Report on the online workshop "Enhancing the Sharing of Geospatial Information and Support to Users in Developing Countries"

Secretariat of UN-GGIM-AP
ESCAP

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This report summarizes the key discussion points and outcomes of the online workshop titled "Enhancing the Sharing of Geospatial Information and Support to Users in Developing Countries" held from 15 to 16 December 2022. The workshop was organised by the UN-GGIM-AP Secretariat.

1. Opening

Mr. Keran Wang from ESCAP thanked participants and agencies for joining the workshop. He stated the renewed commitment of member states towards the implementation of Asia-Pacific Plan of Action on Space Applications for Sustainable Development (2018-2030) and encouraged collaboration following the Jakarta Ministerial Declaration on Space Applications from the Fourth Ministerial Conference on Space Applications. He also highlighted increasing cooperation and effective data management in the Asia-Pacific region.

2. Proceedings

a. United Nations Global initiatives: Integrated Geospatial Information Framework and Global Statistical Geospatial Framework

Mr. Greg Scott from the United Nations Statistics Division shared experiences in geospatial data sharing through existing initiatives and practices. He described the need, development, and work of UN-GGIM global geospatial framework Integrated Geospatial Information Framework (IGIF) to address different data challenges and ensure its interoperability and integration to support global development framework and sustainability challenges.

The presentation also summarized the establishment of two United Nations' centres of excellence: Global Geospatial Knowledge and Innovation Centre and Global Geodetic Centre of Excellence. It summarized the context, binding resolutions, mandate framework and interests of stakeholders before the establishment. The role and operation of these centres towards policy work, capacity building, and support to realizing national development priorities were also discussed.

b. UN Global Service Centre (UNGSC)

Mr. Kyoung-Soo Eom from the United Nations Office of Information and Communications Technology (UN OICT) presented a summary of the United Nations Global Service Centre. It highlighted the centre's contribution to support peace, security, human rights, and all other mandates of UN operations. For example, the organization acts as a global client support section, providing solutions to geospatial needs and capacity building of UN entities and member states. He also outlined examples of UN Maps that provide maps on demand with geo-analytic services such as remote environmental analysis and conflict monitoring tools.

c. Leveraging Geospatial Technologies in Addressing Plastic Pollution and Marine Litter

Mr. Murali Venkat Prasad from the UN OICT Enterprise Solution Service in Asia presented the implementation of the Global Partnership on Marine Litter (GPML) project. It described the development of the GPML Digital Platform to solve global data challenges related to plastic pollution and marine litter through integrated knowledge and unified approaches. The platform addresses lack of coordination through a common action framework,

encourages co-developed solutions through collaborative action and facilitates target-oriented progress measures.

d. **Structure and operation of the Bhuvan geoportal**

Mr. Rao from the National Remote Sensing Centre (NRSC) in India presented the context and development of the Bhuvan Geoportal built in 2009, for geospatial imaging and map visualization services. The presentation described the operation and functions of the geoportal as well as plans for further applications development. The geoportal has provided useful information for disaster management and climate change analysis.

e. **Computable global seamless data cubes and application perspectives**

Mr. Peng Gong from the University of Hong Kong presented its iMap products: iMap China and iMap World. The presentation described the analytic techniques employed to the iMap World 1.0 application to quantify annual global land cover change from 1985 to 2020 and produce global daily seamless data cubes using geospatial data.

f. **iMap platform for covid-19 pandemic and concept of Sphere geospatial information platform**

Mr. Tatiya Chuentragun from the Geo-Informatics and Space Technology Development Agency of Thailand presented the operational structure of COVID-19 iMap platform and how it recorded event-based data. It also introduced the sphere concept which includes a cloud- based platform which provides shared geospatial data and applications for use by the government, public and partners to meet project needs. It uses the principles of findable, accessible, interoperable, and reusable data.

g. **Data Security and practices**

Mr. Rick Miner from the US National Oceanic and Atmospheric Administration (NOAA) presented the organisation's response to the current data security threat landscape using examples such as morphic malware and encrypted traffic malware. The defense approach against intelligent and automated attacks is by developing integrated, collaborative and highly adaptive security platforms. It has built a cloud-based zero trust architectural framework to support end-to-end workflows from ingest, processing, storage, access, and dissemination.

h. **Collaborative Architectures and Techniques**

Mr. Chul Min Lee from ESCAP presented concepts of data and information, and collaboration for geospatial information sharing. He explained the idea of centralized, decentralized, and distributed IT architectural designs as well as additional considerations in terms of privacy and the decentralization trilemma.

