Cyclone Tracking and Alert System: Pacific Islands

**Implementing Institution:**
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**Implementation Period:** The Australian-Pacific Centre for Emergency and Disaster Information (APCEDI) cyclone monitoring service was created by AFAP in 1994 in response to having to assist AFAP field staff during the eruption of the Rabaul volcano in Papua New Guinea. Over the next decade, as the APCEDI system grew, much of the focus of the system centred on cyclones, which are a major hazard for the small island developing States of the South Pacific region.
Costs: The APCEDI programme is one component of a larger disaster preparedness and mitigation programme operated throughout the South Pacific by AFAP and the Foundation of the Peoples of the South Pacific International (FSPI), of which AFAP is a member. In 2002, APCEDI was incorporated into the Australian Agency for International Development (AusAID) Emergencies Programme for three years, with AusAID providing $A1 million (US$750,000). In 2005, when the AusAID grant finished, APCEDI returned to its stand-alone programme status funded directly by AFAP. The average annual running costs for APCEDI are around $A10,000 (US$7,500).

Summary

The Australian-Pacific Centre for Emergency and Disaster Information (APCEDI) began as an internal system of the Australian Foundation for the Peoples of Asia and the Pacific Ltd. (AFAP) and the Foundation of the Peoples of the South Pacific International (FSPI) (of which AFAP is a member) in the 1990s that was being used only locally. However, once its use caught on, it grew quickly. Various agencies such as national meteorological offices have been helpful in providing suggestions for improving APCEDI and ensuring that information provided by APCEDI supports official warning systems. It is also cost-effective, with most costs linked to communication and staffing costs during the cyclone season.

The key objective of APCEDI, which is managed by the Australian Foundation for the Peoples of Asia and the Pacific Ltd. (AFAP), is to translate all the available meteorological and scientific data relating to a cyclonic event into simple yet accurate reports that can be easily understood by all stakeholders. APCEDI currently works with national disaster-management offices and other key disaster stakeholders to devise community strategies and activities for vulnerable island communities in Fiji, Kiribati, Papua New Guinea, Samoa, the Solomon Islands, Tonga, Tuvalu and Vanuatu.

When a cyclone forms and begins to threaten an area, the APCEDI system combines technical information with local knowledge of populations, demographics and topography. APCEDI then issues regular reports via the Internet and radio that provide communities and officials with easily understood information about an approaching cyclone. Reports are also posted on the APCEDI website, where they are freely available and members of the international community can view them at any time. Subscribers to the website can also have APCEDI reports sent to them automatically by e-mail.

APCEDI reports are now a key source for information on South Pacific cyclones and are used by local authorities throughout the region and by international donors that monitor cyclones from elsewhere. Many island communities, national disaster-management offices and local authorities use APCEDI to become better informed of the situation before, during
and after a cyclone hits. APCED1 reports are also widely used by major media outlets and other media organizations interested in cyclone news in the South Pacific.

APCED1 reports are not official warnings, however. The reports are designed to work in tandem with official national and regional warning systems in order to provide more comprehensive contextual information about both the cyclone and the nature of the islands and communities likely to be affected. Once cyclones have passed, the APCED1 system also reports on the damage and the relief efforts that are being mobilized to assist the affected islands.

APCED1 reports have been used by authorities not only to plan for approaching cyclones but also to find and rescue missing ships, locate missing persons, and coordinate and plan post-cyclone operations.

APCED1 is also used as an alert and information system during volcanic eruptions, tsunamis and non-cyclonic storms, after earthquakes and during other natural-hazard events such as droughts and floods.

**Background and Justification**

Before APCED1 was created, local communities, officials, resorts, tourists and many others living and working on various Pacific islands relied on hard-to-interpret meteorological data and reports often from distant locations in Australia, Fiji or New Zealand. These distant meteorological centres had almost no local knowledge of the islands being affected other than what they could see on their maps and charts. Often, official alerts were targeted to islands that had no population, and remote islands with populations were being overlooked or had no means of receiving warnings.

In addition, early-warning information was often received too late, did not adequately cover all the threatened areas, was sent in a language that could not be understood by the recipients, and/or included scientific concepts that local officials had difficulty in interpreting. Compounding the problems, some in-country meteorological field offices were not equipped with working computers, faxes or telephones. This meant that cyclones would arrive with little warning and adequate preparations could not be undertaken in time. This led to more people being killed and injured and far more damage being caused, especially in remote island areas.

