Sustainable Development

The role of international scientific organizations

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Diplomacy programme

Joint ICTP-IAEA Workshop on Environmental Mapping:
Mobilising Trust in Measurements and Engaging Scientific Citizenry
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What is Sustainable Development?

"Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs."

From the World Commission on Environment and Development's (the Brundtland Commission) report 'Our Common Future', 1987.

Resources

- **Non-renewable** – once used, they are gone, e.g. minerals and metal ores, fossil fuels (coal, oil, natural gas) and groundwater in certain aquifers.

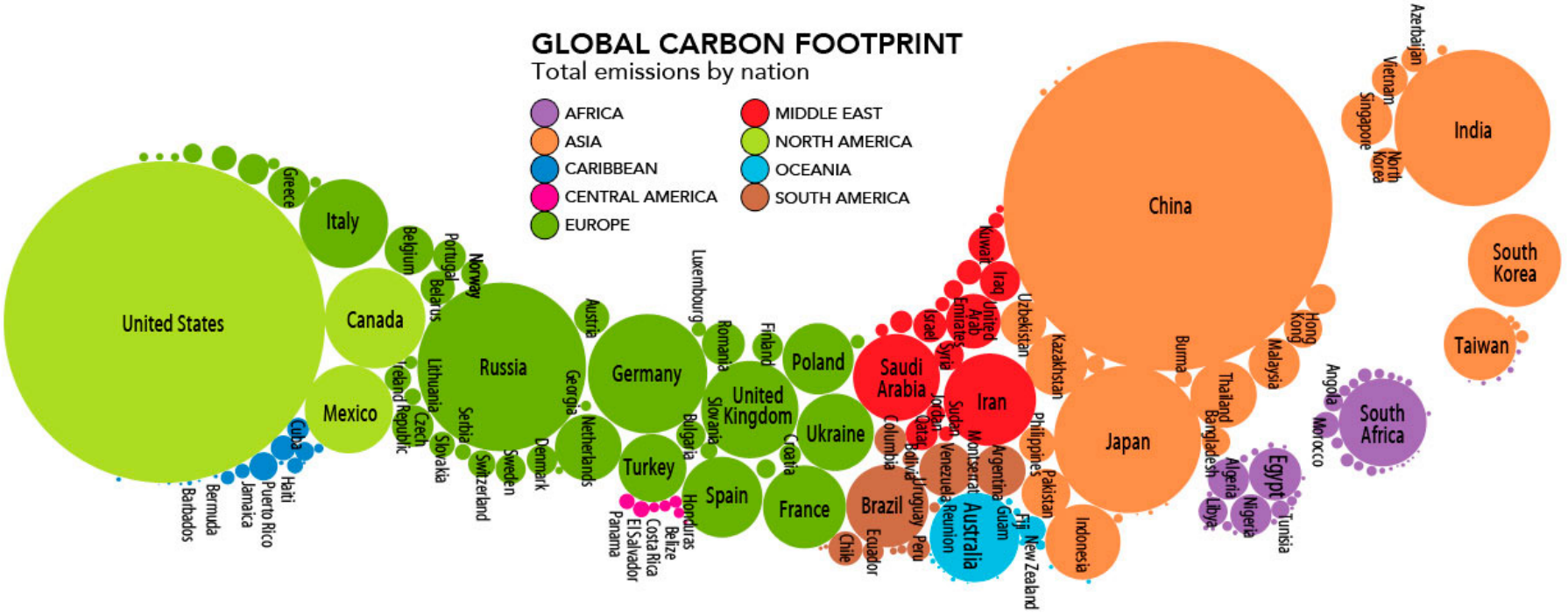
- **Renewable** – can be used repeatedly because it is replaced naturally, e.g. oxygen, fresh water, solar energy, timber, and biomass.

Ecosystem services

Four main types:

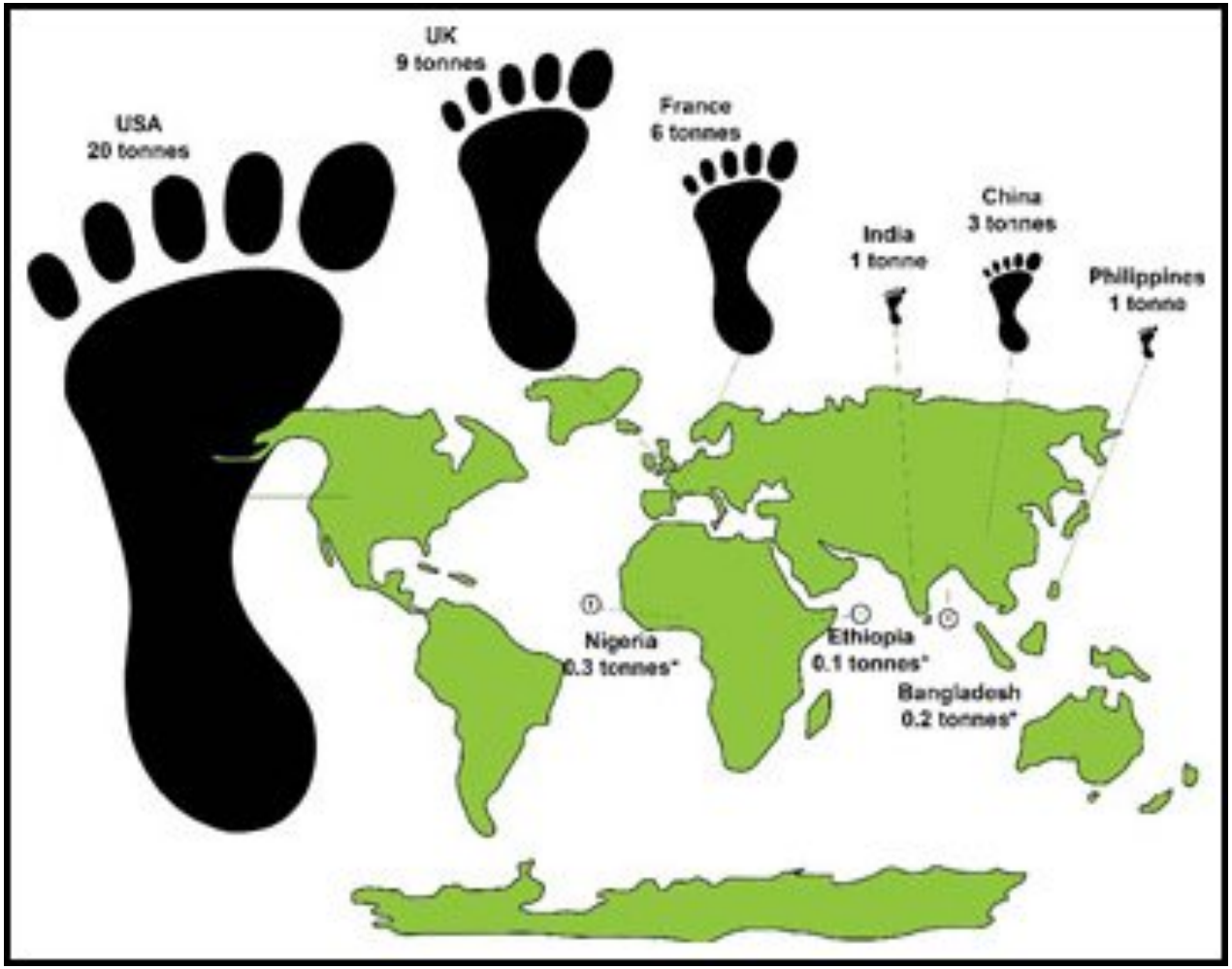
- **provisioning**, such as the production of food and water;
- **regulating**, such as the control of climate and disease;
- **supporting**, such as nutrient cycles and crop pollination; and
- **cultural**, such as spiritual and recreational benefits.

Carbon Footprints

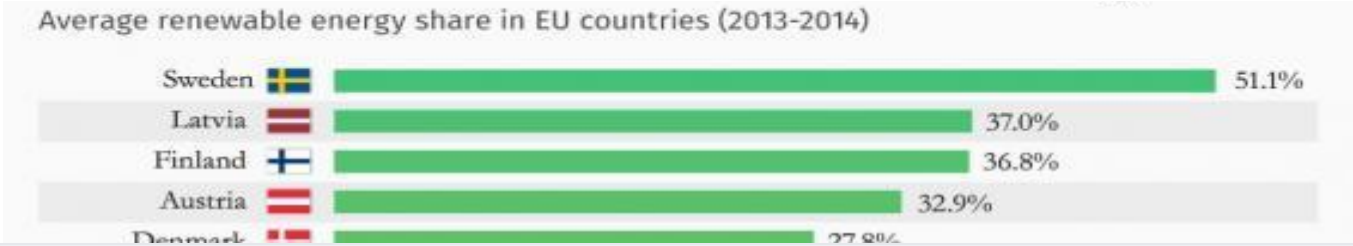


Governments need to make a better effort to identify ways to reduce their carbon footprint.

Carbon Footprints – per capita



Credit: http://www.transitionbelper.org/carbonfootprints.html



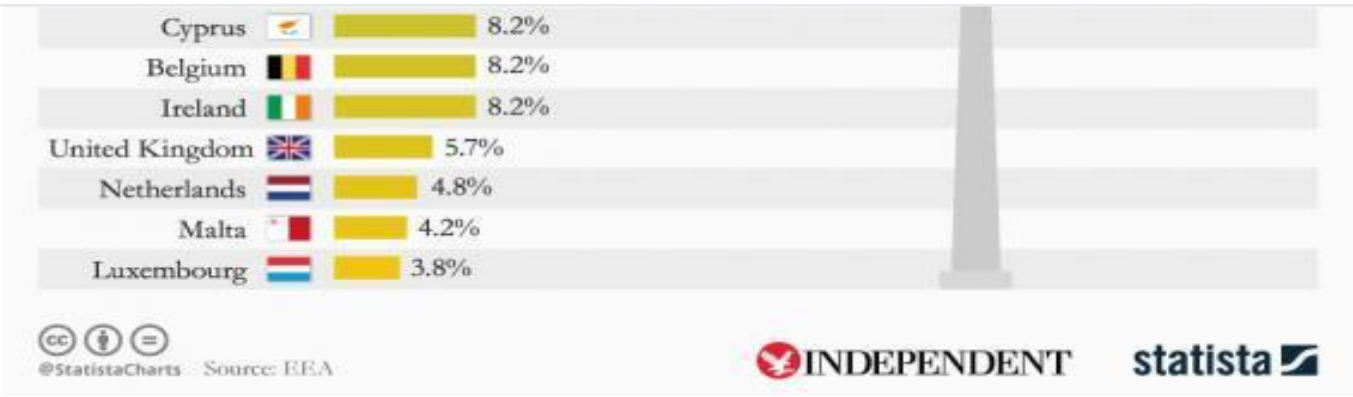
INDEPENDENT

Environment

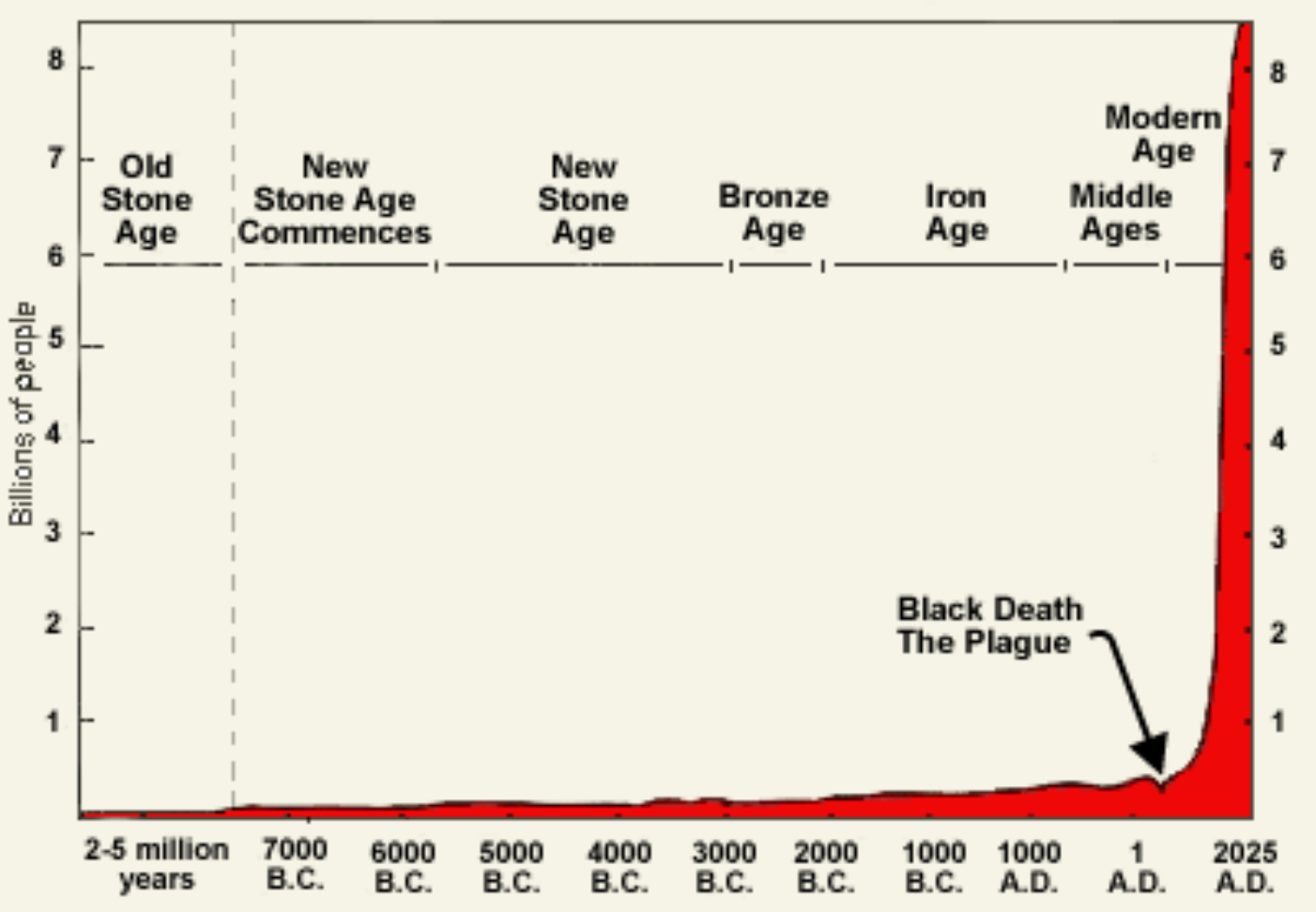
Costa Rica's electricity was produced almost entirely from renewable sources in 2016

Around 15 per cent of US electricity supply was renewable

Peter Walker | @petejohn_walker | Monday 2 January 2017 11:44 GMT | 6 comments



Population Growth



Population Growth

World population reached 7 billion in 2011.

