	0.3	-	0.5	0.4	0.25	-	1	0.8	0.7	0.25	0.6			
Total Estimate value of damage	264,549	134,328	300,000	261,000	432,000	35,775	-	3,621,000	377,280	77,840	1,541,875	429,840			

OTHER CASH CROPS (In Acres)											TIMBER TREES	TOTAL VALUE OF DAMAGE (IN T\$)
Vegetable	Vanilla	Peanut	Coffee	Papaya	Watermelon	Corn	Kava	Mulberry (Hiapo)	Pandanus (Lou'akau)	All Species		
-	210	9.6	-	21.9	23	48	-	31	560	716		
16	-	-	5	15.6	34	-	-	36.4	26	4,496		
-	90	-	7.4	6	1	-	-	-	-	-		
16	300	10	12	44	58	48	-	67	586	5,212		
16	300	10	12	44	58	48	-	67	586	5,212		
16	300	10	12	44	58	48	-	67	586	5,212		
0.10	0.40	0.30	5.00	1.00	1.00	1.00	-	0.25	0.30	0.30		
2	1.5	5	1	5	5	3.5	1.5	-	-	-		
0.7	5	10	1	0.6	0.5	0.5	18	30	10	10		
2,184	900,000	144,000	62,000	130,500	145,000	84,000	-	-	-	-	8,943,171	

## SUMMARY OF DAMAGE TO AGRICULTURE BY TROPICAL CYCLONE CORA

	FRUIT TREES (In Numbers)				BANANA SPECIES (In Acres)						ROOT CROPS (In Acres)				
	Breadfruit	Mango	Coconut, Others		Banana	Plantain	Pata	Other	Yam	Talo Futuna	Kape	Manioke	Kumala		
VAVA'U															
Vava'u	1,324	1,310	-		15	50	11	-	103.6	45.6	185.7	197.9	37.6		
<b>TOTAL</b>	<b>1,324</b>	<b>1,310</b>	<b>-</b>		<b>15</b>	<b>50</b>	<b>11</b>	<b>-</b>	<b>103.6</b>	<b>45.6</b>	<b>185.7</b>	<b>197.9</b>	<b>37.6</b>		
Total area/number surveyed	1,324	1,310	-		15	50	11	-	103.6	45.6	185.7	197.9	37.6		
Average/Mean Damage (%)	0.60	0.60	-		0.50	0.50	0.50	-	0.25	0.20	0.20	0.30	0.10		
Average Yield/Area	223	50	-		5	3	3	-	5	4	2	5	4		
Average price/kg	0.3	0.3	-		0.5	0.4	0.25	-	1	0.8	0.7	0.25	0.6		
Total Estimate value of damage	53,145	11,790	100,000		18,750	30,000	4,125	-	129,500	29,184	51,996	74,213	9,024		





## SUMMARY OF DAMAGE TO AGRICULTURE BY TROPICAL CYCLONE CORA

	FRUIT TREES (In Numbers)				BANANA SPECIES (In Acres)					ROOT CROPS (In Acres)				
	Breadfruit	Mango	Coconut, Others	Banana	Plantain	Pata	Other	Yam	Talo Futuna	Kape	Manioke	Kumala		
HA'APAI														
Lifuka & Foa	367	-	-	30	100	23	-	225	46	155.5	257	75		
<b>TOTAL</b>	<b>367</b>	<b>-</b>	<b>-</b>	<b>30</b>	<b>100</b>	<b>23</b>	<b>-</b>	<b>225</b>	<b>46</b>	<b>155.5</b>	<b>257</b>	<b>75</b>		
Total area/number surveyed	367	-	-	30	100	23	-	225	46	155.5	257	75		
Average/Mean Damage (%)	0.80			0.50	0.50	0.50		0.40	0.10	0.20	0.15	0.15		
Average Yield/Area	223	100		5	3	3		5	4	2	5	4		
Average price/kg	0.3	0.3		0.5	0.4	0.25		1	0.8	0.7	0.25	0.6		
Total Estimate value of damage	19,642	-	100,000	37,500	60,000	8,625	-	450,000	14,720	43,540	48,188	27,000		

OTHER CASH CROPS (In Acres)											TOTAL VALUE OF DAMAGE (IN TS)
Vegetable	Vanilla	Peanut	Coffee	Papaya	Watermelon	Corn	Kava	OTHER CROPS OF COMMERCIAL VALUE		TIMBER TREES	
								Mulberry (Hiapo)	Pandanus (Lou'akau)		
-	4.5	30.0	-	-	37	-	-	91	16.5	-	-
-	4.5	30.0	-	-	37	-	-	91	16.5	-	-
-	4.5	30.0	-	-	37	-	-	91	16.5	-	-
	0.50	0.10			0.60			0.35	0.15		
2	1.5	5	1	5	5	3.5	1.5				
0.7	5	10	1	0.6	0.5	0.5	18	30	10	10	
-	16,875	150,000	-	-	55,500	-	-	-	-	-	1,031,589

## SUMMARY OF DAMAGE TO AGRICULTURE BY TROPICAL CYCLONE CORA

	FRUIT TREES (In Numbers)				BANANA SPECIES (In Acres)				ROOT CROPS (In Acres)					
	Breadfruit	Mango	Coconut, Others	Banana	Plantain	Pata	Other	Yam	Talo Futuna	Kape	Manioke	Kumala		
EUA														
Eua	1,573	1,160		30	190	13	-	384	361	153	41	81		
<b>TOTAL</b>	<b>1,573</b>	<b>1,160</b>	<b>-</b>	<b>30</b>	<b>190</b>	<b>13</b>	<b>-</b>	<b>384</b>	<b>361</b>	<b>153</b>	<b>41</b>	<b>81</b>		
Total area/number surveyed	1,573	1,160	-	30	190	13		384	361	153	41	81		
Area/Number damaged as per survey	1,573	1,160	-	30	190	13		384	361	153	41	81		
Average/Mean Damage (%)	0.80	0.85		0.85	0.85	0.85		0.50	0.15	0.20	0.50	0.15		
Average Yield/Area	223	100		5	3	3		5	4	2	5	4		
Average price/kg	0.3	0.3		0.5	0.4	0.25		1	0.8	0.7	0.25	0.6		
Total Estimate value of damage	84,187	29,580	-	63,750	193,800	8,288	-	960,000	173,280	42,840	25,625	29,160		

OTHER CASH CROPS (In Acres)											TOTAL VALUE OF DAMAGE (IN TS)
Vegetable	Vanilla	Peanut	Coffee	Papaya	Watermelon	Corn	Kava	OTHER CROPS OF COMMERCIAL VALUE		TIMBER TREES	
								Mulberry (Hiapo)	Pandanus (Lou'akau)		
17	180	-	2	-	90	-	235	-	521	-	
17	180	-	2	-	90	-	235	-	521	-	
17	180		2		90		235		521		
17	180		2		90		235		521		
0.30	0.40		0.30		0.30		0.10		0.10		
2	1.5	5	1	5	5	3.5	1.5				
0.7	5	10	1	0.6	0.5	0.5	18	30	10	10	
7,140	540,000	-	600	-	67,500	-	634,500	-	-	-	2,860,249

**APPENIDIX 8.8**  
**MINISTRY OF CIVIL AVIATION**

MINISTRY OF CIVIL AVIATION

**M E M O R A N D U M**

**FROM:** Secretary of Civil Aviation  
**TO:** Chairman, National Disaster Committee  
**DATE:** 29 DECEMBER 1998  
**RE:** BRIEF REPORT ON THE STATUS OF THE AERODROMES IN THE KINGDOM  
AFTER TROPICAL CYCLONE CORA VISIT.

There was no major damages reported from the outer island aerodromes except for debris and trees being blown off. All aerodromes were back to normal operation by 0630 Monday morning 28 December.

For Fua'amotu International Airport, on Saturday 26 December, due to the continuous threat of the tropical cyclone Cora to Tongatapu island, the airport was closed at 1100 hrs. The main reason is for safety.

We were advised by our meteorologist that Cora would hit Tongatapu at 1300hrs. The last flight to depart from Fua'amotu took-off at 1022hrs and Nadi Area Control was advised that Fua'amotu would be closed at 1100hrs due to hazardous weather condition. This gave us time to secure the airport facilities and send the staff home before the cyclone gets worse.

The airport was back to normal operation by 1953hrs Sunday evening with all facilities operating on standby generators. The main power was reinstated the same evening. Fua'amotu was open for flights by midnight Sunday 27 December.

There was no major operational damages at Fua'amotu. Minor damages were caused to the mechanical workshop rollers doors, light fittings and ceiling tiles in the main terminal building, ceiling tiles for the VVIP building and a few roofing iron came loose at the fire station. The cost of the repairing the damages at Fua'amotu aerodrome is estimated at T\$10,000 pa'anga.

If you need further clarification on the matter, please do not hesitate to contact.

Malo



Tevita Kaitu'u Fotu  
Airport Manager  
for Secretary of Civil Aviation

cc. Stanford Ahu

**APPENIDIX 8.9**  
**MINISTRY OF EDUCATION**



GOVERNMENT OF TONGA

---

---

**SAVINGRAM**

---

---

**From:** Director of Education

**To:** Chairperson, Disasters & Relief Committee

**Saving No.:** 10/13/8

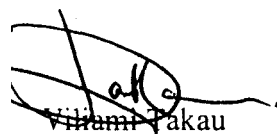
**Date:** 30 December 1998

**Subject:** Preliminary Report on Damages Sustained by Cyclone Cora: Education Sector

I am forwarding herewith the Ministry of Education's preliminary report on damages caused by Cyclone Cora to schools, both Government and Non-Government, on Tongatapu, 'Eua and Ha'apai. Kindly note that this report accounts only for schools, both primary and secondary, which reported substantial damages.

At the end of the report, please also find attached a report from the Principal of the Tonga Teachers College which was belatedly received after the main report was prepared.

For your information, please.

  
Viliami Fakau

for/ **Director of Education.**



# SAVINGRAM

From: The Principal of Tonga Institute of Education  
To: The Director of Education  
Date: 30 December 1998

Re: Estimated cost of Damages done at Tonga Teachers' College by Cyclone 'Cora' on 25 December 1998

Please be informed that Cyclone Cora had done a lot of damages at the College. Wall, door and indows of the classrooms were broken, glass windows of Rooms 3, 5 and 6 were damaged. Louvres of the library were damaged allowing rain water to pass through and some books got wet. Doors and louvres of the Hall were damaged also. Students' vegetable and flowering garden were spoilt.

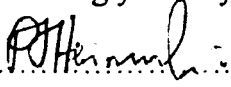
The following is the list of materials damaged and their estimated cost:-

1. 40 windows were broken .....@ \$50.00 each (louvres + plates)	2 000.00
2. 6 classroom doors were broken.....@ \$110 each	660.00
3. walls of the female and male toilets were damaged.....	3 500.00
4. roofing of some classrooms were broken (12 @ \$20.00each)...	240.00
5. protective timber for lining of the Science lab wall was broken (papa kofu moe fakatali) .....	1 800.00
6. banana trees, vegetable garden and flowering garden were very much affected and some were destroyed.....	1 500.00
Total	T\$ 9 700.00

Clearly, the College desperately needed some financial assistance to fix the above-mentioned damages for the beginning of 1999 College Academic Year.

For your information and appropriate action please.

Thanking you for your continuous assistance and support.

  
Peaua Tu'ipulotu Heimuli  
PRINCIPAL

cc Deputy Director for Post Secondary Education System

**PRELIMINARY REPORT FROM SECONDARY, POST-SECONDARY,  
PROFESSIONAL DIVISIONS: DAMAGES FROM TROPICAL CYCLONE CORA**

**TONGATAPU**

Managing Authority/ Institution	Damages	Estimated Replacement Cost (\$)
<b>I. Government</b>		
1. Tonga Maritime Polytechnical Institute	i. Pier: Rocks and boulders washed away  ii. Water Guttering: Blown off and damaged  iii. Fencing: Damaged by falling trees  iv. Capt. Klaus Thomas Memorial Hut: Completely damaged.	500.00  1,000.00  200.00  5,000.00
2. Tonga Teachers College (Also attached)	Water Guttering: Blown and damaged	2,500.00
3. Tonga High School	i. One window in computer room broken, water on floor and desks. Damage to 7 computers not fully assessed  ii. Boards below library damaged; windows blown open, water damage to library books  iii. Windows in staff room blown open - textbooks inside all wet  iv. Glass partition between Principal's and Secretary's offices broken  v. English Book Room louvres blown open, some books wet. Wall of Book Room damaged  vi. Roof of Industrial Arts block damaged	17,500.00  4,500.00  5,500.00  2,300.00  3,000.00  9,200.00

4.	Queen Salote College	i.	Windows (18) broken: Dining Hall (9), Storage Room (4), Band Room (3), Typing Room (1), Form 1 (1)	300.00
		ii.	51 louvers broken	150.00
		iii.	10 Hardboards (walls) damaged	150.00
		iv.	21 Noticeboards damaged	700.00
5.	Nuku'alofa FWPS	i.	56 Roofing sheets damaged	2,500.00
		ii.	62 louvers broken	200.00
		iii.	Lawnmower broken by fallen structures	650.00
		iv.	Roofing timber broken	400.00
6.	Houma Middle School		Staff House: Roof blown and damaged	1,000.00
7.	Tupou College	i.	Roofing Irons & Caps: Blown and damaged	8,488.40
		ii.	Timber & Wallboards damaged	7,278.20
		iii.	Roofing Nails	12,88.80
		iv.	Hardboards	1,280.00
		v.	Particleboards	1,800.00
		vi.	Glasses	720.00
<b>B. Seventh Day Adventist</b>				
1.	Beulah College	i.	School Buildings damaged	13,243.00
		ii.	Dining Hall	3,327.00
		iii.	Girls Dormitory: louvres broken	400.00
		iv.	Industrial Arts Block: louvres broken	168.00
<b>C. Anglican</b>				
1.	St. Andrews		1 Classroom completely damaged	7,300.00

<b>D. 'Atenisi</b>			
1. 'Atenisi Institute	i.	Storage shed	2500.00
	ii.	School buildings: fittings, etc.	5000.00
	iii.	Teachers' Quarters & facilities	1500.00
	iv.	Students' Quarters	1500.00
	v.	Toilet facilities	1000.00

**EUA**

<b>Managing Authority/ Institution</b>	<b>Damages</b>	<b>Estimated Replacement Costs (T\$)</b>
<b>I. Government</b>		
1. 'Eua High School	i. School Hall: Roofing irons removed	1,173.00
<b>II. Non-Government</b>		
<b>A. Free Wesleyan Church</b>		
1. Hofangahau Middle School	i. Staff House: Roof removed	1,450.00
	ii. Principal's House: Roof removed	

CYCLONE CORA: 26 DECEMBER 1998

PRIMARY EDUCATION DIVISION

SUMMARY TABLE OF DAMAGES AND ESTIMATED REPLACEMENT COSTS

DISTRICTS	ESTIMATED REPLACEMENT COSTS	COMMENTS
<b>TONGATAPU</b>		
Vahe Loto	58,800.00	
Vahe Hahake	164,610.00	
Vahe Hihifo	81,620.00	This is a partial estimate as reports from 'Atata and 'Eueiki have yet to be received.
<b>'EUA</b>		
'Eua	131,500.00	
<b>HA'APAI</b>		
Ha'apai	66,650.00	This is also a partial estimate as reports from the outer islands of Ha'apai have yet to be received due to communication difficulties.
<b>VAVA'U</b>		
Vava'u	0	The report from Vava'u has yet to be received but it is expected that damage is minimal.
<b>NIUATOPUTAPU</b>		
Niuaotupapu	0	Similarly a report has yet to come in from Niuaotupapu but it is also expected that there were no serious damages.
<b>NIUAFO'OU</b>		
Niuafo'ou	0	No report was either received from Niuafo'ou and it is also expected that damage there was also minimal.
<b>TOTAL</b>	<b>503,180.00</b>	<b>This estimate is, therefore, only a preliminary one until all reports have come in.</b>

**CYCLONE CORA. 26 DECEMBER 1998: REPORT FORM**

**PRIMARY EDUCATION DIVISION**

SCHOOL	FACILITY	DAMAGE SUSTAINED	ESTIMATED REPLACEMENT COSTS
<b>VAHIE HAHAKE</b>			
1. Atele	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
2. Veitongo	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	Gutter pipes all down and broken.	100.00
	School Resources	OK	0
	Other	1 staff house completely destroyed.	28,000.00
3. Vaini	Classrooms	Roof of two classrooms blown off. Structurally damaged.	56,000.00
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	All books destroyed.	1,000.00
	Other	OK	0
4. Malapo	Classrooms	OK	0

	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
5. Toloa	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
6. Lotolu	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	Schools Resources	OK	0
	Other	OK	0
7. Fua'amotu	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
8. Kai'avale	Classrooms	One hardboard blown down.	100.00
	Toilets	2 Toilets need to be renewed.	0



