Eye on Earth Summit Bulletin

A Daily Report of the Eye on Earth Summit 2015

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SUMMARY OF THE EYE ON EARTH SUMMIT: 6-8 OCTOBER 2015

The second Eye on Earth Summit (Eye on Earth 2015), themed 'Informed Decision Making for Sustainable Development,' convened from 6-8 October 2015 in Abu Dhabi, United Arab Emirates (UAE) under the patronage of Sheikh Khalifa Bin Zayed Al Nahyan, President, UAE. Through dialogue, collaboration and network building among over 600 participants, the Summit aimed to spark international action that will transform the collection, access, sharing and use of data and information in support of sustainable development.

Hosted by Razan Khalifa Al Mubarak, Secretary-General of the Environment Agency - Abu Dhabi (EAD), the Summit was overseen by the Eye on Earth Alliance, a collaboration of five core organizations, namely EAD's Abu Dhabi Global Environmental Data Initiative (AGEDI), the UN Environment Programme (UNEP), the Group on Earth Observations (GEO), the International Union for Conservation of Nature (IUCN) and the World Resources Institute (WRI), and many partners.

Organized across three themes, data demand, data supply, and enabling activities, Eye on Earth 2015 provided participants a chance to explore these themes through panels and discussions during plenary and track sessions convened on all three days. The ideas resulting from the plenary and track sessions were captured in the 'Eye on Earth Summit Outcome Document.'

In addition, a number of launches and side events took place throughout the Summit, covering innovative concepts, new online tools, and the latest innovations in delivering data for informed sustainable development decision making. The winners of three Eye on Earth competitions were announced during the Summit: 'Airscapes Singapore' won the Data Visualization Challenge for visualizing crowdsourced air pollution metrics for urban populations to monitor air quality in real time; the Moabi team won the Citizen Science Challenge for their project 'Logging Roads!' that crowdsources a map of logging roads in the Congo Basin rainforest to track logging violations, forest degradation and potential conflicts with customary land rights; and Elizabeth Tyson, Wilson Center, won the blogging competition for her entry, 'Sustainability 3.0.'

The following report provides a summary of both plenary and track sessions.

A BRIEF HISTORY OF EYE ON EARTH AND RELATED PROCESSES

Barriers, such as limited monitoring and data collection initiatives, lack of coordination among data providers, cost of accessing data sets, and the cost of technology to process and use data, can result in inaccurate and ineffective decision making and policy implementation. Failure to overcome these barriers may result in the loss of valuable environmental assets and resources, particularly in emerging economies.



Keynote Speakers during the opening ceremony

Concerned that many scientists, policymakers and private citizens must rely on limited and poorly presented environmental data and information as they set out to tackle challenges such as water scarcity, food security and climate change, AGEDI, in partnership with UNEP, initiated the Eye on Earth process in 2011.

Eye on Earth aims to mitigate the paucity of environmental data and the lack of adequate technology to process and use data, which hinder sustainable development, particularly in developing countries. The initiative convenes thought and action leaders and organizations from around the world to "converge on key issues to reach consensus on solutions to greater data accessibility" and "collaborate to strengthen existing initiatives and where necessary, launch new ones."

The inaugural Eye on Earth Summit (Eye on Earth 2011) convened in the lead up to the UN Conference on Sustainable Development (UNCSD or Rio+20) that was held in June 2012. UNCSD marked the 40th anniversary of the first major international political conference that specifically had

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the word "environment" in its title (UN Conference on the Human Environment), the 20th anniversary of the 1992 UN Conference on Environment and Development (UNCED or Earth Summit), and the 10th anniversary of the World Summit on Sustainable Development (WSSD).

AGEDI: AGEDI was launched on 2 September 2002 at WSSD, in response to the lack of quantifiable environmental data and to address the UAE's concern about the approach and criteria used for the results of the Environmental Sustainability Index, produced by the World Economic Forum in February 2002.

AGEDI works with partners, members and stakeholders throughout the world to achieve a more sustainable future through "best-impact" access to environmental and societal data. Focusing on support to developing countries and emerging economies, AGEDI's scope includes: monitoring and enabling effective data access and availability across global environmental and societal information networking movements; identifying data needs; determining strategies for data access, acquisition and dissemination; implementing projects which address specific data, information and knowledge product needs; enabling and facilitating local, regional and global participation in, and support of, an active network of thought and action leaders; and ensuring capability and capacity building of developing countries and emerging economies to support "best-impact" access and application of data and information for decision making.

EYE ON EARTH 2011: The first Eye on Earth Summit convened in December 2011, and was facilitated by AGEDI to strengthen existing efforts and inspire a search for unified, global solutions to the issues that preclude access to data. The resulting Eye on Earth Summit Declaration, with its 14 guiding principles, was adopted and forwarded to UNCSD for consideration. The Declaration, endorsed by 48 countries, agrees to advance Eye on Earth collaboration on, *inter alia*: a cooperation agenda involving a diverse range of stakeholders; effective mechanisms for collecting, managing and disseminating necessary environmental information; and public access to environmental information.

Three foundation and five thematic Special Initiatives (SIs) were launched at the Summit. The eight SIs, which form the work programme of Eye on Earth, are: Eye on Access for All; Eye on Environmental Education; Eye on Global Network of Networks (GNON); Eye on Biodiversity; Eye on Community Sustainability & Resiliency; Eye on Disaster Management; Eye on Oceans & Blue Carbon; and Eye on Water Security.

UNCSD: At Rio+20 in 2012, the international community gathered in Rio de Janeiro, Brazil, and agreed to launch a process to develop the Sustainable Development Goals (SDGs), the cornerstone of the post-2015 development agenda. The UN General Assembly (UNGA) endorsed the outcome document, titled 'The Future We Want,' on 27 July 2012.

ELEVENTH PLENARY SESSION OF THE GROUP ON EARTH OBSERVATIONS (GEO-XI): This meeting convened from 13-14 November 2014 in Geneva, Switzerland. GEO is a voluntary partnership consisting of Members and Participating Organizations that are coordinating efforts to build the Global Earth Observation System of Systems (GEOSS). GEOSS seeks to link existing and planned observing systems around the world, and support the development of new systems where gaps currently exist, with a view to providing key data to assist decision makers, planners and emergency managers in nine "Societal Benefit Areas," namely: disasters, health, energy, climate, water, weather, ecosystems, agriculture and biodiversity.

GEO-XI, *inter alia*: discussed the 2016-2025 Implementation Plan; extended the mandate of the Data Management Task Force by one year to develop the Implementation Guidelines for GEOSS Data Management Principles; and considered the 'Report on Data Sharing Principles Post-2015 and Mechanisms to Ensure Legal Interoperability of Shared Data.'

UN SUSTAINABLE DEVELOPMENT SUMMIT: On 25 September 2015, the UNGA adopted the post-2015 development agenda, comprising several elements: a preamble; a declaration; 17 SDGs and 169 supporting targets; means of implementation and the Global Partnership; and a framework for follow-up and review of implementation. This agenda, titled 'Transforming Our World: The 2030 Agenda for Sustainable Development,' was developed by UN Member States during negotiations that stretched from March 2013 to August 2015.

SUMMARY OF THE MEETING

OPENING CEREMONY: CONVENE, CONVERGE, COLLABORATE

On Tuesday morning, the opening ceremony, moderated by Nima Abu-Wardeh, Broadcast Journalist, began with an introductory video to illustrate the role of environmental data in overcoming global sustainability challenges. Razan Khalifa Al Mubarak, Secretary-General, EAD, noted that a transformation towards high quality and comprehensive science, technology and citizen knowledge will be critical in



L-R: Moderator **Nima Abu-Wardeh**, Broadcast Journalist; Keynote Speakers **Razan Khalifa Al Mubarak**, Secretary General, Environment Agency Abu Dhabi (EAD); **Anwar Gargash**, Minister of State for Foreign Affairs and Minister of State for Federal National Council Affairs, UAE; **Achim Steiner**, Executive Director, UNEP; and **Rashid Ahmed Mohammed Bin Fahad**, Minister of Environment and Water, UAE



Keynote Speaker **Achim Steiner**, Executive Director, UNEP

overcoming issues such as poverty, economic development and the protection of the environment. A film outlining the establishment, mission and initiatives of AGEDI followed her remarks.

