Working Group on Big Data and Digital Ecosystems for the Planet | UN Science-Policy-Business Forum on the Environment

Key Proceedings and Outcomes

National Convention Centre, Canberra
6 – 8 November 2019

Working Group on Big Data and Digital Ecosystems for the Planet, UN Science-Policy-Business Forum on the Environment

Canberra, Australia, 6 - 8 November 2019

Key proceedings and outcomes

Contents

Executive summary

The United Nations Science-Policy-Business Forum on the Environment (UN-SPBF or The Forum) promotes initiatives to grow green technology markets that are driven by advances in science and technology, empowering policies and innovative financing.

With a platform of over 2000 collaborating institutions — representing the worlds of business, science and policy — The Forum provides a unique platform for multi-stakeholders to work together to shape the future, with the private sector given a unique place on the table as a key partner and driver of sustainable development.

The planet is not currently on a sustainable path. In order to change the current trajectory requires transparency, inclusion and accountability. A shift in the global political economy of environmental data is needed to harness the efforts of public and private sectors to jointly generate high quality data and insights as a global public good while avoiding technology and data monopolies. The global economy is changing and we will not be able to achieve the environmental Sustainable Development Goals (SDGs) or environmental sustainability without utilizing frontier technologies and integrated data. Social media networks are shaping consumer preferences and political outcomes across the globe.

There is still an opportunity to change the current trajectory if we use data and information: to build awareness of the state of our planet, to influence consumer behaviour, to inform markets and to reform governance systems. A global digital ecosystem for the environment has the potential to put us on a path toward a sustainable future. Citizens must be engaged in using and collecting data. Countries must create a culture of data use, innovation and data governance for national data ecosystems. A private sector contribution related the sharing of data, algorithms and expertise is key. The UN can play a role to incubate and develop a global digital ecosystem which is built upon innovative partnerships across stakeholders.

In November 2019, over 140 top business, UN, Civil Society Organizations, academics and government representatives attended a three-day Working Group on Big Data and Digital Ecosystems for the Planet held at the National Convention Centre in Canberra, Australia. Through presentations, panel discussions and participatory dialogue a number of topics were explored including; addressing data gaps for the SDGs, open source digital platforms, data ethics and governance, disruptive technologies and innovative finance and business models for Big Data.

From the private sector, senior representatives from organizations such as Google, IBM, Amazon, Accenture, ESRI, Huawei and The Economist, along with innovative start-ups, all provided valuable insight into market-led developments in Big Data and Digital Ecosystems for the planet. Additionally, experts from NASA, GEO, European Space Agency, European Commission, IUCN, UN and Citizen Science Global Partnership provided scientific and political guidance on the topics discussed.

Outline of key outcomes

Roadmap 2020/2021

Introduction
The Working Group on Big Data and Digital Ecosystems was established in Paris October 2018 with the purpose to strengthen and align global efforts to develop an integrated, UN-hosted, open source digital platform to manage and share authentic and valid environmental data for decision making to set society

on a pathway to achieving SDGs and internationally agreed targets. The approach and key objectives set were to:

- harness the ongoing data and technology revolution;
- ensure the authenticity and validity of data to support sustainable development;
- address data gaps;
- boost multi-sector and cross agency cooperation;
- transform capacities to address challenges and accelerate progress towards sustainable development;
- create a global partnership for big data and digital platform for the planet;
- define the scope and type of big data and technologies required to achieve the global goals and environmental targets;
- catalyze financing and innovative business models;
- catalyze the deployment of technologies required to achieve agreed goals;
- empower citizen science; and
- take bold, urgent , sustained, inclusive and transformative, integrated action.

The working group issued a first discussion paper in March 2019 in the margins of the 4th UN Environmental Assembly called "A Digital Ecosystem for the Environment: Bringing together data, algorithms and insights for sustainable development."

The Working Group meeting in Canberra October 2019, held in parallel with the Group on Earth Observation (GEO) Week, reviewed progress against these objectives, and highlighted the following critical actions that were required in the lead to Paris/Oslo 2020.

World Environment Situation Room
The Working Group:

- confirmed its full support for the work of the UN to set up the World Environment Situation Room, aimed at providing a prototype for a geospatial on-line platform for monitoring the status of the world environment, and recognised the unique and trusted role that the UN would play in reporting on and drawing information from all global environmental data sources;
- recognised the urgency that existed to complete this work and the enthusiasm of Working Group members to support the UN, by building a partnership of the willing, to share skills and expertise and ensure that lessons learnt from the development of existing environmental platforms were shared with the UN; and
- noted the need to catalyse innovative financing to accelerate the completion of this critical project and to explore innovative business models to secure its on-going success.

Data Sources
The Working Group noted that it was essential that the World Environment Situation Room (WESR) be designed to draw on relevant data sources that address current data gaps. In particular urgent work was required to:

- deliver on the vision of the Digital Ecosystem for the Environment to connect existing global platforms, including WESR, GEOSS (Global Earth Observation System of Systems), the GEO Knowledge Hub, EOSC (European Open Science Cloud), regional platforms such as the Africa Regional Data-cube and the Pacific Earth Observation Data Platform, National platforms on global environment such as Data Terra (France), platforms held by the private sector such as Amazon and Google (USA), Image World (China) and citizen science communities;

- develop common data policies to ensure effective governance and robust interoperability to underpin this technical work;
- understand how to integrate unconventional data sources; and
- to test and pilot normalisation and interoperability of data from a range of sources. Pilots or prototypes should explore systems problems for specific areas of work such as emissions reduction and explore a range of SDGs, where new and unconventional data sources can be used to fill gaps in methodologies and data sources.

