Session title: Scaling AI Solutions for Health Equity in the Global South: From Design to Population-Level Impact.

Session Code: 120925_165

Convenor details:

Convenor's name	**Prof. Jude Kong**
Convenor's organisation	The Global South Artificial Intelligence for Pandemic and Epidemic Preparedness and Response (AI4PEP).
Organisation website	www.ai4pep.org

Speakers

ID	Speakers' name	Organisation name	Country
1	Ms Chaitali Singa	IDRC	Canada
2	Prof Bruce Mellado	University of Witwatersrand	South Africa
3	Dr. Rose-Mary Owusuaa Mensah Gyening	Kwame Nkrumah University of Science and Technology (KNUST)	Ghana
4	Dr Gelan Ayana	AI4PEP Ethiopia (Jimma University)	Ethiopia
5	Dr Elia Badjo	COSAMED	Democratic Republic of Congo(DRC)
6	Prof Andre de Carlvaho	University of São Paulo	Brazil
7	Prof Mary Goitom	York Universit , Toronto	Canada
8	Prof Radwan Qasrawi	Al Qud University	Palestine
9	Dr Aldilas Nursetyo	Universitas Gadjah Mada	Indonesia

Session Thematic Track

AI, Data & Emerging Technologies – Digital transformation and planetary stewardship

Session Summary

The session examined the critical transition from successful pilot projects to widespread implementation of AI-driven health solutions across the Global South. Moderated by Chaitali Sinha, a senior program specialist at the International Development Research Centre (IDRC), the session convened researchers, public health practitioners, and policy experts to address the "scaling gap" that prevents promising innovations from achieving population-level impact.

The 1 hour and 45-minute virtual session featured two complementary panel discussions. The first explored responsible deployment strategies through concrete case studies, including vector-borne disease detection systems, polio surveillance networks, air quality monitoring platforms, mpox response tools, and misinformation countermeasures. Panelists Dr.-Mary O. M. Gyenin, Dr. Gelan Ayana, Prof. Bruce Mellado, Dr. Elia Badjo, and Prof. Andre de Carvalho presented evidence from projects spanning multiple countries and disease contexts.

The second panel addressed the ethical dimensions of scaling health AI in diverse cultural and political environments. Prof. Mary Goitom, Prof. Radwan Qasrawi, Dr Aldilas A. Nursetyo, and Prof. Jude Kong led discussions on decolonizing technology development, establishing equitable governance frameworks, fostering effective public-private partnerships, and building sustainable local capacity. The session emphasized that technical excellence alone cannot overcome systemic barriers to equitable health coverage. Rather, scaling requires intentional design for local contexts, meaningful community participation, supportive policy environments, and governance structures that center Global South voices and priorities in decision-making processes.

Key Scientific Insights

The session provided strong evidence that context-appropriate design fundamentally determines whether health AI achieve population-level impact. Multiple case studies demonstrated that solutions developed through partnerships with end users and designed for local infrastructure constraints outperform technically sophisticated tools created without community input. The Polio Antenna project in Ethiopia showed how mobile-based surveillance systems designed with frontline health workers achieved 95% reporting compliance compared to 40% for previous paper-based systems, enabling real-time outbreak detection across remote regions.

A vector-borne disease prediction system designed by AI4PEP Ghana, is scaling to Philippines and Indonesia by prioritizing data sources that exist in resource-limited settings. Rather than requiring expensive sensor networks, these systems integrate existing weather station data, public health records, and community health worker observations. This design choice enabled maintains a prediction accuracy above 95% for dengue and malaria outbreaks through mosquito species classification.

South Africa's AI-powered air quality monitoring system demonstrated that deployment models matter as much as technology quality. Community-owned sensor networks in South African municipalities have the potential of achieving higher sustainability than government-managed systems because local organizations and the private sector are maintaining devices and using data for neighborhood-level advocacy.

The DRC's AI4Mpox surveillance platform revealed how flexible system architecture enables rapid adaptation to emerging threats. Built on modular components that integrate multiple data streams, the platform was deployed across six other countries within three months of the 2024 outbreak, providing authorities with case tracking and transmission modeling tools. This is enhancing rapid response to the emergency and establishing surveillance infrastructure.

Efforts to counter health misinformation through Brazil's automated fact-checking systems highlighted the importance of cultural and linguistic adaptation. The AutoAI-Pandemics platform (*Dominique*) supports diverse languages and uses culturally specific credibility indicators rather than direct translations of Western fact-checking approaches. This design achieved high user trust ratings compared to lower user trust rates for adapted international platforms, demonstrating that technical translation differs fundamentally from cultural adaptation.

Capacity building emerged as essential infrastructure for sustainable scaling. Projects that invested resources in training local teams to maintain and adapt systems showed dramatically higher long-term success rates than those prioritizing rapid deployment over knowledge transfer.

Link to SDGs and Post-SDG Framework The session advances three interconnected Sustainable Development Goals essential for equitable global health.

S**DG 3 (Good Health and Well-being)** receives direct support through strategies that expand health system coverage and effectiveness. The scaling approaches presented demonstrate

pathways to universal health coverage that work within existing resource constraints rather than requiring unsustainable external funding. By showing how to move from pilot success to population-level impact, the session addressed a major barrier to achieving health targets by 2030.

SDG 10 (Reduced Inequalities) is central to the session's focus on health equity. The ethical frameworks and governance models discussed explicitly counter AI's tendency to benefit already-privileged populations while bypassing marginalized communities. Decolonization approaches ensure that innovation priorities reflect the needs of those facing greatest health burdens rather than commercial or donor interests.

SDG 17 (Partnerships for the Goals) benefits from models of public-private collaboration and South-South cooperation that were examined. The session demonstrated how partnerships structured around shared governance and mutual accountability can mobilize resources while maintaining public health priorities.

Looking beyond 2030, these scaling strategies align with the **Pact for the Future**'s commitment to inclusive AI governance and the recognition that sustainable development requires fundamentally restructuring how innovation happens, not simply increasing its speed. The session outcomes will inform the **Global Sustainability Report 2026** discussions on transformative change pathways that operate within planetary boundaries while expanding human wellbeing.

Key Outcomes and Recommendations

Policy Recommendations: Governments must establish national AI scaling frameworks that provide clear pathways from pilot approval to widespread implementation. Current regulatory structures treat each AI deployment as a novel intervention requiring full approval processes, creating bottlenecks that prevent proven AI solutions from expanding. Streamlined approval mechanisms for AL solutions meeting established safety and efficacy standards would accelerate impact while maintaining quality controls.

Intellectual property frameworks should incentivize rather than restrict knowledge sharing for health AI solutions intended for resource-limited settings. The session identified restrictive licensing as a major barrier preventing countries from adapting successful interventions to their contexts. Governments and international organizations should promote open-source development and AI pools for public health applications.

Procurement policies must prioritize AI solutions designed for sustainability in local contexts over lowest initial costs. Total cost of ownership calculations should account for maintenance requirements, training needs, and local adaptation capabilities. This approach favors appropriate AI over sophisticated systems requiring permanent external support.

National health strategies should mandate community participation in AI solutions design and governance. The evidence presented showed that community engagement transforms outcomes, yet most current policies treat it as optional. Formal requirements for user involvement in design, testing, and oversight would institutionalize lessons from successful scaling efforts.

Institutional Commitments: The AI4PEP Network pledges to enhance its Scaling Support Platform by June 2026, providing technical assistance for countries transitioning proven AI for Health interventions from pilot to national implementation. This platform will offer expertise in regulatory navigation, financing strategies, capacity building, and monitoring frameworks.

AI4PEP Network members commit to publishing detailed implementation protocols and refereed manuscripts for all successfully scaled interventions, documenting not only technical specifications but also governance structures, financing models, community engagement strategies, and adaptation processes. This documentation will be made freely available through an open-access repository.

Research Priorities: Implementation science must receive greater investment to generate evidence on what enables successful scaling in different contexts. While proof of technical efficacy remains important, understanding how to navigate regulatory systems, build coalitions, secure sustained financing, and maintain quality during expansion deserves equal research attention.

Studies examining long-term sustainability after external funding concludes will inform realistic planning. Most current evidence comes from projects still receiving donor support, creating knowledge gaps about true sustainability.

Follow-Up Actions

The AI4PEP Network will coordinate three interconnected initiatives through 2026 to operationalize the session recommendations:

(i) Accelerate Scaling in 2026 by providing intensive support to seven projects ready to expand proven health AI nationally. Each country receives embedded technical advisors, access to implementation expertise, and connections to financing mechanisms. The countries like South Africa, Ghana, Ethiopia, Philippines, Indonesia, Brazil, Peru represent diverse health system contexts and scaling challenges.

(ii) Enhance Governance frameworks in 2026 by bringing together health ministries, civil society organizations, and affected communities from over 20 countries to support the roll-out of governance frameworks for health AI deployment. This

process will produce model policies adaptable to different political and cultural contexts while maintaining core equity principles. Draft frameworks will be completed by December 2026 for consideration in national policy processes.

(iii) Establish a South-South Learning Network for quarterly exchanges between countries at different scaling stages, enabling peer learning and technical cooperation. Virtual exchanges begin immediately, with in-person regional workshops scheduled for June and November 2026. Topics include regulatory harmonization, local manufacturing, workforce development, and sustainable financing models.

The network will submit comprehensive policy briefs to the Financing for Development forum in Seville and the GSDR 2026 process, ensuring scaling challenges and solutions inform global development discussions. A progress report evaluating all initiatives will be presented at the 2026 Science Summit, documenting achievements, challenges, and refined strategies for the final push toward 2030 health targets.

Session title: The Governance of Science, Technology and Innovation and its Connection to the SDGs

Convenor details:

Convenor's name	Luciane Costa
Convenor's organisation	Ministry of Science, Technology, and Innovation (MSTI)
Organisation website	https://www.gov.br/mcti/pt-br

Speakers

(add as many rows as needed)

ID	Speakers' name	Organisation name	Country
1	PhD. Edilson da Silva Pedro	MSTI	Brazil
2	PhD. Bianca Amaro de Melo	MSTI	Brazil
3	PhD. Marconi Edson Esmeraldo Albuquerque	MSTI	Brazil
4	**MODERATOR:** PhD. Daniel Almeida Filho	MSTI	Brazil

Session Thematic Track

Thematic Tracks

1. AI, Data & Emerging Technologies – Digital transformation and planetary stewardship

Session Summary (max 200 words)

The session emphasized that integrating the **Sustainable Development Goals (SDGs)** into **Science, Technology and Innovation (ST&I)** policies is crucial for sustainable and inclusive development. Brazil's **Legal Framework for Science, Technology and**

Innovation (Law No. 13.243/2016) strengthens this integration by promoting research, innovation, and collaboration among universities, research centers, the productive sector, and government. Effective **STI governance**, guided by transparency, efficiency, and inclusion, ensures that investments generate real benefits for society.

Speakers highlighted key pillars of this governance: **Dr. Edilson Pedro** addressed **Intellectual Property and Technology Transfer**, emphasizing balance between innovation protection and knowledge dissemination; **Dr. Bianca Amaro de Melo** discussed **Open Data and Governance**, underscoring transparency and equitable access to information; and **Dr. Marconi Albuquerque** examined **Innovation Incentives and Regulation**, focusing on Brazil's "Law of Goodness."

Together, these perspectives reinforced the strategic role of **open data**, **intellectual property**, and **technology transfer** in achieving SDGs such as **SDG 9 (Industry, Innovation and Infrastructure)**, **SDG 16 (Peace, Justice and Strong Institutions)**, and **SDG 17 (Partnerships for the Goals)**. The session concluded that strengthening STI governance in Brazil and Latin America requires political commitment, investment, and recognition of knowledge as a public good essential for sustainable development.

Key Scientific Insights (max 300 words)

The session "The Governance of Science, Technology, and Innovation and its Connection to the SDGs" featured a discussion among representatives from the Ministry of Science, Technology, and Innovation (MCTI) on how the governance of science, technology, and innovation (ST&I) can strengthen the achievement of the Sustainable Development Goals (SDGs).

The main findings and evidence highlighted were:

- ✓ **The lack of integration** between the Rio-92 environmental conventions (climate, biodiversity, and desertification) and the SDGs, indicating the need for more coordinated governance mechanisms and indicators that measure the impact of ST&I on sustainable development.
- ✓ In Brazil, although there are relevant policies and funds (such as the National Fund for Scientific and Technological Development - **FNDCT** and the **Law of Goodness**), there are still gaps in coordination between government agencies, companies, and universities, in addition to **the absence of a formal ST&I policy** focused on the SDGs.
- ✓ The country has made progress in **open data and open science**, with initiatives such as research repositories at Embrapa, Fiocruz, and USP, but still **faces cultural and legal** challenges in consolidating a national open science law.

- ✓ **The Law of Goodness** is highlighted as an effective tax incentive for innovation, but it needs **reforms to align private investments with socio-environmental priorities**, such as decarbonization and green technologies.

These innovations **are relevant to planetary boundaries** because they reinforce that **scientific and technological governance** must guide economic development within the planet's ecological limits. The integration of innovation, sustainability, and open data policies can promote more **sustainable industrial and technological transitions**, favoring the fulfillment of the SDGs and respect for global environmental limits.

Link to SDGs and Post-SDG Framework (max 150 words)

The session directly contributed to **SDG 9 (Industry, Innovation and Infrastructure)**, **SDG 16 (Peace, Justice and Strong Institutions)**, and **SDG 17 (Partnerships for the Goals)**. The presentations addressed key topics for strengthening the national science, technology, and innovation ecosystem: **Intellectual Property and Technology Transfer** (PhD. Edilson da Silva Pedro), **Data Governance and Open Data Initiatives** (PhD. Bianca Amaro de Melo), and **Regulation and Innovation Incentives – The Law of Goodness in Brazil** (PhD. Marconi Esmeraldo Albuquerque). These topics highlight the importance of integrated public policies, transparency, and collaboration among government, academia, and the private sector. The session aligns with the **post-2030 agenda** by promoting an innovative, ethical, and sustainable environment grounded in open data, research incentives, and institutional strengthening to foster inclusive scientific and technological development.

Key Outcomes and Recommendations (max 300 words)

The session resulted in a set of recommendations aimed at improving public policies, institutional commitments, and research priorities in the field of science, technology, and innovation. It emphasized the need to strengthen **technology transfer mechanisms** among scientific and technological institutions, the productive sector, and society, based on updated and efficient legal frameworks. The session also recommended expanding the use and interoperability of **government open data**, promoting greater transparency, scientific reproducibility, and support for evidence-based policymaking.

At the institutional level, participants highlighted the importance of **integrating ministries, universities, and companies** to accelerate sustainable innovation. The adoption of **data**

governance protocols and best practices in intellectual property management was also considered essential to ensure ethical and efficient use of knowledge resources.

Regarding research priorities, the session identified the need for studies on the **socioeconomic impact of the Law of Goodness (Lei do Bem)** and open data policies, as well as the development of applied research on **technology transfer models** and **innovation management** across regional and international contexts.

Overall, the discussions reinforced the strategic role of science, technology, and innovation policies in promoting sustainable development, institutional strengthening, and inclusive growth. The outcomes underline the relevance of aligning national initiatives with the **Sustainable Development Goals (SDGs)** and the **post-2030 global agenda**, ensuring that innovation serves as a driving force for transparency, competitiveness, and social well-being.

Follow-Up Actions (max 150 words)

Building on the session's outcomes, planned actions include launching pilot projects focused on open data interoperability, technology transfer networks, and regional innovation ecosystems aligned with the SDGs. Collaborative initiatives will involve universities, public agencies, and private actors to enhance STI governance mechanisms and foster evidence-based policymaking. A priority will be the creation of a national observatory on SDG-oriented innovation, coordinated with regional partners in Latin America and the Caribbean. Capacity-building workshops and policy dialogues will strengthen institutional frameworks for transparency, intellectual property management, and inclusive innovation. These efforts aim to consolidate Brazil's leadership in integrating the SDGs into ST&I policies while promoting cross-border collaboration and shared learning for sustainable and inclusive growth.

Luciane Costa
Science &Technology Analyst
COPIT/SETEC/MCTI

Session title: Responsible AI for Scientific Discovery: Navigating Governance, Health, Cybersecurity, and Ethics

Convenor details:

Convenor's name	Dr. Abbas Yazdinejad
Convenor's organisation	AIMMlab, University of Toronto
Organisation website	https://aimmlab.org/

Speakers

ID	Speakers' name	Organisation name	Country
1	Dr. Jude Kong	University of Toronto	Canada
2	Dr. Abbas Yazdinejad	University of Toronto	Canada
3	Dr. Okechukwu (Jake) Effoduh	Toronto Metropolitan University	Canada
4	Dr. Jay Shaw	University of Toronto	Canada
5	Dr. Nur Camellia Zakaria	University of Toronto	Canada

Session Thematic Track

2. AI, Data & Emerging Technologies – Digital transformation and planetary stewardship

Session Summary (max 200 words)

The session *"Responsible AI for Scientific Discovery: Navigating Governance, Health, Cybersecurity, and Ethics"* convened experts from law, health sciences, AI research, and cybersecurity to explore how responsible AI practices can sustain scientific integrity and societal trust. Anchored by a live case study on an interpretable AI system for air-quality forecasting in Toronto, the discussion examined the promises and pitfalls of AI in high-impact domains such as public health and climate science. The session highlighted that while AI enables unprecedented discovery and evidence generation, its deployment also introduces vulnerabilities—ranging from bias and inequity to cybersecurity threats. Presentations emphasized cross-disciplinary frameworks integrating legal accountability, ethical communication, secure AI pipelines, and equitable access to innovation. Through interactive

dialogue, participants identified practical strategies to embed governance, transparency, and security across the scientific AI lifecycle. The session contributed to the Summit's broader theme of ensuring that digital transformation strengthens—not undermines—the resilience and inclusivity of planetary science systems.

Key Scientific Insights (max 300 words)

Moderated by Dr. Jude Kong, the session demonstrated that responsible AI is a precondition for credible, reproducible, and equitable scientific discovery. Using the Toronto Black Carbon Forecasting System as a real-world case, panelists showed how interdisciplinary design—combining atmospheric data, deep learning, and agentic large language models (LLMs)—can forecast air-pollution hotspots while remaining interpretable and policy-relevant. Dr. Kong framed the case study, connected speaker perspectives across law, ethics, engineering, and security, and synthesized takeaways against planetary-boundaries and SDG goals.

1. **Governance and Legal Foundations:** Professor Jake Effoduh underscored that AI systems for public health must align with environmental law, WHO standards, and data-protection frameworks, while introducing auditability and shared accountability mechanisms.
2. **Ethical and Equity Dimensions:** Dr. Jay Shaw stressed that AI forecasts must avoid stigmatizing marginalized communities and that uncertainty communication should empower, not alarm, the public.
3. **Design and Implementation:** Dr. Nur Camellia Zakaria illustrated the need for robust feature engineering, cross-disciplinary collaboration, and transparent dashboards that democratize access to data.
4. **Cybersecurity Integrity:** Dr. Abbas Yazdinejad emphasized that data integrity, model robustness, and secure pipelines are non-negotiable pillars for trustworthy science; attacks on AI infrastructure can directly erode public confidence and policy outcomes.
   Collectively, these findings reinforced that AI for science must operate within "planetary boundaries" of ethical, legal, and cyber-secure governance to safeguard the integrity of environmental and health data critical for planetary stewardship.

Link to SDGs and Post-SDG Framework (max 150 words)

This session advances SDG 3 (Good Health and Well-Being), SDG 9 (Industry, Innovation and Infrastructure), and SDG 16 (Peace, Justice and Strong Institutions). It contributes directly to the AI, Data & Emerging Technologies thematic track by outlining governance principles for digital transformation that support sustainable, evidence-based policymaking. In the post-2030 context, these insights align with the UN Pact for the Future and the forthcoming Global Sustainable Development Report (GSDR 2026) by promoting ethical AI as a foundation for planetary resilience and social equity. The panel's integrated approach—linking cybersecurity, law, and public health—offers a replicable model for the *Science–Policy–Finance* nexus

envisioned in the Financing for Development (FfD4 2025) process, ensuring that AI investments strengthen democratic governance and environmental integrity.

8. Key Outcomes and Recommendations (max 300 words)

1. Governance Integration: Develop and adopt responsible AI governance frameworks for scientific research that codify accountability, transparency, and independent auditing of models influencing public policy.
2. Ethical AI Standards: Embed equity-centered design principles into AI pipelines to ensure that predictive systems in public health and environmental science benefit all communities, particularly vulnerable populations.
3. Cyber-Resilience by Design: Mandate cybersecurity controls—including anomaly detection, federated learning, and differential privacy—to protect data and model integrity across distributed research infrastructures.
4. Policy–Research Convergence: Establish inter-ministerial working groups linking environment, health, and innovation agencies to oversee AI applications in science, ensuring coherence between data governance and planetary boundaries.
5. Capacity-Building and Education: Support training programs for scientists, policymakers, and technologists on responsible AI, ethics, and cybersecurity to cultivate a culture of stewardship.
The overarching recommendation is to treat responsible AI not as a regulatory afterthought but as a *scientific method upgrade*—embedding explainability, fairness, and security from data acquisition to decision dissemination. By institutionalizing these principles, governments and research bodies can ensure that AI strengthens evidence-based decision-making for climate, health, and sustainability challenges rather than amplifying systemic risks.

9.Follow-Up Actions (max 150 words)

Between 2025 and 2026, the convenors and panelists will co-develop a **Responsible AI Governance Toolkit for Scientific Discovery**, in collaboration with the **AI4PEP Network**, **AIMMlab**, and **Toronto Metropolitan University**. This will include policy briefs, open-access datasets, and cybersecurity guidelines for AI pipelines in health and climate domains. Planned activities include:

- A **joint publication** summarizing scientific and governance insights from the session.
- A **pilot study** expanding the Toronto air-quality forecasting model to additional Canadian cities.
- A **workshop series** on *AI Governance and Planetary Stewardship* ahead of **COP30 (Belem, 2025)**.
  These efforts aim to operationalize the session's vision: embedding responsibility, transparency, and security in all AI-enabled scientific endeavors to advance safe, inclusive, and resilient knowledge systems within planetary boundaries.

Session title: Standardizing Health Data and Analytics to Accelerate Clinical Impact and Global Reach

Convenor details:

Convenor's name	Cynthia Sung, PhD
Convenor's organisation	Observational Health Data Science and Informatics
Organisation website	www.ohdsi.org

Speakers

ID	Speakers' name	Organisation name	Country
1	George Hripcsak	Columbia University	USA
2	Agnes Kiragga	African Population Health and Research Centre	Kenya
3	Seng Chan You	Yonsei University College of Medicine	South Korea
4	Nicole Pratt	University of South Australia	Australia
5	Peter Rijnbeek	Erasmus University Medical Center	Netherlands
6	Katia Verhamme	Erasmus University Medical Center and DARWIN-EU	Netherlands
7	Julio Oliveira	Precision Data	Brazil
8	Cynthia Sung	Duke-NUS Medical School	Singapore
9	Patrick Ryan	Johnson & Johnson; Columbia University	USA

Session Thematic Track

Thematic Tracks

AI, Data & Emerging Technologies – Digital transformation and planetary stewardship

Session Summary (max 200 words)

This session presented the Observational Health Data Science and Informatics (OHDSI) community, its global reach, and real-world studies that have impacted healthcare practice and policy.

Key Scientific Insights (max 300 words)

Real-world data (RWD)—information collected during patient encounters with the healthcare system—has the power to improve public health. Research on RWD helps scientists and clinicians better understand diseases, evaluate treatments, and predict health outcomes. The Observational Health Data Science and Informatics (OHDSI) community has spent over a decade addressing the challenges of generating reliable Real-World Evidence (RWE) from RWD. The foundation of OHDSI's work is the Observational Medical Outcomes Partnership Common Data Model (OMOP CDM), a well-defined structure and controlled vocabulary for health care data. Each data partner converts their data into the OMOP CDM format, essentially allowing different health systems to "speak the same language." OHDSI's tools support diverse research, such as comparative effectiveness, drug safety and patient level prediction. The same computer code can be run on multiple OMOP CDMs to combine insights across many sources without sharing personal health details. Data remain under control of the data owner, and codes are brought to the data source. Summary statistics generated by each collaborator are compared to identify similarities and differences, then aggregated for large-scale evaluation. By using this "federated" model—sharing code, not patient-level data—OHDSI is able to conduct global studies on millions of patients. The data owner retains full governance of their data, which promotes trust among collaborators. During the Covid-19 pandemic, the OHDSI community came together to generate evidence on millions of Covid-19 patients within a few months. The European Medicines Agency has a partnership with the Erasmus University Medical Centre to run RWD studies to assist with regulatory decision making (DARWIN-EU®). Many free resources exist for learning and getting training on OHDSI methodology. Regional and country chapters have formed in Europe, Asia-Pacific, Africa, India and Latin America. OHDSI has grown to >4,800 collaborators in 88 countries and 6 continents.

Link to SDGs and Post-SDG Framework (max 150 words)

Identify which SDGs your session contributes to (1–3 main goals) and how it aligns with the post-2030 agenda.

SDG3: Good Health and Well-Being OHDSI conducts comparative effectiveness and safety studies that illuminate which drugs, drug classes, or procedures have better outcomes or lower side effects than other drugs or procedures for the same condition. Patient-level prediction

studies help clinicians tailor a treatment plan for a particular patient based on their demographics, family history, social factors, current illnesses, and medications.

SDG10: Reduced Inequalities. Large-scale, global network studies enable comparisons of outcomes across different populations and help identify which groups may need different engagement or treatment. Towards equity and inclusivity, OHDSI has translated "The Book of OHDSI" into French, Chinese, Korean and Japanese; a project is underway for Spanish, Portuguese, Arabic, Kiswahili, Russian, and Turkish languages to make content accessible to those working in countries where English is not the predominant language among people involved in health care and health informatics.

Key Outcomes and Recommendations (max 300 words)

List the main policy recommendations, institutional commitments, and research priorities emerging from your session.

The mission of OHDSI is to improve health by empowering a community to collaboratively generate evidence that promotes better health decisions and care. Everyone is welcome to actively participate in OHDSI, whether you are a patient, a health professional, a researcher or someone who simply believes in our cause. OHDSI seeks innovation in informatics methodology and conducts studies to produce accurate, reproducible, and well-calibrated evidence necessary for health improvement.

The OHDSI community has a broad geographic distribution encompassing 6 continents. Data in an OMOP CDM exists for ~12% of the world's population. OHDSI's rapid evidence generation—seen during the COVID-19 pandemic and in ongoing work such as the DARWIN-EU® initiative supporting EMA's regulation of health products—exemplifies the community's significant contribution to public health. More than 700 peer-reviewed publications have used OHDSI tools to conduct their research www.ohdsi.org/publications.

A research priority of the community is to generate evidence to answer clinical questions not adequately addressed in existing clinical guidelines. The research will rely on the OHDSI Evidence Network, which aims to create meta-data of high quality OMOP CDM databases, thereby making the data Findable, Accessible, Interoperable, and Reusable (**FAIR**). Data owners with OMOP CDMs who wish to join the OHDSI Evidence Network may contact Clair Blacketer blacketer@ohdsi.org.

The session described many free resources to learn how to convert data to the OMOP CDM, such as the EHDEN Academy (academy.ehden.eu/) and prior OHDSI Symposium OHDSI tutorials www.ohdsi.org/tutorials/. More intensive hands-on tutorials are available for a charge at Columbia University and Oxford University. Oxford offers a few scholarships for people from under-resourced communities.

OHDSI recently developed a more comprehensive framework for representing geospatial data, social determinants of health, and environmental toxins. The GIS Workgroup has written documentation to link spatiotemporal data to health data that will make possible studies

evaluating the connection between planetary health and human health and support Science for a Sustainable Future, a key focus of this year's Science Summit.

Follow-Up Actions (max 150 words)

Complete this form for free membership in OHDSI https://tinyurl.com/JoinOHDSI and get invitations and agendas for the weekly global community calls every Tuesday at 11 AM ET. More personal interactions occur in the Workgroups or Chapters (www.ohdsi.org/workgroups/), which can be joined through this link https://tinyurl.com/JoinOHDSI-Chapters-WG. There are regional chapters for Africa, Asia-Pacific, and Latin America, as well as multiple country level nodes throughout Europe and Asia. Thirty workgroups cover a wide range of topics such as advancing health informatic methodologies (e.g. FHIR to OMOP, Generative AI, GIS, representation of Clinical Trial, Registry, and Survey data in the OMOP CDM), clinical domains (e.g. Oncology, Perinatal and Reproductive Health, Psychiatry, Surgery and Perioperative Medicine, Vision research), and continuing to improve foundational applications such as ATLAS, HADES, and Patient Level Prediction.

