WORKING PAPER*

ENGLISH ONLY

UNITED NATIONS ECONOMIC AND SOCIAL COMMISSION FOR ASIA AND THE PACIFIC

The 20th Session of the Intergovernmental Consultative Committee on the Regional Space Applications Programme for Sustainable Development for Asia and the Pacific

31 October - 1 November 2016
New Delhi, India

Progress Report by the Secretariat

** This document has been issued without formal editing*

A. Introduction – a retrospective look at the evolution of space applications over two decades

1. Space technology applications support decision-making during disaster response and provide an evidence-based approach to disaster management. By providing adequate data, products and tools necessary to acquire, process, store, distribute and effectively utilize geospatial data, such innovative technologies can help quantify risk. They enable informed resilience building and mitigation actions through the application of an exact science. Geospatial analyses based on space technology applications can be applied in all phases of the disaster management cycle; many countries that are prone to disasters are taking advantage of this growing field of research and development and adapting it to address disaster management in pursuit of sustainable development.

2. The benefits of such cutting-edge technologies can be experienced and observed in a growing number of sectors. While developed countries, that have existing satellite technology infrastructure, experience the ubiquitous benefits of such innovations, many countries that do not have such technology infrastructure are potentially left behind. Disaster-prone countries, in particular countries with special needs (CSNs), including least developed countries (LDCs), landlocked developing countries (LLDCs) and small island Developing States (SIDS), can be large beneficiaries from the use of space technology applications and GIS for disaster management and sustainable development, particularly through access provided on a regional cooperative basis.

3. Consequently, Member States adopted resolutions 68/5[1] and 69/11[2] in relation to the Implementation of the Asia-Pacific Plan of Action for Applications of Space Technology and Geographic Information Systems for Disaster Risk Reduction and Sustainable Development, 2012-2017. The resolutions promote regional cooperation for access to space technology for disaster risk reduction through sharing relevant space technology-based information and GIS applications for sustainable development in the Asia-Pacific region, and call for a ministerial conference to evaluate progress and garner additional political will necessary to proliferate the use of such technologies for disaster related activities.

4. The Sendai Framework for Disaster Risk Reduction 2015-2030 was adopted under the UN post-2015 global development agenda, Sustainable Development Goals (SDGs) to promote space applications for disaster management. This mandate emphasizes the role of space technology applications to understand disaster risk and also the role of regional organisations. The United Nations Economic and Social Commission for

- [1] ESCAP Resolution 68/5
- [2] ESCAP Resolution 69/11

Asia and Pacific (ESCAP) supports the development of regional cooperative mechanisms for disaster management at local, national and global levels ensuring that actions on disasters with transboundary origins and impacts can be effectively coordinated through policies that promote the sharing of reliable data and timely geospatial information._Subsequently, Resolution 71/12 [3] adopted during ESCAP's 71st Commission session urged member States and the secretariat to support the implementation of the Sendai Framework in Asia and the Pacific.

5. In Asia and the Pacific, ESCAP, as the only regional Commission with a space technology applications programme, supports regional cooperation to ensure access to technologies and geospatial data necessary for disaster management and sustainable development. Through its 20 year long-standing Regional Space Application Programme for Sustainable Development (RESAP), ESCAP brings together space agencies and related stakeholders under one common purpose - to discuss and address the challenges of space technology applications and GIS for disaster risk reduction and sustainable development. They collaborate with one another and generously contribute to response efforts during times of disaster.

6. Although the Asia-Pacific region has achieved remarkable progress in space technology applications and GIS for disaster management, challenges still remain in improving the consumption of these technologies and the utilization of their applications. For countries with special needs (CSNs), limited infrastructure, a shortage of human capital and a lack of technical capacity can impede access to such innovative technologies rendering them impractical and underutilized. ESCAP and its partners make a continuous effort to improve accessibility, availability and affordability by reducing institutional and technical barriers surrounding such innovations.