The presentation concluded with a proposal to utilize IT architectural breakthroughs to develop a decentralized platform in which geospatial data or information could be shared in a discrete manner among entities for mutual benefit.

i. **Vanuatu Globe Project**

Mr. Zaffar Sadiq Mohamed Ghouse from the UN-GGIM Private Sector Network presented how the Vanuatu Globe platform serves as an easy-to-use visualization tool for observing effects of climate change and its use by government officials to educate the community

about such impacts. The government agencies use the application as a planning tool to implement mitigation measures and reduce the risks related to coastal inundation and as a classroom learning tool for students to learn about the science of climate change.

j. **Indonesia Map Initiative**

Mr. Antonius B Wijanarto from the Geospatial Information Agency of Indonesia presented the One Map Initiative. The One Map Initiative addresses the issue in which there were different kinds of geospatial data being produced by government agencies without a common reference system and collaboration leading to discrepancies in the maps among stakeholders. The effort to resolve land use permits and conflicts gave birth to One Map Policy (OMP) under the presidential decree to synchronize geospatial information programs. The goal of OMP was to establish a reference standard database geoportal to improve the quality of natural resource management, sustainable development, digital economy and policy formulation.

k. **Geospatial Data Application for Sustainable Development Assessment - Case Study in Deqing China**

Ms. Xiao Yang Zhang from the Chen Jun Academician Workstation presented the complexities of data acquisition and handling for the implementation of SDGs in De Qing. Externalities such as socio-economic factors, district demographics, space-resolved (topographic) building dimensions and temporal processing were considered. Statistically supported geospatial data, comprehensive interactive enabled platform was designed with the sanitation and water management (SDG-6) as an objective function. Furthermore, a three-year action plan was developed by using the application-oriented data processing model for assessment.

l. **National geo-database and geo-portal for disaster risk reduction in Tajikistan**

Mr. Manzul Hazarika from the Asian Institute of Technology (AIT) in Thailand presented a platform for multi-hazard risk assessment implemented for Tajikistan. Disaster risk analysis enabled probabilistic approach was developed to compute the risk, complemented by geo-spatial-resolved street views. The meteorology-based model helped to perform vulnerability analysis based on the district population and density. This navigational tool enables government entities to conduct district-level assessments with respect to the intensity of calamities and hazards.

m. **Remote sensing for sustainable water management**

Ms. Diana Dushniyazova from the Kazakhstan Gharysh Sapary presented the importance of monitoring water resources in a landlocked country such as Kazakhstan. Here, remote sensing technologies are employed to extract the data related to surface water irrespective of human engagement. For this, optical resolution with thermo-spectral imagery can help to pinpoint the probabilistic location for water resources and make relevant data-driven decisions.

n. **Open platform to sharing the Geostationary Environment Monitoring Spectrometer (GEMS) data**

Mr. Dong-won Lee from the National Institute of Environment Research (NIER) of Korea presented the GEMS satellite launched in 2020 for monitoring air quality over Asia and the Pacific and introduced the resulting data products as well as the platform to publicly

distribute data to users. Real-time space resolved satellite images captured can be used to compute atmospheric health through concentration of ozone, nitrogen oxides (NOx), sulfur oxides (SOx), and various aerosols. This data is publicly available and accessible.

o. **Data governance/data security: experience of Bhuvan**

Mr. Arul Raj from the NRSC presented the importance of data governance behind the Bhuvan geoportal. The presentation focused on understanding data security and integrity associated with metadata. A four-step model was proposed that defined need of data, the objective function of data, application of data in terms of governance and measurement of effectiveness of workflow. In doing so, multispectral and spatially resolved datasets for the past 50+ years can be made available via satellite imagery archives.

p. **APSCO Data Sharing Service Platform**

Mr. Yu Bai from the Asia Pacific Space Cooperation Organisation (APSCO) presented a data sharing platform to empower developing countries to use geospatial data for disaster management. Examples of its uses include land monitoring, water/snow coverage analysis, flood monitoring and earthquake damage assessment. These thematic layers can be downloaded and visualized on the APSCO data sharing service platform.

q. **Federated Learning as a Solution for Problems related to Intergovernmental Data sharing**

Mr. Joaquin Delgado Fernandez from the University of Luxembourg and Mr. Killian Sprenkamp presented the Federated Learning, a collaborative machine learning technique, as a technical solution to intergovernmental data sharing.

r. **Decision Support System (DSS) for Disaster Management with World Bank funding**

Mr. Manzul Hazarika from AIT presented data security aspects to a platform that was deployed for monitoring and observation of hazards like floods and providing automated alerts.

For the security mechanism, the user requests are queued up in the system depending upon the urgency of request. A secure communication channel is then set up. The security architecture of the mechanism requires authentication, filters, encryption, and authorization. Scrambling based encryption security provides an added layer of security to this tool.

s. **Panel Discussion**

The panel discussion elicited perspectives and suggestions from invited experts and participants related to the following questions highlighted in the workshop concept note:

- *Define means to establish regional geospatial data hub, and should it be centralized or decentralized?*
- *How to connect national geospatial information platform to be used by other countries?*
- *What are the expected standard operating procedures for the regional datahub?*

i. LX Corporation

Mr. Munsung Koh from the LX Corporation hoped that the regional data hub can efficiently fill the technical data gaps for countries in the Asia and the Pacific; such data can be granular and high-resolution imagery to develop cadastral maps as a service or datasets from the regional data hub. The platform can also build capacity of member states through online workshops and lectures.