A fun and engaging way to learn about generating RWE and the OHDSI community is to attend an OHDSI Symposium (https://www.youtube.com/watch?v=BcEN4TyNQwE). The 2026 OHDSI Europe Symposium will be held 16-18 April in Rotterdam, Netherlands. The 2026 OHDSI Global Symposium will be held 20-22 October in New Brunswick, NJ, USA. The OHDSI webpage (www.ohdsi.org) will have announcements of other regional Symposia (Africa, Asia, Latin America) taking place at other times of the year. These Symposia almost always have dedicated tutorial sessions.

Supporting Materials (optional)

Attach or link to relevant presentations, photos, or reports.

- Main OHDSI website: https://www.ohdsi.org/
- OHDSI video: https://www.youtube.com/watch?v=BcEN4TyNQwE
- 'Our Journey' OHDSI Annual Report: https://www.ohdsi.org/wp-content/uploads/2025/10/OurJourney-2025.pdf
- OHDSI Publications https://www.ohdsi.org/publications/
- EHDEN Academy: https://academy.ehden.eu/
- DARWIN-EU®: https://www.darwin-eu.org/

Session title: Towards a Global AI Compact: Sovereignty, Sustainability, and Economic Growth

Convenor details:

Convenor's name	Lissa Maytas
Convenor's organisation	Information and Communications Technology Council (ICTC)
Organisation website	https://ictc-ctic.ca/

Speakers

(add as many rows as needed)

ID	Speakers' name	Organisation name	Country
1	Namir Anani	ICTC	Canada
2	Lissa Maytas	ICTC	Canada
3	Philip Piatkiewicz	AI Data and Robotics Association (Adra)	Belgium
4	Emanuela Girardi	AI Data and Robotics Association (Adra)	Italy
5	Philippe Dufresne	Office of the Privacy Commissioner of Canada	Canada
6	Alan Veerman	Vector Institute	Canada

Session Thematic Track

3. AI, Data & Emerging Technologies – Digital transformation and planetary stewardship

Session Summary (max 200 words)

Briefly describe the main focus, purpose, and participants.

Building on a joint report between the Information and Communications Technology Council (ICTC) of Canada and the European Union's AI Data and Robotics Association (ADRA) titled "*AI Sovereignty and Economic Growth: Strengthening Transatlantic Leadership Between the EU and Canada*", the session discussion highlighted key themes related to how cross-border collaboration on the development and adoption of artificial intelligence (AI) can drive economic growth while safeguarding sovereignty, trust, and fundamental values. The session consisted of keynotes from Namir Anani, President & CEO of ICTC, and Philippe Piatkiewicz, Secretary General of ADRA, along with a panel that included Canada's Privacy Commissioner, Philippe Dufresne, ADRA President Emanuela Girardi, and the Vector Institute's Chief Operations and Finance Officer, Alan Veerman.

Key Scientific Insights (max 300 words)

Summarise the key findings, evidence, or innovations presented. Explain their relevance to planetary boundaries.

Economically, AI is projected to add $15.7 trillion globally by 2030 and boost productivity by more than 3% annually. With this growth rate, the session's insights emphasize that AI must evolve through human-centric, trustworthy, and internationally coordinated governance to deliver its full economic and societal value. This description is a shift toward Industry 5.0, where AI systems can be designed to embed ethics, cultural values, safety, and human-in-the-loop feedback as standard. This human-centric approach not only strengthens trust but also enhances model performance, personalization, and robustness.

To bridge the current business gap in adoption – particularly amongst small and medium-sized enterprises (SMEs) – the session stressed principles-based regulation, agile governance tools (such as safety baselines, codes of practice, and sandboxes), interoperable standards, and data free flow with trust across borders. This emerging global governance architecture, supported by the G7, OECD, and Global Privacy Assembly efforts, is seen as critical to preventing fragmentation and enabling responsible AI development. A key innovation proposed is treating AI infrastructure—compute, data pathways, and talent—like public infrastructure, similar to schools or highways, to ensure equitable access and sustainable economic benefit.

The session also warned of workforce and equity risks, noting that AI is increasingly automating entry-level roles, threatening social mobility. National workforce development strategies that support measures such as work-integrated learning, workforce transition plans, reskilling programs, and equity guardrails were highlighted as helping to ensure that AI-driven prosperity is broadly shared.

Collectively, these insights align with the UNGA Science Summit's focus on planetary boundaries by prioritizing the mindful and intentional development of AI to ensure equitable societal benefit and strengthen the types of global cooperation needed to confront other transboundary challenges, such as climate mitigation.

Link to SDGs and Post-SDG Framework (max 150 words)

Identify which SDGs your session contributes to (1–3 main goals) and how it aligns with the post-2030 agenda.

The session's outcomes align with SDG 8 (Decent Work and Economic Growth), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 17 (Partnerships for the Goals). By fostering equitable participation in an AI-driven economy, the discussion supports inclusive growth and workforce adaptability (SDG 8). Investments in sovereign compute power, data access, and interoperable frameworks directly advance innovation and resilient infrastructure (SDG 9), with emphasis on ensuring these resources are accessible to emerging economies. Global cooperation emerged as a critical enabler, with recommendations to harmonize standards, enable cross-border data flows, and create multi-stakeholder partnerships for governance and innovation (SDG 17). Looking beyond 2030, these recommendations align with the emerging global agenda for inclusive digital transformation, ensuring that AI development remains human-centered, ethically governed, and globally coordinated. This forward-looking approach positions AI as a catalyst for sustainable growth, social inclusion, and technological equity in the decades ahead.

Key Outcomes and Recommendations (max 300 words)

List the main policy recommendations, institutional commitments, and research priorities emerging from your session.

The session emphasized that inclusive AI development must prioritize human interaction, cultural sensitivity, and language diversity to ensure equitable access and alignment with global societal values. Democratizing AI technologies and embedding these principles into design are critical for fostering societal trust and fairness in the rapidly developing area.

A second key outcome was recognition that global cooperation is indispensable for advancing trustworthy AI. Recommendations included harmonizing international standards, enabling secure cross-border data flows, and creating interoperable frameworks that support innovation while safeguarding privacy and fundamental rights.

The discussion also highlighted the need to balance rapid AI innovation with agile, principles-based governance. Suggested approaches included regulatory sandboxes, adaptive legal frameworks, and codes of practice that evolve alongside technological progress. Additionally, public investment in foundational infrastructure — such as sovereign compute power, data access, and workforce development — was identified as essential to unlocking AI's full potential. Building industry ecosystems around these resources will drive productivity gains, research breakthroughs, and equitable participation in the AI economy.

Finally, participants stressed that AI's economic promise depends on reskilling and upskilling the workforce. Creating accessible education and training pathways will enable individuals to

adapt, transition, and thrive in an AI-driven future, ensuring competitiveness and social inclusion. Collectively, these outcomes underscore the need for coordinated action across governments, industry, and civil society to shape an AI landscape that is innovative, trustworthy, and inclusive.

Follow-Up Actions (max 150 words)

Describe next steps, pilot projects, and planned collaborations (2025–2026).

ICTC and Adra are jointly committed to advancing areas of recommendation for global cooperation identified in their report *AI Sovereignty and Economic Growth: Strengthening Transatlantic Leadership Between the EU and Canada*, and to supporting these goals through their respective global collaborations.

1. Leveraging AI for business transformation through AI testbeds, regulatory sandboxes, ecosystem-building, and scaled industry applications.
2. Promoting ethical AI use by harmonizing regulation and aligning on privacy protection, AI governance, and risk mitigation.
3. Building AI knowledge and skills through talent exchanges, coordinated reskilling and upskilling, and curriculum alignment.
4. Enabling just transitions via best practices in labour rights, sustainable AI development, and international cooperation on labour standards.
5. Invesing in international AI innovation hubs leveraging Canada's quantum computing strengths and the EU's Horizon Europe program for joint AI-quantum R&D, cybersecurity, and AI-driven climate solutions.
6. Establishing public-private partnerships to co-design AI policies, develop infrastructure best practices, and strengthen collaboration models.

Supporting Materials (optional)

Attach or link to relevant presentations, photos, or reports.

Joint Report between ICTC and ADRA: AI Sovereignty and Economic Growth: Strengthening Transatlantic Leadership Between the EU and Canada

Session title: Next-Generation Cybersecurity Strategic Shielding for Fortifying EU, UK, GCC and Iraq Infrastructures (NGCSS): Impact on UN Sustainable Development Goals, Outcomes, and Collaboration Potential

Convenor details:

Convenor's name	Asaad Nayyef
Convenor's organisation	ASMY GROUP
Organisation website	www. asmygroup.com

Speakers

(add as many rows as needed)

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1	Prof Asaad Nayyef	ASMY GROUP University of Baghdad	United Kingdom
2	Dr Sameer Rashid Bhat	University of Oxford	United Kingdom
3	Dr. Mustafa Al-Ammar	Experten Zukunft EZ	Germany
4	Prof. Dr. Zuhoor Al-Khanjari	Sultan Qaboos University	Oman

Session Thematic Track

Cybersecurity

Thematic Tracks

4. AI, Data & Emerging Technologies – Digital transformation and planetary stewardship

Session Summary (max 200 words)

The primary challenge addressed by the Next-Generation Cybersecurity Strategic Shielding (NGCSS) initiative is the need to fortify the cybersecurity posture of the UK, EU and GCC critical infrastructures against sophisticated and evolving cyber threats.

Artificial intelligence (AI) is a powerful tool for enhancing cybersecurity and a potential enabler of more advanced cyber threats. For Europe, the UK, and GCC, the stakes are high due to their reliance on digital infrastructure and commitment to technological sovereignty, and they can position themselves as a global leader in secure and responsible AI adoption in cybersecurity.

Key Scientific Insights (max 300 words)

The Next-Generation Cybersecurity Strategic Shielding (NGCSS) project represents a transformative effort to fortify the European Union's critical infrastructures against emerging cybersecurity threats. This project integrates advanced cybersecurity frameworks, AI-driven threat detection systems, and cross-sector collaboration to establish a robust and adaptable infrastructure security model. The impact of this initiative extends beyond the immediate sphere of cybersecurity, directly contributing to the achievement of several United Nations Sustainable Development Goals (UN SDGs) and offering wide-ranging opportunities for collaboration and innovation.

Impact on the UN Sustainable Development Goals (SDGs)

SDG 9: Industry, Innovation, and Infrastructure NGCSS strengthens the resilience of critical infrastructures, such as transportation, energy, healthcare, and digital networks.

SDG 11: Sustainable Cities and Communities

SDG 17: Partnerships for the Goals The global nature of cybersecurity challenges necessitates collaborative solutions.

Link to SDGs and Post-SDG Framework (max 150 words)

RCO1: Risk Assessment and Threat Intelligence: Conduct comprehensive risk assessments of critical EU infrastructures and enhance threat intelligence capabilities to identify emerging cyber threats and attack vectors.

RCO2: Advanced Threat Detection and Prevention: Develop and deploy advanced threat detection and prevention mechanisms leveraging cutting-edge technologies such as artificial intelligence (AI), machine learning (ML), and behavioral analytics to detect and mitigate cyber threats in real-time.

RCO3: Secure Communication and Data Protection: Enhance the security of communication networks and data trans

RCO4: Resilience and Incident Response:

RCO5: Developing New Cybersecurity Approaches:

RCO6: Coordinating Cybersecurity Awareness Efforts

Key Outcomes and Recommendations (max 300 words)

- **NGCSS is the shield that keeps our digital world safe, strong, and ready for the future.**
- **A model for next-generation, human-centric cybersecurity.**
- **Stronger cybersecurity means stronger economies, safer people, and stable nations.**
- **Our project connects technology and people to create lasting digital safety.**
- **With cybersecurity and AI, we stop threats before they stop us.**
- **NGCSS is building a safer digital future for everyone.**
- **Cybersecurity is the foundation of trust in the digital age.**
- **Together, we can protect people, data, and systems worldwide.**
- **NGCSS is the next step toward peace, safety, and progress in the digital. world.**
- **NGCSS is not just about security; it's about building trust in the future.**
- **NGCSS = transformative cybersecurity initiative**
- **Contributes to global sustainability & security**

Strengthens infrastructures, fosters innovation, promotes trust

Follow-Up Actions (max 150 words)

Cybersecurity Risks Associated with AI for EU Critical Infrastructure (CYRAI)

The (CYRAI) project for 2026 represents a vital step toward enhancing the security, resilience, and reliability of digital services and critical systems across the EU. The project aims to safeguard the EU's strategic interests and protect citizens' rights in the digital age by utilising advanced technologies, fostering collaboration, and adopting a proactive and holistic approach to cybersecurity.

Global South-led Synergies and Integration of Data, Digital Health and AI to Combat TB

Convenor: Dr. Romulo de Castro

September 11, 2025 900-1045am EST

Session Speakers/Discussants:

Dr. Romulo de Castro, University of San Agustin (Philippines)

Ms. Chaitali Sinha, IDRC (Canada)

Dr. Emmanuel Musa, York University, AI4PEP (Canada)

Dr. Patricia Espinosa Lopez, Universidad Peruana Cayetano Heredia (Peru)

Dr. Agung Alfiansyah, Universitas Prasetiya Mulya (Indonesia)

Dr. Anis Fuad, Universitas Gadjah Mada (Indonesia)

Dr. Jesus Emmanuel Sevilleja, National Center for Mental Health (Philippines)

Dr. Hasyirul Hashim, Tuberculosis Watch System (Malaysia)

Dr. Gantungalag Ganbaatar, National Center for Communicable Diseases (Mongolia)

Main Scientific Insights and Recommendations

AI4PEP—**a transdisciplinary, multiregional network of AI experts and research professionals from more than 20 Global South countries**—is accelerating AI-powered innovation in global health. Session discussions highlighted that **many active TB programs across the Global South already employ digital health, data systems, and AI**, including AI-enhanced diagnostics, digital adherence tools, mobile case-finding, telehealth, and real-time surveillance platforms.

Key scientific insights and lessons learned from the session include:

1. **AI-based solutions have achieved significant progress in TB diagnostics and treatment support**, addressing long-standing gaps in early detection, MDR-TB triage, and case management.
2. Effective TB innovations must uphold **people-centeredness**, ensuring acceptability, cultural relevance, and community trust.
3. **AI tools must be translated into user-friendly, accessible applications** for frontline providers, CHWs, and patients.
4. **Integrating AI into real healthcare workflows remains a critical challenge**—requiring workflow redesign, digital readiness, governance alignment, and human-centered design.

5. Future efforts must involve **global partners co-creating scalable, ethical, interoperable digital solutions** aligned with "End TB" goals.
6. **Multisectoral cooperation**—health, ICT, environment, social protection, civil society—is essential for successful implementation.
7. **Collaboration and knowledge exchange across countries** are foundational; Global South programs can learn from and build upon each other's innovations (e.g., Morocco's real-time monitoring, Peru's MDR-TB pathways, Philippines' health system strengthening).
8. **Data-driven insights, predictive algorithms, and collaborative workflows** can help identify and engage patients at risk of treatment interruption, improving adherence and outcomes.

Researchers from **Indonesia, Peru, and the Philippines** have catalyzed an initiative to integrate data, digital health, and AI resources. They have invited broader participation from **Malaysia, Mongolia, and other AI4PEP countries**, many with **among the highest TB incidence rates globally**, to advance regional synergies, shared governance, and coordinated research.

The central recommendation: build a **federated, interoperable, responsible-AI ecosystem** that supports:

- ✓ Federated data sharing while preserving national sovereignty;
- ✓ Multi-country AI development and validation;
- ✓ Integrated digital workflows;
- ✓ Shared digital governance frameworks;
- ✓ Decolonized, gender-aware, community-driven, equity-focused innovation.

This positions the Global South as **leaders in global digital governance and responsible AI for TB**.

(2) Links to Relevant SDGs and Planetary Boundaries

The initiative strengthens key SDGs:

- ✓ **SDG 3 (Good Health and Well-being):** improved TB detection, adherence, surveillance, and health-system resilience;
- ✓ **SDG 5 (Gender Equality):** addressing gendered barriers in access, digital inclusion, and AI fairness;
- ✓ **SDG 10 (Reduced Inequalities):** equitable access to technology, South-led research, and community-driven innovation.

Links to **One Health and planetary boundaries** include:

TB's sensitivity to **climate change**, displacement, air pollution, and socio-environmental stressors;

The need for digital tools that integrate **environmental indicators, early warning systems, and ecological determinants**;

Support for **planetary health** through climate-aware, eco-social TB programming.

The approach advances **health justice, gender justice, decolonization, and interdisciplinary collaboration**, ensuring that technologies reflect local realities and serve populations equitably.

(3) Concrete Actions, Commitments, and Follow-Up Plans (2025–2030)

A. Collective Commitment from Global South AI4PEP Countries

AI4PEP countries commit to:

- ✓ **Strengthening research collaborations on TB**, including multi-country studies and shared evaluation pipelines.
- ✓ **Sharing digital resources and expertise** to accelerate responsible innovation.
- ✓ Building **capacity in AI, data science, digital health implementation, and community-engaged research**.
- ✓ Advancing **health and gender equity** through inclusive, community-driven design.
- ✓ **Leading global standards** in responsible AI, data governance, and ethical TB digitization.
- ✓ Supporting workflow integration, human-centered design, and digital literacy in national programs.

B. Draft Governance Framework & Roadmap for Integrating Data, Digital Health, and AI (2025–2030)

2025–2026: Governance Foundations and Pilot Integration

Develop a **Transnational TB Data Governance Framework**, covering privacy, sovereignty, gender justice, ethics, decolonization, and responsible AI.

Form an **AI4PEP Digital TB Integration Council** with representation from ministries, researchers, gender advocates, communities, and partners.

Launch multi-country federated learning pilots and develop early AI models for TB detection, risk prediction, treatment adherence, and real-time monitoring.

2026–2027: Interoperable Systems and Workflow Integration

Implement **digital workflows** for case-finding, referral, diagnostics, and treatment support.

Add **predictive algorithms and adherence risk models** to identify patients at risk of treatment interruption.

Integrate **climate, environmental, and social-determinant data** into TB surveillance dashboards.

Expand frontline capacity-building in digital health and responsible AI.

2028–2030: Scale-Up, Regional Leadership, Sustainability

Publish a **White Paper / Opinion Piece** outlining the Global South digital governance blueprint for TB.

Scale federated data systems and regional AI networks across AI4PEP countries.

Consolidate real-time monitoring systems (e.g., Morocco), MDR-TB AI pathways (Peru), and regional health systems strengthening (Philippines).

Institutionalize governance structures with annual digital equity, algorithmic fairness, and environmental-resilience reporting.

Advance **One Health-aligned approaches**, integrating health, environment, and social protection.

C. Demonstrated Impact and Future Vision

Impact to date includes:

Enhanced facility readiness and diagnostic capability using AI and digital tools;

Strengthened local research ecosystems and digital capacity;

Improved community outcomes through case management, risk stratification, and digital adherence support;

Evidence-based policymaking informed by real-time analytics;

Knowledge-sharing across regions, accelerating innovation through **PAN-regional synergies**.

Future directions (2030 and beyond):

Expanding multi-country digital health research networks;

Advancing interoperable, ethical, AI-driven diagnostic tools;

Scaling real-time monitoring and predictive early-warning systems;

Integrating **One Health and planetary health data** into TB response;

Strengthening sustainable, resilient health systems through responsible, equitable AI.

Prepared by:

Dr. Jesus Emmanuel Sevilleja

Dr. Romulo de Castro

Session title: AI in the Flow: Wastewater Surveillance for Emerging Pathogens and Antimicrobial Resistance

Convenor details:

Convenor's name	Dr. Hana Trigui
Convenor's organisation	Pasteur Institute in Tunis
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Speakers

(add as many rows as needed)

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1	Dr. Sadri Znaidi	Pasteur Institute in Tunis	Tunisia
2	Dr. Emna Souiai-Harigua	Pasteur Institute in Tunis	Tunisia

Session Thematic Track

Health, Inclusion & Sustainability – One Health, social equity and wellbeing

Session Summary (max 200 words)

This session examines how combining wastewater-based epidemiology (WBE) with artificial intelligence (AI) can transform surveillance of waterborne pathogens and antimicrobial resistance (AMR) in Tunisia, with potential expansion across Africa and the MENA region. The AI4PEP-Tunisia project responds to fragmented, paper-based health data by pursuing three key objectives: identifying priority waterborne pathogens and AMR-related genes in partnership with the Ministry of Health; conducting nationwide wastewater sampling using molecular and culture-based methods; and integrating these results with external datasets into an AI-powered platform for real-time outbreak forecasting, AMR spread prediction, and risk mapping.

By merging microbial, genomic, environmental, and demographic data, the project aims to generate actionable insights and strengthen links between data science, microbiology, and public health policy. A central innovation lies in using AI to analyze WBE-derived pathogen loads and AMR

patterns alongside demographic, health, and environmental indicators to model disease risks and identify emerging hotspots.

This multidisciplinary effort, spanning molecular biology, bioinformatics, machine learning, and governmental collaboration, enables earlier detection of pathogen surges, including resistant strains. The initiative also builds local capacity through training and infrastructure, offering a scalable framework for regional adoption and demonstrating how AI-enhanced WBE can deliver early warnings, guide resource allocation, and mitigate future health crises.

Key Scientific Insights (max 300 words)

The core innovation is the successful development of an AI-driven predictive model for monitoring waterborne pathogens like *Salmonella* and *Vibrio* in Tunisia's wastewater treatment plants (WWTPs). By digitizing and analyzing five years of historical compliance data and enriching it with contextual factors, the project created machine learning models and an interactive dashboard. This system transforms fragmented data (among them paper-form data) into an early-warning tool, allowing for proactive public health interventions.

This work directly addresses the Freshwater Use boundary. In water-scarce regions like Tunisia, treated wastewater is often reused for irrigation. The project's focus on ensuring this water is free from high-priority pathogens is a critical step toward promoting safe water recycling. This reduces pressure on freshwater resources by providing a sustainable alternative for agriculture, while also preventing land degradation from contaminated irrigation.

In essence, AI4PEP-Tunisia public health innovation provides a powerful tool for indirect planetary boundary management. By enabling smarter wastewater surveillance and treatment, it helps mitigate cross-boundary pollution and promotes the safe reuse of a critical resource.

Link to SDGs and Post-SDG Framework (max 150 words)

Identify which SDGs your session contributes to (1–3 main goals) and how it aligns with the post-2030 agenda.

AI4PEP-Tunisia project demonstrates strong alignment with the UN's 2030 Sustainable Development Goals (SDGs), particularly contributing to SDG 3: Good Health & Well-being and SDG 6: Clean Water & Sanitation. By developing an AI-driven surveillance system to monitor and predict waterborne pathogens in wastewater, the project directly supports SDG 3 Target 3.3 by working to prevent the spread of water-borne diseases and Target 3.9 by reducing mortality and illness from hazardous water pollution. Simultaneously, its focus on improving

wastewater treatment quality and promoting the safe reuse of water for irrigation and other purposes directly advances SDG 6 Target 6.2 on sanitation and Target 6.3 on improving water quality by reducing pollution and minimizing the release of hazardous materials.

AI4PEP-Tunisia project's methodology provides a forward-looking model that aligns with emerging proposals for the post-2030 development framework, which aims to address critical shortcomings of the current SDG system. A primary challenge has been pervasive data gaps and overlapping indicators, which the project directly overcomes by transforming sparse, paper-based compliance reports into a robust, AI-driven predictive early-warning system, thereby demonstrating a practical solution for enhancing data collection and utilization. Furthermore, the project exemplifies a key proposed feature of the future framework, the use of "custom indicators." By focusing on Tunisia-specific pathogens and enriching its models with locally scraped contextual data, INTERACT perfectly illustrates the development and utility of tailored indicators that complement global core metrics, ensuring that interventions are both highly relevant and impactful within their specific regional and operational context.

Key Outcomes and Recommendations (max 300 words)

List the main policy recommendations, institutional commitments, and research priorities emerging from your session.

Key Outcomes:

1. Successful development of an AI-driven predictive model for *Salmonella* and *Vibrio* in wastewater, demonstrating the feasibility of using retrospective data for early warning.
2. Creation of an interactive dashboard to translate data into actionable public health intelligence.
3. Identification of a priority list of waterborne pathogens for targeted national surveillance in Tunisia.
4. Establishment of a collaborative framework between research, government, and international partners.

Follow-Up Actions (max 150 words)

Describe next steps, pilot projects, and planned collaborations (2025–2026).

The immediate next step is to launch the prospective field sampling campaign in 2025, pending the procurement of reagents. This will involve collecting 24-hour composite samples from the 17 selected WWTPs across both dry and wet seasons.

The primary objective is to detect and quantify the full spectrum of priority pathogens—Vibrio, Salmonella, enteric viruses (Hepatitis A/E, Norovirus), and Microsporidia—using both culture-based and molecular (qPCR) methods. This prospective data is crucial for validating and refining the existing AI prediction models, moving from retrospective analysis to real-time forecasting.

Planned collaborations include deepening the technical partnership with the Ministry of Health's DHMPE for sampling and leveraging the newly secured TAWA grant to integrate AMR surveillance, an initiative that combines Artificial Intelligence, metagenomics, and wastewater-based epidemiology. A pilot project will explore correlating wastewater pathogen levels with clinical case data to strengthen early-warning capabilities, with preliminary results targeted for mid-2026.

Session title: Strengthening Trust through Transparency, Access and Quality: Emerging Strategies to Tackle Disinformation

Convenor details:

Convenor's name	Suzanne Dumouchel
Convenor's organisation	OPERAS
Organisation website	www.operas-eu.org

Speakers

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2	Lidia Borell-Damian	Science Europe	Belgium
3	Niels Stern	Oapen & DOAB	The Netherlands
4	Christina Drummond	University of North Texas	USA
5	Agata Gurzawska	Trilateral Research	Ireland

Session Thematic Track

5. AI, Data & Emerging Technologies – Digital transformation and planetary stewardship

Session Summary (max 200 words)

Briefly describe the main focus, purpose, and participants.

This session addresses two pressing global challenges: (1) rebuilding trust among humans and societies and (2) combating the spread of disinformation. The objectives are

rooted in the recognition that no trust in information is possible if mistrust is too high within societies. Secondly, it considers that fact-checking—though essential—arrives too late in the process to effectively tackle disinformation. Two linked actions must be done to drastically reduce disinformation: 1. increasing the quality of content and 2. (re)building trust across those sharing and receiving content.

The session will examine how these two areas—content quality and trust-building—are not only interrelated but work in tandem to significantly reduce the spread of disinformation. Efforts presented will illustrate how improving the integrity of information and establishing trust between institutions and the public is possible through actionable strategies that create a more informed, resilient, and cohesive society.

The interconnections between trust markers and content quality disclosures will be presented in the context of existing efforts. Taking its roots in the scientific context that have defined criteria for creating trust and maintaining quality, the session closes with suggested actions for policymakers seeking to strengthen national data governance and stewardship.

Key Scientific Insights (max 300 words)

Summarise the key findings, evidence, or innovations presented. Explain their relevance to planetary boundaries.

The key scientific insights highlight that **quality, transparency, and collective governance** are fundamental to rebuilding trust in the digital information ecosystem—especially at a time when generative AI challenges the very notion of authenticity. Together, the Information Quality Protocol (IQP), the PRISM service, the European Diamond Capacity Hub, the development of data stewards and emerging dataspaces demonstrate how shared standards and coordinated stewardship can safeguard the integrity of knowledge while enabling responsible innovation.

Key findings and evidence

1. Quality and Transparency as cornerstones of Trust
The session reaffirms that quality is not only a scientific criterion but a social contract. The IQP, DOAB/PRISM, and Diamond OA models embed transparency through provenance metadata, peer-review disclosures, and open access to validated knowledge. These elements allow both humans and AI systems to understand *how* knowledge was produced and to distinguish trusted content from synthetic or unreliable sources.

2. Trust as an Ecosystem – Collective and Sovereign Governance
Drawing on VERITY, the session emphasizes that trust is formed within a broad "ecosystem of trust" involving researchers, funders, industry, publishers, platforms, policymakers, communities, and citizens. The IQP and dataspaces frameworks **strengthen institutional legitimacy** and enable **collective governance** by defining

shared rules for validation, provenance, and responsible data exchange, while upholding **data and content sovereignty**. This prevents monopolisation, mitigates opaque algorithmic influence, and supports collaborative ecosystem of trust.

