

UNESCO Natural Sciences Sector: Priorities and Programs



UNESCO

SCIENCE FOR
SUSTAINABLE DEVELOPMENT

UNESCO's Sciences for Sustainable Development



Improving knowledge and strengthening capacities at all levels to achieve water security



Advancing science for sustainable management of natural resources, disaster risk reduction and climate change action



Harnessing the sciences, including the basic sciences, engineering, technology and innovation through Open Sciences for sustainable development



Science related challenges



Climate Change Mitigation and Adaptation

The BERLAC project (Capacity Building for Disaster Risk Reduction in the Built Environment in Latin America and the Caribbean) is training masons and strengthening building guidelines in Haiti for more resilient constructions



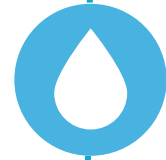
Natural and Environmental Disasters



Biodiversity Loss and Ecosystem Collapse



Since 2022, UNESCO's Earth Network, supported by the Government of Italy, is conducting scientific missions and capacity building activities throughout UNESCO networks of designated sites



Water crises

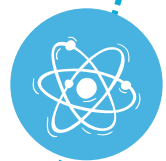
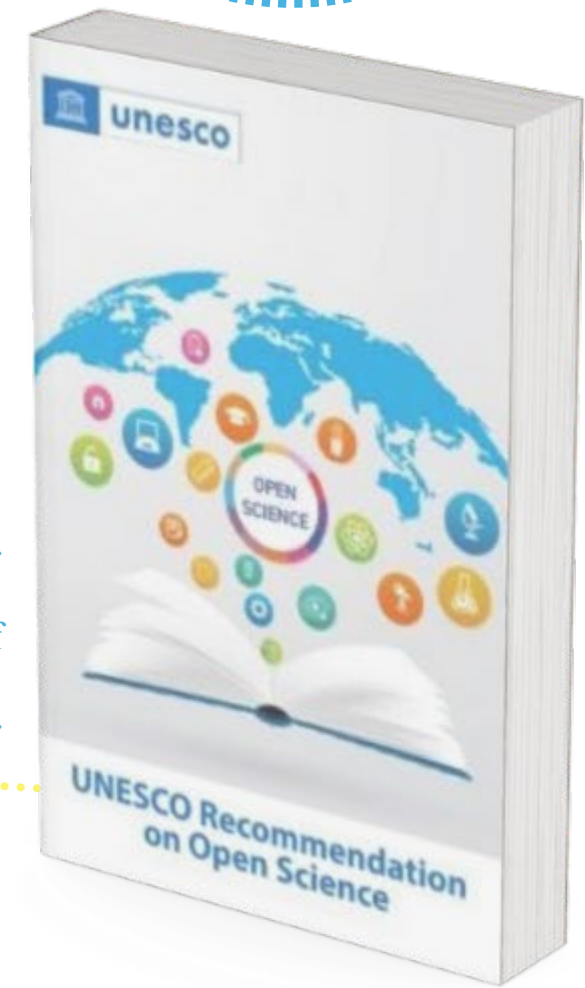


Pressure and Uneven Distribution of Natural Resources



Open Science and Data Sharing

Following an inclusive, transparent and multistakeholder consultative process, the UNESCO Recommendation on Open Science was adopted by the 41st session of UNESCO General Conference in November 2021.