Anwar Gargash, Minister of State for Foreign Affairs and Minister of State for Federal National Council Affairs, UAE, positioned the Eye on Earth Summit in the context of the recent adoption of the SDGs by the UNGA. He described the UAE's long-term support for the SDG process, including investments in new energies, support for a blue economy, and working with 25 countries to eradicate poverty. He stressed that accurate and timely environmental data, as well as data partnerships, are critical in global efforts to tackle climate change and achieve the SDGs.

Achim Steiner, Executive Director, UNEP, said that the environment is no longer viewed as an add-on, but as part of the DNA of the SDGs, which themselves represent the first time all nations have come together to work in the same direction. He highlighted "big data" as crucial in developing systemic approaches for global responses to problems with local impacts, noting that schemes connecting the world of data with practical solutions will guide progress in the future.

Rashid Ahmed Mohammed Bin Fahad, Minister, UAE Environment and Water, underscored the importance of data in supporting the UAE's environmental agenda in its national strategy. He stated that data are important to enhance competitive capabilities in a green economy, and suggested data can help close the gap between developed and developing countries.

WELCOMING PLENARY: DATA REVOLUTION AND INSTITUTIONAL TRANSFORMATION

The plenary began with Mohammed Al Ahbabi, UAE Space Agency, who highlighted the importance of space science for capacity building, noting the commitment of the UAE Space Agency in contributing to Earth observation, data monitoring and management at the local, regional and international levels to support global sustainability.

Thani Al Zeyoudi, UAE Ministry of Foreign Affairs, stressed that achieving the SDGs will require growing institutions and nurturing a culture of generating, reviewing, and sharing data. He noted that "robust data are not just about monitoring progress; data are also required for decision making and policy setting." He outlined UAE initiatives focused on ensuring consistent statistical data, strengthening interagency coordination, developing a national inventory of greenhouse gas emissions, and establishing key performance indicators, including green energy targets.

Naoko Ishii, Global Environment Facility (GEF), said the SDGs provide clear recognition that protection of global commons is essential for achieving development ambitions. She highlighted the need for greater attention to accessibility and affordability of data, noting that deeper analysis was required to establish links between science and data to enable effective policymaking.

Mathis Wackernagel, Global Footprint Network, described the work of his organization, which uses an ecological matrix to assess biocapacity reserves and deficits. Stating that ecological debtors have been increasing worldwide, he underscored that addressing a country's ecological footprint status depends on biocapacity reserves, financial status and drawing on data to help guide decision making.

Robbie Schingler, Planet Labs, highlighted the Global Partnership for Sustainable Development Data under the context of a global remote sensing revolution combining consumer technology, big data and improved connectivity to enhance information transparency across the planet. He described the Dove Satellite, which collects and presents low-cost, daily online delivery of millions of square kilometers of geospatial data monitoring of, *inter alia*, energy infrastructure, agriculture and forestry with beneficial implications for achieving 15 out of 17 SDGs.

Pierre-Yves Cousteau, Founder, Cousteau Divers, cited estimates that ocean ecosystems have an annual economic value of US$2.5 trillion. He presented Project Hermes, a new open source, participatory initiative, funded in part through crowdsourcing, that is collecting real time and historic data on global ocean temperatures through dive profiles.

TRACK SESSIONS

Over the course of the three-day Summit, 26 track sessions took place, allowing participants to explore the Summit's themes from varying perspectives.



Robbie Schingler, Co-Founder and President, Planet Labs

ADDRESSING POLICYMAKING DEMAND FOR DATA – DIALOGUE BETWEEN DECISION MAKERS AND PROVIDERS: Moderating the session, Felix Dodds, University of North Carolina, summarized the importance of indicators at the global, national and sub-national levels to track progress on sustainable development.

Nawal Al-Hosany, Masdar, described data as a critical ingredient in making decisions and building a knowledge economy drawing on the experience of Masdar's initiatives to fill data gaps in the UAE.

David Rhind, Nuffield Foundation, underscored the importance of: drawing on quality statistics; defining what quality data looks like; bridging gaps; building capacity; making data accessible; and communicating data effectively.

Kathrine Brekke, ICLEI – Local Governments for Sustainability, described cities' data needs and what they do with data, drawing on the city of Helsinki, Finland, as an example, and outlined the role of citizen data collection, international standards and the World Council on City Data.



Panelists in the session on "Addressing Policymaking Demand for Data: Dialogue Between Decision Makers and Providers" (L-R) **Nawal Al Hosany**, Masdar; **David Rhind,** Nuffield Foundation; **Kathrine Brekke**, ICLEI – Local Governments for Sustainability; Moderator **Felix Dodds**, University of North Carolina; **Ingrid Dillo**, Data Archiving and Networked Services; **Robert Gurney**, University of Reading; and **Marcos Silva**, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

Ingrid Dillo, Data Archiving and Networked Services, underscored the importance of the quality and technical integrity of data, suggesting basic data certification and standards to guide data management.

Robert Gurney, University of Reading, presented on the Belmont Forum and Challenge, born out of the need to address environmental challenges through international collaboration, and highlighted big data problems in environmental science, including volume, variety, veracity, velocity and data silos.

Marcos Silva, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), described CITES as a good example of how data are collected and applied to monitor and track species trade and provide policymakers with information to support more effective decision making.

The ensuing discussion covered: the role of citizen science; the need to invest in data and data management; the usefulness of consistency in data collection; and the importance of data sharing and of synchronizing data in the public and private sectors.

BIODIVERSITY – DATA GAPS FROM GLOBAL TO LOCAL PRACTICE: In a session moderated by Richard Jenkins, IUCN, Tim Hirsch, Global Biodiversity Information Facility (GBIF), stressed that filling gaps involves mobilizing inaccessible data as well as generating new data. To illustrate, he discussed GBIF's work with Environmental Impact Assessment (EIA) experts in West Asia to engage new data-holding communities, create a data repository, improve the quality of EIAs through transparency, and establish training platforms.

Franck Courchamp, National Center for Scientific Research, France, highlighted the Global Invasive Species Database, a peer-reviewed online database, which provides descriptions of invasive species, pathways of introduction, management considerations and key references for over 850 invasive species.

Ackbar Joolia, IUCN, discussed the IUCN Red List assessment process, its role in policymaking, and capacity development through assessment tools and "train-the-trainer" programmes. He highlighted the goal of assessing 160,000 species by 2020, focusing on plants, invertebrates and fungi and on arid, freshwater and marine areas.

Natasha Ali, IUCN, discussed the Standard for the Identification of Key Biodiversity Areas, contributing significantly to the global persistence of biodiversity in terrestrial, inland water and marine environments by harmonizing existing approaches in identifying important sites for biodiversity.

Healy Hamilton, NatureServe, outlined the Biodiversity Indicators Dashboard, an interactive, multi-spatial and flexible platform, which permits the visualization of information about biodiversity to fill gaps in national capacity to help reach objectives such as the Aichi Biodiversity Targets and the SDGs.

Gary Geller, GEO Biodiversity Observation Network (GEO BON), underscored the need to facilitate national and regional BONs to close data gaps and facilitate monitoring systems with end-to-end connectivity. He described the 'BON in a Box' toolkit for establishing national observation systems, which provides associated planning tools for harmonizing data sharing.

Majid Al Qassimi, EAD, highlighted evidence-based planning for biodiversity protection in the Emirate of Abu Dhabi for a number of species including dugongs, flamingos and dolphins, while detailing *ex-situ* conservation plans for reintroducing the Scimitar-horned Oryx. Al Qassimi identified regional biodiversity challenges, including lack of regional cooperation and political will to translate data into decision making.

ARAB REGION'S ENVIRONMENTAL DATA CHALLENGES: Ahmed Abdelrehim, Centre for Environment and Development for the Arab Region and Europe (CEDARE), and Adel Farid Abdel-Kader, Trend Green Knowledge Inc., moderated the session.