Data and Citizens
The Working Group noted the increasing use of big data by citizens for ordinary everyday task and recognised that the World Environment situation room must connect to citizens across the planet. We can operationalize data for citizens to contribute to and understand the effects of their individual decisions;

- on their personal carbon footprint and how this relates to reductions required by the Paris Agreement on carbon reductions;
- on their resource consumption and to understand its global implications; and
- on the pollution footprint they are creating and how this relates to the global pollution challenge.

Only by engaging citizens in the great challenges of our era will we be able to build behaviour change and accelerate the pace of change required to deliver the reductions we need in carbon, resources and pollution loads.

Data to deliver actions and change.
The Working Group noted the scale of the environmental challenges now facing our planet and expressed frustration at the slow pace of change. The work of the Big Data and Digital Ecosystems Group is not to document our decline but to provide information to transform capacities to address challenges and accelerate progress towards sustainable development.

The Working Group expressed support for rapid prototype models to deliver market-validated pilots to test new ideas that would enable bold, urgent, sustained, inclusive, transformative and integrated actions. Actions could build on big data and digital platforms to link scientists, policy makers, business actors and citizens to make a step change in carbon, resource and pollution reductions. The working group called for the identification / articulation of these actions in the lead up to Paris/Oslo 2020 and for options on how they might be financed and implemented at scale using new and innovative business models.

Pilot programmes were identified as an opportunity to communicate the growing climate, biodiversity and pollution emergencies to businesses and citizens, to build momentum for change. Responding to the big issues of our time is within the grasp of businesses and citizens.

Proceedings

Opening of the HL Working Group on Big Data and Digital Ecosystem for the Planet: Setting the vision and ambition

Welcome Address by Hosts
Gilberto Camara, Director, Group on Earth Observations (GEO) and Working Group Co-chair, welcomed to Canberra and thanked WG participants for their tremendous sense of energy and commitment.

Mr. Camara addressed WG participants on the current trials faced in terms of ensuring that data and state of the art technology using that data is trustworthy and being used for 'social good'.

Martine Woolf, Ag Chief Environment, Geoscience Australia, highlighted that solutions are needed to address the environmental challenges the world is currently experiencing. She highlighted how Geoscience Australia is working on big data solutions through the infrastructure program, Digital Earth Australia. She concluded by addressing the shared community commitment required to share big data.

Opening Remarks

A video message from Inger Andersen, Executive Director, UNEP was played to the WG participants. She highlighted how science had sounded the alarm regarding the environmental crisis, and the renewed sense of urgency has intensified UNEPs efforts towards developing nature-based solutions.

Ms. Anderson emphasized that 1 million species face the threat of extinction and lands are being degraded. Business-as-usual is no longer enough and the world cannot ignore science any longer. A joined approach to solve the environmental crisis is required. Ms. Anderson concluded by reiterating her desire to hear the outcomes from the Working Group.

Professor Jian Liu, Director of Science, UNEP and Working Group Co-chair, thanked the many senior officials, diplomats and the representatives from the business and science communities for their involvements and thanked Mr. Camara and Ms. Woolfe for hosting the event.

Prof. Liu addressed the relevance of the Working Group and highlighted how the various attendees could work together to address the environmental challenges in existence. He noted that according to a recent Institute for Strategic Dialogue (ISD) report which analysed the 93 indicators relating to the environment, 68% are immeasurable due to the lack of meaningful data. Bridging the information gap that exists between the Global North and the South, particularly in landlocked African nations needs to be addressed, especially as so many individuals now own smart phones.

Prof. Liu concluded by addressing the need for all of the participants to take ownership in addressing the issues being faced through collaboration.

Edan Dionne, VP, IBM and Working Group Co-chair, remarked on the fact that technology plays an important role in sustainability and an inclusive direction is required to address the needs of humanity. Nonetheless, ethical responsibilities are required to ensure that data privacy exists. Through the use of artificial intelligence (AI) algorithms, technology that is good for both us and for human kind can address the environmental problems that exist.

Context, mandates and ambition

From Paris to Canberra: Looking Back and Looking Forward
Laurent Durieux, Head, Earth Observations, Institute of Research for Development, France and Co-organizer of the Inaugural SPBF Session on Big Data in Paris discussed the need to refine how to process big data.

He noted that the Working Group is made up of individuals from a wide variety of industries. The environmental crisis needs urgent attention and that it is the children of today who are demanding action.

Mr. Durieux emphasized the importance of the Working Group in addressing big data, due to the rapid technological advancements that have taken place in recent years.

He concluded by urging the Working Group to develop methods to create environmental policies that can rely on the timeliness and reliability of big and in-situ data in decision making before the March 2020 Action Plan deadline.

Shereen Zorba, Head, UN-SPBF Secretariat, presented the key objectives of the UN Working Group on Big Data and the Digital Ecosystem for the Planet to the WG participants to ensure that they could address them through their discussions over the coming days.

