

TWAS and the Future of Science in the Developing World

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Outline

- ✦ TWAS : Major Events 1983-2012
- ✦ TWAS : Strategic Aims and Programs
- ✦ TWAS : Future Directions
- ✦ Global Challenges
- ✦ Action

Major Events 1983-2012

First decade
1983-1992

1983



- ✦ June: Abdus Salam invited Hassan to ICTP to help organize foundation meeting
- ✦ November: Foundation meeting held in Trieste: Approved statutes, elected first TWAS council and developed strategy for fund-raising

1984



- ✦ September: First grant of 50,000 Canadian dollars received from CIDA
- ✦ October: 1.5 million US dollars approved by Italian Ministry of Foreign Affairs to support activities

1985



- ✦ July: Inaugural conference on 'South-South and South-North Cooperation in Sciences'
- ✦ Launching of Academy by UN Secretary General J. Perez de Cuellar
- ✦ Task force to establish African Academy of Sciences under leadership of T. R. Odhiambo

1986



- ✦ February: Agreement with IAEA to administer TWAS funds and staff through ICTP
- ✦ October: 4th Council Meeting held in Trieste
- ✦ Launching of major programmes: awards, research grants, South-South fellowships and lectureships

1987



- ❖ September: 2nd TWAS General Conference, 3rd General Meeting in Beijing, China, hosted by Chinese Academy of Sciences (CAS)
- ❖ Theme: Future of Science and Technology in China
- ❖ First conference in the South. Agreed that all future TWAS conferences be held in the South

1987



- ❖ Theme: Future of Science and Technology in China
- ❖ Presented first comprehensive analysis of S&T development in China
- ❖ Agreed that all future TWAS conferences be held in the South

1988



- ✦ October: CIDA-TWAS conference on 'Women in Science' in Trieste.
- ✦ 200 leading women scientists 60 countries attended, incl. two women Nobel laureates: R. Levi-Montalcini and D. C. Hodgkin
- ✦ Meeting decided to establish TWOWS.

1988

- ✦ October: Established in Trieste the Third World Network of Scientific Organizations (TWNSO) by 90 participants, incl. 15 ministers of S&T and higher education



1990



- ✦ October:
3rd General Conference in Caracas, Venezuela, together with 2nd General Assembly of TWNSO, 4th General Meeting of TWAS
- ✦ Conference opened by President Perez who announced setting up of Simon Bolivar Project for Latin America, modelled on Europe's Eureka Project

1990



- ✦ Conference focused on reviewing the status and prospects of S&T in Latin America and the Caribbean,
- ✦ and on recommendations of the report of the South Commission

1991



- ❖ January: TWAS, UNESCO and IAEA signed agreements to transfer administrative responsibilities for TWAS from IAEA to UNESCO

1992

- ❖ November: TWAS's 4th General Conference in Kuwait
- ❖ Conference opened by Amir of Kuwait in presence of large number of ministers of S&T
- ❖ Focus on science in Arab world and environmental pollution caused by Gulf War in 1991



Second decade 1993-2002

1993

- ✦ November:
10th Anniversary
Celebrations in Trieste,
with 8th General Meeting
- ✦ Decided to launch
endowment fund
campaign for US\$ 10
million from developing
countries



1994

- ✦ Contributions to Endowment Fund received from Kuwait, India, China, Pakistan and Brazil
- ✦ October: Foundation meeting of COMSATS in Islamabad inaugurated by Pakistan's Prime Minister and attended by 22 ministers of S&T



1994

- ✦ October: TWAS Founding President Abdus Salam stepped down as president due to health reasons



1995

- ✦ January:
TWAS Council met in Trieste and appointed J.I. Vargas interim president
- ✦ September:
TWAS's 5th General Conference, 7th General Meeting and TWNSO's 8th General Assembly held in Abuja, Nigeria



1996

- ✦ November: Abdus Salam passed away.
- ✦ TWAS's 8th General Meeting held in Trieste in memory of its founding president



1996

- ❖ Vargas elected president for two years (1987/88)
- ❖ Vargas proposed renaming ICTP after its founder