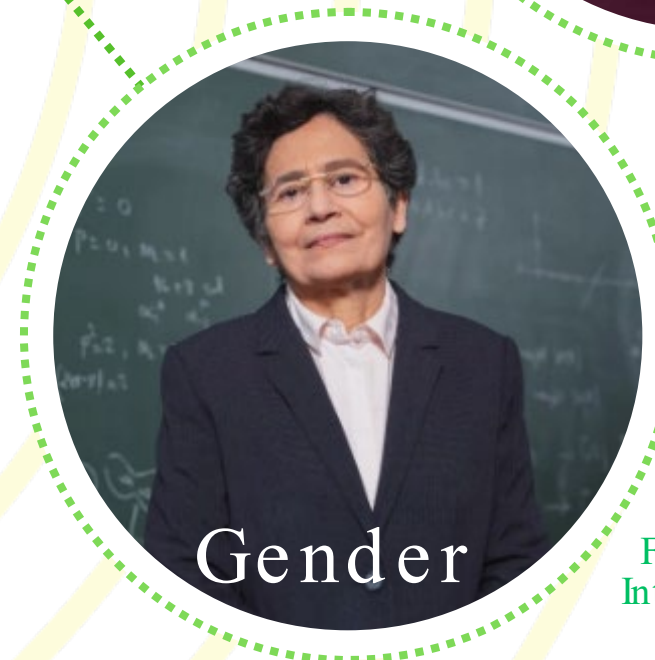


Trust in Science: interface Science-Policy-Society

Natural Sciences Priorities

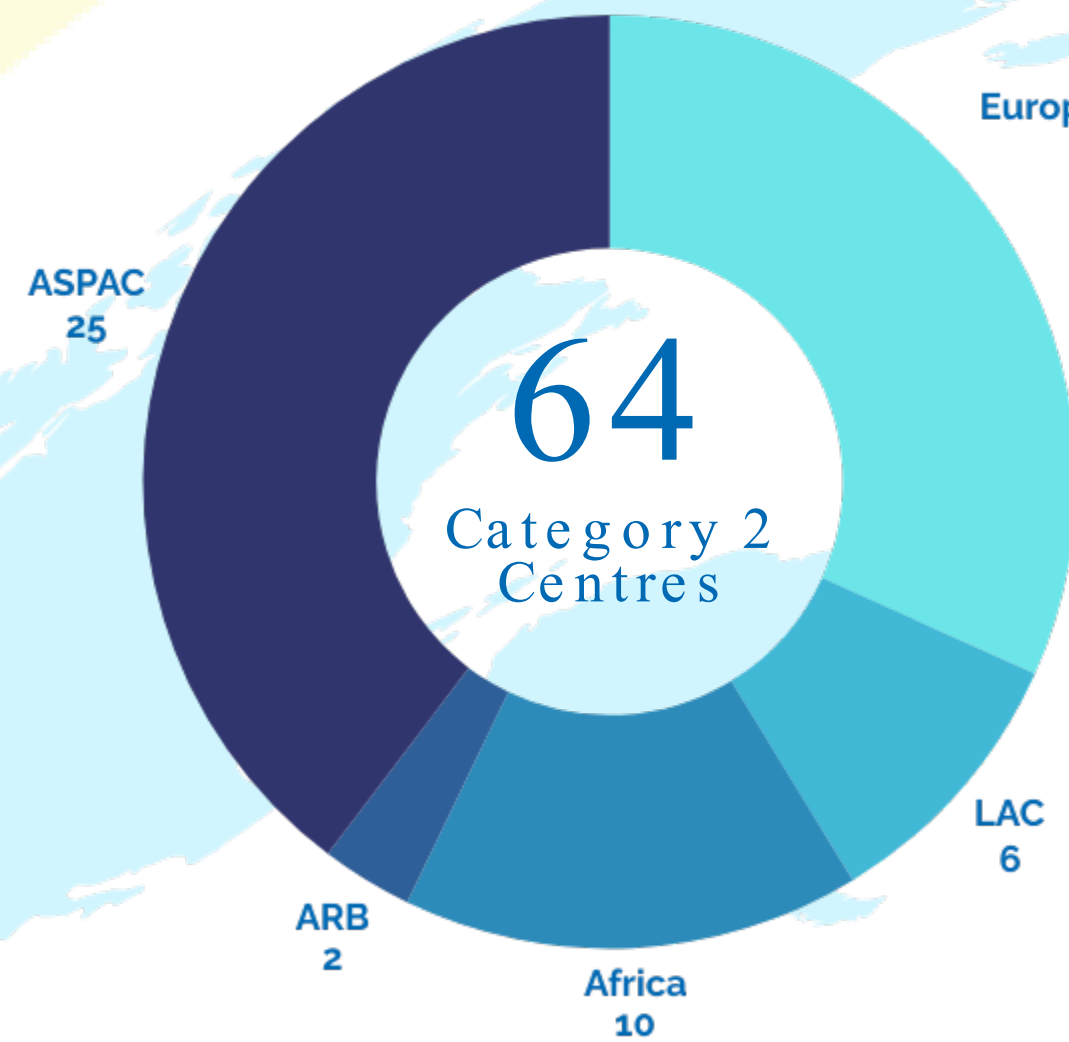
Priority
groups

Global
priorities



Professor Ana María
Font, laureate of the
2023 L'Oréal-UNESCO
For Women in Science
International Awards

