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Report on the United Nations/Indonesia Regional Workshop on Applications of Integrated Space Technology in Water Resource Management, Environmental Protection and Disaster Vulnerability Mitigation

(Jakarta, 7-11 July 2008)

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I. Introduction

A. Background and objectives

1. At the World Summit on Sustainable Development, held in Johannesburg, South Africa, from 26 August to 4 September 2002,¹ Heads of State and Government reaffirmed their strong commitment to the full implementation of Agenda 21,² which had been adopted at the United Nations Conference on Environment and Development, held in Rio de Janeiro, Brazil, from 3 to 14 June 1992. They also committed themselves to achieving the internationally agreed development goals, including those contained in the United Nations Millennium Declaration (General Assembly resolution 55/2 of 8 September 2000). The Summit adopted the Johannesburg Declaration on Sustainable Development³ and the Plan of Implementation of the World Summit on Sustainable Development (Johannesburg Plan of Implementation).⁴

2. 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”,⁵ which had been adopted by the Third United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE III), held in Vienna from 19 to 30 July 1999. UNISPACE III had formulated the Vienna Declaration as a nucleus of a strategy to address future global challenges using space applications. In particular, the Vienna Declaration noted the benefits and applications of space technologies in addressing the challenges to sustainable development, as well as the effectiveness of space instruments for dealing with the challenges posed by the depletion of natural resources, loss of biodiversity and the effects of natural and anthropogenic disasters.

3. The implementation of the recommendations contained in the Vienna Declaration supports the actions called for in the Johannesburg Plan of Implementation to strengthen the capacities of Member States, in particular of developing countries, in order to improve the management of natural resources by increasing and facilitating the use of remote sensing data, and increasing access to more affordable satellite imagery.

4. At its fiftieth session, in 2007, the Committee on the Peaceful Uses of Outer Space endorsed the programme of workshops, training courses, symposiums and conferences of the Programme on Space Applications for 2008. Subsequently, the General Assembly, in its resolution 62/217 of 21 December 2007, endorsed the

¹ *Report of the World Summit on Sustainable Development, Johannesburg, South Africa, 26 August-4 September 2002* (United Nations publication, Sales No. E.03.II.A.1 and corrigendum).

² *Report of the United Nations Conference on Environment and Development, Rio de Janeiro, 3-14 June 1992* (United Nations publication, Sales No. E.93.I.8 and corrigenda), vol. I: *Resolutions adopted by the Conference*, resolution 1, annex II.

³ *Report of the World Summit on Sustainable Development*, chap. I, resolution 1, annex.

⁴ *Ibid.*, resolution 2, annex.

⁵ *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.

activities to be carried out under the auspices of the United Nations Programme on Space Applications in 2008.

5. Pursuant to General Assembly resolution 62/217 and in accordance with the recommendations of UNISPACE III, the United Nations/Indonesia Regional Workshop on Applications of Integrated Space Technology in Water Resource Management, Environmental Protection and Disaster Vulnerability Mitigation was held in Jakarta from 7 to 11 July 2008.

6. The Workshop was organized by the Office for Outer Space Affairs of the Secretariat as part of the activities of the United Nations Programme on Space Applications in 2008. On behalf of the Government of Indonesia, the event was co-sponsored and hosted by the National Institute of Aeronautics and Space (LAPAN) of Indonesia.

7. The Workshop built upon a series of meetings on integrated applications of space technologies in the areas of natural resource management, environmental monitoring and natural disaster management, which were organized by the United Nations Programme on Space Applications between 2005 and 2007.

8. Participants of the Workshop discussed the wide range of space-related technologies, services and information resources available for enhancing the management of coastal and marine ecosystems, water resources and land use, as well as for addressing environment-related emergencies, natural hazards and climate change. The Workshop provided participants with the opportunity to present case studies on the applications of space technologies in water resource management, environmental protection and disaster vulnerability mitigation in their countries.

9. The main objectives of the Workshop were (a) to examine low-cost space-related technologies and informational resources for addressing environmental sustainability and disaster management; (b) to increase awareness among decision makers, managers and representatives of the research and academic community of the potential benefits of integrated space technology applications to natural resources monitoring, environmental protection and disaster management; (c) to strengthen regional and international cooperation in those areas, as well as to support the development of regional networking; and (d) to stimulate proposals for national and regional pilot projects using space-based technologies and information to support sustainable development programmes in developing countries in the region.

