

Are disaster management concepts relevant in developing countries?

The case of the 1999-2000 Mozambican floods

Introduction

Disaster management has evolved somewhat over the past few decades with a shift from response to prevention and preparedness. The United Nations International Decade for Natural Disaster Reduction (1990-2000) saw many nations, including Australia, adopt four specific disaster management concepts, namely:

- the All Hazards Approach
- the Comprehensive Approach (incorporating prevention, preparedness, response and recovery)
- the All Agencies Approach
- the Prepared Community

These four concepts formed the framework for data collection in this study, and as the concepts and their application have been widely published by Emergency Management Australia, they are not detailed here.

It is generally accepted that the four concepts must all be satisfied in order for a nation to have an adequate approach to disaster management. A study was undertaken in the Republic of Mozambique after devastating floods, to determine if the 'universal' disaster management principles are as relevant in developing nations as they are in more affluent nations.

Mozambique

The Republic of Mozambique is a mid-

by Beau Martin, Centre for Public Health Research, Queensland University of Technology; Mike Capra, George van der Heide and Melissa Stoneham, School of Public Health, Queensland University of Technology and Marcelino Lucas, Ministry of Health, Government of Mozambique.

sized nation located on the south-east coast of Africa, as shown in *Figure 1*.

It has a population of approximately 19,000,000, roughly the same as that of Australia. However, its land area of 800,000 km² gives Mozambique a population density about ten times greater than Australia. The capital city, Maputo, is located on the coast in the extreme south of the nation. Mozambique's population is almost entirely (99.7%) composed of indigenous tribes, such as Shangana, Macua, Macondi and Sena (Geographica 1999).

Mozambique's health and economic standing is among the lowest in the world. This can be primarily attributed to a prolonged drought that started in the early 1980s and a 16-year civil war after their independence from Portugal that ended in 1992. These two calamities severely

affected the economy and infrastructure of the nation, and by 1989, Mozambique was the world's poorest country (Geographica 1999).

Mozambican statistics

According to the United Nations Human Development Index, which is calculated from life expectancy, educational attainment and per capita income, Mozambique ranks as the seventh least developed country in the world (Oxfam 1997). Mozambique's social indicators are also among the poorest in the world. *Table 1* shows a selection of Mozambican health indicators, with those of Australia listed for comparison. Data was obtained from World Health Organisation (2000) and United Nations Department of Economic and Social Affairs (1997).

Mozambique is heavily reliant on foreign aid, with 1996 external financing requirements estimated at more than US\$2 billion (Oxfam 1997). Between 70% and 80% of the Mozambican Ministry of Health's budget is directly sourced from overseas contributions.

The floods

Meteorological progression

Mozambique had its usual rainy season in 1999 that began in late September. However, in early December, a massive



Figure 1: Mozambique.

Indicator	Mozambique	Australia
Access to safe drinking water in urban areas	17%	100%
Access to safe drinking water in rural areas	40%	100%
Male adult literacy	57.7%	Above 90%
Female adult literacy	23.3%	Above 90%
Average male life expectancy	41.8 years	76.8 years
Average female life expectancy	44.0 years	82.2 years
Infant mortality per 1 000 live births	118	10
Maternal mortality per 1 000 live births	15	0.09
Infant mortality of males aged five and under per 1,000 live births	196	7
Infant mortality of females aged five and under per 1,000 live births	189	5

Table 1: Health Indicators for Mozambique.

low pressure system settled over Mozambique, as well as neighbouring South Africa, Swaziland, Zimbabwe and Botswana. This created a wetter-than-average month. On 27 and 28 December 2000, Mozambique experienced unusually torrential rain in the southern region; so much rain fell, in fact, that the National Institute for Meteorology had never recorded such a high rainfall in its near-100 year history. The city of Maputo bore the brunt of the weather, and serious damage to infrastructure was caused.

Over the next two months, a series of tropical depressions continued to produce rain in the central and southern parts of Mozambique, filling rivers and dams to capacity, causing more flooding. In mid-February 2000, an offshore depression evolved into a cyclone, code-named Cyclone Eline, which hit the coast of Mozambique on February 22, and travelled inland. Cyclone Eline deposited huge volumes of water on the already water logged country, causing major flooding. The Umbeluzi and Incomati rivers reached levels not seen since 1937, and the Limpopo River rose to an unprecedented high. The towns of Chókwe and lower Xai-Xai were completely flooded. A map of the path of the cyclone is shown in Figure 2 (United States Agency for International Development 2000).

Cyclone Eline moved inland and hit several other African nations before dispersing. Many populated areas were threatened in these nations, to which the respective governments responded by opening floodgates. This caused a series of literal 'walls-of-water' to flow downstream into neighbouring Mozambique, causing the destruction of several towns and extremely rapid inundation of others. The Limpopo, Save, Búzi, Incomati, Umbeluzi, Pungue, Lucite, Mucune and Mussorize rivers and catchment basins suffered extremely extensive flooding.

Up until March 2000, the southern provinces were the most affected, and although the central part of Mozambique had experienced minor to moderate flooding, this was comparatively less severe than the south. Then, in early April 2000, another large tropical depression intensified, resulting in Cyclone Hudah. This cyclone hit two of the central provinces, causing extensive coastal flooding. The sheer size of Cyclone Hudah is shown in Figure 3, a satellite image from the US National Oceanic and Atmospheric Administration.

