

Drought assessment: the 1997–98 El Niño drought in Papua New Guinea and the Solomon Islands

The 1997–98 El Niño episode brought serious drought to many Pacific island countries. This article discusses the drought in Papua New Guinea and the Solomon Islands and assessment of its impact.

Background

Papua New Guinea and the Solomon Islands are situated in the south-western Pacific Ocean, between 2–12° south of the equator. In this location they experience generally warm temperatures year-round, with daily averages reducing by a few degrees during May–October. However, in the highlands of Papua New Guinea, temperatures can be very much cooler with occasional frosts above 2700 metres between May and October. Rain can occur at any time of the year but is generally lower from May to October when the south-east trade winds prevail.

Drought conditions are not infrequent in the smaller Pacific islands, particularly in atolls which rely for fresh water supplies on a shallow fresh water lens lying above the salt water table. People on these islands experience domestic water shortages on a regular basis resulting from either limited rainfall or because wind or wave-borne salt water has drained into the lens turning it brackish. Many atoll populations have developed coping mechanisms to help them through these periods. Using less brackish beach springs or drinking coconut milk are typical examples.

Mainland Papua New Guinea is less widely affected by drought because of its size and geographical complexity. Nevertheless, parts of the country, notably around Port Moresby, are seasonally dry and widespread drought has been experienced on a number of occasions in the past.

Both countries have national meteorological services but these are under-resourced. The Papua New Guinea Meteorological Service receives daily rainfall information on a monthly basis from 12 permanent observation sites and on an irregular basis from 10 voluntary reporting sites. Solomon Islands Meteorological Service receives similar monthly reports from six sites.

The 1997–98 El Niño Event

The Southern Oscillation Index, used as an indicator of El Niño impact in this region,

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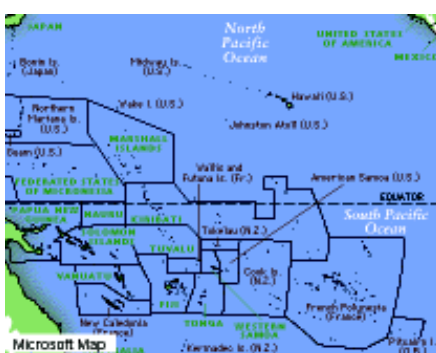


Figure 1: The South-West Pacific



Figure 2: Papua New Guinea

moved dramatically by 22 points from positive to negative in February–March 1997. It then remained negative until May 1998, when there was an even more dramatic change of 25 points from a deep negative index back to positive.

Climatic variations around the world during this El Niño over this period have been widely publicised and are discussed in many papers and venues. In South Pacific island countries, which include Papua New Guinea, the main change appears to have been a significant reduction in rainfall that resulted in droughts that caused concern in at least Papua New Guinea, Solomon Islands, Vanuatu and Fiji. Drought was also experienced later in Samoa and Tonga.

The 1997–98 drought in Papua New Guinea

Rainfall in any part of Papua New Guinea may be subject to wide variation over any

selected period of up to a month. Rainfall in the early months of 1997 was within normal range of expected variation. Recording stations in Papua New Guinea for the period January to March 1997 measured rainfalls from 39% below normal to 69% above normal. The highest figures were from Hoskins and Tokua in New Britain, both of which recorded more than 65% increases.

From April 1997 the rainfall picture changed dramatically. Over the following nine months, Wewak on the north coast of Papua New Guinea was the only station reporting higher than average rainfall. Other stations reported falls 23% to 78% below normal.

As frequently occurs, the symptoms of the oncoming drought were slow to be noticed. The frequency of rainfall variations and the possibility that the dry season was starting early meant that there was no sense of alarm. Traditional dry season agricultural practices were begun but it was not until July that reports of serious water shortages began to reach Port Moresby.

An additional climatic variation in 1997 was the occurrence of an unusually high number of frosts in the Papua New Guinea highlands. These began in June and were experienced down to 1450m, although the areas most affected were those higher than 2200 m in Enga, Western Highlands, Southern Highlands and Central Provinces. Frosts were experienced in every month until October. At least one place, Tambul, in the Western Highlands, experienced successive nights of frost, including eight in September. (Allen, 1998).

