

The Natural Sciences Sector

UNESCO

UNESCO: Engineering the Sustainable Development Goals

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Food for thought?

- More people have mobile phones than toilets! Six of the world's seven billion people have mobile phones - but only 4.5 billion have a toilet - UN Study
- Now more mobile phones in the whole of Africa than there are in the USA
- 2001:25 million- 2012: 650 million (increase 2600%) - The Higher Times, Sept 2013
- Close to four billion people now use the Internet (50% penetration of global population).
- Internet penetration at 15.6% in Africa, +-83.6% UK, but in Somalia it is 1.2% - Internet World Statistics



UNESCO

- UNESCO, created in 1945, worked for the physical reconstruction of the educational facilities of war-devastated countries by building up library and museum collections.
- Mobilizing for **education**: so that every child, boy or girl, has access to quality education as a fundamental human right and as a prerequisite for human development.
- Building **intercultural understanding**: through protection of heritage and support for cultural diversity. UNESCO created the idea of World Heritage to protect sites of outstanding universal value.
- Pursuing **scientific cooperation**: such as early warning systems for tsunamis or trans-boundary water management agreements, to strengthen ties between nations and societies; science and engineering education and curricula development.
- Protecting **freedom of expression**: an essential condition for democracy, development and human dignity.



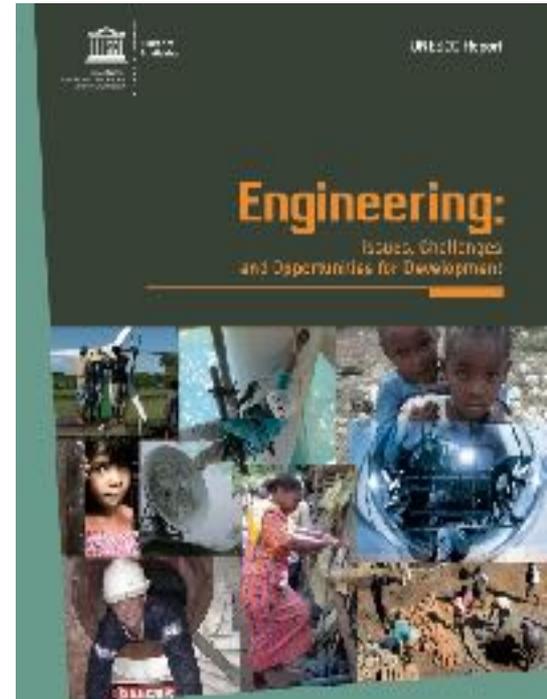
UNESCO

- UNESCO aims to create holistic policies that are capable of addressing the social, environmental and economic dimensions of sustainable development.
- Science and engineering policy and international scientific cooperation links science to society ensuring the public understanding of science and the participation of citizens;
- UNESCO has 195 Members and 8 Associate Members.
- There are around 50 offices globally with the Headquarters in Paris, France.



UNESCO and Engineering

- UNESCO - diverse in terms of Culture, Education, Communication and Information as well as Science
Engineering programme - cross-cutting thematic proposal to draw on engineering related strengths across all Sectors
- *To promote human and institutional capacity-building, particularly in developing countries, to reflect on the UN SDGs and UNESCO priorities*
- *Concentrate on sustainable development and poverty eradication*
- Move from the MDGs to the new SDGs



Millennium Development Goals (MDGs)

- MDGs - an effort to reduce extreme poverty in the world and to lift an estimated 1.2 billion people out of poverty, defined as living on the equivalent of less than \$1 per day.
- Adopted in 2000 by 189 Member States, the MDGs eight anti-poverty targets that the world committed to achieving by 2015. Since the MDGs were adopted in 2000, enormous progress has been made, but more needs to be done.
- MDGs provided a powerful framework for tackling poverty and have galvanized national, regional and global efforts towards promoting human development.
- "The MDGs prove that goal setting can lift millions of people out of poverty, empower women and girls, improve health and well-being, and provide vast new opportunities for better lives." MDG Report 2015



