



General Assembly

Distr.: General
2 June 2003

Original: English

**Committee on the Peaceful
Uses of Outer Space**

**United Nations Regional Workshop on the Use of Space
Technology for Disaster Management for Asia and the
Pacific***

(Bangkok, 11-15 November 2002)

Contents

	<i>Paragraphs</i>	<i>Page</i>
I. Introduction	1-30	2
A. Background and objectives	1-25	2
B. Programme	26-28	7
C. Attendance	29-30	7
II. Observations and recommendations	31-60	8
A. Approach to establishing a strategy	31-38	8
B. Availability of information and technology	39-48	9
C. Institutional environment	49-54	10
D. Capacity-building	55-60	11
III. Plan of action for Asia and the Pacific	61-81	12
A. Implementing a regional network	61-73	12
B. Role of the Office for Outer Space Affairs and the Economic and Social Commission for Asia and the Pacific in implementing the regional network	74-79	13
C. Building upon the regional network	80-81	14

* The submission of the present report was delayed because of the need to refine, together with the Economic and Social Commission for Asia and the Pacific, the proposed plan of action and to receive from Workshop participants their comments on the final version of the proposed plan of action.



I. Introduction

A. Background and objectives

1. The Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), in its resolution entitled “The Space Millennium: Vienna Declaration on Space and Human Development”, recommended that activities of the United Nations Programme on Space Applications promote collaborative participation among Member States at both the regional and international levels, emphasizing the development of knowledge and skills in developing countries.¹
2. Disaster management was singled out as one of the areas of focus. Earth observation satellites and other space-based technologies provide important and unique solutions in all phases of disaster management: disaster mitigation, disaster preparedness, disaster relief and disaster rehabilitation. Such solutions are already an integral part of disaster management activities in many developed and even developing countries.
3. Although national capabilities in the use of space technologies in developing countries have increased significantly in recent years, there is still a need to support in a more direct way the transfer of available solutions for use in disaster management activities, while fine-tuning some of the approaches to meet the specific needs of a country.
4. In order to enhance the use of space technology for disaster management in developing countries and in countries with economies in transition, the Office for Outer Space Affairs of the Secretariat, within the framework of the United Nations Programme on Space Applications, is organizing five regional workshops on the use of space technology for disaster management, bringing together theme specialists, space agencies that have already developed technology solutions and those responsible for dealing with disaster management and the use of space technology in developing countries.
5. The first of the five regional workshops was held in La Serena, Chile, from 13 to 17 November 2000, for the benefit of countries of Latin America and the Caribbean. Almost 200 participants attended, various partnerships were formed and pilot projects are at present being designed for future implementation. The second of the regional workshops was organized in cooperation with the Economic Commission for Africa and was held in Addis Ababa from 1 to 5 July 2002.
6. The regional workshops are the initial step towards adopting an integrated approach, the final objective being the suitable integration of the use of space technologies in a sustainable manner into the operational disaster management programmes of member States through the definition and implementation of appropriate pilot projects. In addition to workshops and pilot projects, the approach will include a training component and the presentation of best practices to high-level disaster managers and decision makers of national and international institutions, including potential funding institutions.
7. The Economic and Social Commission for Asia and the Pacific (ESCAP) is responsible for the implementation of the Regional Space Applications Programme for Sustainable Development (RESAP) in Asia and the Pacific. Within the

framework of RESAP, ESCAP has recently launched an initiative to promote regional cooperative mechanisms for disaster management through the use of space technology, aiming to provide national disaster managers in Asia and the Pacific with harmonized access to space-technology-based information and relevant services that would be provided under existing and planned initiatives. It was intended that the Regional Workshop on the Use of Space Technology for Disaster Management in Asia and the Pacific should support this regional initiative by providing guidelines and recommendations, leading to the development of a strategy for its formulation and institutionalization.

