ANNUAL REPORT

2023-2024

futureearth

Research. Innovation. Sustainability.

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Future Earth Community

Operations and Governance

DIRECTORS' NOTE

As we reflect on another year of transformative science and global engagement, we are proud to share the strides we have made in advancing sustainability science. We also recognize the urgent work that lies ahead to fulfill our shared vision of an equitable world for all and understand that collaboration is required for transformative change. Our work over the past year across disciplines and sectors reflects that.

At the heart of our mission is the pursuit of knowledge that drives meaningful, evidence-based change. This past year, along with partners, we released the 7th in the series of "10 New Insights in Climate Science" reports, providing a summary of the very latest climate science for policymakers. We kicked off a synthesis report for the European Commission focused on knowledge gaps in climate change and biodiversity science to inform Horizon Europe 2025-27. We also started the Earth Commission's second scientific assessment of safe and just Earth system boundaries, along with a new cohort of experts. The Pathways Initiative continued to foster spaces of reflection for researchers to collaborate, and opened a second round of communication grants. Further, the Global Research Networks, regional, national and local committees increased collaboration with new cross-cutting initiatives for synthesis, co-creation and transdisciplinarity of which a first round of results are expected in 2025.

One of Future Earth's greatest strengths is its capacity to connect a global network of researchers, policymakers, and practitioners. This year, we deepened our regional engagement with the creation of the Future Earth Asia Regional Committee and the expansion of the Future Earth Africa Hub as it recruited hosts for nodes across the continent. Both initiatives will enhance our regional presence through agenda setting and collaborative activities, deepen engagement with local initiatives and opportunities, and ensure integration into global priorities that should be reflecting local realities. Capacity building training courses will be provided annually, benefiting from increased networks and also contributing to further network building. The launch of the new Member Portal marks a step forward in how we connect and collaborate with the community, providing a space for shared learning and innovation. The 2023 Sustainability Research and Innovation Congress in Panama - together with the Future Earth Assembly - brought together hundreds of sustainability experts, predominantly from Latin America, and sparked new international collaborations.

Beyond facilitating research and mobilizing networks, a cornerstone of Future Earth is turning knowledge into action. Throughout the reporting period, members of our community represented Future Earth at many science-policy engagements, including the Climate and Biodiversity COPs, IPBES and IPCC, and the Bonn Climate Conference, where they injected cutting-edge sustainability research into the dialogues and connected with decision makers. Our award-winning magazine Anthropocene showcased the power of storytelling in shifting perceptions and driving change with two live performances of the Climate Parables in San Francisco. Anthropocene also initiated work on a seventh printed edition.

While just a small sampling, this work across regions, time zones, and sectors could not be done without our dedicated community and partners. With your continued support and engagement, Future Earth is well-equipped to continue connecting challenges to the tangible solutions needed to transform our environment and society and to be a leading voice for science.

Signed,
Michael Nxumalo, Global Hub Acting Director, Africa
Micheline Ayoub, Global Hub Director, Canada
Wenjie Dong, Global Hub Director, China
Sandrine Paillard, Global Hub Director, France
Fumiko Kasuga, Global Hub Director, Japan
S.K. Satheesh, Global Hub Director, South Asia
Wendy Broadgate, Global Hub Director, Sweden and Interim Coordinating Director
Revital Shpangental, Global Hub Director, Taipei
Erica Key, Global Hub Director, USA

A Global Network of Researchers and Innovators

09 Global Secretariat Hubs:
Africa, Canada, China, France, Japan, South Asia, Sweden, Taipei, United States

23 National, Local and Regional Networks

27 Global Research Networks

MISSION & VISION

Our mission:

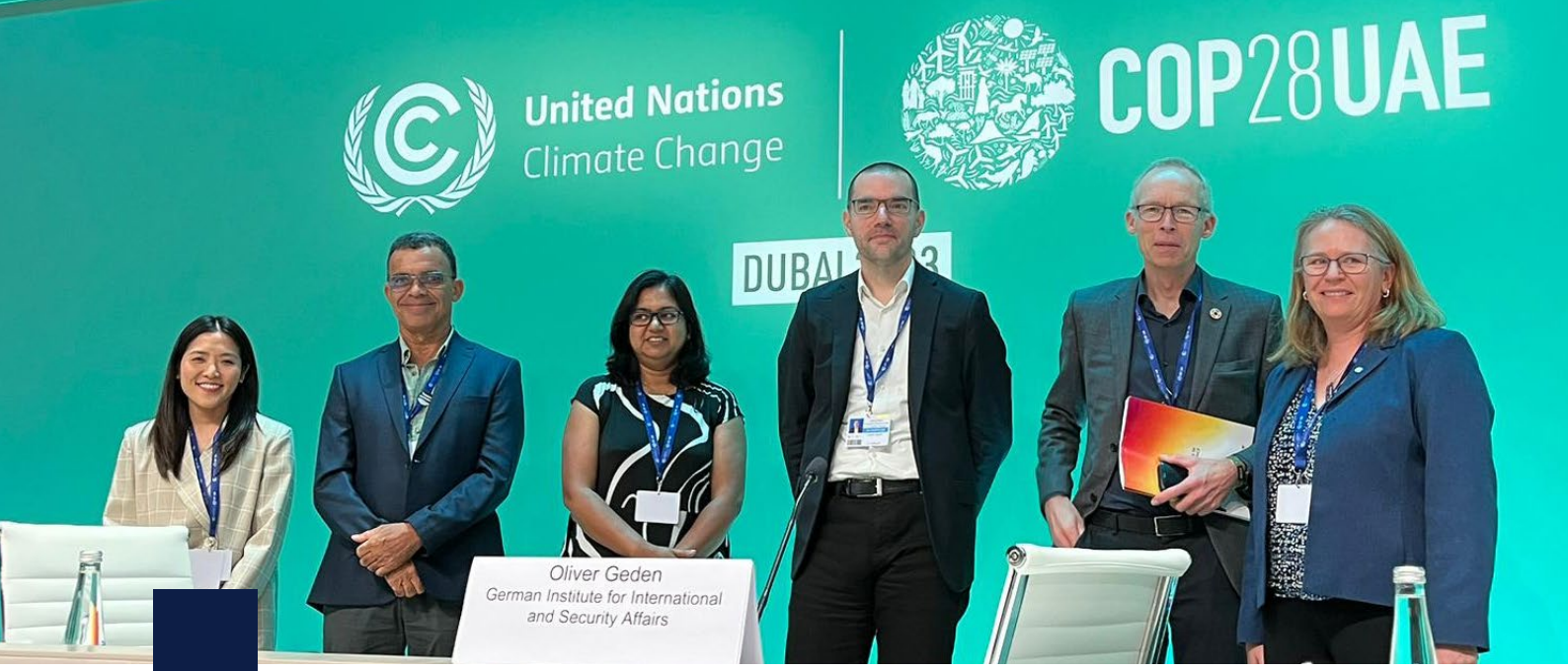
Future Earth's mission is to advance research in support of transformations to global sustainability.

Our vision:

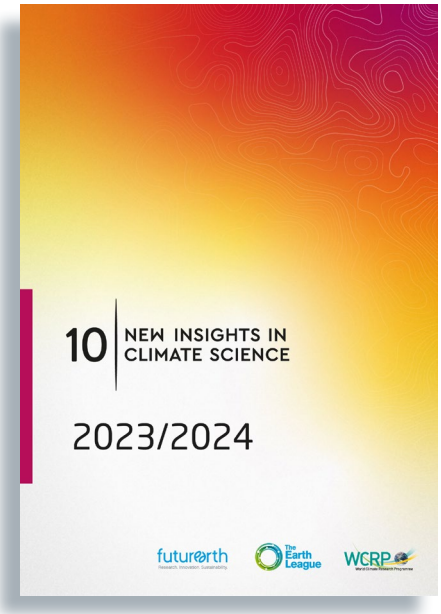
The vision of Future Earth is of a sustainable and equitable world for all, where societal decisions are informed by openly-accessible and shared knowledge.

FUTURE EARTH CROSS-CUTTING PROGRAMS AND INITIATIVES

The Future Earth secretariat develops and runs several cross-cutting initiatives that support specific objectives of the Future Earth mission and vision. They engage experts from across the network and focus on synthesis, science-policy, communications, funding, and early career development.



10 New Insights in Climate Science



The 10 New Insights in Climate Science series highlights essential advances in climate change research, from natural and social sciences, with high policy relevance. An international team of more than 60 researchers collaborate to produce an academic manuscript submitted to peer-review. In 2023, as in the three years before that, the academic manuscript was accepted for publication in the journal Global Sustainability. The academic paper provides the foundation for a policy report, which this year was launched at COP28 in Dubai, UAE, in a press conference organized with the UNFCCC Executive Secretary's office. During COP28, Future Earth and WCRP spontaneously convened a statement from scientists around the world called "The Science is Clear: We Need Net Zero Carbon Dioxide Emissions by 2050." The work toward the 10 New Insights report in the months' prior to the writing of this letter, as well as the network nurtured in the process, was instrumental for enabling this rapid response from the scientific community, which was signed by over 1300 scientists and had coverage from top media including the New York Times and The Guardian.

In years past, the report has been translated to Japanese and for the first time, the full report was translated to French. The French launch event during COP28 (at Concordia University, Montreal and online) featured a panel of distinguished speakers from Quebec, Canada and emphasized the importance of breaking down linguistic barriers for the democratization of climate science. Events sharing the report with policymakers, business leaders and scientists were also held in Japan, Taipei and Sweden.

The 10 New insights in Climate Science is a collaboration between Future Earth, the Earth League and the World Climate Research Programme.

Aeon Environmental Foundation Future Earth Dialogue Project

Future Earth together with the AEON Environmental Foundation, AEON Kyushu Co., Ltd., National Institute for Environmental Studies and Nagasaki University, organized an event on 24 September 2023. “Scientific Dialogue: How Can We Shop Sustainably?” was held at an AEON Shopping Center in Nagasaki Prefecture.
Together with university students, secretariat members and other experts talked with customers at the shopping center about SDGs, environmental certificates of the products, climate change impacts at the region where the items were produced, and how we should behave regarding daily shopping and consumption. At the following stage event, popular comedians joined to familiarize the topics. The event was also live streamed and was a society engaging event with citizens and students to follow-up the products by the previous year’s project, which was included in a recommendation to Prime Minister Kishida in March 2023.

Anthropocene Magazine

Anthropocene is a cornerstone of Future Earth's efforts to shape the global narrative around sustainability science and innovation. Its articles cut across all Future Earth research pillars—from biodiversity conservation to energy innovation to green chemistry, urban design, and food security.

What distinguishes Anthropocene is its editorial niche. Our goal is not to make people feel better; nor is it to scare them into paralysis. Rather we are forging a sophisticated middle ground: Evidence-based journalism that puts the best science and innovations into the hands of those who can do the most with them.

- "The Weekly Science Dispatch" provides short, sharp summaries of the most compelling climate and sustainability science research from around the world—a compendium found nowhere else. We publish new stories Tues through Friday every week. We now have an archive of over 2,100 stories.

- "Fixing Carbon: Dispatches from An Emerging Future" Fixing Carbon is an innovative newsletter that asks hard questions about how we can find our way through the climate crisis. For example: What does family planning look like in a warming world? Should we let AI take our jobs...if it generates less carbon? Are farmers markets or supermarkets the low carbon food choice? Fixing Carbon doesn't tell readers what to think. Instead it pushes them to think through the concepts and dilemmas, from the deeply personal to government policy, involved in the massive transition to a low-carbon world. The format is short, sharp arguments organized in a point-counterpoint dialogue, anchored by accurate, comprehensible data and visuals. Turning complex and jargon-heavy scientific papers into readable, digestible content is essential to communicate the most important climate science. Now entering its third year of publication, we've produced 57 installments to date.

Over the next several years, our growth strategy includes:

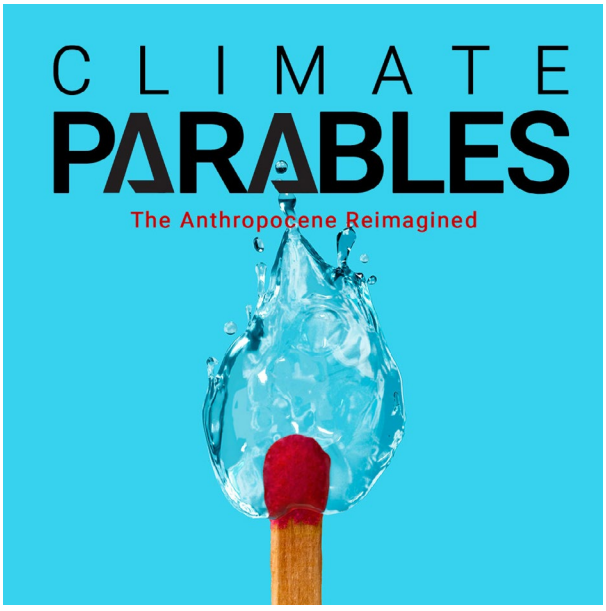
1. Expanding our reach and growing our readership beyond 50,000

2. Rolling out new streams of content—such as The Climate Parables Live on stage—with the help of foundations and sponsorships

3. Continuing to develop a self-sustaining revenue stream through a robust membership/donation program. In 2023, we raised over $120,000 from individual donors.

The Climate Parables

Anthropocene's newest initiative, "The Climate Parables," is an innovative fiction series. For the project, we commission creative science writers to describe life after technological and cultural shifts have mitigated some aspects of climate change. Think of it as climate reporting from the future. We're taking a select few of these stories (all based on real and emerging science) from the page to the stage as live performed journalism shows—in venues where climate professionals gather. Our first shows sold out in San Francisco in May, 2023, where we partnered with the Long Now Foundation. Then in December 2023, we took Climate Parables to the plenary stage at the AGU conference where we drew an audience of over 500.



Belmont Forum Collaboration

Future Earth strengthened its collaboration with the Belmont Forum this year to help deliver the Africa Regional Call, a funding opportunity soliciting transdisciplinary approaches to African priorities led by resident Africans in collaboration with other African research and entrepreneurial partners, with global support. The call was organized with the National Research Foundation of South Africa, Future Earth, Belmont Forum, and National Research Fund of Kenya. The launch will benefit from 7+ years of consultations and partnership development to ensure that the priorities reflect continental needs and alignment with high level frameworks, such as Africa 2063.

Other contributions to the Belmont Forum's suite of transdisciplinary, transnational calls during 2023-2024 included exploration of Environmental Peacebuilding as a possible call theme. Engagements with researchers, practitioners, and funders were held in Europe (hybrid, Switzerland), Africa (virtual, multilingual), Oceania (Fiji), North America (Washington, DC), and South America (hybrid, Panama) to canvas the readiness, priorities, and challenges of a multilateral call on the topic. Several talks and papers have been proposed to share the input from those meetings and elevate the profile of Environmental Peacebuilding globally. A toolkit on monitoring and evaluation of Environmental Peacebuilding was launched in 2023 by the Environmental Law Institute to better communicate impact and learning, and therefore value, to funders, practitioners, and a broad audience interested in Environmental Peacebuilding. Future Earth participated in an advisory capacity in the development of the toolkit and supported its launch.

Together with partners from the Global Development Network and the Centre for Systems Solutions, Future Earth will be coordinating the cohort of awards from the Migration Collaborative Research Action (CRA). These joint efforts will provide skill-building and networking opportunities, valorization, cross-cohort communication, and a social simulation specially tailored to the focal areas of the projects. A hybrid kick-off meeting was held with representatives from the Migration projects at SRI2023 in Panama to introduce the coordination staff, provide some context to the Belmont Forum post-award process, and explain opportunities available to the awardee

Review of submissions to the second Climate-Environment-Health CRA is still underway, with Future Earth-provided monetary support for consortium members in countries on the OECD DAC List for 2022-2023. Final recommendations are expected later in 2024.