After inundating the central provinces, Cyclone Hudah was downgraded to a tropical depression, where it moved south

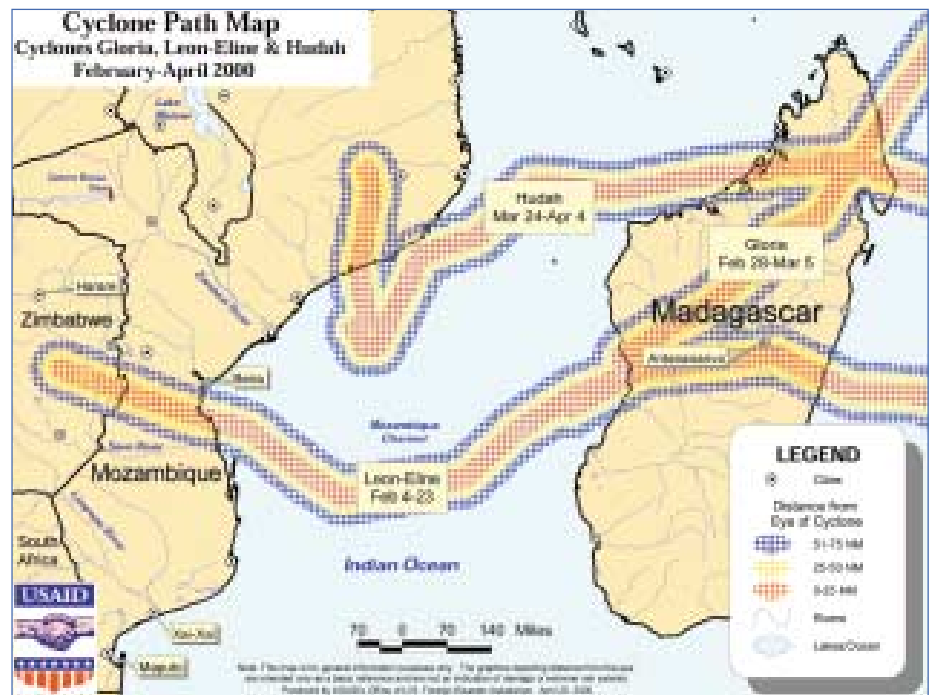


Figure 2: Path of Cyclones Eline, Hudah and Gloria. Source: United States Agency for International Development.



Figure 3: Cyclone Hudah crossing the Mozambican coast. Source: US National Oceanic and Atmospheric Administration

and caused still more rain to fall. Such a volume of rain fell that the ground became completely water logged. Areas of Maputo city were seen to be still inundated in early August, when the data collection for this study was carried out. From mid-April to August, isolated showers occurred throughout Mozambique, which did not cause further flooding per se, but delayed the natural drainage of the floodwaters.

The impact

There are widely differing estimates of the size of the affected population and the number of fatalities attributable to the floods. All the nation's physical and human resources were aimed at rescue and relief, and accurate records were not kept. Indeed, if resources had been used instead for surveillance and record keeping, the affected population may have been greater.

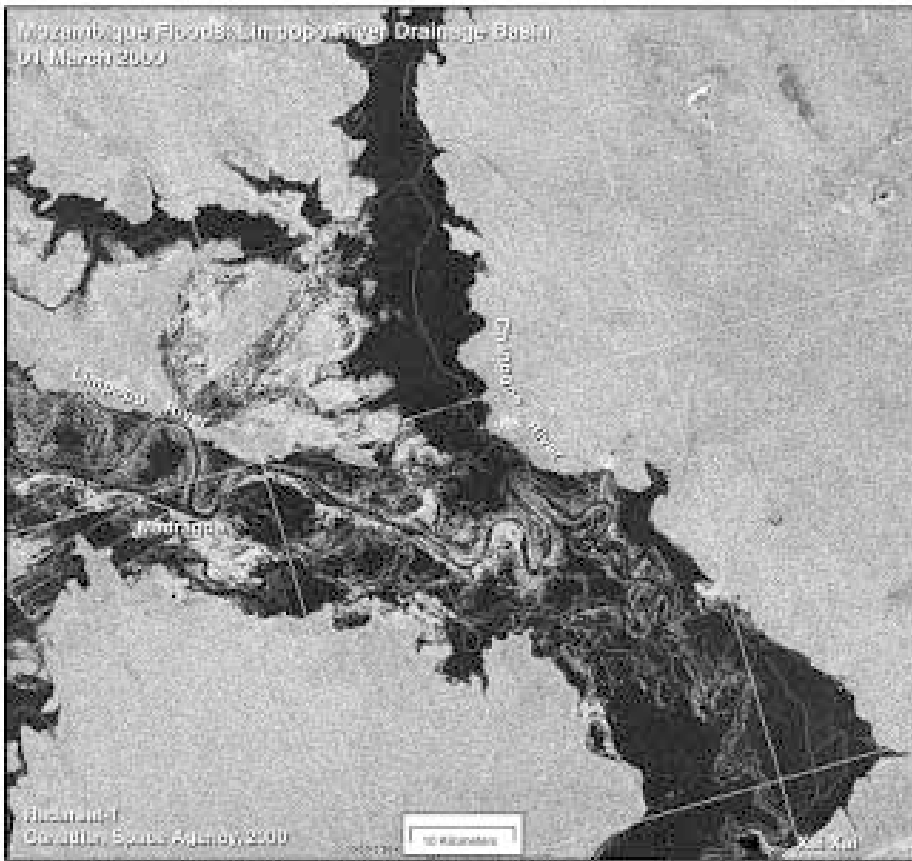


Figure 4: Satellite Image of the Limpopo River and Xai-Xai. Source: Canadian Space Agency.

