



ICT Damage Assessment and Recovery Plan after Cyclone Heta in Niue Islands

A report by

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Background

Tropical Cyclone Heta (5 January 2004) left behind severe physical damage in Niue, especially in the coastal areas of the capital city of Alofi where most of the government department buildings are located. The strong winds, rain and tidal waves destroyed some of the government buildings including the National Hospital, Justice Department and part of the Fale Fono; and most of the government buildings suffered severe damage by salt water. In the area of Information & Communication Technology (ICT), the damage was enormous. The Satellite Antennae and associated interface equipment were totally damaged and beyond repair, which resulted in the failure of international communication directly after the cyclone.

Urgent recovery of the fundamental ICT infrastructure was granted top priority by the Government of Niue. International communications (voice and data) have already been restored by the installation of one satellite dish provided by New Caledonia (the other has not been used/unpacked as of yet). Most of the workstations and databases in the government departments were severely damaged. The Information Systems Office (ISO) of the Department of Administrative Services reported that approximately 25% of all government computers had failed and another 25% of them will fail in the near future. Thus, over 50% of all government computers have or will fail in the short term from the crystallization of salt and corrosion from water caused by cyclone Heta. Replacement of damaged PCs and related IT equipment is urgently needed – and an inevitable task for the full recovery of the Government of Niue.

Damage of the government's IT equipment has led to the serious problem of retrieval of the government's sensitive and insensitive data. Since the year 2002, an International UNV Specialist has developed several databases for individual government departments upon request, and most of these were damaged along with the PCs. The ISO has currently tried to retrieve (salvage) the data from the hard drives of the damaged computers but there is no guarantee that it can retrieve all of them.

Whereas in the short term, replacement of damaged IT equipment is the urgent requirement for the recovery of the daily activities and services of the Government of Niue, the Cyclone Heta incident has revealed a vulnerability of the government's IT system in terms of the security management of its databases. This recovery plan will thus propose, as a mid- to long-term recovery plan, government wide Local Area Networking and centralization of critical data along with a formal backup and disaster recovery plan to be established in order to protect all the government's sensitive and insensitive data

from the risk caused by natural disasters such as cyclones, tsunamis and earthquakes, as well as man-made or natural fires.

This report is a product of the joint team efforts by the ISO Manager, ISO staff members and UNDP ICT consultant. The UNDP ICT consultant visited Niue from 16th to 19th January 2004, about two weeks after the cyclone together with an UNDP Samoa cyclone assessment mission in order to assess the ICT situation and discuss with government officials, including ISO staff members, needs and future recovery plans. Also to assess the planned government ISP establishment, the ICT consultant had visited Niue earlier in December 2003. The present ICT recovery plan consists of a short-term recovery phase and a mid- to longer-term recovery phase. For the ICT sector, in the short-term recovery phase, we propose the replacement of damaged IT equipment and application of latest OS with proper licensing system(s) (inventory list is attached in Annex 2). In the mid- to longer-term recovery phase, we propose the development of a Local Area Networking system and a new database management system (inventory list is attached in Annex 2). **Estimated cost for the short-term recovery totals US\$539,450 and for the mid/long term totals US\$191,000 with grand total of US\$ 731,950.**

Recommendations

1. Short-Term Recovery Plan:

Immediate Replacement of Damaged PCs and Related Equipment.

Replacement of damaged PC and related equipment is an urgent task for the Government of Niue to fully resume its daily operations and administrative services. Pre-Heta, there were a total of 300 PC workstations in the entire government department system. 130 PCs have already failed and 100 PCs will fail within 1 to 20 weeks due to the crystallization of salt and corrosion from salt water forced onto the island by cyclone Heta. The following are the hardware and software required to be purchased immediately (for more detail, see Annex 2):

Hardware:

	Item	Number	Amount (US\$)
1	PC Workstations	230	253,000
2	Memories for PC Workstations	7	800
3	Laptop PC	1	2,000
4	UPS	203	67,500
5	INK Jet Printer	46	13,800
6	Laser Printer	44	66,000
7	Image Scanner	9	1,800
8	Digital camera	6	1,200
9	Tablet style input device	1	1,000
10	Digital white board	1	2,000
11	Video projector	1	4,000

12	CAT 5E Cable(500m box)	6	2,200
13	RJ45 plug(100 packs)	5	150
14	Multimeter	2	500
15	CAT 5 Cable Tester	2	200
16	Ethernet Switch	21	3,700
17	Crimping tool	2	200
	Total		420,050

Software:

	Item	Number	Amount (US\$)
1	Antivirus Software	249	24,900
2	MS Office	231	92,400
3	Clean Slate(up to 100 PCs)	1	600
4	MAP INFO	1	1,500
	Total		119,400

Total Cost for the Short-Term Recovery: US\$ 539,450

2. Mid- to longer-term Recovery Plan:

Enhance the Government's Local Area Network to Protect the Data from Natural Disasters

The extensive damage caused by the cyclone Heta incident has revealed a vulnerability of the government's IT system in terms of data backup and disaster recovery. A government wide Local Area Network and centralization of data need to be established in order to protect all the government's sensitive and insensitive data from the future risk of disaster, both natural and otherwise.

Network / Database Situation before Cyclone Heta

Niue was in the early stages of development of an "e-government" programme prior to the disaster. A few Local Area Networks (LANs) existed already in some government departments - most involving a small number of computers connected "peer-to-peer". There has been no inclusion of domain controllers, or primary fileserver functions at this stage of the governments networking development. Most of the PC workstations in the government have been "stand-alone". Each individual PC workstation has to dialup to the Internet. Since the number of telephone lines and modem bank at Internet Service Provider (ISP) are limited, even at their busiest times, disengagement to the Internet has been frequent.