10. The present report describes the background, objectives and programme of the Workshop. It has been prepared for submission to the Committee on the Peaceful Uses of Outer Space at its fifty-second session and to its Scientific and Technical Subcommittee at its forty-sixth session, both to be held in 2009.

B. Programme

11. The programme of the Workshop was developed jointly by the Office for Outer Space Affairs and LAPAN. It included seven technical sessions, which focused on the following themes: (a) regional and international initiatives and experiences in the use of space technology in water resource management, environmental protection and disaster vulnerability mitigation, and capacity-

building in those areas; (b) space-related technologies and informational resources for addressing water resource management; (c) the use of space technologies in addressing environment-related emergencies, natural hazards and climate change; (d) space-related technologies and informational resources for addressing environmental sustainability and natural resource management; and (e) case studies on applications of space technologies in water resource management, environmental protection and disaster vulnerability mitigation in developing countries, presented by the participants. It included two working group discussion sessions, a one-day technical field trip and an exhibition.

12. At the opening of the Workshop, a keynote address was given by the Chairman of LAPAN on behalf of the Government of Indonesia and introductory and welcoming statements were made by representatives of the Office for Outer Space Affairs, LAPAN and the local organizing committee.

13. A total of 42 oral technical presentations were delivered by invited speakers from both developing and industrialized countries during the four days of the technical sessions. All the presentations focused on successful applications of space technologies and space-related information resources that provided cost-effective solutions or essential information for planning and implementing programmes or projects in the areas of water resource monitoring and environmental protection, environmental vulnerability and water-related disasters. The Workshop also featured presentations on the needs of end-users engaged in managing natural resources and the environment, as well as on the regional and international cooperation and capacity-building required for successful implementation of sustainable development programmes.

14. Each of the technical sessions was followed by open discussions, which focused on specific topics of interest and provided additional opportunities for participants to voice their opinions. The discussions were continued in-depth and summarized by three working groups established by the participants in order to develop ideas and proposals for possible follow-up actions.

15. Details of the programme of the Workshop and its proceedings, together with the list of participants, are available on the website of the Office for Outer Space Affairs (www.unoosa.org).

C. Attendance and financial support

16. The United Nations, on behalf of the organizers, invited developing countries to nominate candidates to participate in the Workshop. Participants were required to have a university degree or well-established professional experience in a field related to the overall theme of the Workshop. In addition, participants were selected on the basis of their working experience in programmes, projects or enterprises that were already using space technology applications or that could potentially benefit from using space technology. The participation of specialists at the decision-making level from both national and international entities was particularly encouraged.

17. Funds allocated by the United Nations and the Government of Indonesia for the organization of the Workshop were used to provide financial support for the participation of 20 participants from developing countries in the region. Full

financial support was received by 17 participants, including international round trip air travel, hotel accommodation and living allowance for the duration of the Workshop, and three participants received partial funding (hotel accommodation and living allowance). The 20 participants came from 15 developing countries.

18. The hosting organization, LAPAN, provided conference facilities, secretarial and technical support, hotel accommodation, meals and transportation to and from the airport for all 20 funded participants, and organized a number of social events for all Workshop participants.

19. The Workshop was attended by a total of more than 90 participants from the following 18 countries: Bangladesh, Bhutan, Canada, Egypt, Indonesia, Iran (Islamic Republic of), Iraq, Lao People's Democratic Republic, Maldives, Myanmar, Nepal, Pakistan, Sri Lanka, Sudan, Syrian Arab Republic, Thailand, Turkey and Viet Nam. The Office for Outer Space Affairs was also represented.

II. Conclusions

20. Following the Workshop discussion sessions, three working groups were established by the participants in order to identify possible follow-up projects aimed at enhancing regional cooperation on activities of common interest and exchanging information and experiences. Two sessions of the Working Groups were designed to give participants an opportunity to share and understand issues and concerns relating to the effective utilization of space-based technologies for sustainable development in the region, and to work together to define a framework for a mechanism for regional or international cooperation.

21. Each working group held discussions with a view to developing project ideas for follow-up actions to be taken by participants after the Workshop. The working groups outlined major tasks and ways and means of undertaking those tasks, including identifying potential funding sources, assigning responsibilities to each member of the working group, defining what end-products were desirable and scheduling the work to be done.