Also, due to Mozambique's recent wars, the country's total population is not known accurately. Probably the most accurate estimates are the figures presented at an international appeal for disaster funding held in Rome, Italy.

The figures were calculated from estimates obtained from national, provincial, local and foreign governments, United Nations agencies and non-government organisations. It was reported that there were 699 deaths, 95 missing persons and an affected population of 4,517,432. However, these figures were dated 21 March 2000, which was before Cyclone Hudah struck. Therefore, it is reasonable to conclude that the figures are most probably underestimates. In fact, these estimates do not include any figures for the central, coastal provinces of Nampula or Zambézia.

At an international appeal held in Rome, it was reported that 10% of the country's cultivated land and about 100,000 hectares of subsistence and income crops had been destroyed. Approximately 90% of all operational irrigation structures in flooded areas were destroyed. Over 40,000 head of cattle had been reported as missing in April 2000. These losses had major consequences for the rural sector of Mozambique, as the nation is primarily dependant on family agriculture, and trade came to a complete halt in the southern rural sectors.

The protection dykes of several towns were destroyed, resulting in complete inundation. Figure 4 (Canadian Space Agency 2000) shows the city of Xai-Xai (bottom right) within the floodplain of the Limpopo river. Normally, river systems would show as thin black lines on a satellite image such as this, however the image shows the rivers as several hundred times wider than usual.

Chókwè was completely inundated twice as a result of a neighbouring country opening the flood gates of its dams. Extensive structural damage was caused both by the flood waters, and the mud and silt that was left behind.

A preliminary assessment of the economic impact of the floods was prepared by the World Bank before cyclone Hudah had formed.

This assessment was also presented at the international appeal in Rome, which calculated a total loss of US\$599,000,000 detailed as follows (Mozambique: Post-Emergency Reconstruction Program 2000):

- lost assets and direct costs, US\$273,000,000
- lost production and indirect losses, US\$247,000,000
- reduction in exports, US\$48,000,000
- increased imports for consumption, US\$31,000,000.

These figures are estimates of the losses due to the floods and do not include any estimates for the cost of reconstruction.

The project

Research for this project was undertaken in July and August 2000, which was at the end stages of the floods. However, there were still areas inundated and people in temporary accommodation centres at that time.

An office was provided within the 'Emergency Technical Coordination and Information Unit' within the Mozambican Ministry of Health, which was where all documents and computer files relating to the floods were kept. This allowed easy access to the many documents, files, graphs, maps and satellite images from the floods, of which a thorough review was undertaken. The Ministry of Health provided any additional information requested by the researcher. Access was also gained to the Department of Environmental Health's library, where a wide variety of government policies and manuals are housed.

Supplementary to this, interviews with several key stakeholders in disaster management and the floods were facilitated, and included senior employees and managers from the Mozambique Government, United Nations agencies, non-government organisations and foreign government aid agencies. The interviewees were asked questions about disaster management in general, with the floods being used as an example.

A large accommodation centre on the outskirts of Maputo city was visited. The camp still housed approximately 300 displaced people awaiting transfers to resettlement camps, months after the deluge from the cyclones occurred. The conditions were very basic, with a lack of food and transmission of air-borne diseases being the main concerns in the camps. Various flood damaged areas around Maputo Province were also visited.

Results

Due to the many types of data collected, a holistic view of disaster management in Mozambique was gained. All the data were integrated, and critiqued using the four disaster management principles. These are detailed individually below.

The All Hazards Approach

For the All Hazards Approach to be followed, an all-encompassing written disaster management plan is preferable as it can stipulate the scope of the plan, and identify actions that are common to all disasters. It is not essential to have a disaster management plan, although some form of disaster planning must be undertaken. This can be formal or

informal, written, spoken or implied. In the Mozambican context, very little evidence of formal planning was located. The government, as well as non-government organisations and United Nations agencies tended to focus most of their money and resources into disaster response rather than preparedness. By doing this, each disaster has been dealt with on a case-by-case basis. By undertaking disaster management in this way, the All Hazards Approach has been largely unachievable.

The publication *Manual de Atenção à Saúde em Situação de Emergência* (Manual of Health Priorities in Emergency Situations 1992, p. 7) takes a rather holistic approach to disaster management planning, and instead of categorising disasters, explains disaster management as applicable to 'emergency situations caused by epidemics or other calamities'. It is important to note that the division of emergency situations into 'epidemics' and 'other calamities' was done because epidemics are so prevalent in Mozambique that they form a large proportion of disaster situations, not because they are seen as needing differing responses. This document would make a good basis for developing a functional disaster management plan, as its scope is wide enough to encompass most disasters.

The local newspaper *Notícias* ran an article on a National Disaster Management Institute working group that were devising a national disaster management plan. (Para Casos de Catástrofes: INGC Prepara Planos de Contingência 1 August 2000, p. 1). The group was reported as writing a plan for floods and other natural disasters. This goes against the principles of the All Hazards Approach, in that both natural and human-caused disasters should be covered by the one set of management arrangements.

Although the general response to the floods was adequately managed, the lack of an identifiable disaster management plan affected the other areas of disaster management, such as prevention and preparedness. There was an almost total lack of prevention and preparedness, largely due to the absence of a working document addressing these issues. This style of management was consistent with disaster management before the 1970s, when aid relief was given the highest priority (McEntire 1998). However, disaster management in Mozambique must be put into the context of everyday life. The Central Government relies on international donations to fund many of its non-disaster activities, so planning for future disasters cannot be given the

highest priority while more immediate concerns are present.