The Belmont Forum is a custodian organization of Future Earth, which has held a special relationship with the Forum as the only non-member to propose a CRA theme for consideration by the members. Future Earth has also contributed to the development, delivery, and management of CRAs to ensure transdisciplinary funding opportunities are not just available, but accessible.

Early Career Researchers (ECRs)

Future Earth seeks to engage diverse early career researchers from all regions in order to strengthen global environmental change and sustainability science. Future Earth is supporting and encouraging innovative and influential ECRs to undertake inter- and transdisciplinary research addressing the physical, biogeochemical and human dimensions of global environmental change. The growing Future Earth ECR Network entails numerous benefits, such as funding opportunities and relevant vacancies, call for papers, dissemination of events, capacity building events, conferences and workshops. The continuous support of Future Earth to the ECR community is pivotal for the long term advancement of the organization's goal and mission.

Several capacity building programs and events are being organized for early career researchers supported by Future Earth.

Early Career Research Network of Networks

The Early Career Research Network of Networks (ECR-NoN) has increasingly been engaged and supported since 2024 with the Future Earth secretariat dedicating one day a week into exploring this valuable relationship. As part of the activities done, Future Earth and the ECR-NoN submitted two contributions for the 2024 Sustainability Research and Innovation Congress (SRI/SSD2024), which were both accepted and are to be presented by NoN executives in June at the Congress. Future Earth also supported a partnership between the ECR-NoN and the International Science Council to host an ECR workshop and networking session open to all ECRs who will attend SRI/SSD2024. The Future Earth Member Portal ECR group has tripled in size since the beginning of the year, going from 150 members to more than 500. Several ECRs linked with Future Earth either through the Portal, the NoN, the GRNs, or the Assembly have received funding for traveling through the Inclusivity and Diversity Participation Fund.

Future Earth 17 Rooms X Initiative

The Future Earth 17 Rooms X Initiative has engaged since the beginning of the year over 50 ECRs linked to Future Earth through this initiative supported by the Rockefeller Foundation and the Brookings institution. Since the beginning of this initiative, several ECRs from 20 countries on 5 continents and representing a variety of institutions and disciplines have met online to develop action-based projects to address the UN's 17 Development Goals. These online brainstorming and planning sessions will culminate with a hybrid summit in Helsinki in June where participants will share their projects and ideas. Over 30 participants will be attending the event in person (90% ECRs) with full funding from Future Earth.

ECRs in Sustainability Science

The "ECRs in Sustainability Science" talk series continued with 17 sessions and included cross-hub and GRN collaboration. The virtual events set a platform for ECRs to get to know each other and to share research activities/outcomes. It not only facilitates mutual learning and provides opportunities to find potential collaborators for transdisciplinary research, but also draws attention from international audiences and makes connections between domestic and overseas researchers. To expand engagement, the ECR Working Group of Future Earth Taipei also continued to select its own network members, and co-organized cross-working group meetings and events.

Transdisciplinarity for Early career Researchers in Asia

The Transdisciplinarity for Early career Researchers in Asia or TERRA School was held in person in Kyoto on November 13-17 2023, with 17 participants coming from 12 countries in Asia and beyond. Co-hosted by Research Institute for Humanity and Nature (RIHN) and Future Earth, the course featured lectures, workshops and interactive sessions on transdisciplinary research theories and practice, with structured learning on tools and methodologies and case studies from research implemented by RIHN in Japan and abroad. This year the course provided space for ideation and generation of seeds for project development. The Asia Pacific Network for Global Change Research hosted a short session and shared grant opportunities for early career researchers. A field visit to Kameoka City allowed participants to interact with organic farmers, local government officials and researchers working on a transdisciplinary project towards a sustainable food production system for the city. To date, 80 ECRs have participated in the TERRA School and a number of them have continued forging collaborations and joint activities.

Eight early career researchers were also selected from 6 Asian countries for the SRI2023 Asia Spotlight Event Fellows Program. These fellows synthesized the insights and discussions from the sessions of the Asia Spotlight event and presented at the closing plenary for the ASE. A capacity building workshop was organized at the Research Institute for Humanity and Nature in March 2024.

Earth Commission

Established in 2019, Earth Commission is an international team of leading natural and social scientists hosted by Future Earth, working collaboratively to provide an independent assessment to quantify Earth system boundaries for essential planetary systems, and synthesize knowledge on translation and transformations needed for the world to live within these boundaries.

During 2023, the Earth Commission concluded its first assessment and published the flagship paper Safe and just Earth system boundaries (Rockström et al., Nature). A launch symposium with Earth Commission members and stakeholders was held at the Royal Swedish Academy of Sciences, and was broadcast online to a wide audience. The results were summarized in various briefing materials and the global media uptake was extraordinary.

Since 2020, the Earth Commission and its working groups have published more than 20 scientific peer-reviewed papers, deepening the knowledge of Earth system boundaries, Earth system justice and methods for translating boundaries for stakeholder actions. In March 2024, the paper A just world on a safe planet: Earth system boundaries, translations, and transformations, encompassing the entire work of the Commission's first phase, was accepted for publication in the journal Lancet Planetary Health.

The Earth Commission's work has been presented in numerous high level meetings and events such as the World Economic Forum, at UN climate and biodiversity COPs as well as at the UN Water Conference, and at scientific conferences such as Sustainability Research and Innovation Congress and Earth System Governance Conferences.

The Earth Commission has now started its second assessment phase. Following a call for nominations to Future Earth's networks and beyond, new members were appointed during 2023 including Co-Chair Fatima Denton and experts in areas such as oceans, novel entities such as chemical compounds, as well as transformations pathways.

A successful discussion series on tipping elements was launched in 2021 in collaboration with AIMES and WCRP. Until March 2024, 24 webinars featuring leading scientists were held, attracting an audience of up to several hundred participants per event.

The Earth Commission and its secretariat are hosted by Future Earth. It forms the scientific foundation of the Global Commons Alliance (GCA), a coalition of actors working together to empower citizens, cities, companies and countries to become effective stewards of the global commons. The GCA is promoting the implementation of the Commission's findings through its network of organizations, including the Science Based Targets Network (SBTN). SBTN and the Earth Commission are collaborating to inform how Earth System Boundaries can be translated for companies and cities into actionable target-setting methodologies.

European Space Agency Partnership Program

Future Earth partners with the European Space Agency (ESA) to facilitate links between Future Earth's projects and ESA programs, helping to guide ESA's strategic direction and support the networks. The program has a seed fund to foster innovative use of Earth observation (EO) in the research activities of the Global Research Networks, which supports collaboration through an annual open call for proposals.

In 2023 the partnership program funded three collaborative EO activities: first, the *Participatory Land Observatories for a Sustainable Andes* (ROSA) activity led by an interdisciplinary team of researchers from the Global Land Programme. They held a series of integrative mapping sessions and an in-person workshop to establish the ROSA network. They identified the network's first six 'observatory' nodes to support integrated monitoring for land management in the Andes, which now have institutional agreements in place. The team have presented their network at several scientific meetings, submitted a manuscript describing their efforts to the journal MRD (in review), and wrote a book describing the observatory nodes (which have now grown to nine), due to be published in February 2025.

Second, the Fire Science Learning Across the Earth System (FLARE) activity was led by a group of early career researchers from SOLAS. They held a transdisciplinary workshop with broad participation, including from across the Future Earth global research networks, and have established themselves as a working group. They have been working on a roadmap white paper calling for more collaborative and holistic wildfire research for the next 5-10 years to be published in summer 2024.

Third, the activity Expanding EO data usage to address climatic changes in the marine biosphere of the northwest Pacific and Indo-Pacific regional seas (EO-WPI) was led by an IMBeR study group. The team held a series of online training workshops and set up mentoring relationships which supported ten trainees selected from Indonesia, Malaysia and the Philippines. This enabled the students to develop satellite data processing software tailored to their specific regional problems, aimed at supporting the information needs of local decision makers, for example for fisheries and environmental management. Twelve manuscripts are in preparation.

Photo credit: ROSA

Future Earth Member Portal

The Future Earth Member Portal was revamped with a new design and functionalities and launched in May 2023. Since its launch, the member portal has grown rapidly, with over 1600 people joining by the end of the reporting period. The portal provides a place for members to interact through posting and sharing news, events, questions, and opportunities, as well as connect with other members through a directory with an interactive map. More than 1000 interactions happened among the members by using various functions of the member portal offers. The portal continues to grow with more members joining each day.

Future of Washing Initiative

The Future of Washing Initiative was launched in December 2018 together with Future Earth, Kao Corporation, and The University of Tokyo Integrated Research System for Sustainability Science (now renamed as the Institute for Future Initiatives). The Initiative aims to create a discussion platform where various stakeholders from the private, academic and public sectors and communities collaboratively explore innovative and sustainable ways of washing. Since its launch, the Initiative has organized 8 events and workshops in person and online to foster discussions on the impacts of washing on the environment, and to facilitate a mind shift and a behavioral transformation in society towards sustainable washing.

During the reporting period, the initiative held its 7th seminar "Future of Washing – From the Perspective of Household Wastewater." More than 60 people, including the private sector and researchers, attended the event. Participants discussed the global situation surrounding water use from the following viewpoints: Water supply and wastewater, community-based water supply and management in low- and middle-income countries, and small-scale distributed water cycle systems to solve the global water scarcity. An 8th and final seminar is being organized.

Program for Early-stage Grants Advancing Sustainability Science

The PEGASuS program was renewed in 2022 by the Gordon and Betty Moore Foundation to elevate participation of underrepresented voices in emerging transdisciplinary research. The focal area for PEGASuS V targeted coastal resilience efforts in Latin America and the Caribbean. An award was made to the University of the West Indies for Engineering the Design of Nature-Based Solutions for Sustainable Development in early 2023. The team established a network with other coastal resilience experts across the Caribbean and held a workshop at the 2023 SRI Congress in Panama. PEGASuS V was complemented later in 2023 by the PEGASuS 5.1 Take It Further funding initiative targeting active projects in two themes: 1) Using Nature-Based Solutions to mitigate or adapt to climate change specific to the oceans and coastal systems and 2) Science-informed decision-support tools for reducing risk and/or improving response to disaster scenarios. Four projects received funding with a special focus on the Global South.

PEGASuS VI was launched at the end of 2023 and solicited proposals from transdisciplinary teams in Latin America and the Caribbean addressing the theme of Risk, Response, and Responsibility. The goal of this call was to support approaches that advance decision making and planning capabilities through integration of multiple sciences with lived experience from stakeholder groups, including but not limited to community and government representatives, planning councils, disaster response and humanitarian aid organizations, insurance and reinsurance companies, and communications partners.

The Pathways Initiative

The Future Earth Pathways initiative was launched in 2018 and aims to enhance researchers' capacity to engage in transformative research and actively contribute to supporting societal actors in co-developing pathways for more sustainable futures at different scales. This year, the Pathways Initiative has been stepping up its communication efforts in order to reach a larger and more diverse audience. Notably, the Pathways Initiative website has been redesigned with a new setting and new visuals highlighting our collaboration with artists.

In a time where deep transformations are needed, spaces for critically examining our ways of producing and sharing knowledge are essential. They are key to better equip a community whose task is to contribute to address complex interdependent challenges characterized by a high level of uncertainty. The Pathways Forum is an open webinar series convening an international and diverse community of researchers and aiming at developing critical reflections on sustainability science. This year, the Forum was an opportunity for an increased effort for collaboration between the Pathways Initiative and the broader Future Earth community. We co-organized a webinar with the UNESCO-MOST BRIDGES Coalition, a Future Earth partner, on how and to what extent litigation is supporting governance and societal transformations for better futures. In collaboration with the Global Land Programme (GLP), we held a webinar on key concepts of social metabolism and how it can be applied to sustainability issues. In addition, a dedicated series was launched on unpacking decolonization within Sustainability Science with the Ocean KAN. The French Sustainability Science Conference series is another space for critical reflection. In 2023, the conference took place in Marseille on 28-29 June. Over two days, 130 participants explored together opportunities to shift towards more transformative research practices. Engaging with society and supporting knowledge co- production for transformations, challenging dominant paradigms through narrative analyses, questioning the carbon footprint of research, and rethinking education to foster a new generation of actors and researchers working towards a desirable future, were the main topics covered during the event.

Inter- and transdisciplinary research is complex and requires time, innovative funding schemes, and specific mixes of skills and expertise. Contributing to the necessary transformations of research and education institutions, and providing training opportunities for early career researchers is therefore fundamental. The Pathways Postdoctoral Grants Programme aims to support early career researchers interested in working on transformative change and furthering pathways research on the ground in diverse contexts. At the same time, the programme encourages inter- and/or transdisciplinary collaboration within the Future Earth and Belmont Forum communities. The three postdoctoral researchers whose projects were selected for funding in 2022 began working on their 24-month pathways project in December. The Pathways Autumn School provides the European sustainability science community with a space to learn and reflect on how to change their practices to make a greater contribution to societal transformations. The 2023 edition gathered around 50 early career and senior researchers during 5 days in Aussois, France under the theme, “Sustainability science framings and practices in Europe: How do we leverage transformative research?” This Pathways School was organized in partnership with the Swiss, French and the German Future Earth National Committees, as well as with BOKU - Vienna University, ICTA - Autonomous University of Barcelona, and Leuphana University. In addition, the Pathways initiative organized a workshop in Paris in June in collaboration with FRB (French Research Foundation for Biodiversity) on place-based scenarios and transition pathways. This workshop aimed to foster and facilitate transdisciplinary collaborations among the French research community and resulted in 13 proposal submissions for the FRB Scenario funding programme.

