JTB-DM/303

UNITED NATIONS

OFFICE OF THE DISASTER RELIEF

CO-ORDINATOR

UNDRO

A REPORT ON CYCLONE ISAAC

THE KINGDOM OF TONGA

MARCH, 1982

by

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APRIL 1982

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A - Mitigation and Preparedness for Natural Disaster in the Kingdom of Tonga by James Lewis (1978)

B - Kingdom of Tonga - Fourth Five-Year Development Plan 1980-85.

INTRODUCTION

1. Tropical Cyclone Isaac struck the Kingdom of Tonga on 3 March 1982, tracking roughly north-east to south-west and cutting a swathe the length of the Kingdom. (See Annex A for disposition of island groups and approximate path of the cyclone).

2. The Cyclone, with its very high wind velocities and accompanying storm surge, caused widespread damage to and loss of buildings, crops, services and other aspects of the national system. Thus is it surprising that casualties to people were low, 6 persons died and some 150 were reported injured.

TERMS OF REFERENCE

3. Terms of reference for this consultancy, contained in UNDRO telegram MSC1818, stated broadly, were:-

(a) To assess outstanding emergency needs with United Nations Development Program Resident Representative, Suva and with appropriate national and international relief officials.

(b) To review and analyse national and international aspects of warning and response in the context of regional disaster preparedness.

4. As regards 3(a) a consultancy briefing was received from the Resident Representative UNDP in Suva on 12 March 1982, en route to Tonga, and work in Tonga itself involved association with appropriate UNDP local officials. Contacts with other international officials and with national representatives were comprehensive and integrated. For example, the consultant attended meetings of the Relief Committee established by the international community; he was also given an office next door to that of the Chairman, Disaster Relief Sub-Committee in order to facilitate involvement in national activities.

5. As regards 3(b), apart from some initial constraints understandably imposed by national pre-occupation with the requirements for disaster relief, the information-gathering process posed no particular problems for this type of consultancy.

6. A list of the main individuals, departments, organizations and agencies consulted is given in Annex B.

AIM OF REPORT

7. The aim of this report, therefore, is to outline the main factors affecting warning of and response to Cyclone Isaac and, within a regional context, to make recommendations for future counter-disaster effectiveness in Tonga.

BACKGROUND

8. The Kingdom of Tonga (see Annex A), located between latitudes 15°S and 23.5 S and longitudes 173°W and 177°W, consists of three main island groups, Tongatapu/'Eua, Ha'apai and Vava'u. These groups comprise a total of 170 islands, 36 of which are inhabited. Total population is estimated as 96,400, of whom approximately 65,000 live on Tongatapu.

9. The Kingdom is exposed to a wide range of natural hazards, comprising cyclone, earthquake, volcanic eruption, drought and tsunami.

10. The most frequent threat is from cyclones which have averaged one every 1.6 years over the last 106 years. Recent examples are:

Cyclone Juliette	1973
Cyclone Anne	1977
Cyclone Ernie	1978
Cyclone Isaac	1982

11. The frequency factor is therefore self-evident. In addition the general effects tend to be common. Cyclones Juliette, Anne and Ernie brought problems of shelter, food, water supply and crop production. Cyclone Isaac did likewise. The need for adequate counter-disaster arrangements in Tonga is therefore clear.

12. Indeed in 1973, following Cyclone Juliette, a Hurricane Relief Committee was established and this Committee functioned actively until organizational changes were made in 1979. These changes stemmed from the recommendations made in Reference A (the Lewis Report) and in essence comprised the setting up of:

A National Disaster Committee

A Preparedness Sub-Committee

An Action Planning Sub-Committee

A Relief Sub-Committee.

The National Disaster Committee, under the chairmanship of the Prime Minister, was virtually an augmented Cabinet and thus had extensive power in terms of decision-making and national direction.

13. Another important background consideration resulting from Tonga's persistent disaster problem is the pattern of international aid and support. The fact that such aid has been so readily available and generously given has an obvious influence on total counter-disaster arrangements. In this regard Reference A states that "Whilst the massive international focus on relief-aid continues, there will be little hope of the indigenous formulation of solutions to the underlying structural problems of disaster that political, economic, social and environmental factors have combined to bring about, but which do possess the latest capacity for mitigation". It is therefore of some interest to note that in Reference B no mention could be found of the possible effects of disaster on Tonga's future progress or of the potential benefits from a disaster preparedness program.

PREPAREDNESS PRIOR TO CYCLONE ISAAC

14. Against these brief but essential background factors, the main aspects of preparedness prior to Cyclone Isaac are now considered.

National Aspects

15. In any consideration of national preparedness for disaster, one factor is of prime significance. It concerns the island nature of Tonga, with all the constraints which this may impose on speedy and effective operational movement (unless specialist airlift is available vide paras 44 and 45). This fact needs to be borne in mind with regard to the preparedness factors contained in paras 16 and 22 below. Also to be borne in mind is the fact that central government and the major proportion of the population are centred on Tongatapu.

16. Resources Available. In a country the size of Tonga with a predominantly agriculture-based economy, counter-disaster resource are perforce limited. The main resources on which call might be made are:

(a) Meteorological Service
(b) Civil Broadcasting Network
(c) Telecommunications
(d) Police and Fire Service
(e) Medical and Health Services
(f) Transport Facilities (including inter-island sea transport and local airline capability)
(g) Construction and Repair Services
(h) Essential Services Capability (Water and Electricity)
(i) Commercial and Industrial Resources
(j) Tonga Defence Service
(k) Voluntary Organizations
(l) Manpower for self-help.