The interviewee from the United Nations Children's Fund (UNICEF) stated that although most organisations and government departments worked well during this disaster, there needed to be a plan with a chain-of-command and clearly defined roles for relevant stakeholders. This was in the event that future disasters did not invoke the same level of solidarity and mutual cooperation as that experienced in the floods.

Almost all of the documents collected specifically related to the floods, and stated this explicitly. This was probably due to the sheer extent of the flooding. The floods were such a devastating occurrence that the government devoted a large proportion of its resources to disaster management of the floods. While planning documents and contingency plans should not be disaster-specific, disaster reports and working documents used throughout the disaster need to be specific in order to explain the extent of the disaster and to best utilise available resources. Although most of the documents collected were disaster-specific, they were working documents to be used exclusively during the floods and for no other emergency situation, and therefore did not go against the principles of the All Hazards Approach.

The Comprehensive Approach

Prevention

The Ministry of Health working document *Minimum Requirements for the Safe Return of Affected Populations* (2000), which was developed in collaboration with the Ministry of Environmental Coordination, Ministry of Public Works and Housing, World Health Organisation and UNICEF, states that because of the floods, the most vulnerable of the population need to be moved to an area with less risk of flooding. Minimum requirements for these new areas were also detailed.

This is corroborated in an interview with a Ministry of Health employee, who stated that the government is helping those in accommodation centres in Maputo city to resettle into less flood-prone areas. This is being performed by trading the displaced person's old land for new land in a less vulnerable area, and providing them with building materials and pre-fabricated building kits. The rationale behind the government-sponsored moves is that disasters on the scale of the 1999–2000 floods, although not occurring often, are an ever present danger to low-lying Mozambique, and by making people less vulnerable to floods now, the extent of the

'human factor' will be reduced in the future. However, it was not possible to ascertain whether the community had input into the planning of the resettlement process. It is important that the government ensures that the relocated populations still have access to fertile land and sources of fish, or relocation may be removing one problem while creating another, especially in a nation so dependant on family agriculture.

A widespread vaccination program was implemented in the southern and central provinces. A report titled *Programa Alargado de Vacinação: Relatório Sobre a Vacinação de Emergência* (Enlarged Vaccination Program: Report of Vaccination in the Emergency 2000) reported that vaccines for meningitis, measles, tetanus and vitamin A deficiency were all made freely available to those in disaster management temporary camps. Although this is not considered to be prevention of the current disaster, it is prevention of possible supplementary complications that may occur as a result of the floods.

Some non-government organisations have a permanent presence in Mozambique. Their day-to-day activities include poverty alleviation through housing programs. This reduces the vulnerability of those being resettled to floods, and could be considered a prevention strategy. However, in a cable document titled *United States Government Response Framework for Flooding in Central and Southern Mozambique* (2000), in which various programs are detailed, the section on resettlement explains how The United States Agency for International Development will 'move affected people back to their homes as soon as possible and support their initial reintegration into flood-devastated areas'. For many people, resettlement into the same flood ravaged areas will mean they will be largely affected by any future floods. Although the idea of trying to return the population to conditions of normality as soon as possible is commendable, it would be desirable for the government to follow the All Hazards Approach, and in relocating people to less flood-prone areas, must not expose those moving to increased potential for other disasters, such as fires, landslides and droughts.

Preparedness

From the data collected, there was seen to be only one preparedness-type activity undertaken in Mozambique.

The Ministry of Health epidemiology department alerted the provinces of possible flooding when Maputo Province began to become inundated. A national register of medicines was compiled by the same department. This preparedness measure was identified by both UNICEF and Ministry of Health interviews, as well as the National Disaster Management Institute situation reports.

In the introduction to *Manual de Atenção à Saúde em Situação de Emergência* (Manual of Health Priorities in Emergency Situations 1992), it is stated that '[the manual] should be studied **before** there is a problem' (translation, original emphasis). In contrast to this statement, not one interviewee identified this publication as providing any direction or reported that it was used.

There were two disease outbreak manuals obtained from the Emergency Technical Coordination and Information Unit (*Unidade de Coordenação e Informação Técnica de Emergência*—UCITE) headquarters that had small amounts of information about preparedness for the specific disease outbreaks. *Manual de Prevenção e Tratamento da Cólera* (Manual of Prevention and Treatment of Cholera 1993) had a section on activities that needed to be undertaken during an epidemic, as did to a lesser extent *Manual Para o Controle e Tratamento da Meningite Meningocócica* (Manual for the Control and Treatment of Meningococcal Meningitis 1997). These two publications were distributed to interested stakeholders, and may have lessened the burden of the disaster. Cholera was a problem during the floods being a water-borne disease, however it is endemic to almost all of Mozambique, so could not be classified as an epidemic. Meningococcal meningitis spreads in areas where people are in close contact, such as temporary accommodation centres, therefore was a concern during the floods. The statistics compiled for cholera cases during the floods were treated with caution, as there was the possibility that the observed increase of cases was due to an increase in surveillance.

There was no evidence that other preparedness activities were undertaken. The interviewee from UNICEF identified a difficulty in obtaining funding for disaster prevention and preparedness when there is not a national emergency. The interviewee went on to say that a national disaster management unit is needed immediately, and should work on prevention and preparedness when there are no disasters.

Although the cholera and meningococcal meningitis manuals may have been useful, they were not written specifically for disaster situations, and must be interpreted for disasters. Rather than having manuals for the specific diseases, it would be preferable to have a document that stipulated minimum sanitary and health requirements and how these can be achieved in order to prevent or minimise disease outbreaks and epidemics.

