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Information and communications technology for disaster risk reduction

Collaborative efforts to improve regional disaster communication capabilities

Note by the secretariat

Summary

The present document deals with the importance of satellite-based communications for responding to disaster emergency situations, how communications capacities help to manage disasters; and how regional cooperation can help in building disaster/emergency communications capacities collectively in the Asia-Pacific region. It highlights issues related to the promotion of the regional platform for collaborative disaster/emergency communications capacity in the region, such as: (a) the importance of the regional platform for a collaborative disaster communications capacity; (b) the capacity gaps and issues to be addressed by the regional platform; and (c) an approach for its development.

The Committee may wish to deliberate on the issues related to disaster emergency communications, including ways and means for their access and availability during disasters in countries with special needs and disaster-prone countries, especially for the small economies in the region, and also to provide guidance on the secretariat's future strategic direction in this area, including possible outputs that could be reflected in the programme of work for the biennium 2012-2013.

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I. Introduction

1. The Asia-Pacific region is home to more than 60 per cent of the world's population, and has suffered from 50 per cent of the world's major natural disasters. From 1980 to 2008, a total of 1.14 million people were killed by natural disasters in the region.[1] In 2008, more than 96 per cent of people killed by natural disasters worldwide were from Asia and the Pacific.[2] Of the 10 countries in the world most frequently hit by natural disasters, 8 are located in the region. The most recent catastrophes which befell the region include the Indian Ocean tsunami in 2004, the Wenchuan earthquake in China, Cyclone Nargis in Myanmar in 2008, and floods in China, India and Pakistan in 2010.

2. Communications systems play an important role in all phases of disaster management, particularly in warning of disasters and in their immediate aftermath. Such communications ensure the timely flow of information needed by Governments, international agencies and other humanitarian actors involved in rescue operations. In any disaster emergency response, rescue or relief situation, the deployment of wireless communications is typically among the first priorities.

3. In the majority of major disaster emergency situations, such as earthquakes, cyclones and hurricanes, terrestrial-based infrastructure is either destroyed by the disaster or was not available before the disaster occurred. In such situations, the rapid deployment of alternate communications systems

[1] PreventionWeb, Asia – disaster statistics. See www.preventionweb.net/english/countries/statistics/index_region.php?rid=4 (accessed 19 August 2010).

[2] ESCAP, *Statistical Yearbook for Asia and the Pacific 2009* (United Nations publication, Sales No. E.10.II.F.1, 2010) p. 22. *Note*: Calculated by dividing deaths in Asia and the Pacific over deaths world-wide.

that are not susceptible to damage from disasters, such as space-based communications systems, is essential.

4. The importance of international cooperation in disaster reduction and emergency response for developing countries was emphasized by the General Assembly in its resolution 64/251 of 22 January 2010 on international cooperation on humanitarian assistance in the field of natural disasters, from relief to development, in which it encouraged member States to develop emergency response telecommunication capacities and encouraged the international community to assist the efforts of developing countries in this area, where needed, including in the recovery phase.

5. At its first session, held in November 2008, the Committee on Information and Communications Technology recommended that the secretariat explore possibilities for developing regional and subregional disaster-communication standby systems in synergy with the International Telecommunication Union (ITU), the Asia-Pacific Telecommunity (APT) and relevant stakeholders (see E/ESCAP/CICT/6, para. 11).

6. The regional Inter-Agency Working Group on Information and Communication Technology (ICT),[3] which has more than 20 members representing United Nations entities and international organizations, agreed at its 14th meeting, held on 11 August 2010, to make joint efforts to promote an Asia-Pacific regional platform for disaster communications capacities, with collaborative emergency communications capacity as its core component.

7. In the present document, the secretariat (a) draws attention to the importance of communications systems for disaster emergency response, (b) highlights the importance of promoting a platform for a collaborative disaster emergency communications capacity for the region, (c) identifies current capacity gaps and issues of emergency communications capacity in countries with special needs and disaster-prone countries, especially small economies, and (d) suggests an approach for the development of the regional platform, along with future work for its realization.

8. Mention of firm names, commercial products and specific technologies does not imply the endorsement of the United Nations.

II. Communications needs for disaster management

A. Disaster communications for risk reduction

9. Disaster communications refers to the transmission, emission and reception of information through electromagnetic devices for functions related to monitoring and mitigating the effects of a serious disruption to a society trigged by natural or man-made disasters. Disaster communications encompasses the communications needs of all phases of disaster management, namely prior to a disaster for the dissemination of early warning reporting, and during disaster response for search, rescue and relief. At times, it may also cover the recovery and reconstruction stages.