3. Beyond True or False – Context, Process, and AccountabilityVERITY's Recommendations for Fostering Trust in Scienceand the IQP both show that trustworthiness depends not on absolutist notions of truth but on **transparent processes, contextual metadata, and repeatable methods**. The shift from binary truth-judgment to *process-based quality assurance* is essential in resisting the "AI chaos-test."

4. Digital and Data Literacy as Resilience Tools
Speakers converged on the importance of strengthening digital, data, and stewardship literacy. Understanding provenance, peer review, data rights, and trust indicators empowers individuals, communities, and institutions to navigate AI-driven information environments critically and confidently.

5. Infrastructures for the Future – Preparing for the AI-augmented World
The contributions show how scientific infrastructures that put trust and quality at their heart, anticipate a future in which human and machine agents co-produce and exchange knowledge. By embedding transparency, auditability, and collective governance into today's systems, these initiatives prepare societies for a digital future aligned with planetary boundaries.

Relevance to Planetary Boundaries

High-quality, trustworthy information is a precondition for effective action within planetary limits. Disinformation about climate change, health, or biodiversity undermines society's capacity to respond to risk. By reinforcing information integrity—especially around climate science and the nine planetary boundaries—these initiatives strengthen our ability to make informed, ethical decisions that support SDGs 3, 4, 13, and 16.

In essence, safeguarding information quality is as vital to planetary stability as safeguarding natural ecosystems. Transparency, distributed governance, and literacy become the **new infrastructures of trust**, enabling societies to act responsibly within safe and just planetary boundaries.

Link to SDGs and Post-SDG Framework (max 150 words)

Identify which SDGs your session contributes to (1–3 main goals) and how it aligns with the post-2030 agenda.

The session directly contributed to several UN SDGs by addressing the structural drivers of disinformation, strengthening the ecosystem of trust in science, research and innovation, and improving the quality and provenance of scientific information. By embedding transparency, stewardship, and collective governance across information systems, the initiatives presented support several SDGs in tangible, mutually reinforcing ways.

SDG 16 – Peace, Justice, and Strong Institutions:

The session advances Target 16.10 by showing how tools such as the ones presented during the session can operationalise public access to reliable information, reinforce accountability, and strengthen institutional legitimacy. By clarifying provenance, preventing manipulation, and enabling collective governance, these frameworks help institutions uphold fundamental freedoms and counter AI-driven distortions.

SDG 3 – Good Health and Well-being

Health mis- and disinformation directly threatens public well-being. By promoting high-quality, contextualised information, strengthening trust in scientific actors (through Stewards of Trust), and enabling transparency around evidence creation, the session supports Target 3.8. Improved information quality underpins effective communication during health crises, vaccination campaigns, and public health decision-making.

SDG 13 – Climate Action

Information integrity is essential for climate mitigation and adaptation. By combating climate disinformation and strengthening trust in climate science—through verifiable provenance, transparent review processes (PRISM), and trusted data sharing systems (OAeBU dataspace)—the session reinforces Target 13.3. Controlled sovereign data sharing can also reduce computational burdens, lowering the environmental footprint of data infrastructures while improving access to trusted climate knowledge.

SDG 4 – Quality Education

The session contributes to Target 4.7 by emphasizing digital, data, and information-stewardship literacy as core competencies for global citizenship. Tools such as VERITY's recommendations for fostering trust in science, participatory governance models, and transparency frameworks empower learners, educators, and policymakers to critically assess information, navigate AI-generated content, and engage responsibly with sensitive or sovereign data in line with CARE principles.

Looking ahead – alignment with the post-2030 agenda

The session anticipates a post-2030 world where sustainability depends not only on ecological and economic resilience but on the **integrity, sovereignty, and trustworthiness of information ecosystems**. By embedding transparency-by-design, collective

governance, and digital literacy into global frameworks, the IQP and related initiatives provide a blueprint for societies to operate within safe and just planetary boundaries.

They reinforce the idea—central to planetary-limits science—that effective climate action, biodiversity protection, and social cohesion all require **trusted, verifiable, high-quality knowledge**. Strengthening information integrity is thus a foundational pillar of the next global development framework.

Key Outcomes and Recommendations (max 300 words)

List the main policy recommendations, institutional commitments, and research priorities emerging from your session.

Policy Recommendations

1. **Embed information quality standards into digital and science governance frameworks.**
   Policymakers should incentivize the adoption of the **Information Quality Protocol (IQP)** and complementary transparency frameworks (e.g., PRISM, FAIR/CARE-aligned provenance standards) to ensure traceability, accountability, and contextual integrity in public communication, Open Access publishing, and AI systems. These standards should be both human- and machine-actionable.
2. **Promote collective governance of sovereign data and knowledge.**
   Policies should empower communities, institutions, and public infrastructures to co-govern information ecosystems. Drawing on VERITY's ecosystem-of-trust insights and dataspaces architectures, governments should safeguard data sovereignty, uphold human rights and benefit sharing, and prevent monopolization or opaque algorithmic control of knowledge systems.
3. **Strengthen digital, data, and stewardship literacy through education and lifelong learning.**
   Digital literacy must now include **critical thinking, provenance, data rights, quality assessment, and trustworthy stewardship**. This is a public good and a resilience measure. Educational systems should integrate competencies that help citizens evaluate data sources, understand variability in evidence, and identify reliable signals in an AI-saturated environment.
4. **Ensure interoperability across scientific, policy, and civic data systems.**
   Promote dataspaces, persistent identifiers, open metadata, and shared semantic standards that connect verified scientific outputs with real-world observations. This supports evidence-based policymaking, citizen engagement, and transparent public services—while upholding privacy and ethical safeguards.

Institutional Commitments

To strengthen trust through transparency, access, and quality, institutions should commit to:

- **Transparency-by-design, human rights-by-design and privacy-by-design** approaches, including persistent identifiers, community-governed metadata standards, and open provenance tracking across scientific and policy workflows.
- **Supporting Diamond Open Access and trusted open infrastructures**, ensuring that openness is aligned with quality assurance, bibliodiversity, and sustainability.
- **Building collaborative trust frameworks** that link academia, media, civil society, and technology providers as stewards of trust to counter AI-driven disinformation and reinforce ecosystem of trust.

Research Priorities

1. **Impact of AI on information integrity and trust.** Advance interdisciplinary research examining how generative AI reshapes public reasoning, scientific credibility, and democratic discourse.
2. **Metrics and indicators for information quality.** Develop robust, interoperable indicators—rooted in IQP, PRISM, FAIR/CARE principles, and trust metadata—to assess provenance, credibility, and contextual accuracy.
3. **Models for collective and decentralized governance of knowledge.** Experiment with federated infrastructures, citizen co-governance models, and trust-by-design mechanisms that operationalize VERITY's Stewards of Trust approach.
4. **Sustainability of Open Access and trust infrastructures.** Assess the ecological and social impacts of AI training, data storage, publishing workflows, and digital infrastructures to ensure that open science operates within planetary boundaries.

Conclusion

The session called for a paradigm shift—from reactive regulation to **proactive trust-building**—anchored in quality, transparency, collective governance, and foresight. These recommendations support the SDGs and align with the **post-2030 agenda**, where trustworthy information ecosystems become essential for societal resilience.

As a final recommendation, the session urges that the forthcoming declaration explicitly reference **information integrity in relation to climate change and the "nine planetary limits" science**. Trusted knowledge is indispensable for navigating global risks and keeping humanity within a safe and just operating space.

Follow-Up Actions (max 150 words)

Describe next steps, pilot projects, and planned collaborations (2025–2026).

Following the session, several concrete actions are planned to advance the agenda of trust, transparency, and information integrity. OPERAS has submitted the **TrustUP project** to the European Commission, aiming to operationalise the Information Quality Protocol and strengthen trust signals across Open Science infrastructures. A dedicated **I4T Knowledge Network webinar** will raise awareness and share practical tools emerging from VERITY, DOAB/PRISM, dataspaces, and IQP implementation.

A **multi-stakeholder working group** will be established to co-develop future-oriented guidance on collective governance, data sovereignty, and quality standards for AI-era information ecosystems. This group will explore alignment with the post-2030 agenda and planetary-boundaries science, including climate-related information integrity.

Additional follow-up includes fostering collaborations between scientific infrastructures, policy actors, and civil society; refining trust indicators; and preparing a shared roadmap for integrating provenance, literacy, and transparency into national and international science governance frameworks.

Supporting Materials

This section is organized in two parts. The first one gathered the presentations done during the session at Science Summit:

Dumouchel, S., Borrell-Damián, L., Stern, N., Gurzawska, A., & Drummond, C. (2025). Strengthening Trust through Transparency, Access and Quality: Emerging Strategies to Tackle Disinformation [Session at Science Summit]. Zenodo. https://doi.org/10.5281/zenodo.17120958

- Presentation: 10.5281/zenodo.17120716 (DOI)
- Presentation: 10.5281/zenodo.17120899 (DOI)
- Presentation: 10.5281/zenodo.17120637 (DOI)
- Presentation: 10.5281/zenodo.17120758 (DOI)
- Presentation: 10.5281/zenodo.17093935 (DOI)

The second one includes different publications and announcements related to the topics of the session:

- OPERAS Editorial Team (September 1, 2025). PRESS RELEASE: OPERAS leads session on Strengthening Trust at UN Science Summit for second consecutive year. *OPERAS*. Retrieved November 5, 2025 from https://doi.org/10.58079/14k8y
- Event Page: https://event.sciencesummitnyc.org/list-of-sessions/detail/214

- In particular, several documents published by the speakers can be found here: https://i4tknowledge.org/#library . Search for "summit" or "science summit" in the searchbar.

Session title: Ensuring secure and sustainable liquid fuel supply for civil transportation: balancing ecosystem integrity and economic fairness for low- and moderate-income populations

Convenor details:

Convenor's name	RICHEL Aurore
Convenor's organisation	University of Liège (Belgium)
Organisation website	www.uliege.be

Speakers

ID	Speakers' name	Organisation name	Country
1	Aurore RICHEL	University of Liège	Belgium
2	Sergio MARTINEZ-VILLARREAL	University of Liège	Belgium
3	Chiaki OGINO	Kobe University	Japan
4	Changbin YIN	Institute of Agricultural Resources and Regional Planning, CAAS	China
5	Shu WANG	Jinan University-University of Birmingham Joint Institute	China

Session Thematic Track

Finance, Industry & Innovation – Aligning investment with planetary resilience

Session Summary

Civil transportation across road, air, and sea remains heavily reliant on fossil fuels, generating major greenhouse gas emissions and natural resource pressures across its value chain. This dependency drives the sector beyond planetary boundaries, threatening climate stability and environmental integrity. Although cleaner alternatives (such as biofuels, e-fuels, hydrogen and electrification) are advancing, their adoption remains uneven. High-income countries move forward through strong policies, investments, and research, while low- and middle-

income regions face constraints in affordability, access, and infrastructure. This disparity risks deepening inequalities and locking many territories into high-emission pathways. Achieving sustainable mobility within planetary boundaries requires more than technology. It calls for mobility justice, a transition that is socially inclusive, territorially sensitive, and economically fair. The sector must evolve beyond a uniform fuel model toward systems adapted to local resources, such as sustainable biomass use in rural areas. This session, bringing together academic and industry experts, moved beyond dialogue to define concrete actions for implementation. It showcased affordable, low-impact fuel solutions supporting rural development while preserving ecological integrity. By linking innovation, social inclusion, and territorial adaptation, the session emphasized how equitable, context-driven approaches can foster a just transition to low-carbon transport within the planet's limits.

Key Scientific Insights

The civil transportation sector is a major driver of global greenhouse gas emissions, accounting for over 23% of all energy-related emissions, or more than 8.4 Gt CO_2-eq. per year, with an annual growth of 1.7%. Road transport dominates (74%), while aviation and maritime each contribute around 10%. Current trends have already driven the **transgression of multiple planetary boundaries**, including global warming, biodiversity loss, infrastructure degradation, and increased atmospheric aerosols. The sector remains heavily reliant on fossil fuels, with electric vehicles representing only 1.4% and renewable biofuels 3.6%; While high-income countries promote low-carbon mobility through policies such as the EU's RED III, these benefits largely exclude disadvantaged populations. Populations in the Global South, with limited access to mobility, suffer disproportionately from emissions and pollution, face high fuel costs, dependence on imports, and heightened **socio-economic vulnerability**, reflecting severe inequities and a **lack of global climate justice**. While aviation has received considerable attention, our research demonstrates the **critical importance of focusing on road transport**, which is both a major source of emissions and inequality. Road passenger transport is projected to more than triple by 2050, emphasizing the need to **prioritize policies that integrate sustainability and equity**. In low- and middle-income countries, biofuel production (bioethanol, biodiesel) should be promoted through short supply chains, energy communities, and local training programs. Our **research highlights successful North-South cooperation** initiatives in Indonesia, South American and several African countries, where organic waste supply chains have been converted into biofuels, creating **active energy communities**, enhancing local energy security, reducing emissions, and addressing local environmental and social challenges. Implementing these initiatives within regulated frameworks ensures sustainability, prevents overproduction, supports rural livelihoods, and contributes to respecting planetary boundaries while advancing global equity and a just energy transition.

Link to SDGs and Post-SDG Framework

This session highlighted actions aligned with SDG 7, emphasizing the deployment of clean, affordable, and low-cost energy for the transport sector, with a focus on road transport. Through our proposed joint vision, the session also promoted sustainable and equitable production and consumption in line with SDG 12. By developing value chains for biofuel production from residual organic matter, the session showcased the benefits of establishing independent, secure energy communities, particularly suitable for low- and middle-income countries. Concrete actions include short supply chains, rural training programs, local waste collection and processing, and targeted public-private investments to support infrastructure and capacity-building. Looking beyond 2030, these initiatives contribute to the post-SDG agenda by setting long-term biofuel targets, integrating energy community models into national planning, creating financial instruments for rural biofuel production, and monitoring GHG reductions against planetary boundaries. These measures foster inclusive, climate-resilient, and socially equitable transport systems, bridging SDG objectives with long-term global sustainability and equity goals.

Key Outcomes and Recommendations

Policy recommendations. Given current factual evidence on the state and medium-term evolution of road transport, it is crucial to intensify the promotion of low-carbon road transport modes. In high-income countries, electrification should be prioritized, with clearly defined and quantifiable targets, while the development of biofuels should be actively supported in low- and middle-income countries. Concrete support for biofuel value chains should involve both financial and educational incentives to foster innovative production from local organic waste, following short supply chain models and the establishment of decentralized energy communities. The integration of these energy communities should be incorporated into national action plans and transport policies. Moreover, it is essential to support public-private financing mechanisms to strengthen local infrastructure, capacity-building, and rural biofuel projects. Finally, measurable and realistic targets should be established, with interim milestones and long-term objectives for 2030 and 2050, to ensure effective monitoring and achievement of low-carbon transport goals. **Institutional Commitments.** Our research has highlighted that effective low-carbon road transport requires cross-sectoral coordination among ministries/agencies/actors of transport, energy, and environment to develop coherent strategies. It also underscores the importance of North-South cooperation, enabling knowledge exchange, technical assistance, and joint biofuel projects that transfer experience from high-income countries to support sustainable solutions in low- and middle-income regions. Finally, our findings emphasize community empowerment, engaging local stakeholders in planning, monitoring, and operating decentralized energy communities. **Research Priorities.** Our research highlights the need for R&D support to optimize biofuel production for local conditions. North-South collaboration

can enable technology transfer and joint innovation, while equity analysis ensures mobility access and affordability for vulnerable populations. Strengthening R&D alongside local engagement is essential for low-carbon, socially equitable, and context-sensitive transport solutions, particularly in regions often underserved by high-income countries.

Follow-Up Actions

Improving communication and visibility is a top priority for our consortium, as it remains essential to effectively engage both public and private stakeholders. By strengthening our outreach and showcasing the economic, environmental, and social added value of biofuel initiatives, we aim to mobilize stronger participation from private actors, currently a key bottleneck in scaling impact. Our team has already established a **biofuel technology transfer platform** (more information), which now requires enhanced visibility and institutional recognition. We are deeply involved in developing short biofuel supply chains in rural communities and plan to launch pilot projects in Asia, where several interventions are already operational. We intend finally to seek support from the United Nations to raise visibility and promote collaboration, as well as engage the **World Bank to explore funding opportunities** through the presentation of our research. In parallel, we aim to expand our activities to new countries with the help of local funding agencies, ensuring broader regional outreach and long-term sustainability.

Supporting Materials (optional)

Link to the details of this session (from our institutional deposit tool):
https://orbi.uliege.be/handle/2268/337154

Relevant collegial works from the different speakers of this session:
https://orbi.uliege.be/handle/2268/335869

https://orbi.uliege.be/handle/2268/332786

https://orbi.uliege.be/handle/2268/324474

Session title: Water Challenge

Convenor details:

Convenors name	Prof Wilfred Lameck Uronu Dumas F. Lafontant, ML, Consultant
Convenor's organisation	Mzumbe University
Organisation website	https://www.mzumbe.ac.tz/

Speakers

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1	Prof. Wilfred Lameck	Mzumbe University	Tanzania
2	Dumas F. Lafontant, ML	Abarigani	United States
3	Denis Kamugisha, Ph.D.	Mzumbe University	Tanzania
4	Clifford Gingo, Ph.D.	Mzumbe University	Tanzania
5	Venance Shllingi, Ph.D.	Mzumbe University	Tanzania

Session Thematic Track

6. Food, Biodiversity & Climate Resilience – Regenerative food systems and nature-based solutions

Session Summary (max 200 words)

Briefly describe the main focus, purpose, and participants.

The proposed project is called eWATER Challenge. It is based on system dynamics modeling to simulate triage and fair allocation of water and/or resources based on equity. The simulation of different management scenarios, including water conservation measures, demand management strategies, supply augmentation options; identification of bottlenecks; and analysis of outcomes

are expected to lead to design interventions intended to improve the distribution of water and/or resources. The objectives of the project are as follows:

- Facilitate organization learning, collaboration, information sharing, innovation and technology, as well as meeting, which is the first step to build capacity and continuous quality improvement (CQI).
- Education about water as a strategic component of human security
- Help policymakers and decision-makers understand the behavior of complex systems, identify potential problems, and design effective solutions.
- Identify areas where resources are scarce and prioritize allocation accordingly.
- Make informed decisions based on a comprehensive understanding of the watershed's water dynamics.
- Optimize water allocation by balancing competing demands while minimizing water scarcity and environmental impacts.
- Improve water security by identifying opportunities for water conservation, reuse, and supply augmentation.

Key Scientific Insights (max 300 words)

Summarise the key findings, evidence, or innovations presented. Explain their relevance to planetary boundaries.

System dynamics modeling is a valuable tool for triaging a population and measure the fair distribution of resources based on need. As a method, system dynamics uses stocks and flows, and feedback loops to simulate complex systems over time. Moreover, modelers can help identify bottlenecks in systems that may be causing delay in the value supply chain. Hence, its use can help measure the fair distribution of water and/or resources by simulating different scenarios to see how resources would be allocated under varied conditions. The analysis of the outcomes of different scenarios will help policymakers, decision-makers, and community stakeholders understand the behavior of complex systems, identify potential problems, and design effective solutions. The insights gained from the model is expected to help improve the standard of living of millions of impoverished people living in Morogoro, Tanzania, through a fairer and more equitable distribution of water and resources

Link to SDGs and Post-SDG Framework (max 150 words)

Identify which SDGs your session contributes to (1–3 main goals) and how it aligns with the post-2030 agenda.

The team is developing this project in compliance with the Sustainable Development Goals (SDG), primarily Goal 13. The proposed model is a combination of insights from behavioral science, gamification, user-centered design, and system dynamics to create an engaging and effective platform for promoting fair and equitable water delivery, usage and conservation. It is designed to provide users with real-time feedback on their water usage and progress, simulate the dynamics of water delivery, usage, conservation, and account for non-linear relationships between user behavior, water usage, and conservation.

Key Outcomes and Recommendations (max 300 words)

List the main policy recommendations, institutional commitments, and research priorities emerging from your session.

The main priority is implementing measures directed towards creating greater awareness regarding natural and man-made crises, and the need to reformulate national and local policies and governance structures in order to adapt to the adverse effects of nature (SDG 2015). Ensuring an enhanced level of societal and institutional resilience as well as secure pathways towards sustainable development, despite challenges that emerge due to evolving crises. The final outcomes depend on tailored processes rather than a one-size-fits-all solution because each community presents unique characteristics and needs. Ultimately, we believe in the importance of context-specific approaches rather than a Do It Yourself (DIY) mentality.

Follow-Up Actions (max 150 words)

Describe next steps, pilot projects, and planned collaborations (2025–2026).

The research team intends to use system dynamics modeling, which it posits is a valuable tool for triaging the population of Morogoro, to measure the fair distribution of water resources based on need. The research team maintains that this methodology will enable it to use stocks and flows, and feedback loops to simulate the complex water systems over time, and account for delay in the value supply chain. By Triage the team means the process of prioritizing individuals based on the risk factors and severity of their condition.

The scope of collaboration is extensive to the extent that the project involves business, commerce, education, finance, health, service, and trade. As such, the team maintains contact with representatives of the following entities: Afrexim Bank, System Dynamics Society, Boston University, South Africa Chapter of System Dynamics Society, Michigan State University, Digital Data Insight, Inc., Alliance for African Partnership, UN Habitat, World Urban Forum, Bentley Systems, ESRI, Guangzhou, Millenium Challenge Corporation, US Africa Business Center-US Chamber of Commerce, US International Development Finance Corporation, Africa Finance Corporation, Pan African Private Sector Trade & Investment, Word Intellectual Property Organization, MORUWASA, and WaterWorkX

Session title: Harnessing Environmental DNA: Advancing SDGs and the Global Biodiversity Framework

Convenor details:

Convenor's name	Kristian Meissner
Convenor's organisation	Finnish Environment Institute
Organisation website	www.syke.fi

Speakers

ID	Speakers' name	Organisation name	Country
1	1.Kristian Meissner	Finnish Environment Institute	Finland
2	2.Mehrdad Hajibabaei	University of Guelph	Canada
3	3.Florian Altermatt	University of Zurich	Switzerland
4	4.Tobias Froslev	Global Biodiversity Information Facility	Denmark
5	5.Laura Höijer	Ministry of the Environment of Finland	Finland
6	6.Florian Leese	University Duisburg Essen	Germany
7	7.Jann Martinsohn	Joint Research Centre	Belgium

Session Thematic Track

7. Food, Biodiversity & Climate Resilience – Regenerative food systems and nature-based solutions

Session Summary (max 200 words)

This session emphasized the urgent need for standardized measurement tools to support bioassessment and biodiversity monitoring within regional and global frameworks like the Global Biodiversity Framework (GBF). Environmental DNA ((e)DNA) offers transformative potential by capturing taxonomic and geographic information that traditional monitoring misses. In aquatic systems, (e)DNA provides scalable means to address biodiversity targets from local to global scales, enabling catchment-scale pattern mapping from water samples, reconstruction of whole community structure, and calculation of ecosystem health indices across land–water interfaces. eDNA complements remote sensing and aligns with modern biomonitoring needs.
We identified critical next steps for implementation: international minimum standards for sampling methods; population and curation of reference databases; and agreement on common data protocols and standards. Currently, sampling method standards are being developed via the open platform iESTF to enable globally inclusive, multistakeholder participation. Data protocols and much of the global data infrastructure exist through GBIF and OBIS, but further work is needed to achieve widely accepted biodiversity data standards that render regional data—including (e)DNA—FAIR, interoperable, and policy-relevant.
Policy stakeholder feedback highlighted the importance of co-creating with policy experts to ensure method development, relevance, and uptake. Decisive policy and funding action are required to enable international standardization, enable production and sharing of eDNA data, and realize (e)DNA's potential for global and regional biodiversity goals.

Key Scientific Insights (max 300 words)

Scientific evidence has abundantly shown that (e)DNA monitoring methods are ready for implementation in biodiversity and bioassessment monitoring, provided that methodological minimum requirements are internationally and inclusively standardized. Such efforts exist but must be strengthened.

Link to SDGs and Post-SDG Framework (max 150 words)

The session mainly linked to SDG's 14 and 15 and the UN Global biodiversity framework (GBF) and links to the UN post-2030 biodiversity strategy through its focus on standardized, interoperable data, innovative monitoring, and policy-relevant action. First, the session foregrounded international standardization of sampling methods, reference databases, and data protocols, aligning with the strategy's drive for robust, comparable biodiversity metrics

across regions. Second, it promotes environmental DNA (eDNA) as a scalable, cost-effective tool that can fill data gaps in hard-to-sample environments, supporting monitoring and decision-making from local to global scales. Third, it emphasized global data infrastructures (GBIF, OBIS) and FAIR data to inform policies and targets. Fourth, it stressed co-creation with policy experts and multi-stakeholder dialogue to ensure tools meet governance needs and drive uptake. Finally, it called for decisive policy and funding action to catalyze standardized data sharing and implement post-2030 biodiversity goals globally and regionally.

Key Outcomes and Recommendations (max 300 words)

To operationalize the global biodiversity framework and better bio-assessment, policy makers should implement a plan that prioritizes (e)DNA minimum requirement standardization, data quality, and governance

1. Standardize and harmonize data and methods
- Establish internationally recognized minimum standards for biodiversity sampling, eDNA protocols, and reference databases within 12–48 months.
- Promote and mandate common data protocols, metadata schemas, and reporting formats across national programs to enable cross-border comparability.
- Create a global accreditation mechanism linked to ISO standards for laboratories and for field teams to ensure consistent quality and reliability.
2. Invest in data infrastructure and interoperability
- Fund and sustain global data infrastructures (e.g., GBIF, OBIS) and regional interoperable portals to ensure seamless data flow.
- Require FAIR data principles (Findable, Accessible, Interoperable, Reusable) for all funded biodiversity projects.
3. Strengthen governance and multi-stakeholder engagement
- Support international standard co-creation platforms that bring together scientists, policymakers and industry.
- Produce policy briefs and decision-ready indicators from standardized datasets to guide targets, reporting, and governance decisions.
4. Translate data into policy action and uptake
- Integrate standardized metrics into national plans, NBSAPs, and GBF reporting cycles.
- Link monitoring outputs to policy levers such as habitat protection, endangered species management, and land-use planning.
- Secure dedicated funding for implementation, capacity building, and technology transfer to ensure uptake.
5. Ensure funding and catalytic action

- Create a fund to seed standardization, data sharing, and tool deployment, with explicit commitments to Global South participation in international standardization to improve inclusiveness.
- Promote international cost-sharing and collaboration to reduce duplication and accelerate adoption.
- Promote information transfer through capacity building, particularly to the Global South.
- Set milestones (e.g., regional standard adoption targets, FAIR compliance rates) and track progress.

6. Monitoring, accountability, and transparency

- Mandate public dashboards tracking standardization and data-sharing progress.
- Publish reports linking biodiversity metrics to policy outcomes and funding effectiveness.

Institutional commitments and research priorities

- Governments: appoint implementation coordination and mandate reporting on standardization and data quality.
- Academia: align research agendas with priority gaps in reference libraries, method validation, and cost-effective sampling in data-poor regions.
- Donors/FRIs: fund cross-border pilot projects, technology transfer, and open-access repositories.
- Research priorities: validate (e)DNA in diverse ecosystems, develop taxon-specific reference libraries, and quantify socio-economic benefits of standardized monitoring.

Follow-Up Actions (max 150 words)

Dependant on funding the session will be followed up by dedicated projects. In Europe the ECOSTAT taskforce on (e)DNA will work on removing road blocks to EU wide adoption of (e)DNA in the WFD related monitoring. Effort to standardize seed documents developed through the inclusive International (e)DNA standardization Taskforce (iESTF) under ISO will continue. Efforts to link regional (e)DNA societies globally are underway, also in Europe a European regional (e)DNA society will be established.