As the effect of the drought and frosts became more widespread provincial governments began making representations to

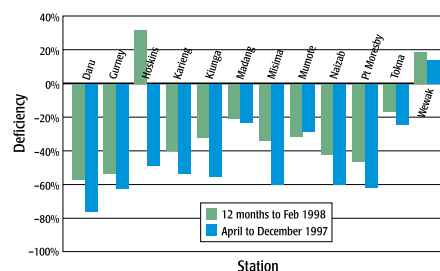


Figure 3: Papua New Guinea rainfall comparisons 1997–98

central government about the difficulties being experienced by both subsistence and commercial farmers. School closures were being reported when poorly maintained water tanks were unable to hold the reserve supplies needed to meet the daily needs of staff and students.

In August, two Papua New Guinea Government departments asked Drs Bryant Allen and Michael Bourke, of the Australian National University, to assess the effect of these frosts on village food supplies (Bourke 1998). Both Allen and Bourke have conducted research into agriculture in Papua New Guinea for more than 25 years and they have an encyclopaedic knowledge of the subject.

By September the request had broadened and Australia was asked by the Department of Provincial and Local Government Affairs to provide a team to assess the scale of the national problem; to assist National Disaster and Emergency Services to establish an operations centre; and to assist with development of reporting and monitoring mechanisms. The assistance of Drs Allen and Bourke with development of recovery mechanisms was also sought.

The Australian Agency for International Development (AusAID), the Australian Government's development assistance agency, convened a team from the Australian National University, CARE Australia and Pacific Emergency Management Associates to meet these needs. Members had experience in geography, agriculture, logistics, water supply, health and emergency management. AusAID also agreed to fund a full drought assessment.

The first assessment

Assessment of the impact of drought is always difficult. It is usually a problem that affects a wide geographic area in a variety of ways. By the time the team arrived in Port Moresby in September, there were reports of drought impact from all nineteen provinces and the local media was encouraging further reports by featuring drought news. The quality of reports differed and there appeared to be a significant 'me too' element in reports from some provinces. The possibility that aid might be forthcoming was also a significant factor. No politician wanted to be seen to be downplaying the possible impact on constituents.

Media and other reports were contradictory but appeared to indicate that:

- more than 1.3 million people were severely affected
- over 70 deaths had been caused by famine
- population movements were beginning
- crops were dying or dead
- bushfires were devastating villages and food gardens

- streams, creeks and swamps had dried up
- rivers were disappearing
- schools had closed and hospitals and clinics might have to close because of water shortages
- lack of water was reducing power generating capacity so that towns were suffering major power cuts
- fights over water were beginning.

Assessment within four weeks was needed so that action could be initiated to develop strategies and priorities. The process was complicated because there had been no coordinated collection of reports to date, information was not shared between agencies or between levels of government, and shortage of funds meant that previous reports had not been checked or substantiated.

A final blow was the discovery that there was no baseline government information available for comparison. Allen and Bourke were considered to have the most comprehensive available knowledge of previous droughts and of agriculture throughout the country. There would be heavy reliance on their expertise. The Department of Agriculture and Livestock had some very skilled and experienced scientists and agricultural workers but none had the same breadth of knowledge of the whole country.

In the time available, it was clear that this would be a very coarse assessment but the increasingly alarming information being received made it imperative that decisions on relief priorities be made quickly. An assessment of the whole country to a common standard was seen a vital information base on which to decide those priorities. The first-ever drought assessment of a developing country of 463,000 sq km and a population of 4.4 million people is not an easy proposition. To attempt to complete it in a month using teams with little or no experience of such assessments was ambitious, and it is to the credit of all concerned that a report was produced in time for meaningful action to be taken.

Allen and Bourke quickly developed a draft questionnaire covering agriculture and food impacts. This was amended, with input from the rest of the team to cover water and health impacts, and put to print. The questionnaire was lengthy because there was a need to obtain some baseline data to compare current and previous conditions and practices. As the answers to questions might exaggerate the situation in individual com-



Drought-affected hills in Milne Bay Province, Papua New Guinea

munities it was decided to include a 'summary' page in which the team could give their view of the situation in each place visited and make a comparison with other similar communities. On this page the assessment team was asked to categorise the impact on a five point scale as follows (Allen and Bourke 1997a).