17. Organization. Prior to Cyclone Isaac organization was centred on the Committee structure outlined in para 12. However, it would appear that the sub-committee structure had already come under scrutiny as being too cumbersome. Thus, given the established role of the former Hurricane Relief Committee (later the Relief Sub-Committee) and the considerable experience of its Chairman, the Hon. Dr S.L. Kavaliku, there appeared to be merit in perhaps combining the three sub-committee roles into one entity, responsible to the National Disaster Committee. It is significant that, under the stimulus of yet another cyclone disaster, a decision in this regard was quickly forthcoming (see para 39). That there should have been some doubt concerning organization should not be allowed to obscure one important fact. It is that if disaster events impose repeated demands on government departments, voluntary organizations and anyone else directly involved, then this produces, at least to some extent, a form of in-built disaster preparedness. Such a situation could be said to apply in Tonga.

18. Planning. There was no formal disaster plan prior to Cyclone Isaac. However as can be gathered from paras 12 and 17 above, there was a conceptual understanding of how counter-disaster action should be taken. Nonetheless, as subsequent sections of this report indicate, this lack of a plan did produce certain disadvantages. For instance, if there had been a tested disaster plan, it is very doubtful whether it would have been necessary to make organizational changes once the disaster had struck; and similarly, provision would have existed for an Emergency Operations Centre (EOC).

19. Training. As far as can be established, no formal counter-disaster training had been organized. There is indication, however, that once the question of organization had been satisfactorily

19. (continued)

resolved (see para 17), it was intended to hold at least one exercise every year to test counter-disaster arrangements generally.

20. Public Education and Awareness. No formal program for public education and awareness existed prior to Cyclone Isaac, though some basic rules for natural emergency situations, with illustrations, are contained in the front pages of the Tonga telephone directory. This is a useful public education/warning facet but it has the obvious limitation of restricted circulation. However, some potential assets for the development of future public education and awareness do exist: they are dealt with later in this report (see paras 83-84).

21. Warning arrangements. An established concept and procedure for warning is in being. Briefly it consists of:-

(a) receipt and assessment of meteorological information by the Meteorological Section.

(b) public broadcasting of this information over the network of the Tonga Broadcasting Commission (TBC).

(c) notification from the Meteorological Section, on a pre-arranged basis, to key persons and organizations that a cyclone problem is developing; and a request to them to listen out for further TBC broadcasts.

(d) an arrangement whereby TBC stays on air whilst emergency broadcasting requirements exist (TBC normally broadcasts on a limited daily schedule only).

It should be noted that various government programs and directives are broadcast over TBC and that the community is accustomed to receiving information, including disaster warning, in this way. Indeed, TBC constitutes the primary information and news transmission

21. (continued)

network for the nation, there being only one weekly newspaper available. This was personally confirmed post-impact in discussions with the Police Magistrate of the Ha'apai Group. When asked why he carried a large portable radio with him, he explained that he was listening out for possible instructions from central government in Tongatapu. Another important asset is that TBC retails an inexpensive transistor radio to the public and it is understood that 'nearly every home has one'. A minor limitation must also be noted: TBC reception in the Vava'u Group is at extreme range and constitutes "hard listening". However, receipt of warning, though difficult, is not precluded.

22. In regard to preparedness generally, the attendance by Tongan representatives at various international seminars, courses and study groups could be expected to provide a core of expertise and advisory capacity. However, it was noted that, perhaps due to exigencies of manning demands, certain government officials thus qualified were not specifically employed in disaster-related posts.

International Aspects

23. Experience, both world-wide and regionally, of providing aid to nations stricken by disaster is, of course, very extensive. Also, as inferred in para 13, Tonga is no stranger to the role of recipient nation. There was, therefore, a form of in-built preparedness here, in the sense that this donor/recipient relationship was well understood by both the Tonga Government and international representatives based in the country. The local specialist knowledge referred to in para. 22 may also have made some contribution.

24. There is also the point that since an extensive United Nations Development Program exists in Tonga, then at least a general

24. (continued)

knowledge of the UN System by government and other agencies could be assumed (however, see para 67 for further comment on this aspect).

WARNING OF CYCLONE ISAAC

Warning Information

25. The approximate timing of Cyclone Isaac's track through the Tongan island groups (see Annex A) was as follows:-

Tongan time	
0100 3 March 1982	Centre 40 miles E of Vava'u
0500 3 March 1982	Centre 20 miles NE Ha'apai
1100 3 March 1982	Centre on SW end of Ha'apai
1340 3 March 1982	Centre 20 miles NNE Tongatapu
1600 3 March 1982	Centre 30 miles SW Tongatapu

26. Prior to and during the Cyclone's impact on Tonga the Tropical Cyclone Warning Centre (TCWC) at Nandi (Fiji) issued the following warning information given here in summarised form:-

Tongan time	
0545 2 March 1982	Tropical Cyclone ALERT for Tonga. Cyclone Isaac about 270 miles NE Vava'u.
1130 2 March 1982	Tropical Cyclone ALERT for Tonga. Cyclone Isaac about 240 miles NE Vava'u moving SW.
1728 2 March 1982	Tropical Cyclone ALERT for area from Ha'apai Group to Tongatapu Group Cyclone Isaac about 120 miles NE Vava'u moving SW. Has winds of 65 knots near centre and gusts to about 90 knots.

26. (continued)

0523 3 March 1982 Hurricane WARNING in force Ha'apai and Tongatapu groups. Cyclone Isaac centred about 20 miles NE Ha'apai at 0500; expected to move SW. Estimated 80 knot winds at centre and gusts to 120 knots.

1145 3 March 1982 Hurricane WARNING in force Southern Ha'apai area. Cyclone Isaac centred about 40 miles NNE Nuku'alofa (Tongatapu) at 1100. Estimated winds at centre 80 knots with gusts to 120 knots. Hurricane force winds expected within 25 miles of centre. Gale force winds expected to about 100 miles of centre. Cyclone expected to move towards SW at about 12 knots. Centre expected to pass close to Nuku'alofa. Very destructive hurricane winds forecast, with average speeds over 63 knots and momentary gusts over 90 knots, expected to move over Nomuka (Southern Ha'apai) during next 2-3 hours and over Tongatapu as cyclone approaches and passes through the group. Winds may reach average speeds of 80 knots with momentary gusts to 120 knots in some places and could cause severe damage. In these areas very high tides and waves are expected to cause rapid flooding to low-lying islands and coastal areas. Rain likely to be very heavy and flooding is to be expected.