MDG 2



MDG2 ENROLMENT IN
PRIMARY EDUCATION
IN DEVELOPING REGIONS
HAS REACHED 91%

**ACHIEVE UNIVERSAL
PRIMARY EDUCATION**

**LET'S
TAKE
ACTION
TO ENSURE
QUALITY
EDUCATION
FOR ALL**

**2015
TIME FOR
GLOBAL ACTION
FOR PEOPLE AND PLANET**

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MDG 3

MDG3



PROMOTE GENDER
EQUALITY AND
EMPOWER WOMEN

**THE WORLD HAS
ACHIEVED EQUALITY
IN PRIMARY EDUCATION
BETWEEN GIRLS
AND BOYS**

**LET'S
TAKE
ACTION
TO ACHIEVE
GENDER
EQUALITY IN
ALL FIELDS**



**2015
TIME FOR
GLOBAL ACTION
FOR PEOPLE AND PLANET**

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MDG 4

MDG4



REDUCE
CHILD MORTALITY

THE MORTALITY RATE OF
CHILDREN UNDER FIVE
HAS BEEN CUT BY MORE
THAN HALF SINCE 1990

LET'S
TAKE
ACTION

TO ENSURE
ALL CHILDREN
LIVE LONG,
HEALTHY
LIVES

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2015
TIME FOR
GLOBAL ACTION
FOR PEOPLE AND PLANET

MDG 5

MDG 5 **MATERNAL MORTALITY RATIO FELL BY 45% SINCE 1990**

IMPROVE MATERNAL HEALTH

LET'S TAKE ACTION TO ENSURE UNIVERSAL ACCESS TO REPRODUCTIVE HEALTH

2015 TIME FOR GLOBAL ACTION FOR PEOPLE AND PLANET

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The image features a photograph of two women in a rural setting. One woman is carrying a baby on her back in a colorful patterned wrap, while the other stands with her hand on her hip. The background shows trees and a simple building. The text is overlaid on a red and white background.

MDG 6



MDG6



**BETWEEN 2000 AND 2013
NEW HIV INFECTIONS FELL
BY 40% AND 37 MILLION
TUBERCULOSIS DEATHS
HAVE BEEN AVERTED**

COMBAT HIV/AIDS,
MALARIA AND OTHER
DISEASES

**LET'S
TAKE
ACTION**

**TO ENSURE
HEALTHY
AND LONG
LIVES
FOR ALL**

2015
TIME FOR
GLOBAL ACTION
FOR PEOPLE AND PLANET

COMPTON/UNITE - VISAGES UN/ROZ/ALVARE

MDG 7



MDG7



ENSURE ENVIRONMENTAL SUSTAINABILITY

2.6 BILLION PEOPLE HAVE GAINED ACCESS TO IMPROVED DRINKING WATER SINCE 1990

LET'S TAKE ACTION

TO ENSURE ACCESS TO DRINKING WATER AND SANITATION FOR ALL



2015
TIME FOR GLOBAL ACTION
FOR PEOPLE AND PLANET

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MDG 8



MDG8 IN 2014 AID MONEY INCREASED TO \$135.2 BILLION

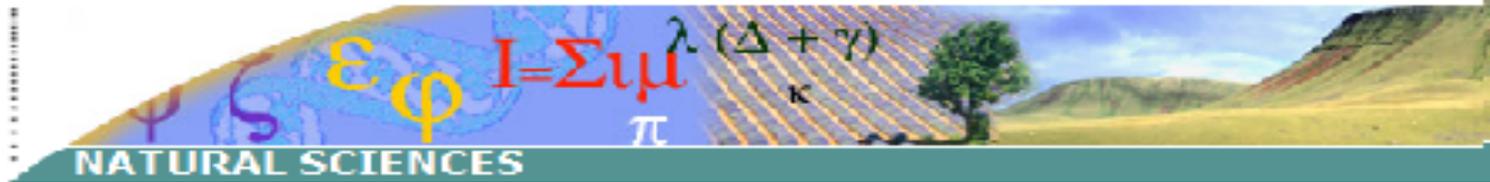


A GLOBAL PARTNERSHIP FOR DEVELOPMENT

LET'S TAKE ACTION TO ENSURE A GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT

2015 TIME FOR GLOBAL ACTION FOR PEOPLE AND PLANET

MORE THAN MINES

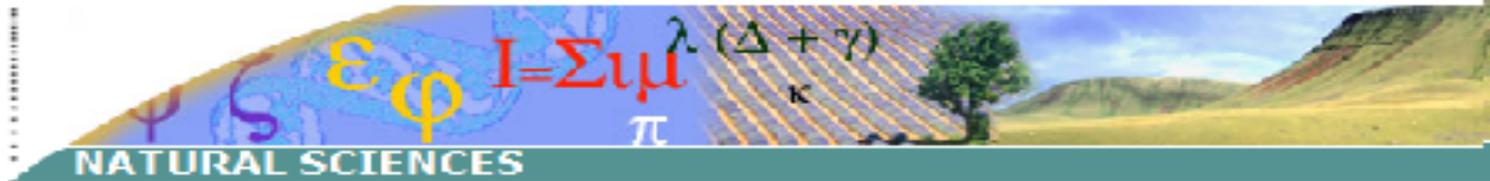


Why the SDG's?