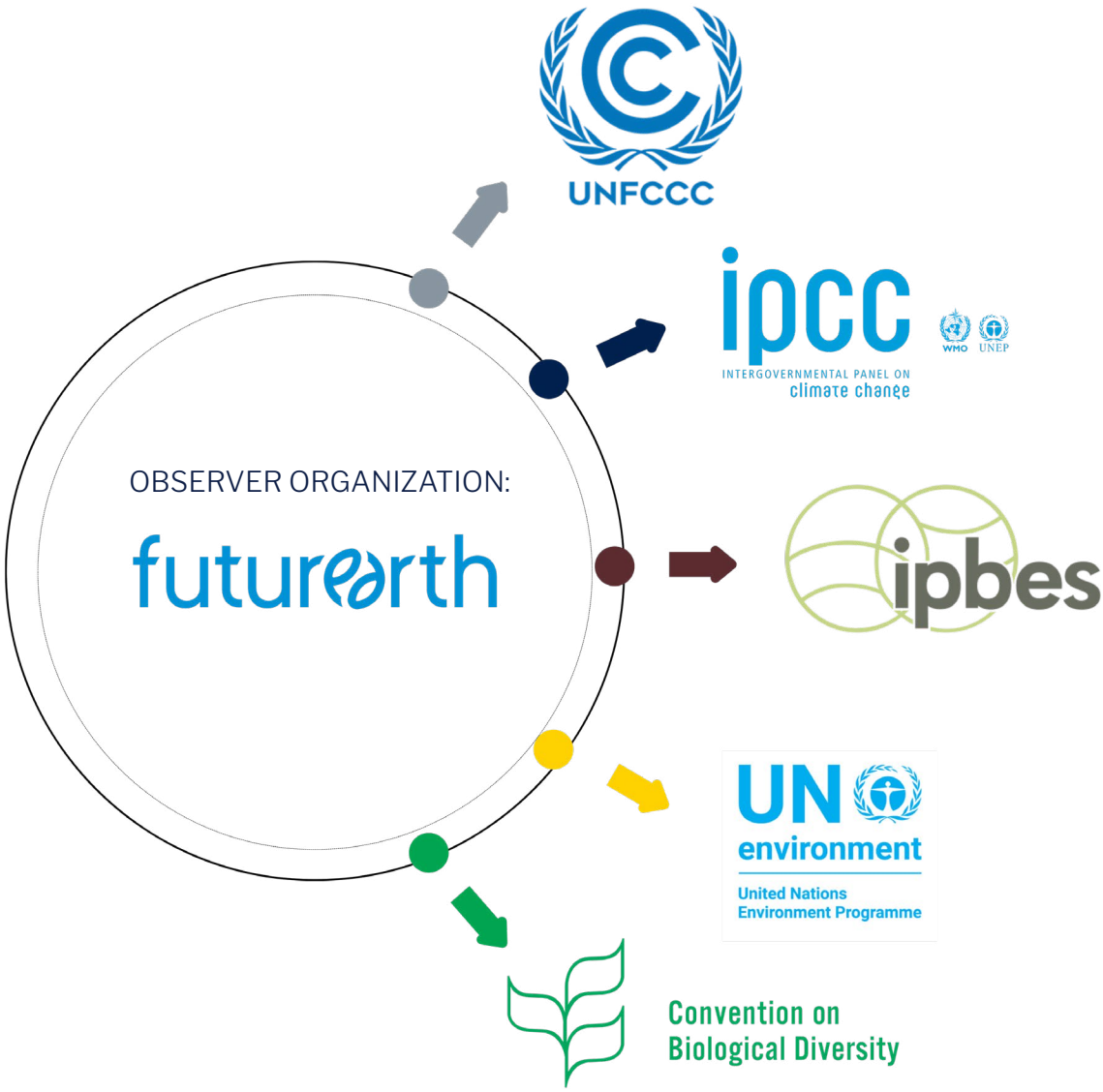
Transformative research is often rooted in new approaches and narratives, and applied to specific contexts. The resulting outcomes often suffer from a lack of visibility, in the scientific and public arenas.

Promoting transformative research is critical to legitimizing novel approaches and narratives and is a key objective in all Pathways events. In addition, the Pathways Communication Grants support innovative ways of communicating scientific outcomes of place-based research projects on pathways for sustainability to educate and engage with non-academic audiences. The funding prioritizes projects led by researchers in low and middle income countries and early career researchers. This year, three new projects were selected for funding: Enabling a democratic energy transition in Colombia through collaborations between community and academia, led by Renata Moreno Quintero, Universidad Autónoma de Occidente - Columbia, Bioleft led by Almendra Cremaschi, Fundacion UNSAM innovacion y tecnologia - Argentina, and Vertical greening for sustainability within slums in African cities, led by Olumuyiwa Adegun, Federal University of Technology - Nigeria.

Science-Policy

Through its extensive scientific community, Future Earth participates in framing sustainability research, research agendas, advising decision makers and more. Future Earth is an accredited observer organization in various international science policy interface processes such as UNFCCC, CBD, UNEP, IPCC, IPBES etc. Every year, Future Earth also takes part in a diversity of science policy initiatives outside of these international platforms.

From April 2023 to March 2024, Future Earth sent delegations to UNFCCC COP28, the Bonn Climate Conference and IPBES 10, and nominated over 30 experts from the Future Earth community to participate in key science policy opportunities



Future Earth and UNFCCC engagement:

- Future Earth at UNFCCC SBSTA 58: The delegation consisted of 3 experts from Future Earth Coasts, IMBeR and the Secretariat, as well as an online delegation of 5 experts.
- Future Earth sent a delegation of 12 experts and engaged in 31 activities at or around COP28 in Dubai in November and December 2023. Some highlights:
  - The 10 New Insights in Climate Science report was launched at the COP in a press conference organized with the UNFCCC Executive Secretary's office on 3 December.
  - Future Earth and WCRP convened a statement from scientists around the world called "The Science is Clear: We Need Net Zero Carbon Dioxide Emissions by 2050" was signed by over 1300 scientists and had coverage in the New York Times and the Guardian.
  - The Global Carbon Project's Global Carbon Budget 2023 was released on 5 December with a press conference at COP. GCP held or participated in 1 side event, various press briefings, and various pavilion events. The Carbon budget report was picked up widely across international media, with 3078 pieces of coverage in the first two weeks following the launch, including several articles in top tier media.
  - Future Earth held a UNFCCC side event led by the Future Earth China Hub on 9 December. "Climate Adaptation and Resilience" was jointly organized with various organizations, including the Chinese Future Earth National Committee.

Future Earth and IPCC engagement:

- Future Earth sent a delegation to IPCC 58 including 3 experts from IMBeR, Risk KAN, and the Swiss National Committee.
- 7 Future Earth scientists were chosen by the IPCC to participate in the Scoping Meeting for the Special Report on Climate Change and Cities. Xuemei Bai was nominated by Future Earth.

Future Earth and IPBES engagement

- Future Earth sent a delegation to IPBES 10 including 11 experts from bioDISCOVERY, PAGES/IHOPE/PECS, iLEAPS, ECR NoN, and Future Earth Coasts.
- Future Earth nominated 3 experts from bioDISCOVERY, Urban KAN and SSCP KAN/Risk KAN to the Scoping Process for the 2nd Global Assessment of Biodiversity and Ecosystem Services.
- Future Earth nominated 9 experts to other IPBES events and opportunities.

Future Earth and UN engagement

◊ Future Earth in collaboration with Sustainability in the Digital Age contributed to two major United Nations multi-stakeholder efforts this year.

- In November 2023, the Future Earth Canada team hosted the North America Regional Foresight Workshop, part of a global series of foresight events to inform deliberations at the 2024 UN Summit of the Future.

- Results were also presented at the sixth session of the United Nations Environment Assembly (UNEA-6) in Kenya, in February 2024, where Future Earth contributed to discussions focused on how multilateralism can help tackle the triple planetary crisis of climate change, nature and biodiversity loss, and pollution and waste.

Photo credit: UNEP / Francis Kiguta

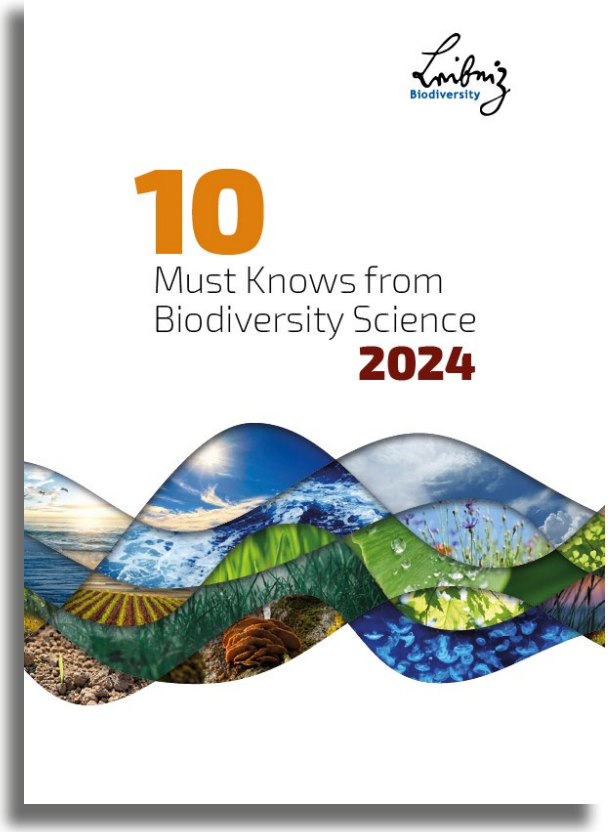
- Future Earth led a project to explore the 17 UN Sustainable Development Goals as the main activity of the 17 Rooms-X initiative supported by the Rockefeller Foundation and the Brookings institution. The recruitment of participants from the Future Earth community led up to a cohort of over 100 participants from 5 continents, and 40 countries sharing their efforts to come up with action-based projects to address the UN's SDGs.

Future Earth and CBD engagement:

◊ Coordination of the Future Earth community engagement at the Convention of Biological Diversity (CBD) SBSTTA in Nairobi from 15-20 November 2023. Future Earth also nominated 3 experts to CBD opportunities throughout the year.

Future Earth engagement in other science policy initiatives:

◊ Future Earth experts contributed to the "10 Must Knows in Biodiversity Science" for 2024. The report is a rich resource providing policy-makers and society with concrete ways to effectively conserve and sustainably use biodiversity at the local, national, European, and global levels in order to implement the 23 global biodiversity targets agreed upon At CBD COP 15 in 2022.

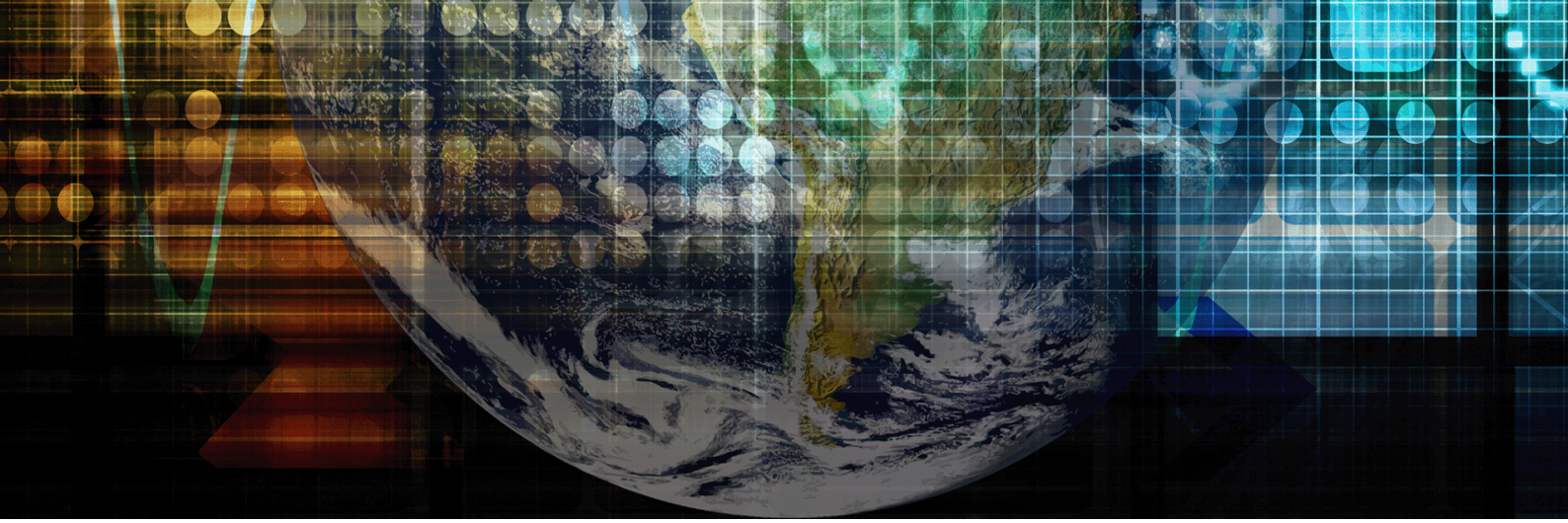


Sustainability in the Digital Age

Sustainability in the Digital Age (SDA) is a think tank at Concordia University and host to the Future Earth Canada Hub. Together they explore how digital innovation can be used in support of healthy people and planet, in line with the UN Sustainable Development Goals (SDGs). Key highlights in 2023-2024 include the following:

Data Collaborative to track GHG emissions: Sustainability in the Digital Age was awarded seed funding to build a Data Collaborative, focused on increasing capacity for GHG emissions tracking and data-informed climate action at the municipal level in greater Montréal. This work is part of a new $123 million applied research initiative called Voltage, creating technologies for carbon-neutral buildings, advanced energy storage, smart grids and the electrification of transportation across Canada.

Coalition for Digital Environmental Sustainability (CODES): CODES is a multi-stakeholder community of change makers and practitioners that seek to collaborate in accelerating a digital planet for sustainability. It is co-championed by UNEP, UNDP, the International Science Council, the German Environment Agency, the Kenyan Ministry of Environment and Forestry, Future Earth, and Sustainability in the Digital Age. This year CODES and SDA launched a Digital Literacy Alliance to identify challenges, solutions, and best practices in advancing education and capacity for a sustainable digital planet. The international working group meets regularly online and will be publishing a first collective intelligence synthesis in September 2024 to advise the implementation of global policies on digitalization and sustainability such as the Global Digital Compact, amongst others.



Sustainability in the Digital Age (SDA) continues to participate in the Leadership in Environmental and Digital innovation for Sustainability (LEADS) graduate training program, in partnership with the four main universities in Montreal, Canada. Several LEADS interns were hosted by SDA and the Future Earth Canada Hub over the reporting period, along with leadership and summer school activities.

Equitable Futures for Nature-based Solutions: Nature-based Solutions (NbS) are actions that protect, manage, and restore ecosystems, while addressing societal challenges like climate change, so there is a simultaneous benefit to nature and people. Since its start in 2021, our NbS research project continues to grow by 1) developing a data governance and data sharing framework in collaboration with Indigenous Peoples, 2) quantifying the contribution of Canada's Indigenous Guardians program in conserving carbon stocks and biodiversity 3) developing an AI algorithm protocol to monitor carbon, biodiversity, water quality, and co-benefits in various eco-zones, and 3) Surveying and mapping NbS projects currently occurring in Canada (both Indigenous and non-Indigenous led).

Sustainability Research and Innovation Congress

The Sustainability Research and Innovation (SRI) Congress - a collaboration between Future Earth and the Belmont Forum - has continued to engage new audiences. The 2023 Congress was held in Panama City, Panama, 25-30 June 2023, and hosted by the Secretaría Nacional de Ciencia, Tecnología e Innovación (SENACYT) and the Inter-American Institute for Global Change Research. 2340 participants from 93 countries registered for SRI2023, including participants in a hybrid Satellite Event 20-22 June in South Africa, and an online Satellite Event 10-12 July in Asia, both aimed at engaging the Sustainability Science and Innovation Community in their respective regions. The SRI2023 program consisted of 292 sessions and activities (176 hybrid, 73 online, and 43 Open Day), marking the first bilingual and mostly hybrid SRI Congress; 139 of these sessions and activities were available both in English and Spanish. The Congress attracted 22 sponsors that ranged from local businesses and government agencies to national and international civil society organizations. Thanks to these sponsorships, SRI2023 was able to support the participation of several early career professionals from the Latin American and Caribbean region. SRI2023 also received significant local media attention, engaged high-level national political leaders, and the Congress Open Day brought together 687 participants around several activities across Panama City, showcasing local sustainability innovation and action.

This reporting period covers a large part of the preparations for SRI/SSD2024 in Helsinki, and Espoo, Finland. The fourth SRI Congress will be delivered in collaboration with Sustainability Science Days, Finland's largest annual sustainability conference, and a joint initiative of the country's two largest universities, the University of Helsinki and Aalto University.