1. Unusually dry, but no major food supply, drinking water or health problems.
2. Some inconvenience. Staple food is short but other food available, must travel further to collect drinking water but health OK.
3. Difficult, with food short and some famine food being eaten, water available at a distance, some babies and old people unwell. No lives at risk.
4. No food in gardens, famine food only being eaten, water in short supply and possibly polluted, increasing sickness, lives of small children and old people at risk.
5. Extreme situation. No food available at all, water very short, many people ill, small children and old people dying.

In due course these categories became the main basis for decision making about drought response.

Thirteen teams of two or three people were organised. The Department of Agriculture and Livestock provided most team members but others were drawn from provincial governments, NGOs, Ok Tedi Mining Ltd and independent agricultural agencies. Field work took up to 18 days with teams travelling by road, sea, air and on foot. The aim was to assess the situation in a representative selection of villages in each census division.



Provincial Secretaries planning the national drought assessment, Solomon Islands

Urban areas were not assessed because they had ready access to food and resources. In the time available, it proved impossible to cover the whole country but every province was visited and enough information was gained to provide a broad picture of the situation and to assess priorities.

Assessment processing

Transport and communications in Papua New Guinea are limited and there were very real problems in getting assessment information back to Port Moresby. Plans to have reports faxed back on a daily basis proved impractical and eventually the summary pages of the questionnaires were faxed as and when the teams could obtain access to a fax machine. The remainder of the report was posted in on completion.

The Data Processing Unit of the Department of Provincial and Local Government Affairs developed a Microsoft Access database into which existing census data was entered. As assessment reports arrived, the summary page information was immediately added to this database. For ease of presentation and understanding this information was then linked to a geographical information system from which maps were prepared regularly to show the degree of severity of drought impact. On the maps, severity was indicated by colour coding the average assessment category of each census division. The maps were widely distributed and became, even more than the tables produced from the database, the most widely circulated indications of drought impact.

Results

The assessment found that virtually everyone in rural Papua New Guinea was affected by the drought to some extent. The summary assessment (Allen and Bourke 1997a) was:

- **777,000 people** in a critical, life threatening situation surviving on dwindling stocks of 'famine' foods and bush foods

- **100,000 people** would be in a similar situation by the end of October 1997
- **250,000 people** eating very small amounts of rapidly diminishing food from gardens, supplemented with 'famine' and bush foods. Many of these people would be in a critical situation in two months
- **130,000 people** still have food in their gardens, but this could be consumed within two months.

The assessment also found that about 100,000 rural people were experiencing critical problems with drinking water. These people were not always those suffering critical food shortages although some were experiencing difficulties with both food and water. The problems included drinking water shortages, access only to brackish water or access only to contaminated water. Throughout the country the majority of the rural population was using water from other than normal sources and many people had to walk for up to two hours to obtain drinking water. The number of people with serious

water supply difficulties was expected to increase rapidly in the following months unless substantial rain fell.

The health situation was harder to assess because rural health in PNG is relatively poor by world standards in normal times. There had been many reports in the local media of deaths caused by the drought but the Department of Health had no information them. The assessment found that most areas reported an increase in diarrhoea and skin infections but the nutritional status in young children was not generally affected. A number of deaths were reported to assessment teams but the Department of Health could not confirm that these were directly caused by the drought.

There has been subsequent criticism of this first assessment implying that it was alarmist and overstated the realities of the situation. This criticism can always be made when adverse forecasts are not fully realised. Any assessment that must be completed in a very short time is vulnerable to criticism, particularly when the critics have the advantage of hindsight and access to the results of later assessments. To some extent this first assessment was its own worst enemy since it spurred governments in Papua New Guinea and Australia to respond to the situation and alleviate the situation over the next few months. As a result, the impact of the drought on many of the people considered to be at serious risk was reduced.

Initial drought response

The response to the drought has been well described elsewhere but the following summarises the main points.

- The Papua New Guinea Government decided that drought relief assistance would be provided to communities in census divisions with an average assess-



The last well on Bellona Island, Solomon Islands still had water, but it was badly polluted. First rains had turned the vegetation green but it would not be productive for some weeks.

ment category of 5, or 4 approaching 5.

- Relief would consist of rations of rice, flour and cooking oil to supplement the limited remaining food stocks.
- The Papua New Guinea Government would distribute rations to the eligible areas accessible by surface transport.
- The Australian Government would distribute rations to those areas only accessible by air.
- Non-government organisation support would be provided to provincial governments to assist them with the logistics of distributing the aid.

