



United Nations
Educational, Scientific and
Cultural Organization

Natural Sciences Sector

Dialogue with Permanent Delegations to UNESCO on the future Medium-Term Strategy 2022-2029 (41 C/4)

- Pillar 3 of UNESCO's Strategic Transformation -

16-17 July 2019

Introductory note

Background – Global, regional and cross regional trends

Recent trends, rising demands from Member States, as well as lessons learned from programme implementation during the last biennia will shape the Medium-Term Strategy 2022-2029 (C/4).

Addressing current **global challenges** extend beyond borders, cultures and political systems, within the framework of international agendas (2030 Agenda, 2063 African Union Agenda, Paris Agreement, Sendai Framework) requires international science-based responses towards sustainable solutions. UNESCO is well positioned to foster such solutions through its international **science programmes and policy advice**, with its unique UN mandate encompassing a broad scope of scientific fields. As **the technological revolution** is currently redrawing the borders of what it means to be human, UNESCO provides a global platform for debate with a focus on universal human rights and benefit to all (see Annex I on facts and figures).

According to various official studies and reports,¹ including the [global risks report 2019](#), presented at the World Economic Forum, the science-related biggest risks that threaten our world in the years to come are the following (see also Annex II on global risks landscape 2019):

- (i) failure of climate change mitigation and adaptation; extreme weather events;
- (ii) natural disasters, man-made environmental disasters;
- (iii) biodiversity loss and ecosystem collapse, and;
- (iv) water crises.

It is obvious that pressure on natural resources is increasing, and many conflicts and instances of violent extremism have their source in an uneven distribution of natural resources with people being displaced for lack of water, food and consequently job opportunities. Climate change should be recognized as a socio-economic issue, as it spares no one, but exacerbates in particular the stress on local communities, in the developing world more than ever, with SIDS and Africa bearing the heaviest burden.

Water will remain high on the agenda, as water security is central for sustainable development, challenged by climate change, with many countries, notably in Africa, facing water scarcity and water related disaster for the years to come.

The loss of Biodiversity may be overlooked in comparison with global climate Change, but its effects are equally devastating for our planet and for our social, environmental and economic well-being. Biodiversity is currently being lost at up to 1,000 times the natural rate. Biodiversity is the living fabric of our planet. It underpins human wellbeing in the present and in the future, and its rapid decline threatens

¹ - [Sustainable Development report 2019](#); [Special Edition of the UN Secretary-General's SDG Progress Report](#); 2019 Global Sustainable Development Report (GSDR) and [2019 Africa SDG Index and Dashboards Report](#).

nature and people alike. Despite an increase in the total number of protected areas in the world, biodiversity continues to decline. Following the historic adoption at IPBES#7 on 6 May 2019 of the [first intergovernmental report on biodiversity at UNESCO](#) - the product of years of research and international cooperation, adopted by 132 countries - nothing will ever be the same. UNESCO, the custodian Organization of knowledge and know-how that is respectful of biodiversity, is committed to addressing this vital challenge. How can we coordinate all knowledge holders in protecting our nature, as leaders for the IPBES Technical Support Unit on Indigenous and Local Knowledge, coordinating dialogue with Assessment scientists?

Another mounting topic in the scientific community is the necessity for [a global science, technology and innovation governance](#) rallying *inter alia*:

- (i) science diplomacy, especially global and regional science initiatives aiming at facilitating scientific collaborations to dealing with global problems (SESAME, Global report on Biodiversity, Water diplomacy, scientific cooperation);
- (ii) international normative framework in STI, such as for open science

UNESCO has been monitoring trends and developments in science, technology and innovation (STI) governance worldwide through the UNESCO Science Report published every 5 years. The idea of a global governance in STI highlights the growing importance of international organizations and actors in all functions of governance, from setting goals and norms, selecting means, regulating their operations and verifying results. In this aspect, discussions are ongoing regarding the possible contribution of UNESCO for setting normative frameworks in STI, e.g. inclusive policy systems and open science, in the next 15 years.