26. (continued)

1610 3 March 1982 Storm WARNING in force for Tongatapu. Cyclone Isaac centred about 30 miles SW Nuku'alofa at 1600 Tongan time. Estimated winds close to centre about 80 knots with momentary gusts to 120 knots. Cyclone expected to move SW at about 12 knots. Winds over Tongatapu averaging about 50 knots at first with gusts up to 70 knots, decreasing by about midnight and further decreasing tomorrow.

TCWC Nandi continued to transmit further information as Cyclone Isaac moved SW out of the Tongan region.

Dissemination of Warning Information

27. The warning information outlined in para 26 was disseminated in accordance with the procedures quoted in para 21.

28. On 2 March 1982, after scheduled broadcast periods of 0650-1000 and 1200-1400, the Tongan Broadcasting Commission (TBC) commenced its third period (normally 1730-2300) and continued through the night 2/3 March, in order to broadcast warning information provided by the Meteorological Section. Also, on its own initiative TBC broadcast the telephone directory information mentioned in para 20. TBC continued on air till approximately 1130 local time on 3 March, when it suffered a power failure (by this time Tongatapu was beginning to feel major effects from the cyclone). Attempts to utilise emergency power proved abortive and TBC was off the air as far as its warning role was concerned.

29. Significantly, however, Radio Fiji, realising the vital role played by TBC in keeping the Tongan Community informed, began broadcasting in the Tongan language. The Tongan Community for its part, with its avid listening habit, soon picked up the Fiji transmissions. Thus, as far as possible, continuity of warning was achieved. However, the timing of the cyclone track when related to the timing of warning information suggests that Vava'u might not have received maximum warning of the cyclone's threat. Personal reports from Vava'u tend to substantiate this. This point is not raised as a criticism but as something which might merit investigation for future effectiveness.

30. Clearly, short of a major national survey, the efficacy of warning, and community reaction to it, cannot be comprehensively judged. However, the very low casualty figures tend to indicate that the community generally heeded the warning and took what precautions and shelter were available. In this regard it is worth noting that rural areas appear perhaps more "radio-aware" than their urban counterparts. Post-disaster discussions in Ha'apai indicated that people did listen to warning broadcasts and sensibly, despite cyclonic rain, took shelter behind substantial structures such as concrete water tanks and under house foundations in order to avoid injury from flying debris. The fact that the cyclone struck mainly in daylight also, of course, helped people in their precautions, thus contributing to a low casualty rate. Certainly some urban dwellers did not receive the warning information, simply because they were doing something else and not listening. One such urban dweller did: this was the Executive Officer, Red Cross, who heard the cyclone information broadcast on 2 March and immediately alerted International Red Cross in Geneva. International Red Cross therefore had the best possible lead-time in which to organise its

30. (continued)

response. It should also be recorded that Fiji Red Cross maintained a monitoring watch in order to ensure that Geneva was kept fully informed.

Initial Government Action on Receipt of Warning

31. It will be appreciated that various actions were taken by government departments and officials, throughout Tonga, as warning information became relevant to their area and responsibility. However, the first major action by the Central government on Tongatapu was to convene a meeting of the Disaster Relief Sub-Committee on the morning of 3 March by which time Tongatapu itself was being attacked. Immediately following this meeting, and pending initial clarification of the effect of the cyclone, the office and department of the responsible Minister, the Hon. Dr. S. L. Kavaliku (Minister for Education) became "Disaster Headquarters". Developments from this situation are outlined in paras 37 and 38.

EFFECT OF IMPACT

32. Meanwhile, it was obviously of urgent priority to establish as fully as possible the effects of Cyclone Isaac's impact on the nation. In this regard two major problems stood in the way. One was the multi-island configuration of Tonga. The other was the serious loss of telecommunications, caused mainly by damage to aerials; and it is understood that this damage took several days to rectify completely.

33. There was another interesting and significant factor. It was that because of previous cyclone patterns, a broad assumption existed that Tongatapu (and therefore the central government) was not likely to be seriously affected. Thus, on all counts this time,

33. (continued)

the central government found itself significantly inhibited. True, the damage to Tongatapu provided a form of assessment benefit: it suggested that if this damage was anything to go by, then the national problems which lay ahead would be daunting.

34. However, pending the arrival of outside aid, especially in the form of reconnaissance capability, the full effect of the cyclone's impact would remain only partially defined.

THE EMERGENCY PHASE

Duration

35. The emergency phase of this disaster, as officially declared by the Government of Tonga, extended from impact until 15 March 1982, inclusive.

Declaration of National Disaster Areas

36. At the beginning of this emergency phase, national disaster areas were declared by Cabinet, together with general priorities.

Organization

37. The organization used to deal with initial emergency operations was fundamentally a combination of the National Disaster Committee and its Relief Sub-Committee (para 12 refers). Normal government business was suspended; and departmental resources were diverted, as appropriate, to disaster requirements.

38. However, as the magnitude of the disaster became clear (see para 45) the need for an Emergency Operations Centre (EOC) was apparent: without an adequate EOC capability, the collection, collation and assessment of vital information, and subsequent decision-making, could not be effectively achieved. On 8 March, therefore, an EOC was established in the headquarters of the Tonga Defence Service in Tongatapu.

39. At the same time the need to streamline the organization mentioned in para 12 also became apparent. Accordingly on 8 March Cabinet approved a revised structure under which Cabinet itself became the National Council for Disaster Relief, Rehabilitation and Reconstruction (NCDRRR) and a Unit called Central Operations replaced the Disaster Relief Sub-Committee. An outline diagram of this organization is at Annex C. Some comments on this necessity for changes have already been made in para 18.

Decision-Making

40. Decision-making in this revised organization was allocated broadly as follows:-

(a) NCDRRR - Policy Decisions

(b) Central Operations (Minister i/C and Chairman) - Decisions for executing NCDRRR policy.