1997

- ❖ September: TWAS's 6th General Conference held in Rio de Janeiro, Brazil, with TWAS's 9th General Meeting, TWNSO's 5th General Assembly and 8th Assembly of International Fund for Science (IFS)



1997



- ❖ Conference hosted by Brazilian Academy of Sciences
- ❖ Conference opened by President of Brazil, TWAS Fellow F.H. Cardoso
- ❖ Theme: Science for Sustainable Development in Latin America and the Caribbean

1998



- ❖ December: 10th General Meeting of TWAS held in Trieste

1999

- ❖ November: TWAS's 7th General Conference, 11th General Meeting and TWNSO's 6th General Assembly held in Dakar, Senegal
- ❖ Conference hosted by Senegalese Ministry of Science and opened by Senegal's President



1999

- ❖ Theme of the conference: 'Science and Sustainable Development in Africa'
- ❖ Participants endorsed 'Dakar Declaration' calling for establishment of centres of excellence in Africa to address issues of critical importance to sustainable development in the continent



2000

- ✦ May: Vargas retired as president; C.N.R. Rao became TWAS's third president
- ✦ Members of InterAcademy Panel on International Issues (IAP) decided in Tokyo to place IAP secretariat under administration of TWAS



2000



- ✦ October: TWAS's 12th General Meeting held in Tehran, Iran, hosted by ministry of S&T and inaugurated by Iran's President Khatami
- ✦ 'Tehran Declaration' calls for strengthening of role of science to promote 'culture of dialogue' among civilizations

2001



- ✦ May: IAP, NAS and TWAS organized meeting on capacity building for academies in Africa, attended by 9 African academies and 4 ministers of S&T
- ✦ December: Follow-up meeting in Nairobi, Kenya, organized with AAS, decided to establish network of African scientific academies (NASAC)

2002

- ✦ October: TWAS's 8th General Conference held in New Delhi, India, with 13th General Meeting and TWNSO's 7th General Assembly
- ✦ Offer by Indian government to host 50 students from the South each year for studies leading to MSc/PhD in biotechnologies



Third decade 2003-2012

2003

- ✦ October: 9th General Conference in Beijing celebrating 20th Anniversary of TWAS
- ✦ More than 100 congratulatory messages from high-ranking personalities



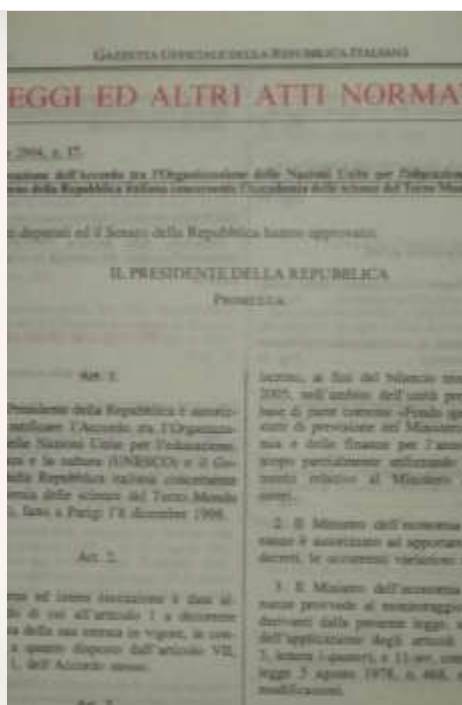
2003

- ✦ Beijing Declaration called on TWAS to expand its role as the 'voice of science in the South'.
- ✦ Official launch of TWAS regional offices
- ✦ Received information that Italian parliament approved law granting 'permanent' annual budget for TWAS



2004

- ✦ 15th General Meeting held in Trieste
- ✦ Approved Third Strategic Plan covering the years 2004-2006
- ✦ New name: TWAS, the academy of sciences for the developing world



2005

- ❖ November: TWAS's 16th General Meeting held at the Bibliotheca Alexandrina in Egypt



2006

- ❖ August: TWAS 10th General Conference and 17th General Meeting in Angra dos Reis, Brazil
- ❖ First TWAS Regional Conference of Young Scientists (RCYS)