Nadia Makram Ebeid, CEDARE, pointed to the gap in access to reliable and scientifically-based data. She spoke on big data, describing it as an opportunity to make sound decisions for the future.

Taher Al Shakhshir, Minister of Environment, Jordan, underscored the lack of coordination among environmental agencies as one of the dominant challenges facing the region.

Iyad Abumoghli, UNEP-Regional Office for West Asia (UNEP-ROWA), emphasized that while many institutions and activities related to data gathering have been established, the key is to select and use the right information to craft policies. He recommended creating clear rules and laws that facilitate collection and access to information, uphold transparency and recognize citizens' rights to obtain data.

Ahmed Abdulmuttaleb Baharoon, Executive Director, AGEDI, highlighted the importance of the Arab region working together, saying problems related to water and climate change cannot be solved by one country alone.

Abdel-Kader referred to the three aspects of sustainable development (economic, social and environmental), saying the latter is most difficult because of the paucity of environmental data. On this challenge, he called for the Arab region to have a vision, strategy, plan and business model.

Fathia Abdel Fadil, UN Economic and Social Commission for Western Asia (UN-ESCWA), pointed to challenges such as: the cross-cutting nature of problems that require environmental data; the high cost of conducting surveys; maintaining timeliness of data and periodicity of surveys; incompleteness of administrative records; difficulty in producing and disseminating aggregated data; and the expansion of Millennium Development Goal (MDG) 7 into five SDGs, with 46 targets.

Asma Abahussian, Arabian Gulf University, noted the rise in country reporting in recent years and highlighted her university's specialty in preparing this data and building the capacity of students in this field.

Mohammed Dawood Al-Ahmad, Environment Public Authority, Kuwait, gave an overview of the eMISK tool, a geo-environmental database for investors, researchers and universities.

Najib Saab, Arab Forum for Environment and Development (AFED), urged frankness in addressing data challenges, saying experts should be encouraged to write fact-based reports without fear of how they will be received. He described AFED's strategy of promoting the information gathered through social media.

MEASURING PROGRESS TOWARDS SUSTAINABLE DEVELOPMENT – PRIORITIES TO MEET THE DATA DEMAND: Constanza Martinez, IUCN, opened the session, highlighting the integrated nature of the SDGs, compared to the MDGs, pointing to the fact that environmental issues have a major role to play in addressing goals on food security, water supply and health, among others.

Peter Stephenson, World Wide Fund for Nature (WWF), discussed, *inter alia*, WWF's conservation programme standards, noting key challenges to overcome, such as incomplete indicators, gaps in data coverage, and limited data collection due to inadequate capacities and resources. He recommended the wider adoption of scalable indicators that can be disaggregated at different levels.

Simon Stuart, IUCN, underscored the successful integration of environmental, social and economic indicators into the SDGs. He pointed to taxonomic capacity as a key challenge in biodiversity monitoring, suggesting the need for novel techniques to enable greater participation of citizen scientists.

Tanya Bryan, GRID-Arendal, discussed the importance of marine data for achieving the SDGs, noting that healthy marine ecosystems are capable of contributing to several non-marine SDGs. She underscored, *inter alia*, the need to ask the right questions to use data effectively, and the need to develop metrics at different scales to achieve global and national targets.

Eugenie Regan, UNEP-World Conservation Monitoring Centre (UNEP-WCMC), discussed the need for interconnected data and sharing of solutions across organizations to enable decision makers to create smarter and more sustainable economies. She noted poor progress on the target of halting biodiversity loss by 2020, highlighting increased pressure on species despite increased awareness.

Guido Schmidt-Traub, UN Sustainable Development Solutions Network (SDSN), underscored progress on availability of environmental data, but cautioned that improved understanding is needed on how to use this data effectively to develop metrics for better policymaking.

The ensuing discussion considered: civil society participation in monitoring; data access across different domains; and mechanisms for monitoring the quality of data.

DONORS' DEMAND FOR DATA: Barbara Ryan, Secretariat Director, GEO, moderated the session and introduced the panelists.

Sylvia Lee, Skoll Global Threats Fund, underscored the importance of considering how to gather and make data accessible when designing projects, suggesting: working with users from the outset so projects are designed around their needs; using data from government agencies; and working with journalists to enable accurate storytelling that serves the needs of users. Noting estimations that 90% of data had been generated in the last two years, she pointed to the need to harness big data through innovative sources such as social media.

Jackson Kimani, Clinton Foundation, described the System for Land-based Emissions Estimation in Kenya (SLEEK) project, which aims to: contribute to data collection required for Kenya's reporting under the UN Framework Convention on Climate Change (UNFCCC); support land-sector policymaking; and make relevant data accessible. He noted the importance of standards and protocols to govern data generation for enabling better data collection to help countries leverage aid.

Tom Cummings, Tällberg Foundation and the Global Alliance for Banking on Values, emphasized how data could be used in foundation and activist decision-making processes. He



Panelists in the session on "Arab Region's Environmental Data Challenges" (L-R) **Moderator Adel Farid Abdel-Kader**, Trend Green Knowledge; Moderator **Ahmed Abdelrehim**, Centre for Environment and Development for the Arab Region and Europe (CEDARE); **Ahmed Abdulmuttaleb Baharoon**, Executive Director, AGEDI; **Asma Aba Hussein**, Arabian Gulf University, Bahrain; **Iyad Abumoghli**, UNEP-Regional Office for West Asia (UNEP-ROWA); **Taher Al Shakhashir**, Minister of Environment, Jordan; **Nadia Makram Ebeid**, Executive Director, CEDARE; **Mohammed Dawood Al-Ahmed**, Environment Public Authority, Kuwait; **Najib Saab**, Arab Forum for Environment and Development (AFED); and **Fathia Abdel Fadil**, UN Economic and Social Commission for Western Asia (UN ESCWA)



Panelists in the session on "Donors' Demand for Data" (L-R) **Barbara Ryan**, Secretariat Director, Group on Earth Observations (GEO); **Sylvia Lee,** Skoll Global Threats Fund; **Jackson Kimani**, Clinton Foundation; **Tom Cummings**, Tällberg Foundation and the Global Alliance for Banking on Values; and **Adel Farid Abdel-Kader**, Trend Green Knowledge

noted the challenge for environmental and sustainable finance is how to effectively link social and environmental criteria in donor evaluation of projects.

Adel Farid Abdel-Kader, Trend Green Knowledge Inc., pointed to the need for an information system that can track and compare progress and analyze financial needs for each of the SDGs, underscoring the importance of matching up the needs of donors and countries through improved communication. He underscored the importance of intelligent development spending, facilitated by analyzing data on spending patterns and outcomes.

Discussions covered, *inter alia*: conditions attached to loans; monitoring impacts of foreign aid; geographical distribution of funding; and the importance of not losing data.

BUILDING KNOWLEDGE FOR HEALTHY LIVES: Jacqueline McGlade, UNEP, moderated the session, beginning with examples of assessing health-related impacts through, for example, UNEP's Affordable Air Quality Monitoring System.

Hayat Sindi, i2 Institute for imagination and ingenuity, introduced an initiative called 'Diagnostic for All' that employs low-cost, portable and easy-to-use technology to bring scientific knowledge to communities and help them apply it to meet community needs. Sindi urged greater imagination and out-of-the-box thinking in harnessing science for benefits at the community level.

Maria Neira, World Health Organization (WHO), discussed the Global Platform on Air Quality and Health, which will provide open access to data, guidance on ground measurements and air pollution indicators. She described WHO's work in providing evidence-based guidelines, promoting the role of health impact assessments and developing health indicators.

Joni Seager, Bentley University, said gender-disaggregated data related to health and environment are often not collected at all, and, if they are collected, often remain undisclosed and/or focus only on the household level.

Parrys Raines, Climate Girl, cautioned that the traditional ways in which scientific data are communicated do not target nor speak to a younger audience. She noted that the Climate Girl website strives to provide a global platform for youth to share their own climate change stories and solutions.