1. Harness the ongoing data and technology revolution,
2. Ensure the authenticity and validity of data to support sustainable development,
3. Address data gaps,
4. Boost multi-sector and cross agency cooperation,
5. Transform capacities to address challenges and accelerate progress towards sustainable development,
6. Create a global partnership for Big data and a digital platform for the planet,
7. Define the scope and type of Big data and technologies required to achieve the global goals and environmental targets,
8. Catalyse the deployment of technologies required to achieve agreed goals,
9. Catalyse financing and innovative business models,
10. Empower Citizen Science,
11. Take bold, urgent , sustained, inclusive and transformative, integrated action.

Ministerial Action and Ambition
Ado Lohmus, Permanent Representative of Estonia to the European Commission and Former UNEA Presidency Representative / Bureau Member, UN Environment Assembly (UNEA) addressed the Working Group participants and identified that the acceleration of ideas to support international governance propcesses should be at the forefront of the participants agendas.

Mr. Lohmus highlighted that the themes of UNEA-4 included finding innovative solutions for the environmental challenges while promoting sustainable consumption and production. He noted the first priority: to bring the partnerships between business, policy and science together to create environmental data. He noted that businesses cannot start achieving actions without targets. A need to harmonize data sources exists to ensure that Artificial Intelligence (AI) and Big Data analysis can take place in an open platform that allows for the sharing of harmonized data.

Mr. Lohmus concluded by explaining to the Working Group that Estonia was once considered a poor country, but since 2000, it has harnessed the potential of both its citizens and industry. He expressed the importance of finding digital solutions to support a circular economy through sustainable financing and environmental performance indicators.

Towards a Global Strategy on Big Data for the Environment
Pascal Peduzzi, Director, UNEP-GRID Geneva / Project Lead World Environment Situation Room addressed the Working Group participants and highlighted that in order to create a Global Strategy on Big data for the environment, the SDGs need to be addressed.

Mr. Peduzzi noted that urgent action is required to address the estimated global population increase. He highlighted how the stratospheric ozone depletion is on track to continue diminishing due to the positive result of Government lobbying and noted that this is an example of how an environmental crisis can be addressed.

Strengthening the Global Data Ecosystem & Addressing Data Gaps
Gregory Scott, UN Statistics, Inter-Regional Advisor on Global Geospatial Information Management, highlighted that a monumental task within the data ecosystem exists and an end to end solution is required. He noted that a key part of the solution is to determine how to increase the pace in unravelling the complexities of the environmental agendas that exist.

Mr. Scott noted that digital transformation and innovation is unleashing the power of data and that citizens can assist in closing the data gaps. Nonetheless, he highlighted that a challenge in closing the data gaps, is knowing that the right data is being collected. Through comparability and timeliness, data can be harmonized and integrated.

Mr. Scott highlighted that cross border environmental challenges exist and the relationships between people, the environment and urbanisation needs to be harnessed.

Mr. Scott concluded by reiterating that everyone can do more. By integrating and sharing data, digital transformations can be leveraged to determine how to overcome the environmental problems that exist, sooner rather than later.

Ms. Zorba asked Mr. Scott on his thoughts regarding the data gap analysis provided by the UN.

Mr. Scott advised that work is being undertaken broadly in the development process to address these gaps through the international community, NGOs and the public and private sectors.

Stefano Nativi, Big Data Lead Scientist of the Joint Research Centre of the European Commission discussed the paradigm shift is that required to understand how to collect Big data as well as to use it appropriately.

He noted that Big Data is the first part of the data cycle and that the establishment of a tecno-socio-economic ecosystem platform could address the challenges faced. Nonetheless, governance needs to be a part of the decision-making process.

Professor Gavin Shaddick, Alan Turing Institute and Chair of Data Science and Statistics, Exeter University, highlighted the challenges of finding comprehensive data and requested the need for a consistent methodology to address the problem.

Prof. Shaddick probed how the quality of data collected can be maintained and whether the differences are important. He suggested the Working Group to determine whether any data was better than no data and whether it is being used for reasons different than originally intended.

Steffen Fritz, Deputy Programme Director, International Institute for Applied Systems Analysis provided a Citizen Science perspective. He highlighted the urgency in addressing the problems that exist and noted that we have ten years to work on the issues.

Mr. Fritz noted that a big opportunity exists to connect with the citizens of the world to bridge the data gaps to ensure that the advancement of knowledge can continue at the pace required. He highlighted how World Water Monitoring Day had harnessed the voluntary contributions of 1.5 million citizens.

Mr. Fritz concluded with six strategies to bridge the data gaps that exist:
1. Build awareness and share experiences on the use of Citizen Science for the SDGs.
2. Develop case studies whereby Citizen Science data has been used in innovative ways by NSOs.

3. Identify criteria for ensuring data quality or create data quality assurance procedures.
4. Integrate Citizen Science into the methodologies of SDG indicators.
5. Promote consistent data collection across Citizen Science initiatives through aligning definitions with global definitions.
6. Support open Citizen Science data that are formatted using standards.

Key contributions from the floor

- A report regarding data gaps needs to be publicly available.
- The Citizen Science message has been deliberate and focused on linking to the global citizens through education and action.
- Government structures are tight and to harness political traction, there is a need for these structures to become flexible and targeted.
- The development of an ethical framework is required before a common and sustainable interest can be achieved.