	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
9. Ha'asini	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
	Classrooms	Roof partly destroyed but building structurally damaged (2 classrooms).	56,000.00
10. Tu'aliku	Toilets	Roof blown away.	2,000.00
	Water Tanks	All gutter pipes blown away and broken.	100.00
	School Resources	OK	0
	Other	OK	0
11. Mu'a	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
	Classrooms	OK	0
12. Lapaha	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
Total			0

	School Resources	OK	0
	Other	OK	0
13. Hoi	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
14. Nukuleka	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
		Classrooms	OK
15. Talafo'ou	Toilets	OK	0
	Water Tanks	Down pipes blown off and destroyed.	200.00
	School Resources	OK	0
	Other	OK	0
16. Talafo'ou MS	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0

	Other	OK		0
17. Navutoka	Classrooms	4 broken louvers.		10.00
	Toilets	OK		0
	Water Tanks	OK		0
	School Resources	OK		0
	Other	OK		0
18. Kolonga	Classrooms	OK		0
	Toilets	OK		0
	Water Tanks	OK		0
	Schools Resources	OK		0
	Other	OK		0
19. Afa	Classrooms	OK		0
	Toilets	OK		0
	Water Tanks	OK		0
	School Resources	OK		0
	Other	OK		0
20. Niutoua	Classrooms	3 asbestos roofed classrooms damaged. Need new roof.		20.000.00
	Toilets	OK		0
	Water Tanks	OK		0
	School Resources	OK		0
	Other	OK		0

21. Holonga	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
22. Folaha	Classrooms	30 broken louvers; 8 pairs of louver frames.	500.00
	Toilets	Roof blown off.	500.00
	Water Tanks	Gutter pipes blown off and broken.	100.00
	School Resources	OK	0
	Other	OK	0
23. Longoteme	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
<b>TOTAL</b>			<b>164.610.00</b>

VAHE LOTO			
1. Kolomotu'a	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
2. Longolongo	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
3. Havelu	Classrooms	1 Blackboard blown off; broken louvers.	200.00
	Toilets	OK	0
	Water Tanks	Broken gutter pipes and down pipes.	100.00
	School Resources	OK	0
	Other	Trees blown down.	0
4. Fanga	Classrooms	Broken louvers.	100.00
	Toilets	OK	0
	Water Tanks	Broken gutter pipes.	100.00
	School Resources	OK	0
	Other	Trees blown down.	0
			0

5. Nuku'alofa	Classrooms	1 classroom completely destroyed; broken louvers and windows.	30,000.00
	Toilets	OK	0
	Water Tanks	Gutter pipes blown off and broken.	200.00
	School Resources	OK	0
	Other	3 breadfruit trees blown down.	0
6. Tonga Side School	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
7. Fasi	Classrooms	1 classroom structurally damaged.	28,000.00
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
8. Ngele'ia	Classrooms	Roof damaged.	100.00
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
9. Popua	Classrooms	OK	0

	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
10. Ma'ufanga	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
<b>TOTAL</b>			<b>58,800.00</b>

VAHE HIIHIFO			
1. Atata	Classrooms	No report yet.	No report received yet.
	Toilets		
	Water Tanks		
	School Resources		
	Other		
2. Eueiki	Classrooms	No report yet.	No report received yet.
	Toilets		
	Water Tanks		
	School Resources		
	Other		
3. Tokomololo	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
4. Pea	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0



5. Ha'alalo	Classrooms	OK		0
	Toilets	5 all leaning side ways. Needs to be straightened.		Needs labour only.
	Water Tanks	OK		0
	School Resources	OK		0
	Other	OK.		0
6. Houma	Classrooms	OK		0
	Toilets	OK		0
	Water Tanks	Broken gutter pipes		100.00
	School Resources	OK		0
	Other	OK		0
7. Kahoua	Classrooms	OK		0
	Toilets	OK		0
	Water Tanks	OK		0
	School Resources	OK		0
	Other	OK		0
8. Fahefa	Classrooms	OK		0
	Toilets	OK		0
	Water Tanks	OK		0
	School Resources	OK		0
	Other	OK		0
9. Matahau	Classrooms	1 classroom structurally damaged.		28,000.00
	Classrooms	OK		0
	Toilets	OK		0
	Water Tanks	OK		0
	School Resources	OK		0
Other	OK		0	

	Toilets	Roof of one toilet damaged.	200.00
	Water Tanks	OK	0
	School Resources	Books for Class 3 all destroyed.	500.00
	Other	Timber trees blown down.	0
10. Kolovai	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	Trees blown down against classrooms.	0
	Classrooms	1 classroom structurally damaged. All furniture damaged. 4 doors destroyed.	35,000.00
	Toilets	2 toilets destroyed.	5,000.00
	Water Tanks	All gutter pipes blown down and broken.	200.00
	School Resources	All books destroyed in 1 classroom.	500.00
	Other	OK	0
11. Kanokupolu	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
	Classrooms	OK	0
	Toilets	OK	0
12. Ha'atafu	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
13. Te'ekiu	Other	OK	0
	Classrooms	OK	0
	Toilets	OK	0

	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
14. Fatai	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	School fence damaged by falling trees.	500.00
15. Sia'atoutai	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
16. Puke	Classrooms	1 Roofing iron removed.	20.00
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
17. Hofoa	Classrooms	Verandah of 2 classroom block blown away and roof damaged as consequence. Upper front wall of 3 classroom block damaged. New wall needed.	10,000.00 3,000.00
	Toilets	Doors (6) blown down.	600.00

	Water Tanks	OK	0
	School Resources	Books wet.	1000.00
	Other	OK	0
<b>TOTAL</b>			<b>81,620.00</b>

**CYCLONE CORA, 26 DECEMBER 1998: REPORT FORM**

**PRIMARY EDUCATION DIVISION**

SCHOOL	FACILITY	DAMAGE SUSTAINED	COMMENTS
<b>VAHE HA'APAI</b>			
1. Pangai/Hihifo	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
2. Koulo	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
3. Fotua	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0

4. Faleloa	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
5. Ha'ano	Classrooms	OK	0
	Toilets	2 toilets completely destroyed.	6,000.00
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
6. Mata'aho	Classrooms	3 roofing irons to be replaced.	50.00
	Toilets	OK	0
	Water Tanks	Gutter pipes all destroyed.	100.00
	Schools Resources	OK	0
	Other	1 staff house completely destroyed.	30,000.00
7. Fakakakai	Classrooms	No report yet.	0
	Toilets		0
	Water Tanks		0
	School Resources		0
	Other		0
8. Mo'unga'one	Classrooms	18 pairs of lumber frames needed. 6 roofing caps needed.	500.00

	Toilets	OK	OK	0
	Water Tanks	OK	OK	0
	School Resources	OK		0
	Other	1 staff house completely destroyed.		30,000.00
9. Fotuha'a	Classrooms	No report yet.		0
	Toilets			0
	Water Tanks			0
	School Resources			0
	Other			0
10. Ha'afeva	Classrooms	No report yet.		0
	Toilets			0
	Water Tanks			0
	School Resources			0
	Other			0
11. Kotu	Classrooms	No report yet.		0
	Toilets			0
	Water Tanks			0
	School Resources			0
	Other			0
12. Manuku	Classrooms	No report yet.		0
	Toilets			0

	Water Tanks			0
	School Resources			0
	Other			0
13. 'O'ua	Classrooms	No report yet.		0
	Toilets			0
	Water Tanks			0
	School Resources			0
	Other			0
14. Tungua	Classrooms	No report yet.		0
	Toilets			0
	Water Tanks			0
	School Resources			0
	Other			0
15. Nomuka	Classrooms	No report yet.		0
	Toilets			0
	Water Tanks			0
	School Resources			0
	Other			0
16. Fonoifua	Classrooms	No report yet.		0
	Toilets			0
	Water Tanks			0
	School Resources			0
	Other			0



	School Resources		0
	Other		0
17. Mango	Classrooms	No report yet.	0
	Toilets		0
	Water Tanks		0
	School Resources		0
	Other		0
18. Lofanga	Classrooms	No report yet.	0
	Toilets		0
	Water Tanks		0
	Schools Resources		0
	Other		0
<b>TOTAL</b>			<b>66,650.00</b>

**CYCLONE CORA: 26 DECEMBER 1998: REPORT FORM**

**PRIMARY EDUCATION DIVISION**

SCHOOL	FACILITY	DAMAGE SUSTAINED	ESTIMATED REPLACEMENT COSTS
<b>VAHE 'EUA</b>			
1. Ha 'atu 'a	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
2. Angaha	Classrooms	Roof of 2 classrooms damaged completely.	8,000.00
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	All resources in these two classrooms destroyed.	1,000.00
	Other	OK	0
3. 'Ohonua	Classrooms	2 classrooms completely destroyed and 2 more structurally damaged.	120,000.00
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0

4. Tufuvai	Classrooms	OK	0
	Toilets	OK	0
	Water Tanks	OK	0
	School Resources	OK	0
	Other	OK	0
5. Hourma	Classrooms	Roof of one classroom damaged.	1,000.00
	Toilets	All doors blown away.	500.00
	Water Tanks	OK	0
	School Resources	Classes 1 and 2 resources all gone.	1,000.00
	Other		0
<b>Total</b>			<b>131,500.00</b>

**APPENIDIX 8.10**  
**MINISTRY OF FISHERIES**

**GOVERNMENT OF TONGA**

**SAVINGRAM**

---

To Secretary, Hurricane Relief Committee  
From Secretary for Fisheries  
Saving No. Hurricane Cora.

Date : 31 December, 1998

---

The following is a quick assessment of the damage sustained by the Ministry of Fisheries.

**Sopu Headquarters.**

Roof of the Boatyard Office lifted off.

Roof damage to the Engineering section and Stores

Roof damage to Nursery.

All electricity and telephone lines down as a result of collapse of pole to Sopu. Urgent repairs needed as external communications including Ha'apai and Vava'u stations operated through email or telephone. No power to Headquarters. Aquaculture section for nursery running on standby emergency generator.

**Tuimatamoana Market**

Guttering down. Needs urgent repair as guttering needed for the tanks, which provides water to the fresh water tanks for the refrigeration plant.

Estimated costs of repairs to roofing and guttering \$15,000.

**Vava'u**

No report received yet due to communication problems.

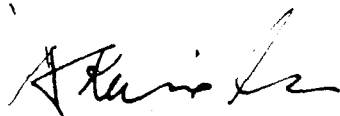
**Ha'apai.**

No report received yet due to communication problems. Reports from Nomuka and Ha'afeva will depend on electricity supply being re-established in Sopu.

**Niutoputapu**

No report received yet due to communication problems.

This preliminary report will be consolidated once proper communications have been established with the Outer Island offices.



'Akau'ola.

**APPENIDIX 8.11**  
**MINISTRY OF HEALTH**

**TO:** Director of Health thru A/CMO (PHD)  
**FROM:** Acting Supervising Public Health Inspector  
**DATE:** 29<sup>th</sup> Dec. 1998  
**Subject:** **EMERGENCY ENVIRONMENTAL HEALTH SURVEY  
FOLLOWING THE CYCLONE KORA HIT TONGA ON 26/12/98**

This Section conducted a preliminary survey of the Sanitation aspect on Sunday 27/12/98 following the cyclone Kora visited Tongatapu on Saturday 26<sup>th</sup> December 1998.

The investigation team split in two for both Western and Eastern part of Tongatapu.

However, the following activities were covered.

1. **WATER SUPPLY:**

The following village water supplies were minor & major damaged by the cyclone, details are:

- |   |                  |   |                                    |
|---|------------------|---|------------------------------------|
| * | 1. Lapaha        | - | electric motor went off            |
| * | 2. Tatakamotonga | - |                                    |
| * | 3. Haveluliku    | - |                                    |
|   | 4. Fatumu        | - | distribution pipe cut off (2" PVC) |
|   | 5. Lavengatonga  | - | inlet pipe damaged (Galv. 2")      |
| * | 6. Nakolo        | - | electric motor went off            |
|   | 7. Pelehake      | - | wooden Pump Shed blown off         |
|   |                  | - | Iron roof (tank) blown off         |
|   | 8. Alakifonua    | - | wooden Pump Shed blown off         |
| * | 9. Longoteme     | - | electric motor went off            |
|   |                  | - | Pump Shed blown off                |
|   | 10. Nukuhetulu   | - | electric motor went off            |
|   | 11. Folaha       | - | electric motor went off            |
|   |                  | - | Pump Shed blown off                |
|   | 12. Pea          | - | electric motor went off            |
|   | 13. Lomaiviti    | - | Pump Shed blown off                |
|   | 14. Utulau       | - | Pump Shed blown off                |
|   | 15. Houma        | - | Pump Shed blown off                |
|   |                  | - | Tank roof blown off                |

2.

- 16. Kala`au - Pump Shed blown off
- \* 17. Te`ekiu - electric motor went off
- 18. Nukunuku - Pump Shed blown off
- \* 19. Fatai - electric motor went off  
tank roof blown off

2. **SANITATION:**

Most of the land were flooded but this inspection concentrated to low lying areas and expecting of mosquito and flies population explosion. Other vectors or vermins is also expected.

Detail estimation is in the second part of this report.

3. **GARBAGE COLLECTION:**

High peak density of refuse flooded especially leaves were found over the land. Disposal site at Tukutonga mounted higher and expecting more and more income day and night. Road way to the dump is damaged and need repair to make it accessible to the huge flow of vehicles moving garbage and debris to the dumping area. Estimation is in the second part of this report.

4. **FOOD SANITATON:**

Due to power lines damaged by the cyclone, most of the island supply went off, there is an expecting of freezing problems of meat and other food products.

Public were advise of this problem may occur during this time.

Other damage foodstuff may inspected when its come to hand.

**IMMEDIATE MEASURES APPLIED FOLLOWING TROPICAL CYCLONE  
KORA**

**Activities**

**Approximate Cost**

1. **WATER SUPPLY**

- 1.1 Replacement of tank Roofs of 3 villages water tank 5000 Gals in capacity. - T\$ 900 . 00
- 1.2 Replacement of Pump Shed for 9 villages water supply 10' x 10' dimension. - T\$4500 . 00



### 3.

1.3	3 moveable Standby Generators (3 phases) to replace the power while is down in 9 villages water supply.	-	T\$4500 . 00
1.4	2" Galvanise pipe & fittings to replace the broken in 2 village water supply.	-	T\$ 270 . 00
1.5	Water treatment chemical 50,000 - chlorine tablets.	-	<u>T\$2500 . 00</u> <b>T\$12670.00</b>

## 2. SANITATION

Due to heavy rain caused flooding and favourably required by vectors breeding activities, and is expected explosion of population.

2.1	3 Insect spraying machines	-	T\$2700 . 00
2.2	100 Liters of insecticide	-	<u>T\$2400 . 00</u>
<b>Total =</b>			<b>T\$5100 . 00</b>

## 3. GARRAGE COLLECTION SERVICE:

3.1	Upgrading roads to dumping area - 20 Uncrushed Gravel.(Trucks)	-	T\$ 900 . 00
3.2	Upgrading Sludge Beds and road -	-	T\$1500 . 00
3.3	Excavating 25 hours	-	T\$2125 . 00
3.4	Bull dozing & levelling 15 Hours	-	T\$1350 . 00
3.5	50 Trucks of Clay Soil to layer cover the Refuse.	-	T\$1250 . 00
3.6	20hrs of End Loader to level the Refuse.	-	T\$1300 . 00

4.

3.7 Transport & Labour cost (this service missed out in 1998 - 99 FY estimate). - T\$3000.00  
Total = T\$11,425.00

GRAND TOTAL = T\$29,195.00

**Note: This report and estimation is only for Tongatapu, other islands is not included**

**CONCLUSION & RECOMMENDATION:**

- There is a need to re – enforce the on – the – spot community education by regular relevant educational radio programmes.
- Prolong power failure to 9 electric motor supply is need “**urgently**” the movable generators to avoid other health problems (waterborne diseases).
- Upgrading of Gertage Collection Demands to be well assessed and provide needs to meet the demand.
- In the wake of mosquito/fly population explosion and of course Dengue Fever acknowledged from neighbour country (Fiji). Supply is very important to provided urgently.
- Provision of replacement of the damage supplies to community supply
- Refrigerated Food Staff should be take into account in inspection and other possibilities may occur.

Yours sincerely

  
.....  
LATU SATEKI TELEFONI

Acting Supervising Public Health Inspector

**APPENIDIX 8.12**

**MINISTRY OF LAND, SURVEY & NATURAL RESOURCE**

"CYCLONE CORA" REPORT  
TO THE  
NATIONAL DISASTER COMMITTEE  
ON  
DAMAGES TO THE OFFICES  
OF THE  
MINISTRY OF LANDS, SURVEY AND NATURAL  
RESOURCES at VUNA ROAD

Date: 30 December 1998

## **1. INTRODUCTION**

This report summarizes major structural damages occurred in the Government offices occupied by the Ministry of Lands, Survey and Natural Resources (MLSNR) during the sojourn, in the country, of the tropical cyclone. "COR4". As presented, to the meeting of the National Disaster Management Committee on Monday 28 December 1998, by the manager of the Meteorological Service, Tropical cyclone CORA ravaged the southern islands of the Tonga group for most of Saturday 26 December 1998.