- All targets of the MDG's were not fulfilled.
- Over **1.1 billion people** - no access to electricity
- **2.4 billion people** - no adequate sanitation
- **663 million** - lack access to clean water
- **1/3 of world's population** - not served by adequate roads
- **150 million children** < 5 years old malnourished - don't survive or grow up stunted.

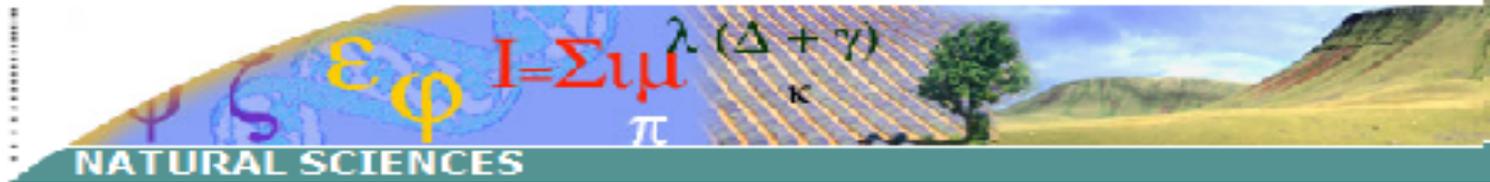
Sustainable Development Goals (SDGs)





Sustainable Development Goals (SDGs)

- **25 September 2015** - 193 Member States adopted the new 2030 Agenda for Sustainable Development, including the [Sustainable Development Goals](#) (SDGs).
- 17 SDGs - all relating to the work in the Natural Sciences Sector
- **SDGs have a more ambitious agenda**, seeking to eliminate rather than reduce poverty, and include more demanding targets on health, education and gender equality. They are universal, applying to all countries and all people. The agenda also includes issues that were not in the MDGs such as climate change, sustainable consumption, innovation and the importance of peace and justice for all.



Sustainable Development Goals 1,2 and 3

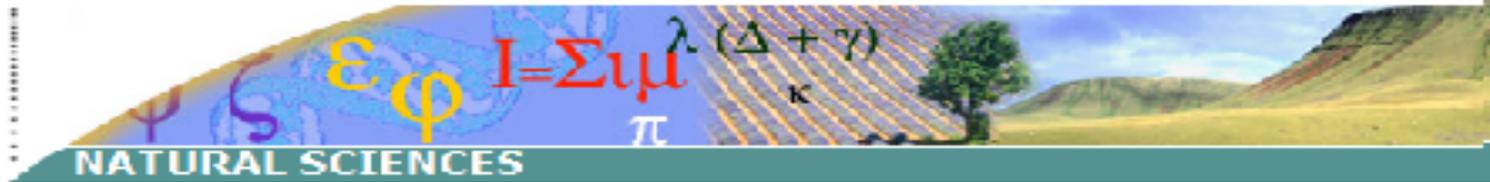
- SDG 1: End poverty in all its forms;
- SDG 2: End hunger, achieve food security & improved nutrition & promote sustainable agriculture;
- Engineering: innovative technologies in farming, medicine, safe sanitation systems
- Double food production in developing countries by 2050;
- Access to technology - inequality in who shares the benefits and costs of technology;
- Digital technology - 75% of Africans own mobile phones;
- Information and communication technologies - advanced medical knowledge and empowering local health workers;



Sustainable Development Goal 6

- Ensure availability and sustainable management of water and sanitation for all;
- huge task - 2.3 billion (1 in 3 people) don't have access to a decent toilet;
- 650 million - no access to clean water;
- 315 000 children < 5 years die - drinking dirty water/poor sanitation
- Well-planned infrastructure and management - engineering solutions

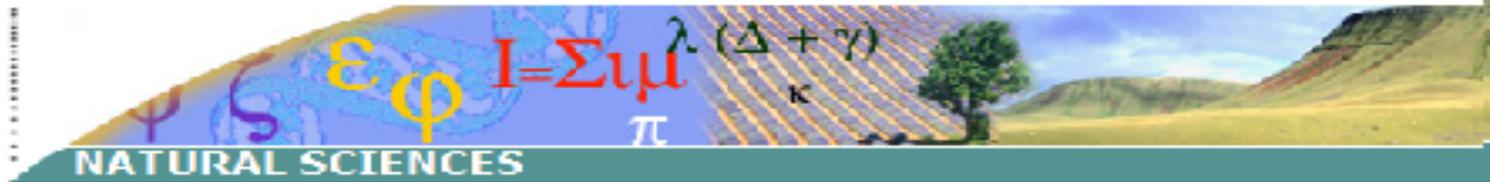




Sustainable Development Goal 7

- Renewable energy - research and development
- Investment
- Access to rural communities
- Teaching the know-how to local communities
- Barefoot college project - transfer of knowledge and skills