Iman Nuwayhid, American University of Beirut, presented data on health and ecological sustainability in the Arab region, emphasizing that despite improvements in child and maternal mortality rates, the region continues to be plagued by a high burden of disease, population pressures, food and water insecurity, as well as war-related displacements. Given this context, Nuwayhid urged a greater role for environment and public health professionals in managing for uncertainty.

ENVIRONMENTAL DATA FOR BUSINESS PERFORMANCE: Opening the session, Leon Bennun, The Biodiversity Consultancy, highlighted the session as the only one with a business focus at the Summit.

Scott Williams, PricewaterhouseCoopers, described embedded challenges within the world's economic paradigm and highlighted opportunities for the private sector to include sustainability in their business models.

Bartholomew Judd, European Investment Bank (EIB), outlined how better environmental understanding, in part though EIAs, can enhance business performance by increasing access to finance and reducing regulatory and reputational risks.

Simon Wilson, Five Oceans Environmental Services, described data demand, data utilization and challenges in data management from the private consultancy perspective. He highlighted the role of: consumer demand; social media; best practices; contractual clauses around intellectual property and confidentiality; regulations; and financial institutions and funding agencies, in facilitating or inhibiting data consistency, availability and transparency.



Jacqueline McGlade, UNEP

Bennun presented on the role of biodiversity and natural capital accounting in businesses, and the current status of available global data. On data gaps, he called for: increased funding; regulatory approaches requiring companies to share data; and strategic assessments to join thinking and planning and reduce business data needs.

The ensuing discussion covered: limitations of social media; maintaining databases and paying for them; the narrative driving business engagement in sustainable development; supply chain visibility; and the role of consumer-driven demand.

CONNECTING NETWORKS TO SUPPORT ENVIRONMENTAL SUSTAINABILITY – WHAT GNON CAN DO FOR YOU!: Moderator Bruce McCormack,



Panelists in the session on "Environmental Data for Business Performance" (L-R) **Bartholomew Judd,** European Investment Bank (EIB); **Leon Bennun**, The Biodiversity Consultancy; **Simon Wilson**, Five Oceans Environmental Services; and **Scott Williams**, PwC

European Umbrella Organisation for Geographic Information, presented a brief history of GNON, noting it as one of three fundamental, cross-cutting SIs of Eye on Earth.

Representing users within the network, David Stanners, European Environment Agency (EEA); Sabah Nait, Environment Agency Austria; and Rodrigo Barriga-Vargas, Pan-American Institute for Geography and History (PAIGH), discussed environmental observation networks in different regions. Stanners pointed to the difficulty of bringing data together to produce indicators and reports, noting the need to enrich assessments to make data understandable.

Representing the technical side of the network, Rob Atkinson, Metalinkage, Gail Hodge, Information International Associates, and Steven Browdy, OMS Tech, presented issues related to understanding and comparing datasets, noting broad differences in terminology used across networks. Atkinson referred to "islands of data," underscoring the need to connect the dots with a monitoring architecture. Reiterating the need for a deeper understanding of data through semantics, Hodge pointed to resources such as data dictionaries as useful tools. Browdy highlighted the importance of standards, and suggested GNON's growth will be facilitated by its decentralized nature.

MOBILIZING DATA TO SUPPORT DECISION MAKING FOR SIDS: In a session organized by the Global Island Partnership (GLISPA), panelists explored a proposed Eye on Islands SI that could help mobilize data for policymaking in support of sustainable development and resilience in small island developing States (SIDS).

Aboud Jumbe, ISLANDS Project, discussed the need to enhance capacity to better use data in integrated planning and assessment through, *inter alia*, natural capital accounting and system dynamics modeling.

Floyd Homer, Independent Consultant, stressed focusing on the "human dimension, not only the technical side," to better understand data use and who benefits.

Asha Singh, Organisation of Eastern Caribbean States, argued for a transformative agenda supporting modalities for the capture and sharing of spatial data.

Aditya Agrawal, GLISPA, stressed the need for more accessible data, stating that islands are laboratories for innovation, especially with regard to solutions for resiliency.

Corinne Martin, UNEP-WCMC, outlined several tools including the Ocean Data View, which provides access to free geographic information system (GIS)-ready time series datasets and the Global Island Database, a high-resolution shapefile for over 450,000 islands.

ARAB CIVIL SOCIETY – AN EYE ON EARTH: This session was moderated by Mufleh Abbad, IUCN. Emad Adly, Arab Network for Environment and Development, discussed internal and external challenges for strengthening civil society in the Arab region, including institutional weaknesses, cultural constraints regarding the legitimacy of NGOs, and illiteracy.

Yomn El Hamaky, Egyptian Sustainable Development Forum, identified the lack of harmonization among national strategies in the region as a challenge facing Arab civil society.

Fatma Zerouati, Environmental Journalist, identified one cause of the problem of desertification in Algeria as a misalignment between national policies, existing land-use patterns, and traditional knowledge of shepherds.

Salvatore Nigro, Education for Employment, spoke of his organization's objective to identify employment opportunities and foster public-private partnerships in the Middle East and North Africa (MENA) region. He said data input is pivotal to these partnerships, linking government with civil society actors.

Ayman Rabi, Palestinian Hydrology Group, highlighted a collaborative multi-stakeholder toolkit for engaging communities in understanding social and environmental vulnerability, constructing scenarios for adaptation and implementing demonstration projects.

DATA FOR SUSTAINABLE DEVELOPMENT: Moderator Janet Ranganathan, WRI, opened the session. Marc Levy, Center for International Earth Science Information Network (CIESIN), compared differing approaches in defining the MDGs and SDGs, framing big data as an opportunity to be catalysts for broader social change.

Louis Liebenberg, CyberTracker Conservation, described the value of, and opportunity for, citizen science using CyberTracker Conservation projects as examples of facilitating data collection by illiterate local and indigenous communities.

Gary Lawrence, Former Vice President, AECOM Technology Corporation, spoke on the importance of understanding "where you are coming from and where you are going" when determining what data are required, highlighting the need to maintain relevance in the context of the communities involved.

Paul Van Gardingen, Ecosystem Services for Poverty Alleviation programme, highlighted data demand, new technologies and data-sharing platforms as opportunities for big data, noting challenges in facilitating data sharing and access, and calling for projects to plan for data sharing from the outset as well as investment in data and data management.

IT'S AN URBAN WORLD!: Fernando Echavarria, US Department of State, moderated this session. Rosario Giusti de Pérez, Environmental Systems Research Institute (ESRI) Venezuela, presented on squatter developments in Latin America, saying it is not just an urban world, "it's a poor urban world." She gave an overview of socially-based guidelines that respond to communities, citing: the need to maintain social domains; community fear of government expropriation; the benefits of focusing on small projects like drainage systems; and the importance of respecting aesthetic views of communities.

Reacting to the presentation, panelists commented on barriers related to land titling and citizens' willingness to use services, and underscored the importance of acknowledging informal settlements and that residents are often attached to their location. Others reported that informal communities score highly on social sustainability and understand where, for instance, their water comes from, whereas formal communities score low in these areas. Panelists then reviewed several funded and unfunded projects associated with the Eye on Community Sustainability & Resiliency SI.

INNOVATIONS IN DATA SUPPLY – BIG DATA AND HOW TO MANAGE IT: Moderator Robert Chen, Columbia University, opened the session on tools for using and managing big data. Stuart Minchin, Division of Environmental Geoscience, Australia, presented the 'Data Cube,' an open source, open data tool, calibrating Australian geospatial data archives into an intelligent analytical engine.

Ilya Zaslavsky, University of California, San Diego, presented 'EarthCube,' a cyber infrastructure for uniting geosciences by increasing data accessibility, citing projects that aggregate and interpret metadata from different sources.

Mark Reichardt, Open Geospatial Consortium, pointed to the growing recognition of the importance of geospatial big data, discussing initiatives and solutions of his organization, including best practices for the use of grids.

Brian Sullivan, Google, presented tools from Google Earth Outreach, including deforestation and air quality maps, designed to leverage Google's tools to make a positive difference by mapping and making data accessible to all.

Stefano Nativi, National Research Council, Italy, discussed GEOSS, presenting the GEO Discovery and Access Broker, a scalable, cloud-computing interface.