UNESCO's Science Family Category 2 Centres and UNESCO Chairs



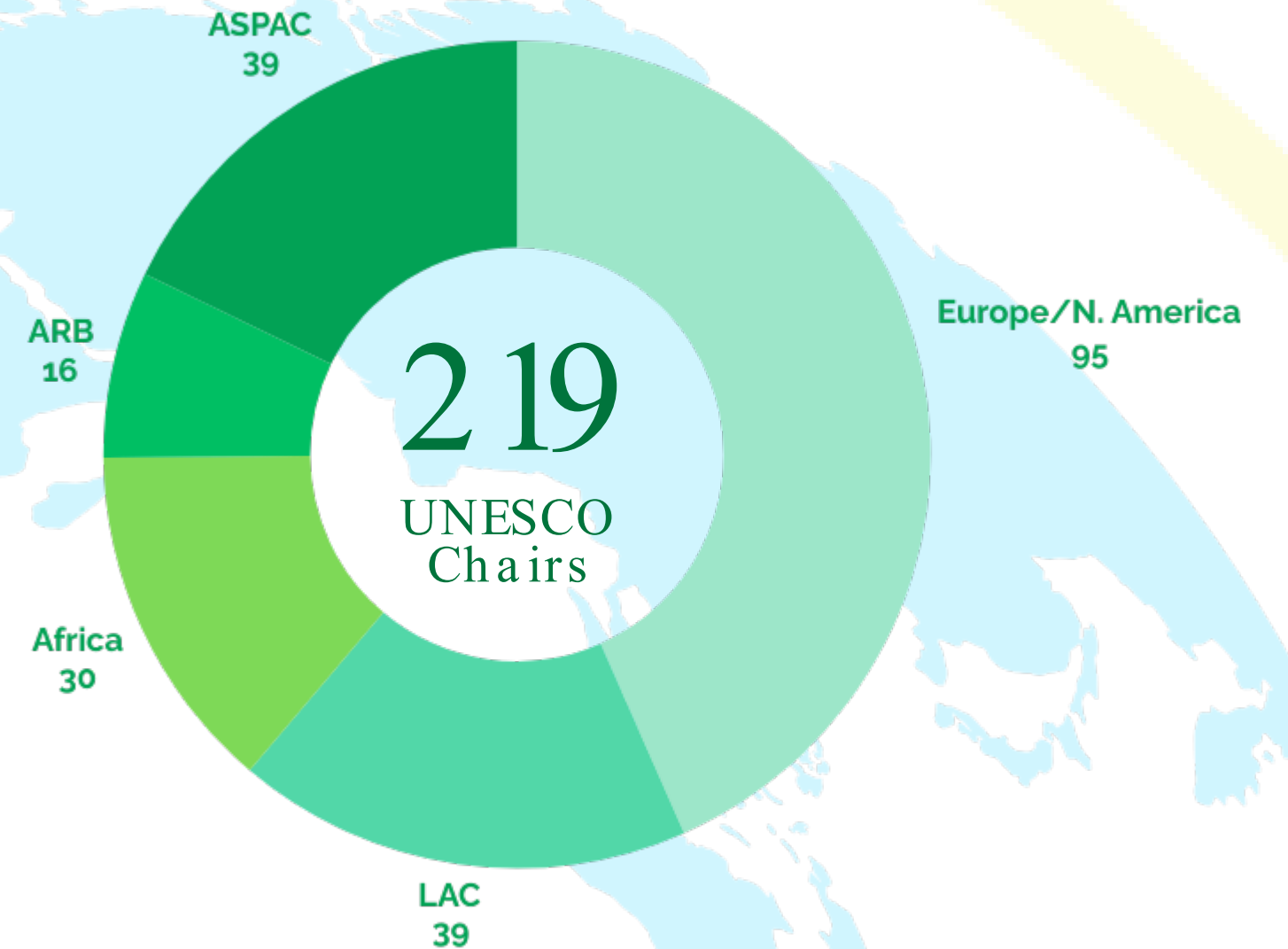
Europe/N. America
21

ASPAC
25

ARB
2

Africa
10

LAC
6



ASPAC
39

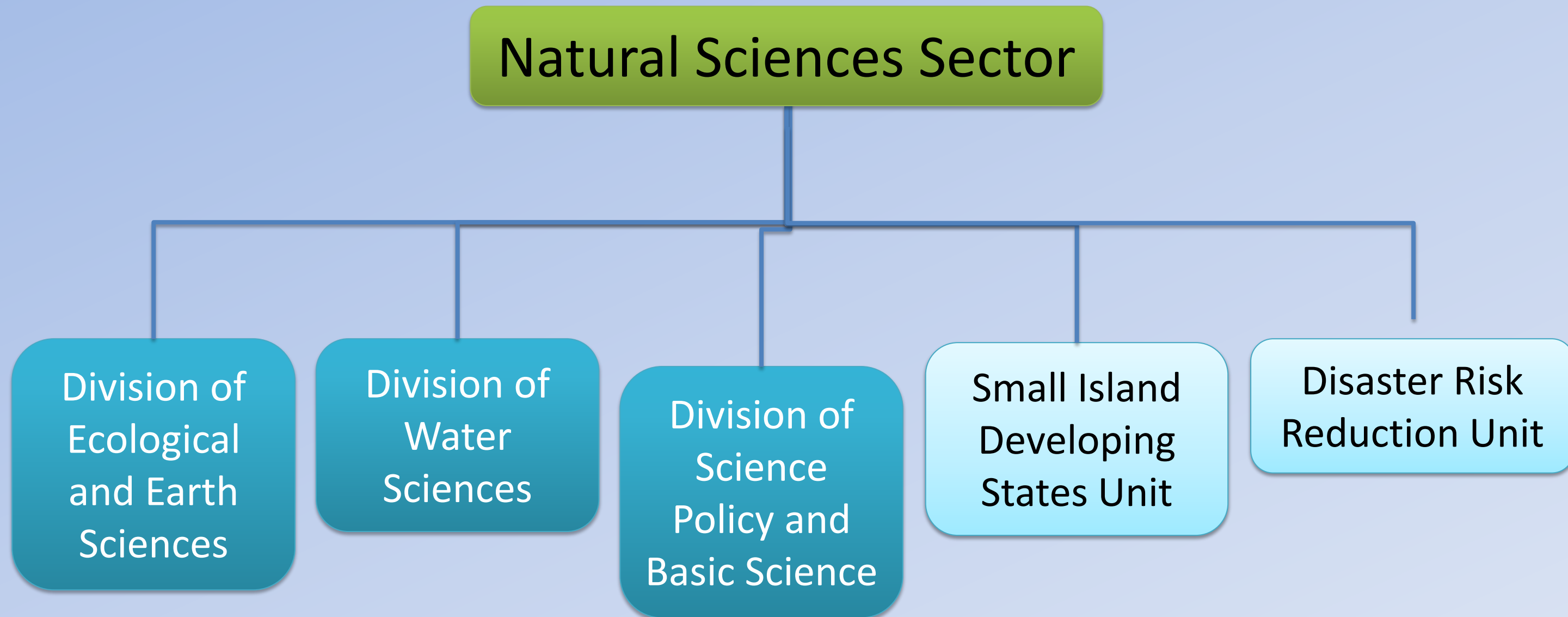
ARB
16

Africa
30

LAC
39

Europe/N. America
95

Division of Science Policy and Basic Science - Context



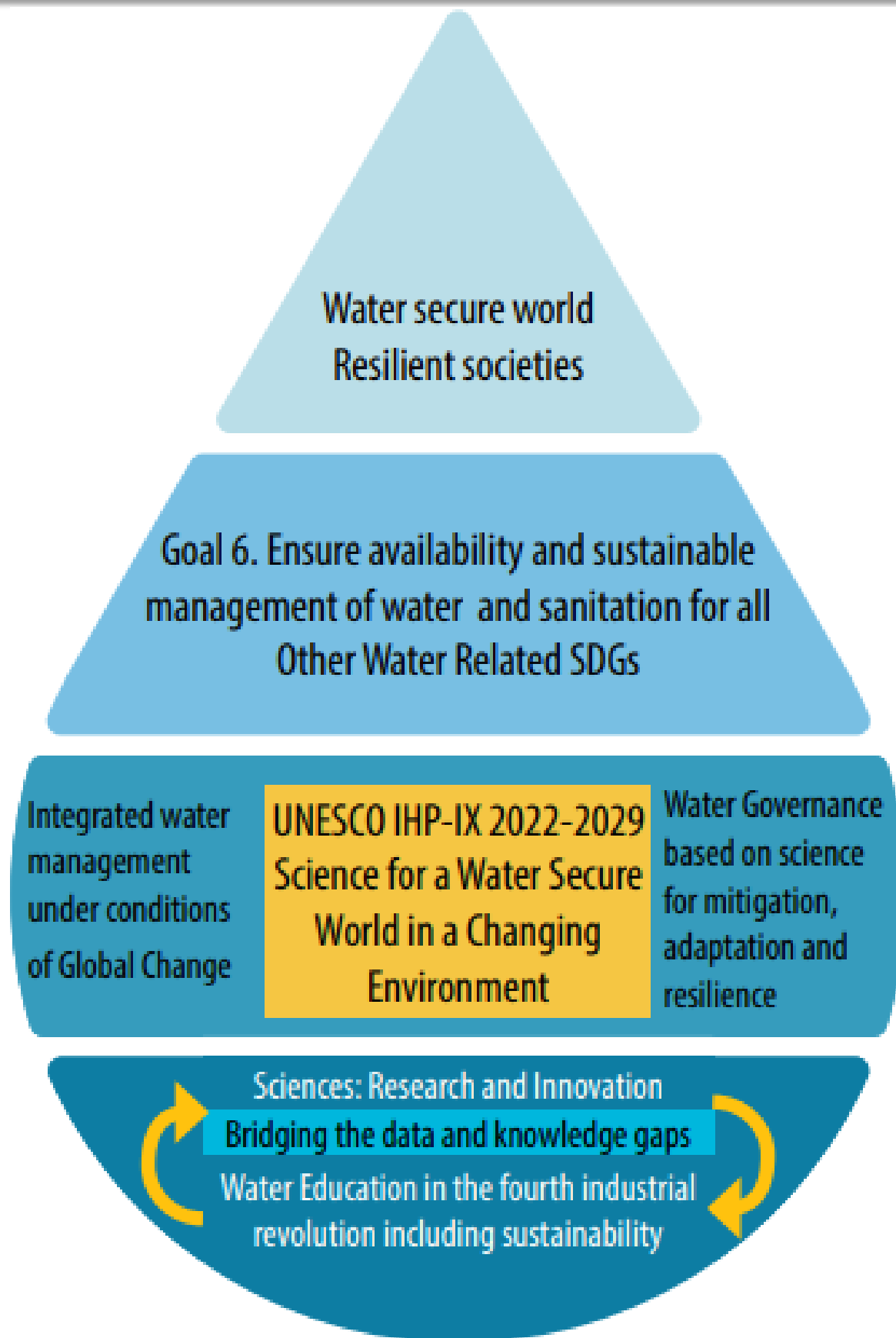
Intergovernmental Hydrological Programme (9th Phase – 2022-2029)

Five priority areas:

1. Scientific **research** and **innovation**
2. **Water Education** in the Fourth Industrial Revolution including sustainability
3. Bridging the **data-knowledge gap**
4. **Integrated water resources management** under conditions of global change
5. **Water governance** based on science for mitigation, **adaptation** and **resilience**