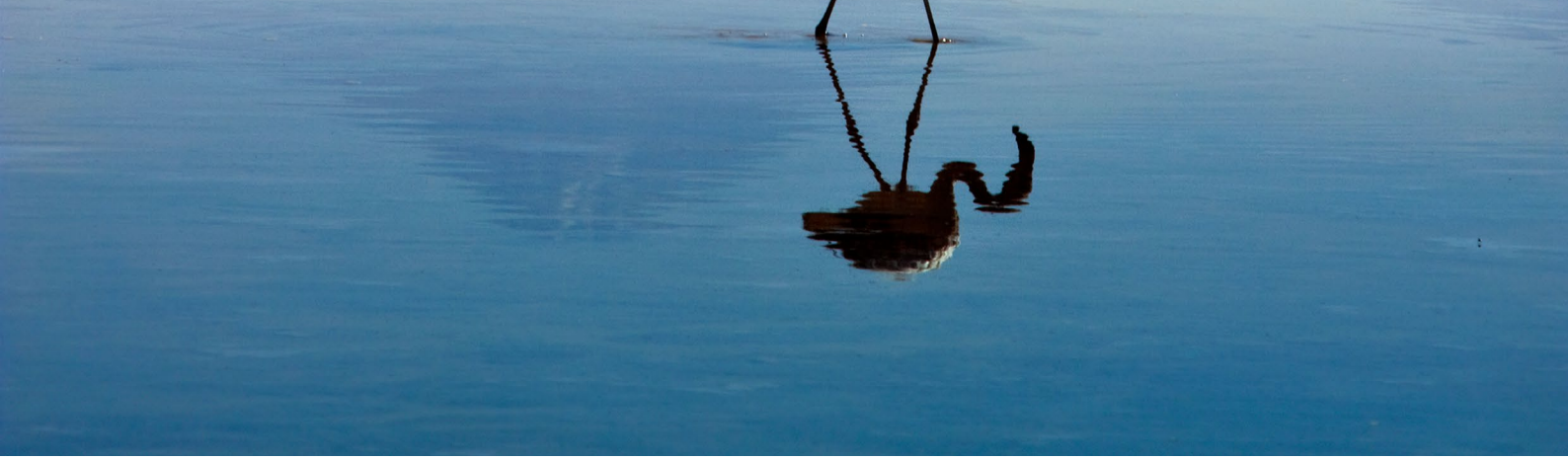
FUTURE EARTH COMMUNITY

The strength of Future Earth lies within the work of the community comprising 27 Global Research Networks, National and Regional Networks (National Committees and Structures and Regional Committees), and the Early Career Network. These networks represent academics, policy-makers, independent scholars, and trainees, all working across sectors and disciplines. They play a critical role in defining and advancing research and solutions in Earth system science and its component sub-systems and their nexus (land, ocean, food, energy, water, biodiversity, etc.), including human societies and health.

The secretariat works to connect the networks and drives synthesis and engagement across the different networks, including communications products and links to policy communities at a global level. These networks engage in collaborations often in a hybrid manner, which has enabled broader participation, maximizing the opportunities for inclusivity and diversity, a core principle of Future Earth.

Global Research Networks

Future Earth's Global Research Networks advance science, each with a particular sub-focus and build on the power of the members to accelerate collaborative solutions for complex problems. The Global Research Networks engaged in cross-Global Research Network meetings to share knowledge and develop a common language to support broadening participation. In 2023-24, the Global Research Networks collectively advanced our understanding of environmental challenges by enhancing interdisciplinary collaboration, integrating scientific knowledge across natural and social sciences, linking science, policy, business, and civil leaders, and fostering open science initiatives. They made significant contributions to tracking and mitigating climate change, biodiversity loss, and extreme weather events, promoting sustainable governance and coastal resilience. Through conferences, workshops, and publications, these networks facilitated knowledge exchange, expanded global partnerships, and developed innovative approaches to address the complex and interconnected issues facing our planet. Below we introduce the networks and highlights of their achievements over the past year.



AIMES

Analysis, Integration, and Modeling of the Earth System (AIMES) is an international network of Earth system scientists that bridge across the natural and social sciences to better understand the integrative role of human activity in the Earth System. AIMES runs an International Project Office at NASA GISS and coordinates efforts through working groups and community building workshops, which are guided by an international scientific steering committee (SSC). The key highlight this year was the publication of a review article in Science on forest degradation in the Amazon led by AIMES SSC members David Lapola and Patricia Pinho as a product of an AIMES workshop held in Manaus, Brazil. An international team of 35 scientists and researchers contributed to the article concluding that human activity has degraded more than one third of the remaining Amazon rainforest through the degradation processes of selective logging, fire, edge effects, and extreme drought. Coverage of this study was featured on the cover of Science and in media including The Guardian, BBC News Brasil and CNN. Other highlights include: The Open Modeling Foundation, dedicated to promoting open science and FAIR principles in social and ecological modeling communities, featured their efforts in two papers; the AIMES Working Group on Land Data Assimilation annually convenes over 100 land surface modelers from the Numerical Weather Prediction and Earth System modeling communities to advance DA development and improve the quantification of uncertainty in land surface models, land carbon budget estimates, and therefore future climate projections. The outcomes of these annual workshops were featured in two publications; the AIMES Working Group on Tipping Elements in the Earth System working group, in addition to a convening an online discussions series in collaboration with the Earth Commission and WCRP on tipping points, irreversibility, and abrupt changes in the Earth system, is developing a standardized experimental design to explore committed impacts, reversibility and rate of forcing on tipping points called the Tipping Points Model Intercomparison Project (TIPMIP) led by Ricarda Winklemann and

Jonathan Donges at PIK, Germany. To support the data needs for this model intercomparison project, a workshop, "Tipping Points and Understanding EO data needs for TIPMIP," was held at the ISSI in Bern, Switzerland. The AIMES/GLP working group on Behavioural Models of Land Systems (BeModeLS) organized an open online meeting to convene social-ecological land system modelers to refine the aims and objectives of the working group.

bioDISCOVERY

bioDISCOVERY is an international research programme fostering collaborative interdisciplinary activities on biodiversity and ecosystem science. bioDISCOVERY research improves our understanding of how biodiversity and ecosystems respond to environmental change, and to overcome the barriers that impede the use of observations and modeling in management and decision-making.

bioDISCOVERY liaises with the Convention on Biological Diversity (CBD) and the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), and experts from its network contribute to assessments and task forces. Cornelia Krug represented bioDISCOVERY and Future Earth at the EC-ESA Joint Earth System Science Initiative Workshop, held at ESA-ESRIN, Frascati, Italy in November. bioDISCOVERY collaborates with GEO BON, and bioDISCOVERY members contributed to the GEO BON Global Conference: Monitoring Biodiversity for Action, held in October in Montréal. bioDISCOVERY members participated in CBD SBSTTA 25, held in Nairobi, Kenya, in October and IPBES 10, held in Bonn, Germany August 28 – September 02. bioDISCOVERY members also serve as experts in IPBES assessments and contribute to IPBES task forces.

bioDISCOVERY also co-leads and contributes to Future Earth's Pathways to Sustainability Initiative.

Earth System Governance

The Earth System Governance Project is a global research network focusing on the intersection of global environmental change and governance across local and global levels. It brings together scholars from various disciplines, including international relations, sustainability science, and development studies. In 2023, alongside Radboud University and the Radboud Centre for Sustainability Challenges, the Project hosted its largest conference to date. With a hybrid format, it attracted over 670 participants from 45 countries, discussing the conference theme of “Bridging Sciences and Societies for Sustainability Transformation” across 90 panels. The conference led to the establishment of the Nijmegen Agenda, aiming to enhance collaboration among researchers and societal actors for sustainability transformations. We extend our sincere thanks to the host institutions and the conference co-chairs. The Project continued its focus on addressing significant challenges in earth system governance. 2023 saw the launch of the South-South Initiative, led by the South-South Committee, to expand and strengthen research networks in the Global South. Throughout the year, the Committee organized six virtual workshops and webinars discussing earth system governance topics pertaining to the Global South.

Emergent Risks and Extreme Events Knowledge-Action Network

Extreme climate and weather events, the associated disasters and systemic risks are becoming increasingly critical in the context of global environmental change. They are a major threat to the achievement of the SDGs and one of the most pressing challenges for future human well-being. The Risk Knowledge Action Network provides an open platform for scientific communities from multiple disciplines working on extreme events, systemic risks, disaster risk reduction and governance to exchange information, knowledge and data and engage in collaborative research activities. Our Working Groups span a wide range of topics such as Compound Events, Early Warning, Climate Risk Modeling and Management or Metabolic Risks on Islands. In 2023 they organized a series of high-level webinars and hosted sessions at AGU and EGU. 2023-2024 highlights include: EU Horizon project "The Human-Tech Nexus - Building a Safe Haven to Cope with Climate Extremes," Herrenhausen Conference "Climate Related Systemic Risks: Lessons Learned from Covid-19," and WCRP OSC Kigali Townhall session.

EvolvES

EvolvES connects evolutionary biology and tools to better predict fluctuations in biodiversity under global change. Knowledge on genetics and how gene frequencies and traits react to environmental change are important as a tool to predict responses of living communities and their contributions to society to human-induced stressors (habitat loss, climate warming, urbanization, changes in land use) as well as the dynamics of invasive species, spread of diseases, etc. EvolvES is organized in five working groups providing an evolutionary framework for biodiversity science. The groups have worked on literature reviews that identified the contributions biological evolution makes to sustainability and how the concepts, theory, data, and methodological approaches used in evolutionary biology can contribute to achieving the UN Sustainable Development Goals. Using this knowledge, EvolvES scientists deepened the interdisciplinary collaboration. The results were presented at the Future Earth Assembly and at other international conferences. At the Society for Experimental Biology Centenary Conference in Edinburgh, Scotland, EvolvES invited chrono-biologists and other natural scientists to join a session about the evolutionary consequences of light pollution.

Finance and Economics Knowledge-Action Network

Members of the Finance and Economics Knowledge-Action Network contributed to SRI2023 by organizing three sessions, in which
knowledge and experiences in members' institutions were shared and ideas were exchanged for further innovations. The Finance and Economics Knowledge-Action Network is developing new ways to align with the concepts of sustainable finance, ESG investing, and the role of science to fight Finance and Economics-related greenwashing.

Future Earth Coasts

Throughout 2023-2024, Future Earth Coasts significantly expanded its global network, welcoming 19 researchers from 12 countries into the Fellows program, forging new partnerships, and recruited 5 major global initiatives as Affiliated Projects, including the IGCP project IM2LSC and the ESA project PRIMUS. Future Earth Coasts introduced the ECR Small Grant Program to support ECRs in less developed countries, and initiated capacity-building initiatives like Fellows Sessions and Dialogue Interview Series, conducting 12 webinars and producing 14 interview editions. New working groups like "CYBER-COAST" and "Just Transition" were established, organizing over 10 seminars and attracting more than 100 members since August 2024. Future Earth Coasts collaborated with YICCAS's Coastal Blue Carbon Group to reveal the ecosystems' potential for mitigating sea level rise and greenhouse gas emissions. Future Earth Coasts sponsored various conferences and trainings, including a training on addressing illegal fishing activities in the Gulf of Guinea, the 4th National Conference on Environmental Microplastic Pollution and Control, FEC Workshop on Coastal Lagoon Assessment and Sustainability, Monsoon School 2023, the 2nd International Mega-delta Conference, and the Ocean Decade on Campus Series. Future Earth Coasts remained engaged in supporting the World Coastal Forum, OAICC, and international conferences like SRI2023 and the Bonn Climate Conference. Future Earth Coasts leads the Future Earth cross-cutting initiative "Meta-Network for Coastal Collaboration" and launched the "Tour de Coasts" survey to understand global coastal challenges, furthering its commitment to coastal sustainability.

Global Carbon Project

The Global Carbon Project (GCP) is an international research project that aims to develop a complete picture of the global carbon cycle, tracking trends in global carbon emissions and sinks as a key measure of progress towards the goals of the Paris Agreement. In the reporting period, GCP produced its 18th update to its Global Carbon budget, launched at COP28 with multiple press briefings, an official UNFCCC side event and participation in more than 5 pavilion events. The 2023 budget report, Friedlingstein et al, (2023), was produced by more than 120 scientists in 16 countries. It finds an overall rise in global carbon dioxide emissions of 1.1% in 2023 compared to 2022, with action to cut fossil fuels not happening fast enough to prevent dangerous climate change. GCP had a large in-person meeting 4-6th July 2023 hosted by the new Global Carbon Budget IPO in Exeter, UK, with the regional carbon budget effort RECCAP2 meeting held on the preceding day. This brought the community together to review capability to date, discuss improvements, and set the vision for the longer term.

Global Land Programme

The Global Land Programme (GLP) brings together over 2,700 scientists and practitioners to study land systems and co-design solutions for global sustainability. GLP's research focuses on the effects of human decisions on land use and the socio-ecological outcomes, crucial for understanding and guiding sustainability transformations in response to global challenges like climate change, biodiversity loss, and food security. Hosted by the Department of Geographical Sciences at the University of Maryland, College Park, the GLP's International Project Office (IPO) coordinates these efforts. In December 2023, GLP launched its 2024-2028 Science Plan and Implementation Strategy, a five-year research agenda that addresses evolving societal needs and integrates diverse scientific perspectives. The plan emphasizes GLP's commitment to inclusivity, detailing the program's history, research goals, and methodologies.

In January 2024, GLP held a Royal Society-funded workshop titled “Policies for Sustainable Land Systems” in Cambridge, England, focusing on themes such as Indigenous governance, rewilding, agricultural policies, and global carbon markets. The insights from this workshop are being developed into a paper to inform future policy efforts. GLP is also preparing for its 5th Open Science Meeting in Oaxaca, Mexico, in November 2024, themed “Pathways to Sustainable Land Systems,” which will gather experts to discuss innovative land management strategies.

Global Mountain Biodiversity Assessment

The Global Mountain Biodiversity Assessment (GMBA) is a platform for international and cross-disciplinary collaboration on the assessment, conservation, and sustainable management of mountain biodiversity. It serves as an advisory body with regard to mountain biodiversity-related policy- and decision-making and liaises with international bodies including the Convention on Biological Diversity, the UN Environmental Programme, and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. In 2023, GMBA made an important contribution to ongoing discussions within the context of the Kunming-Montreal Global Biodiversity Framework implementation with the calculation of the SDG indicator 15.4.1 on the coverage by protected areas of important sites for mountain biodiversity at the scale of individual mountain ranges instead of countries. Disaggregated calculations reveal the spatial variability in biodiversity protection within and across countries and indicate where—and by how much—protection needs to increase. This approach enables annual reporting at spatial scales relevant for policy making, prioritization and management and contributes to improving the coherence of environmental policies for mountains across scales. Further inputs to policy processes in mountain regions include high-resolution forecasts of land-use/land-cover change for Switzerland for three time-steps in the 21st century under different climate change scenarios.

Health Knowledge-Action Network

The Health Knowledge-Action Network (Health KAN) is a collaborative network focused on researching and addressing the effects of environmental changes on population health and healthcare systems. It works with researchers, policymakers, educators, and media to promote planetary health research and knowledge dissemination. Health KAN's efforts support societal change through evidence-based research, which is in alignment with the Future Earth global strategy of facilitating research, network building, and global narrative development. Health KAN members actively participated in a variety of activities to achieve their goals. At COP28, Dr. Kristie Ebi and Dr. Montira Pongsiri elevated the discourse at a joint side event focused on addressing the health impacts of climate change, heat, and air pollution. This event, organized in collaboration with major international research and policy bodies, underscored the necessity of science-based policymaking in climate and health, featuring new research findings that could directly influence policy decisions. During SRI2023, Dr. Anthony Capon and Dr. Brama Kone presented on Climate Smart Healthcare, showcasing innovative approaches to integrating sustainability into health practices. Health KAN endorsed a number of active Working Groups to achieve its mission, including: "Life Course, Sustainable Development, and Health," "Climate Smart Healthcare," and "Accelerating Climate Action: Nature-Based Solutions for Children's Health and Nutrition."

