Sciences for Sustainability: from the International Year of Basic Sciences for Sustainable Development in 2022/2023, to the International Decade of (all) Sciences for Sustainable Development 2024 - 2033 proclaimed by UN and under the auspices of UNESCO

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https://www.iybssd2022.org/en/home/

International Year of Basic Sciences for Sustainable Development in 2022/2023,

under the auspices of UNESCO

Proclaimed by the United Nations General Assembly on December 2nd, 2021

Opening July 8th, 2022 at UNESCO, closing December 15th, 2023 at CERN

Resolution brought up by Honduras with the support of Armenia, Azerbaijan, Bahrain, Bolivia, Brasil, Burkina Faso, Chad, Chile, Colombia, Cuba, Dominican Republic, Ecuador, El Salvador, Fiji, Georgia, Guatemala, India, Indonesia, Israel, Japan, Jordan, Kyrgyzstan, Malawi, Nicaragua, Panama, Paraguay, Peru, Philippines, Qatar, Russian Federation, Saudi Arabia, Serbia, Spain, South Africa, Thailand, Vietnam

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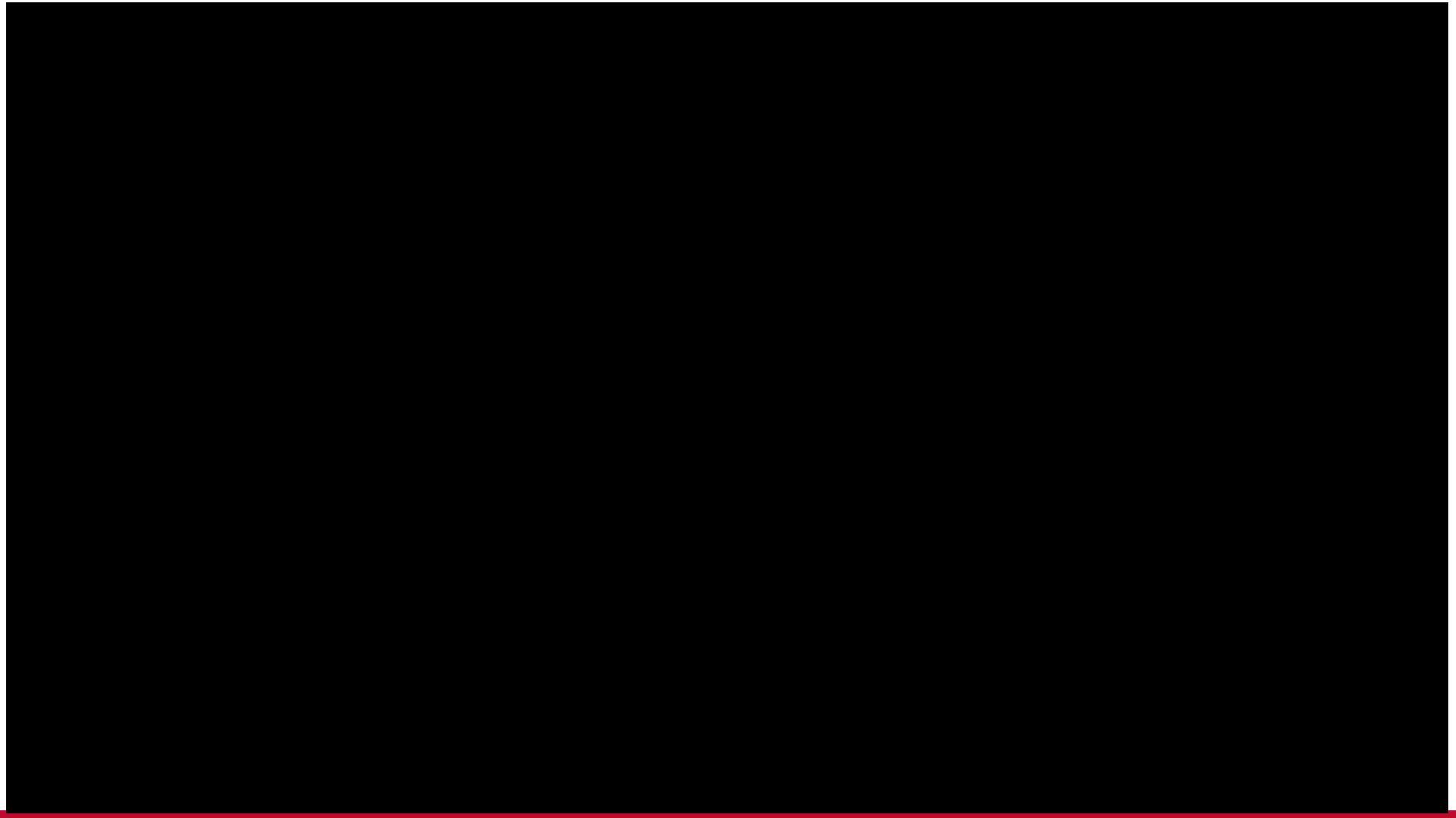

Rationale

- **Curiosity-driven sciences** construct the pool of knowledge which future generations will use for their development
- **Basic sciences** are not always and everywhere considered as they deserve, in the discussions concerning the **societal, environmental and economic development**
- **Curiosity-driven sciences** re-enchant our world and make it worth to be sustainable
- **Serendipity** plays a role!