34 expected outputs

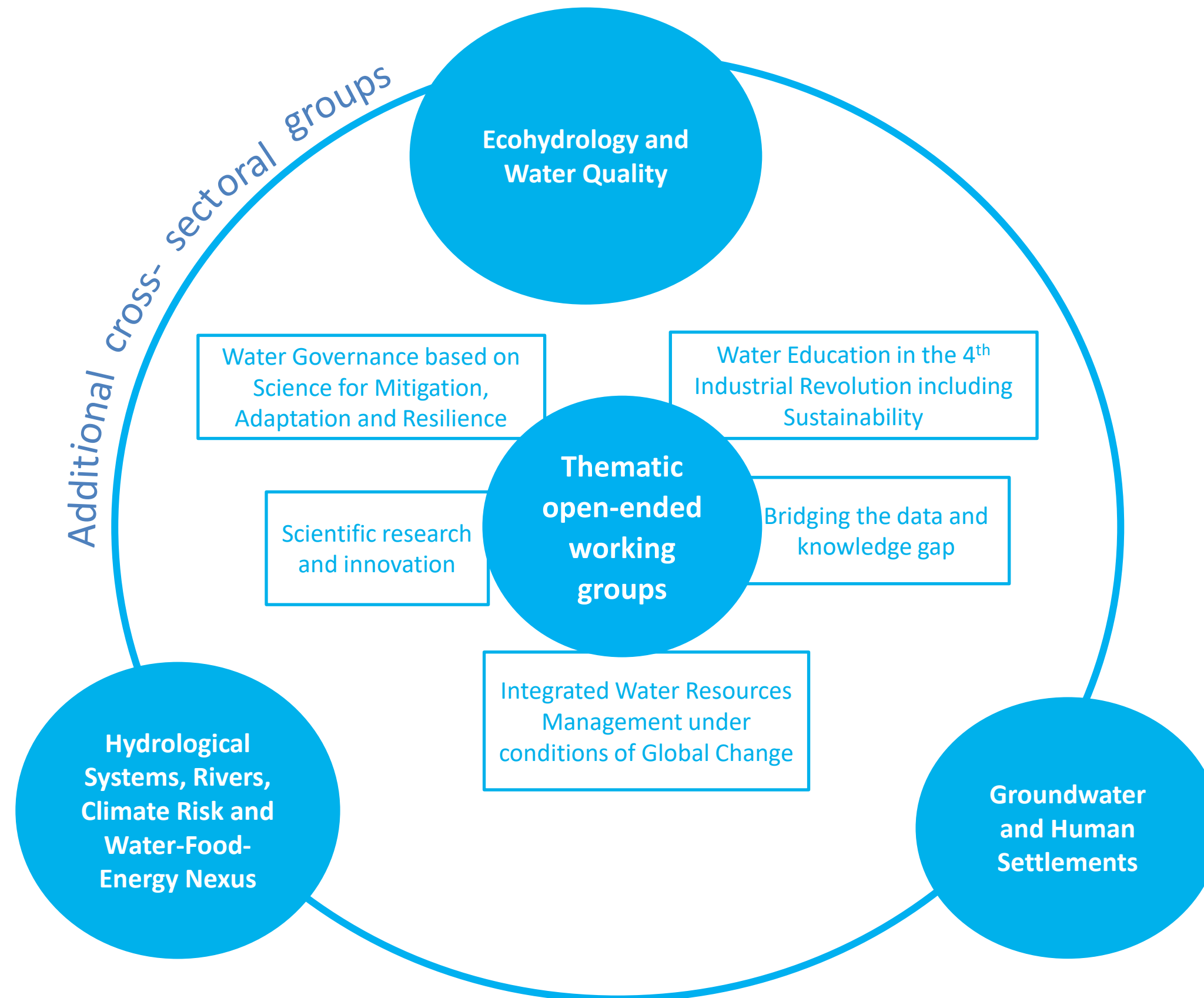
150 key activities (draft Implementation Plan)



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INTERNATIONAL SYMPOSIUM OF CATEGORY 2 CENTRES

Intergovernmental Hydrological Programme (9th Phase – 2022-2029)



Thematic OEWG:

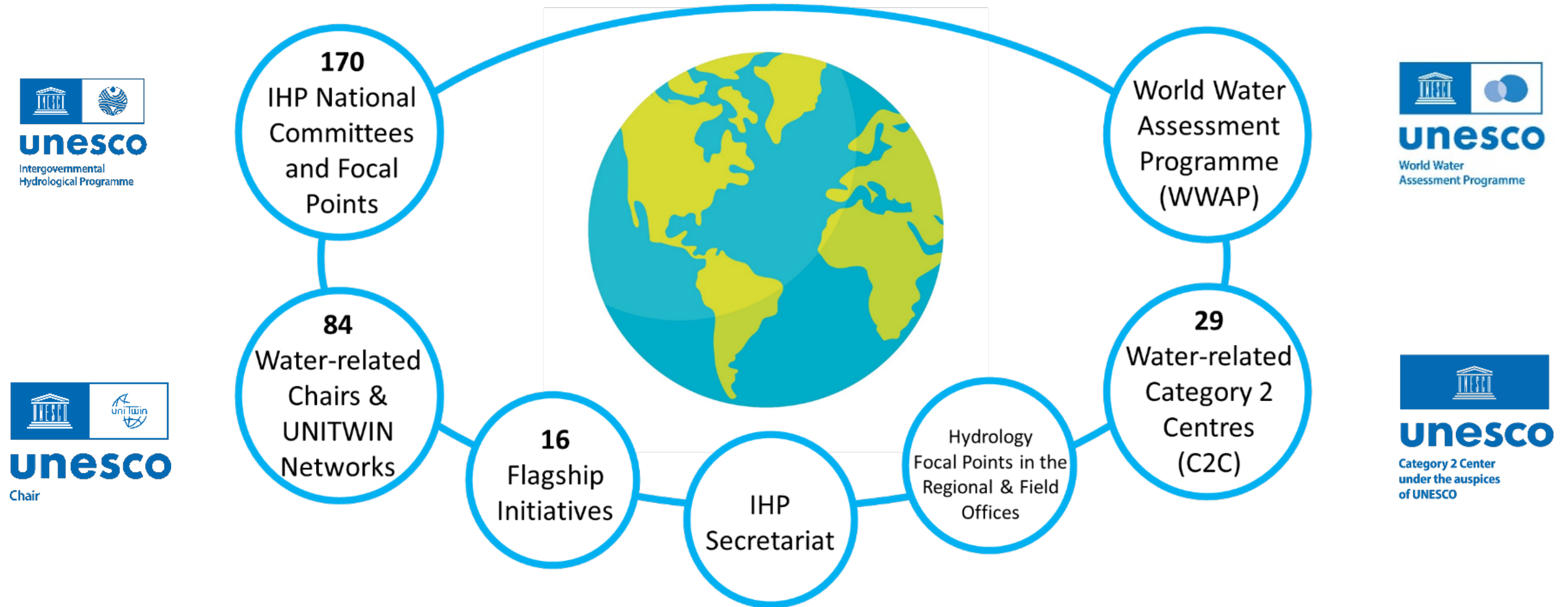
1. Scientific Research and Innovation
2. Water Education in the Fourth Industrial Revolution including Sustainability
3. Bridging the data and knowledge gap
4. Integrated Water Resources Management under conditions of Global Change
5. Water Governance based on Science for Mitigation, Adaptation and Resilience

Additional cross-sectoral groups:

1. Hydrological Systems, Rivers, Climate Risk and Water-Food-Energy Nexus
2. Groundwater and Human Settlements
3. Ecohydrology and Water Quality

The UNESCO Water Family Distribution

Aims to advance hydrological knowledge by supporting scientific research programmes and building capacities