The estimated gale force wind of 75 miles/hour and the associated slow movement of the cyclone inflicted moderate to severe damages to both private and civil infrastructures in Tongatapu, Ha'apai and 'Eua and crops trees and so on in all the islands in the country. Some were unable to combat the strength of the wind and were either defaced or completely pulled-down. Others managed to survive; however, some kind of structural damages must have been inflicted.

Given the location and the nature of the structure of the Government offices occupied by the MLSNR, substantial damages were experienced and immediate rectification is recommended in order to prevent further destruction of valuable tools and equipment (computers, printers, seismographs etc.) and records (maps, files, surveyors' field notes, public registers etc).

## **2. ACTUAL DAMAGES**

This report presents two particular types of damages to the above offices as follows:

### **2.1. Geology Section Office**

The Geology Section of the Ministry is housed in a two-story building located to the southern side of the main administration building at Vuna road. The building is basically made of concrete but with corrugated-iron roofing and hardboard ceiling.

Apart from housing valuable instruments such as computers, printers, photocopiers, seismograph, hydrogeological meters etc., the building also contained valuable records in connection with the hydrocarbon promotion program implemented by the government since the early 1970's. All of these valuable assets are greatly treasured by the government and would become great losses if are not well looked after by those concerned.

Almost all of the roofing has gone and valuables within the building are left open to water at times. All efforts have been made to remove and keep the equipment, material and information in a temporary safe place.

### **2.2. Top floor of the administration building.**

This floor of administration building serves as the main office for the Ministry accommodating office spaces for Hon. Minister of Lands, Survey and Natural Resources, the Secretary, the Administration and Accounting, and the Land Management Division (Drafting and Computing Sections).

Although the building is basically concrete (wall and floor) windows are made of aluminum louver frames and glass enclosures. This type of windows has been proved ineffective in times of strong wind because water could easily forced its way to the interior of the building. In view of the above, maps, computers, printers, files, registration books and other valuables were covered with water during the period of the cyclone. Similar experiences happened

before (cyclones in 1982 and 1997) and this should not be allowed to happen again as complete deterioration of the above would become costly indeed to the government.

**3. Estimates of potential Rectification.**

Costs involved are as follows:

**(1) Priority One Issue: Geology Building**

(1) Roofing	T\$ 2000
(2) Ceiling	500
(3) Electrical	400
(4) Labor	1000
<b>Total</b>	<b>T\$3,900</b>

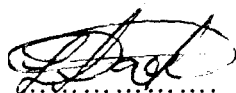
**(2) Priority Two Issue: Main Office**

(1) Aluminum windows (Entire floor)	T\$ 20,000
(2) Wooden shutters	T\$ 3,000
(3) Labour	T\$ 5,000
(4) Roofing	T\$ 25,000
<b>Total</b>	<b>T\$ 53,900</b>

**Recommendations.**

1. That the National Disaster Committee seriously considered the rectification of the above damages gives that serious consideration.
2. That priority is given to rectification of damages in the Geology Section Building.

Respectfully submitted



(Dr Savae Latu)

Secretary for Lands, Survey and Natural Resources



Cc: Honourable Tu'i'afitu  
Minister of Lands, Survey and Natural Resources

**APPENDIX 8.13**  
**MINISTRY OF MARINE AND PORTS**

## MINISTRY OF MARINE AND PORTS

### DAMAGES FROM CYCLONE "CORAL" DECEMBER, 1998

#### **KU'ALOFA HARBOUR**

##### **Navigation Aids**

##### **Estimated Cost**

- |    |   |         |
|----|---|---------|
| a. | No. 1 buoy has shifted closer to the Eastern edge of Hakau Mama'o Reef  | \$500   |
| b. | No. 2 buoy is missing   | \$15000 |
| c. | No.3 buoy has shifted to about ½ mile west of its Chartered position  | \$500   |
| d. | Light on Pile near No.3 Buoy has broken lens  | \$100   |
| e. | Three red beacons to North West of Fafa Island are missing  | \$300   |
| f. | One red beacon at Southern End and the small flashing green Beacon at the Southern Eastern corner of Mounu reef are missing | \$2000  |
| g. | One red beacon at North West Corner of Ualanga 'Uta Missing   | \$100   |
| h. | One green beacon on the Eastern Side of Ualanga Lalo is Missing   | \$100   |
| i. | One green and one red beacons between Pangaimotu and Makaha'a Islands are missing   | \$200   |
| j. | One red beacon at the Narrows is missing  | \$100   |

##### **Ships Aground in Port**

- |    |  |         |
|----|--|---------|
| a. | Two Sea Star fishing boats (Sea Star 2 and Jag No.8) are Aground on the reefs of Mala'e Aloa | \$10000 |
| b. | One yacht grounded on Northern Causeway of Fuaa Harbour Basin                                | \$500   |



## Port Facilities

### a. Q.S. Wharf

-	damage to surfaces of No.1 & No.2 berths from containers and loose cargo blown by wind	\$5000
-	slight damages to about 10 containers	-
-	some cargo damages	-
-	some fenders damaged by No.1 & No.2 berths (about 3)	\$2000
-	some fenders damaged by No 3 & 4 berths (about 10)	\$4000
-	eastern revertments & rock armour heavily scoured by waves	\$5000
-	eastern gate rock armour heavily scoured by waves	\$1000
-	eastern rock armour by bollard heavily scoured by waves	\$1000
-	No.1 shed ventillation hats all missing	\$1000
-	No.2 shelter, roof stripped of 3 roofing sheets	\$200
-	No.2 shed, one door by South Eastern loading bay broken	\$500
-	No.3 berth corner with No.2 berth damaged concrete	\$5000

### b. Faua Basin

-	rock amouring on the Southern and Western side of the basin are damaged	\$50 00
-	bollard by berth for tour boats damaged	\$5000

**Sub-Total** **\$64100**

## BUA (NAFANUA)

1.	Wharf - slight damage	-
2.	Rock armouring – about 20% damage	\$10,000
3.	Navigation Aids	\$5000

**Sub-Total** **\$15,000**

C HA'AFEVA (PULOTU)

1. Wharf more than 80 % damaged \$750,000

2. Navigation Aids \$2000

Sub-Total \$752,000

PANGAI HA'APAI, (TAUFA'AHAU WHARF)

1. Wharf - Southern ramp and rock armour about 30% damaged \$20000

2. Navigational Aids \$2000

Sub-Total \$22,000

NEIAFU VAVA'U (HALAEVALU WHARF)

1. Wharf - slight damage -

2. Navigational Aids -

NIUAFO'OU

1. Wharf (No report) -

NIUATOPUTAPU

1. Wharf *Damage to surface* (No damage reported) \$ 2,000

2. Navigational Aids -

~~TOTAL~~ \$853100

+ 2000

TOTAL = \$855,100

**APPENIDIX 8.14**  
**MINISTRY OF POLICE**

GOVERNMENT OF TONGA

**SAVINGRAM**

**From :** Potungäue Polisi  
**To :** Komiti Tokoni Afä moe ngaahi Faingata'a Fakaenatula"  
**Date :** 30 Tisema, 1998.

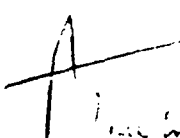
---

**'ULUAKII LIPOOTI 'A E POTUNGAUE POLISI KI HE SAIKOLONE KO  
"COLA".**

- (i) 'Oku u faka'apa'apa mo fakahoko atu kiate kimoutolu 'a e 'uluaki Lipooti (preliminary report) 'a e Potungäue Polisi felave'i mo e ngäue tokoni na'e fai ki he Saikolone ko "COLA". Na'e tö 'i Tonga 'i he 'aho 26 Tisema, 1998.
- (ii) 'Oku hä foki he fakamatala ni 'a e ngäue taimi kakato 'a e Potungäue Polisi ki he malu'i 'o e mo'ui mo e koloa 'a e kakai lolotonga 'a e Saikolone, pehē ki he fakamatala fakalukufua ki Tongatapu, Niuafou, Niuatoputapu, Ha'apai pea mo Vava'u.

Faka'apa'apa atu,

*Koe tutu emi se  
Mina Report kuo isi  
ape ki he Esi Palenia.*



P.K. TU'HALAMAKA

Officer Commanding Police Training School

Pule Tamateafi

**Ma'ae Komanitā Polisi.**

## TALATEU

kamata e ngāue taha 'a e kau Polisi ki he Saikolone CORA 'i he taimi 0900 hrs 'o e 'aho 26 Tisema, 1998 'o toki māhōlō ki he 2200 hrs po'uli 'o e 'aho 'ataau, hili ia e mahino kuo mevahe atu 'a e matangi ni, ko e vaha'a taha 1530 hrs ki he 1830 hrs na'e ongo'i lahi lava ai 'a e malehi ko ia 'a e matangi 'i Tongatapu. Na'e ngāue 'a e Potungāue Polisi ki hono tokoni'i mo fakahaofi ha mo'ui mo malui 'a e koloa 'a e kakai. Na'e te'unga mo e kau Polisi 'e 100 tupu ne nau ngāue taimi kakato 'i he vaha'a taimi ko ia na'e fetaulaki ai 'a e Pule'angā ni mo e Saikolone ko CORA, pea toe fakahoko mo e ngāahi fatongia hili ko ia 'a e saikolone 'a ia ko hono fakamā'opo'opo mo fakama'au 'a e maumau ko ia na'e hokó. 'Oku eu fie fakahā heni na'e 'ikai 'i ai ha mo'ui 'e mole tupu mei he matangi ni, tukukehe pē 'a e fakamatala mei Ha'ap ni felave'i mo e vaka na'e folau mei Pangai ki 'Uiha 'i he taimi 6pm efiafi 'o e 'aho 25 Tisema 1998, 'o toki mahino moai 'i he taimi 0800 hrs 'o e 'aho 27 Tisema, 1998 ne nau tū'uta mo'ui pē ki 'Uiha, hili ia 'enau bake 'i Uoleva. Ko e kakai lalahi 'e toko 6 mo e pēpē 'e 1. Na'e 'ikai toe ma'u 'e he Potungāue ni ha fakamatala pē lipooti ha lavea lahi ne hoko tupu mei he matangi.

## KO E MAUMAU FAKALUKUFUA

### A. VĀHENGĀ NUKU'ALOFA

- (i) **Loto Nuku'alofa** - Na'e 'i ai 'a e maumau ki he fanga ki' fakakoloa 'e 10 pea si'i ange 'i he Hala Taufā'ahaŪ, Hala Uelingatoní, Hala Lēlufē, Ma'ufanga pea mo Tofoa, ka na'e 'ikai ke 'i ai ha koloa 'e kaiha'asi koe'uhí na'e 'osi vahevahe pē 'a e kau Polisi ke le'ohi 'a e ngāahi konga hala mo e feitu'u takitaha.
- (ii) **Tāfea** - Tupu mei he hake 'a e tahi mo e 'uhā na'e tāfea ai 'a e konga lahi 'o Sopa, feitu'u lalo 'o Kolomotu'a kau ai 'a Hala'ovave pchē foki ki Pātangata pea mo Popua. Na'e tokoni 'a e kau Polisi ki he fetukutuku 'a e ngāahi fāmili 'e 12 pē ofi ai 'i Pātangata mo Popua. Ko e fetukutuku ni na'e fai pē ki hono

fāmili pē mo e ngaahi fale na'e faingamālie. Na'e 'i ai foki mo e fetukutuku ha ngaahi fāmili 'i Sopa. Ko e mea na'e mahūō na'e mateuteu 'a e koka'i, pea na'e 'i ai pē mo e taimi se'unga ke fai ai 'a e fetukutuku kimu'a oca toki tō mai 'a e matangi La Cora. Na'e 'i ai 'a e fanga kii fale fanga 'aki 'a e milemila mo e puha pepa 'i Pātangata na'e Holoki 'e he matangi, pea mo e konga lahi 'o e ngaahi 'api 'i Pātangata mo Fopua na'e uesia 'e he matangi pea mo e ma'olunga 'a e tahi. Na'e hake foki e tahi 'i fanga'uta 'o uesia 'a hono ngāue'aki 'o e Hala Tafafāhau mei Fanga 'o a'u ki he Falemahaki Vaiolā pea uesia ai mo e ngaahi fale nofo'anga 'i Lavengamalie. Na'e vave 'aupito 'a e matuku 'a e ma'olunga 'o e vai 'o mahino ko e konga lahi 'o e ngaahi tāfea na'e tupu mei he "tahi lahi".

#### **VAHE LOTO:**

Na'e mahino pē hono uesia e ngaahi fale nofo'angā 'i hono hae 'e he matangi, kā ko e maumau na'e hā sino mai, ko e tāpuni 'o e ngaahi Hala pule'angā 'i Tokomololo pea pehē ki he vaha'a 'o Tokomololo ki 'Utulaū, 'o kau ai mo e hala pule'anga mei Tokomololo ki Liahonā mo e vaha'a 'o Liahona ki Matahaū koe'uni ko e 'ulu 'akau mo e niu na'e holo 'o tāpuni 'a e hala pule'angā.

#### **VAHE HIHIFO:**

Ko e ngaahi kolo na'e uesia lahi taha 'e he matangi, na'e kamata ia 'i Nukunuku 'o a'u ki Kanokupolu, kae tautautefito ki Kanokupolu pea mo 'Āhau. Na'e lahi e 'u maumau ki he ngaahi fale nofo'anga 'i Kanokupolu, pehē ki he 'api lautohi. Ne hā foki pea mo e hake 'a e tahi 'i Kanokupolu 'o ngata mei he hala Pule'angā.

#### **VAHE HAHAKE:**

Na'e kamata 'a e 'ilonga 'a e maumau ki he ngaahi fale nofo'angā mei Pea, Ha'ateiho 'o hā lelei ia 'i Vaini, 'i hono hae 'e e 'ato 'o e konga lahi 'o e Kolisi ko Beulah. Na'e 'ikai hā ha 'u'u maumau lahi ki he ngaahi fale nofo'anga 'i Malapoō pea pehē ki Pelehake, kā koe konga 'o

Fua'amotu, Nakolo mo e ngaahi kolo he Hala Liku na'e fu'u uesia 'aupito 'a e ngaahi fale nofo'anga 'e he matangi tupu mei he'ene teka hake 'o tu'u faka-Tonga Hahake he taimi na'e 'alu ai.

- E. (i) Kuo ma'u e fakamatata mei 'Eua na'e uesia lahi 'aupito e fanga Fonua ka 'oku te'eki ai ke ma'u mai ha fakamatata fekau'aki mo e lahi 'o e mauma'u.
- (iii) Ko e toenga 'o Hahake tautautefito ki he ngaahi kolo 'oku tu'u 'i he hala matatahi tautautefito ki Talafone mo Manuka 'a hono uesia 'o e ngaahi fale nofo'anga. Na'e afuhi 'e he tahi 'a e konga lahi 'a e ngaahi ngoue'anga mo e hala pule'anga 'i he ngaahi kolo matatahi, ka na'e 'ikai ke motuhia ai e fe'alu'aki he hala pule'anga. Ko e konga si'i pe 'o e Palasi 'i Lafalafa na'e kamata ke haea ka na'e fakafiemalie pe, pehe ki he palasi 'i Fua'amotu. Na'e 'ikai uesia 'a Tufunahina pea pehe foki ki he Vila.

F. **FANGA KI'I 'OTU MOTU**

'Oku kau heni 'a 'Atata, 'Eueiki mo e ngaahi motu nofo'i. 'I he lolotonga ni 'oku te'eki ai ke ma'u 'e he Potungäue Polisi ha fakamatata felave'i mo ha mole ha mo'ui pe lavea mei ha motu nofo'i. 'Oku te'eki foki ke ma'u 'e he Potungäue ha fakamatata fekau'aki mo e 'otu motu ni ka 'oku mahino mai na'e uesia he na'e fou ofi mai 'a CORA ki Tongatapu ni 'i he taimi na'e fou faka-Tonga Hahake ai.

G. **FETU'UTAKI 'I HE HALA PULE'ANGA:**

Na'e 'i ai e motuhia 'i he fetu'utaki 'i he hala pule'anga tautautefito ki Vaheloto pea mo Hihifo kac'uma'a 'a Hahake tupu mei he holo 'a e 'akau mo e 'ulu niu he hala pule'anga tautefito ki he 'elia 'oku ha atu 'i he palakalafi "B".

'I he 'aho 27 Tisema, 1998 na'e kamata ngaue 'a e kau Polisi ki hono faka'ata'ata mo hono fakafaingamalie 'i 'a e ngaahi hala pule'anga 'i Tongatapu ni, 'o a'u ki he taimi 12 ho'ata 'o e 'aho tatau pe kuo 'ata 'a

e ngaahi hala pule'anga 'o Tongatapu ni mei Hahake ki Hihifo ki he fetu'utaki. Na'e tokoni foki ki he ngäue ni 'a e nūsini teke mo e loli mei he Potungäue Ngäue pea 'oku fai ai 'a e fakamälö ki he fetokoni'aki ko ia.