Given these problems, it was clear that there was a need for a reporting and alert mechanism that would provide accurate, useful information about the arrival of the cyclone, including its direction and intensity, as well as information about the communities and islands that were about to be affected and the situation once the cyclone had passed. Reports and alerts had to be crafted to take into account the local situation on the ground so that information could be tailored to the specific context and provide people with the best information and advice possible.
The AFAP-Foundation for the Peoples of the South Pacific International (FSPI) Non-governmental Organization (NGO) Network has been operating in the South Pacific region since 1965. It has headquarters and field offices on most major islands and in most island States, including Fiji, Kiribati, Papua New Guinea, Samoa, the Solomon Islands, Tonga, Tuvalu and Vanuatu. As such, it was well placed to develop a Pacific-wide system such as APCEDI.

**Description**

APCEDI was developed in response to the 1994 Rabaul volcanic eruption in Papua New Guinea. This eruption devastated the local AFAP-FSPI NGO Network field office and impacted all the projects being carried out by the organization. At the time of the eruption, many of the reports emanating from both the local and international press were either false or misleading. The APCEDI concept was initiated by the AFAP-FSPI NGO Network to provide information to its local staff in Rabaul to help them find one another and their families and to provide correct information to the local authorities. Later in 1994, APCEDI was created to provide AFAP-FSPI NGO Network field offices with accurate information on natural disasters in their region.

Throughout the 1990s, APCEDI largely reported on cyclones, droughts and other natural disasters within the AFAP-FSPI NGO Network. However, since AFAP was increasingly involved with AusAID and Emergency Management Australia (EMA) in many other disaster-preparedness and relief and rehabilitation efforts, the APCEDI reports, which are provided free of charge, began to circulate more widely throughout the national disaster-management offices and the donor community in the Pacific region.

In March 1997, Super-cyclone Gavin tore through Fiji and Tuvalu, resulting in several deaths and much damage. This extreme weather event marked the first time that APCEDI reports were used by the wider media to provide news on the situation as so many communication links with the affected part of Fiji were cut for some days. APCEDI reports have been widely followed by the media ever since, including during cyclone Zoe, which occurred in December/January 2002/2003 (fig. 1) and cyclone Heta, which occurred in early January 2004 (fig. 2), both of which were Category-5 storms.

In 2004, with funding from AusAID, APCEDI changed from an e-mail and radio service to a web-focused blogging system where reports are regularly updated online. This proved very successful during the 2004-2005 cyclone season, with the website recording tens of thousands of hits. Significant numbers of hits were received from the affected island States as well as donors, news media and international agencies from around the globe. Also at this time, APCEDI started to provide information in French for the French island territories.

Currently, APCEDI has over 500 registered users although this figure increases
during the cyclone season and during active cyclone times. Based on experience from the last cyclone season, it is expected that the website will receive between 5,000 and 10,000 unique user hits in every 24-hour period. Many of these hits will be from the affected islands and neighbouring islands.

**Patenting and Commercialization**

The APCEDI service of AFAP is provided free of charge to the worldwide community. Anyone with e-mail and Internet access can freely and easily use it.

**Partnerships**

The APCEDI system is run from the AFAP headquarters in Sydney, Australia, but it relies on inputs from all partners in the Foundation for the Peoples of the South Pacific International (FSPI) network and from various in-country national disaster-management offices. These partners include: the FSPI Secretariat, Suva, Fiji; Partners in Community Development Fiji, Fiji; FSP Kiribati, Kiribati; the Foundation for People and Community Development, Papua New Guinea; O Le Siosiomaga Society Inc., Samoa; the Solomon Islands Development Trust, Solomon Islands; Tonga Trust, Tonga; the Tuvalu Association of NGOs, Tuvalu; and FSP Vanuatu, Vanuatu.

Among other important partners, APCEDI has received excellent input and advice from AusAID, which funded APCEDI from 2002 until 2005; the Australian Bureau of Meteorology; the Fiji Meteorological Bureau; the...
ReliefWeb website of the United Nations (see www.reliefweb.int); the South Pacific Applied Geoscience Commission (SOPAC) (now the Pacific Islands Applied Geoscience Commission); various national disaster-management offices; and several other related agencies.

**Replicability**

APCEDI could have many practical applications for small island developing States around the globe that are affected by cyclones and other natural disasters. The Caribbean, for example, has a web-based information system and AFAP has been sharing its experiences with operators in this region and, in return, obtaining ideas for improvements that could be made to the APCEDI system. AFAP is also investigating the possibility of applying APCEDI technologies in the North Pacific cyclone belt that includes such countries as the Philippines and Viet Nam.

**Policy Implications**

AFAP, through its NGO partners in each island State, makes sure that the national disaster-management offices are aware of APCEDI and know how to make use of the system. APCEDI is increasingly being used as a standard tool within most national disaster-management offices and these organizations also occasionally use APCEDI to disseminate information or as a basis for search operations for missing people or ships. The aim of AFAP is to promote APCEDI technologies further so that they become a standard part of the training of any national disaster-management office.