There was a notable exception to the disease manuals—malaria. This mosquito-borne disease is endemic throughout Mozambique, and results in more fatalities than any other disease in Mozambique. There were significantly higher numbers of malaria cases reported during and after the floods, as stagnant water provides an ideal breeding place for mosquitoes. It is not known whether a manual exists for malaria in Mozambique, although a disease outbreak such as this should be covered in a national disaster management plan. As previously explained for cholera, this increase in reported cases may have been due to increased surveillance.

Response

The response to the floods was extensive. The interviewee from the Australian Agency for International Development stated that over 200 non-government organisations were working along with all government ministries on the disaster. Of the four disaster management concepts, and of the four principles of the Comprehensive Approach, the response was the best handled, although still had some deficiencies.

A Ministry of Health employee reported that in the early stages of the flood, all ministries and non-government organisations were working independently. This became a problem as some areas of Mozambique were without aid while others had up to 15 non-government organisations working with them. In response to this, the Ministry of Health required all non-government organisations to register with UCITE and obtain a certificate enabling them to be able to work in Mozambique. This system worked relatively well, and was accepted by the non-government organisations. A further discussion of the certification letters of application required of the non-government organisations is detailed under the All Agencies Approach heading.

All of the larger organisations working on disaster response in Mozambique prepared reports which were usually freely distributed among government

ministries and to non-government organisations and United Nations agencies. Reports from Mozambique Red Cross, *Médecins Sans Frontières* (Doctors Without Borders), the United States Agency for International Development, UNICEF, *Action contre la Faim* (Action Against Hunger), Oxfam Great Britain, Japan Disaster Relief Medical Team and World Health Organisation were obtained from UCITE headquarters. These reports provided a valuable insight into collaborative networks for each organisation and how they undertook relief work.

Oxfam Great Britain was highly critical of the National Disaster Management Institute, especially in coordination activities. The document *Trip Report: Aerial Survey of Save and Búzi Rivers—2 March 2000* (2000, p. 3) stated 'there was a clear feeling that the search-and-rescue effort in the Save/Búzi [catchment basin] is under-equipped, under-managed, and inefficient... rescue assets that exist in the area are being wasted'. An interviewee from the Japan International Development Agency also believed that the National Disaster Management Institute (*Instituto Nacional de Gestão da Calamidades*—INGC) was not as effective at coordinating as it could have been, and stated 'INGC has a lot of problems and it didn't work well during the floods, we didn't really have anything to do with INGC'. Several comments by the interviewee from UNICEF also re-enforced the notion that the National Disaster Management Institute were not 'on the ground' coordinating the many organisations and agencies that were stakeholders during the floods, but rather undertaking their activities from their central office in Maputo.

With so many non-government organisations and other organisations working on disaster response, a lack of coordination was initially a problem. The interviewee from UNICEF stated that although most of the non-government organisations worked well with the government, there were some 'pirates' [sic], who arrived in Mozambique with no experience or equipment, and expected the government to provide accommodation and food. The Ministry of Health epidemiologist had similar comments and said such people wasted much of the government's time. A member of UCITE stated some non-government organisations expected resources such as helicopters and boats to be made freely available to them.

Médecins Sans Frontières (Doctors Without Borders) in conjunction with the

European Union and *Agence Européenne pour le Développement et la Santé* (European Association for Development and Health) produced a document titled *Consolidated Information System Mozambique: Special Edition 2—Floods* (2000). Included in this document were 56 maps of affected districts with the extent of the flooding shaded and location of health facilities indicated, as well as detailed information on the number of affected people and access to roads and communications. The document was produced free of copyright and widely distributed to interested stakeholders. It provided those working in the field with an up-to-date reference book of the approximate extent of flooding and access to any of the affected districts, thereby greatly reducing time spent by organisations and agencies assessing the areas beforehand. The international response to the floods was admirable. Several countries deployed military and civil groups to help the people of Mozambique.

There was a problem with foreign governments and non-government organisations donating unusable or inappropriate items. At the onset of the floods, UCITE provided all foreign embassies and consulates in Mozambique, as well as all Mozambican embassies overseas with a list of medications and other materials that were needed. This was done to prevent unnecessary items being sent. However, the interviewee from UNICEF stated that nonetheless, a lot of unsuitable medication and other materials were donated, including expired medication. These all had to be disposed of, with some of the more hazardous medications needing to be incinerated. This diverted scarce government resources. Unnecessary aid was still being sorted from useful aid during early-August 2000.

Conditions in the temporary camps were very basic, and according to the report *Rapid Nutritional Assessment of Displaced Children Aged 1-5 Years in Mozambique* (2000) from the Ministry of Health, up to 8% of children in camps were suffering from moderate malnutrition, and up to 83% of those had diarrhoea. One of the largest accommodation centres in the country was located in Maputo and was visited in late July 2000 as part of this study. At the time of the visit, there were still approximately 300 people living in this 'temporary' accommodation, which had housed people since November 1999. The camp was located in an unused factory that had been segregated into sleeping and dining quarters. There was one room used by



Figure 5: Sleeping area for displaced persons, Maputo Province.



Figure 6: Eating area for displaced persons, Maputo Province.

Red Cross as a health post, and pit latrines were dug on the premises. *Figures 5 and 6* show the living conditions in the temporary accommodation centre visited.