### **MAUMAU KI HE NGOUE'ANGA**

'Oku 'i ai 'a e fakafuofua fakalukufua ki Tongatapu ni mei Hahake ki Hihifo ko e konga lahi 'o e ngoue'anga tautautefito ki he mei, siaine, hopa etc. (fakafuofua ki he pēseti 'e 80 - 85) kuo maumau pea ngali 'e 'ikai hano toe 'aonga.

### **TOENGA 'O TONGÄ NI (NIUAFO'OU, NIUATOPUTAPU, HA'APAI MO VAVA'U)**

Na'e mahino mei he ngaahi fakamatata na'e 'omai mei he ngaahi 'apitanga polisi 'i he vähenga takitaha na'e 'ikai a'u e malohi 'o e matangi mo e maumau, ki he maumau 'i Tongatapu ni. Ko e maumau 'i he ngaahi vahefonua ni na'e mei lahi ki he ngoue kai mo e ngoue fua tukukehe pe 'a Vava'u. Na'e lipooti mai mei Vava'u 'a e maumau ki he ngaahi 'api nolo'anga mo e täfea tupu mei he ma'olunga 'a e tahi 'i Ovaka mo Matamaka kä na'e 'ikai ke 'i ai ha mo'ui 'e mole pe ha lava 'e lipooti mai. 'Oku 'i ai e tui 'e 'i ai e maumau 'i Nomuka koe'tuhi he na'e ofi 'aupito 'a e vähengä ni ki he halanga matangi.

### **MAUMAU KI HE NGAahi 'APITANGA POLISI**

#### **i) Vähenga Nuku'alofä**

Koe ngaahi maumau 'i he vähenga Nuku'alofä na'e täfea 'a e 'Api Polisi Lotolotö pea na'e uesia ai 'e he vai 'a e faliki 'o e ngaahi 'ofisi.

#### **ii) 'Apiako Polisi**

Na'e täfea foki mo e 'Apiako Polisi 'i Longolongö pea na'e maumau 'i he vai 'a e 'ofisi Headquarters mo e ngaahi 'ofisi 'i ai, pea mo e ngaahi falenolo'anga (Police Quarters) 'i he



'apitanga ni. Na'e toe haca foki mo e 'ato 'o e fale ifi mo e fale nofo'anga 'o e Kau Polisi Talifaki (Police Mobile Unit).

**iii) Vahe Hahake**

Na'e lipooti mai na'e uesia 'e he vai 'a e ngaahi 'ofisi 'o e fale polisi 'i Mu'a, pea na'e kamata haca mo e fale ka'a (garage).

**iv) Vahe Hihifo**

'I he vahenga Hihifo na'e toe uesia 'e he vai 'a e ngaahi 'ofisi pea mo e 'ato 'o e fale nofo'anga 'o e 'ofisa pule vahenga. Na'e maumau 'a e matapa'ahi 'o e fale polisi mo ha ngaahi matapa'ahi sio'ata tupu mei he ma'olohi 'a e matangi mo e 'uhā.

**v) 'Eua - Angaha Station**

Na'e ma'u e fakamatala mei 'Eua, na'e haca e 'ato mo e pimi 'o e falepolisi 'i Angaha'a. Ko 'Oho'ua na'e maumau'i pe 'a e fale tau'anga me'alele 'o e 'apitanga ni.

'Oku 'i ai e tui kuo maumau'i 'e he afa'a mo e fale polisi 'i Nomuka koe'uhā na'e ofi 'aupito ki he halanga matangi ka 'oku te'eti fakapapau'i. Na'e 'ikai maumau 'a e toenga 'o e ngaahi 'Apitanga Polisi 'i Tonga ni, Vava'u mo Ha'apai. Ko e mahu'inga 'o e maumau ki he ngaahi 'Apitanga Polisi ne u lave ki ai 'oku (T\$14,500.00.) = \$62,640.00 <sup>At.</sup>

'Oku 'i ai 'a e fakama'alo kia Hou'eiki 'no e kakai 'o e fonua pea mo e ngaahi Potungäue 'a e Pule'anga 'i he ngäue fetokoni'aki mo e Potungäue Polisi lolotonga e tö e matangi ko "CORA".

**TONGA POLICE FORCE**

**From :**

**To :**

**Date :**

Ko e ngaahi fakamatala fakapa'anga (Estimates) fakafuofua ki he ngaahi maumau ne hoko ki he ngaahi 'apitanga Polisi 'i Tongatapu ni, 'i he Saikolone ko "COLA" ne tō 'i he 26 Tisema, 1998.

S/No.	'Apitanga	Maumau	Mahu'inga fakapa'anga	Fakamatala Makehe
1	Police Training School	Roofing, ceiling, windows, cutter	\$23,324.00	
2.	Central Police Station	Floor tiles, windows	10,620.00	
3.	Nukunuku Station	Roofing, ceiling, floor tiles, water tank, septic tank, door, windows	8,934.00	
4.	Houma Station	Electrical, water, windows, ceiling,	3,232.00	
5.	Mu'a Station	Cutter, facia board, water bump, windows	2,830.00	
6.	Vaini Station	Roofing, ceiling, facia board, door	8,820.00	
7.	Dog Section	Toilet, roofing, water tank, windows	4,880.00	
		<b>TOTAL</b>	<b>\$62,640.00</b>	

8 FIRE SERVICE Roller Door = approx 7 \$ 4000.00

*[Signature]*  
29/12 '98

**APPENIDIX 8.15**  
**MINISTRY OF WORKS**

**GOVERNMENT OF TONGA**

**S A V I N G R A M**

**From:** Director of Works

**To:** Chairman National Disaster Management Committee

**Ref:** MW/44/90/98

**Date:** 29<sup>th</sup> December 1998

**RE: CYCLONE CORA PRELIMINARY SURVEY**  
**BUILDING DAMAGES**

The Ministry of Works Building division undergone a preliminary survey of Building Damages on Sunday 27<sup>th</sup> December 1998 following Cyclone Cora's visit on 26 December 1998.

Three Survey Teams consisted of 1 for each district of Tongatapu plus one survey personnel attached to the Tonga Defence Services Aerial Reconnaissance.

The results of the survey is hereby forthwith attached.

  
Sione M. Taumoepeau  
**DIRECTOR OF WORKS**

## 1.0 VAHELOTO DISTRICT SUMMARY

1.1 Total number of Residence totally destroyed	18
Total number of residence partially damaged	80
Total area of roof uplifted	1586.50m <sup>2</sup>
1.2 Total number of Government Buildings partly destroyed	NIL
Total number of Government buildings partly damaged	20
Total area of roof uplifted	1142m <sup>2</sup>
1.3 Total number of community buildings totally destroyed	NIL
Total number of community buildings partly damaged	50
Total area of roof uplifted	2334m <sup>2</sup>

Total ESTIMATED COST OF DAMAGES IN TONGATAPU.

## VAHELOTO DISTRICT

VILLAGE	GOVERNMENT HOUSING		RESIDENTIAL		COMMUNITY	
	DEST	PAR/DEST	DEST	PAR/DEST	DEST	PAR/DEST
PUA			2 only (36m <sup>2</sup> )	5 only roof (94.5m <sup>2</sup> )		
UMAKELIKAO				1/roof 20m <sup>2</sup>	1/store 16m <sup>2</sup>	
UFANGA/UMUSI		Q.S.W. Quarantine roof 20m <sup>2</sup>  Q.S.W. Foreshore East side damage Fair Market roof & Post (192m <sup>2</sup> ) Tu'imatamoana/Fokololo Guttering 60m +60m = 120m E.P.B. door 35m <sup>2</sup>		5 only roof (68m <sup>2</sup> )		S.I.C./Seastar wall clad (20m <sup>2</sup> )  Base pac roof lite 20m <sup>2</sup>  roof/store & work- shop 80m <sup>2</sup>
ALEVA/PAHU			2 only 10m <sup>2</sup> (Urgent)	3/roof 40m <sup>2</sup>		café roof 10m <sup>2</sup> F.W.C. Hall roof 20m <sup>2</sup>  P.K. Paea & Sons roof 40m <sup>2</sup>
LEI/PILI				1 roof 35m <sup>2</sup>		store roof 35m <sup>2</sup>  Factory roof 150m <sup>2</sup>
MOEAFI/ U'ALOFA		Chinese Embassy roof 20m <sup>2</sup>  Ministry of Education 162m <sup>2</sup>  Prime Minister's Office Curtain Wailing 20m <sup>2</sup>  Talamahu guttering 50m <sup>2</sup>	1only 40m <sup>2</sup>	7only roof 262m <sup>2</sup>	3 store 60m <sup>2</sup>	12 store roof 680m <sup>2</sup>

VILLAGE	GOVERNMENT HOUSING		RESIDENTIAL		COMMUNITY	
	DEST	PAR/DEST	DEST	PAR/DEST	DEST	PAR/DEST
Unit of SIMOEAFI/ UKU'ALOFA		Bus station roof 150m2 Teufaiva ticket boof roof 100m2  T.E.P.B. roof 50m2				Tupou high school  2 - classroom roof uplifted 180m2
PU		Fisheries roof 15m2		3/roof 35m2		
LELI				3/roof 40m2		
LA'OVAVE			2 only 100m2	7/roof 112m2		Atenisi roof 36m2
UJENGA			1 only 30m2	2/roof 66m2		
MOTU'A			3 only 122m2	15/roof 170m2		Q.S.C. spouting 50m
NGOLONGO				4/roof 45m2		Akoteu roof 4m2 FWC roof 12m2
LOLOA			2 only 48m2	2/roof 60m2		
IGA		G.P.S. roof 10m2	3 only 150m2	2/roof 60m2		Adiloa roof 60m2
		Police dormitory roof 60m2				stone roof 30m2
						Nova store roof 65m2
						2/shed roof 40m2
						S.A.S. blockwall & roof 20m2

	GOVERNMENT HOUSING		RESIDENTIAL		COMMUNITY	
	OEST	PAR/EST	DEST	PARIOEST	DEST	PAR/DEST
HAVELU		Vaiola hosp. 2/roof 60m2		3/roof70m2		4/store roof 120m2  3/workshop roof 90m2
TOFOA				9/roof 280m2		Night Club roof 20m2  Church Hall roof tower 40m2  store roof 20 m2  timber shed Jewett Cameron roof 45m2
TOKOMOLOLO		Tonga Timber roof  48n2		1 roof 16m2		
PEA			1 only  72m2	3/roof85m2		Catholic Hall roof  15m2  Grand House roof (Villa) 5m2
HA'ATEIHO (ATELE)		T.CA 3 cla- ssroom espetor ridge 25m  Tool shed roof 90m2  Machinery shed roof 10m2		3/roof 110m		Hall roof 20m2  yam shed  •
VEITONGA	G.P.S	G.P.S. quarter 50m2  Telecom station roof 50m2 U.S.P. roof flash in 525m2	1 only  destroyed by five	1 only  20m2	1/store  85m2	Club house roof 20m2



## 2. 0 HAHAKE DISTRICT SUMMARY

Residence	
2.2 Total number of residence	12
Total number destroyed	
<hr/>	
Total number of residence	64
Partly damaged	
Total area of roof uplifted	1546m2
<hr/>	
Government	
Total number of government	NIL
Building totally destroyed	
<hr/>	
Total number of government	5
Buildings partly damaged	
Total area of roof uplifted	105M2 .
<hr/>	
Community	
Total number of community 1 only (Church)	
Buildings totally destroyed	
<hr/>	
Total number of community	22
Buildings partly damaged/	
Total area of roof uplifted	1486m2

## HAHAKE DISTRICT

BUILDING DAMAGED DUE TO CYCLONE CORA

Inspection Date 27/12/98

VILLAGE	GOVERNMENT HOUSING		RESIDENTIAL		COMMUNITY	
	OEST	PARTLY/OEST	OEST	PARTLY/OEST	OEST	PART/OEST
mi Farm		4.2m <sup>2</sup> roof uplifts 2 dwellings				
LAHA				150m <sup>2</sup> roof uplifted 4 dwellings		
NGOTEME				15m <sup>2</sup> roof uplift 2 dwellings		35m <sup>2</sup> roof uplift 2 stores
NI			60m <sup>2</sup> total collapsed	85m <sup>2</sup> roof uplift 4 dwellings		72m <sup>2</sup> roof uplift 2 church hall
LULAH				30m <sup>2</sup> roof uplift 2 dwelling		265m <sup>2</sup> roof hall school 1 store
LAPO				9m <sup>2</sup> roof uplift 2 dwelling		30m <sup>2</sup> roof uplift store
LONGA				12m <sup>2</sup> roof uplift 1 dwelling		
AKI				40m <sup>2</sup> roof uplift 1 dwelling		
TA				195m <sup>2</sup> roof uplift 6 dwelling		120m <sup>2</sup> roof uplift hall and store
KUILAU SCHOOL						20m <sup>2</sup> roof uplift school and store
NI			20m <sup>2</sup> total collapsed	dwelling		26m <sup>2</sup> roof uplift

TALAFO'OU				60m2 roof uplift 4 dwelling	14m2 roof uplift 1 school toilet
NAVUTOKA				72m2 roof uplift 2 dwelling	
MANUKA				77m2 roof uplift 3 dwelling	
KOLONGA				112m2 roof uplift 3 dwelling	160m2 roof uplift school and toilet
AFA				37m2 roof uplift 2 dwelling	
NIUTOUA		26m2 roof uplift G.P.S			
HAVELULIKU		43m2 roof uplift school		47m2 roof uplift 2 dwelling	195m2 roof uplift church and hall
FATUMU				150m2 roof uplift 5 dwelling	88m2 roof uplift hall and store
LAVENGATONGA				60m2 roof uplift 4dwelling	120m2 roof uplift hall
HA'ASINI		22m2 roof uplift MAF Quarter		55m2 roof uplift 4 dwelling	
NAKOLO				85m2 roof uplift 3dwelling	270m2 total total collapsed church
FUA'AMOTU					341 total uplift stores and facto
PELEHAKE		10m2 roof			

NAKOLO		uplift GPSchool		13m2 roof uplift 2dwelling		12m2 roof uplift school
FUA'AMOTU			12m2total collasped Hmguard	140m2 roof uplift 6dwelling		341 roof uplift stores&factorv
PELEHAKE		10m2 roof  uplift G.Pschool				
MALAPO				13m2 roof uplift 2dwelling		12m2 roof uplift school

### 3.0 HIHIFO DISTRICT SUMMARY .

TOTAL NUMBER OF RESIDENCE	
TOTALLY DESTROYED	7
TOTAL NUMBER OF RESIDENCE	
PARTTLY DAMAGED	58
TOTAL AREA OF ROOF UPLIFTED	
	517M
TOTAL NUMBER OF GOVERNMENT	
BUILDINGS TOTALLY DESTROYED	NIL
TOTAL NUMBER OF GOVERNMENT	
BUILDINGS PARTLY DAMAGED	4
TOTAL NUMBER OF COMMUNITY	
BUILDINGS TOTALLY DESTROYED	NIL
TOTAL NUMBER OF COMMUNITY	
BUILDINGS PARTLY DAMAGED	22
TOTAL AREA OF ROOF UPLIFTED	
	202M

TOTAL ESTIMATED COST OF DAMAGED IN TONGATAPU

# HIHIFO DISTRICT

BUILDING DAMAGEDS DUE TO CYCLONE CORA    INSPEC110N INSPEC110N DATE 27/12/198

VILLAGE	GOVERNMENT HOUSING		RESIDENTIAL		COMMUNITY	
	DEST	PAR/DEST	DEST	PAR/DEST	DEST	PAR/DEST
HOFOA		G.P.S 1 house 1m2 wall 5m2		Roof 38m2		Church Hall roof 6m2
SIA'ATUOTAI			1 house 26m2	roof 3 houses 25m2		
PUKE		G.P.S 1 house roof  6m2		Roof 2 houses 15m2		
LAKEPA				Roof 1 houses  6m2		
FATAI		1 houses 9m2				
NUKUNUKU				Roof 4 houses 50m2		Hall Wall 30m2    •  Roof 60m2  Tupou High School 10m2
TE'EKIU				Roof Shouses 50m2  wall 2 houses		

MASILAMEA			15m2 Roof 2 houses 10m2		
FO'UI			Roof 3 houses 40m2		
HA'AVAKATOLO			Roof 3houses 30m2		Hall roof 20m2
KOLOVAI		shed a) Good Samaritan 3m2	Roof 2 houses 10m2		
AHAU			1 houses 20m2		
KANOKUPC	G.P.S 1Houses  Roof 35m2	2 houses 16 m2	Roof 2 houses 45m2		
HA'ATAFU		1 houses 36m2	Roof 3 houses 18m2		F.W.C John Thomas Merioal roof 26m2  F.W.C Church Whole houses sloped to one side 200m2
KALA'AU			Roof 2 houses 10m2		
HA'UTU			Roof 1 houses 5m2		
FAHEFA			1 houses roof 2m2		
VAOTU'U			4 houses roof 60m2		Tonga Hou'eiki Hall roof 40m2

HA'AKAME			1 house roof 3m2
HA'ALALO		1 houses 24m2	1 houses roof 6m2
UTULAU			4 houses roof 45m2
LOMAIVITI			1 house  15m2
MATANGIAKE			2 houses roof 25m2
KAHOUA			1 houses roof 27m2
MATAHAU	G.P.S 1 roof 4m2	2 houses  42m2	2 houses roof 20m2



**4.0 SUMMARY OF BUILDING DAMAGES DUE TO TROPICAL  
CYCLONE CORA IN TONGATAPU**

**INSPECTION DATE: 27th DECEMBER 1998**

1.1	Total number of Residence totally destroyed	37	\$592,000.00
	Total number of residence partially damaged	202	
	Total area of roof uplifted	3650M2	\$292,000.00
1.2	Total number of Government Buildings partly destroyed	NIL	
	Total number of Government buildings partly damaged	29	
	Total area of roof uplifted	1294m2	\$129,400.00
1.3	Total number of community buildings totally destroyed	1 only (1 Church)	\$162,000.00
	Total number of community buildings partly damaged	94	
	Total area of roof uplifted	4022m2	\$322,000.00
			\$1,497,400.00
<b>TOTAL ESTIMATED COST OF DAMAGES IN TONGATAPU SAY</b>			<b>\$1,500,000.00</b>

## 5.0 'EUA ISLAND SUMMARY

		<u>COST \$</u>
1.1 Total number of residence		
Total destroyed	7	\$209,200.00
Total number of residence		
Partly damaged	27	
Total area of roof uplifted	764m2	\$61,120.00
1.2 Total number of government		
Buildings totally destroyed	1	\$60,000.00
Total number of government		
Building partly damaged	Nil	
Total area of roof uplifted	Nil	
1.2 Total number of community		
Buildings totally destroyed	1	\$40,000.00
Total number of community		
Building partly damaged	3	
Total area of roof uplifted	682m2	\$70,00.00
		<b><u>\$340,320.00</u></b>

Note: The estimate for the above damages was taken from the Arial Reconnaissance taken on the 28/12/98.