Sustainable Development Goals 8, 9 & 10

- Sustainability - global production and consumption levels are overshooting our planet's capacity by 50% per year
- Rapid automation - industrial growth
- Big data - data infrastructure
 - CERN offering expertise to UN
- TVET - training and knowledge dissemination to informal sector
 - creation of entrepreneurs and self-starters

8 DECENT WORK AND
ECONOMIC GROWTH



9 INDUSTRY, INNOVATION
AND INFRASTRUCTURE



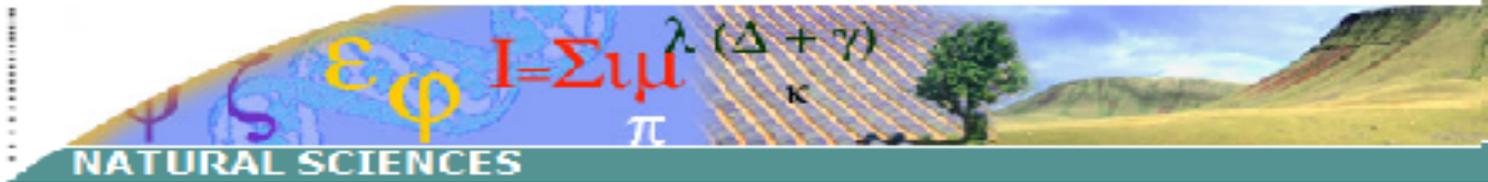
10 REDUCED
INEQUALITIES



Sustainable Development Goals 11, 12, 13 and 15

- COP21 - drastically cut CO2 emissions & limit global temp rise to 2 degree celsius above pre-industrial levels;
- disaster risk reduction and mitigation;
- buildings & infrastructure able to withstand natural disasters;
- eco-efficiency in operations;
- smartly designed cities can emit 80% less carbon (Global Commission on the Economy and Climate)
- 2/3 of infrastucture in developing countries in 2050 - does not exist but decisions now are key
- new solutions - preservation of biodiversity and to regenerate ecosystems





Sustainable Development Goals 14, 16 & 17

- solutions - preservation of marine life, reduce plastic pollution to oceans
- new technologies of fishing - conserve the ocean
- SDG 16 - sharing of knowledge, technology and building strong, inclusive institutions contributes to peace. Engineering education?
- Partnerships - sustainable solutions through innovative technologies

14 LIFE
BELOW WATER



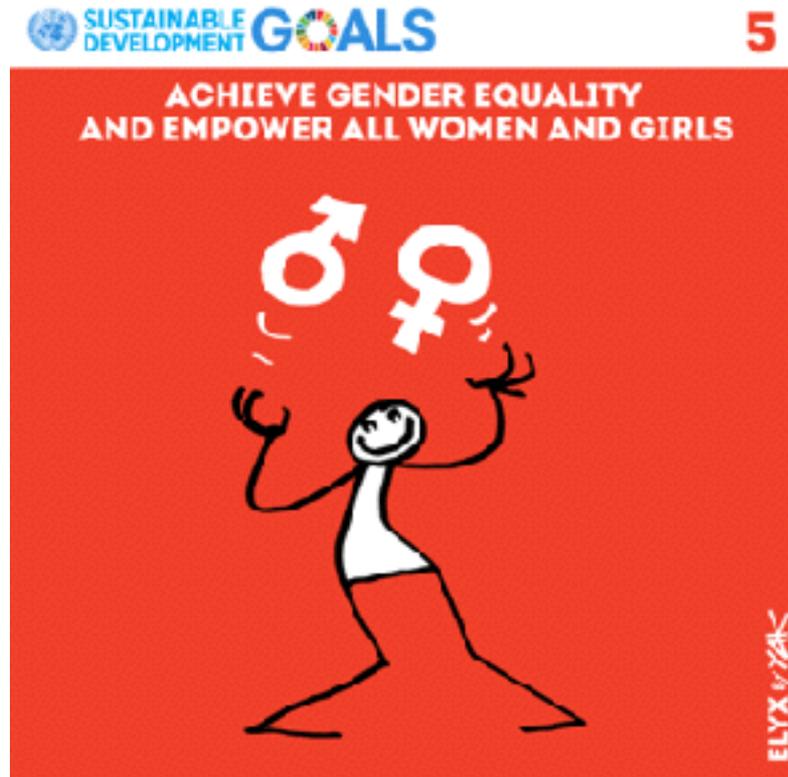
16 PEACE, JUSTICE
AND STRONG
INSTITUTIONS