The temporary camp visited was reported to be better than several other camps as it had permanent structures to house people. Several camps were settled in a matter of days, caused by rapidly rising water being released from upstream dams. Chókwè is a good example of this, where the Mozambique Red Cross reported that the entire city moved within a week (Mozambique Flood Victims Relief Operation: Gaza Province Health Interventions 2000). A report by the World Health Organisation (Visits of a WHO Team to Sofala 2000) stated that of 20 temporary camps visited, only three had latrines, one had safe drinking water,

two had good sanitation and one had sufficient amounts of food.

A lack of coordination in some areas, especially rural, resulted in temporary camps being set up by the population on the side of roads. These camps had no latrines, health facilities or water supplies, and stretched for several kilometres along the roads. *Figure 7* shows an unplanned temporary camp that was set up by displaced people in Cheaquelane. The Ministry of Health estimated that there were approximately 35,000 affected persons in Cheaquelane, and the temporary camp ran for 6 kilometres along the main road.

Recovery

At the Rome appeal, the Mozambican Government presented a document



Figure 7: Unplanned Roadside Camp, Cheaquelane.

entitled *Mozambique: Post-Emergency Reconstruction Program* (2000) which detailed what the government is planning to do once the response phase is over. The category of recovery is divided into four areas: social sectors, infrastructure, reducing vulnerability and future programmatic prevention measures. It is a detailed document, and explains in depth specifically required actions and the associated costs. The total costing of the reconstruction program is US\$449,500,000. However, this figure includes only costs that are needed for recovery activities, mostly restoring infrastructure.

The *Gabinete de Coordenação de Projectos de Investimento* (Cabinet of Coordination of Investment Projects), a working group under the Ministry of Healths *Direcção de Planificação e Cooperação* (Directorate for Planning and Cooperation) published a rather lengthy document titled *Emergency Relief Planning for the Central and Southern Regions of Mozambique* (2000). Part of this document is a set of lists detailing what is needed to rehabilitate each of the health facilities in central and southern Mozambique. A document such as this would be very useful to an aid agency looking to contribute in some way, as it specifically states what the government needs, and leaves no room for speculation. It lessens the burden of unwanted and unusable donations.

Much of the nation's infrastructure was destroyed, including many of the roads. Several parts of the main highway connecting north and south Mozambique were washed away, and the railway lines that connect to Republic of South Africa, Swaziland and Zimbabwe were cut.

The All Agencies Approach

The publication *Manual de Atenção à Saúde em Situação de Emergência* (Manual of Health Priorities in Emergency Situations 1992, p. 8) states 'in an emergency, it

is necessary to have collaboration between a lot of people' (translation). This is the basic, underlying principle of the All Agencies Approach. Once again, the manual seems to have a comprehensive grounding in disaster management principles, and would make a suitable policy document. However, as previously reported, it was not mentioned at all in the interviews or referred to in any of the documents collected for this study.

There was very little collaboration or coordination during the early stages of the floods, which the Ministry of Health identified and rectified by implementing a certificate system, described below.

Every organisation that was working or planning to work in the area of health was required to register with the Ministry of Health in order to begin or continue work. A letter of application from each organisation was required, which needed to include the names of people working in the health sector, basic background information on the organisation, the proposed activities, and the location of these activities. This provided the Ministry of Health with a profile of the aid agencies working on disaster relief during the floods. Once an application was processed, which was usually immediately, a certificate was issued. Without this documentation, organisations were not able to provide relief in Mozambique, and their workers may have even had their visas revoked. The purpose of this exercise was not to regulate the organisations, but rather to increase communication and collaboration between the government and aid organisations, and also between aid organisations themselves.

A document entitled *Floods in Mozambique: Situation Update and Health Intervention* (2000) was distributed by UCITE to all international volunteers working in the health sector. It contained, among other information, a list of aims of the health activities coordinated by UCITE, a set of strategies to control epidemics, and a list of 'steps for a good coordination'. The three members of UCITE that were interviewed all stated that the document was widely distributed and adopted. One of the steps for a 'good coordination' is requesting a certificate of approval from UCITE. As previously explained, a letter of intent was needed in

order to be considered for certification. These letters were all available and perused at UCITE's headquarters, and fell into two distinct categories, those who *asked* what was needed, and those who *told* what they were going to do.

An interesting group of people that UCITE identified as stakeholders in disaster management were traditional healers. Approximately 55% of Mozambique's population are involved in traditional religions or have indigenous beliefs (*Geographica* 1999), in which traditional healers are held in high esteem. It was identified that the government should communicate with these religious community leaders in order to elicit the most comprehensive approach possible. An impediment to disaster relief was found in some traditional religions, where the community believed the floods were 'God's wrath' or punishment from the spirits for wrongdoing of the people. One interviewee stated that traditional healers can sometimes have the determining role in disaster management. A majority, however, accepted relief when it was offered. Religion is an important part of many people's life in Mozambique, and many rely on it to provide them with direction in difficult times. As an example of this, one interviewee from UCITE stated:

In civil society, religious groups are very strong and a very good link to the people. For education and advice, they are very influential—the churches have a very big role. If you turn up with a bunch of doctors or even the army, no-one will listen, but if you have a priest, everyone does what you say.

The Prepared Community

A common theme throughout the data was the solidarity amongst those affected by the floods. It was mentioned by all the interviewees and even identified by Mozambique's President, in a 'Message of Thanks' to all nations involved (Chissano 2000). Having a cohesive community greatly enhances the concept of the Prepared Community, as people are more likely to 'look out' for each other.