DECISION MAKING IN WATER SECURITY – COMMUNITY STRATEGY FOR SUCCESS: This session, moderated by Mark Sorensen, The Geographic Planning Collaborative Group, presented a variety of experiences in utilizing data for improving decision making to overcome water security challenges. Panelists highlighted ongoing initiatives in water-related knowledge management: the identification of links between the state of water resources, water demand, management costs, climatic data and broader geopolitical analysis; the energy-water security nexus in the Arab region; space technologies for water security; participatory citizen-science mapping; and the role of automated data sampling to produce models that guide water-related policies.

In the ensuing discussion, panelists and participants emphasized: the reluctance of many organizations to share their data freely and the need to set conditions for doing so; mechanisms for developing water data standards for dissemination across political jurisdictions; and basing actionable projects on best practices.

OCEANS AND BLUE CARBON – THE ROLE OF MAPPING AND JOINT FACT-FINDING IN EFFICIENTLY CREATING COMMUNITY: Moderated by Jane Glavan, AGEDI, and Carl Nettleton, OpenOceans Global, this session was organized as a discussion between panelists and the audience.

Christian Neumann, GRID-Arendal, described participatory stakeholder engagement in their Blue Carbon Ecosystem mapping tool.

Maria Arreola, Fondo Mexicano para la Conservación de la Naturaleza, discussed engaging young practitioners through the Mesoamerican Reef Leadership Programme to build leadership skills and implement high impact conservation projects.

David Loubser, Secretariat of the Pacific Regional Environment Programme (SPREP), emphasized the need for data standards and strong coordination, providing examples from natural disaster response experiences.

Karl Donert, European Association of Geographers (EUROGEO), highlighted the importance of networking and putting geoscience research in the hands of policymakers.

During the discussion, participants were asked to identify the core problems affecting data collection by communities. Together they noted the "lack of a facilitator organization to identify the needs of the oceans community, put pieces together, and share information to achieve impact beyond project lifespans."

UNDERSTANDING THE COSTS OF KNOWLEDGE – COST OF DATA GENERATION AND MAINTENANCE: Emphasizing that generating knowledge for sustainable development is not free, moderator Thomas Brooks, IUCN, introduced speakers from IUCN, BirdLife International and UNEP, who described the structure and processes behind four knowledge products: IUCN Red List of Threatened Species; Protected Planet; Red List of Ecosystems; and Key Biodiversity Areas. The speakers pointed to costs associated with, *inter alia*, website and database products, staff time, supporting volunteerism, conducting re-assessments, regular updates, maintenance and harmonization of datasets and creating tools for impact.



Panelists in the session on 'Data for Sustainable Development' (L-R) **Paul Van Gardingen**, Ecosystem Services for Poverty Alleviation Programme; Moderator **Janet Ranganathan**, WRI; **Marc Levy**, Center for International Earth Science Information Network (CIESIN); **Louis Liebenberg**, CyberTracker Conservation; and **Gary Lawrence**, Former Vice President, AECOM Technology Corporation



Panelists during the presentation from **Barbara Ryan** (on screen), Secretariat Director, GEO (L-R) **Philemon Mjwara**, Director General, Department of Science and Technology, South Africa; **Mary Glackin**, The Weather Company; **Muki Haklay**, University College London; **Christopher Tucker,** MapStory Foundation; and **Mae Jemison**, 100 Year Starship

Diego Juffe-Bignoli, UNEP-WCMC, presented the results of analytical work on investments in these four knowledge products to date (US$116-204 million), annual maintenance costs for their structures and processes, and estimates for producing comprehensive baselines by 2020 (approximately US$100 million). He noted that some costs are not included and concluded that generating biodiversity and conservation information through knowledge products is affordable and cost-effective, cautioning that questions remain on what the impact of these investments are and how to avoid duplication of efforts.

DATA INTEGRATION FOR EFFECTIVE MONITORING OF THE SDGS: Marc Levy, CIESIN, moderated this session.

Barbara Ryan, Secretariat Director, GEO, outlined three categories of challenges for data integration: technological – how to integrate disparate datasets and domains; policy – the lag between policies and technological advances; and governance – adapting institutions to technological changes.

Robbie Schingler, Planet Labs, described the work of Planet Labs and spoke on opportunities for geospatial data to contribute to monitoring and achieving the SDGs.

Jacqueline McGlade, UNEP, provided examples of how UNEPLive draws on data to track different environmental domains, stating that official statistics can be complemented by other data sources including citizen science, to capture more comprehensive statistics in an SDG ontology interface.

Chukwudozie Ezigbalike, UN Economic Commission for Africa (UNECA), highlighted the potential of "citizens as data collectors" and "data collection as a lifestyle" to contribute to national statistics and monitoring of the SDGs.

Frédéric Launay, EAD, called for working across government agencies and scales to better determine data needs and availability, underscoring the need to examine acceptable risk versus added value in data policies and practices.

EVERYONE IS A SUPPLIER – CROWDSOURCING, CITIZEN SCIENCE AND INDIGENOUS KNOWLEDGE: Moderated by Craig Hanson, WRI, the session showcased innovative approaches to crowdsourcing. Hanson offered the example of the Forest Watch mobile app used by rangers to detect and report forest clearing.

Brian Sullivan, Google, showed how Global Fishing Watch's big data technology platform facilitates transparent monitoring of global fishing fleets and has been used by Kiribati to enforce no-take zones in the Phoenix Islands UN Educational, Scientific and Cultural Organization (UNESCO) World Heritage site.

Tuntiak Katan, Shuar Territory, Ecuador, shared experience in leveraging data to conduct ecosystem services valuation, forest carbon measurement, and forest restoration and management in a transboundary watershed.

Nick Wright, Crowdicity, described working with Rio de Janeiro, Brazil, and Montreal, Canada, to embed citizen crowdsourcing into the heart of municipal policy creation, strengthening relationships between governments and citizens.

Andrew Hill, CartoDB, discussed finding the next approach to engage engineers and data developers in building strong communities around science in creative and visual ways.

SUSTAINING COMMUNITIES IN UPHEAVAL – DATA NEEDS TO SUPPORT REFUGEES AND VULNERABLE POPULATIONS: Douglas Richardson, Association of American Geographers (AAG), moderating the session, began by introducing three disaster risk reduction (DRR) initiatives at the international, regional and local levels, which utilize spatial data infrastructure.

Ziad Ayad, UN Refugee Agency (UNHCR), identified the critical need for using spatial data effectively to support the largest refugee crisis the world has ever witnessed, noting, *inter alia*, how data aid in monitoring displacement patterns, predicts population movements, and tracks and analyzes conflict situations.

Ivan DeLoatch, US Federal Geographic Data Committee, discussed his organization's 'Place-Based Understanding' initiative as an integration of social, economic, environmental



Panelists in the session on 'Data Integration for Effective Monitoring of the SDGs'

and crowdsourced data into a visual lens to support decision making during all phases of crisis, ranging from early-warning to decision support and monitoring.

Daranee Petsod, Grantmakers Concerned with Immigrants and Refugees, highlighted that Eye on Earth 2015 participants could support philanthropic responses to refugee crises by providing integrated data, which helps foundations understand the impact of their donations.

Lorant Czaran, UN Office for Outer Space Affairs (UNOOSA), emphasized the urgent need for high resolution image data for disaster response, but noted that such data are invariably costly and that coordinated access and shared licensing of commercial high resolution satellite data remains a challenge.

SPECIAL INITIATIVES' CONTRIBUTION TO ENABLING CONDITIONS: Moderator Lalanath de Silva, WRI, described how each panelist would speak on ways the three foundational Eye on Earth SIs, Eye on Environmental Education, GNON and Eye on Access for All could address two theoretical scenarios: a dam construction project involving tensions with indigenous communities; and a watershed development project with upland villages affecting downstream villages' water quality.

Fares Howari, Zayed University, underscored the importance of stakeholder access to information, stakeholder involvement, and transparency and accuracy within the process.

Representing the GNON perspective, Jordan Hastings, University of Southern California, said GNON's purpose is to organize and provide information to communities before problems arise, better equipping them with knowledge and tools to handle environmental management challenges.