IGAC

During the reporting period, a number of IGAC Activities held workshops, summer schools, and meetings. The Atmospheric Composition and the Asian Monsoon (ACAM) activity held a meeting in Dhaka, Bangladesh in June, with a summer school for early career scientists on using satellite data held directly before the meeting. In conjunction with this meeting, the MANGO (Monsoon Asia and Oceania Networking Group) held a meeting with MANGO members and policy makers from their region. Each MANGO member attending brought a policy maker from their country to have open discussion on the needs of politicians and policy makers from scientists and vice versa. The PACES (Pollution in the Arctic: Climate, Environment, and Societies) held an open science meeting in Helsinki, Finland in June 2023. Around 40 scientists from 12 countries attended, to discuss current work on this topic, explore what PACES might endeavor to do next, and hear from Early Career Researchers on their needs in this field. GEIA (Global Emissions Inventory Assessment) and AMIGO (Analysis of eMissions usinG Observations) held a joint meeting in June 2023 in Brussels, Belgium. AMIGO held a training workshop on atmospheric chemistry modeling, data assimilation, inverse modeling, and model evaluation at the Royal Meteorological Institute and the Royal Belgian Institute for Space Aeronomy. The workshop was attended by 47 scientists from a number of countries. The GEIA conference shortly followed and brought together 153 researchers. More information on the PACES, GEIA, and AMIGO meetings can be found on our website. IGAC also added two new activities: Allin Wayra on small sensors and BBURNED on biomass burning emissions and uncertainty. Both groups have had a number of online meetings and workshops this year designed to develop the scope and deliverables of these emerging activities.

IHOPE

The Integrated History and Future of People on Earth (IHOPE) is a global network of researchers and research projects using integrative frameworks to provide long-term, human-scale perspectives combining Earth system science with the social sciences and the humanities. IHOPE's Scientific Steering Committee (SSC) had three meetings during the year – all organized digitally, which is now standard practice with IHOPE. Over the past accounting year, IHOPE's SSC has published 83 articles and chapters and 10 book chapters broadly relevant to Future Earth's scope of interest. In 2023, we also organized a new seminar series, Art and Environment, which was filmed. We opened up membership and broadcast this in diverse forums and also continued to send out a newsletter.

iLEAPS

The Integrated Land Ecosystem Atmosphere Processes Study (iLEAPS) promotes global research on ecosystem-atmosphere exchanges and their societal impacts. It builds capacity and fosters leadership through Early Career Science networks. At SRI2023 in Panama, iLEAPS led the session, "Nature-based solutions for mitigating air pollution and climate change in cities." In October 2023, SSC member Stefan Wolff led an autumn school at the ATTO site in the Amazon, focusing on biosphere-atmosphere exchanges, aerosols, VOCs, and biodiversity. iLEAPS participated in the FLARE workshop organized by SOLAS in September 2023 and post-workshop activities. SSC member Pallavi Saxena engaged in various activities, including roles on the Future Earth Horizon scanning Editorial Board, lead author for UNEP's Geo7 report on climate change and biodiversity, contributions to the IGAC Tropospheric Ozone Assessment Report and attending COP28. SSC co-chair Sachin Ghude leads a project on a dust early warning system for a Qatari airport. In March 2024, iLEAPS submitted two proposals to the Future Earth cross-cutting Initiative in collaboration with Finance and Economics KAN, Risk KAN, Middlesex University and Cochin University of Science and Technology, India. We also run monthly webinars and bimonthly interview series with ECRs as the target audience.

IMBeR

The Integrated Marine Biosphere Research (IMBeR) is a large global research project dedicated to promoting, developing and communicating the integrated and interdisciplinary marine research required by society for securing or transitioning toward ocean sustainability in the context of global change. IMBeR networks with over 5000 scientists and more than 1000 early career researchers (ECRs), forming its global capacity. Through its regional programs, working groups, and focused teams, IMBeR produces outputs with various regional focuses.

This year, these included the Ecosystem Studies of Subarctic and Arctic Seas (ESSAS) 2023 annual science meeting, which addressed the ecological, social, and economic dynamics of high-latitude coastal systems; the Integrating Climate and Ecosystem Dynamics of the Southern Ocean(ICED) achieved a significant milestone by delivering the first circumpolar assessment of Southern Ocean ecosystem status and trends, accompanied by the launch of the MEASO summary for policymakers; the continental margins working group organized the Tour of Asian Marginal Seas webinar series, aiming to develop a regional-scale comparative approach; and the two-volume special issue of the IMBeR West Pacific Symposium concluded with the publication of an editorial. IMBeR's commitment to capacity development and supporting ECRs continued with the successful 8th Climate and Ecosystems Summer School in Koper, Slovenia, which was endorsed by the UN Ocean Decade. A novel mentoring project from the ocean color study group secured funding through the ESA-Future Earth Joint Program, equipping the next generation of marine monitoring scientists. The eutrophication study group also conducted its inaugural training session for academia and other diverse sectors. Beginning with the Scientific Steering Committee Meeting in Paris in April 2023, IMBeR has been discussing its new science plan, scheduled for launch post-2025.

Integrated Risk Governance

The Integrated Risk Governance (IRG) Project, a global research network focused on systemic and cascading risks, has made significant strides in understanding and addressing these challenges. Collaborating with Keio University in Japan, the project studied the food-energy-water nexus in Tokyo, revealing the complex interconnections and risks posed by urban agglomeration, high population density, and extensive infrastructure. The research highlighted how extreme weather events, such as typhoons and heavy rainstorms, exacerbate systemic risks and threaten sustainable development. Despite these insights, there remains a gap in understanding the mathematical foundations of disaster risk and dynamic processes. The IRG Project aims to bridge this gap by working with government agencies and business partners to establish long-term scientific and technical bases for managing systemic risks. This includes conducting international training seminars in Japan and China in 2023 and exploring opportunities for developing comprehensive disaster reduction and emergency management industries. Other highlights this year include a disaster risk survey and assessment for which IRGP members served as the leading roles in the technical, evaluation, and special work teams. IRGP members also wrapped up a study in the Tibetan Plateau in which they mapped out how oxygen varies across it. They also updated health guidelines for dealing with low oxygen, and have set up 65 monitoring stations to keep track of oxygen levels.

MAIRS

Monsoon Asia Integrated Research for Sustainability (MAIRS) is a regional consortium to promote the integrated study of earth system processes in the Asia Monsoon Region. During the reporting period, MAIRS promoted collaboration among research programs and networks to tackle the increasing health impacts due to air pollution, climate change and extreme weather. MAIRS co-organized the Scientific Steering Committee 2023 Annual Meeting on 16-17 November, 2023, with participation by Scientists from China, the United States, the Philippines, Malaysia, Indonesia, Thailand, Mongolia, and other countries. Participants presented updates on their respective institutions and research programs, and shared the significant accomplishments and outcomes achieved in 2023 under the MAIRS-FE framework. The meeting reviewed current projects and achievements under MAIRS-FE and underscored the importance of interdisciplinary and cross-sectoral collaborations in addressing complex issues. The SSC reached a consensus on the next phase of work and provided new momentum and direction for future research collaborations.

Ocean Knowledge Action Network

The Ocean KAN continues to grow as a global, trust-based community of researchers, knowledge holders, decision makers, stakeholders, and rights holders. Our Steering Committee also has increased in size to reflect our growth as a community, our balance across place, discipline, and gender, and our diversity in geography and ethnicity. The past year has seen two major, in-situ projects with our Indigenous members. The first involved a five-week visit with our members in French Polynesia and the Cook Islands to better understand their needs and challenges regarding transdisciplinary science. The second was an in-situ workshop on "Co-Designing Ocean Science and Traditional Knowledge to Support the Design and Management of Indigenous Marine Protected Areas," funded by the Future Earth Cross-Cutting Initiatives call, organized jointly with Future Earth-Taipei, held in the 'Etolan Indigenous Amis Community, with Ocean KAN Indigenous scientists from Rarotonga, Mitiaro, Tahiti/Moorea, and the Wayuu Community of Colombia. Ocean KAN members also participated in side events and held in-person gatherings at the World Conference on Marine Biodiversity, the Ocean Sciences Meeting, AGU, and numerous other meetings around the world.

oneHEALTH

oneHEALTH explores the links between global environmental change and health for the planet and society. This year, we focused attention on scientific priorities, educational campaigns and policy options toward upstream prevention of health crises, including pandemics. oneHEALTH is developing an indicator to be used for ecosystem monitoring and management and in global assessments (e.g. IPBES) in combination with the Red List of Ecosystems to assess ecosystem capacity to provide health related services. Currently we are reviewing 4,000 scientific papers to compile information on services related to human health provided in the different ecosystems of the world. oneHEALTH scientists also produced three educational videos to engage kids ages 10-14 on links between ecosystem degradation and human health, and presented about One Health research and community-based conservation at the International Landscape Ecology Conference in Nairobi, July 2023; the Society for Conservation Biology (ICCB) in Kigali, July 2023; the British Ecological Society (BES) Conference, December 2023, in Belfast, and CUGH 2024 meeting in California. Our scientists serve on expert bodies, including the IPBES Nexus assessment and One Health High-Level Expert Panel advising the FAO, UNEP, WHO and WOAH, and were awarded early and mid-career leadership awards by BES and CUGH, respectively, for contributions to ecology and global health.

Past Global Changes

PAGES facilitates activities that address past changes in the Earth System in a quantitative and process-oriented way to improve predictions of future climate and environment, and inform strategies for sustainability. In June, PAGES organized an International Symposium on “Past Global Changes: Lessons for a Sustainable Future” in Switzerland. This workshop was a unique opportunity to highlight PAGES working groups’ (WGs) broad and diverse achievements, such as temporal and spatial flood patterns under the effect of global changes (Schulte et al.), or temperature and hydroclimate reconstruction during transition or past warm periods (Konecky et al. 2023; McClymont et al. 2023; Tzedakis et al. 2022). In September, PAGES organized the DEEPICE Training School in Communication. The program aimed to provide skills to early-stage researchers on climate change and glaciology about communicating science results to the general public, teachers and students, journalists, policymakers and federal offices. PEOPLE3000, a PAGES WG, developed a theory of human demographic transitions that explains why human societies grow over thousands of years, when human societies will experience recessions, and why some recessions are more violent than others (Freeman et al. 2024). Another WG, CRIAS, used an old tree’s growth rings to illustrate the overlay of human and natural histories, and written and physical evidence.

PECS

For the past decade, PECS has been a leading network in supporting inter- and transdisciplinary place-based social-ecological systems (SES) research. Armed with a new cohort of working groups, PECS set out to usher a next chapter in the evolution of SES research in 2023. In June 2023, we hosted our first in-person working group meeting since 2019, in South Africa. Aside from facilitating scientific progress, the meeting allowed advancements on organizing our first conference since 2017 and discussions around the establishment of a SES society. Working groups also connected in other ways: The "nature-based transformations" group ran a writing workshop in France in March, the "collaborative governance" group continued their popular webinar series, and the "methods" group ran an online hackathon to crowdsource resources for their methods website. We also initiated an online cross-cutting, cross-working group "connection" series. Our Latin American node (LAPECS) ran a workshop investigating transformative potential from a Latin American perspective in Uruguay in December, NSERC ResNet (North America) ran a futures workshop on transformative change in conservation and restoration in Quebec, Canada in April, whilst the Southern African node (SAPECS) co-hosted another successful science-practice Garden Route Interface Network conference in October in South Africa.

Programme on Ecosystem Change and Society

SOLAS

Since 2004, SOLAS has been dedicated to quantitatively understanding the key biogeochemical-physical interactions and feedbacks between the ocean and atmosphere. This research area has become more important than ever in the context of climatic and environmental changes. SOLAS launched a marine Carbon Dioxide Removal (mCDR) postdoc programme and a global network of mCDR nodes to advance understanding, model development, and to advance standards for mCDR initiatives, especially concerning Monitoring, Reporting, and Verification (MRV). SOLAS also organized the FLARE workshop to formulate a roadmap for integrated wildfire research as climatic and environmental effects as wildfire frequency increases. The 9th SOLAS Summer School in Cape Verde was the first such event to take place in an African country, highlighting the importance of capacity building for air-sea interaction research in the region. At the end of its second decade, SOLAS coordinated a special issue of Elementa that assessed the state of air-sea interaction science and identified critical research directions for the future. SOLAS has also been organizing events to scope and frame its 3rd decadal science plan that included a scoping workshop in Xiamen, as well as side events at the WCRP Open Science Conference and the UN Ocean Decade Conference.

Systems of Sustainable Consumption and Production

The Systems of Sustainable Consumption and Production (SSCP) Knowledge Action Network emphasizes the need to address whole provisioning systems, including consumption practices and production conditions, as well as lifecycle impacts and the economic, political, social, and cultural imperatives that impel consumerist lifestyles. The Circular Economy Working Group (CE WG) is engaged in diverse projects with a growing membership, including exploring African epistemologies of CE, publishing a book series and journal special issues on CE in business, CE's relation to carbon footprinting and finance, as well as biodiversity and informality. New projects include securing Horizon Europe CE grants and implementing CE in South America. Following its successful relaunch in October 2023 with 4 new co-chairs, the Working Group Communication (WGCoCo) hosted its cross-pollinating quarterly meeting in March 2024 with the theme "Communicating sustainable lifestyles effectively—can nudging be a bridge-builder?" Ongoing projects include the Multiplier event of the Erasmus+ Clim@venture Project and several research work covering gender issues, and sustainable Human-Computer Interaction. The Social Change Working Group (SC WG) welcomed a new co-chair and regularly organizes webinars to facilitate idea exchange among members, with this year's emphasis on broader change beyond consumption practices. Various stakeholder groups' practices, including policy makers, industry, designers, academia, and activists, are scrutinized in these discussions. The Political Economy Working Group (PE WG) is addressing inequality and injustice in the global political economy through collaborative projects, aiming to demonstrate the current system's unsustainability and its deepening of inequality. Their work includes developing and publishing a "caselet" on initiatives like Just Energy Transition Partnerships and Extended Producer Responsibility for Packaging in the US. A new initiative towards developing a Handbook for Sustainable LIfestyles was launched in the 4th quarter of 2023.

Urban

The Urban Knowledge Action Network has a number of very active members advancing cutting edge research on urban sustainability. As an example, this has led to a gift of $4 million from Power Corporation of Canada for the work conducted under the Volt-age project. The Concordia-led initiative received in total $123 million in funding and will seek to innovate novel energy sources, secure new infrastructure and deliver affordable, green energy under diverse conditions across Quebec and Canada. Siir Kilkis, an Urban KAN Steering Committee member and the incoming co-chair, has been appointed Vice Chair of IPCC WGIII. Several Urban KAN Scientific and Engagement Committee members, including Siir Kilkis, Seth Schulz, and outgoing Co-Chair Xuemei Bai were selected experts who participated in the IPCC Cities Special Report Scoping Meeting held in Riga, Latvia in April 2024. Urban KAN Steering Committee Member Burak Güneralp is selected to serve on the Task Force on Scenarios and Modeling of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). Attesting to the know-how gathered within the Urban KAN, and the contributions made over the past years (keynotes and a virtual booth), a number of members have been granted advisory roles for the Innovate4Cities 2024 conference.