Concomitantly, Science diplomacy, which is part of science governance, is coming to the fore as a formidable dimension of interstate power relations and as a tool for cultural dialogue and for peace. UNESCO represents a perfect mediator and knowledge broker to facilitate interstate relations and is solicited to play a prominent role in science diplomacy initiatives. In a world of increasingly transcend borders, researchers, technologists, and innovators depend on sound international coalitions to resolve global endeavors. In this context, new channels of influence and opportunity will be opened up for UNESCO.

Engaging youth in science, conservation and sustainable development is one of the best investments in the future. [An estimated 30 million researchers and engineers will be needed by 2030.](#)

The [gender gap in science](#), as measured by the [average number of female researchers](#), expressed in percent of total number of researchers stands at: **28.8% for the World**; 39.9% for the Arab States; 39.6% for Central and Eastern Europe; 47.2% for Central Asia; 22.9% for East Asia and the Pacific; 44.7% for Latin America and the Caribbean; 32.2% for North America and Western Europe; 19.0% for South and West Asia; and 30.4% for Sub-Saharan Africa.²

We urgently need to **close the gender gap in the Science, Technology, Engineering and Mathematics (STEM) fields and actively promote gender equality in Science Technology and Innovation careers.** Tackling inequalities early within the education system is vital, and UNESCO, through its multidisciplinary mandate in science and education is well positioned to help address these issues.

Some ideas for future reflection

- a) UNESCO has to be policy relevant, reflecting the international commitments/ framework the Member States have signed: How to better reposition UNESCO in the 2030 Agenda, the 2063

² Source: UNESCO Institute for Statistics

- African Union Agenda, the Paris Agreement, the Sendai Framework and the Addis Ababa Action Agenda?
- b) How to best ensure UNESCO's support to the Member States in the implementation of these Agendas in its various domains? How to best support countries to access Science Technology & Innovation for sustainable development?
 - c) How to connect UNESCO science structures? Are tools tailored to address the national science context?
 - d) We are assisting to broad global reactions to environmental crises and habitat loss. There is public mobilization around issues for which science provides the baseline and the potential solutions. What role for UNESCO?
 - e) UNESCO-designated sites are hubs for sustainable development and science engagement with the public: what capacities are to be built to initiate enabling activities for natural resource management?
 - f) Science Diplomacy, Science for Diplomacy, Diplomacy for Science: how we see Science Diplomacy fit in with the global UN 2030 agenda? How can scientific cooperation as an essential element for the governance of shared resources?
 - g) How can we identify opportunities for a more integrated and transdisciplinary UNESCO activities that are inclusive, participatory, as well as Climate-neutral and climate-friendly?
 - h) What tools do we need to measure impact of the Science initiatives?

The dialogue with the Natural Science Sector on the future C/4 (July 2019)

- 16 July from 10 a.m. to 12.30 p.m. (Room II)
 - o the session will be **similar to that of the other Programme Sectors**, structured around the views and reflections of Member States, future trends and UNESCO's possibilities for action over the next ten years, based on the above mentioned questions;

High-level international experts will lead the sessions on 16 July afternoon and 17 July morning, in panels composed of representatives of the Member States.

- 16 July from 3 p.m. to 5.30 p.m. (Room II)
 - o the session will be devoted to:
 - (1) basic sciences, technology and innovation, and knowledge for sustainable development
 - (2) science for sustainable management of natural resource, disaster risk reduction and climate change action
- 17 July from 10 a.m. to 1 p.m. (Room II)
 - o the session will be devoted to:
 - (3) hydrology and water security
 - o it will be followed by a general discussion on all three themes discussed and conclusion. The following additional questions may also be discussed:
 - i) How to measure the "contribution of science for sustainable development"?
 - j) Where does a tailored, responsive UN country presence coordinated across agencies leave UNESCO's science programmes?
 - k) How to involve our networks as agents of change to co-develop, co-design and co-implement our programmes?