Possible increase is expected when or if detail survey is completed.

### VILLAGE: 'OHONUA

BUILDING DAMAGEDS DUE TO CYCLONE CORA

VILLAGE	GOVERNMENT HOUSING		RESIDENTIAL		COMMUNIT
	DEST	PARTLY / DEST	DEST	PARTLY/DEST	
M.O.W machinery shelter 300m2			36m2 40m2 36m2 36m2 80m2	Roof 15m2 20m2 60m2 15m2 40m2 40m2 15m2 20m2 20m2 20m2 20m2	85m2
			60m2 total cooapsed	20m2 30m2 36m2 24m2 34m2 40m2 80m2 489m2	
				40m2 20m2 10m2 40m2 60m2 60m2	
				35m2 25m2	

**TROPICAL CYCLONE CORA 26<sup>TH</sup> DECEMBER 1998**

**INFRASTRUCTURE ASSESSMENT REPORT**

**A) TONGATAPU**

**1. ROADS**

<b>REMARKS</b>	<b>ESTIMATED COSTS OF REINSTATEMENT</b>
No evident of structural damages to the roads except various blockages to the traffic on most of the roads around the network due to either fallen electrical power or trees. Clearing of the roads to traffic commenced almost immediately following the cyclone. The estimated costs for clearing and carted to dump sites is \$2000.	
General cleaning and tidying of roads requested.	<b>\$6000</b>
<b>2. MARINE INFRASTRUCTURE :</b>	
<b>2.1 QUEEN SALOTE WHARF :</b>	
No damages were evident on the wharf as well as the foreshore protection, except for small rocks being displaced at the revetment wall on the eastern side of the wharf.	<b>\$3000</b>
<b>2.2 FAUA WHARF :</b> There was no evident of damages.	-
<b>2.3 VUNA WHARF :</b>	-
<b>2.4 YELLOW PIER :</b>	
No new damage evident.	

### 3.0 HIHIFO & FANGA'UTA COASTAL AREA STORM SEARCH

REMARKS	ESTIMATED COSTS OF REINSTATEMENT
Sea water overflowed inland for more than 30 metres at Hihifo and Fanga'uta coastal area. Water flooded up about 500mm than normal level.	-
Remedial foreshore required at some areas.	<b>\$50,000.00</b>

### B) HA'APAI

#### 1.0 ROADS

REMARKS	ESTIMATED COSTS OF REINSTATEMENT
There was no evident damages to the roads following the tropical cyclone Cora except fallen debris on the roads. Clearing of the roads to traffic commenced almost immediately following the Cyclone. The estimated cost of clearing and carted to dump site is \$1000.	
General clearing and tidying of road required.	<b>\$2000</b>
<b>1.1 CAUSEWAY LIFUKA - FOA</b>	<b>\$10,000</b>
From the aerial survey taken by the Tonga Defence force and Ministry of Works coral fill being washed away from revetment and replacement of fill is required urgently to provide accessibility to causeway.	-
<b>2.1 PANGAI WHARF</b>	
No damages reported from Pangai.	
<b>2.2 HA'AFEVA WHARF</b>	<b>\$350,000.00</b>
The cyclone wrought severe and extensive	

damage to the wharf. The is about 60% of the wharf has been demolished and urgent replacements required.	
--	--

**C) VAVA'U**

**1.0 ROADS**

<b>REMARKS</b>	<b>ESTIMATED COSTS OF REINSTATEMENT</b>
<p>No evident of structural damages to the road except various blockages of the traffic on most of the roads around the network due to either fallen electric power poles or trees. Clearing of the roads to traffic commenced demost immediately following the cyclone. The estimated cost for clearing and carted to dump sites is \$1500.00.</p>	
<p>General clearing and tidying of roads requiared.</p>	<b>\$2500</b>
<p>1.1 WHARF :</p>	<b>NIL</b>
<p>No evident of structural damages to the Halaevalu Wharf. Aerial survey taken by Tonga Defence Force and the Ministry of Works.</p>	
<p>1.2 LUPEPAU'U AIRPORT :</p>	<b>NIL</b>
<p>No evidence of structural damages to the Lupepau'u Airport as due to the aerial survey taken by Tonga Defence Service and Ministry of Works.</p>	

**D) 'EUA**

**1.0 ROADS**

<b>REMARKS</b>	<b>ESTIMATED COSTS OF REINSTATEMENT</b>
No evident of structural damages to the roads following the Tropical Cyclone Cora except various blockages to the traffic on the roads due to fallen electrical power poles and trees.	
The estimated cost for clearing of debris and carted to dump site is 4900.00	<b>\$1000</b>
<b>2.0 NAFANUAL HARBOUR :</b>	<b>\$2,500.00</b>
No damages were evident on the wharf as well as the foreshore protection, except for small rocks being displaced at the revetment wall. Estimated cost for reinstating the dislodged rocks is \$2,500.00	

**E) NIUAFO'OU & NIUATOPUTAPU INFRASTRUCTURE :**

<b>REMARKS</b>	<b>ESTIMATED COSTS OF REINSTATEMENT</b>
No report on the infrastructural damages to Niuas.	<b>NIL</b>
<b>TOTAL ESTIMATED COSTS</b>	<b>\$24,900.00</b>

**APPENDIX 8.16**  
**GOVERNOR OF HA'APAI**



GOVERNMENT OF TONGA  
**SAVINGRAM**

**From** : Governor of Ha'apai  
**To** : Hon. Prime Minister  
**Saving No** : GH 36/179/98 **Date:** 29 December, 1998

**RE: REPORT FROM THE HA'APAI GROUP ON THE EFFECTS OF  
TROPICAL CYCLONE 'CORa' AND THE FOOD SUPPLY  
SITUATION IN THE GROUP**

1. Enclosed herewith is the above-mentioned Report on the current situation in Ha'apai for information.
2. Life is slowly beginning to return to normal in the Ha'apai Group.
3. Wishing you Sir, a Happy New Year!



*Fielakepa*  
-----  
(Fielakepa)  
**GOVERNOR OF HA'APAI**

F/fl

cc: ✓ Hon. Cecil Cocker, Minister of Works (responsible for N.O.D.R.R.)  
Private Secretary to His Majesty (Attention: Sateki 'Ahio)

**REPORT FROM THE GOVERNOR'S OFFICE, HA'APAI GROUP ON  
TROPICAL CYCLONE 'CORa' 25/26/27 DECEMBER, 1998 AND STATUS OF  
FOOD SUPPLY RESOURCES**

**1.0 SUMMARY**

- 1.1 Tropical Cyclone 'Cora' visited the Ha'apai Group on the above dates. Due to the geographical spread of the Ha'apai Group, the effects of the cyclone appears to be more marked in the Lulunga Group and 'Otu Mu'omu'a. As radio telephone communication with these groups have been virtually non-existent (the two islands of Nomuka and Ha'afeva being the only ones with telephones) during the period of the tropical cyclone, the exact situation in these groups will perhaps be more accurately gauged from T.D.S. survey reports by VOEA 'Savea' and VOEA 'Pangai' which were stationed in these areas and any reports from the group on the Air Wing flight (consisting of T.D.S. and N.O.D.R.R. personnel) which visited Pangai, Ha'apai and over flying the group from 1600 Hrs to 1715 Hrs on Sunday, 27 December, 1998.
- 1.2 VOEA 'Neiafu' was stationed at Ha'apai Hahake. It visited Mo'unga'one and Kauvai Ha'ano on Sunday (27th). The situation in these islands is virtually similar as for the remainder of the islands of Ha'apai Hahake. The main effects of the tropical cyclone in Ha'apai Hahake has been in the damage done to agricultural crops.
- 1.3 The food crop and water supply situation for the whole of Ha'apai was comprehensively surveyed by T.D.S. in late October and early November. The Report of 03 November, 1998 from the Operational Commander of Operation 'Kanakana' (water distribution exercise to Ha'apai in two phases conducted by the N.O.D.R.R. and T.D.S.) is attached to this Report as ANNEX 1. The Operation Report highlights the marginalized existence of the Ha'apai populace in terms of food resources. The main crops which was looked at to provide some measure of food security for the short to medium term was the breadfruit ('mei') which was due to mature by January/February/March and the 'ma'ala' yam plantations (for May/June/July) together with the new plantings of 'manioke', 'kumala' and corn and also the projected plentiful mango season. These crops and fruits have now been effectively devastated throughout the whole group by the recent tropical cyclone.
- 1.4 The marginal nature of crops in the islands of Ha'apai was recently highlighted in the local media (in particular T.V. 7 and the 'Tonga Chronicle') and by H.M.'s Government through N.O.D.R.R. with the current distribution of food in 'Otu Mu'omu'a and proposed distribution in Ha'apai Lulunga by H.M.A.V. 'Late'. It will be noted that Ha'apai Hahake was excluded from this exercise (except Lofanga, Mo'unga'one and Kauvai Ha'ano). With the tropical cyclone, this situation needs to be reassessed with a view to reinstating the previously excluded groups.

## 2.0 CURRENT FOOD SUPPLY DISTRIBUTION EXERCISE TO THE MU'OMU'A AND LULUNGA DISTRICTS

i

~ 2.1 In order to gauge the extent and to provide an outline of the above Exercise, which was a follow through from the drought conditions and the water distribution exercise, I attach copies of the following documents:

ANNEX 2: Table on the crop situation in Ha'apai provided for the information of the Hon. Deputy Prime Minister on 22 December, 1998.

ANNEX 3: Savingram No. MW/20/88/98 of 23 December, 1998 from the Director of Works to the Governor of Ha'apai; and

ANNEX 4: Savingram No. GH 36/178/98 of 25 December, 1998 from the Governor of Ha'apai to the Director of Works .

## 3.0 ONSET OF TROPICAL CYCLONE 'CORa

3.1 Tropical Cyclone "Cora's" onset was in some ways reminiscent of the developments in Tropical Cyclone "Hina" in that there was only a short lead - in time from the radio broadcast to the rapid onset of the cyclone. The problem in 'Hina' was that it occurred on a Sunday and similarly here, it being X'mas Day (with Radio Tonga being off air until the early evening).

3.2 In the early afternoon of Christmas Day, Friday, 25/12/98 I was somewhat concerned with the number of small boats leaving Pangai for the outer islands of the Group and the general unsettled weather we were having for the past 24 hours. My office then called the Met Office in Nuku'alofa to check whether any warnings were in force. We received special weather bulletins No.2 and 3 by fax at 1421 Hrs and 1500 Hrs respectively on the 25th of December.

3.3 The Governor's Office then immediately sent telegrams to the District Officers of Mu'omu'a (at Nomuka) (ANNEX 5) and Lulunga (at Ha'afeva) (ANNEX 6) and a Circular Savingram (ANNEX 7) was also issued immediately to all Heads of Government Departments and Statutory Bodies in Ha'apai. The same was also issued to District Officers and Town Officers of Ha'apai Hahake and owners of Motels and Resorts on Lifuka.

3.4 Police vehicles with loudspeakers then travelled the length of Lifuka and Foa at 1515 Hrs announcing the onset of Tropical Cyclone 'Cora' and for people to take the necessary precautions such as boarding up their houses, beaching boats, tethering animals and boats etc.... By 1800 Hrs on the 25th the seas were running high and rough with strong winds and it continued to be so throughout the 25th and 26th until the early hours of Sunday morning (27/12/98).

- 3.5 We understand that the first weather report issued by Radio Tonga was at 1900 Hrs on Friday 25th December shortly after it recommenced transmission on Christmas Day (following an all night broadcast). However the extra hours offered by the faxed Met Office Report meant that people in the Group were able to complete precautionary tasks when it was still daylight.

MISSING PERSONS - 6 ADULTS AND 1 INFANT

- 4.1 According to Ha'apai Police, 7 persons were reported missing on Friday evening, 25th of December on a boat (fibre construction) belonging to Tu'ifua Vaikona of 'Uiha. The boat, a 20 footer, had travelled from 'Uiha to Pangai to collect some passengers which *arrived* from Tongatapu on the 1700 Hrs Royal Tongan Airlines flight. The sea was then already so rough that it was not able to make it to Pangai Harbour but diverted to Huluipaongo (the southern point of Lifuka Island facing Uoleva) where it picked up its passengers at 1800 Hrs.
- 4.2 The sea conditions at 'Auhangamea passage between *Uoleva* and Tatafa were such that a crossing was not able to be made. The boat then spent Christmas night at the 'Tafe' southern end of Uoleva and the passengers remained on board for most of the night (as the mother and infant were not able to go ashore).
- 4.3 An attempt was made to return to Lifuka at 1100 Hrs on 26/12/98 but this was unsuccessful because of the rough conditions between Uoleva and Lifuka. At 12 noon the boat then reached 'Touhuni' at the eastern side of Uoleva where the passengers broke and entered into the Captain Cook Resort (belonging to Soni Kaifoto who was at Pangai for the duration of the tropical cyclone). The Resort was, according to reports, well stocked with food, stove and a gas cylinder. The passengers remained there for the rest of the 26th. They were rescued by two boats from 'Uiha on the morning of Sunday, 27th December just as the VOEA 'Neiafu' weighed anchor at Pangai Harbour to commence search and rescue operations. The Police Patrol vessel 'Lea'aetohi' was also about to depart Pangai. *However*, at my suggestion to the Officer Commanding the Pangai Police Station three police officers boarded the 'Neiafu' - the 'Lea'aetohi' was to remain in Pangai so that search and rescue efforts would not be duplicated and considering the fact that the VOEA 'Neiafu' was ready to sail (having just *arrived* from Mo'unga'one). It is noted that VOEA 'Neiafu' was to later pick up the missing crew of the 'Alatini Fisheries vessel from Fotuha'a.
- 4.4 The weather reports for the Tropical Cyclone and its plotted and actual path over the Ha'apai Group are probably available from the Met Office. However it is suffice to say that the gusting winds and high seas were very strong over Lifuka and Foa and the rest of Ha'apai Hahake for over a prolonged period.

- 4.5 With the finding of the 7 missing persons there was no loss of life or serious injury from the tropical cyclone.

5.0 EMERGENCY MEETING OF THE GOVERNOR AND GOVERNMENT REPRESENTATIVE WITH HA'APAI HEADS OF GOVERNMENT DEPARTMENTS, STATUTORY BODIES AND DISTRICT & TOWN OFFICERS

- 5.1 An emergency meeting of the above was held on Sunday, 27 December, 1998 at 1400 Hrs at the Ha'apai Court House at Pangai. It was well attended. The purpose of the meeting was:
- (a) To ascertain the extent of the damage caused by Tropical Cyclone 'Cora' to the villages and Government assets and property in the Ha'apai Group;
  - (b) To devise ways and means to mitigate the adverse effects of the tropical cyclone;
  - (c) To ascertain the effectiveness of the response of Government agencies and statutory bodies in the Ha'apai Group;
  - (d) To devise a better and more effective tropical warning system for the Ha'apai Group and also more timely and effective response to requirements from the general public;
  - (e) To receive initial reports on the effects of the tropical cyclone from meeting participants; and
  - (f) To better coordinate the efforts of Government Agencies and Statutory bodies and to devise a more timely and effective information flow system (especially situation surveys) amongst Government agencies.
- 5.2 The meeting was commenced by an opening prayer from the Government Representative (Senior Magistrate Taniela Moa) followed by Introductory Remarks by the Governor. The Governor also thanked the tremendous work and efforts of the workers of the Police, T.D.S., M.O.W., T.W.B., TELECOM, Health and T.E.P.B. in Ha'apai during the tropical cyclone. The representatives of the other Government Ministries and Departments and statutory bodies were also thanked.
- 5.3 The pivotal role of District and Town Officers in relief and rehabilitation efforts were also acknowledged.