2006



- ✦ C.N.R. Rao retires as President and Jacob Palis elected fourth President

2006



- ✦ Dissolved TWNSO and established COSTIS with support of G77
- ✦ G77 Foreign Ministers meeting endorsed COSTIS

2007

- ❖ January: TWAS Steering Committee meets for the first time
- ❖ November: TWAS's 18th General Meeting held in Trieste



2008

- ❖ November: The 25th Anniversary Celebration and 19th General Meeting of TWAS in Mexico City



2009



- ❖ October: 20th General Meeting and 11th General Conference in Durban, South Africa



2010



- ❖ October: 21st General Meeting in Hyderabad, India

2011

- ✦ April: Mohamed Hassan retires, and Romain Murenzi takes office as TWAS executive director



Three decades...



2011

- ❖ November: 22nd General Meeting in Trieste, Italy



2012

- ❖ September: TWAS's 12th General Conference and 23rd General Meeting held in Tianjin, China



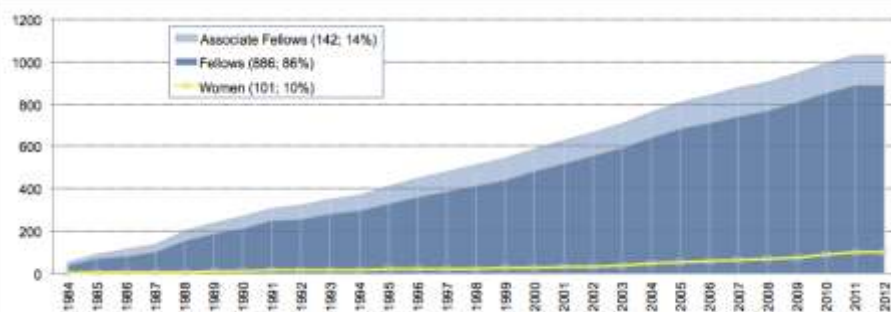
Strategic Aims and Achievements

Strategic Aims and Achievements

- ❖ Recognizing and rewarding outstanding scientists in developing countries
- ❖ Supporting young scientists and research groups in S&T-lagging countries
- ❖ Promoting South-South exchanges and postgraduate education
- ❖ Promoting information dissemination and the exchange of best practices
- ❖ Promoting international cooperation and global partnerships

Recognizing and rewarding outstanding scientists in developing countries

TWAS Membership



- ✦ 1028 Members from 91 countries

TWAS Young Affiliates

- ❖ Each TWAS Young Affiliate is appointed for 5 years. After this period, the status changes to Young Alumnus.
- ❖ Currently TWAS has 121 Affiliates from 45 countries (20 women) and 24 Alumni from 21 countries (5 women).



Rewarding Excellence

- ❖ The Ernesto Illy Trieste Science Prize
- ❖ TWAS Prizes
- ❖ The Abdus Salam Medal for Science and Technology
- ❖ TWAS Medal Lectures
- ❖ The C.N.R. Rao Prize for Scientific Research
- ❖ Atta-ur-Rahman Prize in Chemistry
- ❖ TWAS Prizes to Young Scientists in Developing Countries
- ❖ AU-TWAS Young Scientists National Awards