Annex I: Facts and figures

- UNESCO works on promoting continuous strengthening of the **interdisciplinary climate change knowledge base**, including through the generation and use of sound and unbiased data, information and early warning systems through climate change research, assessments and monitoring. **Education and awareness-raising** enable informed decision-making, play an essential role in increasing adaptation and mitigation capacities of communities, and empower women and men to adopt sustainable lifestyles. Climate change education is part of UNESCO's Education for Sustainable Development (ESD) programme. IHP develops and implements tools and methodologies in water-stressed and vulnerable regions to identify adaptation responses and reduce the impact of droughts and floods. It supports the development of web applications to monitor rain precipitation and shrinking glaciers. It also works to advance sustainable groundwater management, taking into consideration climate change and linked human effects. **UNESCO-designated World Heritage sites**, Biosphere Reserves and UNESCO Global Geoparks provide useful platforms to apply and test climate monitoring, mitigation and adaptation, and to raise awareness of climate change impacts on human societies, cultural diversity, biodiversity, ecosystem services, and the world's natural and cultural heritage. As climate change observatories, many UNESCO-designated sites also contribute to mitigation solutions by promoting green economies and piloting the sustainable use of renewable energy sources. 23 Biosphere Reserves and 16 Natural World Heritage Sites are home to **great apes**, representing around 10% of their habitat. The interdisciplinary approach is embedded in all such initiatives.
- UNESCO counts **701 biosphere reserves** in **124 countries**, including 21 cross-border sites, in which nearly 250 million people live. Biosphere reserves, located in every ecosystem, cover more than the combined size of the European Union and India. These unique sites are living models providing insight for biodiversity conservation, sustainable development, cross-cultural cooperation, and resilient societies.
- UNESCO's **140 Global Geoparks in 38 countries** are multifaceted sites where geological history is studied, local culture is celebrated, future scientists are educated and jobs are created in the local community. Global Geoparks are also the sites where studying the past and the present of the Earth's geology provides clues to future changes and creates a framework for disaster preparedness and risk reduction. The total area of forests protected by UNESCO is twice the size of the United Kingdom.
- Groundwater is the main source for water supply in Small Island Developing States (SIDS) and plays an important role in SIDS adaptation to climate change. Although each is small in area, SIDS collectively have a population of 63.2 million people and a gross domestic product (GDP) of \$575.3 billion. **A large number of SIDS (71%) are at risk of water scarcity (91% for low-lying islands)**. UNESCO has assessed the groundwater systems of 42 small islands to understand the trends and availability of their water resources.
- Ensuring a safe and secure water supply for all includes managing water resources across nations and borders, educating populations about water use and sanitation and preparing for water-related disasters like floods and drought. **UNESCO mobilizes more than 3000 experts worldwide to provide scientific solutions and improved policies to meet these challenges**: through the International (soon Intergovernmental) Hydrological Programme (IHP) and its related family (Category 2 Centres, Chairs, ...), SC has a body of scientific knowledge, data, experience and authority to foster water diplomacy and enhance capacity for sustainable and peaceful water management. In follow up of the Ministerial declaration following the 8th World Water Forum and the UNESCO International Water Conference promoting intersectoral approaches to water management, IHP will continue to strengthen its work on Water Education and strengthening technical capacity for water management. UNESCO has a respected programme to monitor progress against SDG 6, and a world-class publication, the World Water Development Report. The Organization has coordinated the Synthesis Report on Water and Sanitation -