5.4 The meeting then proceeded to receive situation reports from those present and they were as follows:

(a) HA'APAI POLICE

- A. Chief Inspector of Police Sailosi Fanua briefed the meeting on the general situation with regard to public safety and also the general status of the Ha'apai Group. The meeting was informed that the 7 missing persons were found earlier in the day on Uoleva. The acquiring of a standby generator for the Pangai Police Station was supported by the meeting.
- B. In Lifuka District - apart from the many collapsed Fale Tonga and Peito Tonga etc..., the only major building that collapsed in Hihifo was the Mo'unga'one residence. In Pangai some shops were damaged (including those of Salesi Fakahua, and the Women-In-Development (W.I.D.) shop, and the Frisco shop. The office of Walter Shipping at the wharf had also collapsed. There was no loss of life or injury in the district.
- C. In Foa District - same as for Lifuka. The Police also reported that most of the damage was done to agricultural crops with 'mei' and -- mango being the most damaged.
- D. The meeting was informed that two Police Officers were stationed in Ha'ano but no report has yet been received from the District nor from the Lulunga or Mu'omu'a Districts.

(b) HA'APAI T.D.S.

- A. It was noted that the T.o.S. Reports are being submitted directly to T.D.S. Headquarters in Nuku'alofa.
- B. However, the O-I-C. of Velata Base (W.O. 'Isamu Taukapo) gave a general outline of T.D.S. activity in the group. He informed the meeting that the patrol boats were being deployed in the Ha'apai Group as follows: VOEA 'Savea' at Mu'omu'a, VOEA 'Pangai' at Lulunga and VOEA 'Neiafu' at Hahake. A survey team was also expected to arrive on the Air Wing aircraft in the afternoon (Sunday, 27/12/98).

(c) IONGA TELECOM (HA'APAI)

- A. The meeting was informed that telephone communication with Ha'afeva was re-established that morning (Sunday 27/12/98).

- B. As at the time of the meeting, Nomuka, Vava'u and Tongatapu (and other Districts) were still off - air.
- C. It was noted that local telephone communication in Lifuka and Foa was uninterrupted during the period of the cyclone.

(d) TONGA WATER BOARD (HA'APAI)

- A. The meeting was informed that the Pangai and Hihifo water supply system which has now been *converted* from diesel to electric motors was shut off (all 10 pumps) at 0300 Hrs on the morning of Saturday, 26/12/98 with the shut down of the power supply.
- B. 5 electric water pumps were reactivated with the restoration of power at 12 noon on Sunday and the remaining 5 pumps were expected to be back on line on Sunday evening (27/12/98).
- C. The water supply and T.W.B. property and assets were not damaged by the cyclone, apart from the base of the main water reservoir tank stand which was damaged by the winds and may need to be replaced.

(e) TONGA ELECTRIC POWER BOARD (HA'APAI)

- A. There was no major damage to the generators or the power lines apart from those lines cut by falling trees and those at the cause-way ('ahanga) at Foa.
- B. Electricity was shut - off at about 0250 Hrs on Saturday morning (26/12/98). Power was restored in areas where lines *have* been cleared - commencing from Houma Tofua and Hihifo in the late morning of Sunday (27/12/98) and then Pangai and surrounding villages. Foa District was still off power at the time of the meeting.

(f) MINISTRY OF HEALTH - NIU'UI HOSPITAL

- A. At the onset of the cyclone, 9 patients were in Niu'ui Hospital. Patients were *moved* from the west side of the main hospital building to the eastern side. There was one birth on Saturday night (26/12/98) which was complicated by the lack of electricity. The hospital's standby generator has been out of order for 3 years now (*ever* since a generator brush was sent to Nuku'alofa for repair/replacement and nothing has been heard of it since).

- B. The meeting noted that the hospital fencing on the southern and western side of the hospital has been blown down. More importantly however, the meeting noted that the hospital's water front may need to be fore-shored in order to prevent the effects of sea flooding (and soil erosion).
- C. No report has been received from the health centres in Nomuka and Ha'afeva.

(g) MINISTRY OF WORKS (HA'APAI)

- A. It was noted that this Ministry has the central role in disaster relief and rehabilitation activities.
- B. It was reported that there was no major damage to the roadways and agricultural roads of Lifuka and Foa. Police and M.O.W. undertook road clearing activities from fallen trees etc...
- C. The foreshores at Taufua'ahau wharf suffered some damage due to the heavy swells and wave action. The waves also scoured a section of the new wharf (by the small boats landing) covering an area of about 10 metres square and to a depth of 2 metres. The .. ramp of the old wharf was also damaged by the cyclone.
- D. The Faleloa (and 'Uiha) jetties also appeared to have suffered damage on the wharf surface from the pounding force of waves breaking over the wharf.
- E. Apart from minor damage such as blown-in doors etc... all Government buildings (offices and flats) are intact. School and Church buildings also appeared to have escaped major damage.
- F. The purported damage done to Puluotu Wharf and Matuku Wharf are noted from radio reports from Ha'afeva.
- G. The condition of the causeway to Foa has been deteriorating over the past few years. In the cyclone, the waves caused the rocks and aggregate to be piled onto the roadway proper. There ought to be an engineering survey done on the condition of the causeway as large waves have crossed the causeway more frequently in recent times and there has been accretion on the Foa end leaving the Lifuka end lower and much more exposed. Immediate rectification work may save major works later.



(h) MINISTRY OF FISHERIES (HA'APAI)

- A. The meeting noted the concerns expressed by the O-I-C of the Ministry of Fisheries here in Ha'apai relating to safety of life at sea issues in Ha'apai - particularly the need for an early warning system for boats at sea and also the need for a 24 hour radio watch on VHF and HF bands (emergency frequencies).
- B. It was also noted that these issues have been raised at earlier meeting of Government Heads of Department and attached as ANNEXURES 8, 9 and 10 are correspondence between the Governor's Office (Ha'apai) and Tonga Telecom on this issue, inter alia.
- C. The meeting agreed that the necessary radio equipment could perhaps be requested for the Police here in Ha'apai to carry out the 24 hour radio watch (on VHF Channel 16 and HF 2182 kHz and other emergency frequencies).
- D. The telephones on the outer - islands of Ha'apai are still out of order since May 1997 (except Ha'ano, 'Uiha, Ha'afeva and Nomuka). Rectification action and the proposed Wireless Local Loop system for the islands of Ha'apai and Vava'u appears to be making slow progress. Radio telephone communication is important for the Group not only in development matters but also for disaster relief surveys and related activities.

(i) OTHER GOVERNMENT MINISTRIES AND DEPARTMENTS

- A. All other Government Ministries and Departments property, vehicles and boats have not been overly affected by the cyclone.
- B. It is noted from the Ministry of Civil Aviation here in Ha'apai that part of the ceiling of the new terminal appears to have suspension problems and some roof joints appears to leak. They have reported these matters for rectification, otherwise the new runway and facilities at the airport are O.K. (although the water run - off from the runway appears to be swamping surrounding areas).

**r** LIVESTOCK

- 6.1 The livestock situation (cattle, pigs, horses, goats etc...) in the Ha'apai Group appears not to have been adversely affected by the cyclone.

## AGRICULTURAL SITUATION IN HA'APAI

- It,
- 7.1 As mentioned previously, the agricultural situation here in the Ha'apai Group has been comprehensively surveyed by the T.D.S. on 03/11/98 during 'Operation Kanakana'. The only amendment to that Report in the aftermath of Tropical Cyclone 'Cora' is that the remaining acreage of crops such as breadfruit (mei), 'ufi, kumala and manioke and fruits such as mango on which reliance has been placed should be reduced by 3/4.
  - 7.2 The Ministry of Agriculture in Ha'apai has carried out their initial surveys and have submitted their initial report to MAF Nuku'alofa.
  - 7.3 The fact that the cyclone had affected Tongatapu and 'Eua is of great concern to the people of Ha'apai because previously reliance has been placed in these two districts to supply agricultural and other produce when Ha'apai runs short.
  - 7.4 Although crops such as 'manioke' and 'mei' have been very much affected by the strong winds, the more devastating effect of 'Cora' in the islands has been in the blanketing of whole plantations by sea spray. The vegetation in the Ha'apai Group has now turned from green to brown/black. It is hoped that there will be a lot of rain to wash off the salt from plants and crops.
  - 7.5 The meeting noted that immediate action is required to mitigate the devastating effects of 'Cora' on the agricultural situation in the group. The initial strategy which has been discussed with MAF Ha'apai and District and Town Officers is to activate planting and replanting of 'manioke', 'kumala' etc... at the village level. Each village is to be encouraged to procure their own planting material and to plant in the form of a 'toutu'u' especially those who do not have tax allotments. Those with tax allotments are to be encouraged to plant their own allotments with quick growing crops.
  - 7.6 It was thought that 6 acres of new plantings should be the target for large viiages and 4 acres for smaller viiages in the Ha'apai Hahake group where this initiative is to be commenced. It was noted that the outer islands would be looking more at Ha'apai Hahake (together with Tongatapu) for their longer term food supply. District and Town Officers will be responsible for identifying the land for planting.
  - 7.7 The islands of Mu'omu'a and Lulunga are to be similarly encouraged to plant. It was noted however that Government (through MAF) should be requested to assist in ploughing and the preparation of the new tracts for planting. An urgent immediate requirement (by loan or purchase) is the acquisition of a plough attachment to be used in Ha'apai Hahake by MAF (there being no tractor in the outer islands). A plough attachment is understood to be available for purchase from ASCO Motors Nuku'alofa for T\$2,700. Government whether through NODRR or MAF will also be requested for planting materials such as 'kau'i manioke' or 'lau'i kumala'.


- 7.8 In the mid to longer term, MAF will be requested to re-establish and revitalise its Extension Services in the outer islands of Ha'apai especially those in Ha'afeva and Nomuka as this is very much needed to encourage agricultural activity in these districts. The District Officers have made a specific request to this effect.
- 7.9 Agricultural activity, especially food crops, in Ha'apai is very much geared only for subsistence consumption (there being no over - production as there is no established produce market). People grow only enough crops for their immediate needs. Therefore, when there is a drought or cyclone there is bound to be food shortage all around. The long term plan by the Ha'apai Development Committee to establish a produce market in Pangai is a welcome initiative as it is hoped that this will encourage commercial cropping in the Ha'apai Group (at least in the Hahake District). It is also noted that traditional methods of survival - such as the production of 'rنا Tonga' etc... have now been lost. Other traditional methods of preparing for famines and other natural disasters such as the growing of 'talc' and 'manioke' to a depth of 1 to 2 feet to inhibit growth - and therefore viable for a longer period (up to 5 years) have also been discontinued. It is also understood that rain water used to be drained off the stem of coconut trees into a 'haka' which has been chopped into the base of the coconut tree. Perhaps revitalised and re-established MAF Extension Service Centres could help in reviving such traditional survival skills, in addition to the introduction of more modern methods of agriculture and horticulture (and also in the keeping of livestock). In the past the holding of annual Agricultural Shows have provided a focus for agricultural activities in the islands. It had also provided a competitive incentive for growers in the District.

#### 0 GENERAL COMMENTS AND OBSERVATIONS

- 8.1 If there are any things which require to be improved and learnt from Tropical Cyclone 'Cora' from the Ha'apai perspective it is the following:
- (a) The need for EARLY WARNINGS by radio or public announcement so that the general populace can prepare their houses and property in good time and during daylight hours if possible. This is particularly important where the onset of a cyclone is during Sunday or other days where Radio Tonga is off-air, only broadcasting in the evening. It is particularly important in Ha'apai as there are no alternative broadcasting systems such as FM radio or television. There is also the need to forewarn small boats and small fishing vessels and to prevent them from sailing in foul weather;
  - (b) The need was recognised for a set Government response plan to the onset of natural disasters (which is made known to Government Ministries and Departments in Outer Island Districts);

- (c) The need for closer coordination between Government Agencies, Statutory Bodies and the community in dealing with natural disasters and search and rescue operations;
- (d) The importance of Radio Tonga to be on air throughout the duration of natural disasters (if possible) as it is important for Government Agencies in the outer-islands and the general public to know the up-to-date weather situation (especially when there are no alternative forms of communication such as F.M. radio). The same applies to domestic telephone communication. It will also be helpful if the radio could broadcast repeatedly precautionary action for the public to take before and during a cyclone (such as that published in the front of the telephone directory). During the cyclone broadcasts it was noted that departmental public notices were very much Tongatapu - centric.
- (e) The need for a 24 - Hour radio-watch for the Ha'apai Group on VHF (Channel 16) and HF 2182 kHz, 6215.5 kHz and 4125 kHz (distress frequencies) was stressed. The former (i.e. VHF) is the most important as most of the fishing vessels based in Ha'apai with radios have VHF which only has a limited range and calls from Ha'apai cannot be picked up by Nuku'aLofa Radio/A3A;
- (f) The need for encouraging immediate local action in trying to revive the agricultural situation before considering NODRR assistance (which should be the second line of assistance) was emphasized. The population of the group should be encouraged to help themselves rather than to be aid - dependent. Generally speaking however, it is noted that Ha'apai people are resilient and generally resourceful (at least they appear to be so);
- (g) In the clean - up period the lack of a rubbish dump in Ha'apai Hahake is particularly noted. The responsibility for the collection of garbage and designation of areas for the reception of waste is vested by, the Public Health Act 1992 in the Ministry of Health. This also has a safety aspect in that dangerous garbage such as sheets of corrugated iron and metal could be safely disposed rather than being left in towns and villages causing a hazard during cyclones;
- (h) The need for stand-by generators for the Niu'ui Hospital, the Police Station at Pangai and the Administration Offices at Pangai were noted;
- (i) The priority areas for assistance in the Ha'apai Group in descending order are as follows:
  - (1) 'OTU MU'OMU'A: Fonoifua, Mango and Nomuka
  - (2) HA'APAI LULUNGA
  - (3) Lofanga, Mo'unga'one & Ha'ano
  - (4) 'Uiha & Felemea
  - (5) Ufuka & Foa;

- (j) Finally, I wish to acknowledge the assistance rendered by the Government Representative and the Heads of Government Departments and Statutory Bodies in Ha'apai and also District and Town Officers of the Group. I also wish to thank all the Government Departments in Nuku'alofa especially the N.O.D.R.R. and the Tonga Defence Services for the assistance already rendered to the Ha'apai Group (since October);
- (k) The presence of the Pacific class patrol boats in the district during the cyclone and also the VOEA 'Lomipeau' and HMAV 'Late' for the water distribution exercise in November/December and also the Air Wing Survey flight on the 27th December has provided a strong psychological boost to the people of Ha'apai in the knowledge that H.M's Government will be there even when things doesn't look too good - to provide water and food when desperate or to find souls lost at sea when required.
- (l) Under normal circumstances the Ha'apai Group by its very nature is particularly vulnerable to natural disasters such as droughts and tropical cyclones. The drought conditions had already left the group in a critical state, 'Cora' is the equivalent of kicking the patient when it is already down (and this is just the beginning of the hurricane season)!
- (m) I-guess God (and the N.O.D.R.R.) helps those that first attempt to help themselves!

The seal of the Government of Ha'apai is circular, featuring a central crown emblem surrounded by a wreath. The words "KOVANA" and "HA'APAI" are inscribed around the perimeter, with two stars on either side of the crown.  
*Fielakepa*  
-----  
(Fielakepa)  
**GOVERNOR OF HA'APAI**

December, 1998

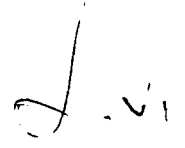
**MINUTE**

To: Commander TDS  
From: Operational Command  
Haapai Water Distribution  
Date: 3rd Nov; 1998.

**SUBJ: SURVEY REPORT ON WATER CONDITIONS  
AND RESOURCES WITHIN HA'APAI GROUP.**

ATT: Hon Governor Ha'apai  
NODRA: Mr. Fotu Veikune  
TDS. Co-ordinator: LtCol S.Petelo  
XO Navy: LCdr. P.F.Matoto  
VOEA LOMIPEAU  
HMAV LATE.

1. Enclosing is a complete survey report for Mu'omu'a group, Lulunga group, Ha'ano, Fotuha'a, Lofanga, Mounga'one, 'Uiha and Felemea.