Towards an Open Data Economy and Ethical Infrastructure
Jean Dusart, Policy Specialist, The European Commission, presented to Working Group participants. He opened by noting that the European data economy was valued at €300 billion in 2016 which is estimated to grow to €739 billion by 2020. Nonetheless, challenges are being faced regarding the availability, quality, organization, accessibility, and sharing of geospatial information. Further challenges that need to be addressed include governance, policies regarding the flow of data, AI trustworthiness, data re-use and privacy.

Mr. Dusart highlighted the initiatives that the European Union has made to build the European Data Economy to ensure that a fair and open data market exists and business to government data sharing policies, codes of conduct and ethical and legal framework on AI.

He concluded with a quote from Ursula von der Leyen, "digital technologies, especially Artificial Intelligence (AI) are transforming the world at an unpresented speed. They have changed how we communicate, live and work. They have changed out societies and our economies".

Ms. Zorba asked the type of investment required by the EU to improve infrastructure and technology big data.

Mr. Dusart advised that at this point is too early to be precise and noted that the outcomes of the EU elections are required before a proposal could be outlined. Nonetheless, he noted that the three main programs that could contribute to achieving these outcomes include research, the innovation program and the Digital Europe program.

Edan Dionne, Vice President, IBM, presented IBM's principals regarding an Open Data Economic and Ethical Infrastructure.

She highlighted that AI should augment human intelligence rather than replace it. The benefits should flow to many, rather than the elite few. Secondly, data is only for the creator meaning that IBM's client data is their own data. Although IBM contribute to assisting in clients getting their insights, their data won't ever be handed to Government department.

Finally, for the public to trust AI, they need to trust the technology.

Conclusions
Ado Lohmus, Permanent Representative of Estonia to EC and Former UNEA Presidency Representative / Bureau Member, UN Environment Assembly (UNEA), concluded Day 1 of the Working Group by sharing that Talin, Estonia, would be the next host of the Working Group on Big Data. Mr. Lohmus expressed the importance of refining the list of priorities to ensure that a prioritised agenda could be created for the next event.

Mega Platforms: Opportunities, threats, lessons learnt and way forward

World Environment Situation Room
Pascal Peduzzi, Director, UNEP/GRID Geneva presented the prototype of the World Environment Situation Room (WESR), an essential knowledge instrument to support progress on delivering the environmental dimension of Agenda 2030 for Sustainable Development.

The WESR website aims to promote the use and sharing of environmental data and engage a number of stakeholders on various environmental challenges on a global scale. Through working with data providers to transform data linking with SDG principles, indicators from a range of levels can be displayed to promote the environmental data in real-time.

Mr. Peduzzi demonstrated how to use the website based on the prototype and showed how a range of search mechanisms will allow this information to be displayed. Data cubes which compare the images of the world in 1985, 2000 and 2015 will enable the changes in geography to be viewed through the embedded search functionality.

Monitoring the environment through a dashboard to provide special data as well as access to reports in a single database through the use of 4,000 publications from UNEP will be included in the database. Scientific data from various countries will be incorporated into the platform and UNEP is assisting developing countries access and contribute to the data. Mr. Peduzzi explained that UNEP had worked with the Nigerian Government to create a national platform.

Members from the Working Group asked Mr. Peduzzi about the governance and review process for the information used to build the WESR. Mr. Peduzzi confirmed the importance of ensuring that the requirements of the UN were adhered to. He confirmed that the Multilateral Environmental Agreement is legally binding and a methodology on meeting these requirements has been identified. Various expertise surrounding the range of environmental topics included within The WESR will be consulted with to ensure that a wide range of information, including unconventional data is available on the platform. Mr. Peduzzi also advised that the data is currently 99% accessible to all.

One participant posed the question, to what extent is it essential that the platform is independent from existing platforms? Mr. Peduzzi confirmed that the UN have different mandates that they are required to achieve and that certain legally binding rules need to be met.

China's Digital Earth
Professor Fang Chen, Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences (CAS) presented to WG participants about the platform China has been developing, called CAS Earth. The Big Data Cloud Service platform is aimed at resolving major scientific and technological problems and provides impetus for a new interdisciplinary, cross scale, macro-scientific approach using Big Earth Data.

Prof. Chen advised that users can now access 40% of the data online and that approximately 3PB will be uploaded annually and that the platform may assist in solving the problem of global data integration.

Prof. Chen explained how the platform is helping to provide data for measuring progress on six of the SDGs.

Key contributions from the floor

- There is a need to be able to abstract data to make it easier for policy makers, business, science and citizens to understand the data's environmental implications .
- Through the creation of a global model which can be used to translate the scientific data efficiently, policy makers may be able to make decisions more effectively.
- The number of decisions being made by policy makers isn't on par with the scale of data being collected.
- Something needs to be done to better align the understanding of Governments and scientists.
- Through the Working Group's 'joining forces', a single platform could be created to address the need for immediate action.
- A single platform incorporating aspects from WESR and China's Digital Earth should be developed with urgency, to inform citizens of the current environmental and climate emergency.