7. With a new global development landscape established in 2015, centred around the Sustainable Development Goals, the Sendai Framework for DRR and the Paris Climate Agreement, the potential for space applications has opened up to new areas, particularly in the implementation of the SDGs. Existing regional cooperation mechanisms for space applications established with a DRR focus can be extended to address global challenges beyond the DRR sphere. The forward looking paper to be presented by the ESCAP secretariat at the Asia-Pacific Space Leaders Forum being held in New Delhi, India on 2 November 2016 outlines opportunities for a new space applications strategy that supports the implementation of the SDGs and benefits all of society. Given this potential turning point in the use of space applications, the following paper provides a retrospective view of the achievement of RESAP over the last two decades.

- [3] Resolution 71/12 on the Strengthening Regional Mechanisms for the Implementation of the Sendai Framework for Disaster Risk Reduction 2015-2030 in Asia and the Pacific.

B. The evolution of RESAP as an institutional mechanism for space applications

8. When RESAP was conceived in the mid-90s, the focus of global development was largely based on poverty reduction strategies and technocratic approaches to development. The regional cooperation modality, which RESAP provided at the time, was sufficient enough to improve such technical links between countries. RESAP was established against the backdrop of the First World Conference on Natural Disaster Reduction, held in Yokohama, Japan, in May 1994, facilitated by the secretariat on the International Decade for Natural Disaster Reduction (IDNDR) 1990 to 2000. The Yokohama Strategy for a Safer World (1995) was a call to action consisting of ten principles, some of which stated that disaster prevention and preparedness where of primary importance in reducing the need for disaster relief; that there were close linkages between disaster losses and environmental degradation; that early warning was a key factor for successful disaster prevention and preparedness; and that the international community accepts the need to share necessary technology to prevent, reduce and mitigate disasters, which should be made freely available and in a timely manner through technical cooperation. RESAP, as a regional cooperation initiative, that provided the necessary platform for such technical cooperation and early warning initiatives.

9. The Millennium Development Goals (MDGs), adopted at the UN Millennium Summit in September 2000, marked a shift from top-down development governance, towards a more target-based approach to the global development agenda that encompassed critical intersections among more areas of government, economy and civil society. During this time, the RESAP network engaged with agencies that were operating more independently, and RESAP widened its engagement to academic institutions as well as other regional mechanisms that were working in the area of space applications. This enabled the RESAP network to remain relevant amid the changing global development landscape. RESAP's focus on disaster risk reduction and sustainable development also allowed it to remain relevant to the global development agenda, by serving cross-cutting issues that addressed different MDG goals.

10. At the same time, globally, space leaders began recognizing the potential for space applications, particularly in the area of disaster management, and the International Charter on Space and Major Disasters was established in 2000. The Disaster Charter is an agreement to assist with emergency response and damage assessment by providing free space applications data to disaster-affected countries. Within the United Nations system, space applications also began to play a larger role in its operations. Within the programmatic framework of the United Nations Training and Research Institute (UNITAR) the Operational Satellite Applications programme (UNOSAT), was set up. Over the years, it spearheaded innovation and is now recognized as a centre of excellence in the areas of satellite analysis and geospatial information. The United Nations Office for Outer Space Affairs (UNOOSA) also established the UN Platform for

Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) in 2006. UN-SPIDER develops solutions to address the limited access which countries have to specialized technologies for disaster management and risk reduction. Treaties and initiatives such as these, and the original Outer Space Treaty of 1967, have gradually shifted the use of space technology, which often had been built for defense or military purposes, towards its use for saving lives, environmental sustainability and development.

11. As the global momentum related to disaster risk management developed from the International Decade for Natural Disaster Reduction, the International Strategy for Disaster Risk Reduction was adopted by the General Assembly in 1999, establishing UNISDR as an inter-agency task force and inter-agency-secretariat for this Strategy. It was further strengthened in 2001 to act as the focal point in the United Nations system on disaster risk reduction.