  
**LUPETI VI**  
Commander  
Tonga Navy







**DETAILS OF WATER TANKS**

ISLAND GROUP	FAKAKATOA 'O E SIMA VAI	FAKAIKIKI 'O E NGA'AAHI SIMA VAI
<b>1. MU'OMU'A GROUP</b>		
a. Nomuka	107	104 are Private Own, 3 Public Cement Tanks = 1 X 18' X 18' X 8', 1 X 26' X 20' X 8' and 1 X 27' X 21' X 8'
b. Mango	31	Fuopotopoto X 27 X 3,000 Ltrs, Tapafa X 4 X 6.3 M X 2.5 X 2.6 M
c. Fonoifua	25	X 3,000 Ltrs
<b>2. LULUNGA GROUP</b>		
a. Ha'afeva	169	X 2,200 Ltrs/1,600 Ltrs ('Oku tu'u faingamalie pe ki Novema)
b. Matuku	28	27 X 2,200 Gals and 1 Public Cement Tank U S
c. Kotu	31	30 X 2,200 Gals and 1 Public Cement Tank
d. Tungua	87	85 X 2,500 Ltrs and 2 Public Cement Tanks X 50,000 Ltrs
e. 'O'ua	41	25 X 2,500 Gals, 9 X 3,000 Gals and 4 X 3,500 Gals
f. Fotuha'a	31	28 X Private Own and 3 Public Cement Tanks at 20,000 ltrs, 10,000 ltrs and 8,000 ltrs
<b>3. HAHAKE GROUP</b>		
a. Lifuka		<pre> graph TD     Lifuka --&gt; Pangai     Lifuka --&gt; Ha'ato'u     Lifuka --&gt; Hihifo     Lifuka --&gt; Holopeka     Lifuka --&gt; Koulo                     </pre>
b. Lofanga	70	60 x 6,000 Ltrs
c. Mo'unga'one		
d. Ha'ano	21	18 X 6,000 - 8,000 Ltrs, 3 Public Cement Tank = 1 X 20,000 and 2 X 8,000 Ltrs
	41	35 X 3,000 Ltrs, 1 X 13' X 13' X 8', 1 X 18' X 18' X 8', Public Cement Tanks 2 X 24 X 24' X 20'
	26	22 X 2,000 Ltrs, 1 X 24 X 24 X 20 and 3 X 37 Dia X 9 height
	49	Fuopotopoto 'e 31 x 2,000 ltrs x Sima Tapafa x 9, Tangike faipa 5 x 10,000 ltrs
e. Foa		<pre> graph TD     Foa --&gt; Falele'ounga     Foa --&gt; Fotua     Foa --&gt; Loto Foa     Foa --&gt; Ha'ateiho Si'i     Foa --&gt; Faleloa                     </pre>
f. 'Uiha	142	88 Cement Tanks no good only 54 are using, 4 Public Cement Tanks
g. Felemea	93	85 x 2,000 ltrs, 3 Tapafa and 5 Round Cement

**SURVEY ON FOOD SUPPLY AND RESOURCES IN THE HA'APAI GROUP  
(October/November, 1998) CONDUCTED BY T.D.S. PERSONNEL (V.O.E.A. 'SAVEA'  
AND RADIO TEAMS DEPLOYED IN THE GROUP) AND COLLATED BY THE GOVERNOR'S OFFICE, PANGAI**

<u>ISLAND GROUP</u>		<u>POPULATION</u>									
<u>1. MU'OMU'A GROUP</u>	<u>Adults</u>	<u>Elderly</u>	<u>Children</u>	<u>TOTAL</u>	<u>MEI</u>	<u>MANIOKE</u>	<u>TALO</u>	<u>KAPE</u>	<u>SI'AI'NE/HOPA</u>	<u>'UFI</u>	<u>KUMALA</u>
a. Nomuka	307	NIL	235	542 (112 families)	220 O.K for Feb/Mar	16 acres stunted growth	4 acres poor condition	NIL wilted	20 acres poor condition	17 acres slow growth	NIL wilted
b. Mango	46	NIL	35	81 (18 families)	402 O.K. for Feb/Mar	14 acres	NIL	NIL	1 acre poor condition	NIL	NIL
c. Fonoitua	154	2	44	200 (23 families)	300 O.K. for Feb/Mar	8 acres	NIL	NIL not growing/poor growth	NIL	NIL	1 acre poor condition
<u>2. LULUNGA GROUP</u>											
a. Ha'afeva	197	4	102	304 (77 families)	500 bearing	10 acres	NIL	Few	5 acres 2a. O.K.	15 acres poor growth	NIL
b. Matuku	66	6	53	125	100 O.K. for Feb/Mar	1 acre depleted	NIL	NIL	8 acres O.K.	2 acres	NIL
c. Kotu	140	3	97	240 (40 families)	300	8 acres	NIL	NIL not growing/poor growth	NIL	1 acre	NIL
d. Tungua	155	4	93	252 (58 families)	250	16 acres stunted growth	NIL	NIL	8 acres	8 acres	NIL

ISLAND GROUP	POPULATION						TOTAL	MEI	MANIOKE	TALO	KAPE	SIAINE/HOPA	'UFI	KUMALA
	Adults	Elderly	Children											
e. 'O'ua	330	5	80		416 (36 families)	150	5 acres slow growth	NIL	NIL	2 acres	4 acres	NIL		
f. Fotuha'a	70	2	46		118 (24 families)	180	16 acres	NIL	Few	NIL	8 acres	NIL		

### 3. HAHAKE GROUP (Selected Islands)

a. Lofanga No data was available for the surveys. However, the agricultural situation in Lofanga is more serious than the above islands. Population of 200+.

b. Mo'unga'one	96	NIL	76		172	200	3 acres	NIL	Few	Few	poor condition	NIL
c. Ha'ano	53	4	15		72 (19 families)	50	5 acres	NIL	NIL	NIL	NIL	NIL
i) Muihoa												

ii) Ha'ano	120	NIL	60		180	300	16 acres	5 acres	2 acres	6 acres	10 acres	NIL
iii) Pukotala	100	NIL	20		120	200	6 acres	2 acres	1 acre	4 acres	8 acres	NIL
iv) Fakakakai	105	14	66		185 (42 families)	400	16 acres not bearing	1 acre	1 acre	3 acres	6 acres	NIL

d. 'Uiha No statistics available but the current agricultural situation follows the above trends.  
Population of about 444+.

e. Felemea	124	9	100		233 (48 families)	300	2 acres	NIL	poor condition	6 acres	NIL
------------	-----	---	-----	--	----------------------	-----	---------	-----	----------------	---------	-----

NOTES:

1. Statistics for Foa District and Lifuka District, although available, have not been included as the priority areas for assistance should be the above islands. The agricultural situation is virtually the same as the above.
2. 'Uiha and Felemea are not priority areas as their economic situation has improved somewhat in the past month with the increase in copra and sea-weed production (sponsored by Sea Star).
3. Due to the drought conditions, the new plantings have experienced stunted growth and crops such as kumala and talo have not grown at all.
4. The drinking water situation is no longer a problem in the Group following Phases I and II of Operation 'Kanakana'. If no further rainfall current supplies should last up to 4 months on average.
5. The survey and radio teams operated in the Group for 1 1/2 weeks.
6. In some islands such as 'O'ua, there are no shops.

**GOVERNMENT OF TONGA**

**SAVINGRAM**

**From:** Director of Works

**To:** Hon. Governor of Ha'apai

**Ref:** MW/20/88/98

**Date:** 23 December, 1998

**RE: FOOD SUPPLY DISTRIBUTION EXERCISE TO THE HA'APAI GROUP**

1. Further to your Savingram: GH 36/175/98 to the Hon. Deputy Prime Minister yesterday afternoon. I hereby affirm an oncoming action plan for the above captioned as prepared by NODRR.
2. An immediate food distribution is to be effected to the following Islands.

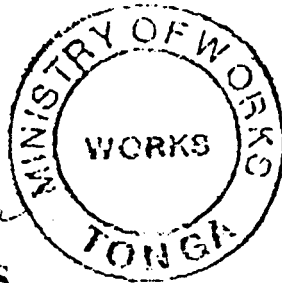
1. Nomuka	6. Matuku	11. Ha'ano
2. Mango	7. Tungua	12. Mui-toa
3. Fonoifua	8. 'O'ua	13. Fakakai
4. Ha'afeva	9. Lofanga	14. Pokotala
5. Kotu	10. Mo'unga'one	15. Fotuha'a
3. The total food to be distributed is as per ANNEX 1 and the Formula is: 4 Kg of Flour 1 Kg of Sugar per head.
4. The only other local contributed food available was pledged by Tonga College are, 40 x 50kg bags of casava and 50 x 50kg bags of kumara and the Hon. Deputy Prime Minister is 20 x 50kg bags taro and some kape. These will be distributed using the best formula on the spot.

5. A survey team consisting of officials from  
Ministry of Health  
Ministry of Agriculture  
Ministry of Works - NODRR

Since you have thoroughly covered the survey situation, the first two Ministries don't meant to drag the operation. They are just there to help, but the main objective of the programme is to be governed by the NODRR food distribution and move along.

6. The HMAV LATE schedule is as per ANNEX 2.
7. Finally we wish you all the joys and blessings of Christmas.

  
Sione M. Taumoepeau  
DIRECTOR OF WORKS



## ANNEX 1

### FLOUR AND SUGAR FOR HA'APAI GROUP

<u>'OTU MU'OMU'A</u>	<u>No.</u>	<u>4 Kg @ Flour</u>		<u>1 Kg @ Sugar</u>			
		<u>Bags</u>	<u>Kg</u>	<u>Total Kg</u>	<u>Bags</u>	<u>Kg</u>	<u>Total Kg</u>
Nomuka	= 590	108 x	22kg =	2376	20 x	30kg =	600
Mango	= 87	14 x	25kg =	350	3 x	" =	90
Fonoifua	= 145	24 x	" =	600	5 x	" =	150

'OTU MU'OMU'A IS COMPLETED :

#### VAHE LULUNGA

Ha'afeva	= 337	54 x	25kg =	1350	14 x	25kg =	350
Matuku	= 181	29 x	" =	725	8 x	" =	200
Kotu	= 190	31 x	" =	775	8 x	" =	200
'O'ua	= 178	29 x	" =	725	8 x	" =	200
Fotuha'a	= 134	22 x	" =	550	5 x	30kg =	150
Tungua	= 252	41 x	" =	1025	9 x	30kg =	270

#### VAHE 'UTHA

Lofanga	= 186	30 x	25kg =	750	8 x	25kg =	200
---------	-------	------	--------	-----	-----	--------	-----

#### KAUVAI HA'ANO

Ha'ano	= 177	29 x	25kg =	725	8 x	25Kg =	200
Muitoa	= 72	12 x	" =	300	3 x	" =	75
Mo'unga'one	= 184	30 x	" =	750	8 x	" =	200
Pokotala	= 120	20 x	" =	500	5 x	" =	125
Fakakai	= 238	39 x	" =	975	10 x	" =	250

#### TOTAL FOOD SUPPLIED TO HA'APAI ISLAND

FLOUR	=	108 x 22 Kg
		404 x 25 Kg
SUGAR	=	42 x 30 Kg
		80 x 25 Kg

#### TOTAL FOOD TO BE SENT AS PER MV. LATE

FLOUR	=	366 x 25Kg
SUGAR	=	14 x 30 Kg
		80 x 25 Kg

## ANNEX 2

### HMAV LATE PROPOSE PROGRAMME FOR HA'APAI FOOD DISTRIBUTION

1. ETD TOULIKI BASE 26 DECEMBER 0500 HRS
2. ETA HA'AFEVA 26 DEC. 1600 HRS
3. ETA KOTU 26 1830 HRS (OVERNIGHT & SUNDAY)
4. ETA MATUKU 28 DEC. 0600 HRS
5. ETA TUNGUA 28 DEC. 0800 HRS
6. ETA 'O'UA 28 DEC. 1000 HRS
7. ETA LOFANGA 28 DEC. 1300 HRS
8. ETA MO'UNGA'ONE 28 DEC. 1600 HRS
9. ETA HA'ANO 28 1800 HRS (OVERNIGHT HA'ANO)
10. ETA FOTUHA'A 29 DEC. 1000 HRS
11. ETA NUKU'ALOFA 29 DEC. 2200 HRS



GOVERNMENT OF TONGA  
**SAVINGRAM**

**From** Governor of Ha'apai  
**To:** Director of Works  
**Saving No** GH 36/178/98 **Date:** 25 December, 1998

**RE: FOOD SUPPLY DISTRIBUTION EXERCISE TO THE HA'APAI  
GROUP AND TROPICAL CYCLONE CORA WARNING**

1. Thank you for your faxed savingram No. *MW/20/88/98* of 23 December, 1998.
2. As I had pointed out to the Hon. Deputy Prime Minister, the assessments from the previous survey work carried out by T.D.S. and N.O.D.R.R. (Kaumavae Folau and Tesimoni Taufateau) are virtually similar, and thus pin-pointing the specific islands requiring priority assistance has not been too difficult.
3. We entirely concur with the plan of action prepared by the N.O.D.R.R. for the above-mentioned exercise and we note the HMAV 'Late' schedule at Annex 2. With the current tropical cyclone warning for 'Cora' we note that there may be alterations to the 'Late's' Schedule.
4. Grateful for your *advice* on any revised schedule. I note that the N.O.D.R.R. radio notices *have* been very effective in informing District and Town Officers of the various island groups.
5. In my saving to the Hon. Deputy Prime Minister (Ref: GH 36/175/98) I had not included the survey results for 'Uiha and Mo'unga'one so for the sake of completeness they are as follows:  
(Source T.D.S. Survey Report of 03/11/98) -
  - (a) Uiha: Total Population: 432 comprising of 240 adults 192 children (pre-school and school age). There are 100 families.  
Agricultural Situation: 160+ breadfruit trees counted. 12 acres of manioke. No talo or kape acreage reported. 4 acres of siaine and hopa. 8 acres of 'ufi and no kumala was reported.

(b) Mo'unga'one: Total Population of 162 consisting of 96 adults and 76 children. 200+ breadfruit trees were counted with 3 acres of manioke, 2 acres of tala, 2 acres of kape with some siaine and hopa acreage. 3 acres of 'ufi, and no kumala was reported.

6. The survey had included fruits such as lesi, mango, tava and including coconut trees. These I have excluded for the time-being although it will be noted that the mango season has appeared to be continuous in the group - and has assisted a lot of the islands as a food resource.

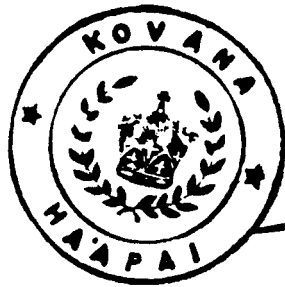
7. It would also be important to note that the manioke crop throughout the group is now virtually inedible due to the recent rainfalls resulting in water - logging (ofo 'a e manioke). Although I presume it could be mashed or grated and utilized in some other form.

8. The annual seasonal migration to Ha'apai will also put a strain on the food resources as all the December ships from Tongatapu have been full of people (including students) coming up to spend the festive season with their relatives here (especially in Ha'apai Hahake and the Lulunga Group). At the same token, a quantity of foodstuffs are also being shipped over to Ha'apai privately by relatives etc...

9. On the issue of Tropical Cyclone 'Cora' we have *earlier this* afternoon issued our own warnings based on the *Met Office* Reports from Nuku'alofa, (Special Bulletins No's 2 & 3) pending the coming on air of Radio Tonga (A3Z *in* the early evening). I considered this necessary to stop inter-island boats and fishing boats sailing and for there to be enough time for the people of the group to tether boats, animals etc... I have also telegraphed warnings to the Lulunga and Mu'omu'a *District* Officers. Ha'apai Police vehicles have covered the Ha'apai Hahake area *with* loudspeakers all afternoon advising people of precautionary measures etc... to take.

10. After all that, I wish to thank you for your season's well wishes. We are also particularly grateful for the generous food-stuff donations made by Tonga College and the Hon. Deputy Prime Minister. I don't think there could be any better X'mas gift - because as usual it is not only the material gift which counts but in the Tongan context (as I have learnt from the water distribution exercise) it is the thought and spirit in which things are *given* that is more important to the people of this island group.

11. I trust Pilimi and your NODRR staff have more things to think about for the time-being than a Merry X'mas (with cyclones replacing droughts etc...), but I still wish you and them all the best of the season - we can probably all celebrate later. May God Bless! And thank you for all your efforts on behalf of Ha'apai.