Focusing on Eye on Access for All, Ana Barreira, Instituto Internacional de Derecho y Medio Ambiente, stressed the role of community and stakeholder consultation and engagement, noting that defining legal frameworks and clear rules of the game is an important part of this process.

GLOBAL FRAMEWORKS (SENDAI FRAMEWORK FOR DRR, SDGS, UNFCCC) – OPPORTUNITIES FOR EYE ON EARTH?: Moderator Costis Toregas, The George Washington University, opened the session. Keynote Speaker Julio Serje, UN Office for DRR (UNISDR), underscored the importance of widening the scope of global frameworks to recognize the interconnected nature of the world in which different systems can influence each other positively or negatively.

He highlighted the importance of governance at all levels to mainstream risk knowledge into cross-cutting policies, and pointed to progress made in standards for loss indicators. He referred to the SDGs as highly ambitious, noting huge data requirements for collecting, assessing and homogenizing data to fulfill the Goals.

During discussions, panelists pointed to: the parallel and complementary nature of the frameworks; the need to look for new sources of data; mechanisms to foster cooperation between different entities; and the need to support projects such as the Eye on Earth Strengthening Information Infrastructure for Emergency Management, to link data suppliers with data users to improve emergency management.

POLICIES, PARTNERSHIPS AND OPEN DATA FOR SUSTAINABLE DEVELOPMENT: Moderator William Sonntag, US Environmental Protection Agency, opened the session by providing examples of open data initiatives and the policies and benefits they offer.

Simon Hodson, the Committee on Data for Science and Technology (CODATA), described CODATA's three strategic areas: data policies; data science; and research data capacity building. He illustrated with an example of training and capacity building in Kenya, and proposed a big data and open data "research ecosystem" made up of six parts.

Paul Uhlir, National Academy of Sciences, spoke on both restrictions and opportunities for open data, stressing three potential benefits: economic, in public and private sectors; educational, within the classroom and at home; and governance, for increased transparency and capacity building.

Chuang Liu, Chinese Academy of Sciences, talked about how to reduce the digital divide, highlighting the particular importance of data in developing countries. She also discussed data-sharing principles and the value added of data sharing.

Leida Rijnhout, European Environmental Bureau (EEB), presented the Environmental Justice Atlas, an online map interface identifying and providing information about environmental conflicts around the world. She outlined the importance of policies and legal frameworks to reduce conflicts and stated the potential to expand and further draw from the Atlas.

Chukwudozie Ezigbalike, UNECA, touched on initiatives for open data in Africa and challenges around open data accessibility. He highlighted enabling factors, including facilitating cross-government buy-in and reviewing national data policies, and stated that official data should belong to the people and be open to all.

EDUCATION FOR SUSTAINING THE PLANET: This session, moderated by Viktor Lagutov, Central European University, focused on the Eye on Environmental Education SI's objective of training and cooperation to better use data for decision making. Mahesh Pradhan, UNEP, described the Global Universities Partnership on Environment and Sustainability, which is based on three main pillars: the provision of Massive Open Online Courses (MOOCs) on sustainability issues and toolkits for greening campuses; training for decision makers; and networking to expand education for sustainability across regions.

Emily Nilson, Central European University, described the In-Service Information and Communication Technology Training for Environmental Professionals (ISEPEI) initiative whose aim is to bridge the gap between environmental practitioners and data developers by shaping management strategies based on informed, data-driven decisions. Nilson highlighted training and capacity building for water security applications that ISEPEI has conducted with government ministers, academics and environmental professionals, through the use of technologies such as remote sensing and GIS.

During the panel discussion, Gayatri Raghwa, EAD, emphasized that while data are an "enabler," students must generate data themselves, citing EAD's Sustainable Schools Initiative in which students conducted green school audits in the UAE. Ashoka Finley, Ecocity Builders, emphasized that one-off workshops must galvanize citizens to make actual changes in their communities. Ed Parsons, Google, urged training on specific tasks for specific needs, particularly for citizens to use devices, create their own data and build their own solutions. Marcos Silva, CITES, urged participants to bridge information technology with traditional learning-by-doing through human interaction. Brian Waswala, UNEP, underscored the need for developing training material on environmental data development, especially for developing countries.

In the ensuing discussion, participants discussed, *inter alia*, the use of data for a paradigm shift in human development rather than repeating unsustainable practices, and the need to use data to not only tell a "human story" to the public, but also to instill agency for behavioral change.

PRINCIPLE 10 OF THE RIO DECLARATION – FOR BETTER ENVIRONMENTAL GOVERNANCE AND ACCESS FOR ALL IN DIFFERENT REGIONS: This session, moderated by Alexander Juras, UNEP, began with a video explaining that Principle 10 affirms citizens' right to access to information, participation and justice in environmental matters.

Carlos de Miguel, UN Economic Commission for Latin America and the Caribbean (ECLAC), called Principle 10 a "prerequisite" to achieving all the SDGs and described an ongoing process, open to all Latin American and Caribbean countries, to establish a regional agreement in support of the Principle. He described the Public Regional Mechanism created to enhance public participation in the design of the agreement.

Danielle Andrade, The Access Initiative (TAI) Jamaica, and Andrea Sanhueza, TAI Chile, demonstrated how public access to information and justice can result in better health and environment outcomes, using examples from a government-managed sewage plant in Jamaica and water polluted with arsenic in Ecuador.

Tsvetelina Filipova, Regional Environmental Center for Central and Eastern Europe, discussed cooperative efforts to build bridges across regions by sharing the European experience of negotiating and implementing the Aarhus Convention. She said the process, while not perfect, is informative and that sharing this experience empowers stakeholders to engage in negotiation processes in other regions.

Jeremy Wates, EEB, called Principle 10 a "fundamental part" of the Eye on Earth concept that should not be treated as a side issue. He described EEB's efforts to promote Principle 10 in the MENA region, by, *inter alia*, raising awareness, assessing legislative and institutional frameworks, and encouraging involvement of governments and civil society.

Stephen Stec, Central European University, presented the Bali Guidelines, which he said were adopted by the UNEP Governing Council in 2010 to help governments fill gaps in national legislation related to Principle 10. He highlighted the launch of an implementation guide for the Guidelines.

The ensuing discussion considered: the right of citizens to produce data; the need for a champion government to drive regional processes; the affordability of accessing justice; and the complexity of working through UN agencies, NGOs and across countries and languages.

REGIONAL INNOVATIVE APPROACHES FOR CROSS-REGIONAL COOPERATION IN DATA SHARING: Moderated by David Stanners, EEA, this session explored: how information networks are cooperating both in and between regions; successful approaches used; and the reasons behind successes. During a group discussion, participants proposed the establishment of an SI within GNON to be a platform for interregional cooperation. Participants questioned whether CEDARE would be interested in being the Eye on Earth host for this proposed SI.

Stanners focused on the issue of enabling conditions, noting that the EEA was established by a European Economic Community Council regulation, and therefore has a strong legal voice in feeding national data into decision making at the European level.



Panelists in the session on 'Policies, Partnerships and Open Data for Sustainable Development' (L-R) Moderator **William Sonntag**, US Environmental Protection Agency (EPA); **Simon Hodson**, Committee on Data for Science and Technology (CODATA); **Paul Uhlir**, National Academy of Sciences (NAS); **Chuang Liu**, Chinese Academy of Sciences; **Leida Rijnhout**, European Environmental Bureau (EEB); and **Chukwudozie Ezigbalike**, UNECA

Ahmed Abdelrehim, CEDARE, illustrated how the Arab Region Environmental Information Network harmonizes efforts among 22 Arab countries to develop environmental, social and economic indicators that feed into integrated environmental assessments in the region.

Frank Turyatunga, UNEP, stressed the need to: bridge the science-policy interface; encourage triangular cooperation, not only South-South cooperation; and identify a formal and inclusive platform to support cross-regional cooperation. He explained how the Africa Environment Information Network collaborates with national focal points to produce state of the environment reporting.