12. The Second World Conference on Disaster Reduction took place in Kobe, Japan in January 2005. This conference came less than a month after the devastating 2004 Indian Ocean tsunami, caused by one of the largest and longest earthquakes ever recorded in history and affecting some fourteen countries and killing a quarter of a million people. One of the outcomes of the conference was the Hyogo Framework for Action (2005–2015): Building the Resilience of Nations and Communities to Disasters. The framework focused on five priorities for action. These included a) ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation; b) identify, assess and monitor disaster risks and enhance early warning; c) use knowledge, innovation and education to build a culture of safety and resilience at all levels; d) reduce the underlying risk factors; and e) strengthen disaster preparedness for effective response at all levels. It specifically called on all actors to promote the application of in situ and space-based earth observations, space technologies, remote sensing, geographic information systems, and modelling, prediction and forecasting tools and studies of the costs and benefits of risk assessment and early warning. It also called on all actors to promote the use, application and affordability of recent space-based technologies and related services, as well as earth observations, to support disaster risk reduction, particularly for training and for information sharing among users.

13. This clear global momentum behind disaster reduction also led to the creation of Sentinel Asia in 2005. An international collaboration and operational mechanism among space agencies, disaster management agencies, and international organizations for applying remote sensing and Web-GIS technologies to support disaster management in the Asia-Pacific region, Sentinel Asia now consists of twenty member countries with fifty one participating organizations and eight international organizations. Sentinel Asia is one of the many operational collaborators which RESAP can call upon during times of crisis and disaster.

14. Among this increased global focus on disasters, RESAP itself expanded its disaster risk reduction activities. However, given the evolving understanding of sustainable development at the time, the network remained challenged when addressing sustainable development as a wider concept, through a natural lack of political will and support and the absence of environmental sustainability as a priority in the MDGs. Therefore, the focus of RESAP remained largely in the areas of disaster risk, and its wider contributions for impact assessment, food security, urban planning and efficient natural resource management remained largely underutilized.

15. In 2012, the United Nations Conference on Sustainable Development adopted the extensively negotiated document The Future We Want, which formed the template for the 2030 Agenda on Sustainable Development. Space technology applications were specifically mentioned as an important means of implementation under The Future We Want: "paragraph 274. We recognize the importance of space-technology-based data, in situ monitoring, and reliable geospatial information for sustainable development policy-making, programming and project operations. In this context, we note the relevance of global mapping and recognize the efforts in developing global environmental observing systems, including by the Eye on Earth network and through the Global Earth Observation System of Systems. We recognize the need to support developing countries in their efforts to collect environmental data."

C. Implementation and Operationalization of RESAP: Tools and mechanisms for space applications in the Asia-Pacific

1. Technological trends

16. The technological trends which compelled the inception of RESAP were driven by the emergence of key space technologies being developed by ESCAP member States and the potential for regional cooperation for the purpose of sustainable development. Such technological trends continued once RESAP was established. However, more and more global data was being made freely available to the public. For example, the US Global Satellite Navigation System (GNSS), known as Global Positioning System (GPS), was declassified in 2000 to provide more accurate services for civilian and commercial use. Consequently, what was previously only reserved for exclusive military use, was now made open to all.

17. Modelling this data became easier through open source Geographic Information Systems (GIS) such as Quantum GIS (QGIS), released in 2002, and other free and open source software packages for remote sensing and GIS. The availability of geospatial data, on a range of thematic areas also significantly increased through initiatives such as the United Nations Environment Programme/Global Resource Information Database (UNEP-GRID). While various international mechanisms, academic institutions and civil society organizations began capturing global baseline data on

population, road networks, water bodies, and other landscape features. The creation of various regional mechanisms in Asia-Pacific, such as Sentinel Asia, also highlighted the growing acceptance and adoption by Asia-Pacific space leaders of the operational use and application of space technologies to benefit society. Despite the data-revolution and innovative technological trends, many countries and governments in the Asia-Pacific region, particularly least developed countries, still do not know how to access and analyze this information.