8. The specific objectives of the Workshop were: (a) to increase awareness among managers and decision makers involved in disaster management of the potential benefits of using space-based technologies; (b) to provide a forum to identify the needs of the region and the institutional settings in terms of the types of information and communication support required for managing specific disasters and the extent to which the needs could be met by space technologies; (c) to develop a regional plan of action that would enable the consolidation of networking among national and regional agencies and lead to the definition of possible partnerships between two or more institutions that would subsequently define pilot projects to further refine the use of space technology in disaster management taking into account the situation in each country; and (d) to strengthen the established regional network of RESAP to promote the regional cooperative mechanisms for disaster management through the use of space technology.

9. The pilot projects would be designed and carried out with international cooperation and would be aimed at creating synergy among the regional initiatives of various institutions or groups of institutions. Institutions willing to cooperate on the pilot projects would be invited to participate in an expert meeting to determine the terms of reference of the pilot projects and to prepare a joint implementation strategy.

10. Several initiatives, many within the United Nations system, focus on making space technology solutions available to those responsible for dealing with disaster-related activities in developing countries, in particular in least developed and Pacific island countries. The workshops, together with the follow-up activities, are planned and implemented taking into consideration the initiatives described below.

Committee on the Peaceful Uses of Outer Space

11. In its resolution 54/68 of 6 December 1999, the General Assembly endorsed the resolution entitled “The Space Millennium: Vienna Declaration on Space and Human Development”² and urged, inter alia, organizations within the United Nations system to take the necessary action for the effective implementation of the Vienna Declaration. The Vienna Declaration includes a number of recommendations, one of which calls for action to be taken to implement an integrated, global system, especially through international cooperation, to manage natural disaster mitigation, relief and prevention efforts, especially of an international nature, through Earth observation, communications and other space-based services, making maximum use of existing capabilities and filling gaps in worldwide satellite coverage.³

12. At its forty-fourth session, the Committee on the Peaceful Uses of Outer Space decided that it would address several of the recommendations, including the one mentioned above, through action teams with the voluntary leadership of member States.⁴ The Committee received offers from Canada, China and France to lead the action team on the implementation of an integrated, global system to manage natural disaster mitigation, relief and prevention efforts. The initial three-year work plan of this action team includes the compilation of information on user needs for disaster management, on national capacity for utilizing space-derived information on disaster management and on existing and planned operational space systems in support of disaster management.

Economic and Social Commission for Asia and the Pacific

13. In its resolution 56/3, ESCAP adopted the recommendations of the second Ministerial Conference on Space Applications for Sustainable Development in Asia and the Pacific, held in New Delhi in 1999. The Ministerial Conference had adopted the Delhi Declaration on Space Technology Applications in Asia and the Pacific for Improved Quality of Life in the New Millennium and the Strategy and Action Plan on Space Technology Applications for Sustainable Development in Asia and the Pacific for the New Millennium, recommended the launch of the second phase of RESAP and identified disaster management as one of the priority fields to be addressed by RESAP II. The Ministerial Conference had also recommended the establishment of regional cooperative mechanisms to facilitate equitable sharing of the benefits of space technology development and applications by all countries in the region.

14. ESCAP is currently executing the project on capacity-building for disaster management in Asia and the Pacific. The RESAP network, comprised of the Intergovernmental Consultative Committee on RESAP, the regional working groups in major fields of space applications and the Regional Information Service and Education and Training Network, is directly involved in the activities of the project and is working towards the establishment of regional cooperative mechanisms.

International Strategy for Disaster Reduction

15. Recognition of the fact that disasters were an increasing problem contributed to the launch of the International Decade for Natural Disaster Reduction for the period 1990-1999, which in turn led to the establishment of the International Strategy for Disaster Reduction, a global strategy with two institutional components. The first is the Inter-Agency Task Force for Disaster Reduction, which has the following main functions: (a) to serve as the main forum within the United Nations system for devising strategies and policies for the reduction of natural hazards; (b) to identify gaps in disaster reduction policies and programmes and recommend remedial action; (c) to ensure complementarity of action by agencies involved in disaster reduction; (d) to provide policy guidance to the International Strategy for Disaster Reduction secretariat; and (e) to convene ad hoc meetings of experts on issues related to disaster reduction.