17 PARTNERSHIPS
FOR THE GOALS

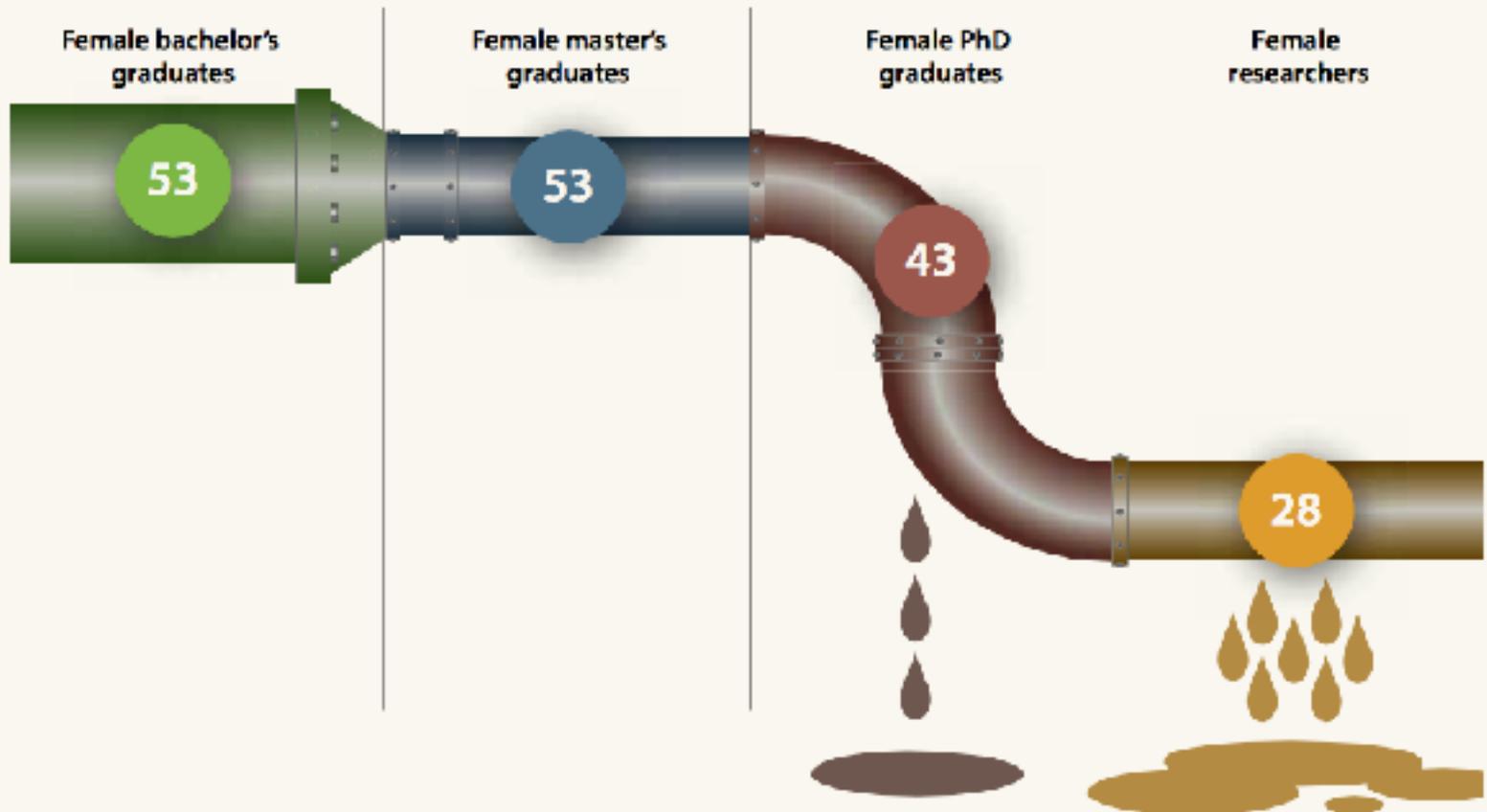


Sustainable Development Goal 5



Women in Research

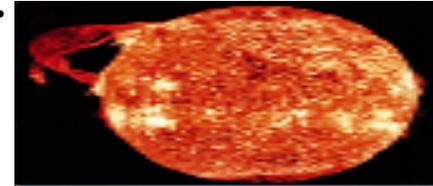
Figure 3.1: The leaky pipeline: share of women in higher education and research, 2013 (%)

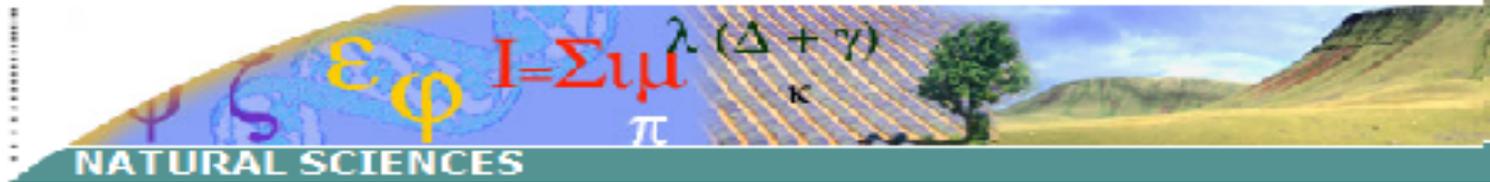


Source: UNESCO Institute for Statistics estimates based on data from Its database, July 2015