10. Prior to a disaster, the information to be communicated includes information and data sharing among all components of early warning systems and among all disaster management information systems in order to form multi-hazard early warning systems or disaster management information

[3] See www.itu.int/ITU-D/asp/CMS/Events/2010/14th-IWG/index.asp.

systems for the establishment and implementation of disaster mitigation and response. It also includes early warning alert to the public with action guidance. In terms of early warning alerts to the public, the communications capacity should ensure the following information flows: (a) disaster alert from the authorities to the general public, and (b) subsequent communication to the general public with action guidance.

11. During the early stages of a major disaster, information needs to be communicated on its location and the affected area and a preliminary assessment of its impact needs to be disseminated. In addition, there needs to be monitoring and early warning of secondary disasters, such as the collapse of dams, quake-lake outbursts, glacial-lake floods, landslides, and wild fires. This information must flow among the different administrative bodies and technical supporting agencies for a comprehensive analysis of the severity of the disaster, for the activation of relevant response plans, and for the organization and coordination of response actions.

12. A period of time (normally 24 hours) after a major disaster occurs, the information to be communicated becomes more diverse. Such information includes surveying, mapping and monitoring information acquired by satellite and aircraft, networking between field teams and relevant administrative and technical support systems, news gathering, teleconference and tele-medicine, as well as communications between victims and their families. At this time, local voice communication among mitigation, rescue and relief teams becomes more important for the effective coordination and utilization of valuable human, technical and relief resources.

13. Disaster communications involves a host of technologies, including terrestrial communications networks (land line as well as wireless systems), sirens, public address systems and satellite-based communications networks.

B. Emergency communications for disaster response

14. Emergency communications is a critical component of the overall disaster communications system. It deals with the response stage of a disaster, especially for a major destructive disaster, when all other means of communications, particularly terrestrial-based communications networks no longer function, are disrupted or destroyed.

15. Satellite communications (SatCom) networks are able to provide communications services in disaster emergency situations. Communications systems based on satellite technology are vital until other means of communications, such as terrestrial communications networks, are fully restored. The restoration period may depend on the magnitude and intensity of the event, as well as the impact on relevant communications systems and infrastructure such as the electric power system.

16. Satellites are the only wireless communications infrastructure that is not susceptible to damage from disasters, as the equipment sending and receiving signals (the satellite spacecraft) are located outside the Earth's atmosphere. A satellite-based communications system is an effective solution for disaster-related emergencies.

C. Importance of emergency communications for disaster response

17. The first 72 hours after a major disaster is an extremely crucial period for saving human lives. An effective response requires that information flow

quickly for coordination among the different Government authorities, international organizations and humanitarian actors, including those from the private sector, so that the most urgent humanitarian assistance can be deployed.

18. The deployment of wireless communications systems is typically among the first priorities when responding to any disaster-related emergency situation. However, terrestrial wireless equipment, such as cellular telephones or land mobile radios is only useful when communications towers and other fixed equipment are in place to connect it to the local and global communications backbone. Having the capability of rapidly establishing emergency terrestrial-based infrastructure is important for all countries, even for those with well developed infrastructure, since that, too, can be destroyed by disasters. Examples of such situations include Hurricane Katrina in 2005, in the United States of America, and the Wenchuan earthquake in May 2008 in China. Emergency terrestrial-based infrastructure has also been used in areas which did not have very well developed infrastructure prior to the disaster, such as in the areas affected by Cyclone Nargis in Myanmar in 2008.

19. Disaster-related situations make it critical for Governments, international organizations and other humanitarian actors to have access to wireless communications networks which are not dependent on terrestrial infrastructure. Satellite-based communications infrastructure and resources can be made available where there is wide satellite coverage. Unlike terrestrial wireless communications infrastructure, satellite-based communications infrastructure is much less affected by major destructive disasters, and can be rapidly and easily deployed or redeployed. Furthermore, restoration time is much quicker, for example a few minutes for handsets and portable terminals or a few hours for very small aperture terminals.

20. Most humanitarian assistance agencies and emergency assistance teams and some national disaster management networks in the region have been equipped with satellite-based infrastructure and services.

D. Cases of recent major disasters utilizing emergency communications services

21. On 12 May 2008, the Chinese Province of Sichuan was struck by the Wenchuan earthquake, which registered 8.0 on the Richter scale (see E/ESCAP/CDR/2, para. 6) and left more than 87,000 people dead or missing.[4] The quake disrupted telecommunications throughout most of the area it affected, particularly the eight most damaged counties, where telecommunications were totally disabled for at least 30 hours, making it difficult to carry out rescue and relief operations (see E/ESCAP/CDR/2, para. 8).