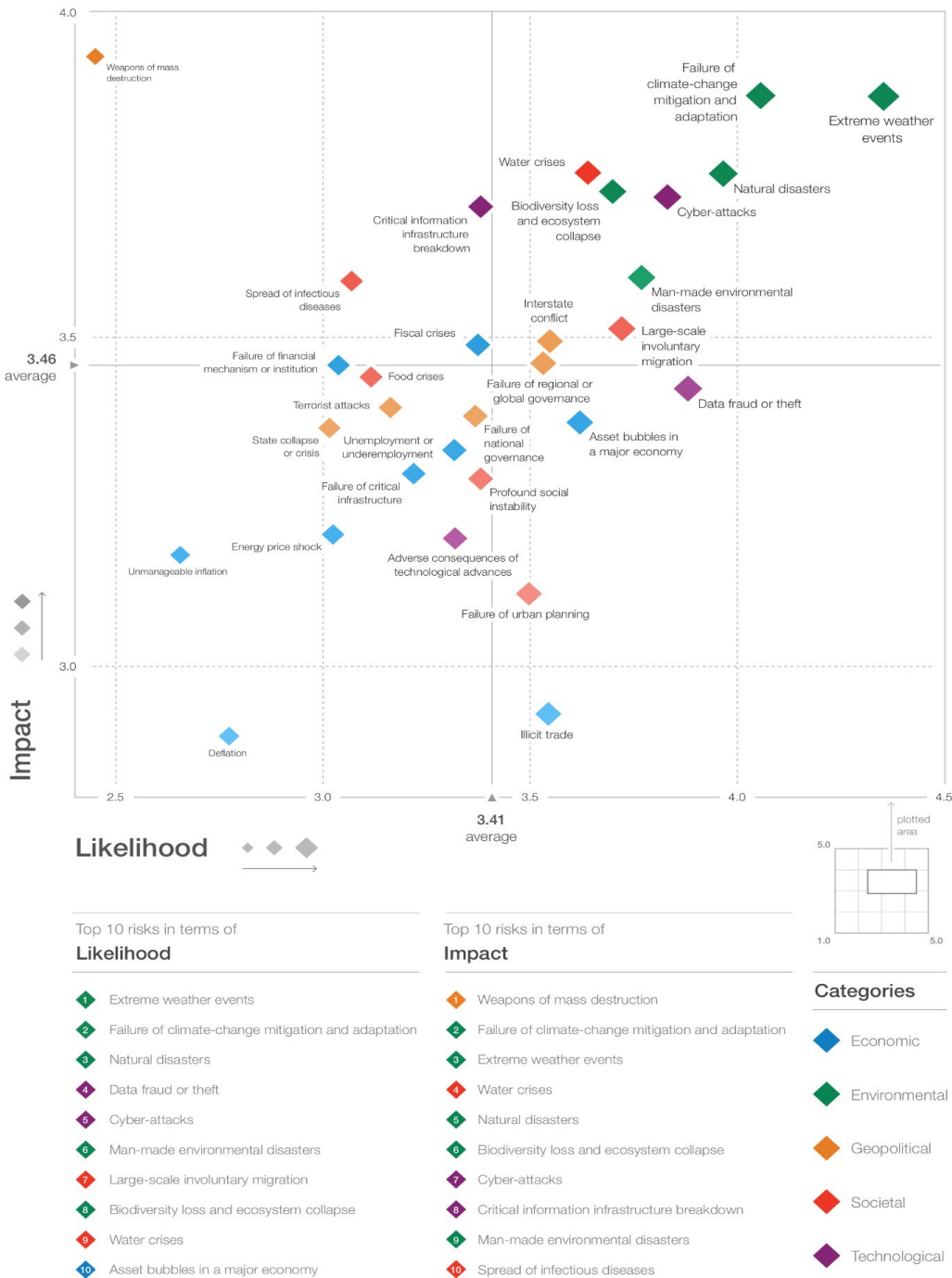
UN – 2018 and is co-custodian of the SDG Indicator 6.5.2: Proportion of Transboundary Basin Area with an Operational Arrangement for Water Cooperation. Given the importance of data management, its relevance will only increase in the future. We identified almost 600 transboundary aquifers shared among 145 countries and produced methods to manage them in a sustainable manner.