16. The second component of the International Strategy for Disaster Reduction is the secretariat of the Task Force, which is based in Geneva. It serves as the focal point within the United Nations system for the coordination of strategies and programmes for natural disaster reduction. The secretariat is a multidisciplinary

team that supports the Task Force, in which international policy can be formulated and which constitutes an institutional platform from which programmes can be launched. It does not implement programmes, but enables others to do so more effectively.

Office for the Coordination of Humanitarian Affairs

17. The Office for the Coordination of Humanitarian Affairs of the Secretariat was established pursuant to the reform programme of the Secretary-General (A/51/950/Add.1-7 and Corr.1), which was endorsed by the General Assembly at its fifty-second session. In accordance with the provisions of Assembly resolution 46/182 of 19 December 1991, the functions of the Emergency Relief Coordinator are focused in three core areas: (a) policy development and coordination functions in support of the Secretary-General, ensuring that all humanitarian issues, including those which fall in gaps between existing mandates of agencies such as protection and assistance for internally displaced persons, are addressed; (b) advocacy of humanitarian issues with political organs, notably the Security Council; and (c) coordination of humanitarian emergency response on the ground, by ensuring that an appropriate response mechanism is established through Inter-Agency Standing Committee consultations.

18. The Office for the Coordination of Humanitarian Affairs discharges its coordination function primarily through the Inter-Agency Standing Committee, which is chaired by the Emergency Relief Coordinator, with the participation of all humanitarian partners, including the International Federation of Red Cross and Red Crescent Societies and non-governmental organizations. The Inter-Agency Standing Committee ensures inter-agency decision-making in response to complex emergencies, including needs assessments, consolidated appeals, field coordination arrangements and the development of humanitarian policies.

United Nations Educational, Scientific and Cultural Organization Unit for Disaster Reduction

19. Within the framework of the International Strategy for Disaster Reduction, the United Nations Educational, Scientific and Cultural Organization (UNESCO) is focusing on building a culture of prevention to counter disasters and reduce the vulnerability of populations at risk. UNESCO is engaged in the assessment and mitigation of risks arising from hazards of geological origin (earthquakes, tsunamis, volcanic eruptions and landslides) and contributes to the study of hazards of meteorological origin (storms, floods, prolonged drought and desertification).

20. UNESCO also fosters information, education, transfer of data and experience among countries and communities aiming at integrating geohazard knowledge and expertise in decision-making processes in order to encourage the adoption of policies and actions for sound planning and management of land-use and construction techniques and to promote the development of preventive and preparedness plans, including the implementation of global to local warning systems.

International Charter on Space and Major Disasters

21. The Charter on Cooperation to Achieve the Coordinated Use of Space Facilities in the Event of Natural or Technological Disasters (also known as the International Charter on Space and Major Disasters) enables countries in which a natural or technological disaster has occurred to receive products derived from satellite images to support disaster mitigation activities. The institutions participating in the Charter are the European Space Agency (ESA), the Centre national d'études spatiales (CNES) of France, the Canadian Space Agency, the Indian Space Research Organization and the National Oceanic and Atmospheric Administration (NOAA) of the United States of America. The Office for Outer Space Affairs is currently defining with the Charter secretariat an agreement that will enable the Office to become a cooperating body to the Charter, which in turn will enable the United Nations system to have access to Charter support in the event of disasters concerning the United Nations system and Member States.

Disaster Management Support Group of the Committee on Earth Observation Satellites

22. The Committee on Earth Observation Satellites (CEOS) is an international organization charged with coordinating international civil space-borne missions designed to observe and study the Earth. CEOS, whose membership is comprised of 41 space agencies and other national and international organizations, is recognized as the major international forum for the coordination of Earth observation satellite programmes and for interaction of those programmes with users of satellite data worldwide.

23. CEOS initiated an activity on disaster management support in February 1997 to demonstrate the concept of an Integrated Global Observing Strategy. It was recognized that taking an integrated view of disaster management user requirements for Earth observation data, even if confined to space-based data, would be a notable challenge. After its first three years as a pilot project, the disaster management support project had resulted in the identification of specific user requirements for seven hazards (drought, earthquake, fire, flood, landslide, oil spill and volcanoes) and the development of recommendations for improving the ability of current and planned systems to meet those requirements. The project was given a new mandate when CEOS established the ad hoc Disaster Management Support Group in November 1999.