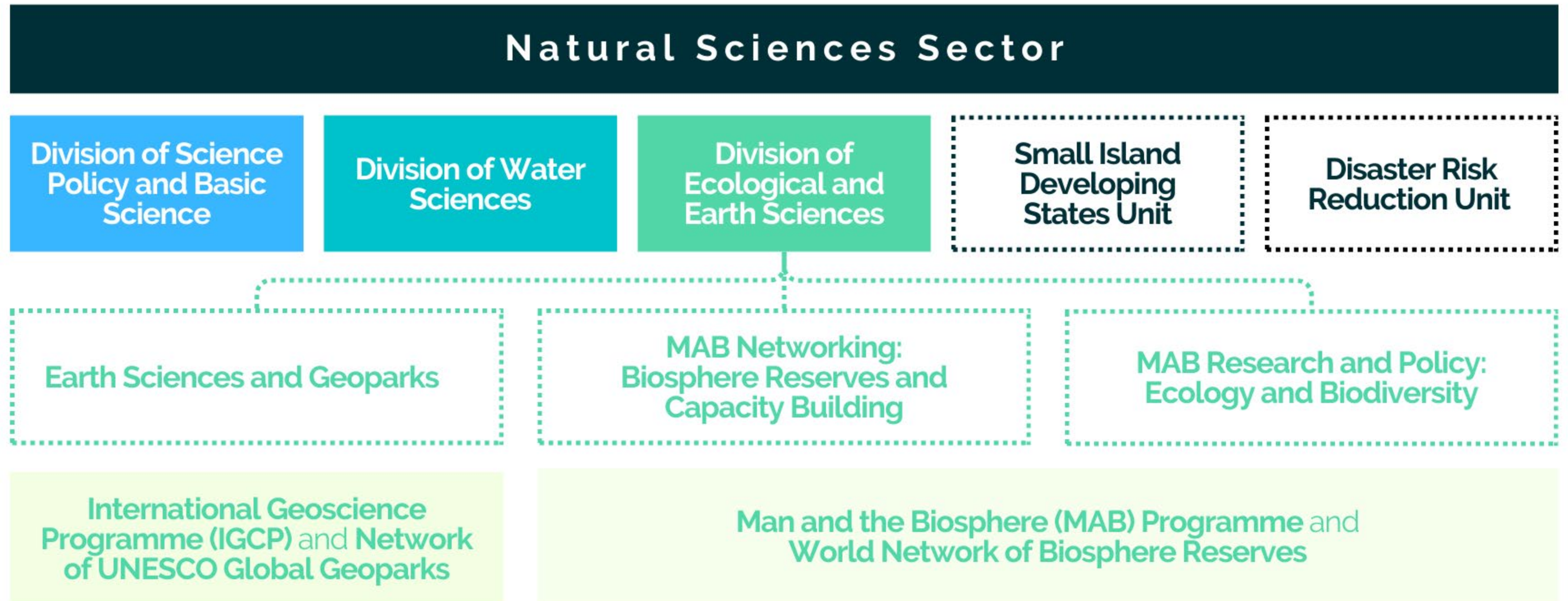
Division of Ecological and Earth Sciences



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Division of Ecological and Earth Sciences

Context



Division of Ecological and Earth Sciences Earth Sciences and Geoparks



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International Geoscience
and Geoparks Programme

Earth Sciences
provide us with
invaluable
knowledge about
our planet, its
systems and its
4.5 billion year
history.

43

active
projects

~3,100
project
participants



42%

young or early-
career participants



53%

of participants from
developing nations



45%

female project
leaders

38%

female
participants

Division of Ecological and Earth Sciences

Earth Sciences and Geoparks



195

UNESCO Global
Geoparks in 48
countries



UNESCO Global Geoparks

...single, unified
geographical areas where
**sites and landscapes of
international geological
significance are managed
with a holistic concept** of
protection, education
and sustainable
development



Preserving
**geological
heritage**

Raise
awareness

Promote
**sustainable
development**

Division of Ecological and Earth Sciences

MAB Programme and the World Network of Biosphere Reserves



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Man and the Biosphere
Programme

The **MAB Programme** aims to establish a scientific basis for enhancing the relationship between people and their environments.

Vision

A world where people are conscious of their common future and their interactions with the planet, and **act collectively and responsibly to build thriving societies in harmony within the biosphere**

Mission

Develop and strengthen **models of sustainable development**

Communicate experiences and lessons learned

Support **evaluation and high-quality management of biosphere reserves**, strategies and policies

Help Member States and stakeholders to achieve the Sustainable Development Goals by sharing experiences and lessons learned



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MAB Programme and the World Network of Biosphere Reserves