Since the year 2002, an UNV / UNITEs Training Specialist has developed databases for some of the departments upon their request. For example, the UNV has developed databases for the Payroll department (payroll report and tax certificate report), Niue National Hospital (outpatient visit records, outpatient registration), Office of External Affairs (donor database), and Department of National Training and Development (student information database). All the databases were created on the individual machines of the requested parties hence it is difficult to share the data whether they are located within the existing “peer-to-peer” LAN or dialup connection. Also, a uniform data management policy is currently being developed by ISO but not fully implemented.

Current Situation and Lessons Learned from Cyclone Heta Disaster

The existing data management policy that was administered by the ISO was largely underutilized therefore, the main urgent task of the ISO staff members has been the “salvation” of the government’s data. They have taken the hard disks out of the individual damaged PCs and manually cleaned the hard disks in order to retrieve the data. There is no guarantee that they will be able to retrieve all the data and it is likely that some of the hard disks are also physically damaged. At the same time there is a high possibility that the data might not be retrievable even if “data salvation” is successfully completed because of the lack of “Standard Naming Conversion” and “Directory Trees.”

It is inevitable that other natural disasters will affect Niue in the future and therefore the physical damage of IT hardware might be unavoidable and other factors such as construction of cyclone proof government building or relocation of the buildings may need to be considered if this type of risk is to be reduced. A lesson learned from Cyclone Heta is that critical data could be better safe guarded and a system be put in place in order to protect the data from disaster, both natural and otherwise. Two specific solutions we propose that would mitigate any further risk are as follow:

1. Continue and expedite the installation of Client/server Local Area Networking with file/database server;
2. Implement a full ITC disaster recovery plan, which will cover IT and Communications.

The ISO is currently working on establishing a file database server as a central point in each government office in order to save the information. A file/database server will be set up as a central point in each government office in order to save the information. A file/database server will reduce the risk of salvation of the data from individual workstations in case of their physical damages. With a file/database server, the data backup for the office data does not need to be done in each individual workstation but only the file/database server. The security of the data will be easily ensured if the backup mediums (CDs/tapes/HDDs) are in their safekeeping. Regular backup of file/database servers should be in operation systematically and ISO staff members should be trained in its usage and should understand the meaning and importance of the data backup.

Continued installation of a government-wide LAN will also solve the current Internet connectivity problem. It will also strengthen the security of workstations from viruses and various Internet attacks.

Local Area Network Design

Consideration should be given by government to the following recommendations for the possible design of the LAN:

- (1) A file/database server will be equipped in each government department.
- (2) CAT5 Ethernet network cabling is used to access to the server as well as 100Base-TX Fast Ethernet switch to provide fast and secure network access.
- (3) The cabling will be constructed under the de facto standard called 'Structured cabling system'. The structured cabling system supports multiple voice, data, video and multimedia systems regardless of their manufacturer.

Required equipment for Mid- to longer-term recovery

	Item	Number	Amount (US\$)
1	PC Workstation	2	2,200
2	Workgroup Server	15	97,500
3	UPS	15	12,400
4	UPS External Battery	1	1,000
5	Ethernet Switch	1	200
6	Satellite	1	33,000
7	Cisco 2600 with 16 ports modem module	2	30,000
8	Network Cabling		14,700
	Total		191,000

Total Cost for the Mid/Long Term Recovery: US\$ 191,000

Required materials such as length of cables, outlet concentrators, number of cabinets and etc needs further investigation.

Role of Information Systems Office (ISO)

Currently ISO has a capacity of hardware maintenance. They are planning to have the capacity of an Internet Service Provider (ISP). UNDP Samoa has been supporting this government initiative since last year. At the end of December 2003, together with the UNDP ICT consultant, ISO finalized the equipment and configuration and it is ready to procure. ISO should have an additional capacity in Local Area Network management.

Capacity Building of ISO

Average 10 working days are required to setup LAN in 21 departments (42 weeks out of 52 weeks/year). One instructor should be recruited in order to build the capacity of ISO staff members in this matter. The instructor will work with a dedicated ISO staff member to conduct “on-the-job” training to the ISO staff members, while he/she will take an initiative to setup the LAN and the new Internet connection.

The instructor will cover:

1. Initial hardware (workstations, servers) software (antivirus, security appliance, etc.) configuration
2. Testing the system
3. Instruct users how to use the new system
4. Instruct designated IT responsible officials how to take backup. (Each department needs to designate one or two officials who will operate backup).
5. Instruct ISO staff how to recover, restore data from media
6. Instruct trouble shooting of LAN and new Internet connectivity.
7. Create documents of the setup for each department.

SUMMARY:
RECOMMENDATIONS OF ICT DAMAGE ASSESSMENT REPORT AND RECOVERY PLAN

	Issue	Immediate Responses	Longer-term Actions	Strategic Intervention	Cost (US\$)
Short Term	Recovery of the Niue Government’s daily ICT operations and connectivity	Replace all damage hardware and software computer equipment	N/A	- Proper software license observed	539,450
Mid / Long Term	Enhance security of the government’s information and communication system	Cabinet approved plan	1. Policies, Plans and protocol	- Full implementation of data/communication policies - Development of disaster plan	191,000
			2. Infrastructure	- Procurement of equipment for LAN and ISP - Establishment of a government-wide Local Area Network - Development of database/file servers - Set up government owned ISP	
			3. Capacity Building	- Recruit additional numbers of ISO staff - Capacity building of ISO staff members for operating new system and government ISP by a technical advisor - Training of government officials for operating new system	32,000
Total					762,450