In 2016 it is 7.4 billion, and expected to reach 8 billion in 2024.

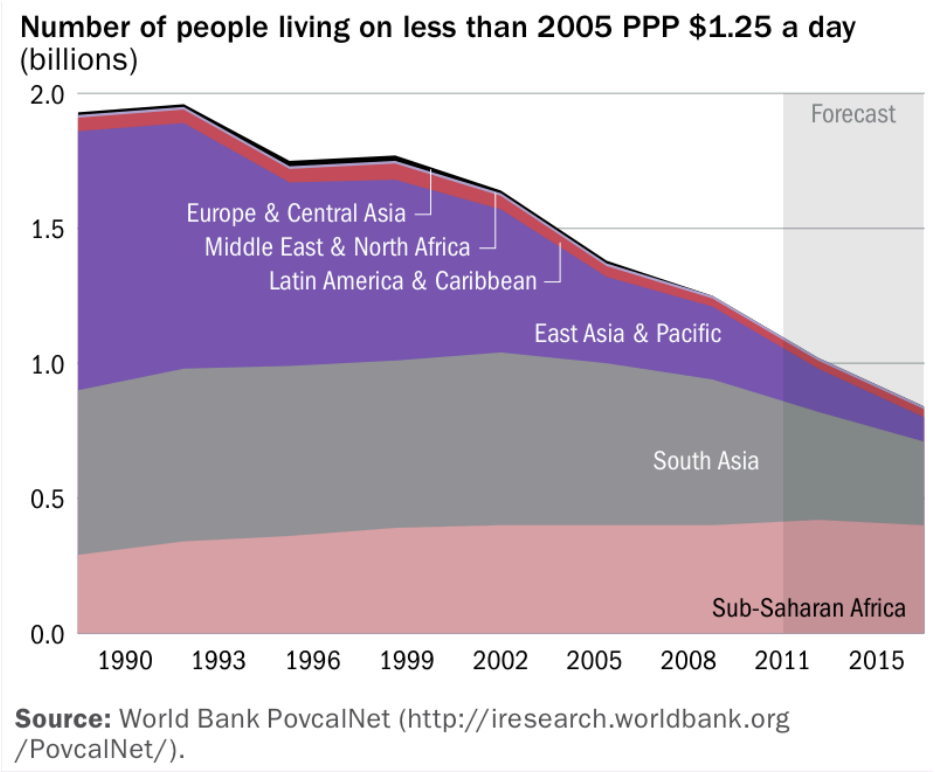
http://www.worldometers.info/world-population/

Millennium Development Goals – 2000-2015

Millennium Development Goals – 2000-2015

2000-2015: Great progress was achieved for many of the MDGs, but progress was patchy.

Critics of the MDGs complained of a lack of analysis and justification behind the chosen objectives, and the difficulty or lack of measurements for some goals and uneven progress, among others. Although developed countries' aid for achieving the MDGs rose during the challenge period, more than half went for debt relief and much of the remainder going towards natural disaster relief and military aid, rather than further development.



Millennium Development Goals – 2000-2015

2015: International Agreements

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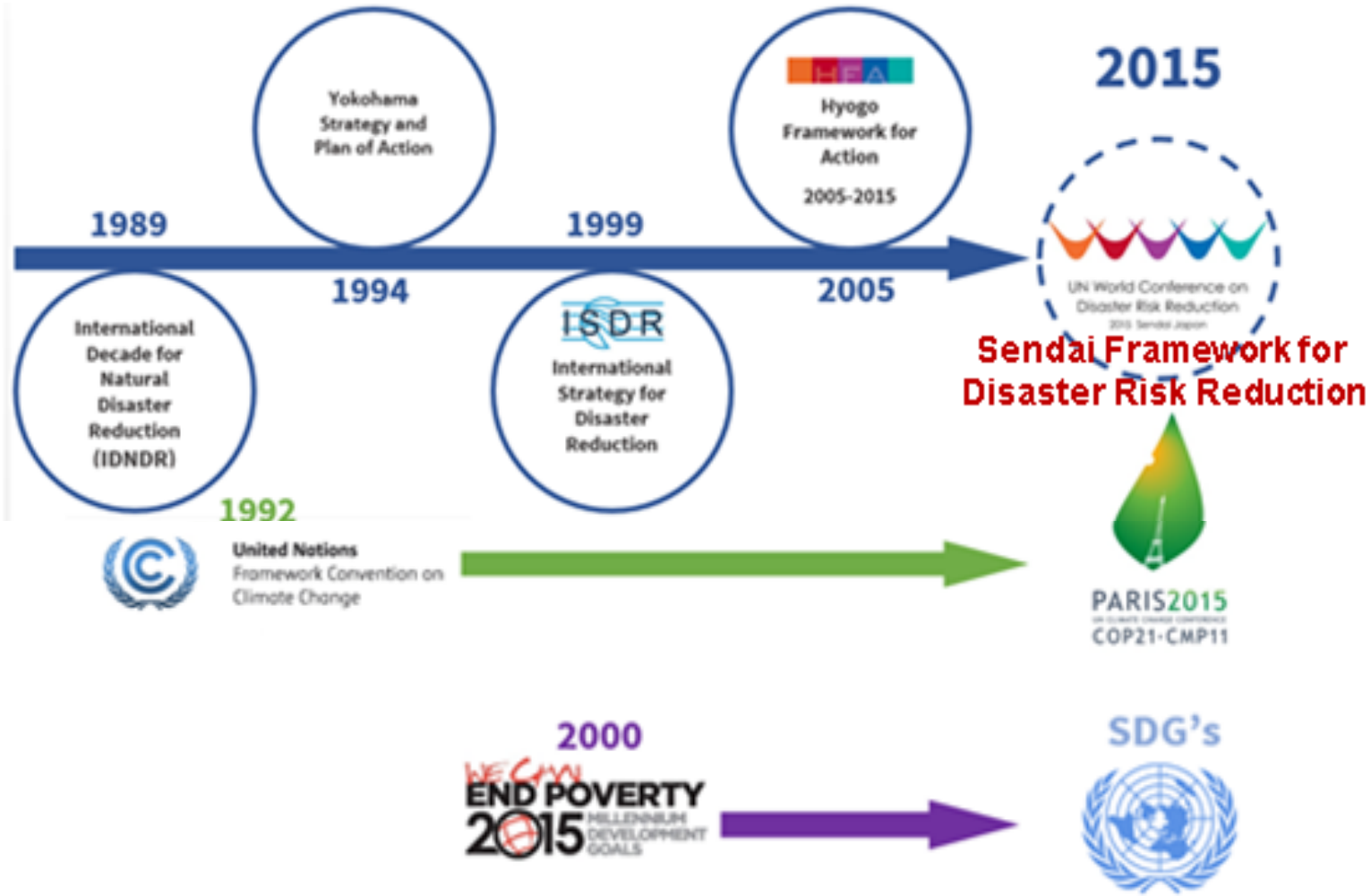


UNISDR
The United Nations Office for Disaster Risk Reduction

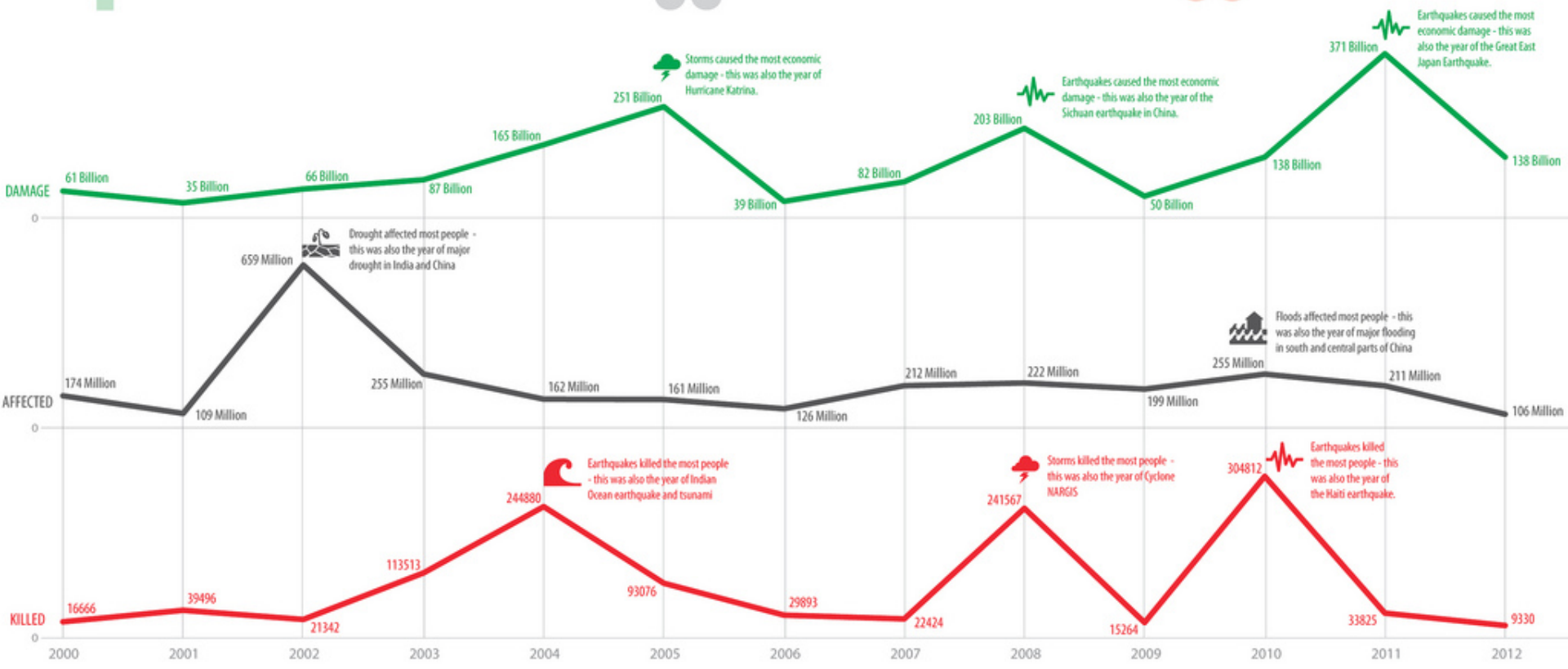
DISASTER IMPACTS / 2000-2012

*Disasters refers to drought, earthquake (seismic activity), epidemic, extreme temperature, flood, insect infestation, mass movement (dry & wet), storm, volcano, and wildfire / Data source: EM-DAT: The OFDA/CRED International Disaster Database / Data version: 12 March 2013 - v12.07
OCHA Humanitarian Symbol (2012): http://reliefweb.int/map/world/world-humanitarian-and-country-icons-2012 / **Find out more about UNISDR: http://www.unisdr.org**

$1.7 TRILLION DAMAGE (USD)

2.9 BILLION AFFECTED

1.2 MILLION KILLED



World Bank research …

Natural disasters:

- force around 26 million people into poverty;
- cost around $520bn in losses each year.

Disaster risk reduction …

Reducing the **risk** posed by natural disasters is one of the main ways through which national governments and the international community can mitigate their negative effects.

(k) In the post-disaster recovery, rehabilitation and reconstructio the creation of and to reduce disaster risk by "Building Back education and awareness of disaster risk;

(l) An effective and meaningful global partnership and th international cooperation, including the fulfilment of respec development assistance by developed countries, are essent management;

(m) Developing countries, in particular the least developed coun States, landlocked developing countries and African countri and other countries facing specific disaster risk challenges, ne timely provision of support, including through finance, techn building from developed countries and partners tailored to identified by them.

IV. Priorities for action

20. Taking into account the experience gained through the im Framework for Action, and in pursuance of the expected outcome focused action within and across sectors by States at local, national the following four priority areas:

Priority 1: Understanding disaster risk.

Priority 2: Strengthening disaster risk governance to manage di

Priority 3: Investing in disaster risk reduction for resilience.

Priority 4: Enhancing disaster preparedness for effective respor in recovery, rehabilitation and reconstruction.

21. In their approach to disaster risk reduction, States, regional an and other relevant stakeholders should take into consideration th each of these four priorities and should implement them, as appropri respective capacities and capabilities, in line with national laws and

22. In the context of increasing global interdependence, concerted enabling international environment and means of implementation contribute to developing the knowledge, capacities and motivation all levels, in particular for developing countries.

Priority 1: Understanding disaster risk

23. Policies and practices for disaster risk management should be of disaster risk in all its dimensions of vulnerability, capacity, exp hazard characteristics and the environment. Such knowledge can b of pre-disaster risk assessment, for prevention and mitigation ar implementation of appropriate preparedness and effective respons

National and local levels

24. To achieve this, it is important:

(a) To promote the collection, analysis, management and use of information and ensure its dissemination, taking into account the of users, as appropriate;

(b) To encourage the use of and strengthening of baselines and risks, vulnerability, capacity, exposure, hazard characteristics effects at the relevant social and spatial scale on ecosy circumstances;

(c) To develop, periodically update and disseminate, as appropriate, location information, including risk maps, to decision makers, the general publ at risk of exposure to disaster in an appropriate format by using, as ap information technology;

(d) To systematically evaluate, record, share and publicly account for understand the economic, social, health, education, environmental a impacts, as appropriate, in the context of event-specific hazard-exposu information;

(e) To make non-sensitive hazard-exposure, vulnerability, risk, disaster and information freely available and accessible, as appropriate;

(f) To promote real time access to reliable data, make use of space and including geographic information systems (GIS), and use information a technology innovations to enhance measurement tools and the colle dissemination of data;

(g) To build the knowledge of government officials at all levels, civil societ volunteers, as well as the private sector, through sharing experienc good practices and training and education on disaster risk reduction, existing training and education mechanisms and peer learning;

(h) To promote and improve dialogue and cooperation among scientifi communities, other relevant stakeholders and policymakers in order to policy interface for effective decision-making in disaster risk managem

(i) To ensure the use of traditional, indigenous and local knowledge appropriate, to complement scientific knowledge in disaster risk a development and implementation of policies, strategies, plans and pro sectors, with a cross-sectoral approach, which should be tailored to context;

(j) To strengthen technical and scientific capacity to capitalize on and knowledge and to develop and apply methodologies and models to a vulnerabilities and exposure to all hazards;

(k) To promote investments in innovation and technology development hazard and solution-driven research in disaster risk management to addr interdependencies and social, economic, educational and environme disaster risks;

(l) To promote the incorporation of disaster risk knowledge, including mitigation, preparedness, response, recovery and rehabilitation, in for education, as well as in civic education at all levels, as well as in profess training;

(m) To promote national strategies to strengthen public education and aw risk reduction, including disaster risk information and knowledge, t social media and community mobilization, taking into account specific needs;

(n) To apply risk information in all its dimensions of vulnerability, capaci persons, communities, countries and assets, as well as hazard charac and implement disaster risk reduction policies;

(o) To enhance collaboration among people at the local level to disse information through the involvement of community-based orga governmental organizations.