748

BIOSPHERE RESERVES

including 22 transboundary sites and 1 transcontinental site



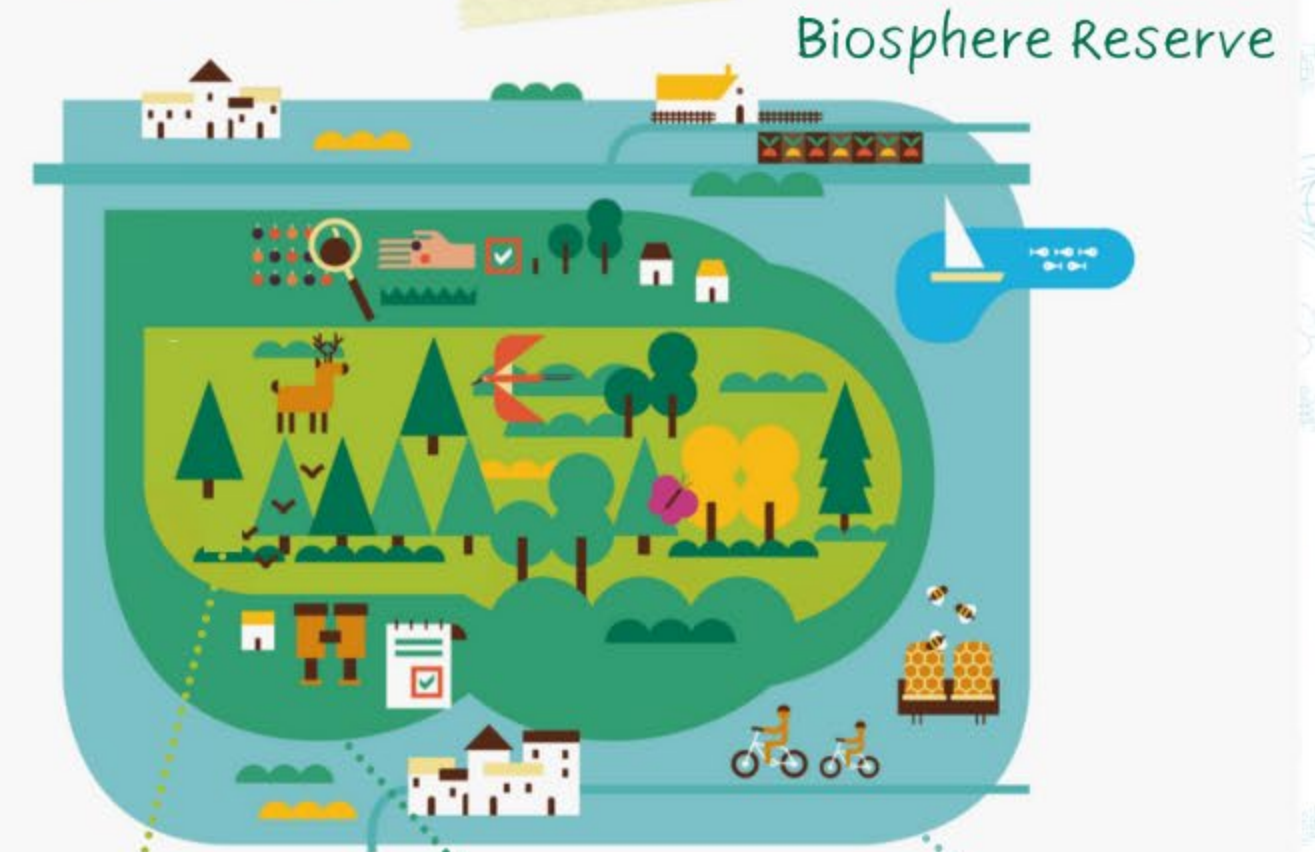
134

COUNTRIES

- approximately 5% of the world's land surface, altogether bigger than Australia



290 million
people call biosphere
reserves their home

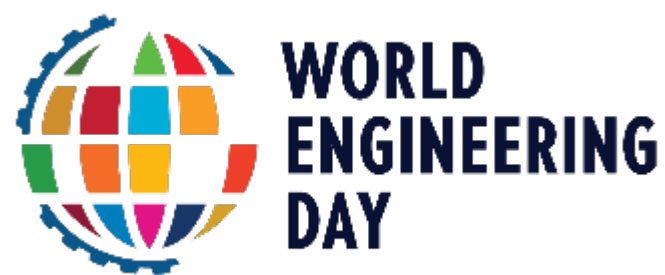
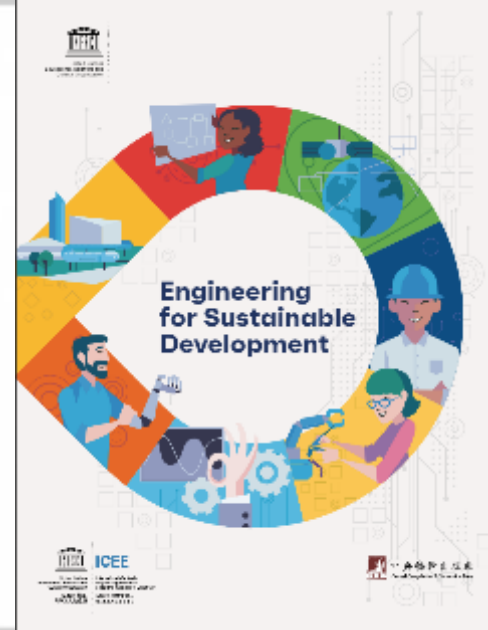
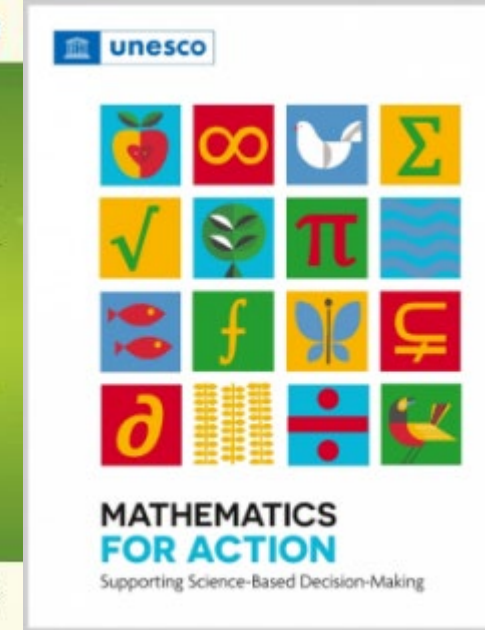
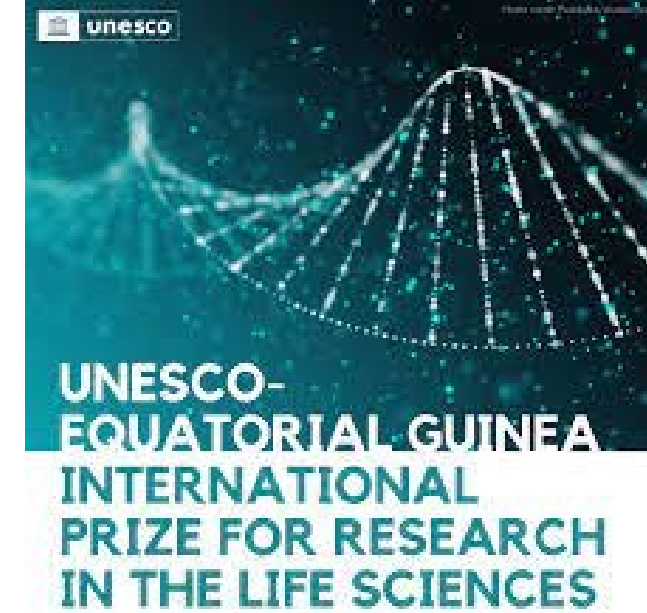


The **core area(s)** comprises a strictly protected zone that contributes to the conservation of landscapes, ecosystems, species and genetic variation.

The **buffer zone** surrounds or adjoins the core area(s), and is used for activities compatible with sound ecological practices that can reinforce scientific research, monitoring, training and education.

The **transition area** is where communities foster socio-culturally and ecologically sustainable economic and human activities.

A conceptual image showing a globe held by two hands. The globe is surrounded by various icons representing different fields of study and technology, including a bicycle, a lightbulb, a laptop, a camera, a game controller, a hot air balloon, a tree, a key, a flower, a clock, and a map. The background is dark with glowing blue and green particles, suggesting a digital or scientific environment.



Section for Basic Sciences, Research, Innovation and Engineering (SC/PBS/RIE)

Carlos J. Finlay
UNESCO Prize
for Microbiology



RIE Priorities

Basic science seeks to expand knowledge about the natural world through observations, experimentation, and theoretical reasoning. **It serves as a foundation for applied sciences, which aim to develop practical applications based on this knowledge.**



Engineering is the application of scientific principles to design, develop, test, and improve structures, machines, systems, processes, and devices for practical purposes. **The goal of engineering is to create solutions that are safe, efficient, and effective in meeting the needs of society.**

**BASIC
SCIENCES**

STEM

ENGINEERING

STEM “Science, Technology, Engineering, and Mathematics” is an acronym used to describe an educational and professional focus on these four areas of study. **STEM education often incorporates hands-on learning and problem-solving skills, encouraging students to think critically and creatively to solve real-world problems.**



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RIE Programmes and Activities