Women in Engineering

- Women are consistently underrepresented in engineering.
- Europe and North America are generally low: 19% in Canada, Germany and the USA and
- 22% in Finland,
- but there are some bright spots: 50% of engineering graduates are women in Cyprus and 38% in Denmark.
- Regional exceptions: share of women graduating as engineers has risen in sub-Saharan Africa, for instance, in the Arab States and in parts of Asia.
 - > 3/10 engineers are women in Viet Nam (31%), Malaysia (39%) and Brunei Darussalam (42%).
- Of the seven Arab countries reporting data, four observe a steady percentage or an increase;
 - the highest scores come from the United Arab Emirates and Palestine (31% each), Algeria (31%) and Oman, with an astonishing 53%.



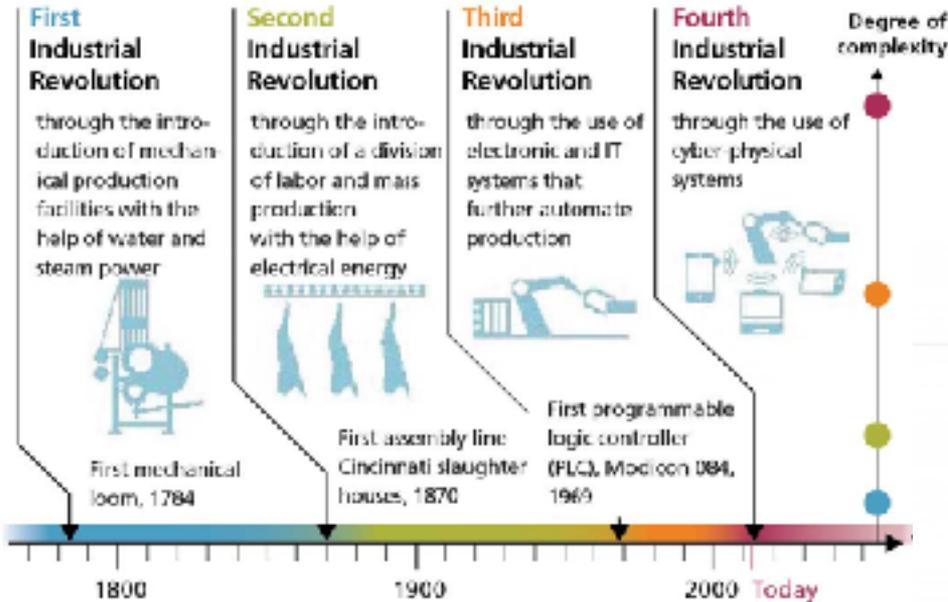


Sustainable Development Goal 4

- Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all - “By 2020, substantially expand globally the number of scholarships available to developing countries... for enrolment in higher education ... engineering and scientific programmes...”
- Engineering education is vital;
- New methods of teaching to entice young students but also stimulate innovative solutions for the SDGs;
- Networks of Category II Centres (ICEE, IKCEST, Aalborg Centre) and Chairs - vital in helping share knowledge and strengthening engineering education globally