Mr. Koh supported the idea of a centralized datahub if cost effectiveness and consistent data management are to be taken as priorities.

Mr. Koh raised the concern that members countries can have over data security and governance based upon their own data disclosure policies and links of sensitive data. In addition, the technical status of the data could be different for each country such as data models, geodetic frameworks, land use information systems and standards. In such a case, the national geospatial systems can be connected interactively for more capacity building topics and granular datasets.

Mr. Koh suggested that the value of sharing data or information can be from having more informed land management and cadastral mapping for a country's economic development.

Mr. Koh also expressed concerns regarding consensus among countries related to data sharing, particularly in case of sensitive information, and suggested exchange of practice sharing with UN Centers of Excellence in Bonn and China, under the lead of ESCAP.

ii. National Remote Sensing Centre (NRSC)

Mr. Rao from the NRSC appreciated the idea of a regional hub and suggested to prioritize datasets by considering the exchange of data that can be sensitive to share among countries. Disaster management can be an area of immediate data sharing, among others. Another aspect for data sharing can be hotspot analysis such as regional climate emergencies where neighboring countries, face similar calamities e.g., floods in Nepal and Bangladesh.

Mr. Rao also suggested that one starting point can be identifying a workable scale of data for specific regional geospatial applications considering national mapping policies of member countries related to database sharing and public access of varying image resolutions for visualization.

Mr. Rao stated that in the presence of multiple global platforms, the need for interactive regional platforms has also become critical. Country specific platforms can also be developed for access through Application Programming Interfaces (APIs) or special permission and metadata can be shared among partners.

Mr. Rao mentioned that India has its own SOPs depending upon scale of cartography, thematic areas, and GIS related standards. Once the scale is identified, the standards among countries can be shared to work out a common regional standard.

Mr. Arul Raj suggested that regional datahub should be a decentralized platform since each country has its own organized geospatial platform under a governing agency and operational framework in place. In such case, an effective exchange mechanism among agencies can be developed for data sharing through APIs or

services such that focus on the maturity of a distributed processing model and service sharing.

Mr. Raj also suggested that Open Geospatial Consortium (OGC) sets a standard for GeoAPI that can be adhered to while setting up regional data hub and documented for better exchange of knowledge. A subsequent operational framework can be defined such that existing standards and SOPs can be employed for people to start using the platform.

iii. Geospatial Information Agency of Indonesia

Mr. Wijanarto from the Geospatial Information Agency of Indonesia agreed to the ideas shared by other experts and suggested to consider interoperability of the data as one of the key aspects while developing the regional data hub.

Mr. Wijanarto noted that the greater challenge lies in reaching consensus over the non-technology related aspects of developing of the platform than its technological aspects.

Mr. Wijanarto stressed that a memorandum of understanding among partner countries can be signed relating to data sharing and varying standards can be used as long as the cooperative understanding holds.

iv. Singapore *Land Authority*

Mr. Kean Huat Soon from the Singapore Land Authority suggested that while developing the regional data hub, the quality, maintenance, frequency of data should also be taken into consideration along with its quantity.

Mr. Soon suggests that countries can take small steps and develop a test pilot with interested countries by utilizing datasets countries are comfortable sharing.

t. Closing Remarks

Mr. Keran Wang from the Space Application Section, concluded the panel discussion by sharing the decisions from ESCAP's intergovernmental Committee on Disaster Risk Reduction which requested the Secretariat to support UN-GGIM-AP and enhance capacity building of member countries by sharing good practices in using geospatial data for managing disaster risks. In 2020, Committee on Science, Technology and Innovation requested the Secretariat to build a regional gateway for sharing integrated data tools and practices on the use of geospatial data.

Mr. Wang noted that through plenary meetings, members have requested the Secretariat to establish a regional platform, in a cost neutral manner for capacity building and information sharing. In October 2022, through the Jakarta Ministerial Conference on Space Applications for Sustainable Development in Asia and the Pacific , ESCAP members also recognized the need for effective data management. Hence, the mandate of ESCAP based upon demand from countries for building their geospatial capacities and actions should be taken to meet these demands.

Mr. Wang proposed an open collaboration among participating institutes to join the informal working group on Virtual Constellation for Disaster Risk Management (VCDRM) that can serve as a pilot for the regional data hub development.

Mr. Wang explained the need for one standard, a unified data platform that can accommodate data at different levels from different satellites, timeseries, resolutions and locations to support countries and service providers. Currently, countries make contributions but not all-in-one solution to disaster management. The disaster hit countries are mostly developing or least developed countries and need support to build one platform to integrate and process geospatial data.

Mr. Wang closed the discussion proposing that ICT developments and innovative digital products are the way forward to integrate different types of data from providers into one platform, and a unified mechanism. In this case, further sessions from countries and researchers can help with the exchange of knowledge about good practices to develop a regional geospatial platform

This report was developed by ESCAP as the Secretariat of UN GGIM-AP:

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