In relation to (b) it is noteworthy that the Minister was given wide decision-making powers in order to speed up the disaster response process.

Assessment

41. Clearly, when the Disaster Relief Sub-Committee (DRSC) met early on 3 March (see para 31) it was confronted by a mammoth task in terms of relief, rehabilitation and reconstruction. Its urgent immediate need, however, was for information on which an accurate assessment of the total situation could be made; and given the circumstances, the effective gathering of this information would not be possible without the assistance of an air capability. Pending the arrival of such assistance, it would appear that the DRSC had no option but to do what it could to mobilise national measures of response (eg organising assessment teams, initiating road clearance, providing relief in Tongatapu, etc) and to consult

41. (continued)
with representatives of the diplomatic corps concerning various international aid aspects.

42. For its part, the international community responded along well-proven lines. The Dean of the Diplomatic Corps, the Australian High Commissioner, automatically assumed chairmanship of an international committee and the task of establishing the type and extent of outside aid began.

43. By 4th March, even without a full assessment, it could be reasonably assumed that the major aid needs would be for food; tents; medical supplies; blankets; generators; emergency communications and transport.

44. International response was prompt. Early on 5 March elements of the Royal Australian Air Force and the Royal New Zealand Air Force arrived in Tongatapu. Both brought vital assessment assets. The first RAAF Hercules sorties (five on 5 March) included the lift of two Iriquois helicopters; whilst the RNZAF initially provided an Orion maritime reconnaissance aircraft and, subsequently, one Andover transport aircraft and 2 Iriquois helicopters.

45. Once this air reconnaissance capability became available and assessment teams could be put on the ground by airlift in the areas worst affected, the situation, though undoubtedly very severe indeed, could at least be tackled in a reasonably coherent manner, with appropriate priorities. Consequently it was soon revealed that the serious problems areas were undoubtedly:-

(a) Destruction of dwellings. This was significant in Vava'u and Tongatapu and very severe in Ha'apai, where about 50% of the 1800 or so homes were destroyed. Apart from homes destroyed, others obviously received varying degrees of damage.

45. (continued)

(b) Destruction of and damage to water supplies. Whilst well water is available to the island communities generally, the water tables are shallow and this often results in supply being brackish. Thus, there is a wide dependence on water caught from roofs and transferred by guttering to storages. The widespread destruction of roofs and guttering, plus cyclone contamination of existing storages, produced a serious shortage of potable water. This shortage, it was estimated, could be long-term unless catchment repairs were effected speedily and future rainfall thereby conserved.

(c) Destruction of and damage to crops. The cyclone inflicted extremely severe damage on the banana and coconut industries; also on cash and subsistence crops.

(d) Disruption of essential services. Essential services such as communications, power, water supply, transport and hospitals were all affected to one extent or another.

In addition to these major problem areas, others (such as risk of disease, effect on government administration due to building damage, disruption of education resulting from destruction of facilities, major foreshore reconstruction in key areas etc) could readily be foreseen.

46. In relation to the foregoing facts on assessment, post-impact consultancy inspection in the Tongatapu and Ha'apai Groups confirmed the seriousness of the situation. It also reaffirmed the view that in relation to levels of destruction and damage, the casualty rate was extraordinarily low.

47. Obviously, assessment data continued to accrue in parallel with relief action; and with the setting up of an EOC on 8 March (see para 38) the processing of this data became more effective.

Emergency Relief Operations

48. Relief operations were many and varied: and went on ceaselessly during the emergency phase. Many organizations and agencies, government and non-government, official and volunteer, rendered vital and devoted service. It would be impossible within the scope of this report to mention all such organizations and agencies. But general tribute to them is hereby acknowledged and recorded.

49. Communications. With the arrival of the Australian and New Zealand Defence Force elements, plus gradual restoration of national facilities, a workable system of telecommunications could be established. In essence it linked Central Operations with the Disaster Relief Committees in Ha'apai and Vava'u and covered relief requirements in Tongatapu. Also a Communications Centre, set up next door to the EOC, covered land and air control for the Australian and New Zealand forces: additionally it catered for Tongatapu's transport radio centre and sea communications net. Thus, relief operations could now be given reasonably clear direction and coordinated application.

50. Coordination. Overall coordination of relief measures was directed by Chairman Central Operations, through the organization shown in Annex C. Given the limitations imposed by the upheavals and disruptions of post-impact conditions, the system worked well. Admittedly some criticisms were voiced concerning the speed of relief action in certain cases: also concerning scarcity of information. However, in disaster response records it would be difficult to find an example of perfect coordination: often it is the reverse. But in any circumstances, it is important that arrangements for coordination are clearly defined and tested well beforehand, as part of preparedness measures. For international

50. (continued)

aspects of relief, the international committee mentioned in para. 42, despite the normal problems of establishing precise aid donations and pledges, fulfilled an invaluable coordinating role.

51. Tasking of Organizations. The requirements reflected by survey and assessment (see para. 45) were met by the general tasking arrangements shown below: this is not intended to be exhaustive, but merely to illustrate broad allocation of role:-

(a) Defence Force elements. It is worth noting that in post-impact conditions, defence forces possess certain invaluable characteristics: they include self-supporting organization, mobility, communications and special skills. In this instance (and as examples only) Australian and New Zealand forces were involved in:-

* further survey and assessment
* transport of people and stores
* medical survey and services
* emergency water supply to badly stricken areas
* rehabilitation of power supplies etc. etc.

(b) Government Ministries and Departments. As is usual, these extended their normal roles to meet disaster needs, as best their capabilities allowed. Examples are:

* clearance of roads, airfields etc.
* maintenance of civil air and maritime services
* rehabilitation of essential services
* transport of emergency commodities
* maintenance of health services and preventive measures
* assistance in meeting needs for shelter, food and clothing in the worst affected areas, etc. etc.