The Future Engineer



Employment outlook across job families jobs change in thousands, 2015-2020

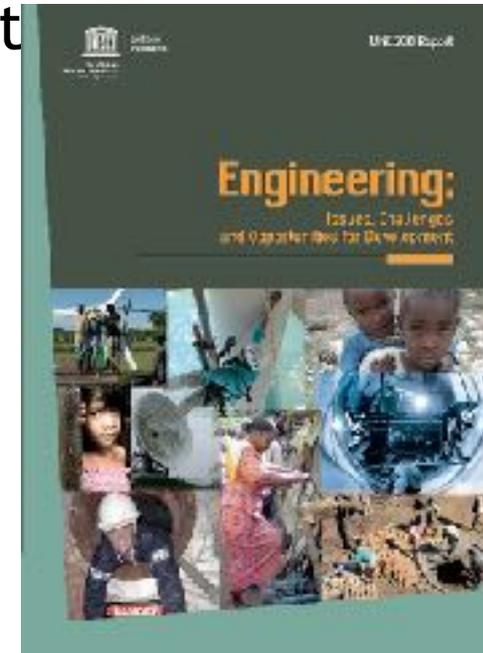


UNESCO Engineering Report

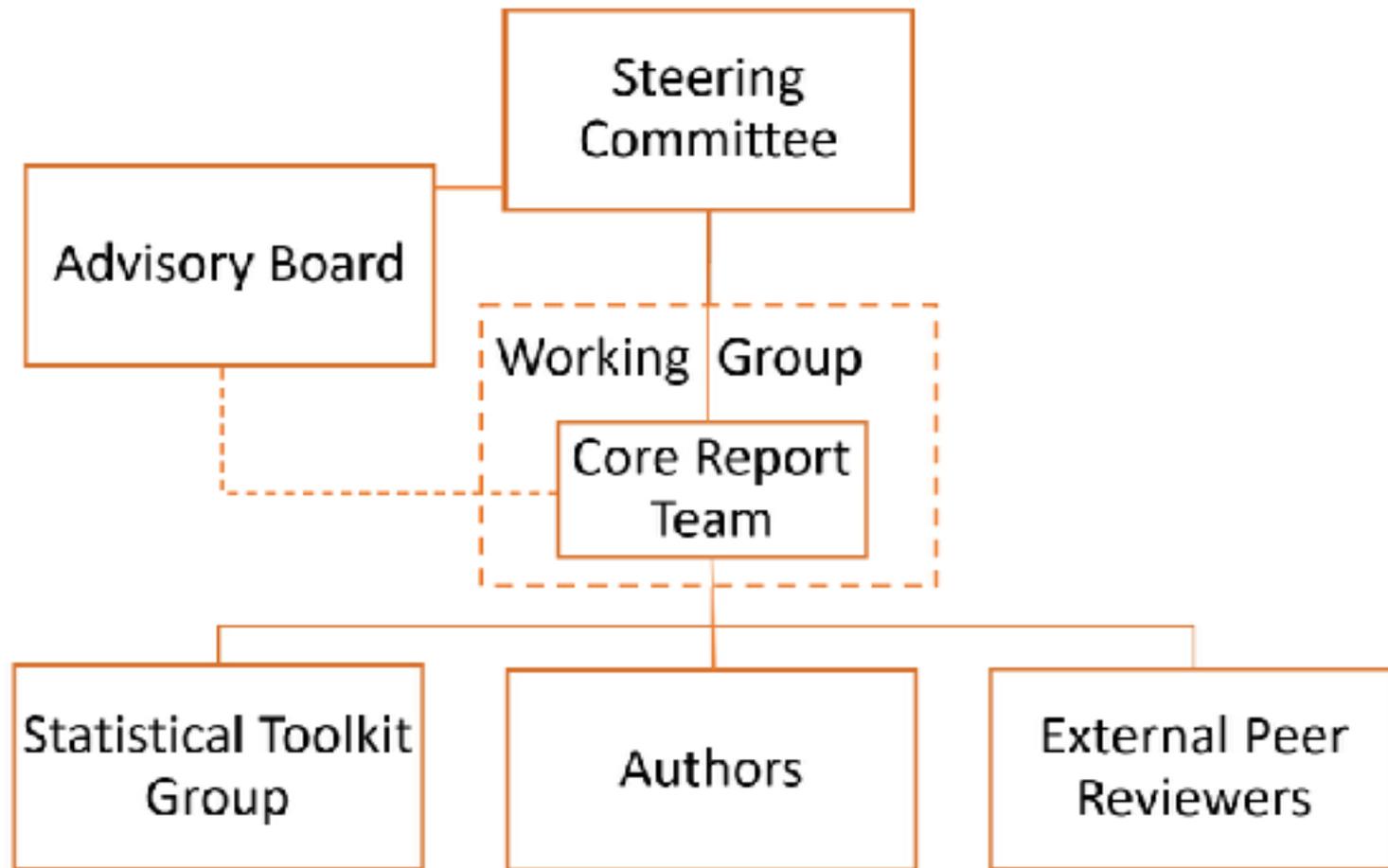
- First engineering report by international organization
- Over 120 expert perspectives on the importance of engineering for sustainable development
- **Challenges for the engineering profession include:**
 - Attraction and retention of youth to engineering, particularly women
 - Strengthening education institutions
 - More interdisciplinary activities in engineering curricula
 - Focus on innovation, entrepreneurship, and job creation
 - Promoting increased public awareness and support for the profession

UNESCO Engineering Report 2

- UNESCO Report: Global Engineering Assessment
- Examine tertiary-level enrolment, graduation and professional employment in engineering disciplines
- UNESCO Global Priorities: Gender Equality and Africa
 - Data disaggregated by gender and engineering discipline
 - Intensified data collection efforts in Africa where reporting is typically sparse
- Recommendations-driven report



Groups Structure



Vision Note - ERII

- The world needs more and better engineers.
- The world needs more and better data on engineers; the key statistic is the number of engineers per 10,000 people in the population of a country.
- Engineers help shape the path of human progress.
- Evidence-based technology policy.
- The Sustainable Development Goals are for everyone.
- The education of engineers must have a global dimension.
- Engineering is for everyone.