Session title: Shaping Infrastructure for a Safer Tomorrow

Convenor details:

Convenor's name	Dr. Mohit Verma and Dr. S. K. Singh
Convenor's organisation	CSIR-SERC and CSIR-CBRI
Organisation website	www.serc.res.in and www.cbri.res.in

Speakers

ID	Speakers' name	Organisation name	Country
Theme 1 – Material, Monitoring and Mitigation (3M) for Safe and Sustainable Infrastructure			
1	Dr N Anandavalli, Director	CSIR-SERC	India
2	Dr MB Anoop, Chief Scientist	CSIR-SERC	India
3	Dr Saptarshi Sasmal, Chief Scientist	CSIR-SERC	India
4	Dr P Harikrishna, Chief Scientist	CSIR-SERC	India
5	Mr J. K. Goyal, Chief Scientist	CSIR-CRRI	India
6	Shri. C.Y. Shivaji, Design Head	L&T (ECC)	India
Theme 2 - Climate Resilient Building and Technologies			
1	Prof R Pradeep Kumar, Director	CSIR-CBRI	India
2	Dr Ajay P Chourasia, Chief Scientist	CSIR-CBRI	India
3	Prof SK Singh Chief Scientist	CSIR-CBRI	India
4	Dr Manish Mudgal Chief Scientist	CSIR-AMPRI	India
5	Dr YP Kajale, Sr Vice President (Tech)	BG Shirke Const. Pvt. Ltd.	India
6	Dr V Ramachandra, President (Tech)	UltraTech Cement Ltd.	India

Session Thematic Track

8. Health, Inclusion & Sustainability – One Health, social equity and wellbeing
9. Food, Biodiversity & Climate Resilience – Regenerative food systems and nature-based solutions
10. Country Focus (INDIA)

Session Summary (max 200 words)

The session was conducted as part of CSIR's event entitled “CSIR for Connect, Collaborate, Converge and Convert (5C) for Global Sustainable Development”. The session brought together scientists, industry leaders, and infrastructure experts to address the growing challenges of climate change and the need for resilient, sustainable infrastructure. The event focused on advancing solutions aligned with SDG 9 (Industry, Innovation & Infrastructure) and SDG 11 (Sustainable Cities & Communities), highlighting innovative construction materials, climate-responsive design strategies, and emerging digital technologies for infrastructure monitoring. Participants included senior CSIR scientists, directors of national laboratories, industry representatives from UltraTech Cement and L&T, and experts working on climate-resilient materials and structural safety. The first thematic track, Material, Monitoring and Mitigation (3M), showcased advances in sustainable construction materials, infrastructure health monitoring, disaster-resilient design, and assessment of high-speed expressway corridors. The second theme, Climate-Resilient Buildings and Technologies, addressed region-specific solutions for vulnerable areas such as the Himalayas, sustainable building materials, advanced geopolymers, and precast technologies, along with industry strategies for decarbonising construction. The session underscored the importance of circular economy practices, low-carbon materials, and collaborative innovation. It concluded with discussions aimed at generating actionable recommendations for scaling resilient infrastructure, strengthening policy frameworks, and supporting India’s transition toward safer, climate-adaptive built environments.

Key Scientific Insights (max 300 words)

The session presented significant scientific advancements in materials, technologies, and design strategies aimed at developing climate-resilient, low-carbon, and disaster-safe infrastructure. A central insight was the emergence of advanced sustainable construction materials, including low-carbon composites, geopolymer binders, and slag-based products that reduce dependence on high-emission cement and steel. CSIR’s work on valorising steel slag for road construction and developing slag-based binders demonstrated measurable reductions in embodied carbon while supporting circular economy principles. These innovations directly address planetary boundaries related to climate change, biogeochemical flows, and novel entities, by lowering resource extraction and minimising industrial waste. Research on heat- and ambient-cured geopolymer concrete showed that such materials can match or outperform Portland cement concrete, offering pathways to drastically reduce CO_2-intensive cement production. Complementing material advances, the session showcased infrastructure health monitoring systems, including digital assessment tools and real-time structural monitoring that enable preventive maintenance, extend infrastructure lifespan, and reduce resource-intensive reconstruction. Another major scientific contribution was the demonstration of climate-resilient buildings featuring hybrid

envelopes, passive solar heating, moisture- and earthquake-resistant designs, and thermal performance monitoring. These strategies significantly reduce operational energy demand, contributing to the planetary boundary of climate stability by lowering cumulative emissions over a building's life cycle. Tailored solutions for sensitive ecosystems, such as Himalayan regions, emphasised adaptation to extreme climates and disaster risks, helping reduce human pressures on fragile landscapes. The integration of Building Information Modelling (BIM) further enhances sustainability by optimising material use, reducing waste, and enabling low-carbon design choices. Collectively, the scientific insights presented reinforce the necessity of circular construction, climate-responsive design, and resource-efficient technologies for staying within safe planetary boundaries while supporting resilient, future-ready infrastructure systems.

Link to SDGs and Post-SDG Framework (max 150 words)

The session directly contributes to SDG 9 (Industry, Innovation and Infrastructure) and SDG 11 (Sustainable Cities and Communities) by advancing low-carbon construction materials, climate-resilient building technologies, and digital tools for infrastructure safety. It also supports SDG 12 (Responsible Consumption and Production) through circular construction practices, valorisation of industrial by-products such as steel slag, and optimisation of material use via BIM. In alignment with the post-2030 development agenda, the session emphasises long-term climate resilience, resource efficiency, and decarbonisation pathways essential for future infrastructure systems under increasing environmental stress. Its focus on adaptive design, disaster-risk reduction, and low-emission material innovation positions it squarely within emerging frameworks centred on planetary boundaries, climate adaptation, and nature-positive development. These insights strengthen global efforts toward sustainable, resilient, and future-ready infrastructure beyond 2030.

Key Outcomes and Recommendations (max 300 words)

The session generated clear outcomes and forward-looking recommendations for strengthening climate-resilient and sustainable infrastructure. Key findings emphasised the need to mainstream low-carbon and circular construction materials, including geopolymers, slag-based binders, and other sustainable composites, to significantly cut emissions and reduce dependence on high-carbon cement and steel. Participants underscored the critical role of digital infrastructure health monitoring, recommending the adoption of real-time assessment and predictive maintenance systems—particularly for high-speed expressways and critical public assets—to enhance safety and extend infrastructure lifespan. Strong

momentum also emerged around climate-resilient building technologies, advocating the scaling of passive design strategies, hybrid envelope systems, seismic- and moisture-resistant structures, and regional adaptation models, especially for vulnerable zones like the Himalayas. Policy recommendations call for integrating low-carbon materials into national standards, incentivising industrial by-product utilisation, and establishing clear climate-resilient design guidelines. Institutional commitments highlighted deeper collaboration among CSIR laboratories, government bodies, defence agencies, and industry, alongside targeted capacity-building in sustainable construction and digital monitoring. Research priorities include expanding demonstration projects on geopolymer concrete, advancing predictive models for disaster resilience, and developing context-specific adaptation solutions. Combined, these outcomes provide a robust roadmap for driving scalable, future-ready, and SDG-aligned infrastructure development.

Follow-Up Actions (max 150 words)

Building on the session outcomes, CSIR will advance several follow-up actions during 2025–2026. Priority efforts include expanding pilot demonstrations of climate-resilient buildings across diverse climatic zones, particularly in Himalayan and coastal regions, to validate hybrid envelope systems, passive design features, and disaster-resilient structural solutions. CSIR laboratories will also scale geopolymer concrete and slag-based binder pilots, focusing on road infrastructure and low-carbon pavements, in collaboration with state agencies and industry partners. Strengthened partnerships with organisations such as L&T and UltraTech Cement will support the deployment of digital infrastructure health-monitoring technologies for expressways and public buildings, enhancing predictive maintenance and structural safety. Planned collaborations with government and defence establishments will further accelerate technology uptake, while joint training programmes will build capacity in sustainable construction and circular economy practices. These actions aim to deliver replicable, low-carbon, and climate-adaptive infrastructure solutions nationwide.

Session title: The Sustainable Pesticide Management Framework in Africa Middle East: Protecting Human Health and the Environment while Increasing Agricultural Productivity

Convenor details:

Convenor's name	Margaux Rundstadler
Convenor's organisation	CropLife Africa Middle East
Organisation website	https://croplifeafrica.org/

Speakers

(add as many rows as needed)

ID	Speakers' name	Organisation name	Country
1	Dr Samira Amellal, CEO	CropLife AME	Morocco
2	Delisa Jiang, Sustainable Pesticide Management Framework Senior Program Manager	CropLife International	Singapore
3	Dr. Paul Ngaruiya, General Manager, Research, Planning and Strategy	Pest Control Products Board	Kenya
4	Mr. Abdessamad El Houzi, Regional Director	Agricultural Council Marrakech-Safi	Morocco
5	DR. Mahmoud Alsisi Food Contaminants Researcher	QCAP Lab	Egypt
6	Dr Ahmed Charibi, Farmer	Horti Souss	Morocco
7	Mr. Julius Nyabicha, Marketing and Communications Lead	Cereal Growers Association	Kenya

8	Mr Benson Ngigi, Stewardship Manager	CropLife Kenya	Kenya

Session Thematic Track

11. Food, Biodiversity & Climate Resilience – Regenerative food systems and nature-based solutions

Session Summary (max 200 words)

The session showcased how the private sector has driven sustainable agriculture in Africa through science and innovation. By transforming research into practical strategies, data demonstrated tangible impacts. Emphasis was placed on the importance of solutions tailored to local needs as well as collaboration and synergies via public-private partnerships to effectively meet Africa's needs.

Specifically, the session highlighted the achievements of the Sustainable Pesticide Management Framework (SPMF), featuring best practices from Kenya, Morocco, and Egypt. The Sustainable Pesticide Management Framework (SPMF) is a five-year program launched by CropLife in Kenya (2021), Morocco (2022), and Egypt (2024), representing an investment of $4.5 million. It is a strategic project aimed at increasing agricultural productivity while protecting human health and the environment in the region. It is based on three pillars: reducing reliance on highly hazardous pesticides, increasing innovation, and promoting safe and responsible pesticide use.

Participants heard from the CropLife network and local partners, including regulators, researchers, farmers, and industry stakeholders, all working together to advance the SPMF in their respective countries with the objective of having positive spillover effects in the region.

Key Scientific Insights (max 300 words)

The key findings highlighted notable progress made under the Sustainable Pesticide Management Framework in reducing dependence on highly hazardous pesticides, fostering innovation, and promoting the safe and responsible use of pesticides to safeguard human health and the environment while enhancing agricultural productivity.

Collaboration within the SPMF - with organizations such as the Pest Control Products Board in Kenya, the Agricultural Council of Morocco, QCAP Lab in Egypt, and local farmers - resulted in several achievements across various domains. For example, regarding maximum residue limits, comprehensive trainings to farmers increased awareness, resulting in improved pesticide application practices (leading to reduced residues), and contributed to boosted exports of citrus, strawberries, and grapes from Egypt to the EU, with fewer border rejections and enhanced export quality.

In terms of circular economy initiatives, the pilot project on empty pesticide container collection in Morocco demonstrated concrete environmental benefits - safely removing 57 tons of empty pesticide container within a year - and protection of human health.

Farmers' training on good agricultural practices strengthened the skills of agricultural advisors, established a structured knowledge transfer framework to field actors, and trained key farmers to act as multipliers. These efforts promoted good agricultural practices, responsible uses, integrated pest management, and the distribution of personal protective equipment, all contributing to more sustainable and responsible farming systems.

Link to SDGs and Post-SDG Framework (max 150 words)

The session demonstrated strong alignment with the Sustainable Development Goals (SDGs), particularly SDG 2: Zero Hunger and SDG 13: Climate Action.

Alignment with SDG 2 (Zero Hunger), through:

- Enhancing agricultural productivity, therefore contributing to food security
- Supporting export growth. Trade of agricultural commodities plays a key role in food security

Alignment with SDG 13 (Climate Action), through

- Reducing reliance on highly hazardous pesticides (HHPs)
- Promotion of innovations, such as biopesticides and drones in agriculture
- Promotion of circular economy initiatives

Overall, progress in these areas exemplify the need in the Post-SDG framework's for a multi-sector partnership approach and the importance of leveraging science, innovation, and circular economy principles to build resilient, inclusive, and environmentally responsible systems that address immediate human needs while safeguarding the environment.

Key Outcomes and Recommendations (max 300 words)

- **Science and risk-based** decision-making provides enabling legislative frameworks that protect human health and the environment while increasing agricultural productivity.
- **Localized policies** are essential. Policies must reflect the specific needs of the region, recognizing that approaches effective in one area may not suit another.
- **Food security** should be a top policy priority for nations and multilateral organizations.
- **Enabling legislative frameworks and agricultural innovations** are crucial for reducing dependence on imports and expanding access to technologies that support farmers in feeding their communities.
- **A conducive trade environment** is vital for accessing crop protection tools and innovations.
- **Responsible stewardship policies** are needed to ensure that agricultural technologies are used safely and sustainably.

Follow-Up Actions (max 150 words)

The FAO International Code of Conduct on Pesticide Management sets out guidelines for the responsible use of pesticides, to maximize benefits while minimizing adverse effects on human health

and the environment. As part of our commitment to the FAO Code of Conduct, CropLife Africa Middle East remains dedicated to advancing the principles of the Sustainable Pesticide Management Framework (SPMF) to support sustainable agriculture across the region. We recognize that effective pesticide management is critical to safeguarding our farmers, consumers, and the environment, as well as to ensuring agricultural productivity. Therefore, we will continue to promote innovation, strengthen stakeholder collaboration, and foster localized solutions tailored to regional needs. Through sustained collaboration and shared commitment, CropLife Africa Middle East aims to institutionalize and maximize the long-term impact of the SPMF.

Supporting Materials (optional)

SPMF Annual Report 2025

Session title: Food Security for Indigenous Peoples and the Sustainable Use of Brazilian Biodiversity

Convenor details:

Convenor's name	Ana Maria Costa
Convenor's organisation	Embrapa
Organisation website	https://www.embrapa.br

Speakers

(add as many rows as needed)

ID	Speakers' name	Organisation name	Country
1	Joenia Wapichana	FUNAI	Brazil
2	Raquel Tupinambá	Conselho Indígena Tupinambá	Brazil
3	Claudia Pinho	MMA	Brazil
4	Edmilton Cerqueira	MDA	Brazil
5	**MODERATOR:** Prof. Dr. Lin Chau Ming	UFAM	Brazil

Session Thematic Track

(select ONLY one and delete the others)

Thematic Tracks

1. **Food, Biodiversity & Climate Resilience – Regenerative food systems and nature-based solutions**

Session Summary (max 200 words)

The session **"Food Security for Indigenous Peoples and the Sustainable Use of Brazilian Biodiversity"** brought together institutional leaders and Indigenous and traditional representatives to discuss the intersection between **food sovereignty, biodiversity conservation, and territorial rights**. Speakers highlighted that **Brazil hosts over 1.7 million Indigenous people** across 305 ethnic groups and **28 categories of Traditional Peoples and Communities**, all playing a key role in maintaining **14% of the national territory as preserved land**. **Dr. Joenia Wapichana (FUNAI)** emphasized that protecting Indigenous lands is not only a constitutional duty but also a **climate strategy**, as these territories ensure food security, biodiversity conservation, and cultural continuity. **Raquel Tupinambá**, an Indigenous leader and scientist, underscored that the Amazon is an anthropogenic forest, shaped by millennia of Indigenous knowledge, plant domestication, and sustainable food systems. **Dr. Claudia Pinho (MMA)** discussed the legal frameworks supporting these rights—such as the Convention on Biological Diversity (Article 8j) and Brazil's Decree 6.040/2007—highlighting ongoing efforts to build a **National Plan for Traditional Peoples and Communities**. **Dr. Edmilton Cerqueira (MDA)** presented the "**Quilombos of Brazil**" seal and initiatives like **PAA** and **PNAE**, linking food sovereignty with equitable benefit-sharing and territorial justice.

Key Scientific Insights (max 300 words)

The session revealed that Indigenous and traditional knowledge systems are **scientifically grounded frameworks for sustainability**, contributing to biodiversity conservation, agroecological resilience, and planetary balance. Evidence presented by **Raquel Tupinambá** demonstrated that **Amazonian ecosystems are co-created by human activity**, where species domestication—such as cassava, açaí, and pupunha—led to diversified, climate-resilient food systems. This supports the growing recognition that **Indigenous land stewardship contributes directly to climate regulation**, aligning with the concept of **planetary boundaries** by maintaining forest integrity, soil fertility, and water cycles. **FUNAI's territorial management programs (PGTAs and PNGATI)** were cited as models that operationalize sustainability through participatory governance, renewable energy access, and community-based monitoring. These frameworks integrate local ecological knowledge into national conservation strategies. **The Ministry of Environment** reinforced that the **legal protection of Traditional Peoples' territories** (Decree 6.040/2007) and benefit-sharing mechanisms under the **Access to Genetic Resources Law (2015)** are key scientific-policy interfaces promoting ethical biodiversity use. **For Quilombola communities**, as described by **Dr. Edmilton Cerqueira**, sustainable agriculture and agroecology, combined with product

certification ("Quilombos of Brazil" seal), offer replicable models for regenerative economies. Together, these insights confirm that Indigenous and traditional systems are **living laboratories of adaptation**, providing replicable evidence for mitigating climate change, preserving biodiversity, and ensuring nutritional sovereignty—key frontiers for human survival within the planet's ecological limits.

Link to SDGs and Post-SDG Framework (max 150 words)

This session directly contributed to **SDG 1 (No Poverty)**, **SDG 2 (Zero Hunger)**, **SDG 7 (Affordable and Clean Energy)**, **SDG 13 (Climate Action)**, and **SDG 15 (Life on Land)**, while intersecting with **SDG 16 (Peace, Justice, and Strong Institutions)** and **SDG 17 (Partnerships for the Goals)**.
It emphasized the centrality of Indigenous and traditional territories for achieving these goals through **sustainable food systems, equitable access to resources, and recognition of traditional governance models**.
The discussions advanced the **post-2030 development agenda** by reaffirming that biodiversity conservation, food security, and climate resilience are inseparable from **territorial rights and cultural preservation**. Integrating ancestral knowledge into policy and science frameworks was highlighted as essential for the **coexistence of humanity within planetary boundaries** and for ensuring a just ecological transition across Latin America and the Caribbean.

Key Outcomes and Recommendations (max 300 words)

The session produced a robust set of outcomes linking **food and nutritional security** to **territorial integrity and biodiversity protection**. Participants recommended:

1. **Recognizing Indigenous and Traditional Territories** as essential assets for climate mitigation and food sovereignty, to be explicitly included in national and global sustainability targets (e.g., COP30 commitments).
2. **Strengthening participatory governance**, through councils like **CNPCT** and instruments such as the **National Plan for Traditional Peoples and Communities**, ensuring representation of women and youth.
3. **Expanding programs** such as **PAA**, **PNAE**, and the **Cistern Program**, which connect local production to institutional markets, guarantee income, and improve nutrition.

4. **Promoting certification systems** like the **"Indigenous Peoples of Brazil"** and **"Quilombos of Brazil"** seals, to enhance traceability, cultural value, and sustainable commercialization.
5. **Scaling up education and capacity-building**, combining ancestral and scientific knowledge for agroecological innovation and renewable energy adoption.
6. **Institutionalizing benefit-sharing mechanisms** under Brazil's 2015 Genetic Heritage Law, ensuring fair compensation and community consent.
   The session concluded that advancing food and nutritional security for Indigenous, Quilombola, and Traditional Peoples is not only a matter of justice but a **scientific and ecological imperative**. Their knowledge systems sustain biodiversity and stabilize ecosystems vital to all humanity.

Follow-Up Actions (max 150 words)

- **Territorial Governance:** Finalize and launch the National Plan for Traditional Peoples and Communities at COP30; ensure CNPCT-led monitoring with quarterly public updates.
- **Program Scaling:** Expand **PAA/PNAE** purchasing from Indigenous/Quilombola producers; set annual targets for supplier onboarding, school coverage, and volumes procured.
- **Certification & Markets:** Operationalize the **"Indigenous Peoples of Brazil"** and **"Quilombos of Brazil"** seals with fast-track guidance, market partnerships, and traceability pilots in two biomes.
- **Benefit Sharing:** Implement community protocols for **Free, Prior and Informed Consent (FPIC)** and standard contracts under the 2015 Genetic Heritage Law; publish model templates.
- **Agroecology & Energy:** Fund PGTA/PNGATI projects on agroforestry, water access (Cisterns), and decentralized solar; prioritize women and youth training.
- **Evidence & Data:** Create an open dashboard linking food security indicators to territorial integrity (deforestation, water quality, procurement data).
- **Financing:** Convene donors and federal agencies to establish a multi-partner facility aligned with SDGs 2, 13, and 15.

Session title: Strategies for Strengthening the Inclusive Bioeconomy Based on the Circular Economy

Convenor details:

Convenor's name	Carla Geovana Macário
Convenor's organisation	Ministry of Science, Technology and Innovation - MCTI
Organisation website	https://www.gov.br/mcti/pt-br

Speakers

(add as many rows as needed)

ID	Speakers' name	Organisation name	Country
1	PhD. Ana Maria Costa	Embrapa	Brazil
2	João Pedro Stedile	MST	Brazil
3	PhD. Caetano Penna	CGEE	Brazil
4	Lucas Ramalho Maciel	MDIC	Brazil
5	**MODERATOR:** PhD. Claudia Magalhães	MCTI	Brazil

Session Thematic Track

Food, Biodiversity & Climate Resilience – Regenerative food systems and nature-based solutions

Session Summary (max 200 words)

The session articulated a strategic vision for Brazil, bringing together perspectives from academia, government, industry, and social movements to address a central challenge: how to reconcile the ambition of becoming an industrialized, high-technology "bio-state" with the fundamental need for social justice, agrarian reform, and agroecological sustainability. The

discussion actively sought to build bridges across this apparent divide, positioning scientific innovation as the enabling tool and government policy as the framework for a new development paradigm.

The discussion synthesized four interdependent pillars for this new model. Ana Maria Costa (Academia) demonstrated how science transforms co-products into value and empowers family farming. Caetano Penna (Government Strategy) detailed the new National Bioeconomy Strategy, grounded in participatory governance. Lucas Ramalho (Industrial Policy) outlined a vision of a globally competitive Brazil through decarbonization. Finally, João Pedro Stedile (Social Movements) established agroecology and agrarian reform as imperatives for sustainability and food sovereignty. The goal was to weave these perspectives into a cohesive and multifaceted national strategy.

The realization of this multifaceted vision depends on a robust foundation of scientific innovation, whose main axes were detailed as the basis for the country's productive transformation.

Key Scientific Insights (max 300 words)

Science, technology, and innovation were established as indispensable enabling mechanisms for Brazil's transition to a circular and inclusive bioeconomy. Research is the engine that transforms biodiversity potential into market solutions and sustainability, offering a tangible pathway to merge industrial efficiency with ecological regeneration.

The scientific innovations presented converge toward a model of full biomass utilization, building a bridge between the needs of family farming and the objectives of the green industry:

• **Valorization of Co-products and Biorefineries:**
The concepts of biorefineries and co-product valorization, detailed by Ana Maria Costa and Caetano Penna, respond directly to João Pedro Stedile's call for organic fertilizer plants and biological pesticides. Research transforms agro-industrial residues—such as those from oranges, grapes, and jackfruit (including the innovative "jackfruit meat" for the vegan market)—into high-value inputs, meeting the needs of agroecology while creating new industrial value chains.

• **Agroecology, Green Chemicals, and New Materials:**
The demand for a production model based on agroecology drives research into bio-substitutes for the petrochemical industry and new materials. Science not only develops alternatives to pesticides but also innovations such as producing graphene from fashion industry waste, demonstrating a circularity that connects sustainable agricultural production with cutting-edge industry.

These scientific insights are crucial for respecting planetary boundaries. They offer a "third way" between predatory extraction and untouched preservation, where waste reduction, fossil input substitution, and biodiversity valorization promote lower greenhouse-gas emissions and environmental regeneration.

Link to SDGs and Post-SDG Framework (max 150 words)

The alignment of bioeconomy strategies with the UN 2030 Agenda positions Brazil as a central actor in the global quest for a sustainable future. The session demonstrated a strong connection with multiple Sustainable Development Goals (SDGs), particularly the following three:

• **SDG 12 (Responsible Consumption and Production):**
The emphasis on circular economy, waste-to-resource approaches, and reduction of industrial losses directly addresses sustainable production targets.

• **SDG 13 (Climate Action):**
The bioeconomy is a pillar of climate action. Strategies for sustainable biomass production and industrial decarbonization through renewable biofuels and biochemicals are direct mitigation measures. The national electricity matrix, which is 93% renewable, amplifies these benefits.

• **SDG 15 (Life on Land):**
Biodiversity valorization, along with reforestation and zero-deforestation proposals, is essential for ecosystem conservation.

The session also showed strong alignment with **SDG 8 (Decent Work and Economic Growth)** and **SDG 10 (Reduced Inequalities)** through the construction of a new economic model that combines sustainable growth with job and income generation, and through the focus on an inclusive bioeconomy that incorporates sustainable management by traditional communities and family farmers.

The vision of transforming Brazil into a “bio-state” represents a strategic counterpoint to “petro-states,” grounding national competitiveness in ecological regeneration and biodiversity rather than in the extraction of finite resources. This model is only viable if built on social justice, becoming a true post-SDG milestone.

Key Outcomes and Recommendations (max 300 words)

The outcomes of the session, reflecting a growing consensus among government, academia, and civil society, outlined a practical roadmap and concrete solutions with priority actions. The principal outcome is the articulation of a cohesive strategy with three interdependent pillars, directed across all sectors, aimed at accelerating the transition to a productive, inclusive, and regenerative bioeconomy in Brazil.

1. Empowerment of the Productive Base:
• Implementation of Agrarian Reform and Agroecology:

Address the demand for agrarian reform to combat unproductive large estates, ensuring access to land and promoting a shift toward an agroecological model with cooperative-based agro-industries to add local value.
• **Support for Cooperative Management:**
Create public policies to facilitate the hiring of qualified managers for family-farming cooperatives, breaking the cycle that limits their access to more profitable markets.

2. Creation of Market Drivers and Regulation:
• **Establishment of a Regulated Carbon Market:**
Implement a regulated market as an economic instrument to value sustainability and boost the low-carbon competitiveness of Brazilian industry.
• **Incentive Programs for the Green Industry:**
Strengthen programs such as "New Industry Brazil" and "Mover," whose success depends on scaling community-based innovations and adding value to sociobiodiversity products.

3. Direction of Research and Innovation:
• **Technologies for Co-products and Family Farming:**
Focus R&D on developing organic fertilizers, biological pesticides, and machines adapted to family-farming scales, turning rural challenges into innovation opportunities.
• **Democratization of Knowledge:**
Apply scientific knowledge to solve the concrete production challenges of rural communities, ensuring that innovation generates direct social impact and strengthens the bioeconomy from its foundation.

Follow-Up Actions (max 150 words)

The discussions were translated into a concrete action plan with defined timelines, demonstrating Brazil's commitment to advancing the bioeconomy agenda in a structured way. The materialization of this vision will occur through coordinated actions over the next two years.

The main steps, projects, and planned collaborations for 2025–2026 include:

• **Development of the Action Plan (PNaDBio):**
The National Bioeconomy Commission, with its participatory governance structure—including five representatives from civil society and three from NGOs—will detail the action plan. It will be organized around seven strategic missions, ranging from sociobiodiversity businesses to renewable biochemistry.

• **Launch at COP30:**
The official launch of the plan is scheduled for COP30 in Belem in 2025, positioning the Brazilian bioeconomy strategy as a global reference.

• **Continuation of Industrial Policies:**
The government will continue implementing initiatives such as the "Brazil Green Seal" and promoting businesses with positive socio-environmental impact to consolidate sustainability as a competitive advantage.

• **Pursuit of Scientific Partnerships:**
International cooperation will be actively promoted to expand research and innovation in bioeconomy and the circular economy, accelerating the transition to a sustainable future.

Session title: Strategies to Promote Greater Efficiency in Food Systems in the Face of Climate Change

Convenor details:

Convenor's name	Gustavo Porpino de Araujo
Convenor's organisation	Brazilian Agricultural Research Corporation
Organisation website	www.embrapa.br

Speakers

(add as many rows as needed)

ID	Speakers' name	Organisation name	Country
1	Eduardo Assad	Getulio Vargas Foundation (FGV)	Brazil
2	Ana Paula Bortoletto	University of São Paulo (USP)	Brazil
3	Kleber Santos	Brazilian Ministry of Agriculture and Livestock	Brazil
	Gisele Bortolini	Brazilian Ministry of Social Assistance and Development, Family and Fight Against Hunger	Brazil

Session Thematic Track

Thematic Tracks

Food, Biodiversity & Climate Resilience – Regenerative food systems and nature-based solutions

Session Summary (max 200 words)

Enhancing food system efficiency amid climate change requires integrated strategies addressing both production and consumption. The session explored farm-to-fork opportunities and challenges in Brazil, emphasizing the adoption of climate-smart agriculture (CSA) and the promotion of intersectoral food policies connecting agriculture, health, environment, and social protection. It highlighted the importance of food

environments—the physical, economic, and cultural contexts shaping food access and choices—as key to fostering healthier and more sustainable diets. Initiatives such as public procurement favoring local, agroecological products and solidarity kitchens that reduce food waste while improving food access illustrate how efficiency can align with inclusivity and nutrition security.