Another important aspect of this concept is having a community that recognises potential hazards and is proactive in reducing the associated risks. This is very difficult for those that live in urban slums and unplanned settlements, where living from week-to-week is more of a priority than disaster planning. It was evident from this research that poverty greatly impedes the

communities' capacity to prevent or prepare for disasters. It is often these populations that are also most vulnerable to the effects of disasters.

Helping others in need is one of the cornerstones of the Prepared Community concept, which may be culturally inappropriate in some societies. In Mozambique, this was not the case, as many people were willing to volunteer. However, the volunteer force was well below that of developed nations because of the simple fact that most people cannot volunteer for free if they want to keep themselves and their families alive. Due to this fact, the largely western-adopted notion of voluntary work in the Prepared Community concept may not be appropriate in lesser developed nations.

Discussion

Possible barriers

Poverty affects all aspects of life, especially health (Najman 1994). When a community is composed of individuals struggling to survive day-by-day, the concept of the Prepared Community becomes a relatively less important issue. The definition of a disaster, as described by Australian Institute of Environmental Health (1991), states that an event becomes a disaster when a community faces severe danger and incurs losses. Everyday life for those living in poverty involves severe danger and incurring losses.

This is not to say that the concept of the Prepared Community is not relevant to Mozambique, but rather that poverty has to be taken into account and considered when evaluating the effectiveness of Prepared Community-type activities. This was consistent with Karand and Aksit (1999) who stated that it was crucial to understand both the attitudes and resources of the community in order to develop a disaster management plan that could be integrated into the vulnerable community. According to Tarrant (1998), the concept of the Prepared Community has not been well implemented in developed nations, such as Australia. Therefore implementation into developing countries such as Mozambique, which has a larger proportion of its population vulnerable to disasters, would be much more difficult.

Are disaster management principles still relevant?

The 1999–2000 Mozambican floods were truly a large-scale disaster. Literally all government employees were involved in the response in some way. This may have occurred because the floods were on

everyone's agenda, and collaboration between government departments and with other organisations was necessary. The government provided political and financial support for those working in the management of the floods.

However, not all disasters are so all-encompassing. There are several disasters every year in Mozambique that affect specific populations, and not the whole country, such as disease outbreaks, fires or loss of fertile land. It is necessary to have a useable disaster management plan for these situations as inevitably there will be reduced political and financial support. Clearly defined roles and responsibilities need to be spelled out for each of the relevant stakeholders, rather than each stakeholder developing a plan in isolation. This was consistent with approaches by both Quarantelli (1994b) and Salter (1998).

Generally, the management of the floods did not comply with internationally accepted concepts of disaster management. The reason for this was because there was minimal planning and no useable disaster management plan, as previously explained. Despite this, this study shows that elements of the All Agencies Approach and the response component of the Comprehensive Approach were more effectively accomplished than the other concepts, such as the Prepared Community, the All Hazards Approach and the prevention, preparedness and recovery components of the Comprehensive Approach.

Conclusion

The four 'internationally accepted' disaster management concepts have been implemented successfully in several developed countries. This study has proposed that they are also relevant in developing countries, although the issue of poverty alleviation must be considered when interpreting the concepts. Although some application of the disaster management concepts were quite lacking in the 1999–2000 Mozambican floods, when economic and social considerations are understood, the concepts are quite relevant and useful to developing countries. Poverty alleviation should always be the top priority, but disaster management planning within the economic constraints of developing countries would greatly reduce the extra burden caused by disasters.

References

Anonymous 2000, *Visits of a WHO Team to Sofala, 8 to 16 March 2000*, unpublished report.

Australian Institute of Environmental Health, Queensland Division, 1991, *The Environmental Health Officer in Counter Disaster Management Arrangements—26th July 1991*, Unpublished seminar notes.

Canadian Space Agency, 2000, *Mozambique Floods: Limpopo River Drainage Basin, 01 March 2000*, [satellite image], www.reliefweb.int/mapc/afr_sth/cnt/moz/moz_fld_mar1.jpg, accessed 20 October 2000.

Chissano J. 2000, *Message of Thanks*, Maputo Mozambique: Government of Mozambique, www.teledata.mz/ingc/message_of_thanks.htm, accessed 20 October 2000.

Direcção de Planificação e Cooperação, Gabinete de Coordenação de Projectos de Investimento 2000, *Emergency Relief Planning for the Central and Southern Regions of Mozambique: English Translation*, Republic of Mozambique, Maputo Mozambique.

Fumo J. 2000, 'Para casos de catástrofes: INGC prepara planos de contingência' *Notícias*, 1 August 2000, p. 1.

Gabinet de Epidemiologia 1997, *Manual Para o Controle e Tratamento da Meningite Meningocócica*, República de Moçambique, Maputo.

Gabinet de Epidemiologia, Departamento de Saúde da Comunidade, 1993, *Manual de Prevenção e Tratamento da Cólera*, República de Moçambique, Maputo.

Geographica, 1999, Random House Australia Pty Ltd, Milsons Point NSW.

Government of Mozambique, 2000, *Mozambique: Post-Emergency Reconstruction Program*, Report presented at International Reconstruction Conference, Rome Italy, 3-4 May 2000.

Karand N. & Aksit B. 1999, 'A Case Study from Dinar and Bursa (Turkey)', *Australian Journal of Emergency Management*, Vol. 13, No. 4, pp. 35–39.

Manual de Atenção à Saúde em Situação de Emergência, second edition, 1992, Direcção Nacional de Saúde, Ministério da Saúde, Maputo Mozambique.