Copernicus Observations Programme (ESA)
Ivan Petiteville, European Space Agency (ESA) explained the Copernicus Observation Program which has developed a range of Earth Observation missions. Fifteen satellites are currently in operation with six used for the Copernicus Observation Programme.

Mr. Petiteville highlighted that new satellites will commence operation in the near future to assist in gathering data, including polar ice topography and land surface temperate. He highlighted that the program aims to support the global agendas of the Paris Agreement, SDGs and the Sendai Framework.

Call for breakout sessions and extension of additional time:

Participants called for additional time to be added to adapt the agenda to address issues of emerging importance resulting from the interactions on the ground. They requested that:

- WG participants should have an opportunity to pass on information learned during the week to politicians.
- The Working Group should focus on a couple of topics only, whereby actions can be achieved to show action and hold governments accountable.
- A global coalition is required to prioritise and work collectively, how this will be structured and financed requires consideration.
- The time is now to build pilots towards a platform to address UN priorities as well as the global goals.

Upon the request of WG participants, the Secretariat agreed to adapt the agenda and hold break-out discussion groups of 7-10 people representing various sectors and interests, to address the following:

1. What are the Working Groups common and differentiated goals?
2. Who are we serving?
3. What needs building?
4. How can it be financed?

5. What can be done between now and the next meeting?
6. What other members of the community should be identified?
7. What is the greatest impact we can make now?

The Final Communique from the break-out sessions, coordinated and compiled by a drafting committee headed by Mr. Martin Brocklehurst is attached.

Digital Planet: The imperative for and challenge of disruptive innovation

A panel discussion moderated by Charles Ross, Economist Intelligence Unit discussed the topic of Disruptive Innovation.

The panel included: **Charles Ross**, Economist Intelligence Unit, (Moderator), **Jeremy Mitchell**, Huawei Australia, **Steve Kopp**, ESRI, **Hendrik Hamann**, IBM, **Rebecca Moore**, Google Earth **Andrew Zolli,** Planet.com, **Marika Popp**, Guardtime AS

Mr. Ross: Organizations, policy makers and people need to rely on and trust data to make decisions and this is challenging in this environment. What is your suggestion to overcome this?

Ms. Popp: The Blockchain solution is a disruption. In 2007, Estonia was cyber attacked by Russia. In response, Estonia is now leading the way in Blockchain technology to tackle the threat from future cyber attacks. The private sector has an important role to play in developing Blockchain technology by ensuring that massive amounts of data can be deployed and is made safe. Additionally, Ms. Popp mentioned that Blockchain technology has been embraced by the European Space Agency to support with Earth Observation data management.

Mr. Ross: How do we ensure the integrity of data is maintained?

Ms. Popp: Data is vast and a need for high quality, trustworthy data is required. Deciding how the integrity of data is assessed is a huge responsibility, to ensure that any manipulated data is recognized and dealt with. These decisions will have an impact for generations to come.

Mr. Ross: What are some of the obstacles that are limiting us?

Mr. Hamann: Don't overestimate what technology can do. A large amount of data is being collected that is relevant to our planet. It needs to be determined whether we are keeping up with the insights we are generating. As we collect more and more data, are we investing in the right technology to make the most of it? If we want to keep up with the pace of the data generated, it must be indexed correctly so that it becomes searchable.

Mr. Ross: Do we have environmental data that can be searched for in real-time?

Ms. Moore: We have progress to report. Over the last couple weeks, a wildfire in California started and we developed algorithms in our Google Earth platform to stream and analyse the data. If you now type into google 'wildfire google earth' hot pixels showing the temperate are able to derive a perimeter of the fire.

Mr. Ross: What are challenges you are faced with?

Ms. Moore: How Earth Observation data can be deployed to be most helpful to society. A global framework needs to be devised to assist in filling the gaps of information. True information can be challenging as some people do not want to know about the raw data.

Mr. Ross: How do you make it available to industry?

Ms. Moore: A project is being undertaken with the UN regarding the distribution of fresh water at a 30-meter square resolution on a global scale. The data analysis involved used 600 million hours of computation time, which would have taken 1200 years on a single computer. There is a need to aggregate reporting in a particular way and we are working with many countries to adopt relevant standards. Google can contribute many computers to accelerate the operation, but partnerships need to be aligned.

Mr. Ross: Who should we be talking to and is it a genuine problem that the industry is facing?

Mr. Zolli: Over time, things that were rare and expensive become cheap and easy. It is important to articulate that disruptive data has plummeted in cost. We took technology and put it into space. The availability of data is accelerating while the price is dropping. We are nowhere near the true disruption point. That is the moment you will see changes start to take place.

Ms. Moore: A quote from an employee of Google states that, "we are drowning in data but are thirsty for insights". The problem lays with the fact that there is a lot of data and we are not extracting useful insights from. Through higher resolution imagery, we have been able to provide much more actionable information about where deforestation is happening and on whose property. There is a huge opportunity to generate that type of information.

Key contributions from the floor

- In-situ measurements are important to be included in the gathering of data.

- Due to government regulations, the time lag when detecting a problem and doing something about it can be three years.

- One example of data analysis providing immediate positive change was identifying the plight of the Rohingya people in Myanmar. The UN imposed sanctions within one day of this data being received. A second example was in Singapore where open data on the impact of palm oil production on the environment resulted in banks turning down companies financing palm plantations.