Global and regional levels

25. To achieve this, it is important:

(a) To enhance the development and dissemination of science-based methodologies and tools to record and share disaster losses and relevant disaggregated data and statistics, as well as to strengthen disaster risk modelling, assessment, mapping, monitoring and multi-hazard early warning systems;

(b) To promote the conduct of comprehensive surveys on multi-hazard disaster risks and the development of regional disaster risk assessments and maps, including climate change scenarios;

(c) To promote and enhance, through international cooperation, including technology transfer, access to and the sharing and use of non-sensitive data and information, as appropriate, communications and geospatial and space-based technologies and related services; maintain and strengthen in situ and remotely-sensed earth and climate observations; and strengthen the utilization of media, including social media, traditional media, big data and mobile phone networks, to support national measures for successful disaster risk communication, as appropriate and in accordance with national laws;

(d) To promote common efforts in partnership with the scientific and technological community, academia and the private sector to establish, disseminate and share good practices internationally;

(e) To support the development of local, national, regional and global user-friendly systems and services for the exchange of information on good practices, cost-effective and easy-to-use disaster risk reduction technologies and lessons learned on policies, plans and measures for disaster risk reduction;

(f) To develop effective global and regional campaigns as instruments for public awareness and education, building on the existing ones (for example, the "One million safe schools and hospitals" initiative; the "Making Cities Resilient: My city is getting ready" campaign; the United Nations Sasakawa Award for Disaster Risk Reduction; and the annual United Nations International Day for Disaster Reduction), to promote a culture of disaster prevention, resilience and responsible citizenship, generate understanding of disaster risk, support mutual learning and share experiences, and encourage public and private stakeholders to actively engage in such initiatives and to develop new ones at the local, national, regional and global levels;

(g) To enhance the scientific and technical work on disaster risk reduction and its mobilization through the coordination of existing networks and scientific research institutions at all levels and in all regions, with the support of the United Nations Office for Disaster Risk Reduction Scientific and Technical Advisory Group, in order to strengthen the evidence-base in support of the implementation of the present Framework; promote scientific research on disaster risk patterns, causes and effects; disseminate risk information with the best use of geospatial information technology; provide guidance on methodologies and standards for risk assessments, disaster risk modelling and the use of data; identify research and technology gaps and set recommendations for research priority areas in disaster risk reduction; promote and support the availability and application of science and technology to decision-making; contribute to the update of the publication entitled "2009 UNISDR Terminology on Disaster Risk Reduction"; use post-disaster reviews as opportunities to enhance learning and public policy; and disseminate studies;

(h) To encourage the availability of copyrighted and patented materials, including through negotiated concessions, as appropriate;

(i) To enhance access to and support for innovation and technology, as well as in long-term, multi-hazard and solution-driven research and development in the field of disaster risk management.

Credit: Virginia Murray
UNISDR - STAG

Sendai, Priority 1: Understanding Disaster Risk

- 25 (g) **Enhance the scientific and technical work on disaster risk reduction and its mobilization through the coordination of existing networks and scientific research institutions at all levels and all regions** with the support of the UNISDR Scientific and Technical Advisory Group in order to: ...

Sendai, Priority 1: Understanding Disaster Risk

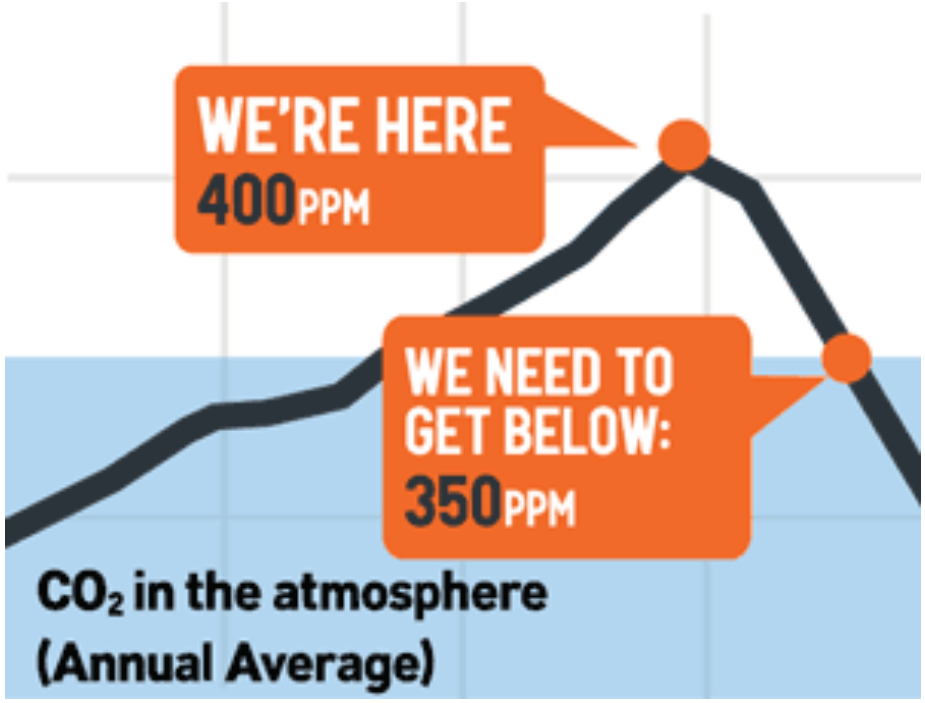
- strengthen the **evidence-base** in support of the implementation of this framework;
- promote **scientific research** of disaster risk patterns, causes and effects;
- disseminate **risk information** with the best use of geospatial information technology;
- promote and support the **availability and application of science and technology to decision-making**.

United Nations Framework Convention on Climate Change (UNFCCC)

- The conference negotiated the Paris Agreement, a global agreement on the reduction of climate change, the text of which represented a consensus of the representatives of the 196 parties attending it.
- The agreement will become legally binding if joined by at least 55 countries which together represent at least 55 percent of global greenhouse emissions.
- On 22 April 2016 (Earth Day), 174 countries signed the agreement in New York.

Climate Change

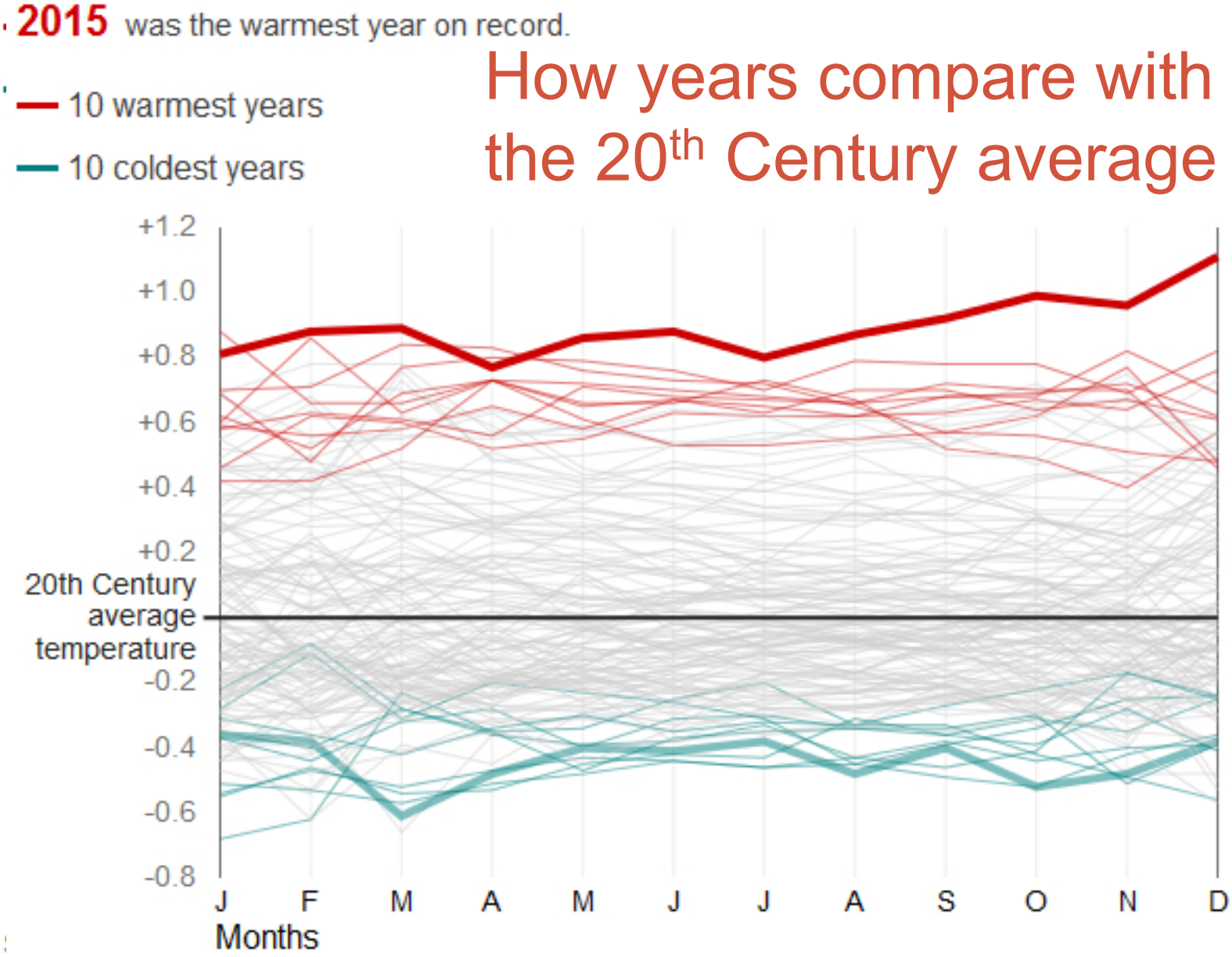
Why is 450 ppm dangerous and 350 ppm safe?



The answer is complex:

- runway greenhouse effect and irreversible conditions;
- associated temperature increases and consequences on adaptability of organisms = our crops and ecosystem services.

How years compare with the 20th Century average



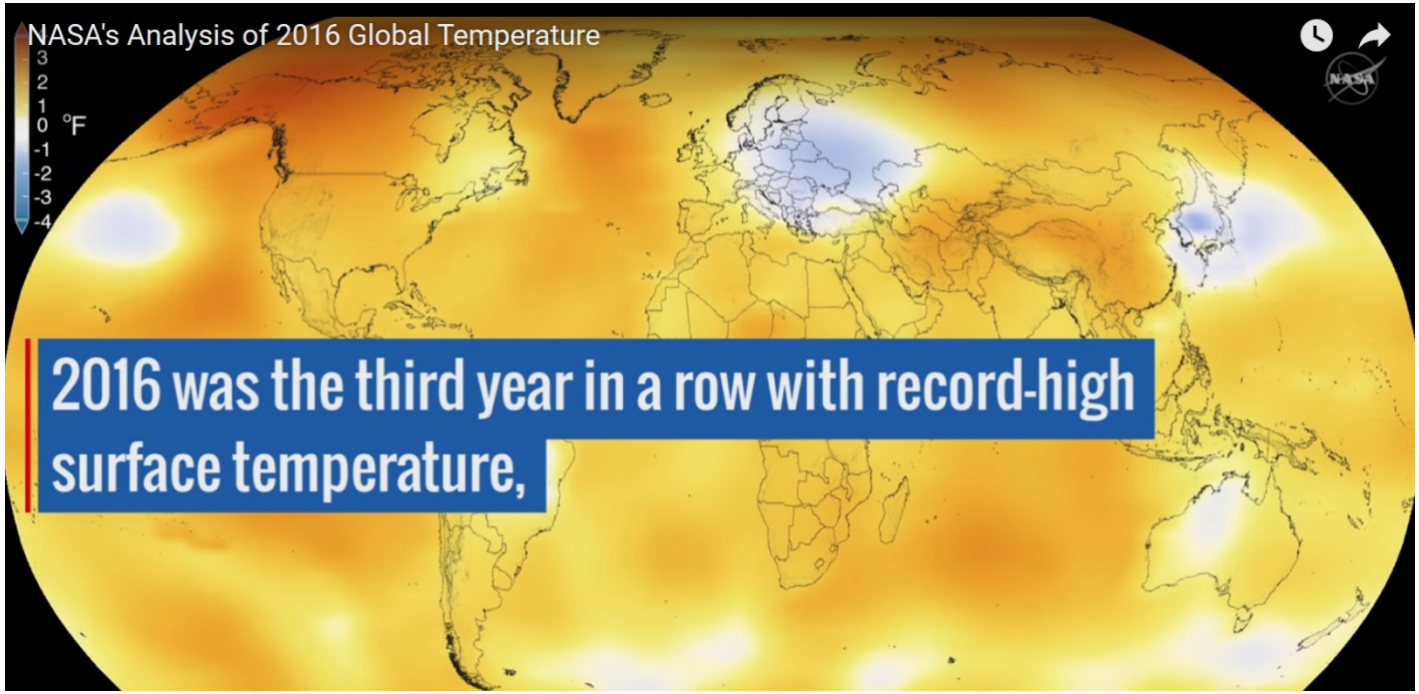
http://www.bbc.com/news/science-environment-36303046

theguardian

Climate change
Global warming

2016 hottest year ever recorded – and scientists say human activity to blame

- Final data confirms record-breaking temperatures for third year in a row
- Earth has not been this warm for 115,000 years



https://www.nasa.gov/press-release/nasa-noaa-data-show-2016-warmest-year-on-record-globally