'Ofa atu,

*Fielakepa*

(Fielakepa)

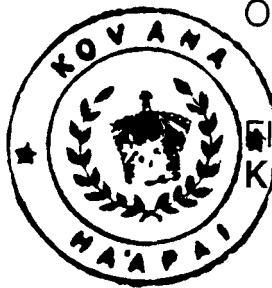
GOVERNOR OF HA'APAI

cc: Hon. Deputy Prime Minister  
Tonga Defence Services

TELEGRAM

ETAT Priority  
Pule Fakavahe  
Otu Muomua  
**NOMUKA**

.. KATAKI FAKATOKANGAI ANGE FAKATOKANGA MATANGI  
. SAIKOLONE KO CORA OKU NGAUNU MAMALIE HIFO MEI HE MAILE TAHI  
200 FAKATOKELAU HIHIFO O VAVAU AKI A E NOTI E FITU KI HE  
FAKATONGA HAHAKE STOP KAPAU E HOKOHOKO PEHEE AI PE  
AMANAKI KE I HAAPAI NI- TAUTEFITO KI HAAPAI HAHAKE KOTU PEA MO  
NOMUKA I HE HOUA E 24 KA HOKO STOP AMANAKI KI HE UHA LAHI MO E  
HOU A E TAHI KI HE TOE HOU ANGE STOP TOKI FAKAONGO LETIO AI PE  
I HAANE TOKI AVA A EFIAFI STOP OATU PE A E FETUUTAKI NI KOEUHI  
KEI MATE LETIO HE KILISIMASI KA KE TEUTEU KEI TAIMI KI AI MOHO  
VAHEFONUA STOP AMANAKI PE KUO AU LELEI ATU KI MUOMUA A E  
MAV LATE MO E TOKON.! MAHOAA MO E SUKA MEI HE POTUNGAUE  
GAUE STOP



OFA ATU

FIELAKEPA  
KOVANA 'O HAAPAI

**TELEGRAM**

ETAT Priority  
Pule Fakavahe  
Ha'apai Lulunga  
**HA'AFEVA**

KATAKI FAKATOKANGAI ANGE FAKATOKANGA MATANGI  
SAIKOLONE KO CORA OKU NGAUNU MAMALIE HIFO MEI HE MAILE TAHI  
200 FAKATOKELAU HIHIFO O VAVAU AKI A E NOTI E FITU KI HE  
FAKATONGA HAHAKE STOP KAPAU E HOKOHOKO PEHEE AI PE  
AMANAKI KE I HAAPAI NI- TAUTAUTEFITO KI HAAPAI HAHAKE KOTU PEA  
MO NOMUKA I HE HOUA E 24 KA HOKO STOP AMANAKI KI HA UHA LAHI  
MO E HOU A E TAHI KI HE TOE HOU ANGE STOP TOKI FAKAONGO LETIO  
. AI PE I HAANE TOKI AVA A EFIAFI STOP OATU PE A E FETUUTAKI NI  
KOEUHI KEI MATE LETIO HE KILISIMASI KA KE TEUTEU KEI TAIMI KI AI  
MOHO VAHEFONU STOP AMANAKI TOKI FOLAU ATU HMAV LATE  
. APONGIPONGI MO E UTA ~OKONI MAHOAA MO E SUKA KA TAU  
~ FAKAONGOONGO PE KI HE MATANGI STOP FEUNGA PE ULUAKI UTA  
\ PEA MO MUOMUA STOP



OFA ATU

FIELAKEPA  
KOVANA 'O HA'APAI

GOVERNMENT OF TONGA

**CIRCULAR SAVINGRAM**

**From** : Governor of Ha'apai  
**To:** All Heads of Government Departments  
& Statutory Boards

**Saving** No: GH 36/176/98

**Date:** 25 December, 1998

**RE: MATANGI SAIKOLONE KO CORA**

1. 'Oku'ou 'oatu heni ha tatau 'O e fakamatala matangi na'e ma'u 'i he 1'4:21 Hrs mo e 1500 Hrs"o e efiafi ni mei Nuku'alofa 'o felave'i pea mo e Matangi saikolone fakatalopiki ko 'Cora'.
2. 'Oku tu'unga hone' 'oatu 'O e fakamatala ni koe'uhi ko e 'ikai ha fakamatala lea 'a e Letio Tonga (A3Z) he 'e toki ava pe ki 'a efiafi.
3. Hange koia ko 'ene ha 'i he fakamatala 'okapau 'e hokohoko mai ai pe 'a e fononga mar 'a e matangi 'i hono halanga lolotonga 'e 'i Ha'apai ni 'a e matangi 'i he houa 'e 24 ka hoko ('i he 45 ki he 70 knots).
4. Koia 'a e fakatokanga ke fai leva 'a e ngaahi me'a 'e ala fai ke fakasi'isi'i 'aki ha maumau 'a e matangi ni ('oka hoko mai) ki he koloa mo e mo'ui 'i he vahefonua ni.
5. Ka 'i ai ha toe fakamatala 'e ma'u 'amuiange pea 'e toki fakahoko atu.
6. Fakatauange na'a mou ma'u ha Kilisimasi Fiefia pea 'oku tau fakatetu'a ki ha Ta'u Fo'ou Monu'ia.



*Fielakapa*  
\_\_\_\_\_  
(Fielakapa)  
**Kovana 'o Ha'apai**

\* Up-dated to 6:15 p.m.  
23/12/98

SPECIAL WEATHER BULLETIN NUMBER TWO FOR TONGA ON  
TROPICAL CYCLONE CORA ISSUED FROM TONGA METEOROLOGICAL  
SERVICES RELAYED FROM NADI AT 12:00 PM THIS MORNING, DEC 25  
1998.

**TROPICAL CYCLONE WARNING**

A GALE WARNING IS NOW IN FORCE FOR VAVA'U, HA'APAI, KOTU,  
NOMUKA AND TONGATAPU GROUPS.

A STRONG WIND WARNING REMAINS IN FORCE FOR NIUATOPUTAPU  
AND NIUAFO'OU.

TROPICAL CYCLONE CORA WAS RELOCATED NEAR 16 DECIMAL 3  
SOUTH, 177 DECIMAL 5 WEST OR ABOUT 230 MILES TO THE  
NORTHWEST OF VAVA'U AT 10:00 AM TODAY. THE CYCLONE IS  
MOVING SOUTHEAST AT ABOUT 05 KNOTS

ON ITS CURRENT PATH. THE SYSTEM IS EXPECTED TO CAUSE  
DAMAGING GALE FORCE WINDS OVER CENTRAL AND SOUTHERN  
TONGA WITHIN THE NEXT 24 HOURS.

OVER VAVA'U, HA'APAI, KOTU, NOMUKA AND TONGATAPU GROUPS:  
WINDS BECOMING STRONG TONIGHT AND REACHING DAMAGING  
GALE FORCE WITH AVERAGE SPEEDS TO 45 KNOTS AND MOMENTARY  
GUSTS TO 70 KNOTS TOMORROW MORNING. PERIODS OF HEAVY RAIN  
AND SOUALLY THUNDERSTORMS. FLOODING OF LOW LYING AREAS  
INCLUDING SEA FLOODING LIKELY. ROUGH TO VERY ROUGH SEAS  
WITH MODERATE TO HEAVY SWELL.

OVER NIUAFO'OU AND NIUATOPUTAPU:

EXPECT STRONG AND GUSTY NORTHERLY WINDS. PERIODS OF HEAVY  
RAIN WITH SOUALLY THUNDERSTORMS. FLOODING OF LOW LYING  
AREAS INCLUDING SEA FLOODING EXPECTED. ROUGH SEAS WITH  
MODERATE TO HEAVY SWELLS.

THE NEXT SPECIAL WEATHER BULLETIN FOR TONGA WILL BE ISSUED  
AROUND 2:00 PM

Special Weather Bulletin Number THREE for Tonga on TROPICAL CYCLONE  
COPA issued from RSMC NADI  
Dec 25/0108 UTC 1998  
TROPICAL CYCLONE WARNING

GALE WARNING REMAINS IN FORCE FOR VAVA'U, HA'APAI, KOTU, NOMUKA AND  
TONGATAPU GROUPS.

STRONG WIND WARNING REMAINS IN FORCE FOR NIUATOPUTAPU AND  
NUIAFO'OU.

Tropical Cyclone COPA was relocated near 17 decimal 0 south 177  
decimal 0 west or about 200 nautical miles northwest of Vavau at  
050000 UTC. The cyclone is now moving southeast at about 07 knots.

On its current path, the system is expected to cause damaging gale  
force winds over Central and Southern Tonga within the next 24 Hours.

Over Vava'u, Ha'apai, Kotu, Nomuka and Tongatapu groups, winds  
becoming strong tonight and reaching damaging gale force with average  
speeds to 45 knots and momentary gust to 70 knots tomorrow morning.  
Periods of heavy rain and squally thunderstorms. Flooding of low  
lying areas including sea flooding likely. Rough to very rough seas  
with moderate to heavy swell.

Over Niuatoputapu and Niufo'ou expect strong and gusty northerly  
winds. Periods of heavy rain with squally thunderstorms. Flooding of  
low lying areas including sea flooding expected. Rough seas with  
moderate to heavy swells.

The next Special Weather Bulletin for Tonga will be issued around  
030400 UTC.





## TONGA TELECOMMUNICATIONS COMMISSION

P O.Box 46  
Nuku'alofa  
TONGA

Phone No. 24255  
Telex 66225  
Facsimile 24800

Our Ref:

18th August 1998

Hon. Fielakepa,  
Governor of Ha'apai,  
Governor's Office,  
Pangai,  
HA'APAL

Hon. Fielakepa,

**RE: OUTER-ISLANDS TELEPHONES IN THE HA'APAI GROUP -  
24 HOUR RADIO VHF/HF**

I acknowledge receipt of your letter dated 4th August 1998 and indeed your concern has similarly created frustration within the Board of TIC and Management on the strategies to be taken to restore the outer island telephone system to normal operation.

For your information, following the destruction of the telephone Base System by lightening in May last year, NEC the manufacturer of the equipments was approached to provide the defective components. We were told that there are no spare parts available on the shelf. They have to be manufactured and the costs would be in the vicinity of a hundred thousand dollars (US). After taking a cost analysis exercise, we dispense the idea of repairing the telephone system and opted to look for a similar system in Australia, to provide an interim measure. At the same time a long term solution was planned using the Wireless Local Loop technology. This new technology will provide a telephone service to every home, business, churches or to the community.

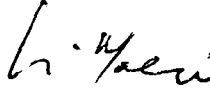
Meanwhile we are awaiting a reply from Telstra - Australia to give us the costs on the short term solution. On the question of the long term solution, we have secured finance of 1.6 million US Dollars from the European Investment Bank, Luxembourg to purchase the WLL equipments both for the outer island in Ha'apai and Vava'u. Six companies have

provided proposals and we are now in the process of negotiating with a potential bidder for the award of contract. This project when implemented will provide the people of the outer-island in Ha'apai a high quality telephone service.

Regarding the 24 hour VHF/HF radio watch, I believe the future for this type of service should be seriously considered by Government. TTC is focussing on commercial activities that will inject a reasonable return on investment. Activities which are not considered to be of commercial value to TTC are muted. The 24 hour Radio Watch will require (3) three operators to work around the clock plus one operator as a reliever. A trade off by reducing the dividend of 50% paid to Government annually could be used to finance the salaries for these four radio operators or better still this type of service be taken up by Marine Department.

I hope I have given you a clear picture on the two issues of concern to you and the Ha'apai Committee.

Yours sincerely



L. MALÜ  
GENERAL MANAGER



GOVERNOR'S OFFICE  
PANGAI HA 'APAI

Telephone 60-126 OR 60-005

Ref: GH 23/147/98

06 November, 1998

Lemeki Malu  
General Manager  
Tonga Telecommunications Commission  
P.O. Box 46  
NUKU'ALOFA

Dear Lemeki,

**RE: OUTER ISLANDS TELEPHONES IN THE HA'APAI GROUP**

1. Thank you for your letter of 18 August in reply to my letter of 04 August on the above-mentioned subject.
2. Indeed the wireless Local Loop system appears to be an advantage over the present system with the possibility of having more telephones in the outer islands of the Group.
3. I note that your staff here are busy with the laying of the telephone lines to Kouvai Foa. I believe that they have now reached the near-side of Faleloa. In previous discussions with your staff, I understand that once the lines reach the far side of Faleloa, then the two existing telephones there can be sent to Lofanga and Mo'unga'one. This would take care of the interim arrangement which I have previously raised with you.
4. I note your comments with regard to the proposal for 24-hour VHF/HF radio watch.
5. With regard to the establishment of the WLL system, do we now have a set time - frame for its installation? I will be most grateful to be up-dated on developments on this matter so that I can give an answer to the many queries I receive on the telephone issue.

6. Finally, it was good to see you at the opening of 'Pulotu' Wharf in Ha'afeva. I am always pleased to see Heads of Statutory Boards and Heads of Government Departments visiting the District. We will be commissioning the new Salote Bilolevu Airport on the 4th of December and we will be commencing the construction of Ha'ano Wharf later this month and following that the 'UihaiFelemea Wharf at Pualoto.

7. The Ha'apai Development Committee projects are now picking up momentum hence my request to be updated on the progress on the WLL system as I believe that its installation will facilitate all our other projects by the provision of faster and better inter-island communications.



Yours sincerely,

*Fielakepa*  
-----  
(Fielakepa)  
GOVERNOR OF HA'APAI

**Appendix 8.17**  
LIST OF ATTENDANCE –  
NATIONAL DISASTER ADVISORY  
COMMITTEE (NDAC) MEETINGS

LIST OF ATTENDANCE- NATIONAL DISASTER (NDAC) ADVISORY  
COMMITTEE MEETINGS

I Meeting on 28<sup>th</sup> December 1998

- Chairman - Hon James Cecil Cocker (Minister of Works and Disaster Relief Activities)
- In Attendance
- Taniela Tufui (Chief Secretary and Secretary to Cabinet)
  - Col Fetu'utolu Tupou (Commander, Tonga Defence Services)
  - Paula Lavulo. Director of Planning
  - Sione M. Taumoepeau, Director of Works
  - Haniteli Fa'anunu, Director of Agriculture and Forestry
  - Paula Bloomfield, Director of Education
  - Laumeesi Maiolo, Director of Health
  - Simione Silapelu, President of TANGO
  - Savae Latu, Secretary for Land, Survey and Natural Resources
  - Saimone Helu, Manager Tonga Water Board
  - Ngalu Fusimalohi, Representative Tonga Broadcasting Commission
  - Pilimi' Aho, Deputy Director of Works (NODRR)
  - Leveni' Aho, Deputy Director of Works (Building)
  - Sitafooti 'Aho, Representative Ministry of Civil Aviation
  - Busby Kautoke, Representative Tonga Telecommunication Commission
  - Maliu Takai, Deputy Secretary, Ministry of Works
  - Siaosi P Moala, Deputy Director of Works (Planning and Finance)
  - Maj. Sione Petelo, Tonga Defence Services

2 Meeting on the 30<sup>th</sup> December 1998

- Chairman - Hon James Cecil Cocker, Minister of Works and Disaster Relief Activities
- In Attendance
- Taniela Tufui (Chief Secretary and Secretary to Cabinet)
  - Col Fetu'utolu Tupou (Commander, Tonga Defence Services)
  - Paula Lavulo. Director of Planning

- Sione M. Taumoepeau, Director of Works
- Haniteli Fa'anunu, Director of Agriculture and Forestry
- Manase Felerni, Deputy Director of Agriculture and Forestry
- Tuitupou Fotu, Secretary for Marine and Ports
- Viliami Takau, Deputy Director of Education
- Simione Silapelu, President of TANGO
- Saimone Helu, Manager Tonga Water Board
- Paula Helu, Manager Tonga Electric Power Board
- Ngalu Fusimalohi, Representative Tonga Broadcasting Commission
- Pilimi 'Aho, Deputy Director of Works (NODRR)
- Isikeli F Pulini, Deputy Director of Works (Engineering)
- Kaitu'u Fotu, Representative Ministry of Civil Aviation
- Tai'atu 'A Cocker, Representative Tonga Telecommunication Commission
- Maliu Takai, Deputy Secretary, Ministry of Works
- Maj. Sione Pete'o, Tonga Defence Services

### 3. Meeting on the 4th January 1999

Chairman - Hon. James Cecil Cocker, Minister of Works and Disaster Relief Activities

In Attendance

- Taniela Tufui, Chief Secretary and Secretary to Cabinet
- Maj Sione Petelo, Tonga Defence Services
- Paula Lavulo, Director for Planning
- Tevita Kolokihakaufisi, Representative Ministry of Foreign Affairs
- Sunia Vikilani, Representative Ministry of Marine and Ports
- Paula Helu, Manager Tonga Electric Power Board
- Paula Bloomfield, Director of Education
- Busby Kautoke, Representative Tonga Telecommunication Commission
- Simione Silapelu, President TANGO
- Ngalu Fusimalohi, Representative Tonga Broadcasting Commission
- Supt. Polutele Tu'ihalama. Representative Ministry of Police

- Pilirni 'Aho, Deputy Director of Works ( NODRR)
- Haniteli Fa'anunu, Director of Agriculture and Forestry
- Sione Taumoepeau, Director of Works
- Isikeli F Pulini. Deputy Director of Works (Engineering)
- Tatafu Moeaki, Central Planning Department

#### 4 Working Sub-Committee

Chairman - Sione M Taumoepeau, Director of Works

Members - Paula Lavulo, Director of Planning

- Maj. Sione Petelo. Tonga Defence Services
- Pilirni .Aho, Ministry of Works
- Isikeli F Pulini, Ministry of Works
- Tatafu Moeaki, Central Planning Department
- Manase Felemi, Ministry of Agriculture