- Governments are not always appreciative of open and transparent data. For instance, deforestation is taking place in a number of countries, but the media is currently only focusing on one country [Brazil]. Personal motivation can hinder the open sharing of data.

Innovative Finance & Business Models
Dr Zaffar Sadi Mohamed-Ghouse, Executive Director, Strategic Consulting & International Relations, Spatial Vision, provided his experience in spearheading start-ups to becoming self-funded businesses.

He described a variety of projects including the Malaysian Geospatial Master Plan which started as a government funded project but is now privatizing. He said that the increasing privatization of Earth Observation projects allows market forces to determine the correct pricing for geospatial technologies which could result in additional benefits such as job creation and faster innovation.

Ms. Zorba asked where information about the environment is needed and whether it relates back to sustainability.

Dr. Mohamed-Ghouse noted that the information needed surrounds the topics of sustainability, the environment and further research into spatial awareness. He highlighted that Spatial Vision commenced with USD 70 million funding for the first seven years, USD 180 million for the next seven years and 50 PhD students. From this, 43 companies and academic institutions invested in both cash and 'in-kind' which enabled the business to stand on its own without the need for government funding after the initial start-up period. He highlighted how the partnerships with companies and academia has resulted in a $2.50 return for every $1.00 invested due to this innovative business model.

Gordon Noble, Australian Sustainable Finance Initiative, spoke about the opportunities for funding in the area of Big Data.

Mr. Noble explained how each of the three international environmental commitments highlight the role of the finance sector, yet questions still remain regarding the most cohesive way to align. He noted that the finance sector is committed to working in a collaborative way and engaging with government regulators. The Australian Sustainable Finance Initiative was created to capture the global committee being built surrounding the area of responsible investment. Companies are rated based on their characteristics to assist investors to make informed decisions.

Mr. Noble explained that the investment horizon of a pension fund has a 20 to 40-year focus which differs vastly to governments short term focus. Investments need to have a long term focused and this has been the driver in the finance industries willingness to adapt. Investor perspective is driving the possibility of stranded assets in the future.

Mr. Noble concluded by noting that a challenge that he has experienced is that the finance industry is bad at 'working in silos and not collaborating', although the market appetite is there to address this.

Jean Dussart, Policy Officer, The European Commission, presented to the group about research and innovation in Europe. The Sustainable Europe Plan is currently in the process of being prepared and will assist in supporting USD 1 trillion of investment over the next decade in Europe. The Digital Europe program is another important project currently underway that will see the digital transformation of society and is relevant for a digital ecosystem for the environment.

Key contributions from the floor

- Free and open policy should be created to ensure that data can continually be used for a variety of programs.

- A standard is required to be able to assess the impact that that the Sustainable Europe Plan will have on the environment.

- To measure the impact that the Sustainable Europe Plan will provide, needs to be looked at in two ways: the return financially and socially.

New tech and innovation

New technology directions
Dr Hendrik F Hamann, IBM, presented to the group and reiterated a recurring theme that had been surfaced during the week - do we need more data? Dr Hamann suggested we have enough data, although we need more but it needs to be collected from non-satellite sources. Dr. Hamann also highlighted another theme that had been uncovered, surrounding the issue on how to combine data and distribute it as information.

Dr. Hammann noted that challenges surrounding the lack of searchable Earth Observation data exists. Although leveraging data is ideal, it does not address the deficiencies that exist in streaming data such as the lack of searchability.

Live Streaming Space
Dr Elena Lobo, SEN, presented about her company's expertise live streaming Earth Observation video from space. She highlighted that to leverage data technology, a variety of data is required, including videos of earth from satellites. SEN aims to make information accessible and actionable to ensure that activities can progress and to address the everchanging environment.

Dr. Lobo provided videos of the SEN satellite and noted that the ultimate aims of this technology is to address the need to provide new perspectives of earth by allowing users to visualize images in a way that is more natural. She noted that partnerships need to be fostered to ensure that the challenges faced when using these technologies are clearly addressed.

A New Class of Decision Support Platform Holistic Impact Assessment Env. / Eco. / Social,
David Lucido, Sentient Hubs, presented to the group about the platform his team has designed. A new class of decision support platform that uses integrated impact assessment across economic, environmental, and social dimensions for planning and governance decision making purposes. The platform will enable users to determine how different parameters can effect communities through an interactive dashboard, for instance, how a 2% increase in population could affect traffic and demand for power and water. The platform is powerful as it can assist a range of stakeholders in understanding a range of implications.

Mr. Lucido concluded by advising that Sentient Hubs would be sharing the data that they have collected with the UN to assist them in the development of their own platform.

Technical & Data Foundation for Sustainability Analysis & Reporting
Jurgen Wichenberger, Accenture, presented about the Sustainability Analysis and Reporting that Accenture has developed. He highlighted that many of his clients make up the worst polluters in the world. Rapid developments in reporting technology is helping these companies become more transparent with their pollution and sustainability reporting.

Mr. Wichenberger noted that information can be sought to create action. Accenture has developed a platform which integrates 127 data sources every four weeks to help build a solution to assist their clients in lowering their carbon footprint.

Mr. Winchenberger concluded by also offering the UN assistance in anyway required in the future.

Key contributions from the floor

- A sustainability rating should be incorporated into the S&P ratings to ensure that sanctions are made against companies that do not comply.

