United Nations A/AC.105/1061

General Assembly

Distr.: General
6 December 2013

Original: English

Committee on the Peaceful Uses of Outer Space

Report on the United Nations International Conference on Space-based Technologies for Disaster Management: Disaster Risk Identification, Assessment and Monitoring

(Beijing, 23-25 October 2013)

I. Introduction

1. In its resolution 61/110, the General Assembly decided to establish the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) as a programme within the United Nations to provide universal access to all countries and all relevant international and regional organizations to all types of space-based information and services relevant to disaster management to support the full disaster management cycle, and agreed that the programme should be implemented by the Office for Outer Space Affairs of the Secretariat.

2. The United Nations International Conference on Space-based Technologies for Disaster Management has been an annual event of the UN-SPIDER programme in Beijing since the establishment of the UN-SPIDER Beijing Office in 2011.

3. The conferences cover various themes based on current issues and needs that are assessed through the UN-SPIDER technical advisory activities. Such activities aim at enabling national Governments to make effective use of space-based information in disaster risk reduction and emergency response.

4. In 2011, the theme of the Conference was “Best Practices for Risk Reduction and Rapid Response Mapping” and in 2012 it was “Risk Assessment in the Context of Global Climate Change”. The theme chosen for 2013 was “Disaster Risk Identification, Assessment and Monitoring”.

5. The Conference brought together national organizations involved in disaster management and the generation of geospatial information in the countries where UN-SPIDER technical advisory support had been provided or was offered. Representatives of the UN-SPIDER Regional Support Office and of regional and

V.13-88527 (E) 171213 181213

international organizations were invited to the Conference, along with experts from centres of excellence from around the world.

A. Background and objectives

6. Despite technological advances in Earth observation and ground-based systems for disaster prediction and monitoring, several countries still face challenges in assessing and reducing disaster risk.

7. Those challenges may be addressed by setting up a mechanism for identifying, assessing, monitoring and responding to disaster risks. With advances in Earth observation technologies and increasing access to space-based information, several opportunities are available for disaster managers to use space technologies for effective disaster management.

8. The United Nations International Conference on Space-based Technologies for Disaster Management: Disaster Risk Identification, Assessment and Monitoring was held in Beijing from 23 to 25 October 2013. It offered an opportunity for sharing information on the latest methods, approaches and models used for the identification, assessment and reduction of disaster risks. It also focused on how to operationalize technological developments in order to address challenges encountered by national disaster management authorities.

9. The Conference was co-organized by the Office for Outer Space Affairs and the Ministry of Civil Affairs of China, in collaboration with the Department of Treaty and Law of China, the Ministry of Foreign Affairs of China, the Department of System Engineering of the China National Space Administration, the Department of Social Security of the Ministry of Finance of China and the Asia-Pacific Space Cooperation Organization (APSCO), with the support of DigitalGlobe.

10. The Conference brought together numerous representatives of countries that had received technical advisory support from UN-SPIDER, as well as representatives of countries willing to work with UN-SPIDER in the future. In addition to sharing knowledge, exchanging ideas and developing networks, the Conference also served as a platform for planning UN-SPIDER activities, including technical advisory missions, capacity-building programmes and outreach events.

11. UN-SPIDER organizes such events to fulfil its mandate and its role within the United Nations, namely promoting the use of space-based information. It works with established networks that bring together national institutions responsible for disaster management and emergency response, as well as other end users and providers of space-based solutions and technologies.

12. The present paper provides a detailed summary of the Conference in 2013 and its outcomes.

B. Attendance

13. UN-SPIDER provided funding for 29 participants from Member States, who were selected on the basis of their engagement with the UN-SPIDER programme and their role in disaster management in their respective countries. Other

participants were selected based on their professional expertise and experience in the area of disaster management, especially the use of space technologies and geospatial information.

14. APSCO, which is based in Beijing, provided funding for an additional 17 participants from its States members.

15. The Conference brought together 127 participants from 39 countries who represented more than 75 organizations (national, regional, international and non-governmental organizations, as well as academia). The attendees were from different types of agencies, including civil protection agencies, disaster management agencies, space agencies, research institutions, science and technology agencies, environmental and natural resources authorities and other government and non-governmental agencies.

16. The following countries were represented at the Conference: Afghanistan, Australia, Bangladesh, Bhutan, Burkina Faso, Cameroon, Canada, China, Congo, Costa Rica, Dominican Republic, Egypt, Ethiopia, Germany, Ghana, India, Indonesia, Iran (Islamic Republic of), Italy, Kenya, Luxembourg, Malawi, Mongolia, Mozambique, Nepal, Netherlands, Nigeria, Pakistan, Peru, Philippines, Romania, Senegal, Solomon Islands, Sudan, Thailand, Turkey, United Kingdom of Great Britain and Northern Ireland, United States of America and Viet Nam.