The discussion also stressed the role of local governments in integrating food and climate agendas through policies and programs. In Brazil, municipalities have advanced food security and sovereignty via school feeding, food banks, and urban agriculture aligned with national strategies. These locally driven actions demonstrate that climate resilience in food systems depends not only on technology but also on governance—requiring coordination, data sharing, and participatory decision-making. By aligning climate action with stronger local food systems, Brazil moves toward a model that combines productivity, environmental stewardship, and equitable access to nutritious food.

Key Scientific Insights (max 300 words)

- High temperatures (above 34°C) cause burnt and abortion of coffee flowers — a problem observed in Brazil since 2007. Studies dating back to 2004 indicate that rising temperatures can significantly reduce yields. However, mitigation and adaptation actions can help reducing these impacts.
- Temperature maps reveal a sharp expansion of areas exceeding 28°C—from 2015 to 2030, these zones will increase dramatically. Rising heat is intensifying evapotranspiration and water deficits. While southern Brazil remains less affected, Central-West and Southeast face significant risks. Climate risk zoning projections suggest that production losses—such as in soybeans—will continue to grow through 2050.
- Brazilian farmers, like many worldwide, are generally conservative and slow to adapt to climate change. Around 40% still lack understanding or engagement with the climate emergency, and some remain influenced by climate change denial. A faster transition toward regenerative and low-carbon agriculture is urgently needed. Deforestation and burning must end, while technologies that reduce environmental impacts must expand.
- Corporate profit prevails over public health, reinforcing a cycle of diet-related diseases and environmental harm. The result is the “Global Syndemic” of obesity, undernutrition, and climate change, first described in *The Lancet* (2019), where all three crises are interconnected and mutually reinforcing.
- Solidarity Community Kitchens go beyond providing free, nutritious meals to vulnerable populations— they are transformative hubs for improving local food environments. By prioritizing food from family farmers, they strengthen local supply

chains, promote healthy eating (fighting hunger), and foster community solidarity, empowerment and dignity (knowledge sharing). Originating from social movements, these kitchens are now supported by the government as a form of social technology that enhances food accessibility and nutrition while rejecting ultra-processed foods.

- Combating hunger and climate change requires more than food production—it demands dignified, healthy, and sustainable food environments for all.

Link to SDGs and Post-SDG Framework (max 150 words)

SDG 02. End hunger, achieve food security and improved nutrition and promote sustainable agriculture

By promoting greater efficiency in food systems worldwide, drawing on both science-based and traditional knowledge, as well as technologies and strategies flexible enough to deliver tailored solutions to local and environmental specificities, it will be possible to:

1. **Diversify diets**, thereby providing nutrients from a variety of sources, preferably those culturally connected to local communities;
2. **Strengthen countries and communities** affected by food insecurity and malnutrition by developing locally resilient food systems that are better adapted to climate change and less dependent on external inputs;
3. **Provide technical assistance, financing and support** for agricultural production by enabling digital tools and empowering local markets and short supply chains;
4. **Enhance the capacity of smallholders** to access markets and trade channels, and;
5. **Support initiatives related to community empowerment**, as they are the main leverage to build strength and resilience within the groups.0

Key Outcomes and Recommendations (max 300 words)

List the main policy recommendations, institutional commitments, and research priorities emerging from your session.

- To address the mains climate related challenges, the Brazilian government has launched several funded initiatives, including the ABC Plan for low-carbon agriculture, the Fertilizer Plan, the Crop Plan, the Food Acquisition Plan, the Forest Program, and programs for deforestation control, wildfire prevention, and

biodiversity conservation. These efforts aim to minimize risks, improve productivity, and enhance climate resilience.

- The main challenges are to eliminate deforestation, reduce fossil fuel use, and recover about 40 million hectares of degraded pasturelands. The transition to integrated and regenerative systems—such as crop-livestock and crop-livestock-forest integration—is essential.
- By adopting sustainable practices, Brazil can double agricultural production without deforestation, offer low-carbon products, and cut methane emissions by 30%, mainly from livestock. The country has the potential to become one of the world's largest carbon sinks, transforming climate challenges into opportunities for sustainable growth.
- Within the broader food systems framework, food environments sit at the intersection of food supply chains and consumer behavior, directly affecting diets. They are crucial because they determine where and how food choices occur. When environments promote healthy options—such as fresh fruits, vegetables, and whole grains—people are more likely to make nutritious choices. Therefore, public policies should focus on making healthier foods less expensive and more accessible, fostering healthy eating especially especially for vulnerable populations.

Follow-Up Actions (max 150 words)

The discussions in this session pointed to the following as advisable or necessary:

Next Steps

- Policy Design, Implementation, and Monitoring**,** tailored to country-specific contexts;
- Catalyzing Change in Global Food Systems**,** with a focus on affordable, sustainable, and healthy food environments;
- Accelerating the Adoption of Sustainable Technologies**,** such as low-carbon agriculture, integrated systems, and regenerative practices;
- Promoting Dietary Diversification**,** with emphasis on fresh, minimally processed, and culturally appropriate foods;
- Integrating Bottom-Up and Governmental Approaches**,** combining community-led initiatives with institutional support;
- Advancing Digitalization and Transparency**,** to improve data access, traceability, and public engagement, and;
- Combating Climate Denial through science-based awareness campaigns.

Implied Collaborations

- Expert Panels for Policy Evaluation**,** to assess impact, feasibility, and cost-effectiveness;
- Community and Government Partnerships**,** fostering co-development and inclusive implementation;
- International Policy Sharing**,** especially among countries in the Global South;
- Engagement and Education, including partnerships with farmers and specific communities such as Indigenous peoples, traditional populations, and residents of urban peripheries.

Session title: The IPBES NEXUS Report on the Interlinkages between Biodiversity, Water, Food, Health and Climate

Convenor details:

Convenor's name	Pamela McElwee
Convenor's organisation	Rutgers University and IPBES
Organisation website	www.ipbes.net/nexus

Speakers

(add as many rows as needed)

ID	Speakers' name	Organisation name	Country
1	Pamela McElwee	Rutgers	US
2	David Obura	CORDEO, IPBES	Kenya
3	Paula Prist	IUCN	US, Brazil
4	Taylor Ricketts	U of Vermont	US
5	Mario Herrero	Cornell	US, Costa Rica

Session Thematic Track

Thematic Tracks

12. Food, Biodiversity & Climate Resilience – Regenerative food systems and nature-based solutions

Session Summary (max 200 words)

Global environmental crises related to biodiversity, water, food, health and climate change have often been addressed individually, by separate processes (e.g., individual international conventions or siloed national authorities). A large body of scientific knowledge on each of these crises exists – but there has never been a critical global synthesis on the interlinkages between these crises before. Our panel explored the findings and impact of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) Nexus Assessment, adopted by governments in December 2024. The assessment provides an overview of the interlinkages and interactions among biodiversity, water, food, health and climate change, exploring who is most affected, most at risk and benefiting most from these interactions. The purpose of the panel was to share the key themes and messages from the Assessment to provide decision-makers and other stakeholders with the best-available evidence, analysis and options. Speakers included the co-chair of the assessment, the chair of IPBES, and several coordinating lead authors from the report. Audience members included participants from think tanks, academic institutions, NYC government offices, and professional societies, along with a number of students. A rich discussion following the presentations showed the value of integrated assessments for tackling interlinked challenges.

Key Scientific Insights (max 300 words)

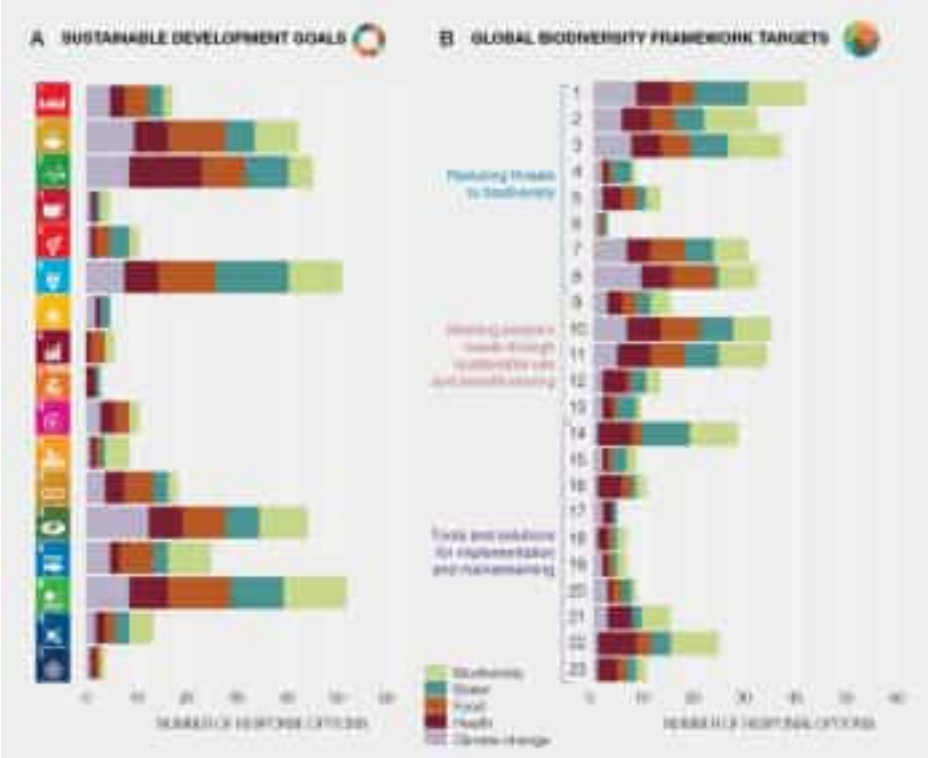
Key messages and insights from the panel are that existing crises across biodiversity loss, climate change, water and food insecurity and health are interlinked, but our responses to these crises are not. Global crises interact and exacerbate each other in ways that make separate efforts to address them ineffective and counterproductive. Current efforts have failed to address these crises because they are siloed, don't account for underlying causes and work in isolation. The speakers and audience members discussed that actions to address one crisis, such as climate change, have often exacerbated the negative consequences of the other crises, particularly with regards to biodiversity. These messages were particularly resonant to attendees who were also visiting Climate Week events as well as the Science Summit.

However, another key insight is that integrated solutions already exist, as the Nexus Assessment identified 70 response options that provide synergistic outcomes across key categories of actions including conserving, restoring and managing ecosystems; consuming sustainably, reducing pollution, integrating policy and governance, managing risk, ensuring rights and equity, and aligning financing. These solutions are available worldwide, and many of these are no more expensive than unsustainable business as usual pathways. The panel and audience also discussed how the Nexus Assessment can help countries and communities take the next steps toward more integrated decisions and

actions to simultaneously achieve the SDGs, the Global Biodiversity Framework and the Paris Agreement. The report also provided concrete estimates of the economic costs of failing to act and of addressing the nexus elements individually rather than together.

Link to SDGs and Post-SDG Framework (max 150 words)

Our panelists discussed how response options that aim to improve the status of biodiversity, water, food, health and climate change often have ancillary benefits for the SDGs, particularly those SDGs related to these nexus elements, such as SDG 14 and 15 (Life on Land and Life Below Water), SDG 13 (Climate Action), SDG 6 (Clean Water and Sanitation), SDG 2 (Zero Hunger), and SDG 3 (Good Health and Wellbeing). A figure showing these interlinkages was shown during the presentations (below). Panelists and audience members discussed how the post-2030 agenda will need to do a better job of linking between SDGs and look for synergistic solutions.



Key Outcomes and Recommendations (max 300 words)

The panelists focused on key recommendations, such as the adoption of nexus response options, which are actions or policies that support effective, sustainable, synergistic governance and management of the nexus elements and their interlinkages, particularly focused on solutions in the food and health sectors. Over 70 response options are assessed in the report representing a range of solutions available to actors in multiple sectors and which can be applied at different spatial and temporal scales and in different ecological, social, political, and economic contexts. Examples include restoration of coastal and marine ecosystems, restoring soil health, shifting to sustainable healthy diets, and promoting urban green infrastructure. For example, Brazil's National School feeding Programme has addressed both food and health by incorporate dietary guidelines into school curricula to educate children from a young age, purchasing food for schools from local food producers with a focus on local agricultural diversity and strong recognition of the cultural and emotional dimensions of food.

Overall, the panelists noted that the nexus assessment provides decision-makers with the best-available evidence and tools on the interlinkages among biodiversity, water, food, health and climate change to support integrated decisions and actions, including guidance on how economic, financing and governance systems can evolve towards holistic and integrated approaches. Such actions should recognize the role different actors have in addressing global crises and ensuring more just and sustainable outcomes for people and nature.

Follow-Up Actions (max 150 words)

Describe next steps, pilot projects, and planned collaborations (2025–2026).

The authors of the Nexus Assessment have continued to present the findings at other forum, including: Science Day of the 27th meeting of the Subsidiary Body on Scientific, Technical, and Technological Advice of the Convention on Biological Diversity in Panama; at the World Conservation Congress in October 2025 in Abu Dhabi; at a meeting of the UN Disaster Risk Reduction office at UN Headquarters on Towards a Risk-Informed Approach to Development; and other events. An audience member who works closely with state legislators in Albany offered to set up a briefing for decision-makers on the relevance of the

nexus assessment to New York. An audience member from a DC security think tank proposed follow up activities in DC to share the assessment findings with other like-minded decision-makers.

Supporting Materials (optional)

www.ipbes.net/nexus.

Session title: Financing Open Research for Global Development: Challenges and Opportunities

Convenor details:

Convenor's name	Allen Mukhwana
Convenor's organisation	Science for Africa (SFA) Foundation
Organisation website	https://scienceforafrica.foundation/

Speakers

ID	Speakers' name	Organisation name	Country
1	Evelyn Gitau	SFA Foundation	Kenya
2	Allen Mukhwana	SFA Foundation	Kenya
3	John Edmunds	Foreign Commonwealth and Development Office (FCDO)	UK
4	Ashley Farley	Gates Foundation	USA
5	Nokuthula Mchunu	National Research Fund (NRF)	South Africa
6	Nora Ndege	International Network for Advancing Science and Policy (INASP)	Kenya

Session Thematic Track

Thematic Tracks

13. Science Diplomacy and Global Partnerships

Session Summary (max 200 words)

Briefly describe the main focus, purpose, and participants.

This session addressed the urgent need to finance Open Research as a global development priority. Co-organized by the SFA Foundation, FCDO UK, and INASP, it brought together leading voices from government, philanthropy, and research institutions. Discussions focused on sustainable, equitable funding models for Open Research, particularly in under-resourced settings. Key themes included the shift from pay-to-read / pay-to-publish open access models, the role of digital infrastructure, and the importance of aligning Open Research with national development agendas. The session also introduced a draft Vision for an African-led Open Research ecosystem by 2030 and invited feedback from participants to shape its final form. The session emphasized that Open Research is not a luxury, but a core enabler of inclusive, impactful science aligned with the SDGs.

Key Scientific Insights (max 300 words)

Summarise the key findings, evidence, or innovations presented. Explain their relevance to planetary boundaries.

The session highlighted several critical insights:

- Open Research is a global public good essential for equitable knowledge sharing, scientific progress, and achieving the SDGs.
- Three major challenges were identified: limited domestic investment in research, inequitable access to digital infrastructure, and fragmentation due to reliance on external aid.
- Innovative funding models such as pooled African funds, blended finance, and diamond open access were discussed as viable alternatives to traditional Article Processing Charge (APC)-based publishing systems.
- Digital equity emerged as a foundational requirement, with calls to leverage existing computing infrastructure and open-source platforms.
- Behavioural change among researchers and institutions is necessary to shift norms around publishing and data sharing.
- Preprints and open repositories were emphasized as critical tools for accelerating research dissemination and improving transparency.
- Philanthropic and governmental funders were urged to redirect APC budgets toward sustainable, community-led platforms.

These insights underscore the need for a systemic shift in how Open Research is financed and governed, particularly in the Global South. The session emphasized that Open

Research must be embedded in national policies and supported by inclusive, context-sensitive funding mechanisms to ensure long-term sustainability and impact.

Link to SDGs and Post-SDG Framework (max 150 words)

Identify which SDGs your session contributes to (1–3 main goals) and how it aligns with the post-2030 agenda.

The session directly contributes to the following SDGs:

- SDG 9 (Industry, Innovation, and Infrastructure): by advocating for investment in digital and research infrastructure.
- SDG 4 (Quality Education): through support for open access to knowledge and equitable publishing opportunities.
- SDG 17 (Partnerships for the Goals): by promoting global and regional collaboration in financing Open Research.

The session aligns with the post-2030 agenda by emphasizing the essential role of inclusive, sustainable, and locally led research ecosystems in advancing global development. It calls for a reimagining of knowledge production and dissemination that centres equity, digital access, and community engagement.

Key Outcomes and Recommendations (max 300 words)

List the main policy recommendations, institutional commitments, and research priorities emerging from your session.

1. Vision for Open Research in Africa: A draft vision was presented, aiming for an African-led, globally influential Open Research ecosystem by 2030.
2. Policy Shifts: FCDO is updating its open access policy to mandate open access publishing and encourage preprints.
3. Funding Redirection: Gates Foundation has ceased paying APCs, redirecting funds to support diamond open access and community-led infrastructure.
4. Infrastructure Investment: Emphasis on leveraging existing computing and e-infrastructure across Africa to support Open Research.
5. Pooled African Funds: Proposal to create continent-wide mechanisms for negotiating publishing waivers and investing in shared repositories.
6. Behavioural Change: Need for funders and institutions to incentivize openness in research assessment and career progression.

7. Global Coordination: Call for funders to collaborate on sustainable models and avoid fragmented efforts.
8. Equity Lens: Ensure that Open Research platforms and policies address digital divides and support under-resourced researchers.

Follow-Up Actions (max 150 words)

Describe next steps, pilot projects, and planned collaborations (2025–2026).

1. SFA Foundation to finalize the vision statement for Open Research in Africa based on session feedback.
2. FCDO to consider its Open Research policy, incorporating preprints, open access mandates, and broader remit including data.
3. SFA Foundation to explore pooled African funds for publishing waivers and shared infrastructure.
4. Advocate for funders and other partners to collaborate in advancing Open Research financing as a policy priority at national, regional, and global levels
5. Funders to collaborate on sustainable models for diamond open access.
6. Continued advocacy and community engagement to promote open data practices.
7. Redirect APC budgets to support equitable publishing platforms.
8. Ongoing dialogue among panelists and stakeholders to advance financing strategies.
9. SFA Foundation to embed open access requirements in supported research.

Supporting Materials (optional)

Attach or link to relevant presentations, photos, or reports.

https://blog.inasp.info/financing-open-research-for-global-development-how-africa-can-lead-the-next-chapter/

Session title: THE AFRICAN SCIENCE RENAISSANCE – LEADERSHIP, INNOVATION, COLLABORATION AND PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT

Convenor details:

Convenor's name	Professor Chioma Blaise Chikere
Convenor's organisation	University of Port Harcourt, Nigeria
Organisation website	www.uniport.edu.ng

Speakers

(add as many rows as needed)

ID	Speakers' name	Organisation name	Country
1	Prof. Chioma Blaise Chikere	Department of Microbiology, University of Port Harcourt, Rivers State	Nigeria
2	Prof. Ntakadzeni Edwin Madala	Department of Biochemistry and Microbiology, University of Venda	South Africa
3	Prof. Memory Tekere	Department of Environmental Sciences, CAES, University of South Africa (UNISA)	South Africa
4	Dr. Fidele Tugizimana	Research Centre for Plant Metabolomics (RCPM), Department of Biochemistry, University of Johannesburg	South Africa
5	Dr. Thandazile Mhlongo	Centre for Postgraduate Studies Cape Peninsula University of Technology	South Africa

6	Laura Nwogu-Chigozie	World Bank Africa Centre of Excellence in Oilfield Chemicals Research (ACE-CEFOR), University of Port Harcourt, Rivers State	Nigeria

Session Thematic Track

Thematic Tracks

Science Diplomacy and Global Partnerships

Session Summary (max 200 words)

The session presentations focused mainly on case studies of Pan-African scientific research collaborations, outputs, and innovations that have strongly contributed to sustainable development, in-country, in-continent and globally. We spotlighted innovative research outcomes from Africa's higher education space that are addressing global challenges such as climate-driven crises, environmental pollution, social inequities and inequalities, food insecurity, environmental degradation and other anthropogenic problems. For instance, by incorporating indigenous peoples and indigenous knowledge, our colleagues at the Universities of Johannesburg and Venda in South Africa have discovered bioactive phytochemicals in therapeutic herbs and plants using metabolomics and mass spectrometry techniques that could possess anti-cancer and contraceptive properties and also microbial secondary metabolites that have plant-growth-promoting potential. Participants cut across different career stages in higher education from Africa and beyond.

Key Scientific Insights (max 300 words)

Our session established that Africa as a continent is blessed with rich human and natural resources that purposeful collaborations and partnerships can help in harnessing the benefits derivable from them. The use of metabolomics and other high-end analytical techniques in deciphering the myriads of biochemical components in the rich biodiversity of the continent is an invaluable asset that our session demonstrated could lead to the discoveries of very potent natural products with great biotechnological/health/industrial benefits. We have discovered some novel species (microbes and plants) within the rich biological components of our ecosystems that possess very potent therapeutic and bioremediation potentials. Within planetary boundaries, green, sustainable, and regenerative chemistry approach used in our research and development protocols has minimal or no environmental footprints thus preserving the planet in terms of reduction in chemical pollution that exacerbates climate crisis.

Link to SDGs and Post-SDG Framework (max 150 words)

Our session contributed significantly to UN SDGs 13, 15 and 17. Outcomes from our sessions align with the post-2030 agenda in terms of creation of enabling scientific research ecosystems that incorporates the indigenous resources and knowledge systems in Africa in furtherance of the continental and global priorities - African Union Agenda 2063 and the UN SDGs.

Key Outcomes and Recommendations (max 300 words)

We hope to see the African Union formulating policies that will focus on strengthening of beneficial collaborations within our higher education space by creating a borderless Africa with no visa bottlenecks like in the Schengen region in Europe. The immigration requirements at embassies of most African countries outside regional countries make scientific mobilities/partnerships/cooperation nearly impossible. A situation where a scientist who has funded research visit, conferences to undertake in another region of Africa other than the country of birth/citizenship, loses these opportunities due to visa problems is counter-productive and hinders scientific innovations and sustainable development. Within our institutions, efforts are made to establish bi/multilateral agreements that could foster Pan-African research collaborations geared towards enhancing scientific productivity and manpower training in order to halt massive brain drain of professionals. From us as collaborators, we have committed to co-creation of knowledge and initiatives that focus on harnessing the benefits in our indigenous biodiversity using biotechnological research approaches.

Follow-Up Actions (max 150 words)

Our key next steps are to ramp up collaborations, mobility programmes and workshops within our African higher education space for improved service delivery and manpower training. All of us on this panel have established very strong research collaborations/partnerships in terms of co-creation of knowledge, co-supervision of PhD students and co-application/development of research proposals for grants to drive Pan-African indigenous research and development projects. Post-science summit 2025, my PhD student Laura Nwogu-Chigozie (one of the speakers) registered at the World Bank Africa Centre of Excellence in Oilfield Chemicals Research (ACE-CEFOR), University of Port Harcourt, was hosted in the laboratory of my collaborator, Dr. Fidele Tugizimana at the University of Johannesburg, South Africa for metabolomics research from 20 September to October 20, 2025. These collaborations are expanding and we are hopeful of more fruitful outcomes that will benefit our institutions, countries and continent at large from 2026.

Session title: Saving the Earth through Science and Technology —A Case Study of Innovative Technology at Shinshu University in Japan

Convenor details:

Convenor's name	Daisuke Mizusawa
Convenor's organisation	Shinshu University
Organisation website	Japanese: https://www.shinshu-u.ac.jp/ English: https://www.shinshu-u.ac.jp/

Speakers

(add as many rows as needed)

ID	Speakers' name	Organisation name	Country
1	Katsuya Teshima (Dr.)	Director/Distinguished Professor, the Institute for Aqua Regeneration, Shinshu University	Japan
2	Kazunari Domen (Dr.)	Distinguished Honorary Professor, the Institute for Aqua Regeneration, Shinshu University	Japan
3	Yoko Kamimura (Ms.)	EVP, Chief Interpreneur Engagement Officer & Chief Evangelist, SUNDRED Co.	Japan
4	Adam O. Karia (Dr.)	Rector and CEO, Water Institute, Ministry of Water /Special Professor of Water Management and Governance, the United African Institute of Technology in Rwanda	Tanzania

Session Thematic Track

Science Diplomacy and Global Partnerships

Session Summary (max 200 words)

(Briefly describe the main focus, purpose, and participants.)

This session, held alongside the 80th session of the United Nations General Assembly, focused on advancing global sustainability through science diplomacy and technological innovation. Hosted by Shinshu University, the event highlighted cutting-edge research from its Institute for Aqua Regeneration, with a particular focus on water purification and green hydrogen production. The purpose was to share practical, scalable solutions to global water and energy challenges and foster international collaboration toward achieving the Sustainable Development Goals (SDGs).

Keynote speeches introduced novel technologies such as Shindai Crystal® and green hydrogen production using photocatalysts, while the panel discussion explored their real-world applications in Tanzania and future deployment in Nagano Prefecture. The session emphasized the importance of cross-sector partnerships, policy engagement, and youth empowerment.

Participants included 77 onsite attendees, among them junior high school students, company and government representatives, and 62 online participants, including researchers, institutional partners, and international stakeholders. The session received high praise for its scientific relevance and inclusive approach, reaffirming the role of universities as global actors in science diplomacy and sustainable development.

Key Scientific Insights (max 300 words)

(Summarise the key findings, evidence, or innovations presented. Explain their relevance to planetary boundaries.)

The Shinshu University session at the Science Summit 2025 presented two major technological innovations addressing critical planetary boundaries: freshwater use and climate change. These innovations were developed by the Institute for Aqua Regeneration of Shinshu University, established in 2024 to advance sustainable water and energy solutions.

The first innovation, introduced by Distinguished Professor Katsuya Teshima, focused on advanced water purification technologies. These include Shindai Crystal® for heavy metal removal and fluoride purification. Field applications in Tanzania, such as the Lemanda Village water plant, demonstrated their effectiveness in addressing fluoride contamination—a major health risk affecting millions. These technologies contribute directly to maintaining the freshwater boundary by enabling safe, decentralized water access without reliance on energy-intensive infrastructure.

The second innovation, presented by Distinguished Honorary Professor Kazunari Domen, involved green hydrogen production using photocatalysts. This method enables direct hydrogen generation from sunlight and water, offering a scalable, carbon-free alternative to fossil fuels. With a prototype system already operational and plans for expansion, this

technology supports the climate change boundary by reducing greenhouse gas emissions and promoting renewable energy transitions.

The session emphasized that technological innovation alone is insufficient. Panel discussions highlighted the need for behavioral change, policy alignment, and international cooperation. The collaboration with the Tanzania Water Institute exemplified science diplomacy in action, bridging global expertise with local needs.

These innovations are highly relevant to the Planetary Boundaries Framework. They address two of the most transgressed boundaries—climate change and freshwater use—by offering practical, science-based solutions that can be scaled up. Moreover, the session emphasized the importance of integrating Earth system science with social systems, empowering youth, and fostering global partnerships. This ensures that scientific progress contributes to a safe and just operating space for humanity.

Link to SDGs and Post-SDG Framework (max 150 words)

(Identify which SDGs your session contributes to (1–3 main goals) and how it aligns with the post-2030 agenda.)

The Shinshu University session contributes directly to three core Sustainable Development Goals:

- **SDG 6: Clean Water and Sanitation** — through innovations in water purification technologies such as Shindai Crystal®, with real-world applications in fluoride-affected regions like Tanzania.
- **SDG 7: Affordable and Clean Energy** — via green hydrogen production using photocatalysts, offering scalable, carbon-free energy solutions.
- **SDG 17: Partnerships for the Goals** — by fostering international collaboration, notably with the Tanzania Water Institute, and promoting science diplomacy.

Aligned with the post-2030 agenda, the session emphasized long-term planetary stewardship, inclusive innovation, and youth engagement. It called for science to transcend borders and disciplines, enabling systemic change beyond the SDG timeframe. The technologies and partnerships showcased represent foundational tools for shaping resilient, equitable futures in a rapidly changing global landscape.