Water Future

Water Future made concrete efforts last year to raise the profile of science-based evidence in water management. Partnering with UNESCO, Water Future presented the game-changer idea for establishing an Intergovernmental Science-Policy Platform for Water Sustainability (ISPWAS) as a solution-oriented scientific assessment. During the reporting period, two side key events were organized: “Science-based Global Water Assessments” at the High-level Political Forum (HLPF) on Sustainable Development at UN headquarters in July 2023 and “Towards Global Action on Water: Science-Based Solution” at COP28. The implementation started with the planning of the national water assessment, which would be implemented by national entities based on their needs. Water Future is engaged in preparing standardized and validated guidelines for a comprehensive science-based national water assessment with a strong capacity development component. It would support developing countries with national assessment capabilities (integrated data sets, models, and information technology) by providing a repository of free and universally available earth system science data sets, methodology and modeling products (as a global public good of knowledge and information) for spatially and temporally contiguous national water resource assessment.

Water-Energy-Food Nexus

The Water-Energy-Food Nexus Knowledge Action Network (Nexus KAN) acts as a liaison between Earth system science, social science, humanities, and society to explore and promote science-based solutions to address pressing water, energy and food system challenges. Its mission is to promote and facilitate collaboration between existing projects, networks and individuals involved with nexus issues to co-generate knowledge, expertise and experience required to solve nexus challenges. The Scientific Steering Committee (SSC), established in 2018 and with six active members, acts as the implementation group to coordinate activities to fulfill the stated mission. Key highlights from this year: Jointly organized regional meetings with Future Earth in Asia and MAIRS-FE in July 2023 in Hainan Island, China; the organization of a regional Nexus forum focused on mutual learning between practitioners and policy makers held in Split, Croatia in September 2023; joined an event organized by the European Commission and the National Science Foundation on international cooperation with a focus on the Nexus; organized numerous events and a training in the framework of the NexusNet COST Action.

National, Local and Regional Committees: Updates from around the Globe

Future Earth National, Local and Regional Structures forge a bridge between local, national and regional sustainability science and research and the global sustainability community, aggregating knowledge and inspiration from the ground to the global and back. Below are examples of this critical work.

Asia

The Future Earth Asia Regional Committee (ARC) was launched in Seoul, Korea on 19 October 2023 as a side event to the 22nd Science Council of Asia Conference. The ARC, composed of Future Earth National Committees in Australia, China, India, Korea, Japan, Mongolia, Philippines, Taipei, Thailand and nodes of the Global Research Networks in the Asia-Pacific region (GLP-Japan, ILEAPS-Korea, MAIRS-RPO, Water Futures, SIMSEA and HI-ASAP), aims to leverage international collaboration to address interconnected sustainability challenges and drive positive change in the region.

From January 2024, the ARC Co-chairs with a core group developed a concept note that serves as a master document from which proposals for funding were generated. A proposal for the Future Earth Cross cutting initiative was submitted and webinars highlighting the work of the Future Earth community in Asia were initiated.

The **Chinese National Committee for Future Earth** and Future Earth's Early-Career Researcher Fellowship was awarded to 14 young scientists to support various sustainability-oriented research, supported the organization of two summer youth scholar training courses, and conducted the "Future Earth Virtual Symposium." The Committee also organized two events: A side event at COP28 called "Climate Adaptation and Resilience" and a session for SRI2023, "Climate Change, Sustainable Development and Green Renewable Energy in China." The A3 Foresight Program --"Future Earth Strategies in Northeast Asia - Climate Change and Its Impact"; Domestically, the first Climate Change Science Conference entitled "New Situation, New Mission and New Contribution" was convened.

The **Future Earth Japan National Committee** hosted the third Future Earth Japan Summit, “Peace and Life in the Anthropocene” in November 2023 to discuss the urgent issue of how we can reconcile the cause of protecting peace and people’s lives with the cause of safeguarding environment on a regional to global scale. In conjunction with the Summit, a poster exhibit introducing the efforts of member institutions was displayed on the website. The Committee supported several events aimed at the public, including collaboration with non-profit organizations, to discuss the transformation and action toward a sustainable future.

The Korean National Committee with Oxfam & Fair Finance Asia co-hosted an international hybrid seminar on “Towards an Equitable Asia: Climate Finance, Just Transition, and Leverage Points Lens” during the Annual Meeting of Asia Development Bank in April 2023 in Seoul. In June, the committee joined the Future Earth Assembly meeting in Panama and hosted two sessions during SRI2023. In October, the committee hosted the Inaugural Meeting of Future Earth’s Asia Regional Committee and the ‘Future Earth’ Special Session (“Sustainability Science from an Asian Lens”) during the 22nd Science Council of Asia Conference at Seoul National University. In November, the committee co-hosted Future Earth in Northeast Asia special session with the A3 Foresight Program (among China, Japan, Korea) during the Annual AsiaFlux Conference in Jeju, Korea. In December, the committee participated in COP28 and the 1st Asia Climate Action Forum in Dubai, co-hosted by the United Arab Emirates University and Seoul National University

The **National Committee for Future Earth Mongolia** organized several events targeting scientists and policymakers under the Science-policy Pathways Program, launched in October 2022, including the “Science-Policy-Week” held in November 2023 which attracted more than 280 scientists, and 70 policymakers and practitioners, and “the Science-Policy Pathways Forum and Science Exhibition” held in provinces which reached to more than 6000 local participants in 11 provinces and 1500 scientists from 48 academic institutions. These events led to an official collaboration between local government offices and scientific institutions in 9 provinces. The Committee also participated in SRI2023 and presented at the Asia Spotlight Event. They are also active in implementing collaborative research projects on local adaptation plans and the need for science-policy interface for local herding communities.

Future Earth Taipei enhanced collaboration with Knowledge-Action Networks (KAN) and the Future Earth Secretariat hubs, and hosted co-branded events: “The 2023 International Conference on AI for a Sustainable Society” in August and “the 2024 Ocean KAN Inner Circle Meeting and Workshop” in March. The Committee also organized various international networking events, including supporting 20 researchers and their stakeholders to participate in SRI2023 as well as organizing international workshops on air quality and health. It also had local networking events with international guests from the Future Earth Coast, the Future Earth Canada Hub, and Ocean KAN. In addition, they organized an annual symposium, cross-disciplinary networking, and discussion meetings among 11 working groups. They are also committed to training Early Career Researchers (ECRs) and organized 15 regular online talks, 5 cross-hub collaboration projects, and 3 training courses.

Future Earth Philippines began a collaborative research project with the Department of Science and Technology-Region 3 and select universities to analyze flooding in Central Luzon, using problem tree analysis workshops to develop mitigation approaches, with plans to expand nationwide. "The Filipino SDG Action Hour" webinar series, now at its 83rd installment, raises public awareness on sustainability. From March 2023 to April 2024, the webinar covered wide ranging topics covering the interconnections between and among science, arts, humanities and sustainability. Future Earth Philippines continues to expand its Universities SDG Action Network initiative (with funding by the Philippine Department of Science and Technology and other agencies) to foster further collaboration and support for sustainability in 2024 and 2025.

The **Thailand National Committee** secured funding from the Program Management Unit for Human Resources & Institutional Development, Research, and Innovation (PMU-B), a prominent organization in Thailand committed to promoting the country's progress in science, research, and innovation, and implemented various research projects on the blue carbon assessment methodologies that are calibrated using satellite data, the promotion of sustainable palm oil bio-farming, and the adoption of digital farming and smart farming technologies. The Committee will further look into the utilization of big data and intelligent decision-making systems to enhance artificial intelligence capabilities, as well as the effective use of satellite data for air quality management and the application of Geographic Information Systems for managing natural disasters.

In 2023, **Future Earth Australia** focused on sustainability advocacy and project advancement, integrating into the National Committees branch of the Australian Academy of Science while undergoing structural changes. The committee participated in the Adaptation Futures Conference in Montreal, Canada in October 2023 and chaired a session on how adaptation researchers across the world can better support one another. Future Earth Australia also implemented the Early Career Researcher and Professionals (ECRP) program, which coordinated three Collaboration Labs and launched the Opportunities Fund. It organized an urban sustainability workshop hosted by RMIT University, forming the basis of our 2024 Update to the existing Sustainable Cities and Regions Strategy. The University of Sydney hosted a Just Adaptation collaboration lab alongside FEA in November, leading to the development of an adaptation card game. The Sustainable Oceans and Coasts workshop inspired participants to work in a transdisciplinary way and are currently authoring a paper together. The Opportunities Fund was awarded to 18 ECRPs to support sustainability research and professional development. In 2023, FEA provided policy advice and input to 8 National Parliamentary Submissions and key policy workshops.

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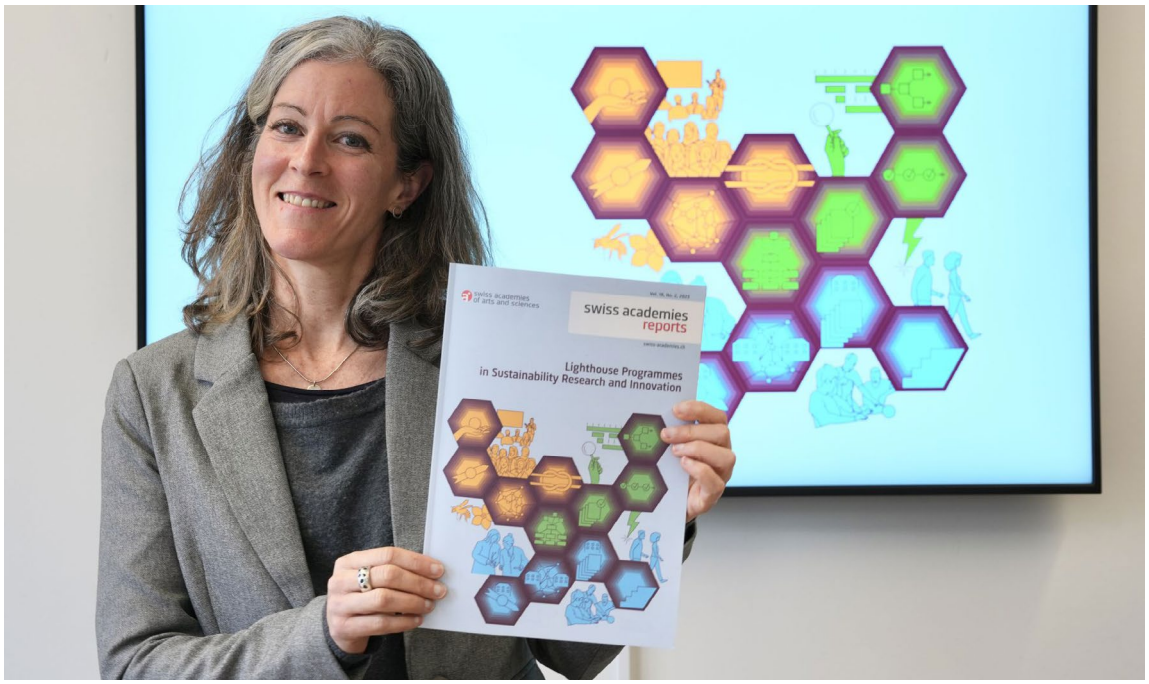
Europe

The Future Earth community in Europe has continued the work undertaken in 2022 at the Hamburg in-person meeting. Some high-capacity National Committees have led the way by continuing past and undertaking new national and international activities, and have provided continuous efforts for a stronger collaboration among European National Committees, notably through the organization of a European Autumn School on Sustainability Science. Smaller Committees have supported the effort by undertaking a wide diversity of activities at their national level.

The **German Committee Future Earth** (DKN) has established several working groups focused on key topics, including sustainable AI, real-world laboratory research, food system transformations, multi-risk and societal resilience in extreme events, and climate risk and technology impact assessment. In addition, DKN has launched a new call for proposals for working groups. The committee has also actively participated in national workshops of scientific advisory boards for the federal government, focusing on transformation areas, synergies between advisory boards, and enhancing the science-policy dialogue. Furthermore, DKN has played a coordinating role in the "10 New Insights in Climate Science" initiative (past and upcoming issues) and collaborated with the Swiss and French National Committees to organize the Pathways Autumn School for European researchers.

The **Swiss National Committee** launched a report on design options of large integrative funding programs in sustainability research called "Lighthouse Programmes in Sustainability Research and Innovation." Furthermore, the Swiss National Committee held its 2023 Sustainability Science Forum on November 14 on the theme "Policy and science: joining forces for a sustainable future." The Swiss National Committee was a partner in the organization of the Pathways Autumn School which engaged 53 European researchers in November 2023.



The **French National Committee** (CNFCG - Comité National Français des Changements Globaux) was involved in the organization of the French Future Earth annual Conference in Marseille (June 2023) which gathered 130 participants over 2 days, around the topic "Sustainability sciences and (in)action: rethinking our practices". The French Committee was also a partner in the Pathways Autumn School.

The **Slovak National Committee** brings together researchers from different scientific organizations (Institute of Landscape Ecology, Slovak Academy of Sciences; Institute of Forest Ecology SAS, p.r.i.; Slovak Ecological Society SEKOS, Global Water Partnership) and universities (UKF Nitra, TUZVO), with which it collaborates closely. The Slovak Committee organized the 19th International landscape Ecological Symposium in Trenčianske Teplice from 16 to 19 May 2023 in cooperation with ILE SAS. In addition, it focused on popularization activities. The Slovak Committee co-organized a Student Conference on Water Quality on 23 May and participated in the organization of the World Environment Day in Smolenice Castle, the event "Weekend with the Slovak Academy of Sciences" and was part of the organization of a Summer school for young scientists from 17 to 21 July 2023.

The **Romanian National Committee** was involved in a series of activities aiming to promote sustainability and climate change research directions in Romania. The Committee co-organized a workshop for students on "Integrated Environmental Research and Sustainable Development" in December 2023. That month, the Committee also organized a round table on "Recent Geography and Artificial Intelligence." The Committee co-organized 2 bilateral workshops (Ro & Ge) on sustainability challenges in the Danube Basin – the 2nd workshop was held in June 2023 on "Human-Environment Interactions in the light of Climate Change and Sustainable Development Goals: case studies from the Danube Basin."

The **Russian National Committee** supports initiatives aimed at involving young scientists in research on global change and sustainable development. The Russian National Committee held the 15th All-Russian Youth Scientific School-Conference "Meridian: Studies of Nature and Society in the Context of Global Transformations" in November 2023. The Committee also supported the creation of two new master degrees at the Higher School of Economics: Low Carbon Development Management and Spatial Data and Applied Geoanalytics.

South Asia

The Future Earth Community in South Asia comprises a **South Asia Regional Office hosted** by Divecha Centre for Climate Change, Indian Institute of Science. The Regional Programme focuses on Food Security and Malnutrition (Fo), Health Sensitization (H), Coastal Risk and Resilience (Co) and Sustainable Communities (S) known as FoHCoS. The program is aimed at developing new sustainable practices and tools in sustainability science and Informing decision-making through Knowledge and Policy Briefs.

Southern Africa

The National Research Foundation's bid to host the Future Earth Global Secretariat Hub began in November 2021 and was approved at the end of March 2022. A two-year phased implementation process is being followed to establish the Africa Hub as a truly global initiative with a strong African presence and voice, integrating Africa's thriving and expanding sustainability science, policy, and funding communities into the global sustainability science arena. The approach taken articulates a clear framework for Future Earth Africa Hub, which includes the 'Africa Hub Leadership Centre' hosted by Rhodes University and the University of Pretoria supported by four 'Africa Hub Nodes' strategically located throughout the continent (to be supported by other partner academic institutions and/or funders). Financial support is provided by the National Research Foundation. By 1 April 2024, the Africa Hub will have a fully functional governance structure. The newly-established South Africa National Committee on Global Change, South African Global Change Science Committee, strategically provides input into the Future Earth Africa Hub initiative and associated programs and initiatives within South Africa.