22. The working groups decided that the following ground rules should be applicable to their work:

(a) *Financial aspects.* Tasks and pilot projects would be carried out on the assumption that no external funding would be available. Each member of the group would therefore perform his or her tasks on a voluntary basis. Tasks would therefore be chosen that were compatible with the work of each group member at his or her institution.

(b) *Coordination.*

(i) At the national level, upon returning to his or her home country, each working group member would form a country team and define tasks or pilot projects in preferred thematic areas, with the scope, approach, schedule and end-product defined;

(ii) At the regional level, members of each national team would share data and technical knowledge, and facilitate the exchange of relevant information. The Office for Outer Space Affairs would monitor progress on the projects.

National team leaders would keep the chairperson of each working group and the Office for Outer Space Affairs informed about the status of project implementation at least twice yearly.

23. Working group one on spatial data processing, analysis and application was established with the objective of identifying areas in which participants could collaborate and could share expertise in the use of space technology. The working group defined the following areas of common interest and relevance: (a) agriculture (crop monitoring); (b) water resources (hydrological and hydrodynamic modelling); (c) environment (mapping of land use and land cover and monitoring of droughts and deforestation); and (d) mineral resources (mapping of mineral resources using remote sensing).

24. The working group developed a number of proposals for follow-up actions to be carried out by participants, which included projects on monitoring rice crops using remote sensing (Bangladesh and Indonesia); watershed management and hydrological and hydrodynamic modelling using remote sensing and geographic information systems (Bangladesh, Bhutan, Lao People's Democratic Republic, Nepal, Pakistan, Sri Lanka and Thailand); environmental analyses using space technologies (Indonesia, Lao People's Democratic Republic, Myanmar, Nepal and Viet Nam); and mapping of mineral resources using remote sensing technology (Indonesia, Pakistan and Thailand).

25. The objective of the discussions of working group two on capacity-building, training and education was to improve the quality of human resources in member countries in order to enable organizations working in the fields of environment management, natural resource monitoring and disaster management to increase their utilization of space technologies.

26. As intended end-products, the working group suggested establishing a Web link for the purpose of exchanging information and sharing data, imagery and expertise (possibly through the use of open source databases and e-mailing) and initiating joint projects on capacity-building, including training and education, among the members of the working group on a bilateral, trilateral or multilateral basis.

27. The major tasks identified by the working group for achieving the above results included sharing information on the training events and facilities available in member countries (Egypt, Indonesia, Iran (Islamic Republic of), Iraq, Sudan, Syrian Arab Republic and Turkey) and in relevant organizations or agencies in industrialized countries; establishing coordination bodies at the national, regional and international levels; identifying target groups for training and education; strengthening and sharing remote sensing infrastructure such as ground stations, satellite imagery and data processing software and hardware in member countries; enhancing the level of skills in using space technology in member countries, with the assistance of relevant institutions in industrialized countries and regional or international organizations.

28. The objective of the discussions of working group three on the establishment and development of national and regional space policy was to improve the effectiveness, efficiency, legacy and ethicality of the development of space science and technology, as well as its utilization and applications.

29. The working group outlined the following tasks to be implemented by its members: (a) creation of a compendium of existing space-related policies to be used by countries for the purpose of establishing their own national space plans; (b) establishment of space policies to meet the needs of end-users, particularly in the area of disaster management; and (c) exploration of ways of improving existing space policy mechanisms. The working group showed how national space organizations, disaster management and civil protection agencies, meteorological organizations, research and development institutions and other relevant bodies in developing countries in the region would benefit from the carrying out of the above tasks.

30. The reports of the working groups were presented to and adopted by the participants at the closing session of the Workshop. The participants expressed their appreciation to the Government of Indonesia and the United Nations for organizing the Workshop and for the significant support provided.

III. Follow-up actions

31. The Workshop provided an opportunity to facilitate support for the increased use of space technologies for sustainable development in the region. The pilot projects and actions identified by the working groups would provide guidance on how the institutions of participants could collaborate through regional partnerships.

32. The Office for Outer Space Affairs should monitor progress in implementation of the above projects and coordinate actions undertaken by national teams. The Office should also facilitate the exchange of information among national teams and consolidate the partnerships established at the Workshop.

33. Implementation of the projects enumerated by the participants of the Workshop would result in improving national and regional coordination mechanisms for matters relating to natural resources monitoring, environmental protection and water resource management, and in strengthening the capacities of countries in the region to respond to natural disaster challenges and would enhance regional cooperation in those areas.