- **Basic sciences explore the soul of the Universe!!**

Examples

- Vaccines and treatments against COVID-19 are full of basic biology (DNA, RNA, etc.)
- The WEB was born at CERN from the needs of fundamental science
- Google research engine comes from a brilliant mathematical idea
- Artificial intelligence relies on statistical methods
- Cellular phones are full of transistors, integrated circuits, etc.
- GPS relies on Einstein theory of Relativity and on quantum atomic clocks
- The Genome Project has opened the way to gene therapies
- PET scan and MRI are based on antimatter physics and fundamental atomic magnetism
- Generation and storage of renewable energy depends on advances in physics, chemistry and materials science
- Reduction in pollution and green chemistry rely on basic advances in chemistry
- The second quantum revolution is having now applications!!

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Leading Union

Support

- 50 International Unions and Organizations, 110 science academies, scientific networks, International Advisory Committee
- High Patronage: 31 Nobel laureates and Fields Medalists
- UNESCO, International Science Council ISC, World Science Forum, Club of Rome, Inter Parliamentary Union. These unions, organizations, academies, networks and associations are the foundations for the success of the year and for further initiatives beyond this International Year. A real asset!!
- Almost 500 events amongst which 6 flagship events: opening ceremony at UNESCO, Science Ethics and Human Development in Vietnam, Basic Sciences for Sustainability in Serbia and Rwanda, Open Sciences in Honduras, Closing Ceremony at CERN

Statement of the Opening Ceremony and in Rwanda!

- Basic sciences are curiosity and inquiry driven They are the foundations of education and the sources of discoveries which turn into applications: they can then serve an inclusive sustainable development (improving global equity and well-being together with a healthy and lively planet). All together (education, discoveries, applications, and inclusive sustainable development) can boost collaborative and open Basic Sciences. This is the virtuous circle that we want to promote during the International Year of Basics Sciences for Sustainable Development and after.

- To achieve this goal, we shall need you, teachers, scientists, entrepreneurs and society at large to share this vision, and act accordingly. A decade of sciences for sustainability might be necessary.

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Science, Ethics and Human Development

- **Scientific knowledge, technology and innovation shape our lifes, our imagination, our hopes, our fears. But beyond, it is a common universal heritage.**
- **Business as usual is no more an option. Every scientist through his/her institution, especially when supported by public funds, and even if his research is curiosity and inquiry driven, must try to best connect to the society and should have in mind how his or her activity and findings could impact the world (responsibility), and might be of interest for contributing to make it better and not worse.**
- **However, scientists must be given the necessary funding and freedom and the right to collaborate with the other scientists in their field to conduct their research (science for peace) and be listened to at all levels of decision making and inspire that way the decision makers and the society at large.**
- **It is a balancing act (responsibility and freedom) to ensure societies trust their scientists and the knowledge they provide**
- **Doctoral education should include in priority ethics, integrity and sustainability**

Research Policy Statement (APS)

- ***Integrity, Transparency (Open Science respecting Intellectual Property), Reciprocity (between Scientists and Institutions, Trust)***
- ***call upon their governments and those who promote policies and practices that advance international scientific collaboration***, to:

- Enact travel and visa policies that enable scientific interactions between peers and partners;
- Assess policies to ensure that they do not result in unnecessary or unintended barriers to multinational research collaborations; and
- Foster opportunities for international research collaboration and exchanges for early-career physicists.

A Plea for Basic and Applied Sustainability Science

- Sciences education of young people, which is multidisciplinary and integrative should be implemented in addition to the standard STEM education.
- Sustainability Sciences must be co-constructed (scientist with private and public sectors) and open (publishing, data, software, hardware)
- It goes from very basic (understanding the planet habitability, gaiaology) to the 17 **interconnected** SDGs and beyond (interplay between curiosity driven science, applied sciences and traditional knowledge)
- Reduce poverty. Improve well being beyond just consuming, target global equity and a lively and healthy planet.
- Circular economy fuelled by decarbonated energy could be the application target of Sustainability Science, with a lot of innovations and new practices needed
- It could benefit for their organisation from models of organisation in Big Basic Sciences and from the IPCC and IPBES model of interaction between scientists and decision makers
- A decade of actions might be necessary to implement that!

International Decade of Sciences for Sustainable Development 2024 - 2033

Proclaimed by consensus the UN General Assembly on 2023 August 25th

- Resolution brought up by Serbia with the supporting countries: Argentina, Cuba, Equatorial Guinea, Guatemala, Honduras, Hungary, South Africa, Spain and Viet Nam.

Rationale and Goals

- Basic sciences, although essential for sustainability are not enough. We need to embark all sciences (basic, applied, social and humanities) and all knowledge systems (including traditional and indigeneous).
- Equitable, peaceful and planet friendly circular economy fuelled by decarbonated energy should be the application target of Sustainability Sciences, with a lot of innovations and new practices needed.
- Sciences for sustainability are rising but are very fragmented thematically, geographically, organizationally.
- We need to educate, to mobilize transdisciplinary sustainability hubs (scientists with NGOs, private and public sectors), to interconnect them, to structure them in order to co-transform efficiently (spider-web organization)
- We need to create the spirit for Sustainability Sciences which presided to the creation of the CERN International Organization after World War II

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Global challenges

- Global challenges approaches (from components to system, from local to global, from short term to long-term, involving open science and the society at large), although threatening, are a unique opportunity to cooperate and build a better world.
- Following further the international mobilization with the decade, laws and treaties should be enacted towards these goals, based on a dialog between all stakeholders, including scientists.

Thank You

- **We count on you and YES WE CAN, YES WE MUST!**