17. The Conference was also attended by representatives of the United Nations Development Programme, the World Food Programme (WFP), the United Nations Economic Commission for Africa, the Office for Outer Space Affairs and the African Union-United Nations Hybrid Operation in Darfur (UNAMID).

C. Programme

18. The opening ceremony of the Conference was addressed by representatives of the Ministry of Civil Affairs of China, the China National Space Administration, the Ministry of Foreign Affairs of China, UN-SPIDER, the Chinese Academy of Sciences and APSCO.

19. The plenary sessions began with two keynote speeches from representatives of the Chinese Academy of Sciences and UN-SPIDER. Those keynote speeches helped set the tone of the Conference.

20. A total of five plenary sessions and three working group discussions were held, focusing on technical subjects relevant to the theme of the Conference. The three working groups discussed drought monitoring, UN-SPIDER technical advisory support activities, and advances in technology for disaster risk management. The Conference participants were also invited to visit the China Centre for Resources Satellite Data and Application.

21. A total of 47 presentations were delivered at the Conference: 35 presentations during the five plenary sessions and 12 presentations during the working groups. A summary of each session is provided below.

II. Summary of plenary sessions

22. Session one, on operational initiatives, programmes and projects on disaster risk identification, assessment and monitoring, included five presentations, on the following topics: construction and development of the national disaster reduction and relief operational system in China; evaluation of the success of the UN-SPIDER technical assistance missions; role of the Regional Centre for Mapping of Resources for Development in disaster risk reduction in its member States; APSCO activities on space-based disaster risk management; and the auditing of disaster risk management.

23. Session two, on advanced research and development in the use of space-based information in disaster risk assessment, included 10 presentations, on the following topics: key issues with regard to and possible solutions for integration of disaster information; flood risk assessment and modelling research in Asia and Africa by the International Water Management Institute; thirty-metre-resolution global land cover mapping and data application; the value of DigitalGlobe high-resolution imagery for disaster risk management; cloud service remote sensing application system for disaster emergencies based on a high-resolution project; Earth observation satellite data for disaster risk identification and assessment; processing and management of remote sensing images for disaster emergency response; modelling flood regulation and ecosystem services using artificial intelligence; exploration of an integrated reduction application based on the BeiDou navigation satellite system; and using satellite technology to prevent and respond to maritime accidents.

24. Session three, on the cooperation mechanism for improving disaster risk management, included five presentations, on the following topics: synergy among different space collaborative initiatives for better disaster emergency support; space technology for disaster mitigation; introduction to the global navigation satellite system disaster reduction system; the application of space-based technologies for disaster management in West Africa; and investment in disaster risk reduction in Mozambique.

25. Session four, on preparing for effective disaster response and rapid mapping by knowing risks, included five presentations, on the following topics: agriculture drought monitoring; application of 3D geographical information system models in support of the UNAMID mission camp risks analysis and management; space-based activities for disaster emergency response in Indonesia; the national disaster observatory of China; and activities of the International Centre for Integrated Mountain Development with regard to disaster risk reduction.

26. Session five, on national experiences and best practices, included five presentations, on the following topics: space-based information service for flood mapping; the perspective of Ghana on emergency responses; satellite images used during the 2013 floods in the Sudan; operationalizing disaster management training programmes in universities in developing countries; and the role of the National University of Sciences and Technology in building the resilience of Pakistan against disasters.

27. Each session included a discussion period.

III. Summary of working groups

A. Drought monitoring

28. Over 35 persons participated in the discussion on drought monitoring, focusing on three main areas: technologies and methods adapted for use in drought risk assessment and monitoring; capacity-building in the utilization of drought methods and models; and mechanisms for cooperation with China, as well as the United Nations and other international organizations.

29. Five presentations were delivered, which are summarized below.

30. The first presentation was delivered by a representative of the International Centre for Drought Risk Reduction of China. It focused on how to improve drought risk mapping and assessment with the easy-to-use and free-of-charge model used by the Centre. The model focused on a database that utilized socioeconomic data, meteorological data, geographical information system layers and remote sensing data with resolution ranges from 30 metres to 1 kilometre. The model provided services in the form of indices and thematic maps such as on water shortages and droughts in the Horn of Africa.