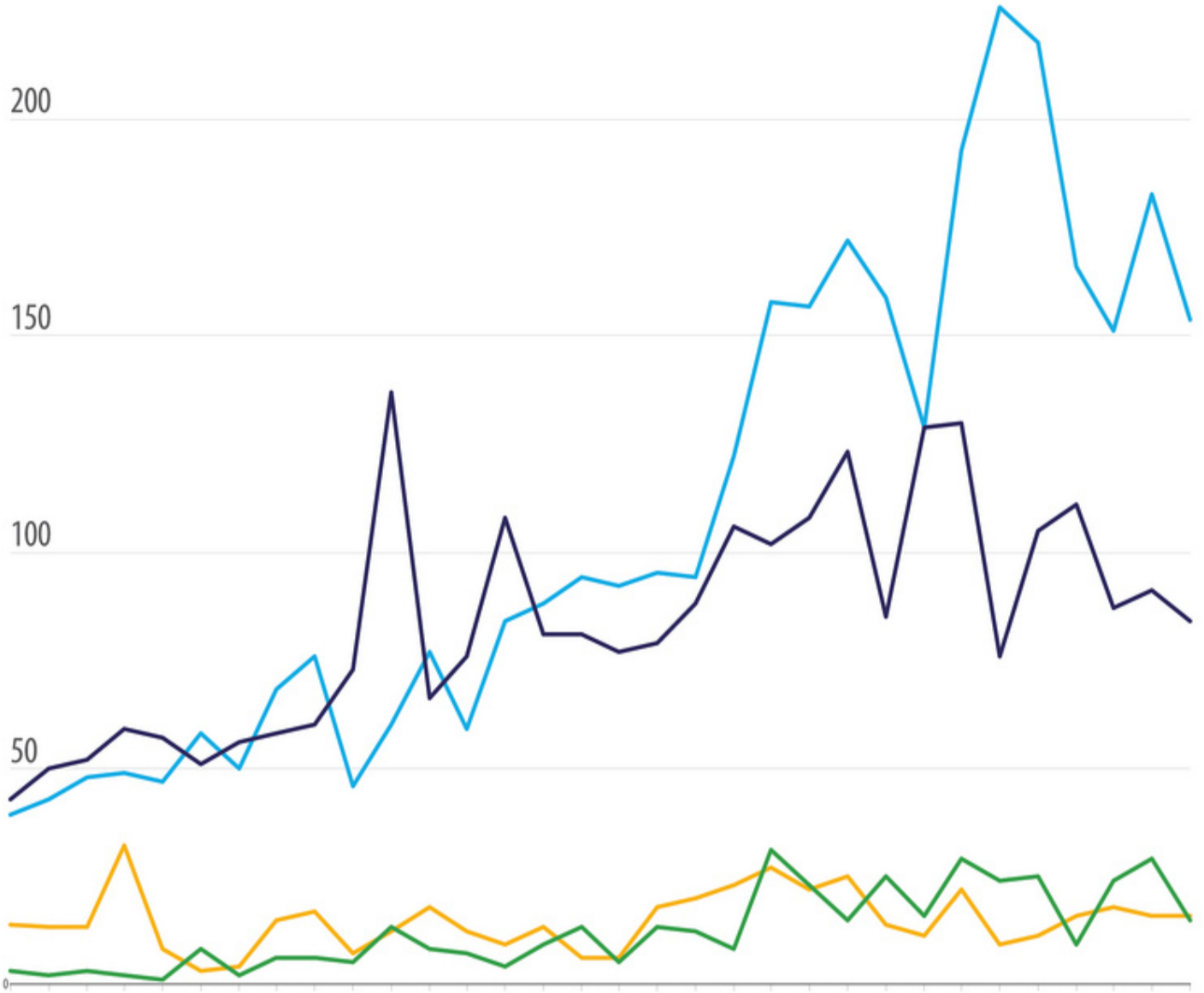
Number of Climate-related Disasters Around the World (1980-2011)

3455 FLOODS

2689 STORMS

470 DROUGHTS

395 EXTREME TEMPS



UNISDR
The United Nations Office for Disaster Risk Reduction
http://www.unisdr.org

Version: 13 June 2012

DATA SOURCES

EM-DAT - http://www.emdat.be/ - The OFDA/CRED International Disaster Database; Data version: 13 June 2012 - v12.07

Humanitarian Symbol Set (2008): http://www.ungiwg.org/map/guideline.php

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
FLOOD	39	43	48	49	47	58	50	68	76	46	60	77	59	84	88	94	92	95	94	122	158	157	172	159	129	193	226	218	166	151	183	154
STORM	43	50	52	59	57	51	56	58	60	73	137	66	76	108	81	81	77	79	88	106	102	108	123	85	129	130	76	105	111	87	91	84
DROUGHT	14	13	13	32	8	3	4	15	17	7	12	18	12	9	13	6	6	18	20	23	27	22	25	14	11	22	9	11	16	18	16	16
EXTREME TEMPERATURE	3	2	3	2	1	8	2	6	6	5	13	8	7	4	9	13	5	13	12	8	31	23	15	25	16	29	24	25	9	24	29	15

SDGs agreed 2015-2030

UN Headquarters, New York: 25 September 2015


SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

17 SDGs – 169 targets

SUSTAINABLE DEVELOPMENT GOALS
HEALTH-RELATED TARGETS

Goal 1. End poverty in all its forms everywhere

1.3 Implement nationally appropriate social protection systems and measures for all
1.5 Build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other shocks and disasters

Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture

2.1 End hunger and ensure access by all people to safe, nutritious and sufficient food all year round
2.2 End all forms of malnutrition

Goal 3. Ensure healthy lives and promote well-being for all at all ages

3.1 Reduce the global maternal mortality ratio to less than 70 per 100,000 live births
3.2 End preventable deaths of newborns and children under 5 years of age
3.3 End the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases
3.4 Reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being
3.5 Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol
3.6 Halve the number of global deaths and injuries from road traffic accidents
3.7 Ensure universal access to sexual and reproductive health-care services
3.8 Achieve universal health coverage
3.9 Substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
3.a Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control
3.b Support the research and development of vaccines and medicines for communicable and noncommunicable diseases that primarily affect developing countries and provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health
3.c Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries
3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks

Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

4.5 Eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities
4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, nonviolent, inclusive and effective learning environments

Goal 5. Achieve gender equality and empower all women and girls

5.2 Eliminate all forms of violence against all women and girls in the public and private spheres
5.3 Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation
5.6 Ensure universal access to sexual and reproductive health and reproductive rights

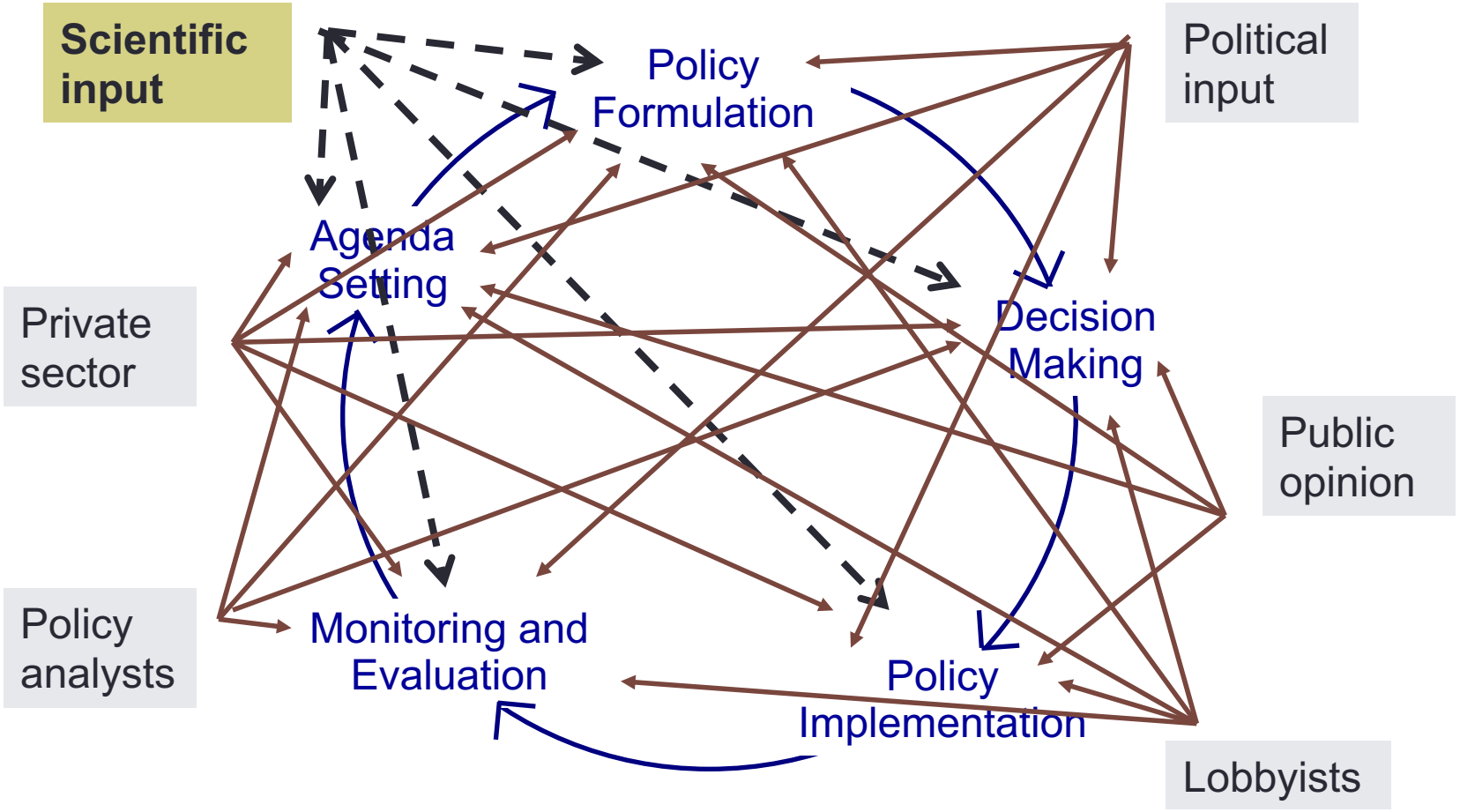
Goal 6. Ensure availability and sustainable management of water and sanitation for all

6.1 Achieve universal and equitable access to safe and affordable drinking water for all
6.2 Achieve access to adequate and equitable sanitation and hygiene for all and end open defecation

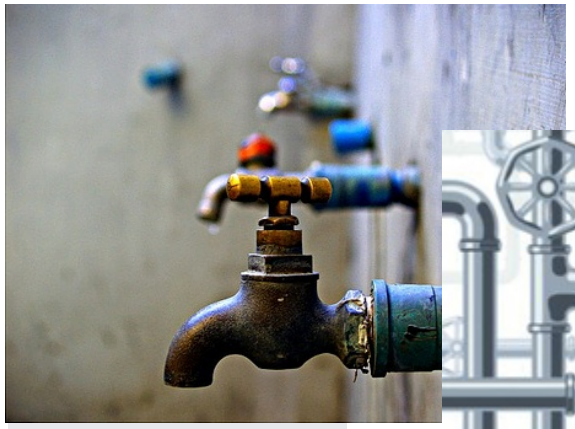
Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all

7.1 Ensure universal access to affordable, reliable and modern energy services

Classic policy cycle is a concept only

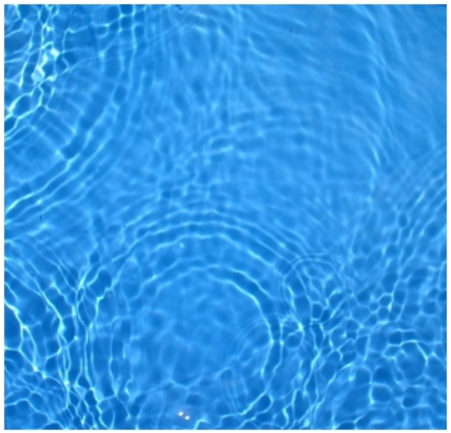


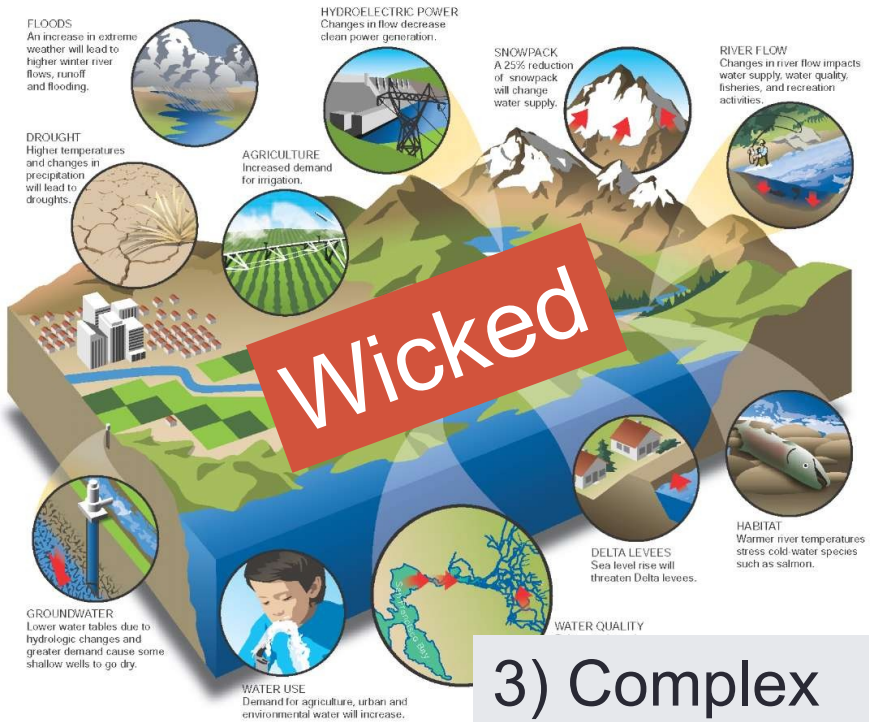
Three types of problems



1) Simple

2) Complicate





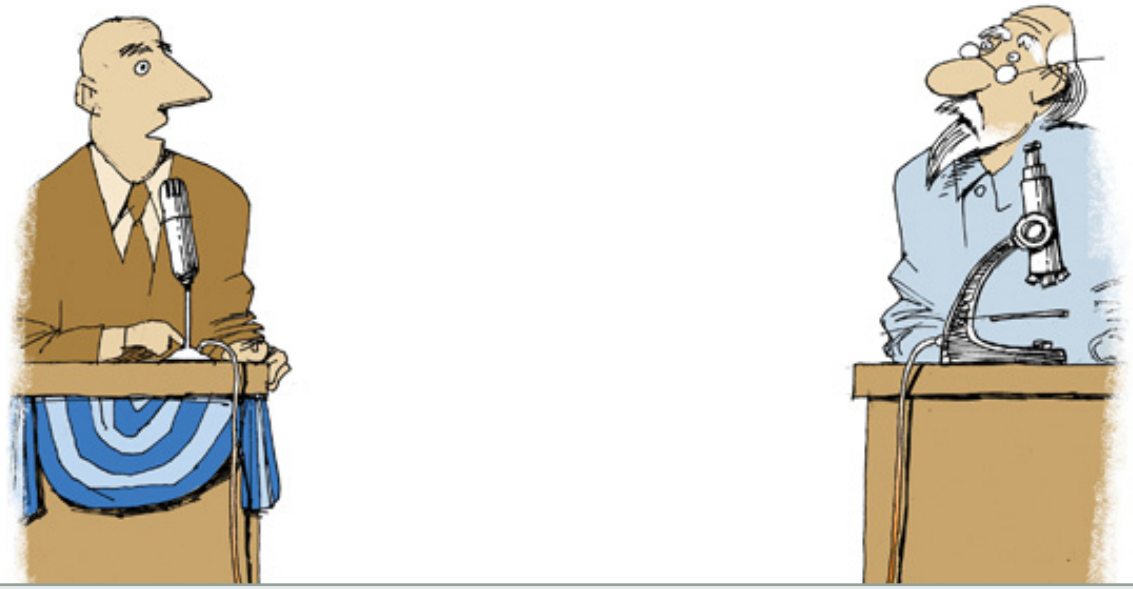
3) Complex

The Scientist » Magazine » Critic At Large

The Great Divide

A two-way bridge between science and policy is desperately needed.