The second assessment

The first assessment report recommended continuing assessment be carried out by the Department of Agriculture and Livestock but it was agreed in subsequent discussions that further assessments be carried out at two monthly intervals. AusAID funded a second assessment in November and December 1997, once again under the leadership of Drs Allen and Bourke.

The second assessment was carried out by 18 teams of two or three people, many with experience in the first assessment. Care was taken to task experienced members to carry out this assessment in different provinces so that there would be a second, independent, view of the impact of the drought and frosts to compare with the first.

Because of the difficulties of entering large volumes of information in computer databases in a short period, a new assessment form was prepared for this assessment. It consisted of a single sheet similar to the summary sheet of the first assessment. The main differences were that separate assessment ratings were required for food supply and water supply impact, and that teams were asked to assess the forecast ratings in each location in a further two months.

Results

This assessment, with better-prepared and more experienced teams, was able to cover a higher proportion of the estimated 3.15 million rural dwellers. It found that some 40% of the rural population were seriously affected. Analysis showed (Allen and Bourke 1997b):

260,000 people in a critical, life threatening situation surviving on dwindling stocks of 'famine' foods and bush foods

980,000 people eating very small amounts of rapidly diminishing food from their gardens, supplementing these with 'famine' and bush foods. Many of these people would be in a critical situation in a further two months

980,000 people still with food in their gardens but this could be consumed within two months



Major pest damage to the first green vegetable crop in northern Solomon Islands after the rain began.

The water assessment showed:
5,000 people in a critical, life threatening situation with an extremely limited water supply of very poor quality

363,000 people with small amounts of poor quality water available locally or better quality water available only at a long distance

853,000 people whose local water sources were dry but with alternative sources available, possibly polluted and at a distance

No formal health assessment was carried out at this stage but teams reported an increase in the number of people dying from unexplained symptoms. There was also an increase in the proportion of young to middle aged adults dying whereas the normal pattern is to have a predominance of very young and very old people dying. An increase in the incidence of severe malaria was reported and there were indications that nutritional standards were falling.

Continuing response

As a result of this assessment, the program of supplementary relief food delivery was continued with adjustments to the locations targeted. Attention was paid to delivering planting materials so that crops could be grown as soon as sufficient rain arrived. At that time the El Niño phenomena was forecast to last until the middle of 1998 and there was no indication that the drought would ease to any significant extent before March or even May. Further assessments were obviously going to be necessary and a system of monitoring would also be required.

The third assessment

Shortly after the second assessment was completed, rain began falling in many parts of Papua New Guinea. Although it was not continuous and did not make up the shortfall, the falls appeared to alleviate the situation in some districts. The return of rain could not alleviate all problems, however. The various staple crops take between

three months and a year to grow and produce normal volumes of food. As most planting materials had been consumed or destroyed, it was obviously necessary to assess the impact of this rain and to plan recovery measures.

The previous assessments had been publicly seen as AusAID operations despite being carried out mainly by Papua New Guinea officials. The Papua New Guinea Government was keen to have any future assessments identified as national operations. In view of the experience its staff had gained in earlier assessments, responsibility for a third assessment was given to the Department of Agriculture and Livestock. Mr B Wayi, Director, Rehabilitation was appointed as coordinator. An Australian consultant assisted him and AusAID funded the assessment once again.

As the rain was reported to have alleviated the drought in all areas, the government decided to conduct the assessment only in the worst affected areas, ie those rated in Category 4 and 5 in the previous assessment either for food or water. This would require assessment of 244 districts in 17 provinces. Fourteen teams were nominated to carry out the assessment.

The questionnaire used in the second assessment had produced valuable results but the lack of specific questions in the assessment form had led different assessment teams to record their results in different ways. This had made interpretation difficult. It was decided that as this assessment was to address recovery as well as relief measures, it would be necessary to add questions on particular points to supplement a general assessment form that was slightly modified from that used in the previous operation in the light of changed conditions.

In view of the previous difficulties with processing questionnaire data, it was agreed

that only the summary form and drought ratings would be entered in the database, leaving analysis of the remaining information to be carried out in slower time.

The increased rainfall made access to some parts of the country very difficult during this assessment and it was not possible to reach all of the targeted districts. The assessment also produced some different assessment problems. Recovering crops in the lower Ramu Valley, which had been considered a seriously affected area, were found to be under up to 2 metres of flood water and had been lost yet again!