31. The second presentation was by a representative of the Beijing Normal University and demonstrated the University's experience in modelling. Their model was complex and was based on the comparison of two indices calculated using the Moderate Resolution Imaging Spectroradiometer, namely the normalized difference vegetation index, which showed meteorological information (temperature, precipitation and humidity), and agro-meteorological data. The university's model was validated through multi-source field observation data and had been found to give accurate results in monitoring the occurrences of drought and in characterizing drought categories.

32. The third presentation was by a representative of the National Drought Management Authority in Kenya. The presentation demonstrated the model on community and technology interlinkages used in Kenya for drought risk assessment and monitoring. The model combined physical indicators (including precipitation and soil moisture), agricultural indicators (including vegetation cover and crop yields) and social indicators (such as food and seed stocks). The indicators were collected at the household level within sample areas. The main problems of the model were the vast area and differences between the sites in terms of the environment and livelihood, and limited access to remote sensing data.

33. The fourth presentation was by a representative of the Department of Disaster Management Affairs of Malawi. The main problem highlighted was the increase in the frequency of droughts and floods, mainly in the southern part of the country. The department lacked any space-based information or technology for assessment and monitoring. The country had started working to mitigate drought by growing drought-tolerant crops such as cassava and by water harvesting, conservation farming and goat breeding.

34. The fifth presentation was by a representative of WFP. It highlighted the strengths of WFP in geographical information systems and mapping. The Programme used different products, such as rainfall estimates and the normalized

difference vegetation index, that were based mainly on the free data of low-resolution satellites for their emergency response, logistics, analysis and planning. There was a need for high-resolution remote sensing data.

35. The outcome of the discussion was as follows:

(a) The group appreciated the advanced technology of China and the country's experience in drought modelling, which may be shared and adopted by other countries;

(b) The persisting problem faced by African countries with regard to the availability and accessibility of remote sensing data, mainly high-resolution data, in addition to their low capacities in data-handling and drought modelling was discussed. A proposal for capacity-building was made, acknowledging UN-SPIDER efforts and support;

(c) Cooperation with China, as well as the United Nations and other international organizations, was recommended and appreciation was shown for UN-SPIDER efforts in that regard. UN-SPIDER was requested to support efficient mechanisms for future cooperation.

B. UN-SPIDER technical advisory support activities

36. The aim of the working group was to share the experiences of the countries that had received UN-SPIDER technical advisory missions and to provide insights into those activities for other countries. The working group also reviewed the way in which technical advisory missions were conducted and discussed ways of assessing the impact of those missions. The working group also discussed follow-up activities in the countries where technical advisory missions had already been carried out.

37. The session started with an overview by UN-SPIDER of the technical advisory missions that had been carried out in different countries. That was followed by five presentations, on the following topics: types of disaster in Afghanistan and disaster management; space technology applications related to disaster management in Viet Nam; mapping software for disaster management in Burkina Faso; the national disaster information reporting system of China; and the global observation status of the HJ-1 satellite of China.

38. The participants discussed how technical advisory missions were conducted and suggested possible improvements. The preparations for all technical advisory missions appeared to be adequate and the current practice of allocating five days for the missions should be maintained. A few suggestions were made, such as the development of templates and a standard manual to provide guidance to the expert team. Some mission experts felt that visits to disaster sites during such missions were important.

39. With regard to impact analysis, each country representative gave a briefing about the progress made following the technical advisory mission to their respective country and shared their future plans. The general impression was that the impact of such activities should be evaluated over the long term, as many agencies were involved in implementing the recommendations of the mission experts. In several

countries, the missions had served as an eye-opener to many stakeholders. The group suggested developing some indicators to analyse the impact of the missions.

40. Experts from various organizations offered ideas about their support for such activities and showed interest in collaborating with UN-SPIDER.

41. The discussion led to the development of specific activities for member States and UN-SPIDER in 2014, including requests for new technical advisory missions to some Asian and African countries and follow-up activities for the member States to which such missions had already been carried out.

C. Advances in technology for disaster risk management

42. The working group discussed the following four issues:

(a) Should countries own their own satellites in order to get access to space-based information? Which strategy was better: launching a satellite or using data from a foreign satellite?

(b) Unmanned aerial vehicles were becoming increasingly popular in monitoring disasters. Could they be integrated as yet another "system" in the Global Earth Observation System of Systems (GEOSS)? Were they being taken seriously by the Committee on Earth Observation Satellites?

(c) Many data and tools were now available for effective emergency preparedness. Were disaster management agencies making use of those tools?

(d) Risk assessment had matured as a science; however, not many efforts were being seen to prepare comprehensive, multi-hazard, multi-vulnerability risk assessments at the national level. What were the challenges?