By Didier Schmitt | December 1, 2013



"The search for scientific bases for confronting problems of social policy is bound to fail, because of the nature of these problems.
They are 'wicked' problems, whereas science has developed to deal with 'tame' problems."
Rittel and Webber 1973

IAP
TWAS
OWSD:
all hosted at ICTP in Trieste, Italy

iap SCIENCE RESEARCH HEALTH
the interacademy partnership

- InterAcademy Partnership

twas

- The World Academy of Sciences

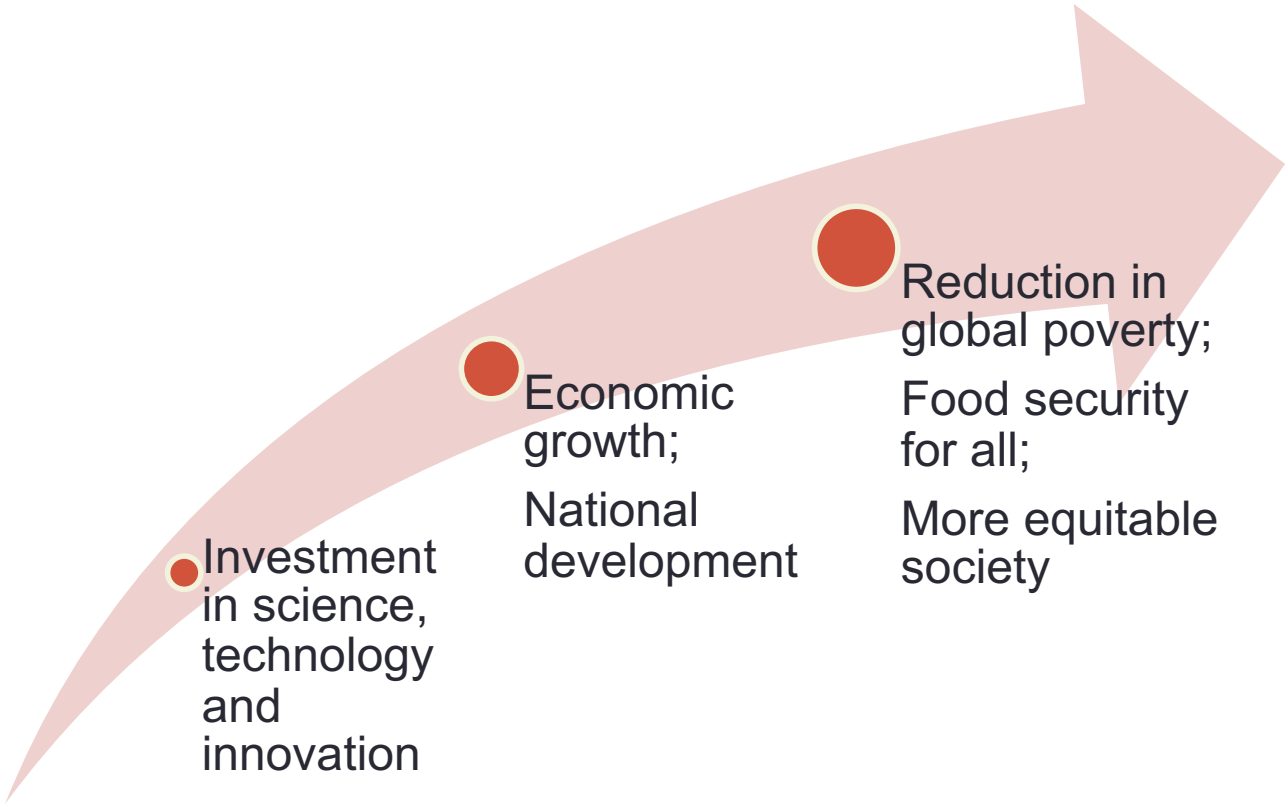
ORGANIZATION FOR WOMEN IN SCIENCE FOR THE DEVELOPING WORLD

- Organization for Women in Science for the Developing World

Three organizations - Guiding principles

Backed by science and engineering, nations can address challenges in agriculture, climate, health and energy and other areas.

Three organizations - One mission



What is IAP?

More than 130 member academies around the world …

… organized into four regional networks

… and a thematic network.

iap SCIENCE RESEARCH HEALTH
the interacademy partnership

17 PARTNERSHIPS FOR THE GOALS

3 GOOD HEALTH AND WELL-BEING

What does IAP do?

Four strategic priorities:

- Provide evidence-based advice and perspectives on global issues;
- Strengthen the global research enterprise;
- Develop a scientifically literate global citizenry;
- Strengthen the global network (of science academies).

How does IAP do it?

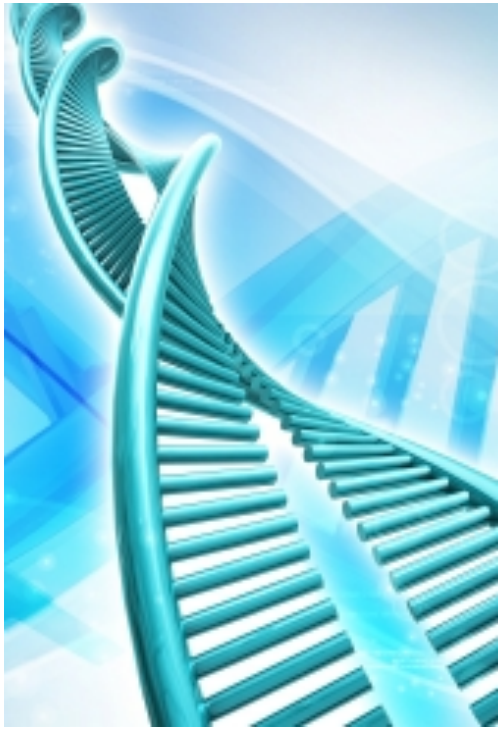
Statements – Short (2-3 page) documents that provide a synthesis the latest research findings on topical issues and provide advice and recommendations to policy-makers.

IAMP Statement : A Call for Action to Strengthen Healthcare for Hearing Loss
March 2015

IAP Statement on Synthetic Biology
May 2014

Joint IAP/IAMP Statement on Antimicrobial Resistance: A Call for Action
November 2013

Policy advice/ recommendations



iap
the global network of science academies

IAP Statement on Realising Global Potential in Synthetic Biology: Scientific Opportunities and Good Governance

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WORLD VIEW *A personal take on events*

DAVID AUSSERHOFER/LEOPOLDINA

Time to settle the synthetic controversy

If synthetic biology is to thrive, the world needs to decide now how the field should be regulated and supported, says **Volker ter Meulen**.

BEYOND DIVISIONS
The future of synthetic biology
nature.com/synbio

The creation of an artificial yeast chromosome shows that synthetic biology is getting closer to what most scientists want: to be able to deliver benefits to society. The field has already found cheaper ways to produce medicines, and is making progress in applications from water purification to materials design.

The topic is, however, controversial, and that is jeopardizing its promise. Environmental groups argue that it poses risks to health and the environment and have called for a global moratorium. We have been here before: exaggerated fears and uncritical acceptance of claims of the risks of genetic modification led to excessively cautious regulation and a block on innovation that not only slowed the development of new products, but also deterred basic science.

The debate over synthetic biology is now entering a critical phase. The Conference of the Parties to the Convention on Biological Diversity (CBD) — the global framework that governs the protection of biodiversity — is currently exploring possible restrictions and will clarify its position at meetings next month and in October. But given the precedent of how the issue of genetically modified crops was handled, many scientists are worried that some policy-makers will take unsubstantiated concerns of environmental groups at face value and impose cumbersome and unnecessary rules. To prevent that, we need an objective, evidence-based and balanced assessment of the risks and benefits, both within from existing fields, such as genetic modification. This means that the work is not proceeding entirely without regulation, as some claim; much of it is, in fact, governed by existing rules. The use, release and movement across borders of genetically modified organisms, for instance, are covered by the application of the Cartagena Protocol on Biosafety.

The recognition that key methods are already controlled is crucial, because it should defuse some of the public controversy about risk. Also important is striking the right balance between statutory regulation and self-governance by scientists and scientific bodies. (The IAP and others have published recommendations on how to develop individual and institutional codes of conduct.)

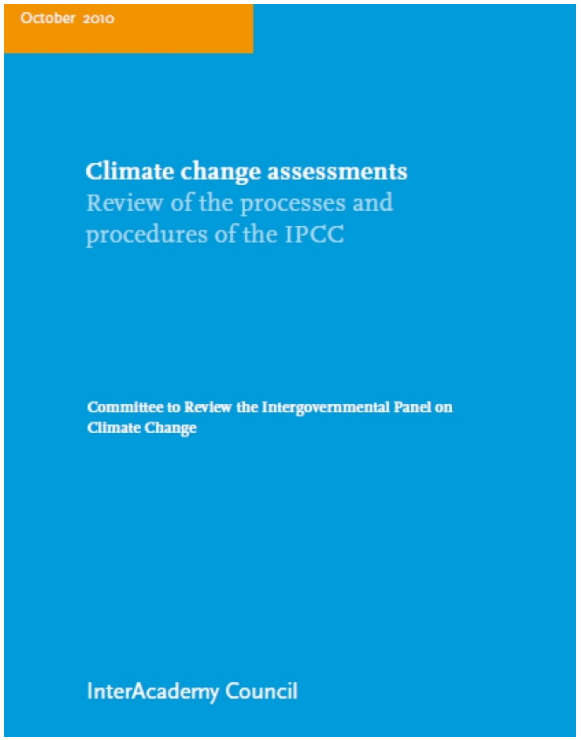
FUNDING BODIES ACROSS THE WORLD MUST ANTICIPATE THE POTENTIAL OF SYNTHETIC BIOLOGY.

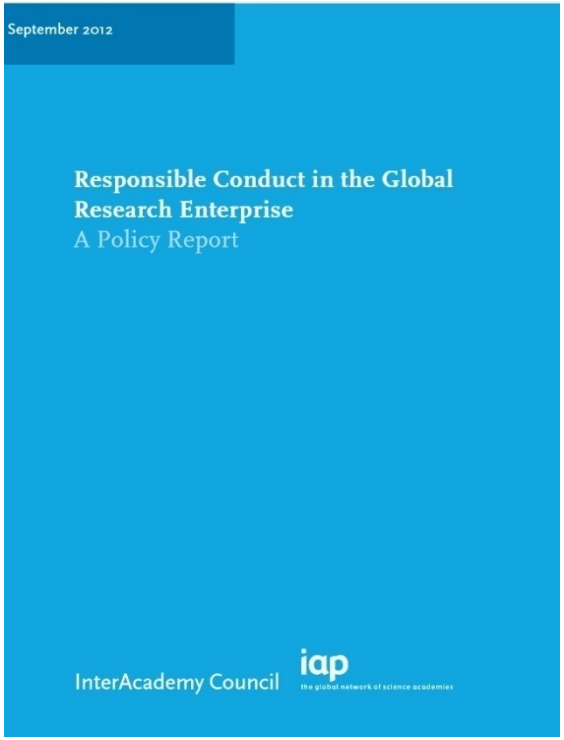
A second aspect that must be considered more broadly is how the results of synthetic biology are owned and shared. The current situation reflects its mixed parentage from both the biosciences (with its tradition of patenting) and engineering and software development (which embrace open sourcing and sharing). The announcement of how researchers worldwide worked to produce a synthetic yeast chromosome shows how openness can pay off in academia.

As synthetic biology progresses, techniques and tools will inevitably be developed that are not covered by existing regulations. It is reasonable to assume, the IAP argues, that these will allow the research to be done with greater precision. More-controlled modifications to genetic sequences,

How does IAP do it?

Reports – Extended, fully researched documents (usually more than 100 or 200 pages).
Take a long time (2-3 years) to prepare.
Often commissioned by major international organization, e.g. UN.





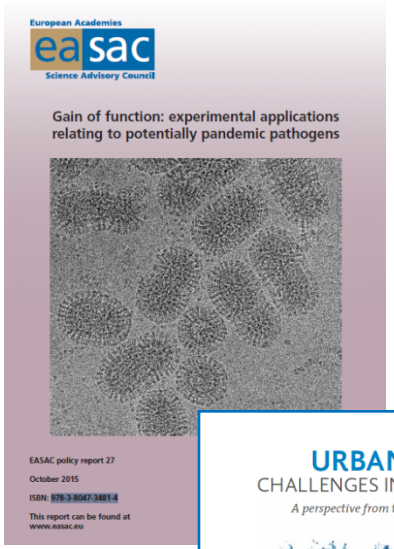
How does IAP do it?