Key Outcomes and Recommendations (max 300 words)

(List the main policy recommendations, institutional commitments, and research priorities emerging from your session.)

Policy Outcomes and Recommendations

1. **Advance science-policy integration**: The session emphasized the need for stronger alignment between scientific innovation and policy frameworks, particularly in water safety and renewable energy.

2. **Promote decentralized water solutions**: Technologies like Shindai Crystal® should be supported through policy mechanisms that enable local implementation, especially in underserved regions.

3. **Support hydrogen infrastructure**: Governments and industry should collaborate to accelerate certification, safety standards, and public understanding of green hydrogen technologies.

4. **Foster youth engagement**: Education policies should incorporate sustainability science and innovation to empower the next generation.

Institutional Commitments

- **Shinshu University** reaffirmed its commitment to global collaboration through the Institute for Aqua Regeneration, with ongoing partnerships in Africa and plans for regional hydrogen deployment in Nagano Prefecture.

- **Tanzania Water Institute** committed to joint research, academic exchange, and the development of a national fluoride monitoring system.

- **Shinshu University** and **Tanzania Water Institute** reaffirmed the necessity of global science diplomacy while supporting cross-sectoral collaboration and open innovation.

Research Priorities

1. **Water purification materials**: Continued development of crystalline materials for heavy metal and fluoride removal, with emphasis on scalability and local adaptation.

2. **Photocatalytic hydrogen production**: Expanding pilot systems and improving solar-to-hydrogen efficiency, with a target of 5% and theoretical potential up to 20%.

3. **Behavioral and cultural studies**: Investigating water awareness and public perception across regions to inform effective implementation strategies.

4. **Monitoring and impact assessment**: Establishing frameworks to evaluate the societal and environmental impact of deployed technologies.

These outcomes reflect a shared commitment to science-driven sustainability, equitable access, and long-term planetary resilience.

Follow-Up Actions (max 150 words)

(Describe next steps, pilot projects, and planned collaborations (2025–2026).)

Following the Science Summit 2025, Shinshu University will advance the social implementation of its water and energy technologies through targeted pilot projects and expanded international collaboration. A key next step includes scaling up the photocatalytic hydrogen production system, with plans to expand from 100 m^2 to 5,000 m^2, supporting regional decarbonization in Nagano Prefecture.

In partnership with the Tanzania Water Institute, joint research and academic exchange will focus on fluoride removal technologies, with the goal of establishing localized treatment facilities.

Shinshu University also plans to deepen engagement with youth and local communities through educational outreach, science initiatives and a new graduate school specializing in water-related technologies. These follow-up actions aim to strengthen science diplomacy, foster inclusive innovation, and ensure that technological breakthroughs translate into tangible benefits for society and the planet.

Session title: Decolonising Science: Ethical Reflections on Sample Return Missions

Convenor details:

Convenor's name	Thilina Heenatigala
Convenor's organisation	Earth-Life Science Institute (ELSI)
Organisation website	www.elsi.jp/en/

Speakers

ID	Speakers' name	Organisation name	Country
1	Thilina Heenatigala	Earth-Life Science Institute (ELSI)	Japan
2	Niklas Hedman	Committee on Space Research (COSPAR)	Austria
3	Lukáš Likavčan	Slovak Academy of Sciences	Slovakia
4	Natalie Trevino	The Open University-Space Ethics Group	UK
5	Erik Persson	Lund University	Sweden

Session Thematic Track

14. Science Diplomacy and Global Partnerships

Session Summary (max 200 words)

In recent decades, sample return space missions—from lunar regolith to Martian dust and asteroid fragments—have transformed how we understand the solar system and the origins of life. These missions are milestones of scientific achievement, involving extraordinary technological precision and deep curiosity. Yet, as nations and private actors accelerate their exploration agendas, critical questions remain under-examined: Who gets to explore? Who decides what is sampled, studied, and safeguarded? And what assumptions—scientific, cultural, or political—are embedded in these missions?

This panel explored the ethical dimensions of sample return missions through the lens of decolonising science. Sample return is not merely a technical or scientific process; it is also a symbolic and material act of extracting from another world. As with terrestrial histories of colonial exploration and resource extraction, power dynamics—rooted in wealth, geopolitical influence, and epistemic authority—shape who leads these missions, whose knowledge counts, and who is left out of the conversation. The dialogue emphasised that sample return is not solely a technical or scientific act but also a cultural and moral one, reflecting humanity's evolving relationship with other worlds. The session called for expanding planetary protection frameworks beyond biological containment toward an ethic of care, inclusivity, and cosmic justice.

Key Scientific Insights (max 300 words)

Sample return missions mark a new phase in planetary exploration, bridging laboratory science and interplanetary contact. While their scientific potential is immense—offering direct insights into the origins of planets and life—the session highlighted the urgent need for accompanying ethical frameworks. The key insight is that planetary protection must evolve from narrow biological safeguards into a more holistic approach integrating moral, cultural, and ecological perspectives.

The discussion underscored that these missions reproduce existing asymmetries in global science: technologically powerful nations determine what is explored, collected, and studied. To ensure planetary stewardship, new governance mechanisms are needed that treat extraterrestrial materials as part of a shared planetary commons, open to equitable participation and knowledge sharing.

The session also proposed that celestial bodies—whether living or lifeless—carry non-instrumental value deserving of respect and restraint. Viewing sample return as both scientific inquiry and moral encounter reframes exploration as a relational act rather than extraction. By embedding ethics into mission design and curation, space science can model inclusive, reflexive, and responsible innovation. These insights connect directly to planetary boundaries, urging a science that recognises limits, interdependence, and shared responsibility across worlds.

Link to SDGs and Post-SDG Framework (max 150 words)

The session directly contributes to SDG 9 (Industry, Innovation and Infrastructure) by emphasising responsible, ethically grounded scientific innovation in planetary exploration. It also advances SDG 10 (Reduced Inequalities) and SDG 16 (Peace, Justice and Strong Institutions) by highlighting the need for inclusive governance, equitable participation, and

transparent decision-making in global space activities. The discussion foregrounded SDG 17 (Partnerships for the Goals), calling for greater collaboration between spacefaring and non-spacefaring nations, as well as between scientific, philosophical, and Indigenous knowledge communities. Looking beyond 2030, the session aligns with emerging post-SDG priorities around planetary stewardship, intergenerational justice, and ethical governance of shared domains. Sample return missions were framed as catalysts for shaping a future global framework that integrates scientific progress with decolonial principles, ensuring that humanity's engagement with the Solar System strengthens equity, responsibility, and planetary care.

Key Outcomes and Recommendations (max 300 words)

The session produced several cross-cutting outcomes that highlight the need for a more inclusive and ethically robust approach to sample return missions. First, participants affirmed that planetary protection should expand beyond biological and technical standards to encompass cultural, philosophical, and decolonial dimensions. This includes recognising that celestial bodies may hold non-instrumental value and should not be treated solely as scientific resources.

Second, the discussion underscored the importance of global equity. Current governance structures—dominated by a small number of spacefaring nations—risk reproducing historical asymmetries in knowledge production and decision-making. Participants recommended establishing mechanisms that enable broader participation from the Global South, Indigenous communities, and interdisciplinary expertise in shaping sample return policies.

Third, the session emphasised that governance frameworks must evolve from compliance-based models to more proactive and participatory systems. Recommendations included developing ethical impact assessments for planetary missions, strengthening international cooperation through COSPAR and UN bodies, and adopting open, transparent approaches to data and sample access.

Finally, the discussion pointed to the need for cultivating "ethical foresight" within space agencies and research institutions—embedding interdisciplinary ethics from mission conception to sample curation. These recommendations collectively call for a shift from extractive logics toward practices rooted in care, reciprocity, and shared planetary stewardship.

Follow-Up Actions (max 150 words)

Following the session, participants committed to advancing interdisciplinary dialogue on the ethics of sample return missions. Planned actions include drafting a scholarly commentary article to disseminate key insights to the astronomy and planetary science community; initiating discussions with COSPAR and relevant UN bodies on integrating broader ethical considerations into planetary protection frameworks; and exploring partnerships with institutions in the Global South to expand representation in future governance dialogues. Additional steps involve organising a follow-up working group or roundtable in the next Science Summit cycle, focusing on developing preliminary guidelines for ethical impact assessments in planetary mission planning. These actions aim to maintain momentum, build international collaboration, and translate the session's insights into practical contributions to global space governance.

Session title: Powering Progress: Access to Clean Water.

Convenor details:

Convenor's name	Karen Mulberry
Convenor's organisation	Institute of Electrical and Electronics Engineering (IEEE)
Organisation website	www.ieee.org

Speakers

(add as many rows as needed)

ID	Speakers' name	Organisation name	Country
1	Dr. Vishal Singh	Centre for Ecology, Development and Research	India
2	Dr. Suparana Katyaini	Council on Energy, Environment and Water	India
3	Shilpa Nischal	CII Water Institute	India
4	Dinanath Kholkar	COEP Technological University	India
5	Mark Sira	Principal, Power Innovation	USA
6	Srikanth (Sri) Chandrasekaran	IEEE	India
7	Harshita Jain	IEEE	India
8	Karen Mulberry	IEEE	USA

Session Thematic Track

Health, Inclusion & Sustainability – One Health, social equity and wellbeing

Session Summary

The workshop explored the urgent challenge of clean water access in rural communities by examining how deforestation and climate change have impacted water resources and how technology can drive measurable change. Using a science-based, interdisciplinary approach to water access combining engineering, environmental science, data, and community-based practices, experts discussed the impacts of climate change on rural communities in the Himalayas.

The interactive workshop explored the urgent global challenge of clean water access in rural communities. Drawing on interdisciplinary expertise in environmental science, engineering, public health, and digital innovation, the session provided participants with an understanding of the systemic barriers to clean water, particularly the climate change impact on the rural communities in the Himalayas. The discussion highlighted the interdependency between energy and water, and the opportunities for new approaches addressing water use and electric power generation that address gaps to sustainable resources.

Panelists underlined that clean water access is vital for the health, well-being, and economic development of rural communities in developing nations. However, challenges like limited infrastructure, resource constraints, and energy scarcity hinder progress. The disparity between clean water access and economic development in rural communities is particularly acute in rural areas where infrastructure is limited, resources are scarce, and climatic challenges are exacerbating water insecurity.

Key Scientific Insights

Summarise the key findings, evidence, or innovations presented. Explain their relevance to planetary boundaries.

The workshop concluded that technology could accelerate progress, but only if solutions are interoperable, scalable and sustainable. Using a clean water project in the Himalayas as an example of what can be accomplished through a multidiscipline approach, the workshop explored how the impact of deforestation and development have adversely affected the springs in Himalayan rural communities

The workshop concluded by noting that there is still much to be accomplished to address access to clean water.

Link to SDGs and Post-SDG Framework

Identify which SDGs your session contributes to (1–3 main goals) and how it aligns with the post-2030 agenda.

The workshop focused on understanding the intersection of rural electrification and water access with the SDGs—especially SDG 6 (Clean Water and Sanitation), SDG 7 (Affordable and Clean Energy), SDG 9 (Industry, Innovation, and Infrastructure), and SDG 13 (Climate Action) and what is needed to ensure clean water is continually available in rural communities that are facing dramatic changes to their environment as a result of climate change.

Key Outcomes and Recommendations

Clean water requires a multi-pronged and multi-discipline approach. Successful implementation will need a standards-based system with local training, inclusive planning, and community ownership. For example:

Dr. Vishal Singh provided examples of the Himalayan Water Paradox; how abundant water resources have become scarce over time

Dr. Suparana Katyaini spoke on how India's water policies are addressing clean water for India's Food, Land for a sustainable future

Shilpa Nischal looked at data gathered using an evaluation tool on to look at the impact of climate change and water source sustainability

Dinanath Kholkar provided examples of IEEE standardization efforts to support the affordable agriculture program and presented the Jal Mulya research project led by the Pune International Centre (PIC), which focused on promoting the sustainable and efficient use of water through a cost-price approach

Mark Siira provided an update on a new IEEE Industry Connections program on the Energy Water Nexus that is working to better understand the demands and needs for water and energy to initiate a standardization effort to investigate the gaps and develop standards to address the intersection of clean water and energy that will address today's issues and provide a framework for the future.

Recommendations:

1. Promote standards-based design as a default for rural infrastructure initiatives.
2. Encourage partnerships among engineers, local governments, NGOs, and academia to develop a framework of what is needed and to implement standards-guided solutions.
3. Scale pilot projects into regional programs using replicable, standards-based templates.

Follow-Up Actions

Describe next steps, pilot projects, and planned collaborations (2025–2026).

According to the Indian Council on Agriculture Research (ICAR) Vision 2050 document, India's overall water consumption is projected to increase by nearly 50%, along with an increased water demand on irrigation water which is expected to rise to about 1,745 billion liters per day (BLD) by 2050, compared to 1,658 BLD in 2000. Simultaneously, food demand is expected to grow from 280 million ton in 2020 to approximately 400 million ton by 2050. This rapid increase in demand, along with the overexploitation of natural resources, is putting a lot of stress on the country's water and soil systems.

Change in weather patterns is increasing these challenges, altering water cycles, degrading soil quality, and increasing the vulnerability of agricultural productivity.
Unsustainable farming practices, excessive use of fertilizers and pesticides, and poor water management are leading to soil nutrient loss (0.5–1.3 million ton annually), declining food quality, and increasing risks of malnutrition and food- and water-borne diseases. These interconnected issues underline the need to view **water, soil, and health as a single, integrated ecosystem** rather than isolated components.

IEEE standards provide frameworks that ensure compatibility, safety, and performance across diverse environmental and technical conditions. Work is underway to look at the water energy nexus and to define a framework and standards based tools and policies to address the gaps between clean water needs, technology advancements, and impacts from climate change.

Supporting Materials

Attach or link to relevant presentations, photos, or reports.

Blog post: https://standards.ieee.org/beyond-standards/powering-progress-access-to-clean-water/

IEEE biography https://standards.ieee.org/ieee-author/ieee-standards-association-ieee-sa/)

IEEE Standards Association – https://standards.ieee.org

Ministry of Jal Shakti – https://jaljeevanmission.gov.in

Ministry of Power – https://powermin.gov.in

IEEE Smart Village India – https://smartvillage.ieee.org/regions/india/

UN SDG Knowledge Platform – https://sdgs.un.org/goals

“Tracking SDG 7: The Energy Progress Report” – World Bank, IEA, 2023

Session title: Regional Observatories for Vector-born Diseases

Convenor details:

Convenor's name	Vena Pearl Bongolan
Convenor's organisation	College of Computer Studies, De La Salle University Manila
Organisation website	

Speakers

(add as many rows as needed)

ID	Speakers' name	Organisation name	Country
1	Vena Pearl Bongolan	College of Computer Studies, De La Salle University Manila	Philippines
2	Kingsley Badu	Kwame Nkrumah University of Science and Technology	Ghana
3	Aldilas Achmad Nursetyo	Center for Tropical Medicine, Universitas Gadjah Mada	Indonesia
4	Mahendhiran Nair	Sunway University	Malaysia
5	Paul Rossener Regonia	Department of Computer Science, University of the Philippines Diliman	Philippines
6	Jaymar B. Soriano	Department of Computer Science, University of the Philippines Diliman	Philippines

Session Thematic Track

15. Health, Inclusion & Sustainability – One Health, social equity and wellbeing

Session Summary (max 200 words)

Briefly describe the main focus, purpose, and participants.

This was meant for a general audience (speakers come from economics (planetary health), applied mathematics, computer science, medicine (epidemiology) and vector biology), on a plan for a Regional Dengue Observatory. We are attempting a "wider" view of dengue, which includes regional analysis of dengue, regional observations, and modeling.

Key Scientific Insights (max 300 words)

Summarise the key findings, evidence, or innovations presented. Explain their relevance to planetary boundaries.

What is new here is the use of mosquito monitors, which will inform the modeling. The monitors could monitor weather in the area, and, along with serology, could inform the virulence, which we included in our model.

Link to SDGs and Post-SDG Framework (max 150 words)

Identify which SDGs your session contributes to (1–3 main goals) and how it aligns with the post-2030 agenda.

Our three main SDG goals would be:

a) Good health, and well-being
b) Clean water, and sanitation
c) Sustainable Cities and Communities
   What has emerged, in preliminary observations and discussions is:
   a) Aedes is a container breeder
   b) People store water in containers, which might not be properly sealed or netted
   c) Rapid urbanization and poor delivery of water services might be a big factor in dengue.

   Among the post-2030 goals, we could impact:
   a) Provide basic services for all and

b) Deliver good health and education for all

Key Outcomes and Recommendations (max 300 words)

List the main policy recommendations, institutional commitments, and research priorities emerging from your session.

This study is in its early stages. So there were few results to discuss. However, the SWOT analysis revealed:

STRENGTHS of the proposal:

a) Highly collaborative, takes advantage of expertise of various countries
b) We can localize models for the region
c) One-health perspective is easy to understand
d) AI applications and socio-economic modeling can give independent comparison.

WEAKNESSES:

a) Right now, lack of funding.
b) Resolution of the one-health perspective might be challenging.
c) High electricity with generative Ais came up, need for "smaller" machines.

OPPORTUNITIES:

a) Power of AI enables early detection of emerging problems, specially for medical practitioners.
b) Pro-social AI and on the spot coaching of people at risk.

THREATS:

a) TB might be getting more attention, but dengue has its own importance.
b) AI brings risks of mis/disinformation and agency decay.

Follow-Up Actions (max 150 words)

Describe next steps, pilot projects, and planned collaborations (2025–2026).

- A “pilot” project that belongs to this umbrella would be the cooperation between Ghana and the Philippines on the mosquito monitors, and mathematical modeling. This has funding, and is on-going.
- Important right now is a proper “scoping” of the research, ie, cut to minimum which we are sure will get funded.

Session title: Foresight in Medicine: Shaping the Future of Healthcare

Convenor details:

Convenor's name	Zisis Kozlakidis
Convenor's organisation	IARC/WHO
Organisation website	https://iarc.who.int/

Speakers

ID	Speakers' name	Organisation name	Country
1	Karine Sargsyan	Cedars-Sinai Medical Centre	USA
2	Lukasz Nazrko	Technical University of Bialystok	Poland
3	Kostas Athanasakis	University of West Attica	Greece

Session Thematic Track

Thematic Tracks

AI, Data & Emerging Technologies – Digital transformation and planetary stewardship

Session Summary (max 200 words)

The medical sector is rapidly evolving through AI, genomics, telemedicine, and other innovations. This session, led by the Medical University of Graz, IARC/WHO, and Bialystok University of Technology, explores integrating foresight methodologies with responsible research and innovation (RRI) frameworks to shape sustainable, equitable healthcare. By aligning patient-centred approaches with emerging technologies, the session highlights robust, adaptable strategies for addressing modern medicine's complexities, fostering socially desirable, publicly beneficial digital innovation across diverse healthcare contexts.

Key Scientific Insights (max 300 words)

The session offered the following four key scientific insights:

- The session emphasised how medicine is rapidly evolving through innovations such as genomics, artificial intelligence (AI), telemedicine and digital health platforms. These technologies are enabling earlier detection of disease, more personalised treatments and broader reach of healthcare services in under-served populations, at a potential scalability that healthcare has not experienced before.
- A recurring theme was the integration of health systems within broader environmental and planetary-health contexts. Delegates pointed out that human health cannot be considered in isolation from ecosystem health, resource constraints, and environmental change (e.g., climate change, biodiversity loss).
- Therefore, there was a call for foresight in medicine, i.e., the ability to anticipate long-term shifts (e.g., ageing populations, novel pathogens, climate-driven health threats), align health innovation with sustainability goals, and design resilient systems rather than reactive ones.
- The final insight focused on equity and access: as medicine becomes more technologically advanced, ensuring that innovations don't exacerbate disparities is central. The session stressed that future health systems must be inclusive, affordable, and responsive to global population needs, particularly in low- and middle-income countries. Within this context, the session also discussed governance and responsibility, specifically the need for collaboration across sectors (health, environment, technology, policy) to ensure that forward-looking medical systems respect ethical, environmental and social boundaries.

Planetary boundaries become directly relevant for future healthcare systems, as health systems, especially high-tech ones, consume significant resources (energy, rare materials, water) and generate waste (medical waste, e-waste, chemical by-products). Foresight in medicine must therefore factor resource efficiency and environmental footprint into design. Additionally, medical innovations must anticipate climate-driven stresses (heatwaves, vector-borne diseases, water-scarcity) and thus align with the planetary boundaries. Lastly, equity in health is intertwined with planetary limits: communities most vulnerable to environmental disruption are often those with weakest health systems. Designing resilient healthcare that operates within planetary boundaries helps reduce vulnerability and avoid tipping points.

Link to SDGs and Post-SDG Framework (max 150 words)

The session's outcomes directly support the UN Sustainable Development Goals (SDGs) by promoting health innovation that aligns with environmental and social sustainability. It strengthens SDG 3 (Good Health and Well-being) through equitable, preventive, and resilient healthcare; SDG 13 (Climate Action) by embedding climate foresight in health systems; and SDG 12 (Responsible Consumption and Production) via sustainable resource use in medical innovation.

Additionally, the session aligns with the post-2030 agenda by advocating a holistic health model that integrates sustainability, equity, and resilience. It envisions healthcare systems that operate within planetary limits, leverage innovation responsibly, and strengthen global solidarity—ensuring that medical progress continues to advance both human well-being and environmental stability beyond 2030.

Key Outcomes and Recommendations (max 300 words)

Key Outcomes:

The session strongly advocated that the future of healthcare requires an anticipatory and systems-based approach, integrating technological innovation with ecological and social awareness. Advances in AI, genomics, and digital health were seen as essential tools for personalised and preventive medicine, yet their deployment must account for resource efficiency and ethical governance. The discussion underscored the need to bridge health and planetary sciences, recognising that human health is inseparable from environmental

stability and that medical systems must operate within the limits of planetary boundaries. Moreover, equity and inclusiveness emerged as central: future-ready health systems must serve diverse populations and prevent technological divides.

The following recommendations were made:

1. Embed planetary health principles in healthcare planning, ensuring innovation respects ecological thresholds and promotes resilience to climate-related health risks.
2. Develop foresight frameworks in policy and research to anticipate long-term health challenges, including demographic shifts, environmental change, and emerging diseases.
3. Foster cross-sector collaboration between medicine, technology, environmental science, and policy to co-create sustainable health infrastructures.
4. Promote equity and digital inclusion, ensuring that advances in medical technology are accessible and beneficial to all regions, especially low- and middle-income countries.
5. Integrate sustainability metrics—such as carbon footprint, waste reduction, and circular economy principles—into health innovation and delivery.

Follow-Up Actions (max 150 words)

The session is going to be written up as a scientific publication, to consolidate these ideas into a single reference document. Additional pilot project collaborations are envisaged for 2025-2026.

Supporting Materials

https://www.linkedin.com/posts/zisis-kozlakidis-647b1530_science-summit-new-york-city-2025-activity-7372722329778290688-gqhM?utm_source=share&utm_medium=member_desktop&rcm=ACoAAAaSelcB7k78iM_1JXEpWEuiWRJpAC-Uoh4

Session title: AI in the Flow: Wastewater Surveillance for Emerging Pathogens and Antimicrobial Resistance

Convenor details:

Convenor's name	Dr. Hana Trigui
Convenor's organisation	Pasteur Institute in Tunis
Organisation website	https://pasteur.tn/

Speakers

(add as many rows as needed)

ID	Speakers' name	Organisation name	Country
1	Dr. Sadri Znaidi	Pasteur Institute in Tunis	Tunisia
2	Dr. Emna Souiai-Harigua	Pasteur Institute in Tunis	Tunisia

Session Thematic Track

Health, Inclusion & Sustainability – One Health, social equity and wellbeing

Session Summary (max 200 words)

This session examines how combining wastewater-based epidemiology (WBE) with artificial intelligence (AI) can transform surveillance of waterborne pathogens and antimicrobial resistance (AMR) in Tunisia, with potential expansion across Africa and the MENA region. The AI4PEP-Tunisia project responds to fragmented, paper-based health data by pursuing three key objectives: identifying priority waterborne pathogens and AMR-related genes in partnership with the Ministry of Health; conducting nationwide wastewater sampling using molecular and culture-based methods; and integrating these results with external datasets into an AI-powered platform for real-time outbreak forecasting, AMR spread prediction, and risk mapping.

By merging microbial, genomic, environmental, and demographic data, the project aims to generate actionable insights and strengthen links between data science, microbiology, and public health policy. A central innovation lies in using AI to analyze WBE-derived pathogen loads and AMR patterns alongside demographic, health, and environmental indicators to model disease risks and identify emerging hotspots.

This multidisciplinary effort, spanning molecular biology, bioinformatics, machine learning, and governmental collaboration, enables earlier detection of pathogen surges, including resistant strains. The initiative also builds local capacity through training and infrastructure, offering a scalable framework for regional adoption and demonstrating how AI-enhanced WBE can deliver early warnings, guide resource allocation, and mitigate future health crises.

Key Scientific Insights (max 300 words)

The core innovation is the successful development of an AI-driven predictive model for monitoring waterborne pathogens like *Salmonella* and *Vibrio* in Tunisia's wastewater treatment plants (WWTPs). By digitizing and analyzing five years of historical compliance data and enriching it with contextual factors, the project created machine learning models and an interactive dashboard. This system transforms fragmented data (among them paper-form data) into an early-warning tool, allowing for proactive public health interventions.

This work directly addresses the Freshwater Use boundary. In water-scarce regions like Tunisia, treated wastewater is often reused for irrigation. The project's focus on ensuring this water is free from high-priority pathogens is a critical step toward promoting safe water recycling. This reduces pressure on freshwater resources by providing a sustainable alternative for agriculture, while also preventing land degradation from contaminated irrigation.

In essence, AI4PEP-Tunisia public health innovation provides a powerful tool for indirect planetary boundary management. By enabling smarter wastewater surveillance and treatment, it helps mitigate cross-boundary pollution and promotes the safe reuse of a critical resource.

Link to SDGs and Post-SDG Framework (max 150 words)

Identify which SDGs your session contributes to (1–3 main goals) and how it aligns with the post-2030 agenda.

AI4PEP-Tunisia project demonstrates strong alignment with the UN's 2030 Sustainable Development Goals (SDGs), particularly contributing to SDG 3: Good Health & Well-being and SDG 6: Clean Water & Sanitation. By developing an AI-driven surveillance system to

monitor and predict waterborne pathogens in wastewater, the project directly supports SDG 3 Target 3.3 by working to prevent the spread of water-borne diseases and Target 3.9 by reducing mortality and illness from hazardous water pollution. Simultaneously, its focus on improving wastewater treatment quality and promoting the safe reuse of water for irrigation and other purposes directly advances SDG 6 Target 6.2 on sanitation and Target 6.3 on improving water quality by reducing pollution and minimizing the release of hazardous materials.

AI4PEP-Tunisia project's methodology provides a forward-looking model that aligns with emerging proposals for the post-2030 development framework, which aims to address critical shortcomings of the current SDG system. A primary challenge has been pervasive data gaps and overlapping indicators, which the project directly overcomes by transforming sparse, paper-based compliance reports into a robust, AI-driven predictive early-warning system, thereby demonstrating a practical solution for enhancing data collection and utilization. Furthermore, the project exemplifies a key proposed feature of the future framework, the use of "custom indicators." By focusing on Tunisia-specific pathogens and enriching its models with locally scraped contextual data, INTERACT perfectly illustrates the development and utility of tailored indicators that complement global core metrics, ensuring that interventions are both highly relevant and impactful within their specific regional and operational context.

Key Outcomes and Recommendations (max 300 words)

List the main policy recommendations, institutional commitments, and research priorities emerging from your session.

Key Outcomes:

5. Successful development of an AI-driven predictive model for *Salmonella* and *Vibrio* in wastewater, demonstrating the feasibility of using retrospective data for early warning.
6. Creation of an interactive dashboard to translate data into actionable public health intelligence.
7. Identification of a priority list of waterborne pathogens for targeted national surveillance in Tunisia.
8. Establishment of a collaborative framework between research, government, and international partners.

Follow-Up Actions (max 150 words)

Describe next steps, pilot projects, and planned collaborations (2025–2026).

The immediate next step is to launch the prospective field sampling campaign in 2025, pending the procurement of reagents. This will involve collecting 24-hour composite samples from the 17 selected WWTPs across both dry and wet seasons.