Rodrigo Barriga-Vargas, PAIGH, provided an overview of collaboration on developing an integrated map of the Americas. He discussed efforts to consolidate regional activities through the development of the Spatial Data Infrastructure for the Americas.

Sabah Nait, Environment Agency Austria, presented the experience of the Shared Environment Information System, including mapping of national data as input to the Horizon 2020 Mediterranean Report and six country-level assessments.

Peter King, Asian Environmental Compliance and Enforcement Network, provided examples of bilateral technical exchanges, or "twinning partnerships," that are cost-effective and generate tangible results such as improved laws and policies supported by task forces and replication tools.

Costis Toregas, The George Washington University, proposed that regional networks could play a role in standardizing reporting under growing international reporting requirements.

ENSURING THE CAPABILITIES EXIST: Moderator Andiswa Mlisa, GEO, opened the session.

Mae Jemison, 100 Year Starship, discussed the importance of transdisciplinary education at all levels to enable capabilities for Earth observations into the future, noting that people need to be literate in and excited about science, recognizing the future and success of their descendants as inextricably linked to the health of the Earth.

Luiz Machado, National Institute of Space Research, Brazil, presented on cooperation between users and data providers, noting that success is greater when users are part of the decision making processes, and suggesting cooperation in which users have responsibilities within the process and acquire capabilities to further develop technologies themselves. He suggested capacity building activities such as investing in scholarships for university students.

Jurry de la Mar, T-Systems, pointed to advances that are changing the world's technological capabilities, noting the need to address how these changes will be managed. Highlighting the importance of public-private partnerships to big data infrastructure, he underscored the role of competition in speeding up innovation, also stressing the value of education and the usefulness of pay per use solutions to enable new businesses to survive.

Wilbur Ottichilo, Kenya National Assembly, stressed the importance of engaging continuously with policymakers so that Earth observations can be mainstreamed into development agendas, pointing to the implementation of sustainable development within Kenya's first national constitution, released in 2010. Stating that Kenya may be one of the few countries in the world to have climate change legislation in place before the 21st session of the Conference of the Parties (COP 21) to the UNFCCC scheduled to convene in Paris, France, he emphasized the need for more policymaking champions.

Participants then discussed: dynamics within public-private partnerships; the difficulty in making Earth observations accessible to non-specialists; and encouragement and support of participation from groups including youth, women and non-scientists.

PLENARY SESSIONS

In addition to the opening ceremony and welcoming plenary on Tuesday, delegates convened in two plenaries on Wednesday and two plenaries on Thursday, followed by a closing ceremony.

DATA REVOLUTION-DATA SUPPLY SIDE: On Wednesday morning, Nima Abu-Wardeh, Broadcast Journalist, opened the Summit's second day, introducing moderator Barbara Ryan, GEO. Ryan set the scene for the panel, exemplifying Landsat's free and open data policies as successful in creating public goods and generating economic benefits.

Philemon Mjwara, Department of Science and Technology, South Africa, focused on open data policies and iterative Earth observation data exchange, providing examples from GEO, GEOSS and AfriGEOSS. On challenges, he noted that Africa and the Gulf region are not well represented in GEO.

Christopher Tucker, MapStory Foundation, explored how his organization's open, not-for-profit platform allows the public to drag and drop data to communally produce spatio-temporal analyses, providing an opportunity to enable a new generation of policymaking.



Panelists in the session on 'Ensuring the Capabilities Exist' (L-R) **Andiswa Mlisa**, GEO; Mae Jemison, 100 Year Starship; **Luiz Machado**, National Institute of Space Research, Brazil; **Jurry de la Mar**, T Systems; **Wilbur Ottichilo**, Kenya National Assembly

Mary Glackin, The Weather Company, presented on using big data to make people safer and businesses smarter, highlighting the growing diversity of actors involved in weather data collection.

Muki Haklay, University College London, described opportunities for facilitating participatory "extreme" citizen science, calling for its expansion beyond data collection and into all scientific processes.

Mae Jemison, 100 Year Starship, spoke of a visionary challenge to illustrate the "extraordinary" by using compelling data to deliver new perspectives to known challenges.

REACHING AUDIENCES THROUGH INNOVATIONS IN VISUALIZATION: On Wednesday afternoon, Craig Hanson, WRI, opened this session, stating it would show "what gets visualized, gets used." Janet Ranganathan, WRI, presented a sneak preview of Resource Watch, a prototype open data platform for advancing sustainable development, aiming to fill the gap between data supply and data use by providing a single, accessible platform bridging different resource issues.

Craig Mills, Vizzuality, underscored the need for a "presentation revolution" to enable the data revolution to be of real use. He pointed to the importance of design and emotional considerations when developing data interfaces.

Angela Lungati, Ushahidi, stressed the need to engage with usually passive observers, explaining that Ushahidi, meaning "testimony" in Swahili, had been designed as an enabling platform that allows ordinary citizens and marginalized people to make their voices heard.

Trista Patterson, GRID-Arendal, presented a video, inviting the audience to visualize the images as data, pointing to the importance of establishing feedback loops to connect the self with data, data with the audience, and audience back to the self.

CREATING THE ENABLING ENVIRONMENT: On Thursday morning, moderator Nima Abu-Wardeh, opened the session, which began with a presentation by Jim Toomey, Syndicated Cartoonist, 'Sherman's Lagoon,' who explained how he strikes a balance between entertainment and environmental messaging, urging participants to be "content creators."

Keynote speaker Inger Andersen, Director General, IUCN, introduced the panelists and began by emphasizing that the enabling conditions for using data to achieve sustainability do not yet exist. She highlighted four themes for improving enabling conditions: increased financing for the production of knowledge; greater clarity on the conditions and incentives for open-access data; the role of integrated technology; and capacity building to support and inspire conservation practitioners and youth.

Enrico Giovannini, Rome University, stated that creating enabling conditions requires more than technical, financial and statistical aspects, but a transformation of societies, suggesting that laws and business monitoring systems should integrate sustainable development considerations. Stating his dissatisfaction with the speed of the UN system, he emphasized that we must not wait until 2019-2020 to produce baselines and indicators, suggesting the creation of an "SDGs data lab" to speed things up.

Carmelle Terborgh, ESRI, advocated the role of GIS in implementing the SDGs. Terborgh proposed four enabling conditions to maximize the impact of data: building capacity; providing both an open data policy and a web destination to facilitate access to data; using maps as tools for creating compelling communication; and developing mobile apps as a means of democratizing data.

Patricia Zurita, BirdLife International, described her organization's structure and work, noting that enabling conditions include: adequate finance, suggesting drawing on private sector finance by developing and selling biodiversity tools; continuous development and strengthening of local capacity; maintenance of "rock solid" science; and translation of information into "swallowable pills" to better inform policymakers and decision makers.

CUTTING-EDGE EYE ON EARTH: Remote sensing and location enabling applications: On Thursday afternoon, Taner Kodanaz, DigitalGlobe, explained the benefits that high-resolution imagery from geospatial satellites is bringing to people around the world, such as: helping to coordinate rescue responses following natural disasters; contributing to disease prevention measures; and documenting hidden crimes, such as modern slavery. He noted a success story in which satellite images of illegal fishing trawlers led to the release of people held in slavery for 18 years.

Anil Kumar, EAD, provided an overview of habitat mapping in the UAE using high-resolution imagery that has been used to measure progress on national and international targets, for conducting emergency responses, and for assessing impacts of infrastructure development. He described how data from wildlife tracking are fed into land-use decisions and environmental permitting and outlined plans to make data publicly available through a portal.

In response to the realization that biodiversity conservation is often a race to monitor vulnerable species amidst rapid land-use change, Lian Pin Koh, Conservation Drones, described how low-cost drone technology offers huge potential for monitoring vulnerable species, landscape patterns, enforcement of protected areas and rapid mapping for disaster relief. He emphasized that drones are just a "means to an end" for translating findings into actionable information for policymakers to protect species and rehabilitate ecosystems.