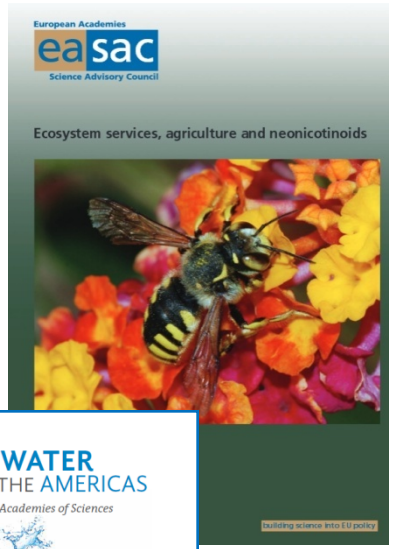
Improving Scientific Input to Global Policymaking: Strategies for Attaining the Sustainable Development Goals

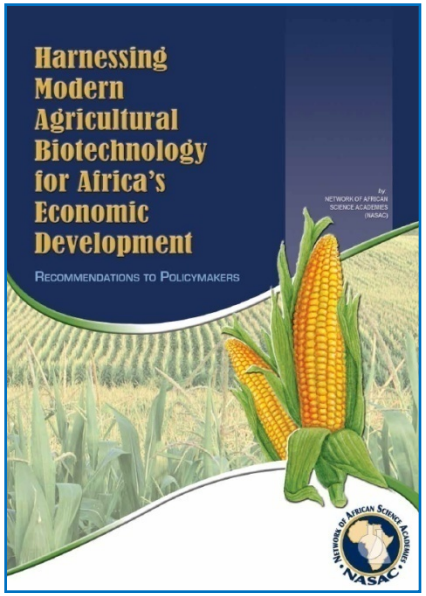
This 3-year project will develop a framework for action that strengthens the global science-policy interface and will also facilitate productive collaboration and adoption of best practices among the organizations that generate scientific advice.

How does IAP do it?

Regional influence







New projects:
Regional ➤ Global

How does IAP do it?

Regional influence

Harnessing Science, Engineering, and Medicine to Address Africa's Challenges

This 3-year project is engaging African and non-African leaders in science, engineering and medicine, African governments, bodies such as the United Nations and the African Union, the global donor community, industry, and other stakeholders in activities that demonstrate the value of independent academy science-policy advice, with the ultimate goal of ensuring sustainability of national investment of science and technology.

How does IAP do it?

Regional influence:
Regional > Global

Food and Nutrition Security and Agriculture

Four regional networks' statements are currently being finalised.
Once available, they will be used to feed into a global statement, to be launched at an international event and disseminated among policy-makers and stakeholders world wide.

How does IAP do it?

Involvement with the UN

Many UN conventions and protocols have science at their core:

- Convention on Biological Diversity;
- Convention on Biological and Toxin Weapons;
- UN Framework Convention on Climate Change;
- Sendai Framework for Disaster Risk Reduction.

A New World: Development through S&T

TWAS has joined with others, including **IAP** and **OWSD**, to promote a **science-for-development** model for the South.

The result?

A New World: Development through S&T

- Rising R&D investment by many developing nations
- Significant growth, poverty-reduction
- A development model for other nations

A troubling gap

Some have S&T, some don't

- Globally, 81 nations fall into the category of S&T-lagging countries.
- 48 are classified as Least Developed Countries.

Africa: A time of historic challenge

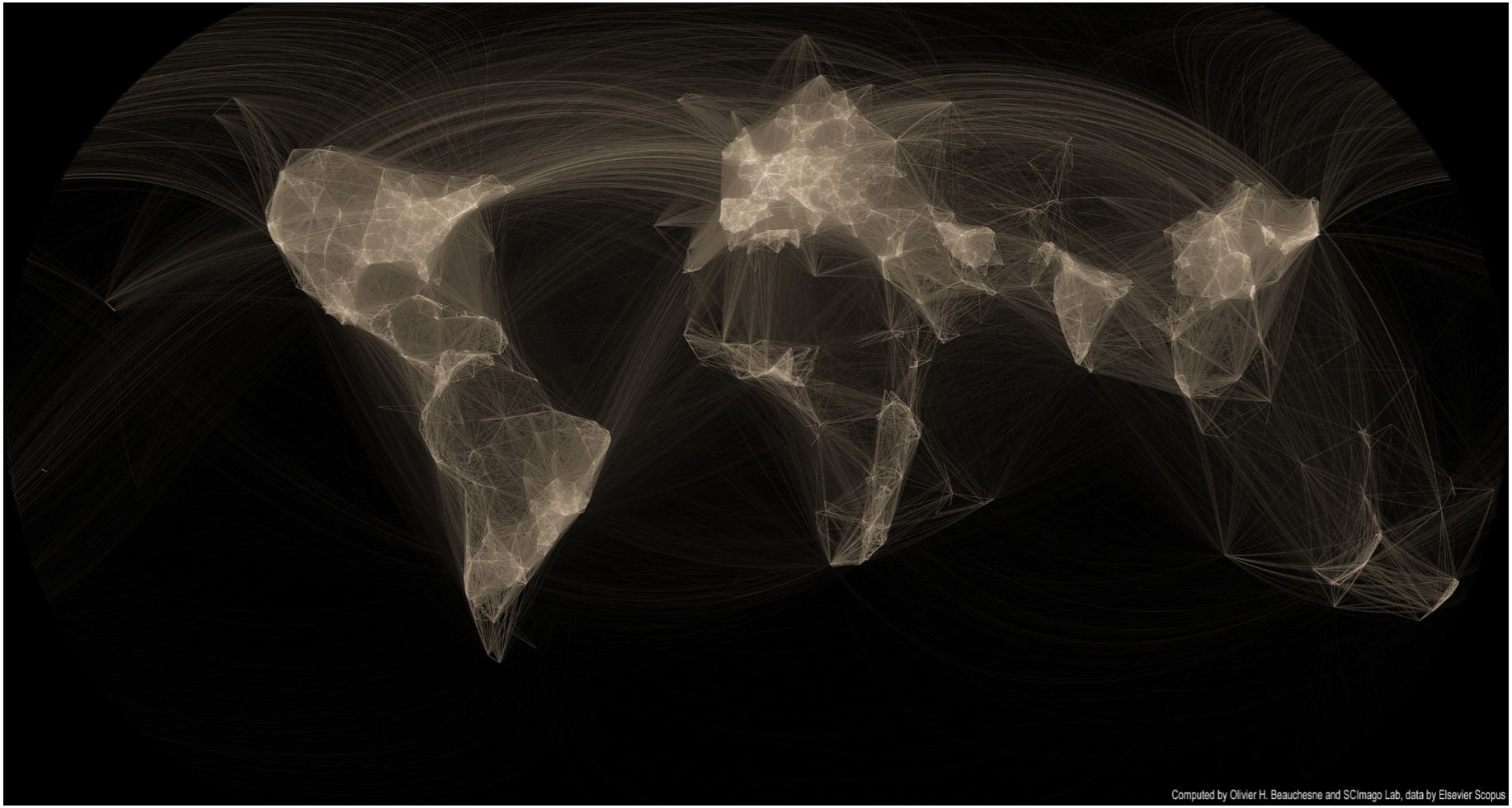
Of the world's

48

Least Developed Countries…

34 are in Africa

Global scientific cooperation



African challenges: Population

- Africa today has 1.1 billion people – 14% of the world's population
- Population could increase to 2.4 billion in 2050…

World Population Prospects: The 2012 Revision, United Nations

African challenges: Population

- In 2010, about 200 million Africans are between 15 and 24 years old.
- By 2050, over 450 million

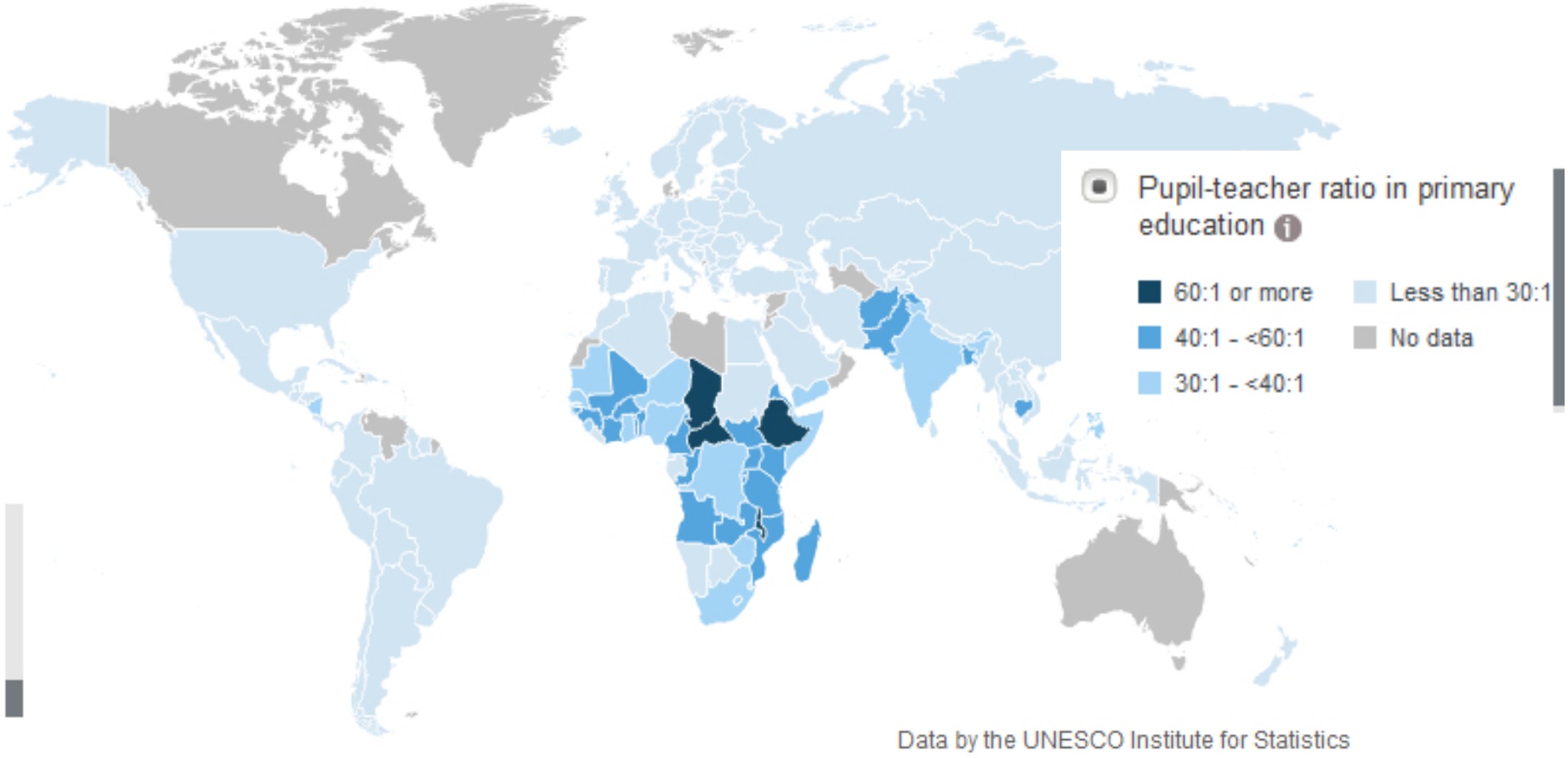
World Population Prospects: The 2012 Revision, United Nations

Africa: The education challenge

- Young people represent an enormous potential resource…
- Africa will need hundreds of thousands of new scientists and engineers in the coming decades.

Africa: The education challenge

But Africa's educational system does not have the capacity to teach and train them.



Science education

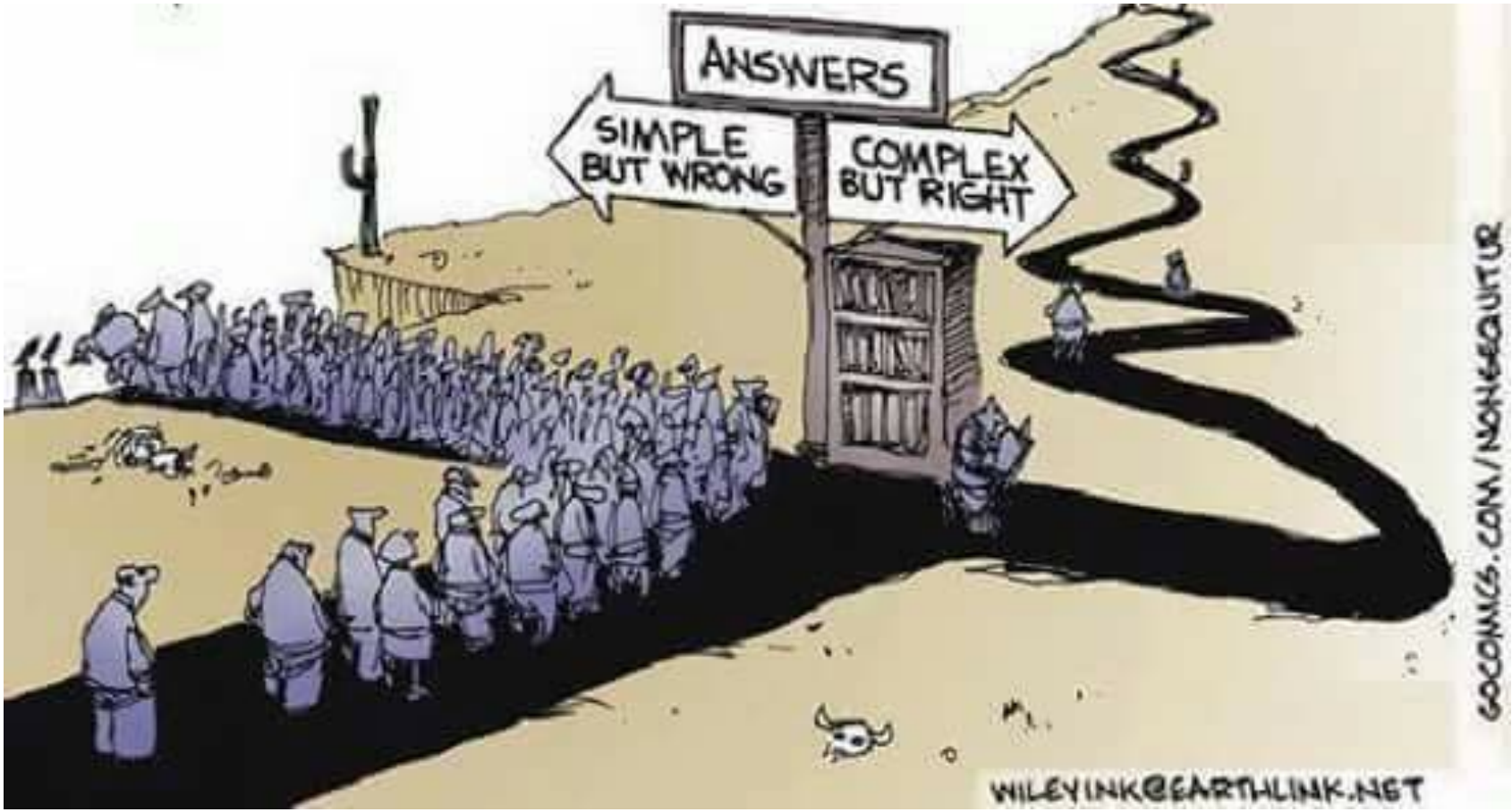
"I'm sorry, Jeannie, your answer was correct, but Kevin shouted his incorrect answer over yours, so he gets the points."