Remote Access Initiative



Phase 1

A lab willing to give remote access to its equipment is identified

Unavailable/needed Equipment identified

Scientists travel to be trained

1-2 scientists selected

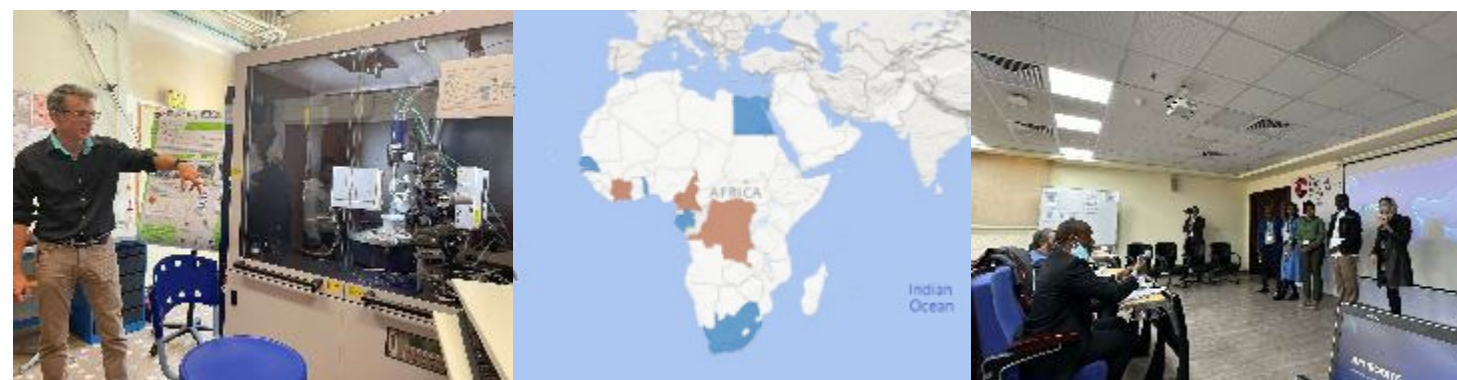
Go back to use the equipment

Train other scientists; research and education

Full remote access for research and education

Phase 2

Phase 3



Series of Science-Engineering Entrepreneurship Bootcamp

- Nanotechnology Bootcamp in January 2023 in Egypt
71 participants from 10 African countries
- Science and Engineering Bootcamp in Panama in September 2023
35 participants from 10 LAC countries
- Nanotechnology Bootcamp in January 2023 in Mongolia
30 participants

136 participants, 21 countries, 3 continents

Engineering Programme



Space Education through series of discovery workshops

Engineering Reports



Africa Engineering Week
Hands-on training



WomEng in South Africa is cracking the code to get girls into engineering studies

UNESCO is collaborating with WomEng on the One Million Girls in STEM campaign, launched together at the UN Commission on the Status of Women in March 2021.

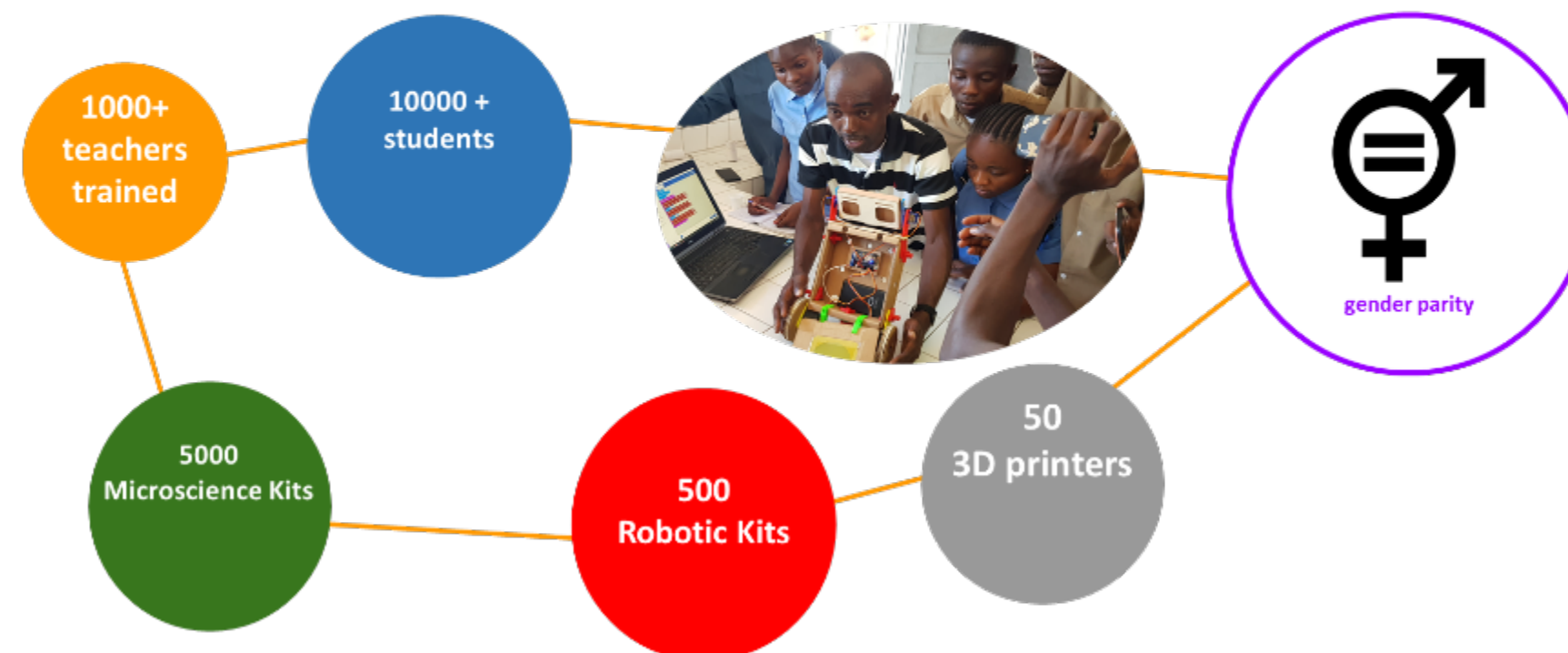
World Engineering Day



With WFEO

UNESCO STEM ACTIVITIES

During the last 5 years, we have been inspiring the next generation of thinkers and makers, with an accessible, hands-on robotics, machine learning and Microscience experience



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Section on Science Technology and Innovation Policy (SC/PCB/STIP)



STIP Section Priorities



Open Science

Key priority: implementation of the UNESCO Recommendation on Open Science

- ❖ Awareness raising, partnerships, capacity building
- ❖ Policy analysis, monitoring and benchmarking; policy advice

STI Systems

Key priority: technical support and international collaborations to improve STI policies and governance for the achievement of the SDGs

- ❖ Technical Assistance and Capacity Building Activities
- ❖ International partnerships and networks
- ❖ Information systems on STI policy and instruments (GOSPIN)

Women in STI

Key priority: promote gender equality in STI and gender-transformative STI policies

- ❖ L'Oréal-UNESCO For Women in Science
- ❖ International Day of Women and Girls in Science
- ❖ UNESCO Call to Action: Closing the Gender Gap in Science



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STIP Section Priorities



Popularization of Science

- ❖ Kalinga Prize
- ❖ World Science Day



UNESCO Science Report

The series monitors the evolution of the support system for science, technology and innovation worldwide over time. Key emerging trends are identified and placed within their socio-economic and political context. Each report begins with an overview of global trends. The UNESCO Science Report comprises the contributions of an independent team of experts, each writing about the country or region from which they hail. Authors endeavour to make use of the most recent data available – many of which are provided by the UNESCO Institute for Statistics.