Results

The third assessment (Wayi 1998) confirmed that production of early maturing staples and vegetables was increasing in many areas after significant rain had fallen. It was considered that recovery could have been faster if more seeds and planting materials had been available. Problems were being experienced with outbreaks of crop disease and with pest attacks while the sudden release of soil nutrients had resulted in the growth of excess leaves and vines at the expense of sweet potato tubers.

Nevertheless the number of people considered seriously affected had fallen sharply. Preliminary assessment of the food situation in all provinces except Western Province (where the team was involved in a helicopter crash and the assessment had to be repeated) indicated:

34,000 people in a critical, life threatening situation surviving on 'famine' foods and bush foods

335,000 people eating very small amounts of food from their gardens, supplementing these with 'famine' and bush foods.

Continued improvement was expected.

The water situation had improved even more dramatically. Only a few districts were reported to be in serious difficulty and the main problems in the category 4 areas were salinity and contamination rather than shortage.

1,000 people in a critical, life threatening situation with an extremely limited water supply of very poor quality

75,000 people with small amounts of poor quality water available locally or better quality water only at a long distance.

Continuing response

As a result of this assessment, supplementary food deliveries were scaled down and concentrated on the worst affected districts. The assessment also supported other initiatives to assist recovery measures and improve resistance to future droughts. Coordination of water supply development activities was improved with particular attention being paid to those areas that had

experienced the worst shortages. Further research into drought resistant crop varieties was initiated and measures to increase the delivery of planting materials were implemented.

Later situation

During a visit to PNG in July 1998 it was clear that, although some agricultural problems continued, the drought was now considered over. Recovery appears to have been quicker than expected by any of the assessments. Some crop shortages continued but these were more the result of slow growing periods than of any continuing rainfall deficit. Most of the pest and disease problems had eased and the second-planted crop of sweet potato did not appear to be suffering from non-production of tubers. There were no reports that any other root crop had experienced this particular problem.

The 1997-98 drought in the Solomon Islands

Similar rainfall patterns also affected Solomon Islands in 1997 although later than Papua New Guinea. Total rainfall during the first four months of the year varied between 7% below and 28% above normal at the six recording stations. The higher recordings were made at recording stations affected by Tropical Cyclone Justin in March. In May the rainfall fell to between 29% and 89% below normal at all stations. For the period from May to December total rainfall between 32% and 58% below normal was recorded.

First reports that a serious drought was developing appear to have reached Honiara in September and October. Water rationing was imposed in some provincial centres in September although this was not unusual in those centres where the water supply system had been allowed to run down. More alarming were reports of school closures in the same month. By November, reports of problems had become so numerous that the National Disaster Council asked all provincial governments to report on the way in which the drought was affecting provinces. No guidelines were given for the report and the results were of varying quality. As a whole they did not give a clear enough picture for a decision to be made about the need for government intervention. However the situation in the off-lying islands of Rennell and Bellona Province was clearly serious and a technical assessment team was sent to these islands. As a result of its report, Bellona was declared a disaster area. Provision of water containers, pumps and supplementary rations of rice was approved but shipping difficulties resulted in the supplies being delayed until late December.

Those provincial reports that did describe the effects of the drought indicated that



Figure 4: Solomon Islands

springs and streams were drying up and that staple crops were small and underdeveloped. Supplementary crops were also affected with vegetables dying in some areas and new plantings shrivelling up.

In December, AusAID agreed to fund a national drought assessment and to provide a consultant to assist with the process

The assessment process

In some ways, carrying out a national drought assessment in Solomon Islands is easier than in Papua New Guinea. This is a smaller country with a population of approximately 300,000 people living on some 36 inhabited islands in an archipelago spread over some 800,000 square kilometres of ocean. However, infrastructure is generally less developed (although some sectors are better organised) and there is a serious shortage of professional staff. Inexperience and lack of funds for provincial officials to visit many parts of their provinces had been among the reasons for the poor reporting of the drought. Transport and other infrastructures are not well developed and have suffered badly from funding shortages in recent years. The country got into serious financial trouble under the previous government and a new government was seeking to turn the situation round. Cooperation between central and provincial government appeared to have improved. The security situation was good although at the time of the assessment there were still concerns about the situation on the border with Papua New Guinea since Bougainville, which was still in a state of rebellion, could be seen from the northern Solomon Islands.