24. The objective of the Disaster Management Support Group was to support natural and technological disaster management on a worldwide basis by fostering improved utilization of data from existing and planned Earth observation satellites. The Support Group completed its work in 2002 and CEOS endorsed its recommendation that activities of the Support Group be integrated into the International Charter on Space and Major Disasters, the workshops organized by the Office for Outer Space Affairs and their follow-up activities and the geohazards theme of the Integrated Global Observing Strategy.

25. Two other working groups within CEOS are involved in activities directly related to the topic of disaster management: the Working Group on Earth Observation Education and Training, which could provide valuable support to disaster management capacity-building, and the Working Group on Information

Systems and Services, which aims at stimulating, coordinating and monitoring the development of the systems and services that manage and supply the data and information from participating agencies' missions.

B. Programme

26. The United Nations Regional Workshop on the Use of Space Technology for Disaster Management for Asia and the Pacific was organized by the Office for Outer Space Affairs and ESCAP and sponsored by CEOS, ESA, CNES, the Geo-Informatics and Space Technology Development Agency of Thailand and the International Strategy for Disaster Reduction secretariat.

27. The Workshop was hosted by ESCAP and held at the United Nations Conference Centre in Bangkok.

28. At the opening session of the Workshop statements were made by representatives of the Office for Outer Space Affairs, ESA and CNES and the Under-Secretary-General of the United Nations and Executive Secretary of ESCAP. The opening address was given by the Minister of Science and Technology of the Government of Thailand. A total of 49 presentations were delivered in 12 thematic sessions and 12 presentations were delivered in two parallel open sessions covering all aspects of the current use of space technology for disaster management. Six discussion sessions were held on the main topics, which subsequently formed the framework of a proposed plan of action. Additionally, one of the presentation sessions consisted of a videoconference linking Maui, Hawaii, and Bangkok, which enabled the discussion of the proposal being put forward by the Japan-United States Science Technology and Space Applications Program on an international disaster exercise scenario.

C. Attendance

29. The Workshop was attended by a total of 139 participants from the following countries: Afghanistan, Australia, Austria, Azerbaijan, Bangladesh, Canada, China, France, Georgia, Germany, India, Indonesia, Iran (Islamic Republic of), Japan, Lao People's Democratic Republic, Malaysia, Mongolia, Nepal, Netherlands, Pakistan, Philippines, Republic of Korea, Russian Federation, South Africa, Sweden, Syrian Arab Republic, Tajikistan, Thailand, Turkey, Tuvalu, United Kingdom of Great Britain and Northern Ireland, United States of America, Uzbekistan and Viet Nam. The United Nations Cartographic Section, the United Nations Office on Drugs and Crime, the Office for Outer Space Affairs, ESCAP, the United Nations Environment Programme, the Office of the United Nations High Commissioner for Refugees, the Food and Agriculture Organization of the United Nations, the World Meteorological Organization, the Asian Disaster Preparedness Center, the Asian Disaster Reduction Center, the Asian Institute of Technology, ESA, the International Strategy for Disaster Reduction secretariat and the Mekong River Commission were also represented.

30. Funds allocated by the United Nations and by the sponsors (NOAA on behalf of CEOS, ESA and CNES) were used to defray the costs of air travel and daily

subsistence allowance of 24 participants and the representative of the Office for Outer Space Affairs.

II. Observations and recommendations

A. Approach to establishing a strategy

31. The thematic and discussion sessions were structured around the three topics considered to be the cornerstones of an effective plan of action: availability of information and technology, institutional environment and capacity-building. The Workshop proposed a strengthened regional network to coordinate the plan of action and the sharing of experience and expertise.

32. Through the presentations given during the thematic sessions, participants gained an understanding of the various issues linked to each cornerstone, whereas during the discussion sessions participants focused on defining the modus operandi of the regional network and the follow-up activities.