4 QUALITY EDUCATION

Science education

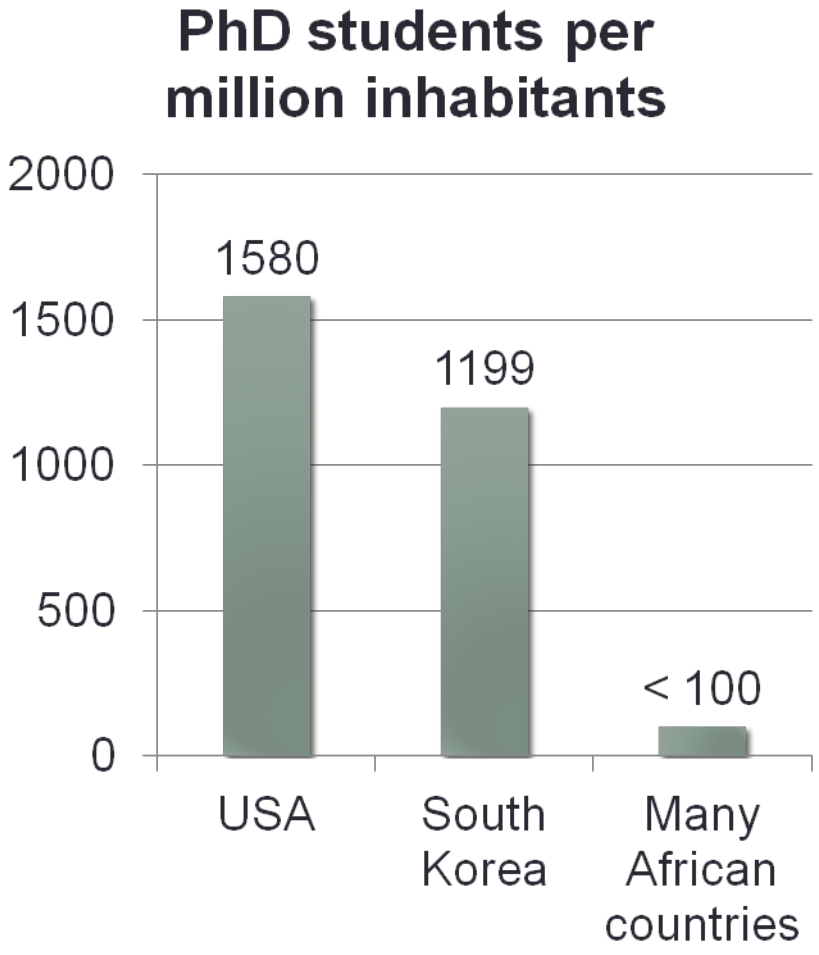
Through its **Science Education Programme**, IAP has been promoting 'Inquiry-based science education' (IBSE) around the world. It's main focus is on primary education.

IBSE = "Learning by doing"
Developing 'critical thinking' skills


ANSWERS
SIMPLE BUT WRONG
COMPLEX BUT RIGHT
WILEYINK@EARTHLINK.NET

African challenges: The PhD deficit

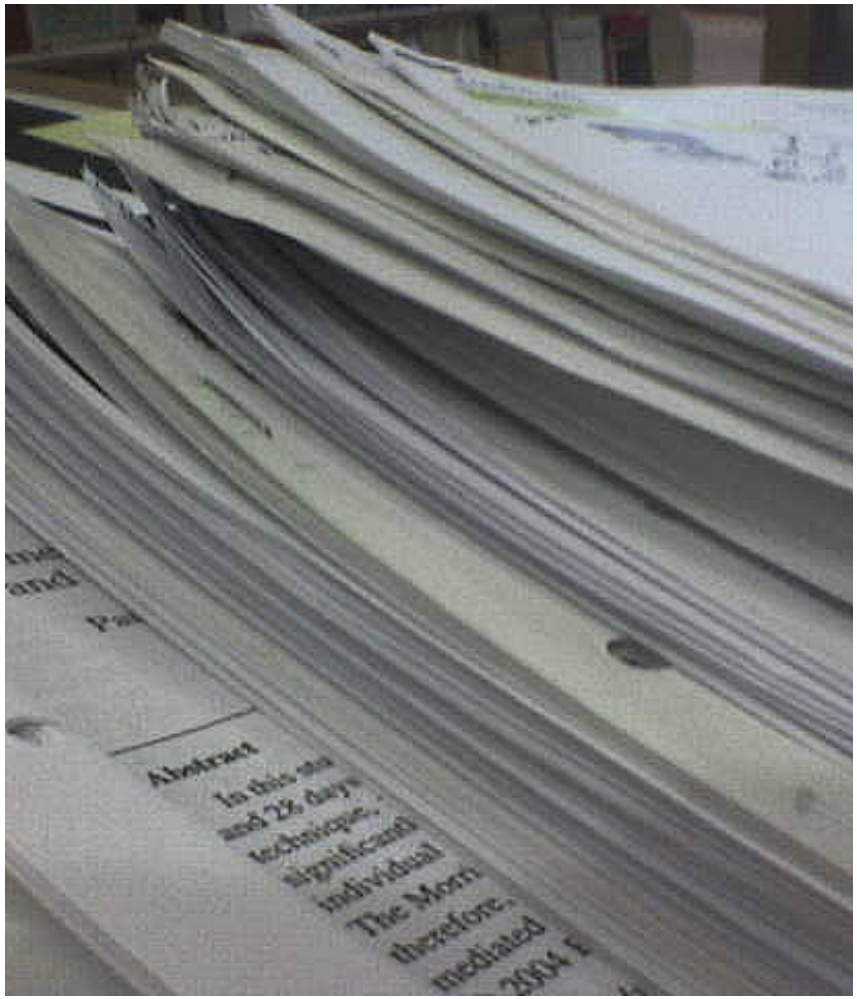
- Many nations of Africa have fewer than 100 PhD students per million population
- Some have fewer than 20



UNESCO, SciDev.net

African challenges: Scientific output

- Africa accounts for only 0.8% of global R&D expenditure
- only 2.4% of global research publications



Science & Engineering Indicators 2014, US National Science Board

Abdus Salam

"Funds allotted for science in developing countries are small, and the scientific communities sub-critical. Developing countries must realize that the scientific men and women are a precious asset. They must be given opportunities, responsibilities for the scientific and technological developments in their countries. Quite often, the small numbers that exist are underutilized. The goal must be to increase their numbers because a world divided between the haves and have-nots of science and technology cannot endure in equilibrium. It is our duty to redress this inequity."

TWAS Programmes

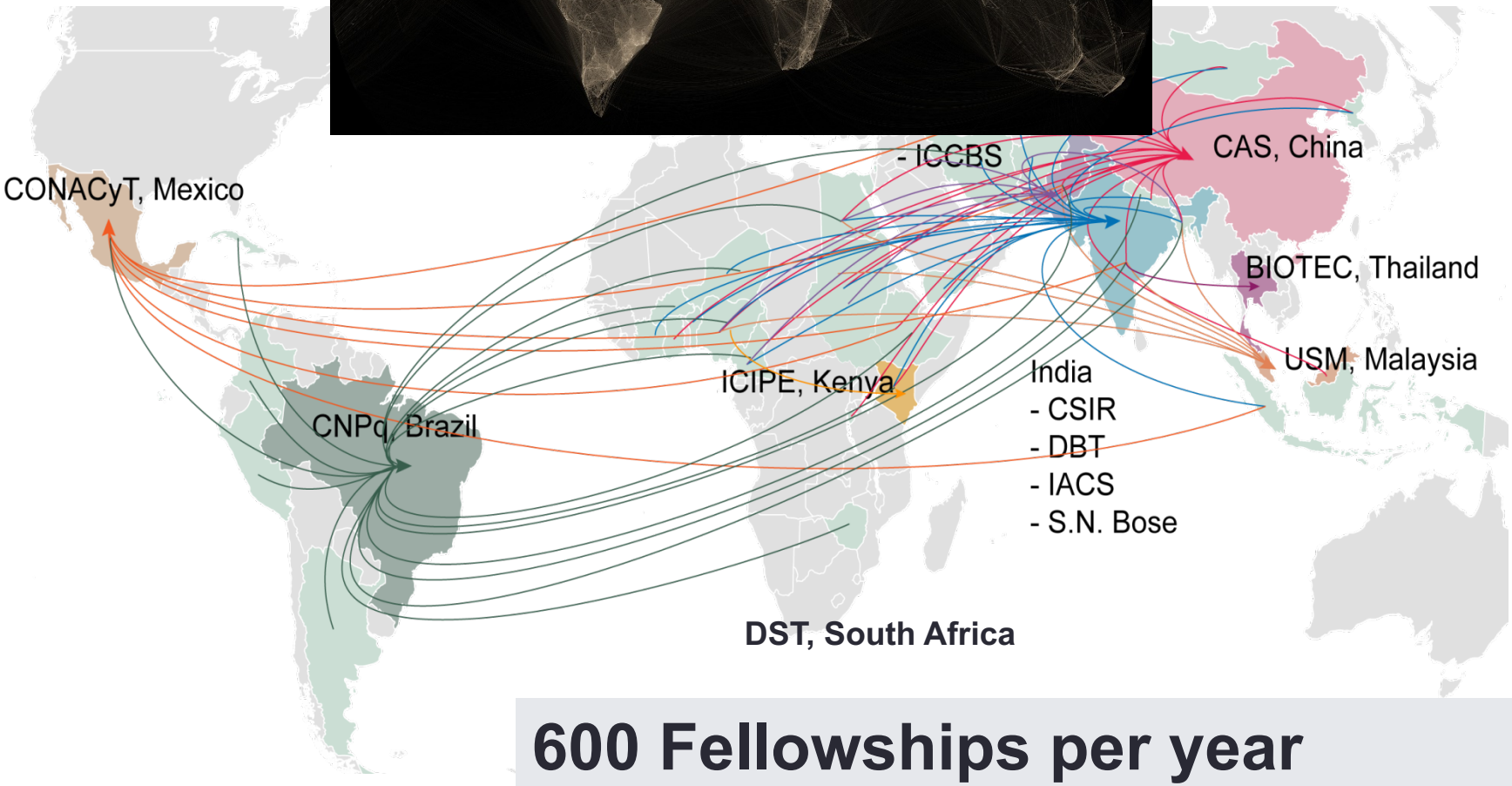
- PhD training
- Human capital mobility
- Research support
- Honouring excellence

Scientific capacity and excellence in the South

PhD Fellowships

Educating and training PhD-level scientists helps a country not only in research and education, but also in science policy, business and international relations.

TWAS P

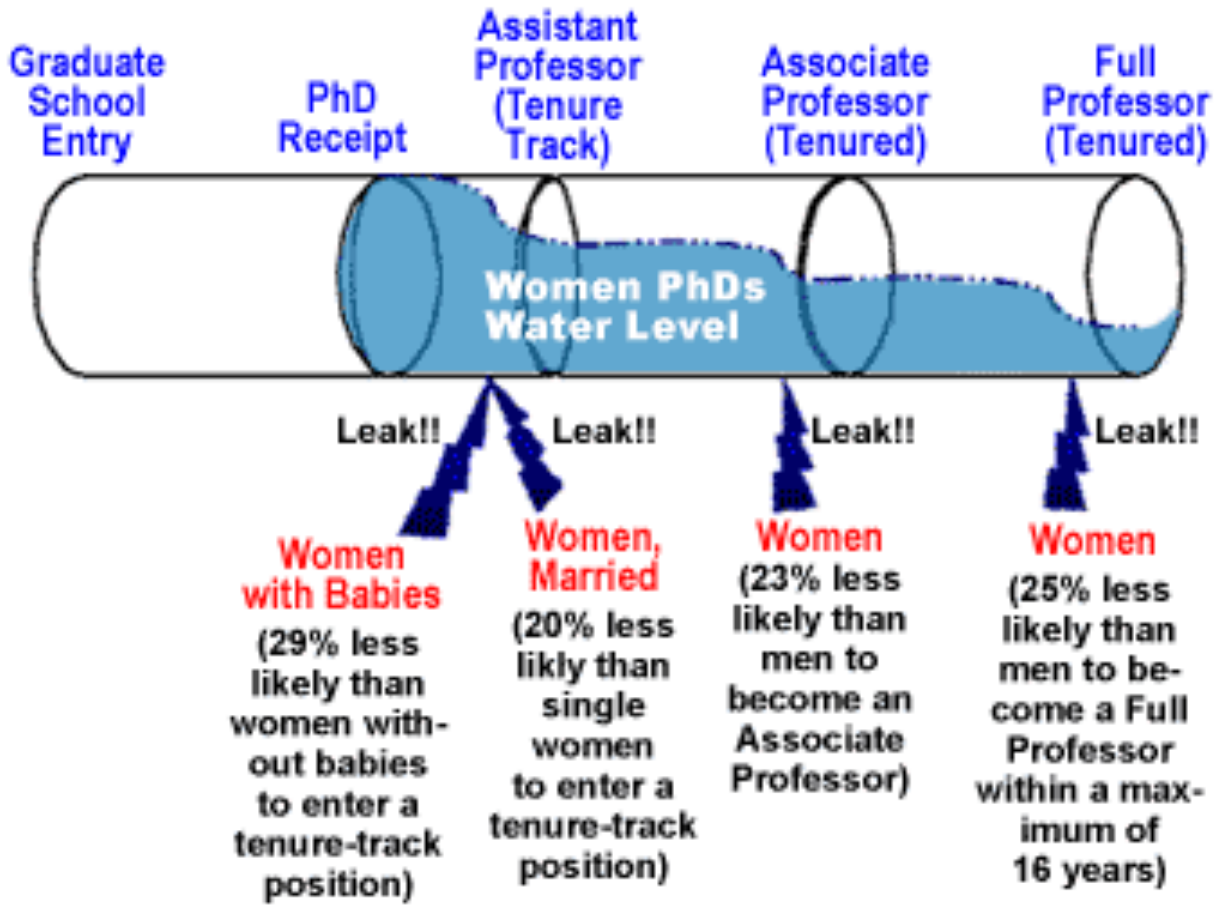


600 Fellowships per year

PhD; Postdoctoral; Visiting researchers/professors

Women in science

Leaks in the Academic Pipeline for Women*



"Leaky pipeline"

Women can do it!