22. Urgent telecommunications needs were first met by satellite-based means, while 25,000 persons were mobilized to restore the telecommunications facilities that had been seriously damaged. A total of 383 emergency telecommunications vehicles were dispatched, many of them equipped with satellite communications facilities. However, road damage

[4] ESCAP, *Statistical Yearbook for Asia and the Pacific 2008* (United Nations publication, Sales No. E.09.II.F.1) p. 208.

prevented them from reaching some of the most seriously hit areas. More than 2,000 satellite mobile handsets were deployed.[5]

23. Within four days, cellular mobile services were restored via satellite in some of the most seriously hit areas. Broadband links were established by more than 1,300 satellite terminals, some of which had to be air dropped or carried to their location on foot. These systems were used for networking, transmitting remote-sensing images, holding videoconferences among decision makers and using telemedicine among field teams and major supporting hospitals.[6]

24. Pakistan suffered unprecedented floods in July and August 2010, which has directly affected more than 15.4 million people, about 8.5 per cent of its population.[7] The disruption of transport and communication links exacerbated the difficulties in assessing the impacts of the disasters and in organizing effective rescue and relief actions.[8]

25. In order to cope with the existing situation, the World Food Programme's Fast Information Technology and Telecommunications Emergency and Support Team is helping to re-establish the satellite and radio-based communications systems necessary to improve the response capacity of the Government of Pakistan, the United Nations response team and the non-governmental organizations.[9] These efforts have enabled the Government and the international community to rapidly scale up the emergency response for the delivery of food, medicine and supplies and to ensure the safety of aid workers throughout the vast geographical extent of the floods. The International Committee of the Red Cross has donated satellite telephones to the Pakistan Red Crescent for use in areas where communication networks are non-existent or remain out of order.[10]

III. Regional platform for disaster/emergency communications capacity

26. A regional platform for disaster/emergency communications capacity is an institutionalized cooperative mechanism that provides information and technical support to assist high-risk countries, giving them affordable access to life-saving communications systems. It is the result of a collaborative effort made by all stakeholders, including those in the private sector, with shared infrastructure, services, and resources, used collaboratively through established procedures when needed.

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[5] Ibid., para. 20.

[6] Ibid.

[7] FAO, "Pakistan: floods resulted in severe localized crop damage and losses to household flood reserves", *FAO/GIEWS Global Watch*, 18 August 2010. Available from http://www.fao.org/giews/english/shortnews/Pakistan13082010.pdf., 18 August 2010

[8] Aneeqa Ishaq, "Pakistan Floods: Disruption of communication links makes the relief process difficult", *Society of ICTs*, 9 August 2010. Available from http://ictec.wordpress.com.

[9] Kathleen Hall, "IT teams fly in to help Pakistan flood victims", *ComputerWeekly.com*, 19 August 2010. Available from www.computerweekly.com/Articles/2010/08/19/242447/IT-teams-fly-in-to-help-Pakistan-flood-victims.htm.

[10] International Committee of the Red Cross, "Pakistan: no respite in devastating floods", 13 August 2010. Available from www.icrc.org/web/eng/siteeng0.nsf/html/pakistan-news-130810.

27. When a major disaster hits, it is often beyond the capacity of one country to handle all of the consequences. This is especially true for many developing countries and small economies. A regional platform would provide much more efficient support to countries hit by such disasters.

28. Often a disaster will hit several countries at once, as the Indian Ocean tsunami did in 2004. A regional response with the collectively built capacity would be of much greater help for managing post-disaster situations effectively.

29. The regional Inter-Agency Working Group on ICT, at its 14th meeting, held on 11 August 2010, decided to make a joint effort in promoting an Asia-Pacific regional platform for disaster communications capacities, with a collaborative emergency communications capacity as its core component.[11]

30. The purpose of a regional platform is to provide comprehensive assistance and extensive services, as far as disaster emergency communications is concerned. Ideally, such a platform should have the following objectives:[12]

(a) Pool the resources—including equipment, human, financial—needed to build and enhance effective disaster communications management in the region;

(b) Rapidly deploy those resources when requested by countries hit by major disasters or which are experiencing emergencies;

(c) Provide extensive communications services (such as telemedicine) for humanitarian assistance and rescue operations;

(d) Assist in national disaster communications preparedness by putting in place a proper national policy/plan and set of procedures (such as a national emergency telecommunications plan);

(e) Raise awareness and assist in ratifying and implementing the Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations[13] which is aimed at removing barriers to cross-border resource movements for humanitarian assistance.

31. The regional platform's collaborative capacities could be divided into two major categories: (a) rapid deployable standby equipment and services for emergency response; and (b) pre-disaster distributed capacity for