51. (continued)

(c) Red Cross. As indicated in para. 30, Red Cross was alert to possible response needs even before Cyclone ISAAC struck and was able to provide some early relief measures in the form of clothing, blankets and first aid assistance. It continued strongly in this general welfare support role throughout the emergency period. In this role it received strong direction from the official delegate of the League of Red Cross Societies (the Executive Director of the Victorian Division (Australia) of Red Cross), who possessed valuable prior post-impact experience. Thus, the Red Cross function embraced a variety of extra tasks, notably the provision and funding of health inspectors from both Australia and New Zealand. These specialists, tasked by the Tongan Government, provided invaluable services in the health protection fields.

(d) Church and Welfare Organizations. These, such as Council of Churches, Peace Corps, Foundation for the People of the South Pacific, Seventh Day Adventist Mission, etc., all played a most valuable part in providing relief services and fulfilling a wide variety of assistance roles.

It should also be noted that whilst the Tonga Police was not tasked by Central Operations, it contributed in a variety of ways to the overall emergency relief task. Valuable assistance was also forthcoming from the Tonga Defence Services, which were mobilised for action early in the warning period.

52. International Aid. As the emergency phase progressed, and the extent of Tonga's plight became known, offers of international aid accumulated. Some notes on this aid are contained in Annex D but it is worth recording that the initial RAAF airlift on 5 and 6 March

52. (continued)

(8 Hercules sorties) provided major amounts of the commodities listed in para. 43, plus military personnel to assist in their distribution and utilization. In parallel, of course, the RNZAF airlift also made a key contribution. Thus, the point to be made here is that a quick and sizeable initial airlift by Hercules-type aircraft can provide a vital injection of relief early in the post-impact period of any disaster such as Cyclone Isaac; and this point has particular relevance to disaster assistance in the Pacific region generally.

RESTORATION AND RECONSTRUCTION

53. The period of this consultancy was such that only the initial aspects of the restoration and reconstruction periods could be covered i.e. up to 5 April 1982. The information in this section may not therefore reflect final situations in data assessment, priorities and decision-making.

The Problem

54. The problem facing Tonga as a result of cyclone Isaac was a typical one in terms of recovery from disaster. Almost every part of the national system had been affected and the Government faced the twin tasks of:-

(a) the continuance of normal government functions and national activities, plus,

(b) the formation, development and execution of plans and projects necessary for restoration and reconstruction.

Given that task (a) normally requires the full effort and resources of the government machine, it is clear that task (b) can only constitute a massive national overload.

55. It is doubtful if to date (5 April 1982) the full extent of the problem can be measured but some very general idea can be gathered from the following estimates for three projects only:

Housing Needs	$US 5,600,000
School repairs and reconstruction	6,510,000
Foreshore repairs (one section)	3,472,000
	15,582,000

The annual government budget (not including aid programs) is approximately $US 16,250,000.

56. Additional details contained in Annex E help to give a wider perspective of what is involved in the total recovery requirement. In this connection it obviously needs to be borne in mind that, as with all disasters, recovery costs are, by their nature, imprecise; and needs directly attributable to the disaster tend to become inseparable from desirabilities envisaged pre-disaster.

57. In endeavouring to address itself to these major and generally longer-term problems, the Government of Tonga also had to bear in mind, of course, the carry-over from the emergency period: that is, the need for continuing to provide food, shelter and clothing wherever the need was serious.

58. Perhaps one of the biggest difficulties of all for the Government of Tonga in looking towards the future is that of balancing-off its post-disaster program needs against the various aid options available. The political implications involved are outside the scope of this report; but their effects on Tonga's recovery from Cyclone Isaac are nonetheless real.

59. In both the short and long term there are, as always, delicately balanced issues where outside aid is concerned. For instance, too much aid in food can produce a "hand-out" resignation among

59. (continued)

deprived communities: whereas it is in the national interest, and that of the communities themselves, that wherever possible people should get back to work. Similarly, massive inputs of aid commodities can seriously upset commercial and associated programs. The evidence is that the Government of Tonga is aware of these pitfalls and striving to avoid them. The decision to apply a three-months emergency program, plus a longer-term school feeding program, under the auspices of the World Food Program, was thus carefully considered and made.

Organization

60. To assist in meeting the requirements illustrated in paras. 54 to 59 above, the Government decided to retain the Central Operations structure in an advisory capacity and to set up a new smaller, more-streamlined organization, to be called the Office for Disaster Relief and Reconstruction. This Office is to be directed by Hon. Dr. S. L. Kaveliku, also Minister-in-Charge of Central Operations, thus giving the very necessary continuity required for dealing with the total spectrum of response to the aftermath of Cyclone Isaac. The essential feature of this new office is that its function is disaster-orientated; in other words, on behalf of Government, it deals with all programs stemming from this disaster, thus aiming to give coherence to the principle stated in para. 54 (b) above. The envisaged tasks to be undertaken by the office are estimated to take two years.

61. An outline diagram of the new organisation is shown in Annex F.

THE FUTURE FOLLOWING CYCLONE ISAAC

62. In this report, aspects of disaster preparedness, response to disaster itself and recovery from it, as far as they apply to Tonga, have been covered in a form which hopefully provided a reasonably

62. (continued)

succinct overview. One further point needs to be made. It is that, for the next two years at least, Tonga's total national resources will inevitably be at full stretch as a direct result of Cyclone Isaac. It could be understandable, therefore, that disaster preparedness for the future has perforce to be given other than major priority. However, if in the near future Tonga should suffer yet another sizeable natural disaster, the effect on the nation could only be catastrophic. Disaster preparedness must, therefore, be given a fair priority in the total scheme of things.

CONCLUSIONS AND RECOMMENDATIONS

The Disaster Threat

63. The disaster threat to the Kingdom of Tonga is well known and well documented. As has been illustrated by Cyclone Isaac, this threat is capable of inflicting very severe damage and destruction upon the country; and as in this case, the results can have wide-ranging effects upon the nation's way of life, its economy and its future development.

Preparedness

64. It is recognised that frequent disaster experience produces a measure of in-built preparedness and that this applies to both natural response capability and to the speed and extent of international assistance. However, the cost of disaster is very high and extensive, both nationally and internationally. It follows that the level of preparedness in Tonga should be as high as practicable.