All National Committees and Regional entities also engage collaboratively and with the Future Earth Secretariat to connect local, national and regional work globally.

EVENTS 2023

APRIL

18

10 New Insights in Climate Science Japanese Launch *online*

20

Environmental Policy and Disaster Management Seminar, *Bangkok, Thailand*

MAY

12 & 13

Climate Parables Live Performance, *San Francisco, California*

31

Earth Commission Assessment Launch, *Stockholm, Sweden*

JUNE

26 - 30

Sustainability Research and Innovation Congress 2023 (SRI2023), *Panama City, Panama*

29 - 30

Future Earth Assembly, *Panama City, Panama*

JULY

10 - 12

SRI2023 Asia Spotlight Event, *online*

AUGUST

11 - 12

2023 International Conference on AI for a Sustainable Society, *Taipei*

SEPT

24

Scientific Dialogue: How Can We Shop Sustainably?, *Nagasaki, Japan*

OCT

15 - 20

Autumn School 2023, *Aussois, France*

NOV

13 - 17

TERRA School, *Kyoto, Japan*

DEC

30 NOVEMBER - 8 DECEMBER

10 New Insights in Climate Science Launch at COP28, *Dubai, UAE*

14

10 New Insights in Climate Science Canada Launch, *Montreal, Canada*

EVENTS 2024

JAN

15 - 19

Earth Commission at the World Economic Forum Annual meeting, *Davos, Switzerland*

19

Future Earth Taipei Annual Symposium, *Taipei*

MARCH

12

Future Earth's 17 Rooms X Kickoff, *Online*

OPERATIONS & GOVERNANCE

Global Secretariat Staff

Canada

- Micheline Ayoub, Global Hub Director
- Jennifer Garard, Deputy Director
- Andréa Ventimiglia, Advancements Officer
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- Rachelle Fox, Digital Communications Officer
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- Poonam Maskeri, Research Assistant
- Ernest Habanabakize, Research Assistant
- Alyson Surveyer, Partnerships Coordinator

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- Shu Dong, Administrative Officer
- Yaxing Du, Science Officer
- Zhongming Gao, Science Officer

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- Junya Tani, Senior Adviser
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- Marcin Jarzebski, Science Officer
- Masami Oka, Communications Officer
- Sikopo Nyambe, Science Officer
- Sunhee Suk, Science Officer
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- Xianping Luo, Science Officer
- Yuri Kojina, Communications Officer

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- Sruthi Subbanna, Project Scientist III, Science Policy Analyst
- Madhusudan T, Digital Content Associate, Science Officer
- Mamatha G, Accounts
- Pradeep TL, Office Management

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- Jakob Lundberg, Deputy Director
- Maya Rebermark, Engagement Lead
- Lisa Jacobson, Program Manager
- Albert Norström, Science Director, Earth Commission
- Daniel Ospina, Science Officer
- Sophie Hebden, Science Officer
- Unn Rasmussen, Head of Finance and Administration
- Zandi Mshvildadze/Therese Öreteg, Finance and Administrative Officer
- Cecilia Andersson, Fundraising & Administrative Officer
- Susanna Dobrota, Coordinator & Administrative Officer

Taipei

- Revital Shpangental, Global Hub Director
- Shih-Chun Candice Lung, Executive Secretary of Future Earth Taipei
- Shih-Yu Lee, Deputy Director
- Hsin-lin Sophie Su, Science Officer, Research and Innovation
- Yu-Chun Dolly Chung, Science Officer, Capacity and Networks
- Tzu-Hsun Anny Chang, Program Assistant, Communication

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- Veera Mitzner, Associate Director
- Bridget Blake, Global Communications Manager
- Laurel Milliken, Global Finance and Governance Lead
- Makyba Charles-Ayinde, Latin America and the Caribbean Regional Lead
- Judit Ungvari, Global Research & Innovation Co-Lead
- Kyoko Shiota MacAulay, Network Manager
- Stephan Useche, Event Tech Manager
- Kathy Kohm, Editor-In-Chief, Anthropocene Magazine
- Mark Harris, Senior Editor, Anthropocene Magazine
- Stephanie Honda, Digital Content Intern (October 2023 - June 2024)
- Lalie Marie, Intern (March 2024 - July 2024)

Africa

- Mr. Michael Nxumalo, Interim Director
- Mr. Lebogang Mpetle
- Mrs. Kholofelo Mampeule

Governing Council (March 2024)

GROUP	NAME	LOCATION
Early Career Researcher (ECR)	Arijit Paul	India
	Giovanni Avila-Flores	Mexico
	Timothy Balag'kutu	Ghana
Low and Middle Income Country Expert (LMIC)	Kalpana Chaudhari	India
	Lucas Enrico	Argentina
	Yulia Sugandi	Indonesia
Global Research Network (GRN)	Faten Attig Bahar	Tunisia
	Sirkku Juhola (co-chair)	Finland
	Xuemei Bai	Australia
Global Secretariat Hubs Board and Funder	Gordon McBean	Canada
	Deliang Chen	Sweden
	Jean-Marie Flaud	France
	Maria Uhle (co-chair)	USA
	Yukari Takamura	Japan
National, Local, and Regional Structure	Stephanie Burton	South Africa
	Taikan Oki	Japan
	Joon Kim	South Korea

Future Earth Assembly Members (March 2024)

NAME	LOCATION
Early Career Researcher (ECR)	
Glenn Fernandez	China
Meng Wang	China
Jay Dean Pockling	United States
Sally Torres	Peru
Erna Karalija	Bosnia and Herzegovina
Ajibola Akanji	Nigeria
Rachel Kelly	Australia
Kabir Rasouli	Canada
Mais Aljunaidy	Turkey
Aakriti Srivastava	India
Regional Committee/Entity	
Jane Olwoch	Namibia
Belinda Reyers	South Africa
Manfred Lange	Cyprus
Riyad Y. Hamzah	Bahrain
Chrispin Kowenje	Kenya
Allali Abedlkader	Morocco
Jaanaki Gooneratne	Sri Lanka
Kanupriya Harish	India
Mohd Nordin Bin Hassan	Malaysia
Hein Mallee	Japan

National or Local Committee/Structure	
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Suvdantsetseg Balt	Mongolia
Diarmuid Torney	Ireland
Mary Dobbs	Ireland
Wolfgang Cramer	France
Thierry Lebel	India
Vandana Prasad	India
Lourdes J. Cruz	Philippines
Rico C. Ancog	Philippines
Philip Lewis	United Kingdom
Melissa Leach	United Kingdom
Luis Santamaria	Spain
Emilio Casamayor	Spain
Daniela Jacob	Germany
Sebastian Sonntag	Germany
Taro Yamauchi	Japan
Nobuko Saigusa	Japan
Candice Lung	Taipei
Hsin-Tien Lin	Taipei
Wenjie Dong	China
Bojie Fu	China
Vladimir Kolosov	Russian Federation
Evgeny Gordov	Russian Federation
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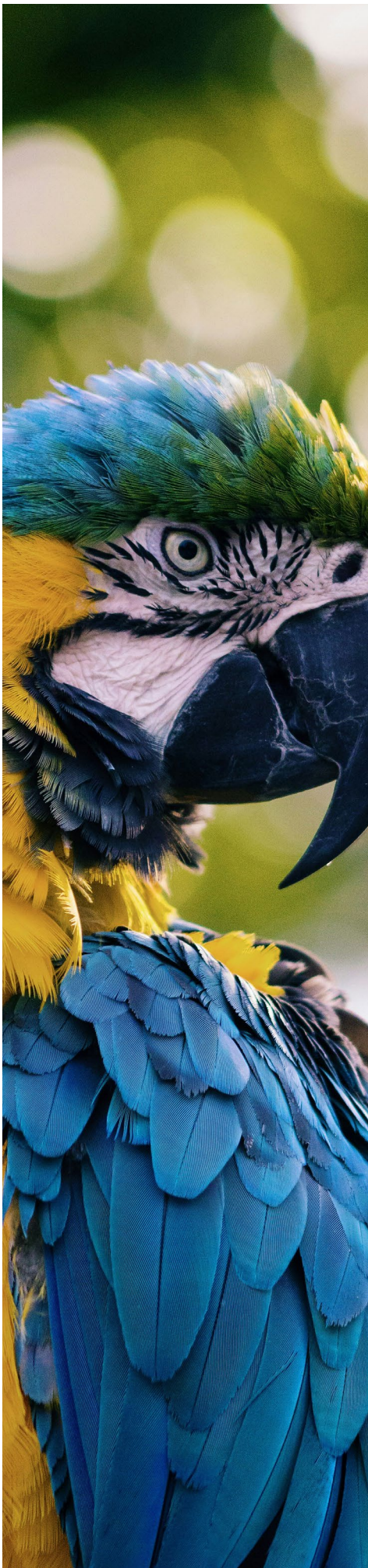
Juan Salazar	Australia
Gabriela Wuelser	Switzerland
Peter Edwards	Switzerland
Kaisa Korhonen-Kurki	Finland
Soonchang Yoon	South Korea
Joon Kim	South Korea
Margreth Keiler	Austria
Coleen Vogel	South Africa
Neville Sweijd	South Africa
Kuaanan Techato	Thailand
Siwatt Pongpiachan	Thailand



Global Secretariat Hub Boards or Funders

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Gordon McBean	Canada
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Stéphane Blanc	France
Marie Stenseke	Sweden
Stefan Claesson	Sweden
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Chiho Watanbe	Japan
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Aldo Stroebel	South Africa
Smriti Basnett	India

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Eva Spehn	Switzerland
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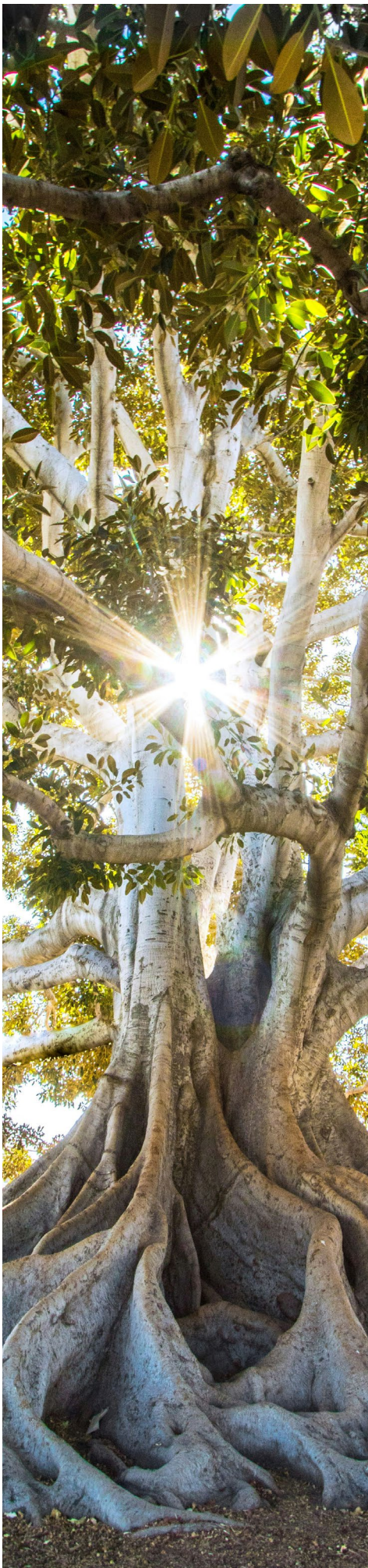
Langley DeWitt	United States
Ruth Morgan	Australia
Thomas McGovern	United States
Benjamin Poulter	United States
Semeena Valiyaveetil Shamsudheen	United Kingdom



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Peijun Shi	China
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Taibat Lawanson	Nigeria
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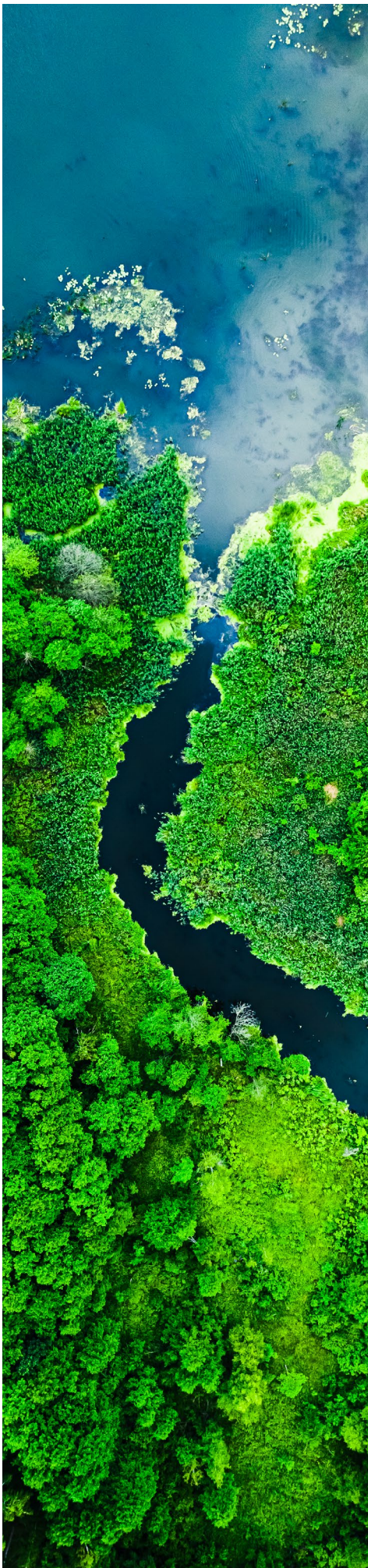
Jana Sillmann	Germany
Chrisy Laspidou	Greece
Marja Spierenburg	Netherlands
Unai Pascual	Spain
Maria Jose Martinez-Harms	Chile
Pep Canadell	Australia
Peraphan Jittrapirom	Netherlands



Low and Middle Income Country (LMIC)	
Najet Aroua	Algeria
Jurgenne H. Primavera	Philippines
Filipo Zulu	Zambia
Yulia Sugandi	Indonesia
Sylvia Mitchell	Jamaica
Eduardo Erazo Acosta	Colombia
Leopoldo Cavaleri Gerhardinger	Brazil
Joeli Veitayaki	Fiji