18. In 2008, the United States Geological Survey (USGS) made its data, from the NASA and NOAA Landsat programme, freely available (up to 30 metre resolution), creating a massive potential for its use for scientific and development purposes. Notwithstanding the release of such technical data in the public domain, the release of free and open data remained a challenge in the Asia and Pacific region, even as Asia-Pacific space leaders continued to support the need for regional cooperation.

19. This mind-set slowly changed as several Earth observation (EO) initiatives followed suit in the open-data revolution during the second decade of RESAP's creation. With multiple instruments on-board the Terra and Aqua satellites launched by NASA, including the widely used moderate-resolution imaging spectroradiometer (MODIS) and Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER), daily specialized observation of both land and the oceans became possible. Digital elevation modelling of the earth's topography offered through initiatives such as Global 30 Arc-Second Elevation (GTOPO30), Shuttle Radar Topography Mission (SRTM) and Global Digital Elevation Model (GDEM), allowed the earth's terrain to be modelled in 3D for geomorphology, hydrology and other purposes. Meanwhile, initiatives such as the Tropical Rainfall Measuring Mission (TRMM) provided data on precipitation and other weather related events, allowing scientists to see the internal structure of cyclones and storms for the first time.

2. Establishment of the 5 year plan of Action on Space Applications and GIS 2012-2017

20. Under resolution 69/11 on the implementation of the Asia-Pacific Plan of Action for Applications of Space Technology and Geographic Information Systems for Disaster Risk Reduction and Sustainable Development, 2012-2017 (Asia-Pacific Plan of Action), ESCAP was asked to take the lead in implementation of the Asia-Pacific Plan of Action, in clear recognition of the fact that although considerable gaps in financial, technical, and institutional capacity still exist in utilizing space applications, regional cooperation is one of the key mechanisms to address these gaps and needs in the region. Member States were thus urged to work closely through the mechanism offered by RESAP.

3. Training network in Asia and the Pacific

21. The RESAP training network operates through specialised regional training centres and technical institutions - the Centre of Space Science, Technology and Education for Asia and the Pacific (CSSTEAP) in India, the Institute of Space and Earth Information Science of the Chinese University of Hong Kong and the UN Training and Research Institute's Operational Satellite Applications Programme (UNOSAT). ESCAP resolution 66/8 established the Asian and Pacific Centre for the Development of Disaster Information Management (APDIM) in Tehran, the Islamic Republic of Iran which will be a regional hub providing technical assistance to members of the RESAP network. Furthermore, ESCAP's Committee on Disaster Risk Reduction, in its third session, discussed the potential for enhancing training centers in the Asia Pacific region, by endorsing the establishment of a regional research and training institute as a center of excellence in disaster management, which Bangladesh has proposed.

4. Delivering as One – building strong regional partnerships

22. The secretariat delivers its work through RESAP networks and in partnership with international and regional organizations including: UNITAR and its UNOSAT; UN-SPIDER; the United Nations Development Programme (UNDP); the United Nations International Strategy for Disaster Reduction (UNISDR); UN-GGIM; the Food and Agriculture Organization of the United Nations (FAO); the World Meteorological Organization (WMO); Asia-Pacific Regional Space Agency Forum (APRSAF) and Sentinel Asia; Asia-Pacific Space Cooperation Organization (APSCO); International Charter Space and Major Disaster (the Charter); GEO; the ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Center); the South Asian Association for Regional Cooperation (SAARC); Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP); Regional Integrated Multi- Hazard Early Warning System for Africa and Asia (RIMES); the Applied Geoscience and Technology Division (SOPAC) of the Secretariat of the Pacific Community (SPC); Asian Institute of Technology (AIT); Chinese University of Hong Kong (CUHK); and the Global Water Partnership (GWP).