Again a rapid assessment was needed and the experience of PNG was of great benefit in developing the process. Once again there was no baseline government information available on normal agricultural and water supply conditions although the Department of Health had a valuable database.

Because of the close relationship with provincial government and the familiarity of their staff with their area of responsibility, it was decided to use provincial officials for the assessment with standardisation checks being carried out by the consultant and by National Disaster Office staff. A workshop

of all Provincial Secretaries was convened and an assessment form developed using the Papua New Guinea examples as a model. It contained some basic questions and a summary page that differed in requesting separate ratings for food and agriculture, water supply and health impacts of the drought.

The ratings agreed were:

Water

1. Unusually dry but no major drinking or other water problems.
2. Some inconvenience, usual water source not available, or water tastes salty.
3. Difficult, water available but at a distance and takes much time to collect.
4. Conditions bad, water in short supply or possibly polluted.
5. Extreme situation. Water very short or too salty or polluted to drink.

Food

1. Unusually dry, but no major food supply problem.
2. Some inconvenience. Staple food is short but other food available.
3. Difficult, with food short and some famine food being eaten.
4. No food in gardens, famine food only being eaten.
5. Extreme situation. No food available at all.

Health

1. Unusually dry but no health problems.
2. Some inconvenience, dry skin and other minor health problems.
3. Difficult, some disabled and old people and children unwell, increase in diarrhoea.
4. Conditions bad, more people sick, lives of disabled and old people and children at risk.
5. Extreme situation. Many people sick, small children, disabled and old people dying.

It was decided to base the assessment on the 171 rural electoral wards. Assessment teams were asked to visit 4 villages in each ward, trying to cover as wide a selection of large and small, coastal and inland villages as possible. The ratings would be averaged to give a rating for each province.

The assessment was complicated by two tropical cyclones that passed close to some outlying islands during December, causing wind and storm surge damage. Assessment teams were asked to report separately on this damage but it was impossible to segregate the impacts on the communities completely. The drought made some crops more vulnerable to damage and drought loss of some crops had made others more important.

The assessment actually started in January 1998 but transport and other difficul-

ties stretched the assessment period and some results were not available until March and April. Fortunately for the country, but unfortunately for the assessment process, rain began to fall again in December and there was reasonable rain in some provinces in January.

Assessment processing

All assessment forms were returned to the National Disaster Office by air for entry into a Microsoft Access database developed for the purpose. Arrangements were made for specialist agricultural, water supply and health data to be relayed to relevant departments for recovery and mitigation purposes. Arrangements were made with the Lands and Survey Office for ratings to be mapped.

Results

The assessment (National Disaster Office 1998) confirmed that although all provinces had been affected by the drought, the severity of the impact varied. In general the impact was considered to be less severe than in Papua New Guinea

The water assessment showed that:

14,000 people were experiencing serious shortages of safe drinking water or used water that was significantly polluted.

33,000 people were experiencing difficulties in getting safe water or had to walk long distances to collect it.

Worst affected were small islands with limited fresh water resources. Some of these people were using water so brackish that it made assessment team members sick.

The food assessment showed that:

26,000 people had no food left in their gardens and were surviving on famine food from the bush or supplementary rations from trade stores or supplied by relatives, friends or provincial governments

29,000 people had very small amounts of rapidly diminishing food from their gardens, supplementing these with 'famine' and bush foods.

By the time the assessment was completed, most provinces had had enough rain to start planting but the growing crops were being severely affected by insect pests. There was also competition for surviving food from pigs and birds. Planting materials were scarce.

The health assessment showed that **7000 people** were suffering significant increase in diarrhoea, skin complaints (usually in areas with brackish water) and other health problems with old and very young people at risk

33,000 people were subject to significant ill health risks

The most commonly reported problems were diarrhoea, skin complaints, eye infections and influenza.

Response

The Solomon Islands Government arranged for supplementary food rations to be provided to the worst affected provinces to cover the expected growing period but the continuing rain meant that response needs were fairly small.

Future drought assessment

Emergency drought assessment is not an activity that has been found necessary in this region in recent years. Yet if the forecast increase in the frequency and severity of El Niño events occurs, it is an activity that will require increased attention. There will be a need for:

- collection of suitable baseline data;
- detection and triggering systems so that assessment can begin before the situation deteriorates too far
- preparation of software that will allow easy processing and mapping of information
- preparation of plans and supporting procedures
- identification and training of personnel to form teams in all countries likely to be affected.