Major meteorological offices in the Pacific are now using APCEDI to gather information. Staff members in these offices have reported that they find the APCEDI format and reporting easy to use. In response, they are also trying to tailor their own official reports so that they contain less meteorological jargon. In addition, they are attempting to make their official reporting more inclusive, with specific island information that is easy to understand. This has been a positive change at an official level.

**Impact**

Despite the bad cyclone seasons experienced recently in the South Pacific, very few people have been killed or seriously injured. While AFAP cannot claim that this been a direct result of APCEDI, it is felt that overall improvements in Pacific cyclone early-warning systems generally, including APCEDI, have all contributed to improving the situation and have helped to make people far more aware and prepared for cyclones, their approach and their impact.

AFAP and other NGOs and regional bodies such as SOPAC continue to undertake cyclone preparedness work in the Pacific region that trains local people in how to prepare for cyclones and what to do before, during and after the cyclone. This also helps to minimize loss of life and damage and helps people to return to
normality soon after the cyclone.

The fact that there was a real need and demand for the APCEDI service is a major factor behind its success. It appears that, during major storms, people cannot get enough information and APCEDI provides information that is relevant to local communities and national and international agencies. Another contributing factor is that many communities in the Pacific are close to a tourist resort, church or school that has an Internet connection. At first, AFAP was uncertain whether an Internet-based system would be appropriate for remote Pacific communities. However, it has been found that, in some island States such as the Cook Islands, the main islands of Fiji and Tonga, and Samoa, the Internet is widely available and information can be disseminated quickly. Nevertheless, for remote parts of Kiribati, the Solomon Islands, Tuvalu and Vanuatu, reliable Internet access is still not available. This makes radio transmission the only effective means of communication in the short term.

The general public has been very enthusiastic about APCEDI. AFAP often receives messages and e-mails from people throughout the Pacific thanking it for caring about them and letting the organization know what is happening on the ground.

APCEDI has also proved to be a catalyst for getting more information about Pacific cyclones into the international news media, an outcome that helps to raise global awareness of these storms and their impact.

As APCEDI is not expensive and is simple and straightforward to run, there is a strong likelihood that it will be sustainable as long as the need for it continues and people with good technical disaster backgrounds are managing the programme.

**Lessons Learned**

Throughout each stage in the growth of APCEDI, lessons learned have been used when upgrading the system. Given the nature of the programme, which is fundamentally a technical blogging service, the lessons learned have been largely technical and have resulted in improvements to the type of material provided on the site and its presentation, often through adding more user-friendly functionality. AFAP has also been proactive in adopting new Internet and communication technologies. APCEDI was able to grow significantly when donors and the media had confidence in the system and found the reports to be accurate and informative. AusAID, in particular, was a source of both funding and advice and feedback, and AFAP is currently working with AusAID on ways to upgrade the system for future cyclone seasons.

To date, there have been few obstacles associated with the implementation and running of APCEDI. Occasionally, an inadvertent mistake or error is made in a report that may unintentionally upset someone. However, mechanisms exist so that such errors can be corrected.
quickly. Generally, when people see how quickly errors are corrected, they are happy with the response. National meteorological offices have also been helpful in ensuring that there is no confusion between APCEDI reports and official reports. APCEDI now uses approved disclaimers and has introduced other changes in response to requests from national offices.

**Future Plans**

The APCEDI manual is currently being upgraded so that it contains up-to-date information on all the major islands and island groups in the South Pacific. In addition, AFAP is improving its updating processes so that all information and contact details are up to date prior to each cyclone season. AFAP also continues to investigate different and new Internet-based technologies that may prove useful in improving APCEDI. For the 2005-2006 cyclone season, for example, an adjunct blogging and comment website was introduced alongside the official website, providing an open forum and bulletin board where people could upload information or ask questions about active cyclones in their area.

AFAP has considered charging the media for subscriptions to APCEDI in the future to make it more cost-effective and sustainable but, to date, the service continues to be made available free of charge to everyone. This free accessibility is a key component of the APCEDI system and AFAP intends to continue improving the site and its ability to disseminate information to the widest possible extent so that eventually even the remotest areas of the Pacific will be covered.

**Publications**

APCEDI Reports are available on the Internet at [www.afap.org/apcedi/index.html](http://www.afap.org/apcedi/index.html). These reports have been widely used and cited in the news media, including by Agence France-Presse, ABC News, the BBC, CNN, Reuters and other media organizations interested in cyclone news in the South Pacific. To date, no other specific publications relating to the system have been published.

**Case Study Prepared by:**

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**Project Participants:**

A team based at the headquarters of AFAP in Sydney, Australia, maintains the APCEDI system, with assistance from AFAP members and partners in developing and refining it. These partners, listed above, form a broad Pacific regional network that depends on the expertise and local knowledge of the in-country partners to function