43. A summary of the discussions on those four issues is presented below.

44. Australia did not own its own remote sensing satellites, but was the largest user of foreign satellite data, and used open-source data. One line of thought on the issue of which strategy was better was that it was preferable to make maximum use of existing satellites instead of adding new satellites to orbit. However, there were not enough available examples to demonstrate the economic benefits of using satellite data archives, on either a paid-for basis or free of charge.

45. Bilateral and regional collaboration for space resources, such as launching satellite constellations and investing in data access and data-sharing, were preferred by developing countries in Africa, as smaller countries were unable to launch satellites. The need for better regional cooperation and sharing of responsibilities was necessary. A few examples were given, such as efforts by European countries to provide weather-related information to African countries and several regional programmes in Africa that focused on monitoring natural resources. The possibility was discussed of establishing an information platform to increase awareness of existing space assets and solutions and containing guidelines for accessing satellite data with assistance from UN-SPIDER. Such a platform could be built on the UN-SPIDER knowledge portal.

46. The participants from China, Indonesia and the United States mentioned that they were using unmanned aerial vehicles to assess the damage caused by disasters.

However, there were many challenges (such as legal issues, privacy and data sensitivity, limited coverage, lack of standards and the acquisition of large data sets) to establishing collaborations in that area. GEOSS was considering how unmanned aerial vehicles could complement space-based Earth observation systems.

47. The participants from WFP explained the role of the Programme in preparedness planning and its joint efforts with other partners, including non-governmental organizations, national Governments and international organizations. The challenge faced by WFP was working in different countries with different circumstances. The models were often not reliable under different circumstances as they lacked vulnerability information. The lack of linkages between risk and emergency was also a matter of concern: emergency response was often a more attractive area to focus on, owing to its visibility and the attention it was paid by Governments. As a result, risk-reduction efforts had not received enough attention. It was also felt that the community needed a better understanding of the value of space-based information products. A lack of discussion between the space community and end users was one of the factors that had created the gap. Risk-mapping projects should use local knowledge and take into account the needs of the end users. A professional approach, whereby end users bought the products and services offered by the mapping community, could be necessary.

48. In order to make risk assessment relevant to the realities on the ground, knowledge at the local level should be taken into consideration by integrating remote sensing data with in-situ data. A risk assessment needed information from several organizations in a country, therefore it was important that information-sharing was improved at the national level. There was a gap between the scientific community and the people working at the operational level, which could be improved through better communication between stakeholders. Countries should organize capacity-building activities in order to better understand risk-related knowledge. Understanding of risks should be provided at all levels in the education system, whereas continuous awareness-raising and training were needed for the agencies involved in disaster management. However, methods for risk assessment should be simplified so that they may be used more effectively by the countries still in need of mastering new technologies.

IV. Conclusion and next steps

49. The United Nations International Conference on Space-based Technologies for Disaster Management: Disaster Risk Identification, Assessment and Monitoring built upon the conclusions of the discussions of the conferences in 2011 and 2012. UN-SPIDER had provided financial support for participation in the three conferences by officials from national disaster management offices of developing countries and regional support offices and officials and experts from the space community. Thus, the conferences had contributed significantly to strengthening networks between those working in disaster management and those in space technology.

50. The 35 presentations given during the five plenary sessions covered wide areas of space technology applications, such as operational initiatives, programmes and projects, advanced research and development, cooperation mechanisms, preparing

for effective disaster response and rapid mapping by being aware of risks, and national experiences and best practices.

51. The working groups provided opportunities for Member States to exchange views on working with UN-SPIDER and partner organizations.

52. The Conference also provided a platform for countries where UN-SPIDER had conducted technical advisory missions to report on their progress in implementing the recommendations of the missions.

53. Member States, UN-SPIDER, regional support offices of UN-SPIDER, United Nations entities and related international and regional organizations took up several elements from the Conference for the development of their 2014 workplans and are planning specific events with UN-SPIDER.

54. Participants expressed the opinion that the Conference should continue to be organized on an annual basis and that the themes for the Conference and the discussions should be more focused on specific topics.

55. Participants in the Conference acknowledged with appreciation the support of the Ministry of Civil Affairs of China, the China National Space Administration, the Ministry of Foreign Affairs of China, the Ministry of Finance of China, APSCO and DigitalGlobe.

56. During the closing ceremony, officials from the National Disaster Reduction Centre and the China National Space Administration acknowledged the success of the Conference, provided valuable suggestions on utilizing the expertise of China and assured of their commitment to supporting that activity. The representative of UN-SPIDER took the opportunity to provide a briefing on the stakeholder consultation process that would provide further direction to the UN-SPIDER programme.