Should government and business analytics be part of an open source digital platform on the environment?

Creating a Culture of Accountability
Luhui Yan, Carbonstop, identified that data requirements differ between governments, industry and consumers. Carbonstop software is used to report to the government about companies' emissions through the "carbon management software".

The software not only helps the Chinese Government sanction polluters, but can also encourage sustainable business practice, for instance, one organisation achieved a USD 100 million contract with L'Oréal due to their good performance on Carbonstop. Alibaba calculated their emissions using Carbonstop and have now created actions to address the 3.62 million tonnes of carbon emitted into the atmosphere annually, including the development of a successful application called Antforest, whereby trees are planted in China and Mongolia.

Closing review and endorsement of recommendations

A Task Force comprised of six volunteers from the WG participants was formed to review and synthesize the proposals from the four break-out groups to draft follow-up actions for The Forum ahead of the UNEA Bureau Meeting in Oslo in June 2020 and its Third Global Session in Paris in September 2020.

The final communique from the break-out sessions is attached.

Closing Deliberations

Gilberto Camara, Director, Group on Earth Observations (GEO) and Working Group Co-chair, Eden Dionne, IBM and Pascal Peduzzi, UNEP, provided the closing remarks to the Working Group.

Mr. Peduzzi highlighted that it had become apparent that significant institutional support is required. The Working Group was made up of a fascinating number of participants with a strong engagement to achieve the SDGs. A sense of emergency regarding the environmental crisis had been recognized and the level of support and engagement was 'astounding'. A number of attendees offered to provide generous opportunities for collaboration with the UN going forwards. The Task Force recognized that 'the time is now' to act and through a strong commitment, many achievements could be made.

Ms. Dionne highlighted her observations from the week, including that it had been made apparent a need for ethical and responsible data sharing. She highlighted that the second meeting of the Working Group has provided positive interactions and inclusiveness, through the tremendous enthusiasm and sense of urgency towards solving the environmental crisis. She emphasized that much work needs to take place, although the willingness to work together was the positive take-away.

Mr. Camara explained to the Working Group about the creation of GEO and noted that although separate, it is actually a part of the UN system. He advised that when starting a new formation, such as the Task Force, the excitement can surpass goodwill and although enthusiasm will wane, there is a strong a need to provide a mechanism that promotes sustainable business practice.

GEO has had success in raising 'in-kind' funds (cloud credits) through a range of organizations including Amazon, Google and Microsoft which helps smaller organizations globally to use a range of software. These non-binding agreements are buying GEO time until an agreement can be finalized. He provided the Working Group with tips relating to the creation and work of the proposed Global Partnership:

- Donations from business and organizations does not mean endorsement of that brand or product.
- A knowledge hub is needed to ensure that an open repository of information is shareable.
- Opportunities need to be given to make informed decisions.
- Promote the sharing of data between a range of stakeholders.
- Provide UNEP with an engaged community.

Mr. Camara concluded by confirming that a global requirement exists - the need to put faith into open science to ensure that governments recognize and understand accurately the environmental problems that exist.

On behalf of the Secretariat, Ms. Zorba thanked Mr. Camara, Mr. Peduzzi and Ms. Dionne for their comments. She confirmed that she was proud to have convened in Canberra and for the transparency and desire to contribute to the process conveyed during the week. Ms. Zorba then invited Anne Bowser, one of the Co-chairs of the Global Partnership, to present the final proposals, which were:

1. Connect to existing platforms such as the World Environment Situation Room using the private sector and Citizen Science.
2. Determine common overarching principles.
3. Connect platforms to link interoperable data in a structured manner through pilots and prototypes to achieve a range of SDGs to fill gaps and methodologies.
4. Accomplish the goals through governance, funding and fundraising strategies through the use of Task Forces.

Closing

Ms. Zorba closed the Working Group session on behalf of the Secretariat by thanking all of those in attendance and for their contribution over the week including the event sponsors, Co-Chairs, GEO, UN Science Policy Business Forum as well as Estonia for hosting the next Bureau meeting.

Participants thanked the UNSPBF Secretariat team for their exceptional efforts to make the week a success.

Estonia announced possibly hosting the next Working Group meeting in 2020-2021.

Final Communique from the Break Out Sessions
Coordinated and finalized by Drafting Committee Rapporteur Mr. Martin Brocklehurst

Introduction

The Working Group on Big Data and Digital Ecosystems was established in Paris October 2018 with the purpose to strengthen and align global efforts to develop an integrated, UN-hosted, open source digital platform to manage and share authentic and valid environmental data for decision making to set society on a pathway to achieving SDGs and internationally agreed targets. The approach and key objectives set were to:

- harness the ongoing data and technology revolution;
- ensure the authenticity and validity of data to support sustainable development;
- address data gaps;
- boost multi-sector and cross agency cooperation;
- transform capacities to address challenges and accelerate progress towards sustainable development;
- create a global partnership for big data and digital platform for the planet;
- define the scope and type of big data and technologies required to achieve the global goals and environmental targets;
- catalyze financing and innovative business models;
- catalyze the deployment of technologies required to achieve agreed goals;
- empower citizen science; and
- take bold, urgent , sustained, inclusive and transformative, integrated action.