Availability of information and technology

33. Discussions on data were centred on the types, quality and sources of data needed, the present availability of data for Asia and the Pacific and difficulties of distributing and accessing such data. The availability of data referred not only to having access to the data needed in a timely manner, but also to obtaining the data and relevant products and services in an appropriate format for use.

34. A number of available technologies could provide data for use in disaster management: remote sensing technologies (satellite and aerial photography), which provided data on terrain, land cover, vegetation and so forth; light detection and ranging (LIDAR) devices, which were being used to create elevation models for natural landscape features and buildings; ground surveying tools, which produced maps for boundaries and other landscape elements; governmental censuses and surveys, which provided socio-economic data for defined spatial units; global navigation satellite systems, which offered a means of obtaining positional information for stationary or moving objects; wireless telecommunication developments, which facilitated emergency communication and interpersonal contacts during disasters; wireless technologies, which provided a means for data logging in the field; and Internet products and services, which provided access to and dissemination and sharing of data, information and knowledge on a real-time basis.

Institutional environment

35. The Workshop considered that “institutional environment” referred not only to the existence of institutions that were involved in disaster management or that already had competence in the use of space-based solutions, but also to current national and regional policies with regard to disaster management. Consideration also was given to existing initiatives that would support or complement the development of applications of space-based technologies. Important aspects of the institutional environment were the communication channels already in place and the

strength of the networks and partnerships. It was noted that dealing with disasters was a multidisciplinary activity that involved all sectors of society.

Capacity-building

36. The third cornerstone of a successful strategy was increasing the current capabilities of the region through training, strengthening of institutions and funding. Appropriate human resources could be considered the single most important resource to have available during a crisis, but training staff required time and effort.

37. Resources for a regional network were limited and mechanisms would need to be put in place to build synergies among institutions, enabling the sharing of knowledge, expertise and results.

38. After 61 presentations and many hours of discussion, valuable observations were made and important conclusions drawn. These are presented below.

B. Availability of information and technology

39. The Workshop participants learned of the wide availability of remotely sensed images with various spatial, spectral and temporal resolutions. Several presentations stressed the availability of imagery with 1 km resolution down to sub-metre resolution and the potential application to disaster management.

40. A presentation given on behalf of the Disaster Management Support Group of CEOS provided a framework for understanding user requirements (in terms of spatial, spectral and temporal resolution of satellite imagery) and the current capacity of the existing Earth observation satellites to meet those requirements in the following hazard areas: earthquake, fire, flood, landslide, oil spill, sea ice and volcanic activity (<http://disaster.ceos.org>).

41. Several presentations afforded participants the opportunity to learn of the extent that space technology had already been incorporated into disaster management activities in the region, particularly those relating to floods, drought monitoring, seismic activity, cyclone monitoring, landslides, snow melt run-off monitoring, forest and grassland fire monitoring and sea ice, and to support the study of risks of vector-borne diseases. The use of space technology for disaster monitoring began in the region in the 1980s and had been increasing steadily, with several systems already operational and benefiting from the low-cost or free satellite imagery available from the Feng Yun FY-1 and FY-2 geostationary meteorological satellites of China, the China-Brazil Earth Resources Satellite (CBERS-1), the advanced very high resolution radiometer of NOAA, the Wide Field Sensor on board the Indian remote sensing satellite and the Moderate-resolution Imaging Spectroradiometer (MODIS) of the National Aeronautics and Space Administration of the United States. Those systems had been responsible for significantly reducing losses due to flood disaster and the impact of cyclones in recent years.

42. At a presentation given on behalf of ESA, Workshop participants learned about the Environmental Satellite ENVISAT. Launched in March 2002, it carried on board a total of 11 instruments, which enabled the simultaneous imaging of Earth's surface by different sensors, providing an invaluable source of data to support various areas, including disaster management.

43. Several presentations stressed that radar imagery (both space and airborne), such as the images available from RADARSAT-1, was useful to several hazard themes, in particular flood monitoring, cyclones, oil spill, snow and ice storms, volcanic eruptions and earthquakes. The Disaster watch programme of the Canadian Space Agency was an initiative that was helping to make Synthetic Aperture Radar Satellite RADARSAT-1 imagery available to support disaster management activities.