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LINKS

Local and Indigenous Knowledge Systems



LINKS works with indigenous peoples and local communities, scientists and policy-makers to promote multiple evidence-based approaches to understanding

EVIDENCE



NORMS & METHODS



UPTAKE

- LINKS help shape international instruments and methods, such as IPBES, IPCC, BESNet, UNFCCC, UNCBD, UNCCD, UN Ramsar, among others.
- Technical and methodological support for science assessments.
- Research and knowledge production that bridge from orality to evidence, data, trends or other analyses.
- National policies on indigenous knowledge systems.



LINKS

Local and Indigenous Knowledge Systems



LINKS supports UNESCO and environmental agreements by implementing ILK-Science cooperation using advanced methods and ethics. Focus areas include IPBES Assessments, UN Ocean Decade, UN Water Action Decade, and other UN initiatives related to indigenous knowledge, ecosystems, and sustainable food systems.



Implement a joint program with the Secretariat of the Convention on Biological Diversity, IUCN, UNESCO Sectors, and the International Indigenous Forum on Biodiversity to explore the connections between **Biodiversity and Cultural Diversity**



Concentrate on African regional and national capacity to link ILK with SDGs, climate and biodiversity. New initiative in Central Africa.



Provide support to BES Net countries engaged in National Ecosystems Assessments, dialogues and post-NEA policy uptake



Nature & Culture Summit
COP15, Montreal, Canada
December 2022

UNESCO's approach to DRR

- At the interface of a wide mandate - Natural and Social Sciences, Education, Culture, and Communication and Information, UNESCO takes a **multi-hazard, multi-disciplinary and multi-stakeholder participatory approach**.
- **8 cross-cutting thematic** (EWS is one of the thematic)
- UNESCO explores **both conventional and innovative solutions** for effective preparedness and response.
- **UNESCO's priority areas:** Africa, gender, SIDS, youth.



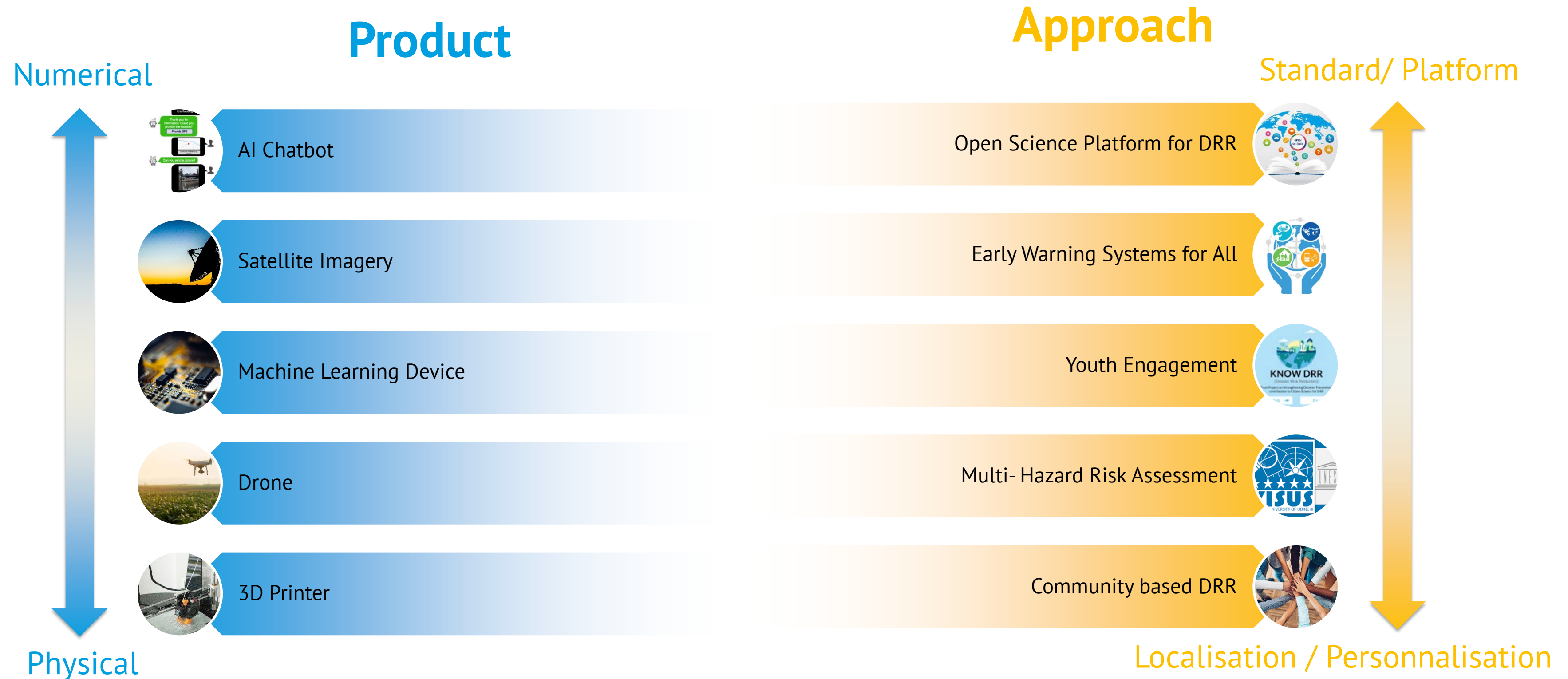
UNESCO Numbers

In 2023, UNESCO supported:

- **47 countries** in developing their cross-sectoral development strategies/plans to mitigate disaster and climate risk at national, sub-national and/or sectoral levels
- **29 countries** in strengthening their early warning systems
- **41 countries** in updating their frameworks for preparedness and/or early/anticipatory action
- **14 countries** in developing and implementing recovery and reconstruction frameworks which incorporated elements of disaster risk reduction and/or 'build back better'



Mapping of UNESCO's innovative solutions



International Decade of Sciences for SD (2024-2033)



A unique opportunity for humanity to use the critical role that sciences play in the pursuit of sustainable development in responding to the complex challenges of our time to ensure a safe and prosperous future for all.

- Raise awareness of the importance of all sciences
- Promotion of a coordinated, collaborative, scientific approach to policymakers
- UNESCO to lead the implementation
- UN Member States and all other relevant stakeholders to actively support
- Foster a spirit of global partnership and solidarity- full and equal access to and participation in science, technology and innovation
- Recognises that open science can help in promoting and strengthening international cooperation
- Bridge the science and technology divides within and between countries

On 25 August 2023, the UN General Assembly proclaimed the years 2024-2033 to be the “International Decade of Sciences for Sustainable Development”



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SCIENCE FOR
SUSTAINABLE DEVELOPMENT

THANK YOU

INTERNATIONAL SYMPOSIUM OF CATEGORY 2 CENTRES UNDER THE AUSPICES OF UNESCO

15 – 17 May 2024, Kuala Lumpur, Malaysia