Major pest damage to the first green vegetable crop in northern Solomon Islands after the rain began again.

- development of administrative and logistical measures to enable the assessments to be carried out quickly and effectively.

Baseline data

In each vulnerable country, government will need to identify currently available information on water, agricultural, economic and health activities that may be vulnerable to drought. Information gaps will need to be filled. Having identified the activities and resources that may be vulnerable, resources will need to be committed to identifying the key indicators of drought in that country and establishing databases of 'normal' conditions for comparison purposes. Particular attention will need to be paid to the staple crops grown by subsistence farmers in remote areas since the response to their needs will be most difficult. These steps should be within the capabilities of all regional countries although some scientific support may be needed.

Detection and triggering systems

Although the marked reduction in rainfall was clearly evident in meteorological station reports in both Papua New Guinea and Solomon Islands, the danger signals do not appear to have been recognised. In many countries, the value of such long-term climatic data does not appear to be recognised outside the meteorological and scientific communities. As a result there has been little attention paid to establishing systems that will detect significant trends and bring them to the attention of those most concerned so that appropriate responses can be initiated. The wider community, including many government agencies, has limited understanding of the value of climatic data. This is another area requiring early action that is well within the national capabilities.

Software

The ease with which basic database recording programs could be prepared in Papua New Guinea and Solomon Islands shows that it should be possible to develop a more sophisticated and user-friendly program that could be adapted to the needs of all regional nations. Investigation may show that such a program is already available elsewhere in the world but, if not, it would have considerable export potential. A donor might usefully initiate such a project.

Preparation of plans and supporting procedures

Drought is not unknown in the region and should be covered in existing disaster plans. However this is an insidious hazard with very long-term effects of differing complexity. The response, while it has much in common with the response to rapid impact disasters requires some special techniques. This is

particularly the case with assessment, which requires much more scientific and professional participation on a continuing basis than assessment of an impact disaster. Current disaster plans in the region make no more than passing mention of drought as a disaster. This gap needs urgent rectification in the light of recent experience. Simultaneously there is a need to prepare assessment and other procedures to support the plans.

Assessment team identification and training

Identification of suitable people for assessment teams is difficult in countries where the professional human resource base is sparse. Yet it can be provided indirectly if the few professionals can share the key parts of their expertise with assessment team personnel with other skills. Accordingly, once assessment personnel have been identified, it is important that they receive training that would include questioning and analysis techniques as well as briefing by appropriate professionals such as agriculturalists, water engineers and health workers. There would need to be detailed refresher training before an assessment is carried out but the task would be reduced if groundwork had been done.

Administrative and logistical support

It was clear in the assessments discussed in this paper that one of the key shortfalls to conducting timely national drought assessment is the shortage of experienced administrators available to be committed to running such an operation and the shortage of logisticians outside the commercial sector. Administrative staff can be made available if priorities are acknowledged but they will usually be from other areas and will require a settling-in period to become fully effective in assessment administration. This period can be reduced if suitable staff can be identified and trained in advance.

The shortage of logisticians and appears to stem from a lack of any development priority for this discipline. Suitable people are probably available in the commercial sector and these could be identified, trained and used if funds are made available.

In the longer term it is important that disaster management staff be trained in logistics.

Conclusion

Competent, trustworthy assessment is important for any country after a disaster. In the absence of such assessments it is likely that other authorities and donors will continue to try to impose their own assessment before providing assistance. This

results not only in convergence and duplication (at least ten separate assessment operations took place after the Aitape Tsunami in Papua New Guinea in July 1998) but also in lengthening the suffering of disaster victims.

Drought assessment, like other disaster assessment, is a skill well within the capability of regional countries. The problem at present is that development of appropriate infrastructure and skills is not being given sufficient priority in the disaster management development process. Assessment looks easy but it requires skill and training if the results are to be accepted.

Bibliography

The author was involved in a small way in preparations for the first drought assessment in Papua New Guinea, was a member of a UN assessment team in the country while the second assessment was in progress and was the consultant who assisted with the organisation of the third assessment. He was also the consultant employed to assist with the development of the Solomon Islands drought assessment. Much of the information used in this paper is drawn from personal knowledge and original source documents but the assistance of the following documents is gratefully acknowledged:

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