The primary objective is to detect and quantify the full spectrum of priority pathogens—Vibrio, Salmonella, enteric viruses (Hepatitis A/E, Norovirus), and Microsporidia—using both culture-based and molecular (qPCR) methods. This prospective data is crucial for validating and refining the existing AI prediction models, moving from retrospective analysis to real-time forecasting.

Planned collaborations include deepening the technical partnership with the Ministry of Health's DHMPE for sampling and leveraging the newly secured TAWA grant to integrate AMR surveillance, an initiative that combines Artificial Intelligence, metagenomics, and wastewater-based epidemiology. A pilot project will explore correlating wastewater pathogen levels with clinical case data to strengthen early-warning capabilities, with preliminary results targeted for mid-2026

Session title: Decolonizing Medical Ethics: Reimagining Ethical Frameworks Across Cultural and Material Contexts

1. Convenor details:

Convenor's name	Dilyara Nurkhametova
Convenor's organisation	Nuvance Health
Organisation website	www.nuvanceglobalhealth.org

2. Speakers

ID	Speakers' name	Organisation name	Country
1	Mitra Sadigh	Nuvance Health and Yale New Haven Health	United States
2	Tendai Machingaidze	Cayuga Medical Center	Zimbabwe
3	Duong Duy Khoa	University of Medicine and Pharmacy	Vietnam
4	Chiratidzo Ndhlovu	University of Zimbabwe Faculty of Medicine and Health Sciences	Zimbabwe
5	Keneilwe Molebatsi	Keneilwe Molebatsi	Botswana
6	Zahiruddin Quazi Syed	Datta Meghe Institute of Higher Education and Research	India

3. Session Thematic Track

Indigenous and Traditional Knowledge Systems

4. Session Summary

Global health and clinical medicine often invoke ethical principles as if they were neutral and universally applicable. But the dominant bioethical canon—autonomy, beneficence, non-maleficence, and justice—emerged from Western philosophical traditions, grounded in individualism, rationalism, and conditions of relative resource abundance. This panel interrogates the assumed universality of these principles and invites consideration of what ethics looks like in contexts shaped by collectivist values, histories of colonial harm, and pervasive material scarcity. We explore how ethical judgments are deeply shaped by material conditions—such as whether a health system has the resources to honor certain ethical principles. What is "just" in a high-income tertiary hospital may be impossible—or even unethical—in a low-resource setting. Through case studies, cross-regional dialogue, and grounded theory, we explore how care, consent, justice, and obligation are redefined across contexts. Ultimately, we argue for a shift from exporting Western ethics to co-creating pluralistic, justice-driven frameworks rooted in lived experience and cultural specificity. We align this work with the SDGs, especially SDG 3 (Good Health and Well-being), SDG 10 (Reduced Inequalities), and SDG 16 (Peace, Justice, and Strong Institutions)—and call for an ethics of care that is adaptive, relational, and accountable to the communities it serves.

5. Key Scientific Insights

This panel advances three core scientific insights at the intersection of medical ethics, global health systems, and planetary boundaries.

1. Ethical frameworks are materially and ecologically situated, not universal.
Dominant bioethical principles—autonomy, beneficence, non-maleficence, and justice—were developed within Western sociopolitical conditions marked by resource abundance and individualism. Evidence from collectivist societies, conflict settings, and low-resource health systems demonstrates that these principles cannot be ethically or operationally transplanted without considering cultural norms, ecological constraints, and histories of colonial extraction. This challenges the assumption of ethical universality and introduces a more contextually grounded, pluralistic model.

2. Material scarcity and systemic inequity reshape ethical possibilities.
Empirical research in under-resourced health systems shows that ethical decision-making is fundamentally constrained by environmental and material limits: workforce shortages, supply chain instability, climate-related disruptions, and infrastructural fragility. These conditions—often intensified by climate change and ecological degradation—alter what forms of care, consent, and justice are feasible. The panel reframes scarcity not as an ethical failure of individuals but as a structural consequence of global political-economic systems that exceed planetary boundaries through overconsumption and unequal resource flows.

3. Ethical practice must align with ecological sustainability and distributive justice.
We highlight emerging models of relational and community-embedded ethics that integrate environmental stewardship, collective well-being, and equitable resource allocation. These approaches recognize that health systems depend on stable ecological conditions, and that honoring planetary boundaries is integral to delivering ethical, sustainable care. Cross-regional case studies illustrate how community-defined ethics—rooted in reciprocity, care, and interdependence—provide more resilient frameworks in an era of climate crisis, forced migration, and ongoing colonial power dynamics.

Relevance to Planetary Boundaries
Planetary boundary exceedance amplifies health inequities, exacerbates resource scarcity, and undermines the feasibility of Western ethical norms. By integrating ecological limits into ethical reasoning, we can offer innovations that support sustainable health systems, reduce inequity, and strengthen just, climate-resilient models of care.

6. Link to SDGs and Post-SDG Framework

This panel directly supports:

7. **SDG 3**, by insisting that good health requires not only access to care but ethical care that makes sense within each community;
8. **SDG 10**, by challenging ethical systems that reproduce global inequity;
9. **SDG 16**, by promoting ethical institutions that are inclusive, accountable, and culturally grounded.

10. Key Outcomes and Recommendations

List the main policy recommendations, institutional commitments, and research priorities emerging from your session.

This session generates concrete policy, institutional, and research directions for transforming medical ethics into a pluralistic, justice-driven, and context-responsive field aligned with global equity and planetary sustainability.

1. Policy Recommendations

Adopt context-sensitive ethical guidelines that move beyond universalist, autonomy-centric frameworks and incorporate collectivist values, relational accountability, and local decision-making structures.

Integrate material and ecological constraints into national ethical standards, ensuring policies acknowledge the realities of scarcity, climate-related disruptions, and structural inequity.

Mandate community consultation in ethical governance, requiring health ministries and research bodies to engage local leaders, patients, and civil society in shaping ethical protocols.

Embed ethical humility and anti-colonial safeguards into global health partnerships, including requirements for transparency, shared decision-making, and equitable resource allocation.

2. Institutional Commitments

- **Strengthen ethics committees** by incorporating members with lived experience, community representatives, and experts in decolonial and environmental ethics.
- **Develop training programs** for clinicians, researchers, and policymakers on cross-cultural ethics, scarcity-aware decision-making, and reflexivity.
- **Shift funding priorities** toward models that reward community co-creation, South-South collaboration, and capacity building rather than extractive, donor-driven agendas.

- **Implement institutional accountability mechanisms** to ensure ethical principles align with local realities and planetary boundaries, including periodic audits of equity and ecological impact.

3. Research Priorities

- **Empirically study ethical practice under conditions of scarcity**—including rationing, task-shifting, and informal care networks—to inform more realistic global ethical frameworks.

- **Investigate relational and communal models of ethics** across diverse cultural settings to identify transferable principles for pluralistic ethical systems.

- **Examine the intersection of ethics and planetary boundaries**, including how climate change, ecological degradation, and resource depletion shape care delivery and moral responsibility.

- **Support participatory research led by local scholars**, particularly in the Global South, to counter epistemic hierarchies and generate contextually grounded ethical knowledge.

Follow-Up Actions (max 150 words)

In 2025–2026, the panelists will continue deepening dialogue on decolonizing medical ethics through ongoing cross-institutional discussions, reading groups, and informal consultation spaces. These conversations aim to refine shared language, identify gaps in existing ethical frameworks, and strengthen collaborative understanding across regions.

We are also actively brainstorming pathways to translate these conversations into practice. This includes exploring possibilities for capacity-building workshops, ethics curriculum redesign, and reflexivity-oriented training approaches that could better integrate cultural context, material realities, and ethical humility into clinical and global health education.

These follow-up actions remain intentionally iterative and exploratory, prioritizing co-creation, shared reflection, and relationship-building as we collectively consider how to support more context-sensitive and community-grounded ethical practice.

Session title: Multi-Stakeholder Engagement Strengthening and Advocating Sustainable Practices of Emerging Technologies (MESS-Age)

Convenor details:

Convenor's name	Dr. Nibedita Saha, MBA, PhD
Convenor's organisation	Tomas Bata University in Zlín
Organisation website	https://www.utb.cz/en/

Speakers

(add as many rows as needed)

ID	Speakers' name	Organisation name	Country
1	Dr. Nibedita Saha	Tomas Bata University in Zlín	Czech Republic
2	Prof. Petr Sáha	Tomas Bata University in Zlín	Czech Republic
3	Prof. Chinnappa Jayachandran	Montclair State University, New Jersey	United States
4	Dr. Wei Wang	University of Skövde	Sweden
5	Dr. Tomas Saha	Tomas Bata University in Zlín	Czech Republic
6	Dr. Archisman Bose	University College Cork	Ireland
7	Assoc. Prof. Dr. Nabanita Saha	Tomas Bata University in Zlín	Czech Republic
8	Prof. Altin Idrizi	University of Elbasan	Albania

Session Thematic Track

16. Indigenous and Traditional Knowledge Systems

Session Summary (max 200 words)

The significance of multi-stakeholder initiatives (MSIs) highlights the cooperation between various participants, including scientists, policymakers, industry leaders, businesses, civil society groups, citizens, small and medium-sized enterprises (SMEs), as well as public and private investors. In practice, MSIs represent a systematic strategy employed by organizations to engage key stakeholders and individuals who have or may exert significant influence over the organization's environmental, social, and governance (ESG) practices.

Main Focus:

- *Highlighted the importance of multiple stakeholder's initiatives and engagement for the progress of present-day society.*
- *Emphasized socially responsible human resource management (SRHRM) to comprehend the levels of readiness in humans (HRL).*
- *Addressed conducting social life-cycle assessments (S-LCA) and social impact assessments in the emerging technologies industry to mitigate potential social risks.*

Purpose:

- To provide a scientific agenda that meet the advancement of international public policy strategies of MSIs.
- To foster sustainable business practices that serves as a catalyst for achieving sustainable development goals (SDGs).
- To discourse the call to action, i.e. *think holistic, act locally and engage everyone*.
- To emphasize emerging technologies and their varied applications, to overcome barriers to its broader implementation.

Key Scientific Insights (max 300 words)

The key scientific insights of this proposed session are as follows:

To explore various elements, including the integration of social life cycle sustainability assessment (S-LCSA) for new technologies alongside social responsibility, encouraging sustainable practices, and involving a diverse range of stakeholders.

To include the exploration of new technologies in education, particularly recent developments in emerging technology research such as battery technology, the energy industry, and policy papers that showcase the applied use of Sustainable Life Cycle Assessment (SLCA) in formulating battery policy strategies.

To implement and follow the European Union's initiatives aimed at improving battery efficiency across its entire lifecycle, from design and production to usage, and S-LCA implementation shortcomings that overlook demographic factors.

To evaluate the positive impacts to achieve societal acceptance for integrating both top-down and bottom-up approaches.

To enhance the assessment of the long-term sustainability of new technologies. Engaging multiple stakeholders improves the assessment of social sustainability in the lifecycle of new technology development. In today's knowledge-driven and economically focused society, the assessment and effectiveness of sustainability throughout the life cycle of social interactions have been greatly improved and influenced by socially aware and responsible individuals capable of managing complex and challenging situations.

To achieve sustainable development goals and to meet the demand for future research, this study emphasized the importance of socially responsible human resource management (SRHRM) that fostering sustainability within the advancement of emerging technologies, such as battery research and energy sectors, which aim to tackle forthcoming technological and energy challenges.

Link to SDGs and Post-SDG Framework (max 150 words)

SDGs Goal 3_GOOD HEALTH AND WELL-BEING: Multi-Stakeholder engagement strengthening sustainable practices to engage in collaborative efforts through social life-cycle assessments (S-LCA) and social impact assessments within the battery industry to reduce potential social risks that may affect individuals throughout different phases of product development.

SDGs Goal 4_ QUALITY EDUCATION: Multistakeholder partnership mobilizing and sharing knowledge, expertise, technologies and financial resources to support the achievement of the SDGs goals and to foster their existing innovative capabilities

SDGs Goal 7_ AFFORDABLE AND CLEAN ENERGY: A well-established energy system supports all sectors. As, climate, economy, and society are interconnected and inseparable. The multi-stakeholder initiatives leverage emerging research opportunities addressing social, environmental, and economic concerns, with a strong focus on innovation.

- Scientific advancements should support the stability and resilience of the planet.
- Short-term profits verses long-term planetary well-being.
- The governance of emerging technologies should prioritize biodiversity, climate considerations, and human rights.

Key Outcomes and Recommendations (max 300 words)

Understanding the significance of socially responsible human resource management (SRHRM) in order to comprehend the levels of readiness in humans (HRL) that encompass both the sociotechnical and socio-political situations.

Emphasizing the importance of performing social life-cycle assessments (S-LCA) and social impact assessments within the battery sector to reduce potential social risks that may affect individuals at different phases of product development.

Highlighting the efforts of various stakeholders, including civil society organizations (CSOs) and the private sector (NGOs and corporations), governments. As they are increasingly aware of the importance of considering the social impacts of products, particularly regarding the supply chain for lithium batteries.

Empowering researchers as well as policymakers on integration of renewable energy developments that address social, environmental, economic challenges and committed innovation partnerships.

Follow-Up Actions (max 150 words)

Following the goal of the science summit's proposed session, the research plan of MESS-Age is aimed to investigate: the importance of creating a platform involving multiple stakeholders to take the advantage of new research possibilities, to reconcile social, environmental, and economic issues that emphasizes on innovation, enhancing the well-being of the community and society as a whole. The European Union realizes it as a significant objective for the progress of present-day society. We, from the University Institute, Tomas Bata University in Zlin, Czech Republic join in this project COST ACTION__ MultiViewLCSA _CA CA23157 (https://www.cost.eu/actions/CA23157/). It aims to bring together academia, industry and policy makers into a pan-European network to advance the research frontier of Life Cycle Sustainability Assessment (LCSA) to facilitate sustainable business models (BM), to respond to the supportive social change and the development of international public policy approaches to implement sustainable business scenarios with the innovative BMs.

Supporting Materials (optional)

Relevant speaker's presentations link:
https://acrobat.adobe.com/id/urn%3Aaaid%3Asc%3AEU%3A958a6bb0-31a9-426a-912c-19d078db65ca/?x_api_client_id=adobe_com&x_api_client_location=combine_pdf&viewer%21megaVerb=group-discover

Session title: Centring Multispecies Justice in the Blue Economy to Address Ocean-Climate-Biodiversity Crisis

Convenor details:

Convenor's name	Dr Senia Febrica
Convenor's organisation	School of Global Affairs, Lancaster University
Organisation website	https://www.lancaster.ac.uk/

Speakers

(add as many rows as needed)

ID	Speakers' name	Organisation name	Country
1	Dr Celine Germond-Duret	School of Global Affairs, Lancaster University	United Kingdom
2	Professor Philippe Cullet	SOAS University of London	United Kingdom
3	Professor Jan Bebbington	Pentland Centre for Sustainability in Business, Lancaster University	United Kingdom
4	Professor Philip Hammond	Scottish Oceans Institute, University of St Andrews	United Kingdom
5	Roberto Cerda	Restore Coral	Mexico
6	Emilie McGlone	Peace Boat US	United States of America
7	Coco Francavilla	Music For The Sea	Spain

17. Planetary Boundaries Framework – Integrating Earth system science into global policy

Session Summary (max 200 words)

Briefly describe the main focus, purpose, and participants.

Despite blue economy projects around the world aiming for the sustainable use of marine resources, there are growing criticisms regarding potential injustices towards human and non-human populations (Germond-Duret, Heidkamp and Morrissey, 2022; Dulvy et al.; 2021). Using 'multispecies blue justice' lenses, this session brought together leading experts and practitioners on sustainable development to explore how to better integrate nature, climate, and biodiversity in the blue development agenda. This is crucial because of the growing criticism regarding potential injustices towards human and non-human populations caused by blue economy projects around the world (Germond-Duret et al., 2022). Taking the 'ocean decolonisation' approach this session expanded the concept of justice to include both ocean dependent communities and non-human populations. It offered academic insights, practical guidance and best to address a major blind spot in ocean justice study that often omits non-human-others (Tschakert, 2022), and conservation practices that often overlook ocean dependent communities. In a context of "blue acceleration" (Jouffray et al., 2020), the need for an approach that provides ethical and legal protection to ocean populations (human and non-human) has never been so pressing.

Key Scientific Insights (max 300 words)

Summarise the key findings, evidence, or innovations presented. Explain their relevance to planetary boundaries.

The key findings and innovations listed below revealed that due to the connectivity of different processes within the planetary boundaries, a blue economy development (e.g. port expansion) that affects one process in the planetary boundaries framework (e.g. land system change) could risk affecting the other processes (e.g. biosphere integrity – disrupting biodiversity) (Rockstorm et al., 2024; Stockholm Resilience Centre, 2025). Therefore, any decision on ocean sustainability cannot be considered in isolation.

- There is a general lack of consideration for "justice" in the dominant discourses on development and the blue economy.
- There is a need to advocate for local to global dimension of multispecies justice, starting at the local level with the most marginalised communities.

- Seafood businesses have an important role to play to multispecies justice, particularly through the implementation of the principles of 'market for responsibility'. These principles required businesses to be equipped with stewardship standards of behaviour and information provision, data on the impacts of corporations, formal corporate governance requirements, voluntary landscape for collective stewardship behaviours and impacts, and any ranking/rating of performance regarding stewardship.
- Blue economy activities could bring negative impacts on the wellbeing of marine mammals such as incidental mortality in fishing gear and bycatch. A holistic approach is needed to build sustainable blue economy that take into account the wellbeing of multispecies.
- Coastal communities in Mexico, particularly small-scale fishers, are facing injustices because of the growing tourism, port expansion, and narcotrafficking - – threatening the economic, social, and cultural longevity of the communities.
- Capacity building and advocacy programmes focusing on young people in the context of blue economy and ocean-climate actions are urgently needed.
- Integration of underwater acoustics research, soundscape analysis, and music have been successful to provide support to the conservation of Posidonia oceanic— a threatened seagrass in the Mediterranean.

Link to SDGs and Post-SDG Framework (max 150 words)

Identify which SDGs your session contributes to (1–3 main goals) and how it aligns with the post-2030 agenda.

Our session primarily contributes to the achievement of SDG 14: Life below water. It also touches upon other interrelated SDGs as our session examine:

- innovative and participatory approaches to enable inclusive blue economy processes: replicable creative and arts-based methods (e.g. visual arts, music, and citizen science projects) to ensure the view and knowledge of traditionally overlooked stakeholders, such as Indigenous Peoples and local communities, small-scale fishers, women, youth and children, are at the centre of the blue economy and conservation processes (SDG 4, 5, 11, 13, 14, 16, 17).
- capacity building to enhance ocean literacy and the ability of different stakeholders including Indigenous Peoples, small-scale fishers, women, youth and children to engage with decision makers (SDG 1-5 ,8, 10, 13-17).

- impacts of blue economy activities, particularly fisheries, on the abundance, survival and movement of marine mammals, and best practices for managing and assessing impacts (SDG 1-2,4,12-14, 17).

Key Outcomes and Recommendations (max 300 words)

List the main policy recommendations, institutional commitments, and research priorities emerging from your session.

- Mainstream the consideration for the social dimension of the blue economy.
- Deconstruct dominant discourses that influence political agenda and how we view the ocean and the blue economy.
- Advance multispecies justice provides us a way to rethink justice differently by integrating the specific needs of coastal communities and protection of marine environment.
- Ensure that multispecies justice is considered across all levels of ocean governance.
- Promote a stewardship commitment by businesses to create possibilities for recognising responsibilities to protect the marine environment and communities who depend on it.
- Advance the principles of 'market for responsibility that are equipped with stewardship standards of behaviour.
- Take action to mitigate impacts of blue economy activities (e.g. incidental mortality in fishing gear, bycatch) on marine mammals as they are unsustainable for some populations of some species.
- Respectfully include traditional knowledge and their knowledge holders in the conservation and sustainable use of the ocean resources and spaces.
- Ensure the protection of coastal communities in Mexico that are facing threats of displacement, land and ocean grabbing, and criminalization due to rapid blue economy development, narcotrafficking, and climate crisis.
- Support the next generation of small-scale fishers in Mexico that are on a steep decline.
- Empower youth to access marine science and mainstream multispecies justice in ocean governance.

- Embark on innovative solutions to enable young people to build capacity, advocate for peace and sustainability, support sustainable shipping and coastal community resilience on a global scale.
- Cultivate creativity, art, and music to address today's ocean-climate-biodiversity crisis. Music, as a universal language, can cross boundaries and can reach audiences beyond science. It awakens care, inspires responsibility, and turns information into shared meaning.
- Recognise that sustainability requires both science and emotional reconnection and cultural transformation – where art and music can serve as catalysts in translating scientific knowledge into human experience.

Follow-Up Actions (max 150 words)

Describe next steps, pilot projects, and planned collaborations (2025–2026).

We are preparing:

- A joint research proposal focusing on advancing multispecies justice in the blue economy. The proposal will focus on examining the interactions between blue economy activities and the wellbeing of coastal communities and marine mammals; and
- A peer-reviewed article on fairness, justice and equity in the BBNJ Agreement.

Supporting Materials (optional)

Summary of Science Summit (Alongside UNGA 80) Session, available from https://wp.lancs.ac.uk/blue-justice/category/news-and-blogs/.

Session title:

Global Academic Cooperation in the Bioeconomy – European Bioeconomy University (EBU) Session, (16 September 2025, Science Summit, New York and Online)

Convenor details:

Convenor's name	Dr. Nataša Lovrić
Convenor's organisation	University of Eastern Finland UEF, (EBU)
Organisation website	https://www.european-bioeconomy-university.eu

Speakers

ID	Speakers' name	Organisation name	Country
1	Iris Lewandowski (EBU)	UHOH	Germany
2	Denis Dobrynin (EBU)	UEF	Finland
3	Elspeth MacRae	IACGB	New Zealand
4	Lucía Pittaluga	Latin American University Bioeconomy Network	Uruguay
5	Herrick Fox	North American Bioeconomy	USA
6	Grant Edwards	Lincoln University	New Zealand
7	Orachos Napasintuwong	Asian Bioeconomy	Thailand
8	Thomas Rewe	African Bioeconomy University	Kenya

Session Thematic Track

Thematic Tracks

18. Planetary Boundaries Framework – Integrating Earth system science into global policy

Session Summary

The workshop gathered global leaders from academic and policy institutions to explore pathways for an integrated global bioeconomy network. Representatives from Europe, Latin America, Africa, North America, and Asia shared their regional experiences, strategies, and frameworks to connect education, research, and innovation for a sustainable bioeconomy transition.

Planetary Boundaries and Systems Thinking:

- Prioritize carbon neutrality and circularity in biomass use.
- Avoid overexploitation of renewable resources through evidence-based regional bioresource assessments.
- Embed biodiversity conservation and ecosystem services in economic planning.
- Encourage cross-scale governance, integrating local resource management with global policy commitments.

Key Scientific Insights

Participants agreed that the bioeconomy cannot thrive in isolation; policies and actions in one country are interdependent with those of its neighbors. A fragmented approach reduces the net global impact on climate, biodiversity, and sustainable resource use.

Introduced by the African Bioeconomy University (ABU), the KICS concept emerged as a transferable model to link education, policy, and entrepreneurship. The framework aligns innovation ecosystems with policy reforms and education systems, enabling rapid knowledge transfer from research to business.

The need for globally harmonised curricula and bioeconomy education networks was repeatedly underlined. Participants emphasized student mobility, summer schools, and cross-regional degree programmes as foundations for the next generation of bioeconomy professionals.

The International Advisory Council on Global Bioeconomy (IACGB) definition was endorsed as the common conceptual baseline. Consistent terminology is essential for international cooperation and evidence-based policymaking.

Latin American and Asian contributions stressed that bioeconomies are plural, shaped by local socio ecological contexts. A comparative “bioeconomies of the world” perspective grounded in case studies from Amazonia to Kenya and Thailand was proposed to foster mutual learning.

The US and EU participants underscored the need to bridge high-tech bio-manufacturing (bioplastics, cell-culture proteins, biofuels) with ecosystem-based and indigenous approaches, ensuring technological acceleration does not erode ecological resilience.

The Berkeley Transdisciplinary Bioeconomy Hub presented an inclusive approach linking engineering, chemistry, agriculture, economics, and business to tackle challenges such as wildfires, biomass utilization, and circular value chains.

Link to SDGs and Post-SDG Framework

The scientific dialogue directly addressed the intersection between the bioeconomy and the UN Sustainable Development Goals (SDGs), as well as the safe operating space defined by the planetary boundaries framework.

SDG 2 – Zero Hunger: Bio-based innovations in regenerative agriculture and sustainable food systems, including the Southeast Asian cassava value chain network, aim to secure resilient and low-carbon food production.

SDG 4 – Quality Education: The global network's primary output, shared curricula and student mobility, advances bioeconomy literacy and skills development.

SDG 7 – Affordable and Clean Energy and SDG 9, Industry, Innovation, and Infrastructure: Circular bio-based industries and biomanufacturing hubs are positioned as engines for decarbonized growth.

SDG 12 – Responsible Consumption and Production: Cross-continental research initiatives focus on valorising biomass residues and reducing dependence on fossil inputs.

SDG 13 – Climate Action and SDG 15 – Life on Land: Bioeconomy strategies were framed as integral tools for climate mitigation and biodiversity restoration through sustainable land use and forest-based value chains.

SDG 17 – Partnerships for the Goals: The workshop itself exemplified multilateral academic collaboration, supporting global governance of the bioeconomy.

Key Outcomes and Recommendations

- Establish a Global Bioeconomy Academic Alliance (GBAA) under an open consortium model linking EBU, ABU, Latin American, Asian, and North American networks.

- Co-develop a global open-access curriculum in bioeconomy and sustainability science by 2026, piloted through joint master's and PhD mobility schemes.

- Promote interregional research infrastructures and joint laboratories to facilitate shared innovation, data exchange, and bioresource mapping.

- Create a shared knowledge and communication platform (LinkedIn/portal) for joint news, events, and collaboration opportunities across continents.

- Develop a global policy science interface linking academic outputs with decision-makers in FAO, UNEP, EC DG RTD, and national ministries.

Follow-Up Actions (max 150 words)

Building on previous discussions in Nairobi (GBS 2024) and Joensuu (EBSF 2025), the UNGA session established a joint roadmap for 2025–2030.

The Science Summit EBU session consolidated a shared scientific understanding that the bioeconomy is both a knowledge system and a governance framework essential for achieving a sustainable planet. The participants committed to transforming dispersed initiatives into a structured Global Academic Bioeconomy Network that connects regions, disciplines, and generations.

Next milestones:

2026 – Global Bioeconomy Summit (Dublin) – discussing and deepeing further the GBAA collaboration opportunities.

Session title: Energy Transition Under Pressure: Africa, Innovation & SDG 7

Energy Transition Under Pressure: Africa, Innovation & SDG 7

18.Sept.2025 | 13.00 EDT (New York Time)

https://event.sciencesummitnyc.org/list-of-sessions/detail/134

13.05-13.15 | Welcome address & brief presentation of ANSOLE

Prof.Daniel Ayuk Mbi Egbe

CEO, African Network for Solar Energy (ANSOLE), Jena, Germany

13.15-13.25 | Microalgae : Turning sunlight into a spectrum of sustainable resources.