Justin Saunders, emapsite.com, drew on a World Bank project in Malawi as an example of using satellite imagery and a mapping portal to address an extreme flooding event. He



Inger Andersen, Director General, IUCN



Panelists during plenary (L-R) Moderator **Craig Hanson**, WRI; **Janet Ranganathan**, WRI; **Craig Mills**, Vizzuality; **Angela Lungati**, Ushahidi; and Trista Patterson, GRID-Arendal

demonstrated how accessing imagery within a day of the event, sharing this information with relief organizations through an open mapping portal, masdap.mw, and collecting crowdsourced spatial information facilitated rapid response.

Steven Ramage, what3words, presented his company's innovative global mapping system that translates coordinates into three-word location references to geographically locate spaces on land and sea without the need of an internet connection. He underscored useful applications of the system, including delivering medication to residents of rural areas without fixed addresses, uncovering landmines, delivering mosquito nets, and mapping tents within refugee camps.

Feet in the Field: Moderator Stuart Paterson, Conservation Leadership Programme (CLP), introduced a panel to discuss how conservationists can be encouraged to collect primary data in the field, highlighting the training and networking initiatives offered by the CLP to support professional development for conservation action.

David Kuria, Kijabe Environment Volunteers (KENVO), described his organization as a community-based trust in the Southern Aberdares of Kenya, engaged in ecological research, environmental education, eco-agriculture innovations and community empowerment. Kuria highlighted that collected data have been used to improve site management, noting that stakeholder ownership of solutions and collaborative networks with international partners are key to overcoming challenges such as high turnover of staff and limited technical capacity.

Alberto Campos, Aquasis, presented on his organization's mission to prevent the extinction of keystone species, noting the need for long-term funding, conservation fieldwork training and institutional strengthening. He spoke on the success of Aquasis' conservation plan, which was adopted as a national action plan in Brazil.

Ayesha Yousef Al Blooshi, EAD, spoke on EAD's marine biodiversity conservation efforts, describing how primary data collected are used by governments and other organizations. Drawing on examples of their work on mangroves, coral reefs, dugongs, dolphins and turtles, she demonstrated their use of technology to improve data collection and monitoring of marine ecosystems.

Nicolas Heard, Mohamed bin Zayed Species Conservation Fund (MBZ), provided a donor's perspective, expressing support for conservationists making a difference in the field, especially in developing countries, with the Fund's small grants. He urged combining passion and enthusiasm with science and efficiency to achieve conservation outcomes.

Jacky Judas, MBZ, presented on the first citizen-science water research and learning programme in the UAE. He explained that the project, carried out in the Wadi Wurayah National Park, uses volunteers and aims to contribute to education, public awareness and scientific data production.

Jean-Christophe Vié, IUCN, said the success of tracking the 70,000 IUCN Red List species could be attributed to many people on the ground. Giving examples of conservation initiatives and programmes, including the Save Our Species (SOS) partnership, he highlighted: using species data to identify priorities; drawing on technology innovations in species monitoring; and the importance of monitoring to understand progress and impact.

CLOSING CEREMONY

REPORTING ON THE SUMMIT OUTCOMES: On Thursday afternoon, Nima Abu-Wardeh, Broadcast Journalist, moderated a panel discussion with Razan Khalifa Al Mubarak, Secretary-General, EAD; Jacqueline McGlade, UNEP; Barbara Ryan, Secretariat Director, GEO; Janet Ranganathan, WRI; and Thomas Brooks, IUCN.

On how to turn words from the Summit into action, panelists highlighted social media, open data programmes, encouraging governments not to be scared of technological tools, and citizen engagement to influence government priorities.

On what to change or improve, panelists pointed to ranking more countries in the Environmental Democracy Index and gathering more data points, improving institutions' ability to give meaning to observations collected, aligning collaborative work with a vision and strategy, synchronizing the work of scientists and policymakers, and mapping the infrastructures of the panelists' respective organizations.

On follow-up activities and promises for action, panelists pledged to connect with contacts made at the Summit, contribute their experience in building and maintaining networks, support the uptake of the IUCN Red Lists, Key Biodiversity Areas and Protected Planet into the activities of Eye on Earth, and advocate for the critical role of organizations like the SOS, CLP and MBZ.

Opening the floor, Abu-Wardeh asked participants what actions they will take as a result of the Summit. Nadia Makram Ebeid, CEDARE, Pat Cummens, ESRI, and John Wertman, AAG, expressed their interest in intensifying collaboration with the Eye on Earth Alliance.

EYE ON EARTH SUMMIT OUTCOME DOCUMENT: During the panel on the summit outcomes, panelists referenced the main points of the Eye on Earth Summit Outcome

Document, which Abu-Wardeh announced would be available online shortly after the Summit. The document recognizes that reporting on the SDGs requires: a diverse range of data; engagement with a wide array of stakeholders to manage data, including governments and non-governmental groups; and capacity building and technological support.

The outcome notes that citizen science was a major focus area within the Summit agenda, and suggests the need to include citizen-science data in reporting on the SDGs. Stating that a global coalition of citizen- science groups will be established, the document reports that the Eye on Earth Alliance offers citizen- science groups a convening space at the Summit and other events.

The Outcome Document presents action-oriented statements supporting informed decision making for sustainable development on: data needs of policymakers; capacity building for the SDGs; the data revolution; technology support; interregional; knowledge sharing; Arab region data needs; SIDS data issues; polar and cold regions; building knowledge for healthy lives; and the Principle 10 Action Plan.

It also recognizes at least 20 proposals for Special Interest Groups (SIGs), including: regional SIGs; SIGs under the existing SIs; and thematic SIGs.

Finally, the Outcome Document announces that the Alliance will formalize the Eye on Earth Governance Framework and institutional arrangements by the end of 2015 and that the Alliance's five existing members (AGEDI, GEO, IUCN, UNEP and WRI) will enlarge the Alliance strategically by inviting other organizations to join the Alliance, noting that they have already received five expressions of interest.

CLOSING REMARKS: In her closing remarks, Razan Khalifa Al Mubarak recognized a strong commitment to collaboration between diverse organizations and stakeholders around the world in providing social, economic and environmental information combined with citizen engagement for sustainable knowledge generation in achieving the SDGs. She acknowledged the five members who have formalized the Eye on Earth Alliance (UNEP, AGEDI, GEO, WRI and IUCN) and welcomed new organizations, which seek to contribute their expertise, resources and perspectives to the shared vision and collective purpose of the Eye on Earth community. She thanked delegates for "believing in the movement," continually engaging and sharing information, noting the value of convening and collaborating.



Razan Khalifa Al Mubarak, Secretary-General, EAD, delivering closing remarks

Abu-Wardeh closed the meeting at 5:35 pm.



L-R: **Nima Abu Wardeh**, Broadcast Journalist, moderated a panel discussion with **Razan Khalifa Al Mubarak**, Secretary-General, EAD; **Jacqueline McGlade**, UNEP; **Barbara Ryan**, Secretariat Director, GEO; **Janet Ranganathan**, WRI; and **Thomas Brooks**, IUCN

GLOSSARY

AAG	Association of American Geographers
AFED	Arab Forum for Environment and Development
AGEDI	Abu Dhabi Global Environmental Data Initiative
CEDARE	Centre for Environment and Development for the Arab Region and Europe
CIESIN	Center for International Earth Science Information Network
CLP	Conservation Leadership Programme
EAD	Environment Agency - Abu Dhabi
ESRI	Environmental Systems Research Institute
EUROGEO	European Association of Geographers
GEO	Group on Earth Observations
GEOSS	Global Earth Observation System of Systems
GIS	Geographic Information Systems
GNON	Eye on Global Network of Networks
MBZ	Mohamed bin Zayed Species Conservation Fund
MDGs	Millennium Development Goals
MENA	Middle East and North Africa
PAIGH	Pan-American Institute of Geography and History
SDGs	Sustainable Development Goals
SI	Special Initiatives
SIDS	small island developing States
SOS	Save Our Species
UNCSD	UN Conference for Sustainable Development
UNECA	UN Economic Commission for Africa
UNEP-WCMC	UNEP-World Conservation Monitoring Centre
UNFCCC	UN Framework Convention on Climate Change
UNGA	UN General Assembly
WRI	World Resources Institute