65. It is recommended, therefore, that a review be made of current preparedness with the aim of making improvements, wherever this is necessary and possible; and that UNDRO technical assistance should be sought for this purpose.

Plans

66. No disaster plan, in the internationally understood sense of that term, exists in Tonga. The merit of such a plan is extensive: it lays down the total rationale for dealing with disaster, including clear allocation of roles and responsibilities, and it also provides a basis for training and public awareness programs.

67. As part of the plan, or as an adjunct to it, a short disaster manual or directory, is worth considering in the Tongan situation. Certainly in the case of Cyclone Isaac there was doubt in the minds of Government and other officials concerning the roles and capabilities of some aid agencies. A suitable manual or directory would help in this and other respects.

68. It is recommended that, as a matter of priority, a National Disaster Plan be produced for the Kingdom of Tonga, with sub-plans as appropriate, so that all concerned with disaster affairs know clearly what are their roles and responsibilities, what action they should take, and when they should take it.

Organization

69. In the study of disaster, what is known as the 'disaster as a benefit' syndrome often arises. This could be said to have applied to the organizational side of disaster response to Cyclone Isaac because the disaster itself forced changes to be made at short notice.

70. The basic concept of organization prior to Cyclone Isaac (para. 12) was obviously viewed with some doubt. Two things, singly or together, would almost certainly have resolved this issue well before the cyclone struck by revealing organizational shortcomings. One would have been the formulation of a National Disaster Plan; the other some form of training program and associated exercises.

71. Valuable experience in disaster organization has been gained in Tonga during Cyclone Isaac. This experience should be coordinated with appropriate previous experience and applied to review, and amend as necessary, disaster organization for the future. This organization should have, generally speaking, the following characteristics: ability to deal with all foreseen disaster problems; capability for quick activation; possession of necessary communications, information-handling and similar mechanisms; ability to apply necessary control and coordination; ability to function reasonably if key persons are unavailable, etc.

72. It is recommended that current disaster organization in Tonga should be reviewed, and where necessary its capability enhanced, along the general lines proposed above.

Warning and Communications

73. In this disaster, warning arrangements, given their limitations, worked reasonably well and, as far as can be judged, the community generally received and acted upon warning information. However, certain failures of communications did occur.

74. It is recommended that, for the immediate future, the present warning system be retained but that emergency power and other back-up systems should be strengthened wherever practicable.

Survey and Assessment

75. Due to the multi-island configuration of Tonga, survey and assessment of disaster effects can be very difficult (if not virtually impossible) without an air reconnaissance and airlift (for survey teams) capability.

76. It is recommended that:-

(a) in the new proposed National Disaster Plan (see para. 68) the most effective arrangements possible should be made to ensure the utilisation (probably by charter) of local airline capability, and

(b) in any international relief planning arrangements, this survey and assessment aspect should be covered as far as possible and

(c) in connection with para. 77 an appropriate simple methodology should be utilised during survey and assessment, thus providing standardised and therefore readily usable data.

Handling of Information

77. The effective collection, collation and assessment of disaster information, plus the subsequent decision-making process, is vitally important in the response to disaster. This is a key role for the Emergency Operations Centre, which in turn is an integral part of any disaster organization (see paras. 69-72). To function effectively in its total role, and especially in its information-handling function, the EOC requires certain data display capabilities and handling procedures.

78. It is recommended that, for the future, special attention be given to EOC capability, including if possible, the earmarking of alternative sites to be used in case of damage to or malfunctioning of the main EOC.

International Support Arrangements

79. During the formulation of the National Disaster Plan discussions should be held with the major international support sources (i.e. High Commissioners, UN agencies etc.) in order to establish

79. (continued)
(or confirm) procedures for requesting, integrating and coordinating international resources and capabilities. The procedures thus agreed would be incorporated in the National Disaster Plan.

80. It is recommended that agreed international support arrangements be outlined in the proposed National Disaster Plan.

Training

81. Whilst it is recognised that specialist disaster training makes demands on resources, manpower and time, some form of training effort should be considered. This training need not be complex and can be selective in nature. It would be best considered as an adjunct to the National Disaster Plan which, of course, it is designed to support.

82. It is recommended that a limited disaster training program be introduced.

Public Awareness and Education

83. Consideration should be given to promoting public awareness and education in relation to disaster preparedness, probably along the general theme of the 'aware and self-reliant community'. Some of this promotion could be done through short radio programs especially, for example, in advance of the cyclone season. Programs in schools also offer good potential benefits and well-proven material for these could no doubt be procured from countries such as Philippines. Church organizations could also be asked to assist in disaster awareness programs.

84. In this general context a lot of well-tried material (such as posters etc.) is available and could be readily adapted to Tongan requirements.

85. It is recommended that a program for public awareness and education be investigated and introduced as soon as practicable.

Coordination

86. Despite some initial organizational problems (see paras. 37-39) coordination of disaster operations was effectively achieved under direction of the Minister-in-Charge, Central Operations (para. 40). No basic change is recommended on this aspect, though the formulation of a National Disaster Plan may reveal possible measures enhancing general coordination capability.