McEntire D. 1998, 'Balancing International Approaches to Disaster: Rethinking Prevention Instead of Relief', *Australian Journal of Emergency Management*, Vol. 13, No. 2, pp. 50–55.

Médecins Sans Frontières, European Union and Agence Européenne pour le Développement et la Santé, 2000, *Consolidated Information System Mozambique: Special Edition 2 – Floods*, Médecins Sans Frontières, Maputo Mozambique.

Ministério da Saúde, 2000, *Programa Alargado de Vacinação: Relatório Sobre a Vacinação de Emergência*, República de

Moçambique, Maputo Mozambique.

Ministério da Saúde, 2000, *Rapid Nutritional Assessment of Displaced Children Aged 1-5 Years in Mozambique, March 29-31 2000*, Republic of Mozambique, Maputo Mozambique.

Ministry of Health 2000, *Minimum Requirements for the Safe Return of Affected Populations*, Republic of Mozambique, Maputo Mozambique.

Ministry of Health, National Health Directorate 2000, *Floods in Mozambique: Situation Update and Health Intervention*. Unidade de Coordenação e Informação Técnica de Emergência, Maputo Mozambique.

Mozambique Red Cross Society 2000, *Floods 2000—Synthesis*, www.mozambique.mz/floods/rcross.htm, accessed 24 August 2000.

Mozambique Red Cross Society and International Federation of Red Cross and Red Crescent Southern Regional Delegation 2000, *Mozambique Flood Victims Relief Operation: Gaza Province Health Interventions*, unpublished report.

Najman J. 1994, 'Class Inequalities in Health and Lifestyle' in Waddell C. and Petersen A. eds., *Just Health: Inequality in Illness, Care and Prevention*, Churchill Livingstone, Melbourne, Victoria.

Oxfam International 1997, *Debt Relief for Mozambique: Investing in Peace*, www.caa.org.au/oxfam/advocacy/moz97.html accessed 20 October 2000.

Quarantelli E. 1994, *Twenty Criteria for Evaluating Disaster Planning and Managing their Applicability in Developing Societies*, Disaster Research Center, University of Delaware, Newark Delaware USA.

Salter J. 1998, 'Risk Management in the Emergency Management Context', *Australian Journal of Emergency Management*, Vol. 12, No. 4, pp. 22–28.

Smith R. & Oxfam Great Britain 2000, *Trip Report: Aerial Survey of Save and Búzi Rivers—2 March 2000*, unpublished.

Tarrant M. 1998, 'Risk Communication in the Context of Emergency Management: Planning "With" Rather Than "For" Communities', *Australian Journal of Emergency Management*, Vol. 12, No. 4, pp. 20–21.

United Nations Department of Economic and Social Affairs, Statistical Division, 1997, *Statistical Yearbook—Annuaire statistique*, forty-second edition, United Nations, New York USA.

United States Agency for International Development, Office of Foreign Disaster Assistance 2000, *Cyclone Path Map: Cyclones Gloria, Leon-Eline & Hudah: February–April 2000*, (map), www.reliefweb.

int/mapc/afr_sth/reg/cyclone_path.pdf, accessed 20 October 2000.

United States Department of State and United States Agency for International Development 2000, *United States Government Response Framework for Flooding Disaster in Central and Southern Mozambique*, Cable document, reference Maputo 702.

World Health Organization 2000, *The World Health Report 2000—Health Systems: Improving Performance*. World Health Organization, Geneva Switzerland.

About the author

Beau Martin is currently undertaking a PhD on the sustainability of aid given to developing countries, at Queensland University of Technology. The disaster management study was undertaken as part of an honours degree for a bachelor

of health science, for which Mr Martin received 1st class honours.

He has an active interest in health and sustainable development in developing countries, and has been employed by the Australian Agency for International Development to undertake a medical waste segregation program for Mozambique.

Contact details

Beau Martin, can be contacted at: QUT School of Public Health
Victoria Park Road
Kelvin Grove Qld 4059
Phone: 07 3864 5698
Fax: 07 3864 3369
Email: bd.martin@qut.edu.au

This article has been refereed

Conference Announcement

5th New Zealand Natural Hazards Management Conference 2002

Te Papa, Wellington, New Zealand

14-15 August 2002

Optional Field Trip: 16 August 2002

The Institute of Geological and Nuclear Sciences (GNS), the National Institute of Water and Atmospheric Research (NIWA), Ministry of Civil Defence and Emergency Management, Wellington City Emergency Management Office, Wellington Regional Council, and the Earthquake Commission (EQC) invite you and your colleagues to participate in the 5th New Zealand Natural Hazards Management Conference in August 2002.

Target Audience

Emergency managers, planners, risk assessors, utility managers, natural hazards researchers and scientists.

Theme

The conference will provide a forum to discuss the integration of hazard information into effective risk management, including:

- applying hazard information to best practice planning
- exploring new technologies—advances in science application
- natural hazard mitigation for industry
- creating resilient communities through integrating science and practice

Conference Format

The conference will feature keynote addresses, case studies, formal presentations and poster sessions.

Pre conference short courses

Several pre conference short courses are planned. Further details will be available later.

Post conference Field Trip

A one-day optional field trip is planned for 16 August 2002. The trip will visit sites around Wellington to discuss local hazard issues and see examples of successful hazard mitigation strategies.

Registration

Registration and program details will be sent out late May 2002.

More information

Diane Tilyard, Wairakei Research Centre
Institute of Geological & Nuclear Sciences
Private Bag 200, TAUPU
Phone: 07 374 8211; Fax: 07 374 8199
Email: d.tilyard@gns.cri.nz