44. Satellite images were being integrated into geographic information systems to support early damage assessment systems to estimate human loss and property damage following an earthquake.

45. Existing satellite capabilities were being used as an integral part of the Cyclone Warning Dissemination System currently in operation in India. Such proven solutions could be used in various countries across the region with similar needs. Communication satellites also had a major role to play after a disaster in the case of damage to the existing communication infrastructure. The International Satellite System for Search and Rescue (COSPAS-SARSAT) (www.cospas-sarsat.org/) had also been used to monitor distress incidents and save human lives.

46. A demonstration jointly organized by the Shin Satellite company and the Geo-Informatics and Space Technology Development Agency, both of Thailand, was given on the integrated use of satellite broadband services with remote sensing, highlighting the importance of that space-based solution for disaster response.

47. One trend that was highlighted at the Workshop was the move towards establishing disaster management “constellations” of small satellites. The Disaster Monitoring Constellation of small, low-cost satellites, which was being coordinated by Surrey Satellite Technology of the United Kingdom, would give the user community the possibility, once all four of the planned satellites were launched, of a daily revisit over a disaster area. Similarly, the Environmental and Disaster Monitoring Satellite Constellation of China would provide similar capabilities once the first stage was completed before 2005 under current plans.

48. A presentation given on behalf of the International Charter on Space and Major Disasters demonstrated the success of joint efforts since the Charter became operational on 1 November 2000. To date, the Charter had been activated a total of 25 times, mostly in response to flood emergencies. The availability and use of spatial data affected every aspect of society. Spatial data should be made available to the people who needed them, when they needed them and in a form that enabled decisions to be made with minimal pre-processing.

C. Institutional environment

49. Priority should be given to addressing institutional fragmentation of information and responsibilities, the upgrading of existing technological capacity to monitor hazards nationwide and the implementation of effective information management systems for the collection, analysis and dissemination of information.

50. In several presentations it was argued that disaster management activities should be pro-active instead of reactive. That line of reasoning was supported during the discussion sessions, with the recommendation that emphasis should be

placed more on disaster prevention and mitigation and less on emergency disaster response. When defining priority activities, it was necessary to focus on vulnerability assessment.

51. During a discussion on fire management, it was suggested that the development of regional expertise in remote sensing and the coordination of development of a global fire system to be used for detection, monitoring and reporting should be focused on.

52. Given that decision makers had diverse needs, the solution envisaged that would make use of space technology was an integrated information platform that could accommodate information from different sources, in different forms and on varying scales.

53. It was recommended that regional systems could build upon successful operational national systems and that through international cooperation spatial data and technology should be shared.

54. A presentation given by a representative of the United Nations Tropical Cyclone Programme informed the Workshop participants of the objectives of that initiative, which was to assist member States in upgrading the capabilities of national meteorological or hydrological services, or both, to provide better tropical cyclone forecasts and more effective early warnings through regionally coordinated systems.

D. Capacity-building

55. The following user groups needed to be trained: policy and decision makers and administrators, scientists and engineers responsible for databases and information systems and various end-users of geospatial information such as planners and civil protection and rescue personnel.

56. Capacity-building should be aimed at increasing the capability of organizations and individuals to use geospatial information effectively for disaster preparedness, response and recovery. Technology had a role to play in expanding access to information, while geographic information systems technology (in the form of digital databases and software toolboxes) could improve decision-making by providing information for planning, spatial logistics (for example, evacuation routes) and other purposes; could build capacity for understanding, predicting and problem-solving in the geospatial domain; and could help the general public to contribute to disaster awareness and preparedness.

57. Training could take the form of awareness seminars, training courses and workshops, e-learning, tutorials on CD-ROM and nine-month postgraduate courses.

58. Training should be channelled through existing "centres of excellence" in training, such as the Centre for Space Science and Technology Education in Asia and the Pacific, affiliated to the United Nations, which was specifically designed to meet the training needs of the Asian and Pacific region.