Vision Note - ERII

- How can a country develop if it doesn't have engineers?
- As we know from the previous UNESCO Engineering Report, obtaining this statistic is not trivial.
- A strong gender imbalance exists internationally, also in Africa, in regards to women's presence in engineering. Approaches to informing and teaching engineering have decreased and become outdated in many countries. Thus, there is a strong need in attracting more young women in this field.
- How an engineer is trained to think today could affect the quality of life in the 22nd Century and beyond. Technological expertise is no longer sufficient.

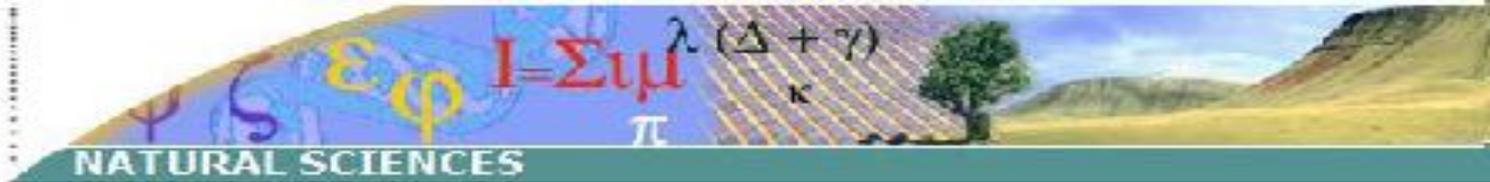


Table of Contents - ER II

The UNESCO Engineering Report II will be guided by the ToC structure.

It is intended to give a sense of the wider content of the Report to authors and contributors, and to provide a basis for management discussions of the Report's content by the Steering Committee and Advisory Board.

Four sections:

- Opening: Preface, Executive Summary, Recommendations, Introduction
- Opportunities: SDGs, Diversity & Inclusion, Innovation
- Solutions: The Future Engineer (WCCE), Engineering Education, Future Trends
- Tracking Progress: Regional Trends (LAC - WCCE); Statistics & Data, Statistical Toolkit

Maximum of 150 pages.

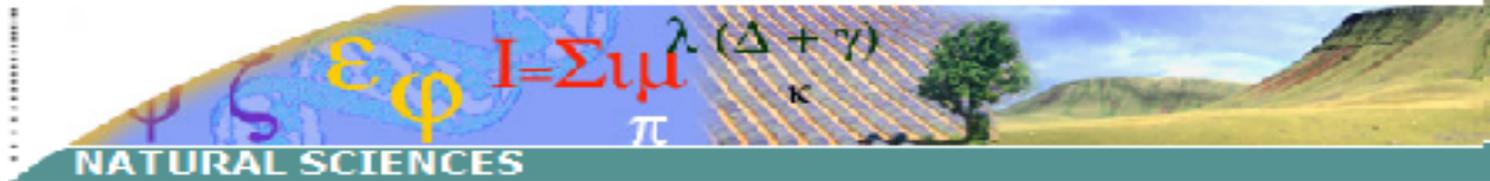
Next Steps

Product Content/ Offer

- Editorial: development of quality and compensation scales, ToR general structure for author chapter commissions;
- Statistical Toolkit: development/ transfer of indicators, further identification of data sources, analysis of trends, visualization;

Strategic Processes

- Resource Mobilization: development of fundraising plan for second year and beyond for sustainability and growth of the report as a project;
- Logical Framework: develop to track indicators of progress, quality and impact of the report as a project, and use as ‘evidence’ to communicate/ advocate the value of the report for fundraising.



Conclusion

- All societies are seeking new sources of dynamism, to eradicate poverty, to build sustainable and **lasting peace development**.
- Engineering, science and technology are important.
- **UNESCO was born in 1945 at the Institute of Civil Engineers in London.**
- The world has changed since then, but the need for engineering, science and technology has only deepened. And so have the aspirations of all societies to benefit from progress - **leading to peace engineering**.
- Given the complexity of contemporary global challenges, such as the sustainable consumption of resources and climate change adaptation, supporting and investing in science and engineering education for both men and women is essential for the improvement of societies.
- The **education and training** of future engineers and scientists is necessary to develop innovative solutions to these challenges and to improve the quality of life for all.
- There is only one planet and one ocean and UNESCO is working with all stakeholders to ensure that education is the way forward to save our ecosystem and bring about peace.



UNESCO'S 70th Anniversary Celebrations

United Nations
Educational, Scientific and
Cultural Organization