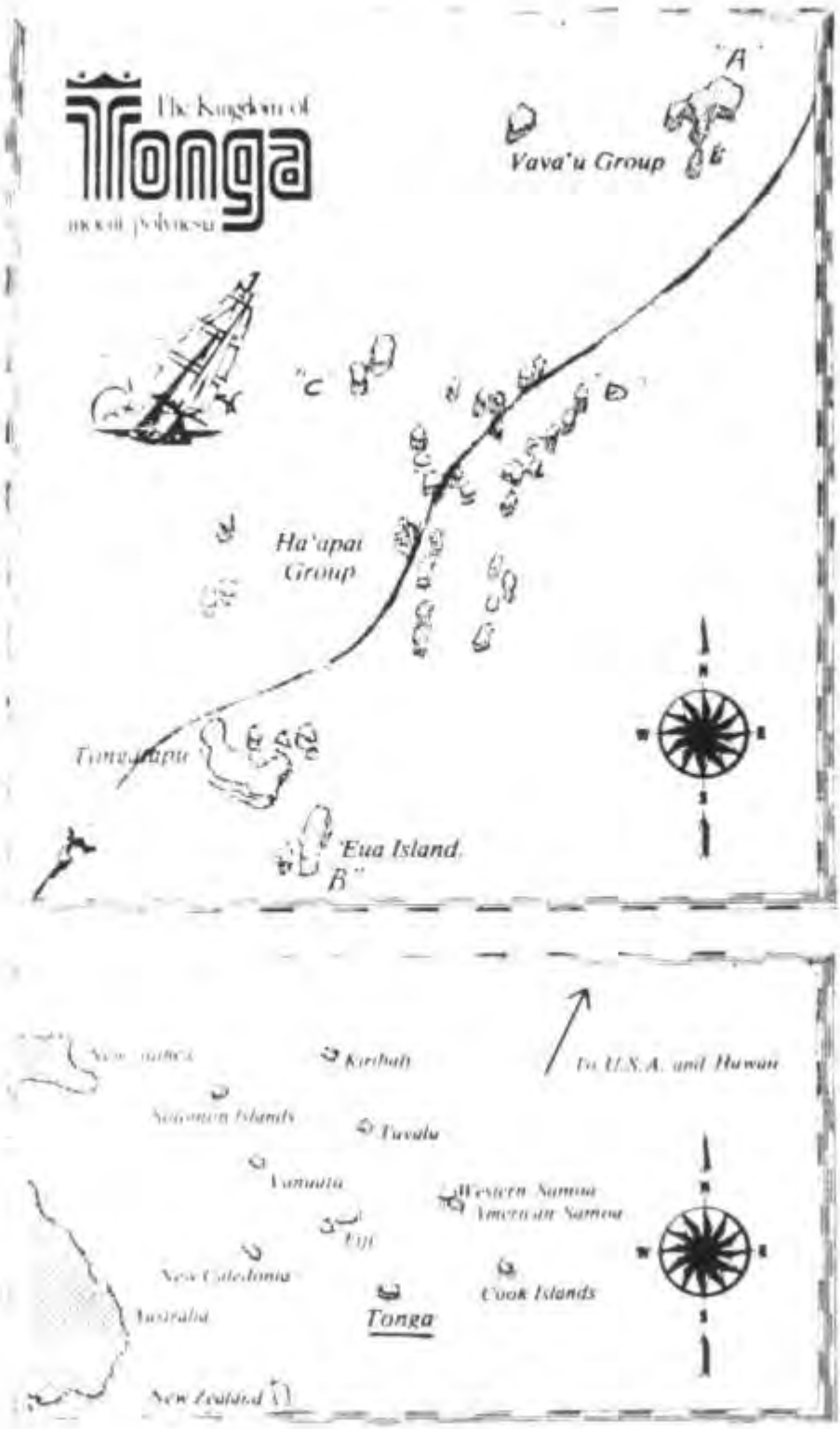
ACKNOWLEDGEMENT

87. During this consultancy it has obviously been necessary to seek discussions with a wide range of individuals and organizations. Often, these discussions have been an imposition on the time of those heavily involved in the pressures of post-disaster affairs. It is therefore desired to place on record acknowledgement for the courtesy, kindness and cooperation received in the compilation of this report.

5 April 1982

Air Vice-Marshal W. CARTER
Consultant for UNDRO

TONGA - DISPOSITION OF ISLAND GROUPS AND APPROXIMATE PATH OF CYCLONE ISAAC



Approximate Distances: "A" - "B" = 260 miles

"C" - "D" = 60 miles

LIST OF MAIN INDIVIDUALS, DEPARTMENTS, ORGANIZATIONS AND AGENCIES CONSULTED

(in approximately chronological order)

Resident Representative, United Nations Development Program

Ministry of Foreign Affairs and Defence

Red Cross (International and National Elements)

Regional Deputy Representative, World Food Program

Relief Delegation from Government of Fiji

Acting Director, Civil Aviation

Relief Delegation from Western Samoa

Central Planning Department

Statistics Department

The British High Commissioner

Chairman, Disaster Relief Sub-Committee (also Minister of Works, Education and Civil Aviation)

Research Representatives from James Cook University

Resident Advisor, Delegation of the Commission of European Communities

The Australian High Commissioner

The New Zealand High Commissioner

Consular Officials

Head Meteorological Section

Superintendent, Telegraphs and Telephones Department

Director of Education

Director of Agriculture

Disaster Control Officials

Secretary to Government

Minister of Lands, Survey and Natural Resources

Officer-in-Charge Planning and Training, Police Department

cont'd/.

Director of Health

Minister of Health

Minister of Police

Manager, Tonga Broadcasting Commission

Dr. Keith Eaton, Disaster Building Specialist (U.K.)

Members of the public (regarding their reactions to the disaster)

Representative, Federation for Disaster Aid (French)