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Detlef Stammer	Switzerland
Susanne Mecklenburg	United Kingdom
Kanji Fujiki	Japan
Shen Xiaomeng	Germany
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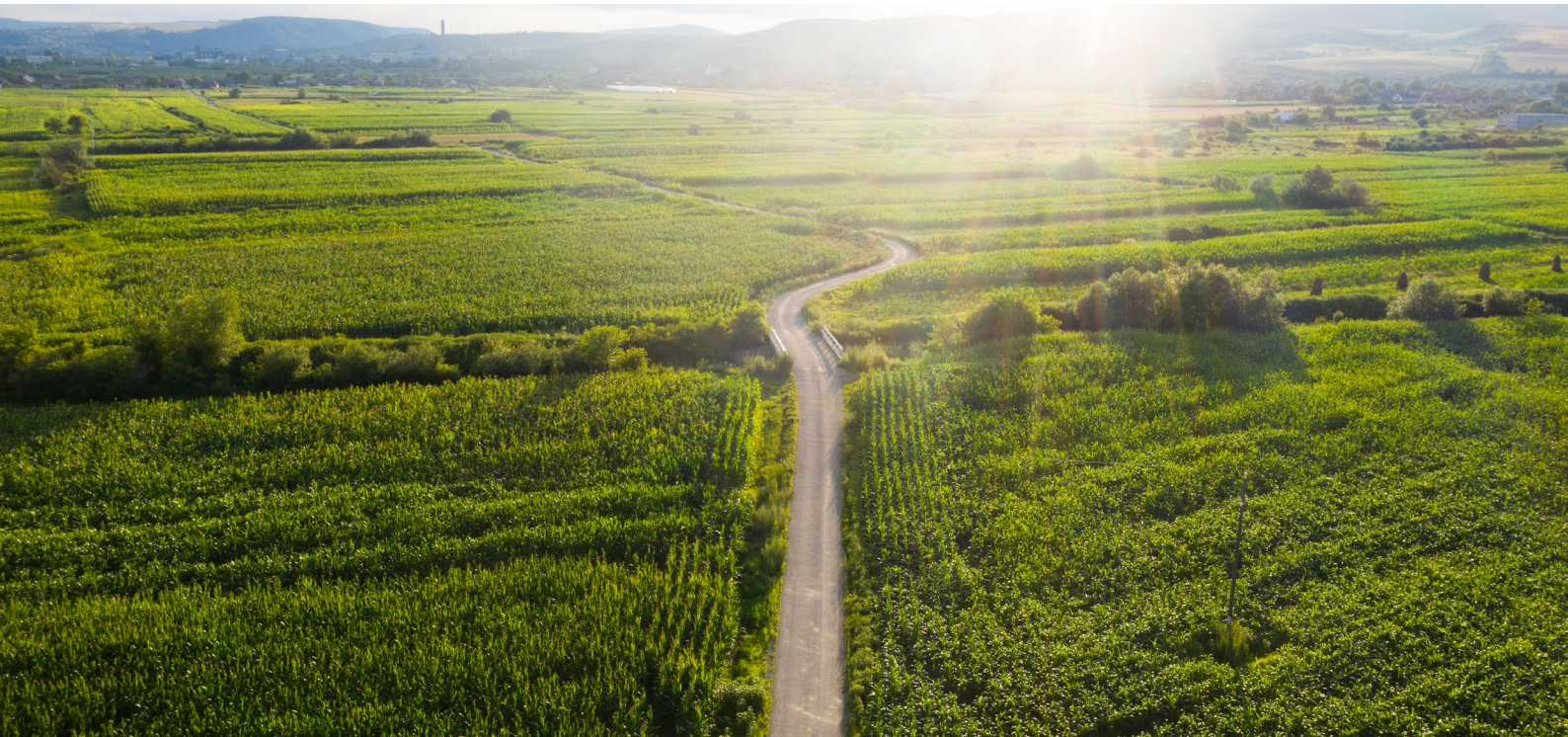
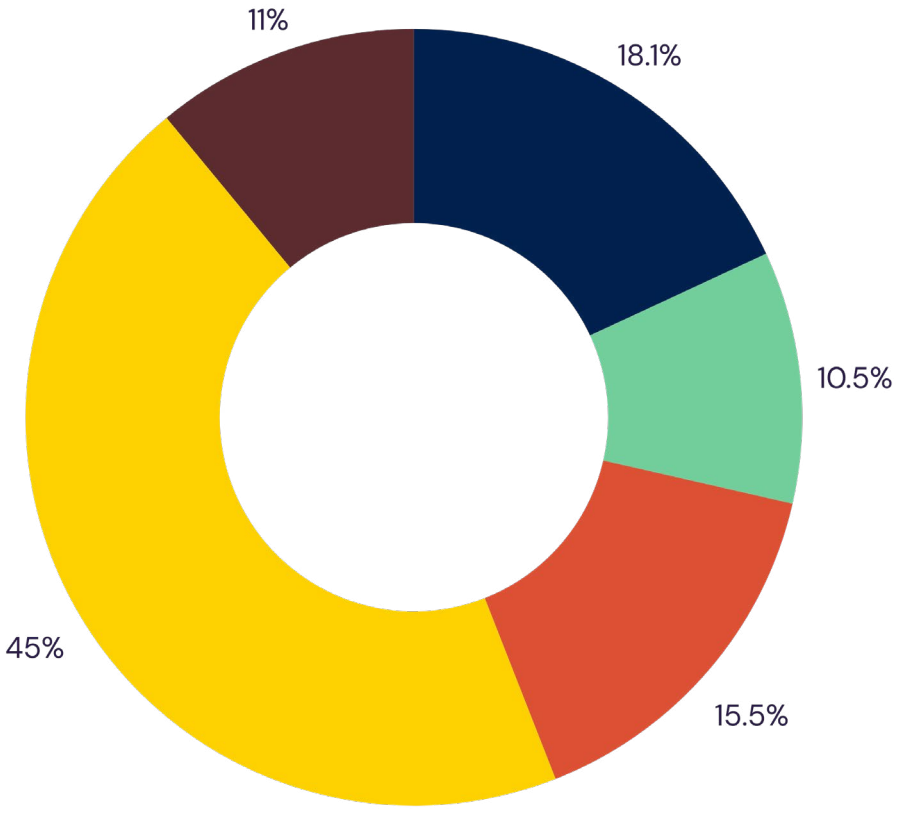
Nicole Arbour	Uruguay
Meriem Bouamrane	France
Andrea Hinwood	Kenya



Financial Summary

For the fiscal year April 2023 - March 2024, Future Earth's consolidated budget increased by 10% from the previous year to 8.5 million Euros.

Communications	**€1.5**
Coordination	**€0.9**
Networks	**€1.3**
Research & Innovation	**€3.8**
Strategy, Advancement, & Partnerships	**€0.9**
Grand Total	**€8.5**



Funders

Canada Global Hub

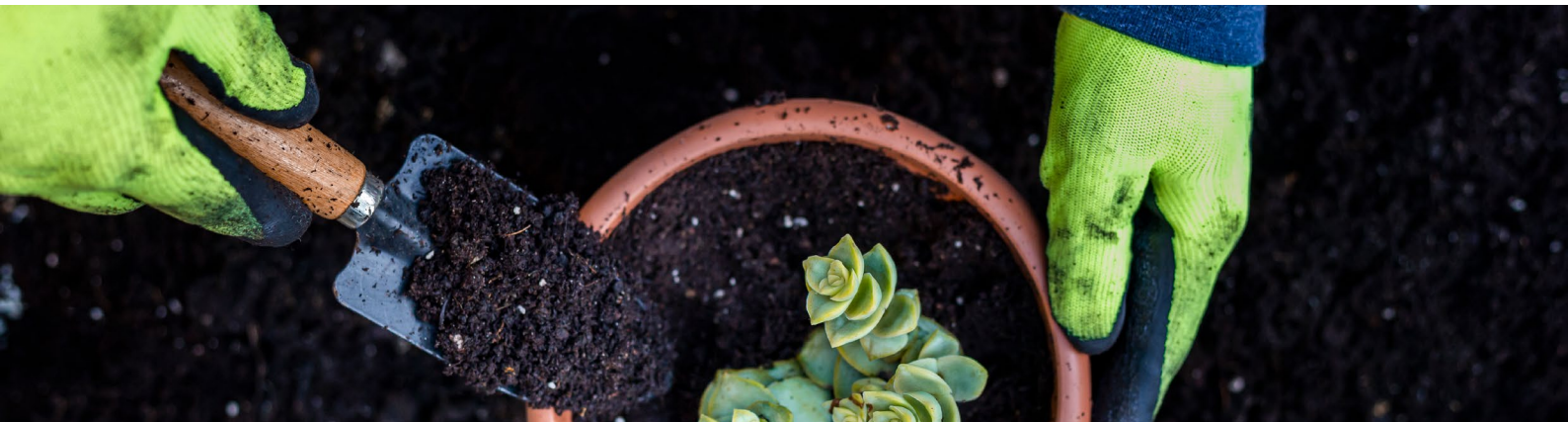
- Fonds de Recherche du Québec (FRQ)
- Microsoft
- Mitacs
- Natural Sciences and Engineering Research Council of Canada (NSERC)
- United Nations Environment Programme (UNEP)
- Social Sciences and Humanities Research Council of Canada (SSHRC)

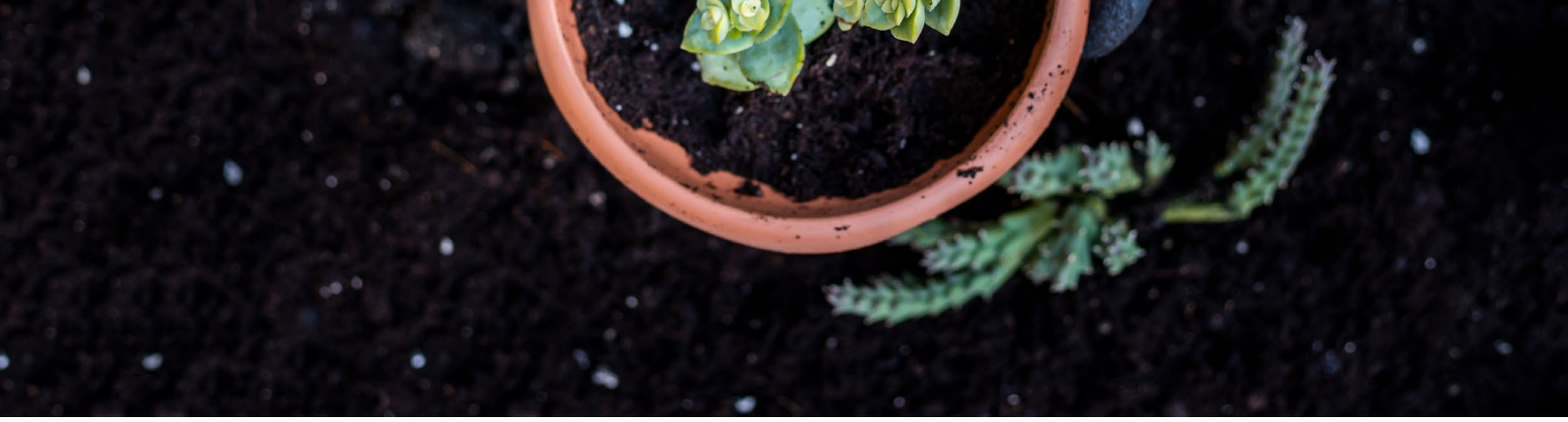
China Global Hub

- China Association for Science and Technology
- Sun Yat-sen University
- Southern Marine Science and Engineering Guangdong Laboratory (Zhuhai)
- Key Laboratory of Tropical Atmosphere-Ocean System, Ministry of Education
- The ISC Urban Health & Wellbeing programme

France Global Hub

- Alliance Nationale pour la Recherche en Environnement (AllEnvi)
- Agence Nationale de la Recherche (ANR)
- Centre National de la Recherche Scientifique (CNRS)
- Ministère de l'Enseignement supérieur, de la Recherche et de l'Innovation (MESRI)
- Institut de Recherche pour le Développement (IRD)
- Sorbonne Université





Japan Global Hub

- AEON Environmental Foundation
- Hokkaido University
- KAO Corporation
- Keio Research Institute at SFC
- Kyushu University
- Ministry of Education, Culture, Sports, Science and Technology (MEXT)
- Nagasaki University
- National Institute for Environmental Studies
- Remote Sensing Technology Center of Japan
- Research Institute for Humanity and Nature
- Saraya Co., Ltd.
- Science Council of Japan
- The University of Tokyo/Institute for Future Initiatives

South Asia Global Hub

- Divecha Centre for Climate Change
- Ministry of Earth Sciences

Sweden Global Hub

- European Space Agency
- Hewlett Foundation
- MAVA
- Oak Foundation
- Porticus Foundation
- Herlin Foundation
- Gordon and Betty Moore Foundation
- Global Challenges Foundation
- Swedish Research Council, FORMAS
- Frontiers Research Foundation

Tapai Global Hub

- Academia Sinica

USA Global Hub

- Cynthia and George Mitchell Foundation
- George Mason University
- Gordon and Betty Moore Foundation
- Knight Foundation - NewsMatch
- Long Now Foundation
- University of Colorado Boulder
- US Global Change Research Program
- US National Science Foundation
- V Kann Rasmussen Foundation

National Contributors

- Austria (Federal Ministry for Science, Research & Economy)
- Finland (Council of Finnish Academies)
- India (Indian National Science Academy)
- Japan (Ministry of Education, Culture, Sports, Science and Technology, MEXT)

Custodian Organizations

- United Nations Educational, Cultural and Scientific Organization (UNESCO)
- UN Environment Programme (UNEP)
- International Science Council (ISC)
- Belmont Forum

Partner Organizations

- START International
- Mountain Research Initiative (MRI)
- World Climate Research Programme (WCRP)
- Science and Technology in Society (STS) Forum
- United Nations University (UNU)
- European Space Agency (ESA)

Select publications

Future Earth-wide integrative publications :

10 New Insights in Climate Science

- Future Earth, The Earth League, & WCRP. (2023). 10 New Insights in Climate Science 2023/2024. Future Earth, The Earth League, World Climate Research Programme. https://doi.org/10.5281/zenodo.10251586
- Bustamante M, Roy J, Ospina D, et al. Ten New Insights in Climate Science 2023. Global Sustainability. Cambridge University Press; 2023;:1–58. doi:10.1017/sus.2023.25

Earth Commission

- Rockström, J., Gupta, J., Qin, D. et al. Safe and just Earth system boundaries. Nature 619, 102–111 (2023). https://doi.org/10.1038/s41586-023-06083-8
- Mohamed, A., DeClerck, F., Verburg, P., Obura, D., et al. Securing Nature's Contributions to People requires at least 20%–25% (semi-)natural habitat in human-modified landscapes, One Earth, Volume 7, Issue 1, 19 January 2024, Pages 59-71
- Stewart-Koster, B., Bunn, S.E., Green, P. et al. Living within the safe and just Earth system boundaries for blue water. Nat Sustain 7, 53–63 (2024)
- Gupta, J., Prodani, K., Bai, X., Gifford, L., Lenton, T. M., Otto, I., … Tàbara, J. D. (2023). Earth system boundaries and Earth system justice: sharing the ecospace. Environmental Politics, 1–20.

- Gifford, L., Liverman, D., Gupta, J., & Jacobson, L. (2023). Governing for a safe and just future with science-based targets: opportunities and limitations. Climate and Development, 1–10. https://doi.org/10.1080/17565529.2023.2264255
- Bai, X., Hasan, S., Andersen, L.S. et al. Translating Earth system boundaries for cities and businesses. Nat Sustain 7, 108–119 (2024).
- Lenton, T.M., Xu, C., Abrams, J.F. et al. Quantifying the human cost of global warming. Nat Sustain 6, 1237–1247 (2023). https://doi.org/10.1038/s41893-023-01132-6
- Abrams, J. Armstrong McKay, D. Sakschewski, B. Loriani, S. Zimm, C. Ebi, K. et al Committed warming leaves little choice to avoid climate tipping points, One Earth 2023
- Xiao, C. .. Qin, D. et al. Do abrupt cryosphere events in High Mountain Asia indicate earlier tipping point than expected?, Advances in Climate Change Research, 2023
- Roose, S. Bala, G. et al. Quantification of tropical monsoon precipitation changes in terms of interhemispheric differences in stratospheric sulfate aerosol optical depth, Climate Dynamics, Volume 61, pages 4243–4258, (2023).

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Text: Edited by Bridget Blake
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