Dr Nuttapon Vachiraroj

Research Officer of the Biodiversity Research Centre, Thailand Institute of Scientific and Technological Research (TISTR)

13.25-13.35 | ANSOLE E-CONNECT (www.ansole-econnect.org)

Sabrina Zearott

Assistant Head of International Projects, ANSOLE

13.35-13.45| Introducing the BRIDGE initiative for AI in furthering SDG7 in rural Subsaharan Africa

Vidvuds Beldavs

Riga Photonics, Riga Latvia

13.45-14.00 | Models used by SMEs engaged in manufacturing, distributing, or promoting clean cooking technologies to drive transition and uptake among marginalized communities in Africa. Case Study Uganda SMEs under Uganda National Alliance on Clean Cooking

Mariah Kizza

Founder SWEDO Innovation

14.00-14.15 | Empowering informal settlements with solar thermal powered water systems that transform lives through sustainable energy; enabling healthier communities and a greener planet

Pheladi Chiloane

Director, Solar 4 Africa

14.15-14.25 | The Energy Situation in Malawi: Current Realities and Future Prospects

Jean Mbumba Banda

Willy Brandt School of Public Policy, University of Erfurt, Germany

14.25-14.35 | Achieving SDG 7 by 2030 in Ghana

Irene Osei-Owusu

Willy Brandt School of Public Policy, University of Erfurt, Germany

14.25-14.50| Discussion on progress in disrupted global aid and closing remarks

All

Convenor details:

Convenor's name	Prof. Dr. Daniel Ayuk Mbi Egbe
Convenor´s Assistant´s name	Ms Jean Mbumba Banda
Convenor's organisations	African Network for Solar Energy (ANSOLE) & World Association of Industrial and Technological Research Organisations (WAITRO)
Organisations´ websites	https://ansole.org/ & https://waitro.org/

Speakers

ID	Speakers' name	Organisation name	Country
1	Prof. Dr. Daniel Ayuk Mbi Egbe	ANSOLE +WAITRO	Germany
2	Dr. Nuttapon Vachiraroj	Thailand Institute of Scientific and Technological Research	Thailand
3	Vivdus Beldavs	Riga Photonics Centre, Riga + ANSOLE	Latvia & USA
4	Sabrina Zearott	University of Erfurt+ ANSOLE	USA & Germany
5	Mariah Kizzah	SWEDO (Smart Women in Environment and Development Organisation) Innovation	Uganda
6	Pheladi Chiloane	Solar 4 Africa	South Africa
7	Jean Mbumba Banda	Willy Brandt School of Pubilc Policy, University of Erfurt, Germany + ANSOLE	Malawi + Germany
8	Irene Osei-Owusu	Willy Brandt School of Pubilc Policy, University of Erfurt, Germany+ ANSOLE	Ghana+ Germany

Session Thematic Track

19. Planetary Boundaries Framework – Integrating Earth system science into global policy

Session Summary (max 200 words)

Briefly describe the main focus, purpose, and participants.

The session *"Energy Transition Under Pressure: Africa, Innovation & SDG 7"*, held on 18 September 2025 as part of the Science Summit at UNGA80, focused on exploring Africa's pathway toward achieving Sustainable Development Goal 7 – Affordable and Clean Energy. It convened around 30 participants including experts, researchers, policymakers, and students to discuss innovative solutions and policy approaches that can accelerate Africa's clean energy transition.

The purpose of the session was to illustrate how science, technology, and local innovation can address Africa's pressing energy challenges while promoting sustainability and inclusion. Presentations featured various perspectives, including the potential of microalgae technology and AI in energy systems, community-led clean cooking initiatives, solar thermal solutions, and policy recommendations from Malawi and Ghana.

ANSOLE in collaboration with WAITRO created a platform for dialogue and knowledge exchange. Participants from Africa, Europe, and Asia contributed to an engaging discussion that highlighted the importance of the link between science and policy. Beyond the technical engagement, the session also joyfully celebrated two participants' birthday.

Key Scientific Insights (max 300 words)

Summarise the key findings, evidence, or innovations presented. Explain their relevance to planetary boundaries.

The session "Energy Transition Under Pressure: Africa, Innovation & SDG 7"**,** showcased practical innovations driving Africa's clean energy transition while remaining within planetary boundaries. Around 30 experts, researchers, and policymakers discussed how new technologies and partnerships can accelerate access to affordable and sustainable energy.

The presentation "Microalgae: Turning Sunlight into a Spectrum of Sustainable Resources" demonstrated how microalgae can convert sunlight and carbon dioxide into renewable biofuels, food supplements, fertilizers, and bioplastics. Evidence showed their high photosynthetic efficiency, carbon-capture potential, and low land and water requirements. These qualities make microalgae a key bioeconomy solution that reduces greenhouse gas emissions, reduces land and nutrient pressures, and supports circular energy systems. Microalgae could potentially strengthen local energy security and green employment while staying within ecological limits.

The **BRIDGE Initiative** presentation introduced a Europe–Africa partnership for inclusive generative AI that supports sustainable development. Through projects in Kenya, Nigeria, Tanzania, and Uganda, BRIDGE applies AI to local challenges like energy access, climate resilience, and community empowerment while promoting cultural and linguistic inclusivity. This approach ensures that Africa becomes a co-creator of digital technologies that optimize energy use and enhance social equity.

Additionally, **ANSOLE-Econnect** platform was highlighted as a digital hub enabling researchers and practitioners to interact, collaborate, and share energy-related studies, funding, and opportunities. The platform strengthens Africa's research networks, promotes knowledge exchange, and supports evidence-based policymaking in the energy sector.

These initiatives put together illustrate how innovation can fuel the world's clean energy future within the planet's ecological boundaries. They demonstrate that sustainable progress depends on new technologies and on inclusive collaboration and knowledge-driven transformation.

Link to SDGs and Post-SDG Framework (max 150 words)

Identify which SDGs your session contributes to (1–3 main goals) and how it aligns with the post-2030 agenda.

The session *"Energy Transition Under Pressure: Africa, Innovation & SDG 7"* directly contributed to **SDG 7 – Affordable and Clean Energy**, while also tackling **SDG 9 – Industry, Innovation and Infrastructure**, **SDG 13 – Climate Action**, and **SDG 17, Partnership for the Goals**. Discussions mainly focused on how scientific innovation, digital platforms, and inclusive policy frameworks can increase access to sustainable and equitable energy in the world.

One of the technological initiatives that was highlighted was **ANSOLE-Econnect** platform (**www.ansole-econnect.org**), which allows researchers and practitioners to interact, collaborate, and share energy-related studies and opportunities. This platform demonstrates how technology can strengthen research networks and promote knowledge exchange and management in the energy sector.

The session aligned with the post-2030 agenda by promoting collaboration among scientists, policymakers, and entrepreneurs while emphasizing innovation, equity, and resilience. It showcased how Africa's scientific community is building practical, locally sourced solutions to accelerate progress toward universal energy access and sustainable development beyond 2030.

Key Outcomes and Recommendations (max 300 words)

List the main policy recommendations, institutional commitments, and research priorities emerging from your session.

The session *"Energy Transition Under Pressure: Africa, Innovation & SDG 7"* generated several key recommendations and priorities to guide future action in policy, research, and institutional collaboration.

Policy Recommendations:

Participants emphasised that achieving SDG 7 in Africa requires stronger policy frameworks and financial instruments to make clean energy more affordable and accessible to everyone. They encouraged governments to introduce targeted subsidies and incentives for renewable energy technologies, particularly for low-income households and rural communities. There was also consensus on the need to bridge the gap between science and policy to ensure that research findings directly inform national and regional energy strategies. The importance of international cooperation in harmonising standards and adopting joint investments in clean energy infrastructure was also highlighted.

Institutional Commitments:

ANSOLE reiterated its commitment to advancing collaboration and research through the **E-CONNECT platform**, a digital space that allows researchers, innovators, and practitioners to

interact, share publications, and identify partnership opportunities in the energy sector. ANSOLE also pledged to continue strengthening capacity-building **initiatives**, mentorship programs, and knowledge exchanges among researchers and universities.

Research Priorities:

The session identified several areas for future research, including developing affordable, scalable clean energy technologies such as microalgae-based bioenergy and AI-driven optimisation systems. Participants also called for studies to examine the social and economic impacts of clean energy interventions led by grassroots organisations and SMEs, particularly in informal settlements and rural areas.

Follow-Up Actions (max 150 words)

Describe next steps, pilot projects, and planned collaborations (2025–2026).

To mark its **15th anniversary**, **ANSOLE** will carry out a series of SDG7-related events in Africa and Europe. **ANSOLE** and **WAITRO** will strengthen their partnership to advance research and innovation in order to achieve SDG7. The **ANSOLE-Econnect** initiative will evolve from a pilot project focused on five countries (Cameroon, Côte d'Ivoire, Madagascar, Uganda and Zambia) to a platform operating across Africa and beyond. Additionally, collaborations are planned with the **TEA@SUNRISE Network** (www.sunrisenetwork.org) and the **World Conference on Photovoltaic Energy Conversion** (www.wcpec9-korea.com) for SDGs 7 and 13-related events in **Kuala Lumpur, Malaysia** (11–16 January 2026) and **Daejeon, Korea** (15–20 November 2026), respectively. The WCPEC9 event incorporates the **2nd Africa-Asia Joint Photovoltaic Symposium** (A^2PVS).

Sabrina presenting ANSOLE-Econnect at Science Summit in the presence of Jean Mbumba Banda, convenor´s assistant.

Listening to the presentation of Pheladi Chiloane, director of Solar4Africa, South Africa

Listening to the presentation of Mariah Kizza, director of SWEDO, Uganda

Session title: Climate Change and Its Impact on Women's Health: A Comprehensive Study in Sub-Saharan Africa

Convenor details:

Convenor's name	Floriane NSABIMANA
Convenor's organisation	United Nations Population Fund
Organisation website	https://burundi.unfpa.org/en

Speakers

ID	Speakers' name	Organisation name	Country
1	Marcel NIBASUMBA	IFDC	Burundi
2	Eric Kithio NDAPU	UNFPA	Burundi
3	Jessé Kelly INKURIZE	UNFPA	Burundi
4	Dr Gladys Kelly KEZA	UNFPA	Burundi
5	Grâce Bénie MUGISHA	ASSEJEBA	Burundi
6	Céleste INGABIRE	UNFPA	Burundi

Session Thematic Track

Food, Biodiversity & Climate Resilience – Regenerative food systems and nature-based solutions

Session Summary (max 200 words)

This session explores the multifaceted relationship between climate change and women's health in Sub-Saharan Africa, drawing on findings from the comprehensive study *"Climate Change and Its Impact on Women's Health."* It examines how extreme weather events, water scarcity, food insecurity, and rising temperatures disproportionately affect women — from increased exposure to waterborne diseases and pregnancy complications to heightened risks of malnutrition, mental distress, and gender-based violence. The discussion brings together experts from diverse fields to connect data, health realities, and policy solutions. Together, they highlight evidence-based insights, community resilience strategies, and gender-sensitive adaptation models that can drive equitable climate action. The session aims to make visible the often-overlooked gendered impacts of climate change, inform policy responses, and promote women's leadership in building climate-resilient health and food systems across Africa.

Key Scientific Insights (max 300 words)

Climate change profoundly affects women's health in Sub-Saharan Africa, with cascading effects across health, psychology, humanitarian systems, agriculture, and policy. Extreme weather events have increased fivefold since the 1970s, driving waterborne diseases and worsening gender disparities in

resource access. Heat exposure raises risks of stillbirth (16%), low birth weight (12%), and preterm birth (10%), while poor sanitation fuels infectious outbreaks. Psychological impacts are severe: depression, anxiety, and PTSD rise up to 30%, compounded for women and girls by displacement and gender-based violence. Floods and droughts disrupt health services, displace millions, and increase protection risks. Economically, women—who perform up to 80% of agricultural labor—face declining yields and food insecurity, costing nations 3–16% of GDP. Empowering women and ensuring their participation in decision-making strengthens climate adaptation and community resilience. These insights show that climate change threatens both planetary and social boundaries. Addressing it through gender-responsive, climate-smart, and community-based strategies is essential to safeguard human well-being, equity, and planetary health.

Link to SDGs and Post-SDG Framework (max 150 words)

This session advances SDG 3 (Good Health and Well-being), SDG 5 (Gender Equality), and SDG 13 (Climate Action) by highlighting how climate change disproportionately impacts women's health, mental well-being, and livelihoods in Sub-Saharan Africa. It emphasizes closing gender gaps in access to health services, resources, and decision-making. Aligned with the post-2030 agenda, the session advocates integrated, gender-transformative, and climate-smart strategies that link environmental sustainability, human health, and social equity. These cross-sectoral approaches promote resilient societies that operate within planetary boundaries while fostering well-being, justice, and sustainable development.

Key Outcomes and Recommendations (max 300 words)

The session highlighted critical actions to address climate change's gendered impacts on health in Sub-Saharan Africa:

- **Policy Recommendations:** Implement gender-responsive climate and health policies ensuring women's access to healthcare, clean water, sanitation, and nutrition. Incorporate mental health and protection services for women and girls into disaster preparedness and response. Promote women's participation in decision-making to strengthen community resilience and climate adaptation.
- **Institutional Commitments:** Establish cross-sectoral coordination among health, agriculture, and disaster management institutions to tackle climate-related health risks. Humanitarian agencies should ensure equitable access to services for displaced women and girls during emergencies. Invest in programs that enhance women's livelihoods and food security in rural communities.
- **Research Priorities:** Collect longitudinal, sex-disaggregated data on climate impacts on maternal, reproductive, and mental health. Study effective interventions to reduce gender-based vulnerabilities to climate disasters. Evaluate community-based, gender-transformative adaptation strategies for evidence-based policymaking.

Follow-Up Actions (max 150 words)

For 2025–2026, the session will guide practical steps to address climate impacts on women's health:

Pilot Projects: Launch community-based, gender-transformative climate adaptation programs integrating maternal and mental health with sustainable agriculture.

Collaborations: Strengthen partnerships among health ministries, agricultural agencies, humanitarian organizations, and women-led groups for coordinated interventions.

Research & Monitoring: Conduct longitudinal studies on climate-related health risks and assess pilot program effectiveness.

Capacity Building: Train local health workers, policymakers, and community leaders in climate-smart, gender-responsive strategies.

Session title: Marine Resources for Sustainable Development

Convenor details:

Convenor's name	Dr. Parul Sahu
Convenor's organisation	CSIR-Central Salt & Marine Chemicals Research Institute (CSMCRI), Bhavnagar (India)
Organisation website	https://www.csmcri.res.in/

Speakers

ID	Speakers' name	Organisation name	Country
1	Dr. Kannan Srinivasan	CSIR-Central Salt & Marine Chemicals Research Institute	India
2	Dr. Puyam Singh	CSIR-Central Salt & Marine Chemicals Research Institute	India
3	Mr. Nirjar Bhatt	Memtrix Technologies LLP	India
4	Dr. Vaibhav Mantri	CSIR-Central Salt & Marine Chemicals Research Institute	India
5	Mr. Tanmaye Seth	Aquagri Processing Pvt. Ltd.	India
6	Dr. Arvind Kumar	CSIR-Central Salt & Marine Chemicals Research Institute	India
7	Mr. Bharat Raval	Indian Salt Manufacturers' Association	India

Session Thematic Track

Health, Inclusion & Sustainability – One Health, social equity and wellbeing

Session Summary (max 200 words)

The session on "Marine Resources for Sustainable Development", held under the CSIR initiative "Connect, Collaborate, Converge and Convert (5C) for Global Sustainable Development," focused on utilizing marine resources like saltwater and marine algae to develop sustainable technologies that support the UN Sustainable Development Goals (SDGs). Emphasis was placed on translating scientific research into practical, industry-aligned solutions with social and environmental impact.

The session featured discussions on innovative technologies in water purification, marine algal cultivation, and solar salt production. Highlights included recent advancements in desalination, membrane-based water purification systems, and mobile hybrid purification units, with a focus on sustainability and reuse of materials. Developments in marine algae cultivation were also presented, including bio-stimulant formulations, intellectual property-backed innovations, and systems to ensure a reliable feedstock supply chain. Advances in solar salt production covered methods to improve quality and yield, create value-added specialty salts, and extract useful chemicals from brine.

Industry perspectives added depth, focusing on hollow fiber membrane technology, industrial wastewater recycling, and seaweed cultivation as a livelihood for coastal communities. The session also addressed the need for stronger policy support, global partnerships, and collaborative industry-research efforts. With about 100 global participants attending online, the session underscored the importance of international cooperation in sustainable marine resource development.

Key Scientific Insights (max 300 words)

The session on **'Marine Resources for Sustainable Development'** provided several key scientific insights into how marine resources such as saltwater and marine algae can be harnessed for sustainable technologies aligned with the Sustainable Development Goals (SDGs). A major focus was on innovative **desalination and water purification technologies**, addressing global water scarcity. Advances in membrane technologies, including first and second-generation reverse osmosis (RO) membranes and ultrafiltration (UF) systems, were highlighted. Notably, decentralized desalination plants have delivered over 4 billion litres of potable water, benefiting rural communities with user-friendly and solar-compatible systems. The **reuse of end-of-life RO membranes** and mobile water purification units running on hybrid energy showcased practical approaches to sustainability and disaster resilience.
In the area of **marine algal cultivation**, the development of bio-stimulants, IPR-protected innovations, and seedling production nurseries were presented as scalable solutions for sustainable agriculture and feedstock security. Seaweed cultivation was recognized as a **socio-economic driver** for coastal communities, offering employment, women's empowerment through SHGs, and income diversification.

On the **salt front**, scientific interventions have led to improved solar salt yield and purity, with value-added products like low sodium salt and specialty chemicals from brine. Emphasis was placed on industry-research partnerships, international collaboration, and the development of a skilled, future-ready workforce to build a resilient and globally competitive salt and marine chemical industry.

Link to SDGs and Post-SDG Framework (max 150 words)

The session highlighted strong linkages to key Sustainable Development Goals (SDGs), particularly SDG 3 (Good Health and Well-being) through salt technology innovations, SDG 6 (Clean Water and Sanitation) via advanced desalination and water purification, SDG 12 (Responsible Consumption and Production) through marine-algal bio-stimulants and sustainable salt production, and SDG 14 (Life Below Water) by promoting sustainable seaweed

cultivation and empowering coastal communities. Looking beyond 2024, the post-SDG framework emphasizes ending hunger through marine-algal biostimulants enhancing crop yields, ensuring sustainable water management with desalination technologies, and fostering inclusive economic growth via skill development in coastal regions. The framework commits to harnessing science, technology, and innovation to benefit people and the planet, scaling up support to developing countries, and advancing human rights, gender equality, and empowerment of women and girls, thereby ensuring a resilient, equitable, and sustainable future through marine resource innovation and international collaboration.

Key Outcomes and Recommendations (max 300 words)

The session on Marine Resources for Sustainable Development under CSIR's "5C" initiative underscored the critical role of science, technology, and innovation in transforming marine resources into sustainable solutions aligned with global development goals. Key outcomes and recommendations include:

A. Policy Recommendations:

- Promote integrated marine resource policies that support sustainable desalination, seaweed cultivation, and salt production.
- Develop enabling regulatory frameworks to accelerate deployment of decentralized water purification systems and marine-algae-based bioproducts.
- Incentivize private sector participation and coastal community engagement through subsidies, training, and inclusive innovation programs.

B. Institutional Commitments:

- Strengthen industry-research partnerships to co-develop scalable, IP-backed technologies with social and environmental impact.
- Establish national and regional centers of excellence focused on marine biotechnology, salt technologies, and sustainable aquaculture.
- Foster capacity building through dedicated skill development initiatives for youth and women in coastal regions.

C. Research Priorities:

- Advance next-generation water purification technologies emphasizing material reuse, hybrid energy integration, and disaster resilience.
- Expand research on marine algae for biostimulants, bioenergy, and nutraceutical applications, including development of reliable seedstock systems.
- Innovate in solar salt quality improvement, value-added salt derivatives, and extraction of specialty chemicals from brine.

D. Global Collaboration:

- Build international networks to exchange knowledge, harmonize standards, and facilitate technology transfer, particularly to the Global South.
- Align marine innovation strategies with SDG and post-2030 priorities to ensure inclusivity, environmental sustainability, and economic resilience.
- This session reaffirmed that translating marine science into impactful solutions requires collaborative, cross-sectoral efforts—combining scientific excellence, policy support, community engagement, and global cooperation to address water security, food systems, and coastal livelihoods.

Follow-Up Actions (max 150 words)

Building on the outcomes of the session, CSIR will advance major initiatives in 2025–2026 across salt and marine chemicals, desalination, macro-algae cultivation, and marine environmental assessments. Pilot-scale projects are planned for decentralized desalination units, value-added salt products, and scalable seaweed-based biostimulants. Skill development programs targeting coastal youth and women's self-help groups will be expanded.

CSIR is also pursuing R&D collaborations with developing countries in Africa and South Asia to co-develop sustainable marine technologies tailored to regional needs. Under the CSIR-ISTAD framework, international partnerships will be strengthened to support knowledge exchange and joint innovation.

Industry engagement will be prioritized for upscaling proven technologies in water purification and marine bio-products. These efforts aim to create robust value chains, ensure socio-economic impact, and contribute meaningfully to SDG-aligned global development through sustainable marine resource utilization.

Supporting Materials (optional)

Attach or link to relevant presentations, photos, or reports.

[A] Link of online streaming (CSIR India Youtube channel):
https://www.youtube.com/watch?v=PyIanpFAtR4

[B] Photos during the online session:

Session title: OVERCOMING INVISIBLE BARRIERS: WOMEN'S CONTRIBUTIONS TO SCIENCE AND INNOVATION FOR SUSTAINABLE DEVELOPMENT IN HIGHER EDUCATION LEADERSHIP AND RESEARCH

Convenor details:

Convenor's name	Professor Chioma Blaise Chikere
Convenor's organisation	University of Port Harcourt, Nigeria
Organisation website	www.uniport.edu.ng

Speakers

ID	Speakers' name	Organisation name	Country
1	Prof. Chioma Blaise Chikere	Department of Microbiology, University of Port Harcourt, Rivers State	Nigeria
2	Prof. Michelle Bloor	School of Social and Environmental Sustainability, University of Glasgow	United Kingdom
3	Prof. Ntebogeng Mokgalaka-Fleischmann	Faculty of Science, Tshwane University of Technology (TUT), Pretoria	South Africa
4	Dr. Gertie HP Arts,	Wageningen Environmental Research, Wageningen University and Research	The Netherlands
5	Dr. Sharon Munyaka	Organizational Psychology Services Practice, Sharon Munyaka Inc. 53 Melrose Street, Johannesburg	South Africa
6	Dr. Chidinma Peace Okafor	Department of Microbiology, Faculty of Biological Sciences, Imo State University, Owerri, Imo State	Nigeria

Session Thematic Track

Gender Equality and Women in Science

Session Summary (max 200 words)

This session aimed at inspiring women in science, higher education research and leadership to rise above limiting barriers and ceilings using evidence-based models from our accomplishments despite the inherent challenges such as the patriarchy, stereotypes, impostor syndrome, lack of self-confidence and mentorship. We showcased the undeniable footprints and achievements of notable women in higher education leadership and research from international, cross-continental and global perspectives and these formed good empowerment resources to encourage and mentor more women to stand up for themselves amidst perceived or invisible road blocks in their career and professional spaces. Participants cut across countries and continents comprising mainly women in early, mid and established career stages in higher education and a few men from higher education.

Key Scientific Insights (max 300 words)

Our session presented bold evidences of impactful achievements by women in higher education leadership and research such as co-creation of knowledge and research projects, co-authorship of powerful scientific research papers published in high impact factor and indexed journals, mentorship of next generation early career/emerging researchers/scientists who are doing well indifferent areas of endeavors, and occupation of leadership positions in different spaces. The invisible barriers are being increasingly surmounted by bold women in leadership, research and governance recently thereby presenting inspiration, role model figures and motivation for others to rise up to the challenges. In Africa about 3% of Vice Chancellor (VC) positions is held by women before now but recently, more women have been appointed as VCs in Sub-Saharan Africa Higher Education Institutions. This statistic has also improved in Europe and other parts of the global North. Within the context of planetary boundaries, women scientists especially from the mission and vision of scientific professional bodies that majority of my teammates and I are full members of, like Society of Environmental Toxicology and Chemistry (SETAC - www.setac.org) and International Society for Microbial Ecology (ISME – www.isme-microbes.org), nature-based solutions, green and sustainable chemistry practices and circularity are integral parts of our research and innovation projects to ensure our experimentations/field investigations do not harm the planet.

Link to SDGs and Post-SDG Framework (max 150 words)

Our session contributed immensely to UN SDGs 4, 5, 13 as our teammates have secured research grants and funds from national and international agencies that supported collaborative/individual/institutional projects that delivered impactful outcomes geared towards enhancing women empowerment/inclusion in higher education, environmental sustainability, mitigating climate change, advancement of the SDGs and global partnership/cohesion in line with the post-agenda 20230.

Key Outcomes and Recommendations (max 300 words)

Policy recommendations from our session are that institutions, governments and policymakers should implement gender-sensitive policies that focus mainly on transparency, structured mentorship and sponsorship programmes to train more women for

leadership opportunities, family-friendly and flexible work schedules/arrangements especially for nursing mothers and parents with young children, flexible maternity leave plans, targeted leadership and research funding support for early career workforce, creation of an equitable and inclusive culture/work environment and systematic data collection and accountability to identify gender-gaps, pay disparities, promotion delays/denials for achieving measurable and transparent gender equity goals. Institutional commitments from our different backgrounds show that these issues are still work-in-progress and with more intentionality from women already in leadership positions towards the initiation of these conversations, a better world is envisaged. Our research priority from our session focuses on co-creation of proposals/projects that will enable our team break more of these barriers in terms of enhanced productivity/promotion rates, publication rates, supervision of more graduate female scientists, support for female graduate students struggling with young families and research impact in our various domains.

Follow-Up Actions (max 150 words)

Key next steps, pilot projects and collaborations from 2025 to 2026 will focus on co-creation/supervision of proposals/research projects that will enable our team break more of these barriers in order to achieve enhanced productivity/promotion rates, publication rates, supervision of more graduate female scientists, support for female graduate students struggling with young families and increased research impact in our various domains. For instance, I and Prof. Ntebogeng Mokgalaka-Fleischmann – (a Professor of Chemistry and the Executive Dean, Faculty of Science, Tshwane University of Technology, Pretoria) are planning to co-supervise her PhD student who will visit my lab in University of Port Harcourt, Nigeria in 2026 for the microbiological aspect of this project.

Session title: THE FUTURE IS FEMALE – HARNESSING GENDER INCLUSIVITY IN STEMM FOR THE ADVANCEMENT OF THE AFRICAN UNION (AU) AGENDA 2063 AND UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS (UN SDGs)

Convenor details:

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Speakers

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Session Thematic Track

Youth Futures – Empowering the next generation of science and policy leaders

Session Summary (max 200 words)

This session showcased the impact of STEMM programmes in mentoring and empowering the girl child to have intentionality and confidence in choosing and excelling in careers in the STEMM pipeline. The adult speakers demonstrated the impact of intentional mentoring of girls in STEMM field with verifiable facts and statistics in terms of outstanding academic performance and excellent grades, increased representations at competitions nationally and internationally and enhanced self-confidence and self-leadership in the empowered girls. The teenage speaker in grade 12 shared her experiences from participating in international STEM (iSTEM) Olympiad in Barcelona in July 2025 which gave her the opportunity to compete at this global level in science category and also win a bronze medal. The grades 9 and 10 speakers as emerging STEMM trainees shared their love for coding and STEMM competitions as veritable resources for enhanced academic success and self-development. Participants cut across high school students, educators, tech professionals and higher education leaders.

Key Scientific Insights (max 300 words)

Gaps in STEMM resources and manpower for training and empowering high school students/educators especially in resource-limited settings found in the global south must be intentional addressed/bridged if we must achieve the SDGs. Presentations made by the speakers showed that while progressive efforts are made by privately-owned high schools in incorporating STEMM education and empowerment in their curriculums and resources for empowering the students with digital skills, more efforts and commitments are needed from NGOs, governments, donors, tech giants in closing the digital divide that hinders inclusivity and sustainability in STEMM education. Within the context of planetary boundaries, STEMM education encourages sustainability, critical thinking, problem-solving initiatives that will mitigate, halt and reverse the impact of anthropogenic activities on the planet. For instance, when a high schooler is empowered with tech skills that help in developing eco-friendly products like solar powered domestic appliances, both man and the environment benefit immensely from this.

Link to SDGs and Post-SDG Framework (max 150 words)

Our session significantly contributed to UN SDGs 4, 5 and 17. Our session outcomes align with the post-2030 agenda in terms of conscious efforts in reducing inequalities and closing the digital/gender divides existing in lower middle-income economies in STEMM education/enrollment, girl child empowerment and access to valuable information.

Key Outcomes and Recommendations (max 300 words)

Policy recommendations, institutional commitments and research priorities emerging from our session are that governments as the regulator of education globally should make policies that will mandate high schools (public and private) to make STEMM training compulsory for both leaners and educators; schools should commit to the exposure of students and educators to sustained and regular training and competitions in STEMM programmes and finally both schools and parents/guardians should partner well in the training of the learners in STEMM subjects. For

instance, as a parent of 3 adolescent girls in grades 9, 10 and 12, I and my husband collaborate with our children's school by providing financial support and enrollment of our girls to participate in national and international STEMM competitions.

Follow-Up Actions (max 150 words)

Key next steps will involve creation of enabling resources to encourage increased training and enrollment of high school coaches/teachers and girls in STEMM pipeline to bridge the gender disparity experienced in this area. We are hopeful of applying for funding to ramp up STEMM enlightenment programmes especially in minoritized and underrepresented communities post-Science Summit 2025.