59. Partnerships across institutions had to be created so as to maximize the benefit of implementing space-based systems. It was also necessary to increase networking with space agencies, taking advantage of the CEOS forum and, in particular,

building upon work carried out by the Action Team on Disaster Management, established by the Committee on the Peaceful Uses of Outer Space following a recommendation made by UNISPACE III, as well as the RESAP network.

60. Funding was considered a major concern and efforts should be made to involve bilateral and multilateral development agencies, such as the United States Agency for International Development and the Asian Development Bank. The Office for Outer Space Affairs had developed a database of funding institutions that could be contacted for financial support.

III. Plan of action for Asia and the Pacific

A. Implementing a regional network

61. The starting point for the plan of action discussed at the Workshop was the recommendations of the Regional Workshop on Cooperative Mechanisms in Space Technology Applications for Disaster Management, which was organized by ESCAP and held in Beijing on 5 and 6 June 2002.

62. At the Regional Workshop, the participants deliberated on mechanisms for strengthening national capabilities towards managing disasters efficiently, focusing on natural disasters, more specifically water-related ones such as flood and drought, which affected most countries in the region.

63. In relation to floods, the cooperative mechanism proposed was to promote the sharing of and increase access to data and information, to promote the exchange of experiences and training opportunities, and to identify possible projects on flood management.

64. The cooperative mechanism proposed to address drought was to focus on extending best practices and know-how through technical cooperation, to involve centres of excellence, to extend ongoing drought-monitoring programmes to cover urgent needs of neighbouring countries and to synergize resources and the efforts of United Nations bodies devoted to drought-management activities.

65. The course of action suggested at the Regional Workshop on the Use of Space Technology for Disaster Management for Asia and the Pacific, which would build upon the above recommendations, was to consolidate the existing regional network and use it to provide support in coordinating the efforts of the various institutions interested in forming a new network and in developing joint pilot projects that would incorporate and define the use of space-based solutions for disaster management.

66. In the course of carrying out their activities, the institutions taking part in the regional network would take into consideration the observations and recommendations put forward at both Workshops. The regional network would work with the Action Team on Disaster Management. It should take advantage of the support offered by various countries during the eighth session of the Intergovernmental Consultative Committee on RESAP, held back-to-back with the above-mentioned Beijing Workshop. The following countries and regional institutions had offered support: China, India, France and ESA.

67. When defining possible pilot projects, institutions that are part of the regional network should recognize work in progress, especially work that already had local commitment. Those institutions would interact primarily using the Internet and facsimile, providing information to all interested institutions on activities being proposed or carried out and fostering viable partnerships among the different initiatives and interests. Once partnerships had been defined, a further step would be to identify pilot projects that the institutions could participate in jointly.

68. To define the responsibilities of each institution, it was suggested that an expert meeting be held to bring together experts from each institution to define terms of reference for suggested pilot projects and a strategy for their implementation.

69. Teams would work on a "best efforts" basis. Each institution would be responsible for its own expenses. If additional funding support was needed for satellite imagery or hardware and software, or both, the team could contact interested space agencies or bilateral and multilateral development institutions, or both, to secure the additional support required.

70. The Workshop adopted a two-stage approach to defining the interests of the institutions that were to take part in the proposed regional network. During the first stage, participants defined 21 hazards that should be considered separately, namely: coastal management and erosion; crop pests; cyclones and storm surges; deforestation; desertification; drought; earthquakes and tsunamis; epidemiological hazards; fire; floods; haze and fog; land degradation; landmines; landslides, mud slides and flash floods; mangrove and coral reef degradation; oil spills; pollution and industrial catastrophe; sand and dust storms; sea level rise; snow storms, avalanches and glaciers; and volcanoes.

71. During the second stage, institutions expressed their interest in participating in each hazard area. A total of 65 institutions demonstrated their interest by making a tentative commitment to participating in one or more hazard areas.

72. The final stage of implementation of the regional network would involve the following activities: extending the network to other institutions; setting up an Internet-based discussion list (to support both regional and global activities); setting up a web site to disseminate information on progress and achievements and following up on all tentative commitments.