The working group issued a first discussion paper in March 2019 in the margins of the 4th UN Environmental Assembly called "A Digital Ecosystem for the Environment: Bringing together data, algorithms and insights for sustainable development."

The Working Group meeting in Canberra October 2019, held in parallel with the Group on Earth Observation (GEO) Week, reviewed progress against these objectives, and highlighted the following critical actions required in the lead to Oslo 2020 and UNEA 2021.

World Environment Situation Room
The Working Group:

- confirmed its full support for the work of the UN to set up the World Environment Situation Room, aimed at providing a prototype for a geospatial on-line platform for monitoring the status of the world environment, and recognised the unique and trusted role that the UN would play in reporting on and drawing information from all global environmental data sources;
- recognised the urgency that existed to complete this work and the enthusiasm of Working Group members to support the UN, by building a partnership of the willing, to share skills and expertise and ensure that lessons learnt from the development of existing environmental platforms were shared with the UN; and
- noted the need to catalyse innovative financing to accelerate the completion of this critical project and to explore innovative business models to secure its on-going success.

Data Sources
The Working Group noted that it was essential that the World Environment Situation Room (WESR) be designed to draw on relevant data sources that address current data gaps. In particular urgent work was required to:

- deliver on the vision of the Digital Ecosystem for the Environment to connect existing global platforms, including WESR, GEOSS (Global Earth Observation System of Systems), the GEO Knowledge Hub, EOSC (European Open Science Cloud), regional platforms such as the Africa Regional Data-cube and the Pacific Earth Observation Data Platform, National platforms on global environment such as Data Terra (France), platforms held by the private sector such as Amazon and Google (USA), Image World (China) and citizen science communities;
- develop common data policies to ensure effective governance and robust interoperability to underpin this technical work;
- understand how to integrate unconventional data sources; and
- to test and pilot normalisation and interoperability of data from a range of sources. Pilots or prototypes should explore systems problems for specific areas of work such as emissions reduction and explore a range of SDGs, where new and unconventional data sources can be used to fill gaps in methodologies and data sources.

Data and Citizens
The Working Group noted the increasing use of big data by citizens for ordinary everyday task and recognised that the World Environment situation room must connect to citizens across the planet. We can operationalize data for citizens to contribute to and understand the effects of their individual decisions;

- on their personal carbon footprint and how this relates to reductions required by the Paris Agreement on carbon reductions;
- on their resource consumption and to understand its global implications; and
- on the pollution footprint they are creating and how this relates to the global pollution challenge.

Only by engaging citizens in the great challenges of our era will we be able to build behaviour change and accelerate the pace of change required to deliver the reductions we need in carbon, resources and pollution loads.

Data to deliver actions and change.
The Working Group noted the scale of the environmental challenges now facing our planet and expressed frustration at the slow pace of change. The work of the Big Data and Digital Ecosystems Group is not to document our decline but to provide information to transform capacities to address challenges and accelerate progress towards sustainable development.

The Working Group expressed support for rapid prototype models to deliver market-validated pilots to test new ideas that would enable bold, urgent, sustained, inclusive, transformative and integrated actions. Actions could build on big data and digital platforms to link scientists, policy makers, business actors and citizens to make a step change in carbon, resource and pollution reductions. The working group called for the identification / articulation of these actions in the lead up to Paris/Oslo 2020 and for options on how they might be financed and implemented at scale using new and innovative business models.

Pilot programmes were identified as an opportunity to communicate the growing climate, biodiversity and pollution emergencies to businesses and citizens, to build momentum for change. Responding to the big issues of our time is within the grasp of businesses and citizens.

End

Drafting Committee:

Ben Tregenna - Ben.tregenna@unep-wcmc.org - Agreed by Corli Pretorius on Ben's behalf.
Karim Selouane - Karim.selouane@resallience.com - Agreed
Laurent Durieux - Laurent.durieux@ird.fr- Agreed
Benjamin Munro - ben.bpm@gmail.com - Agreed
Anne Bowser – anne.bowser@wilsoncenter.org - Agreed
Kathryn Sforcina - ksforcina@palo-it.com - Agreed
Martin Brocklehurst - martin.brocklehurst@me.com - Agreed

Attachments

For delegate presentations, participant list, event agenda, the final communique from the break-out sessions and other supporting documents are available at un-spbf.org/canberra-2019/

Acknowledgements

The UN-SPBF extends its sincere gratitude to the Government of Australia and GEO Week 2019 for hosting and supporting the Working Group meeting.

Special thanks to Prof. Dr. Gilberto Camara, Director of the GEO Secretariat for his co-chairmanship of the Working Group, and to Mr. Steven Ramage, Head of External Relations, for his tireless work to create cohesion and greater cooperation with GEO. His efforts are recognized and very much appreciated.

The Secretariat would also like to acknowledge with gratitude the initiative and hard work put in by the break-out session leads and members. Special mention goes to Mr Martin Brocklehurst and the drafting committee: Ben Tregenna, Karim Selouane, Laurent Durieux, Benjamin Munro, Anne Bowser, Kathryn Sforcina, Martin Brocklehurst

Contacts

Shereen Zorba
Head, UNEP Science Policy Business Forum
Chief, Science-Policy-Business Interface
United Nations Environment Programme
shereen.zorba@un.org