- **“Change the minds, not the climate”** - Knowledge about environmental change comes in many forms and from many sources, from large-scale research to local indigenous communities. Sharing the information from all sources gives the depth of insight into changes in biodiversity that can inspire collaborative, adaptive solutions to climate change impacts and sustainable development challenges.
- Anticipating the increasing occurrence of extreme weather patterns, droughts, floods, landslides and hurricanes, SC will strengthen cooperation with Member States, SIDS in the first place, by bringing our **Disaster Risk Reduction programmes** to a different level (**school assessment against natural hazards**, build back better, early warning systems, capacity building in geosciences..). UNESCO’s work on geohazard risk reduction is unique, due to its multidisciplinary and comprehensive approach, which is increasingly recognized as a key element of multi-hazard risk reduction.
- UNESCO provides technical advice on inclusive systems and evidence based STI policies. **UNESCO is a founder of the Technology Bank** in assisting MS in the South to catch up with the 4th industrial revolution, and has initiated the first joint project in Guinea, Haiti, Sudan, Timor Leste. **Artificial Intelligence and Biotechnology will change the face of the world**. It is important that UNESCO offers not only the ethical considerations, but also a platform where the societal impact of these technologies can be discussed. UNESCO should also make sure that countries in the developing world are not merely seen as “technology tools” but as equal technology founders, equipped to actively participate in their design and development, as to benefit from the economic perspective they offer. **Providing open access to data, and promoting open science will be increasingly important** and UNESCO (SC, CI, SHS) will work with its partners to foster Open Science and access to applications as to provide an equal level playing field. The Draft Resolution foreseen for the 41st session of the General Conference (2021) will be an important milestone in that sense.
- For two decades, **the UNESCO Science Report series has been mapping science, technology and innovation (STI) around the world on a regular basis**. Written by 60 experts, the 2015 edition summarizes a 5-year evolution against the backdrop of socio-economic, geopolitical and environmental trends that have helped to shape contemporary STI, providing more country-level information and priorities that should orient the implementation of the 2030 Agenda and drive its assessment.
- **Since 1998, the L’Oreal-UNESCO for Women in Science Partnership has highlighted 102 outstanding women scientists—3 of whom went on to win the Nobel Prize**. The program has also supported 3100 Fellowships for research granted to women in 155 countries.
- **72 training and research centers (category 1 and 2) and 172 UNESCO Chairs – a true network of knowledge -- in 70 countries are associated with UNESCO**. Since 2002, the Abdus Salam International Centre for Theoretical Physics (ICTP), a UNESCO Category One Centre, has welcomed more than 15,000 women scientists from developing countries for research and educational opportunities. The Organization for Women in Science for the Developing World (OWSD), hosted by the World Academy of Sciences (TWAS), is a career-development and support network of more than 4800 women in science and technology, 90% of whom are from developing countries.
- The Visual Inspection for defining the Safety Upgrading Strategies (VISUS) methodology has been used by UNESCO teams to assess more than 1500 schools around the world for seismic safety, ensuring the safety of more than 350,000 students, teachers and staff. More than 100 schools were inspected in Haiti after

the 2010 earthquake. Youth are also engaged in Africa, where UNESCO has hosted science, engineering and STEM forums and workshops that have expanded rapidly to reach more than 20,000 students in over 13 countries.

- **UNESCO has established the SESAME centre, modeled on CERN also created under the auspices of UNESCO in 1954, under its auspices.** The SESAME is a particle accelerator producing a light that is over a million times brighter than daylight, making SESAME a super microscope that reveals the inner structure of matter. It is the first intergovernmental research center (particle accelerator) in the Middle East and beyond, playing the role of science diplomacy tool establishing diplomatic bridges between countries from this difficult region. SESAME brings together Cyprus, Egypt, Jordan, Pakistan, Turkey, Palestine, Iran and Israel. **With SESAME, UNESCO has proven the power of science for diplomacy to build bridges between peoples and governments.**
- Fostering the development of the innovation and research capacity in Africa, as per the **“Afrimpulse”** initiative will remain a priority for SC in the future C/4. Afrimpulse is intended to promote the scientific research and innovation capacity of Africa, and as such, provide a boost to existing initiatives and an impulse to new initiatives. Special attention is given to women in Africa. “Afrimpulse” also supports the establishment of an African Platform for Open Sciences in Africa, the second Engineering report, the implementation of the SIDS action Plan and the “AfroBioFund”.

Annex II: The Global Risks Landscape 2019



Source: World Economic Forum Global Risks Perception Survey 2018–2019.

Note: Survey respondents were asked to assess the likelihood of the individual global risk on a scale of 1 to 5, 1 representing a risk that is very unlikely to happen and 5 a risk that is very likely to occur. They also assess the impact on each global risk on a scale of 1 to 5 (1: minimal impact, 2: minor impact, 3: moderate impact, 4: severe impact and 5: catastrophic impact).

Figure I in *The Global Risks Report 2019 14th edition*,

<http://www.mmc.com/content/dam/mmc-web/insights/publications/2019/jan/global-risks-report-2019.pdf>;