Associate Director, United States Peace Corps

Governor of Ha'apai Group

Police Magistrate, Ha'apai Group

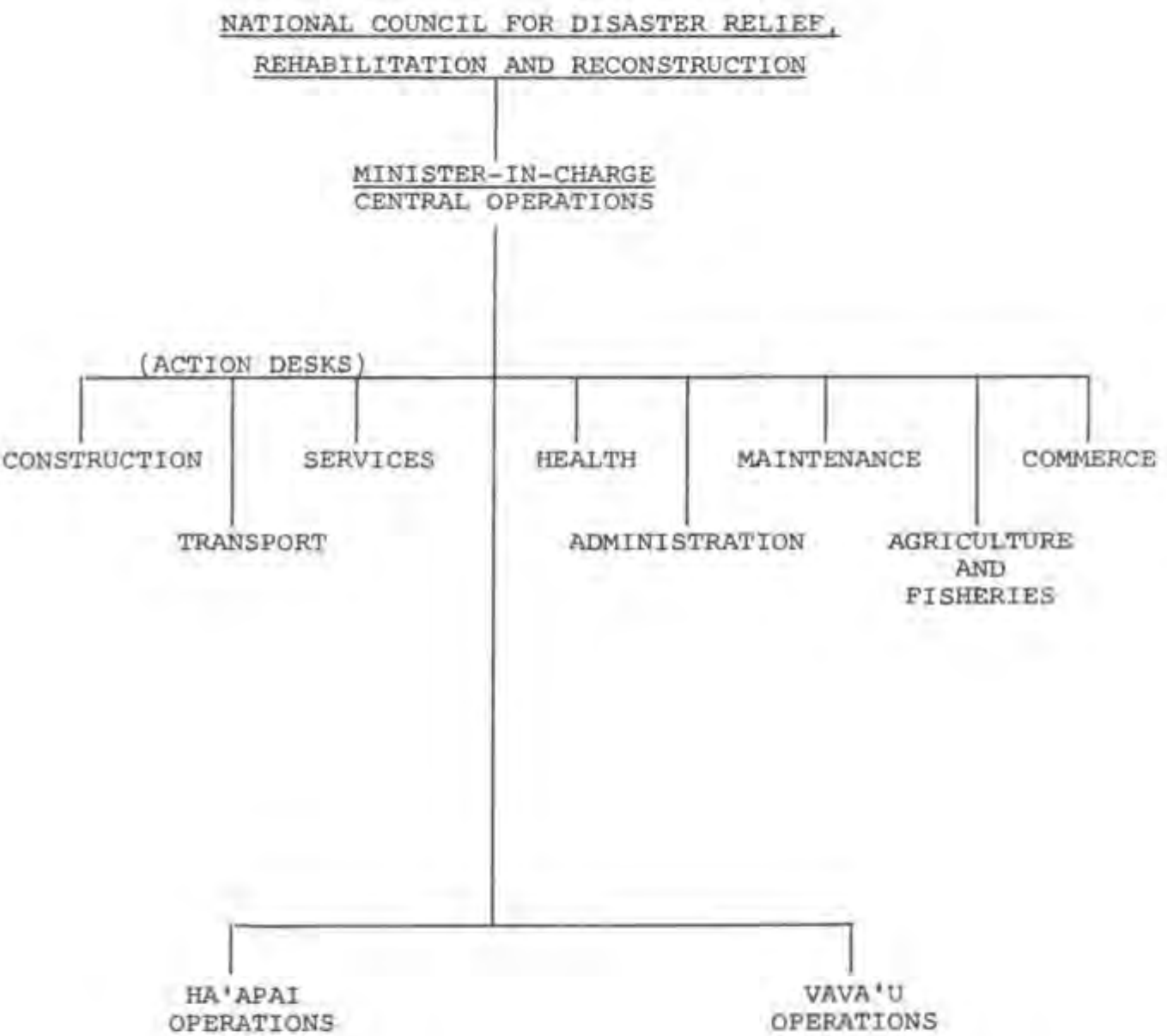
Senior Police Officer, Ha'apai Group

Country Liaison Officer, World Health Organization

Director, Foundation for the People of the South Pacific

ANNEX C

OUTLINE OF DIAGRAM OF POST-IMPACT ORGANIZATION



ANNEX D

SOME NOTES ON INTERNATIONAL AID

1. This Annex is intended to provide only a general indication of international aid to Tonga for relief and associated purposes following Cyclone ISAAC. It does not attempt to cover aspects from normal international aid programs.

2. Financial Aid. As at 29 March, 1982 relief funds totalled almost US$2,000,000 and included contributions from:-

United States	Japan
Papua New Guinea	China
United Kingdom	UNDRO
UNDP	Switzerland
EEC	SPEC
Fiji	Nauru
Korea	West Germany
Commercial Organizations	Individuals etc.

3. Other Assistance. Various other forms of assistance, mainly for relief and recovery programs, were offered or being considered by:-

West Germany	Japan
EEC	China
Korea	United Kingdom
Australia	New Zealand
UNESCO	UNICEF
World Food Program	FAO
United States	Council of Churches
Red Cross	UNDP
UNDRO	Fiji
Western Samoa etc.	

ANNEX E

RESTORATION AND RECONSTRUCTION NEEDS

1. The following are broad areas of need in the restoration and reconstruction program following Cyclone ISAAC. Definitive programs are assumed to be mainly the future responsibility of Office for Disaster Relief and Reconstruction.

2. Agriculture. Mainly rehabilitation and re-planting of food crops, coconut, banana, vanilla and other cash crops.

3. Fisheries. Rehabilitation and development of local fishing industry; parallel development of other aspects of fishing industry.

4. Civil Engineering Works. Various repair, reconstruction and some development needs for wharves, foreshore, drainage and roads.

5. Construction. Repair and rebuilding of Government buildings houses and schools.

6. Water Systems. Major repairs.

7. Power. Major repair program; and possible development of emergency arrangements for disaster purposes.

8. Communications. Major repairs and replacements; development of improvements for disaster emergencies.

9. Health. Major repairs and reconstruction program; public health program (especially for relocation of homeless etc: water purification.

10. Transport. Repairs and reconstruction for airports; improvement of internal air services, especially to assist in disaster. Shipping needs for island communication.

11. Commercial. Programs to assist recovery and future development.

12. Manufacturing Industry. Generally as for commerce.

13. Police and Tonga Defence Services. Improved transport and communications facilities.

14. Communities. Repair and re-build community halls etc.

15. Disaster Preparedness, Relief, Rehabilitation and Reconstruction. General improvement of systems and facilities.

16. Poultry-Livestock. Need to improve food output from poultry farms and piggeries.

17. Banking. Assistance from banking in general relief and recovery programs.

ANNEX F

OUTLINE DIAGRAM - OFFICE FOR DISASTER RELIEF AND RECONSTRUCTION