73. The regional network proposed at the Workshop was aimed at attracting the participation of governmental and academic institutions, non-governmental organizations, private industry and United Nations bodies. Any institution interested in developing activities in the region that incorporated space technology for disaster management activities would be able to join the regional network.

B. Role of the Office for Outer Space Affairs and the Economic and Social Commission for Asia and the Pacific in implementing the regional network

74. It was agreed that, as a follow-up to the tentative commitments made at the Workshop, the Office for Outer Space Affairs would, in cooperation with ESCAP and its established RESAP network, contact the heads of each of the institutions that

had expressed an interest in joining the network and request them to confirm their participation in the hazard themes in which they were interested.

75. A representative of the Office for Outer Space Affairs agreed that the Office would maintain the regional network database, periodically verifying and updating the information on institutions that had been included and stated that the Office would focus on bringing into the network interested space and development agencies. The Office and ESCAP agreed to facilitate appropriate coordination with the activities of the Action Team on Disaster Management and the International Charter on Space and Major Disasters.

76. ESCAP would, in close cooperation with its members, relevant initiatives, and other international organizations, continue its efforts to promote the establishment of regional cooperative mechanisms on using space technology for disaster management, with the aim of providing its members with harmonized access to relevant information products and services. The effort would initially focus on flood and drought disasters.

77. The Office for Outer Space Affairs would also support, to the extent possible, expert meetings to bring together representatives of institutions interested in developing joint pilot projects that used space technology for disaster management activities. At those meetings, it was expected that terms of reference for those pilot projects would be defined and implementation strategies would be developed, including the securing of any additional funding, if necessary.

78. The web sites of the Office for Outer Space Affairs (www.oosa.unvienna.org/SAP/stdm) and ESCAP (www.unescap.org/icstd/space/index.asp) would be enhanced by the addition of relevant links and information on space technology applications for disaster management for the benefit of the regional network. All institutions would be responsible for providing the information to be posted in the web sites. A discussion list was already being used by participants in the regional network (www.ungiwg.org/cgi-bin/mailman/listinfo/unoosa-stdm).

79. The Office for Outer Space Affairs and ESCAP would also focus on capacity-building through the provision of training courses in and workshops on the applications of space technology for disaster management. Training would be channelled primarily through the existing United Nations-affiliated Centre for Space Science and Technology Education in Asia and the Pacific, as well as other centres of excellence in the region.

C. Building upon the regional network

80. The seemingly interminable succession of disasters, floods, droughts, storms, earthquakes, landslides, volcanic eruptions and wildfires, is causing growing concern. The number of people at risk has been growing steadily, by 70-80 million per year.⁵ Action needs to be taken immediately to alleviate the effects of future disasters by taking advantage of recent technological developments.

81. The Workshop demonstrated that space-based technologies had a real contribution to make in all areas of disaster management and that measures needed to be taken to ensure the deployment of the technologies currently available. The establishment of a regional network was an important step towards the goal of

achieving a greater use of space technology to support disaster management activities. The 65 institutions that had expressed an interest in participating, as well as the other institutions and the private sector that were to be invited to join, should seize the opportunity offered by those cutting-edge technologies to define and implement solutions to the pressing disaster threats that had become an everyday reality in the Asian and Pacific region.

Notes

¹ *Report of the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space, Vienna, 19-30 July 1999* (United Nations publication, Sales No. E.00.I.3), chap. I, resolution 1, part 1, para. 1 (e) (ii) and chap. II, para. 409 (d) (i).

² *Ibid.*, chap. I, resolution 1.

³ *Ibid.*, sect. I, para. 1 (b) (ii).

⁴ *Official Records of the General Assembly, Fifty-sixth session, Supplement No. 20 (A/56/20 and Corr.1)*, paras. 44-62.

⁵ *Living with Risk: a Global Review of Disaster Reduction Initiatives* (<http://www.unisdr.org/unisdr/Globalreport.htm>). The report will subsequently be issued as a United Nations publication.