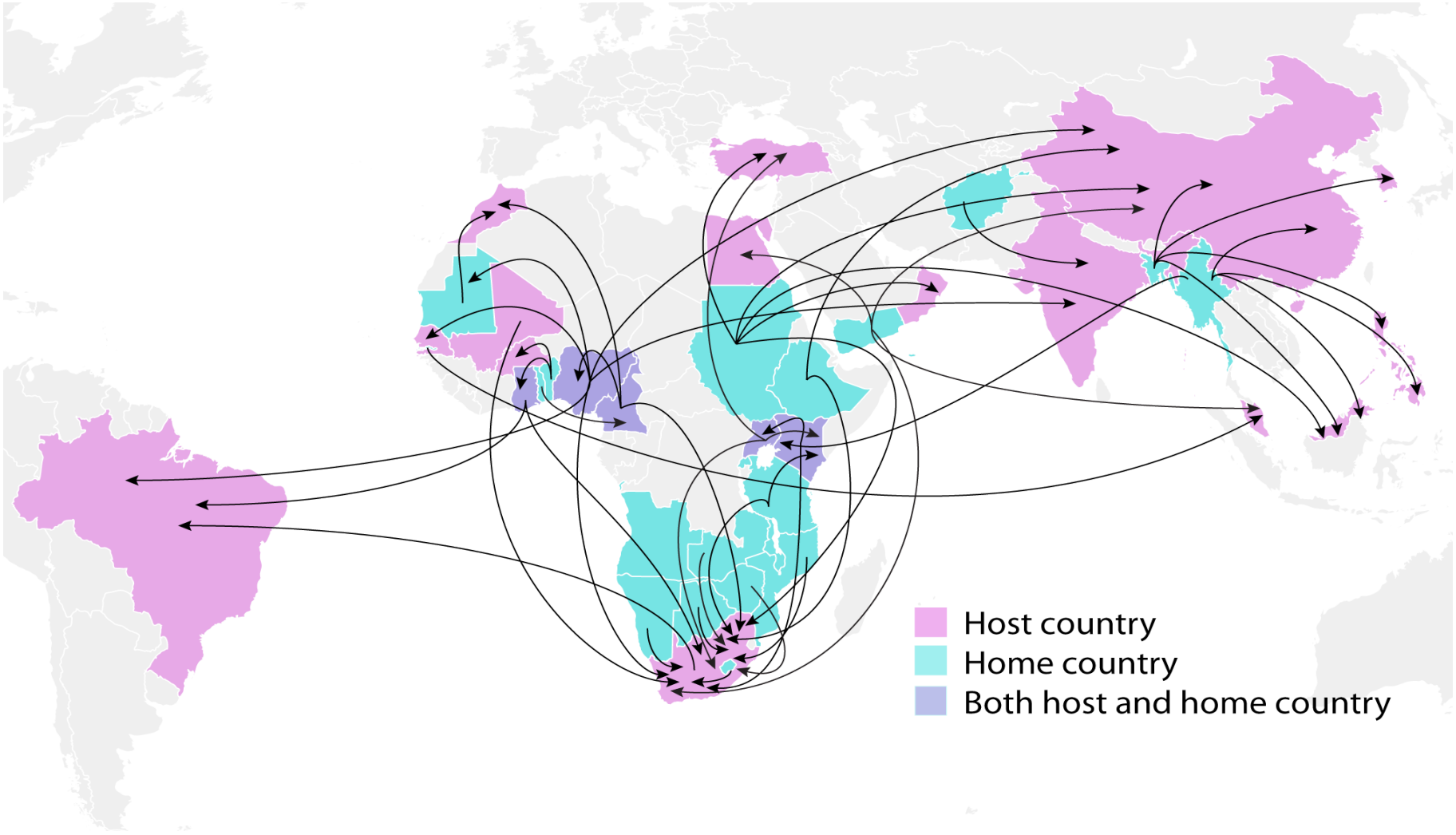
Ayokunmi Omolola Oyeleye, awardee from Nigeria, carrying out a research visit at the Institute of Microbiology, CAS.

"With so much joy I write to inform you that I was delivered of a baby boy last week, 17 May. I am doing well and so is my baby. I really want to appreciate OWSD for the favourable consideration towards the deferment of my fellowship programme. I am looking forward to being back in China and to resume my studies by September."

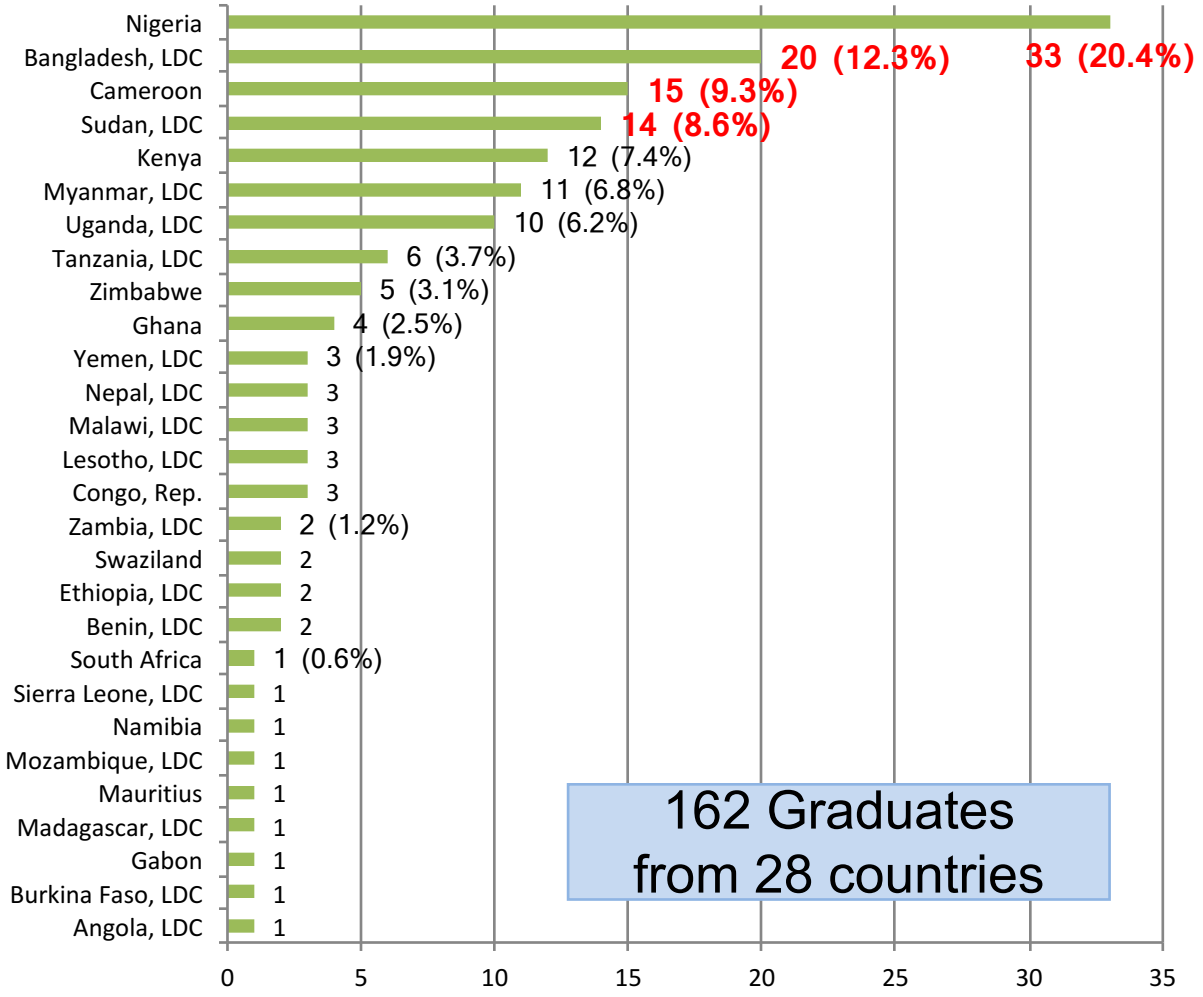
OWSD Fellowships

- 340 awardees
- 162 graduates
- 49 completed
- 104 onsite
- 25 pending

OWSD PhD Fellowships

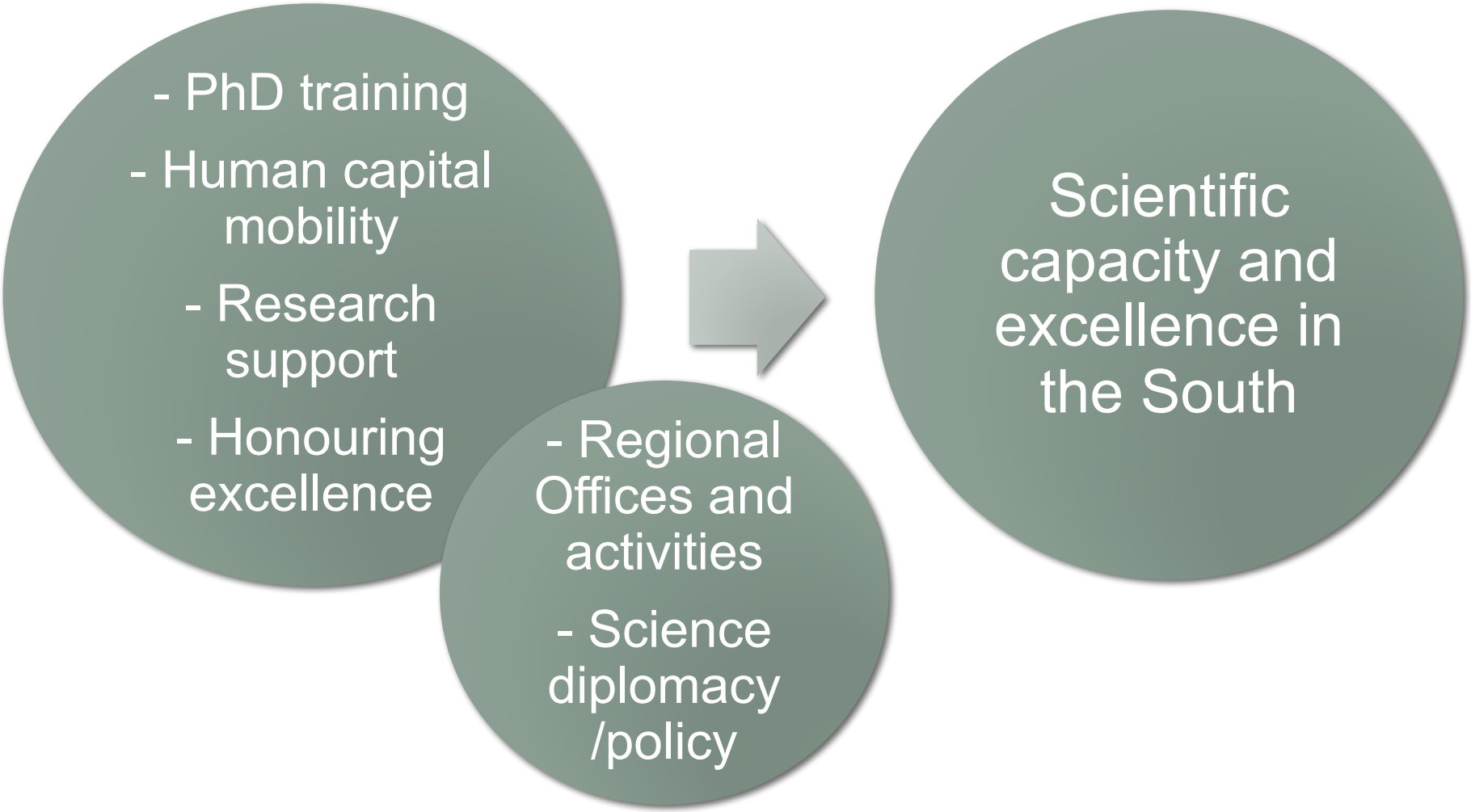


OWSD Graduates




5
GENDER EQUALITY
10
REDUCED INEQUALITIES

More on TWAS

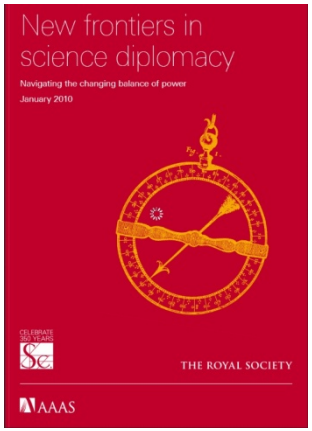

- PhD training
- Human capital mobility
- Research support
- Honouring excellence
- Regional Offices and activities
- Science diplomacy /policy
Scientific capacity and excellence in the South

Science diplomacy

What is 'science diplomacy'?

- Science *in* diplomacy – Informing foreign policy objectives with scientific advice
- Diplomacy *for* science – Facilitating international science cooperation
- Science *for* diplomacy – Using science to improve international relations between countries.

Three 'summer courses' held in Trieste in partnership with AAAS: June 2014, June 2015, July 2016.



AAAS-Royal Society, 2009

Science diplomacy

Transboundary issues:

- Climate change;
- Pollution;
- Sustainable use of biodiversity, including fisheries;
- Sustainable water management;
- Communicable diseases;
- Genetically modified organisms;
- Energy: biofuels; nuclear waste; dams; carbon emissions, etc.

Wicked

Science diplomacy – Thematic workshops

Transboundary issues:

- Energy policies for a sustainable future – Trieste, December 2013;
- Sustainable fisheries – Mexico, September 2014;
- Climate change & high-altitude agriculture – Trieste, December 2014;
- Sustainable water management – Trieste, Nov/Dec 2015.

Challenges for a new era

Despite many countries' massive expenditure on military resources, the major challenges facing the world today - climate change, emerging diseases, poverty, etc - cannot be solved by military intervention.

Science diplomacy must be part of the answer.

Daryl Copeland, Canadian Global Affairs Institute, speaking at the AAAS-TWAS Science Diplomacy summer course, June 2015.

'Bridging the Chasm': AAAS Science &Diplomacy journal

www.sciencediplomacy.org/perspective/2015/bridging-chasm

More than 100 young scientists from developing countries trained in science diplomacy.

Three organizations: One mission

Thank you

Peter McGrath

m c g r a t h @ t w a s . o r g

www.twas.org

www.iapartnership.org

www.owsd.net