Supporting young scientists and research groups in S&T-lagging countries

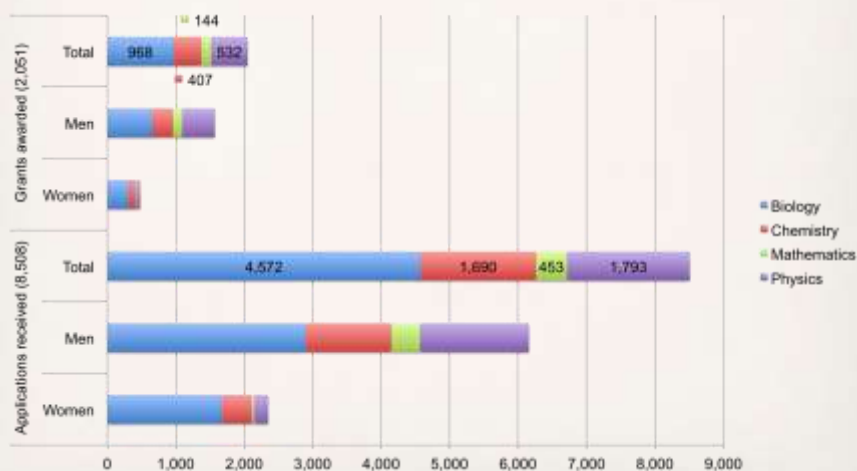
FOUNDATION FOR SLC's

Merit-based competitive research grants in basic sciences

- ❖ For young scientists in S&T-lagging countries (USD15,000 for one year)
- ❖ For research units in Least Developed Countries (USD100,000 for three years)



TWAS Research Grants 1986-2010



Promoting South-South exchanges and postgraduate education

TWAS Fellowships

322 fellowships available per year

PhD fellowships	161 per year
Postdoctoral fellowships	115 per year
Visiting scientists	26 per year
Research and advanced training	20 per year

One of the largest South-South fellowship programmes in the world

TWAS Fellowships

One of the largest South-South fellowship programmes in the world

PARTNERS cover

- stipend
- accommodation

TWAS covers

- travel and visa costs
- administrative costs



TWAS Fellowships

Postgraduate PhD Fellowship
at Chinese Academy of Sciences

- ❖ Obtained PhD in 2007
- ❖ Thesis on the kinetics and thermodynamics of the absorption of some heavy metal ions on modified kaolinite clay
- ❖ 25 publications (2005-2011)
- ❖ Member, Global Young Academy (GYA) President, Nigerian Young Academy (NYA)
- ❖ Currently Senior Lecturer in materials chemistry at Redeemer's University, Nigeria

Emmanuel Unuabonah (Nigeria) with supervisor and colleagues at the Institute of Soil Science, CAS, Nanjing, China



2011 prize winner of
AU-TWAS Award for Young Scientists

Promoting information
dissemination and the exchange
of best practices

TWAS Publications



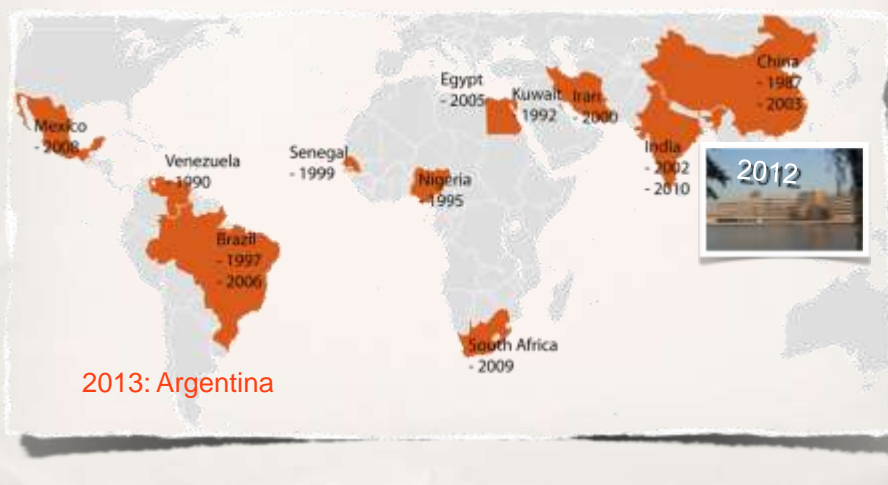
Promoting international
cooperation and global
partnerships

TWAS General Conference/Meetings

- ❖ Organize annual general meetings and general conferences every three years in a developing country
- ❖ Support international meetings held in the South
- ❖ Support visits of internationally renowned scientists to institutions in the South



TWAS General Conference/Meetings



Future Directions

Vision

- ✦ TWAS aspires to be the world's leading global merit-based science academy dedicated to building S&T capacities and promoting scientific excellence in the developing world.

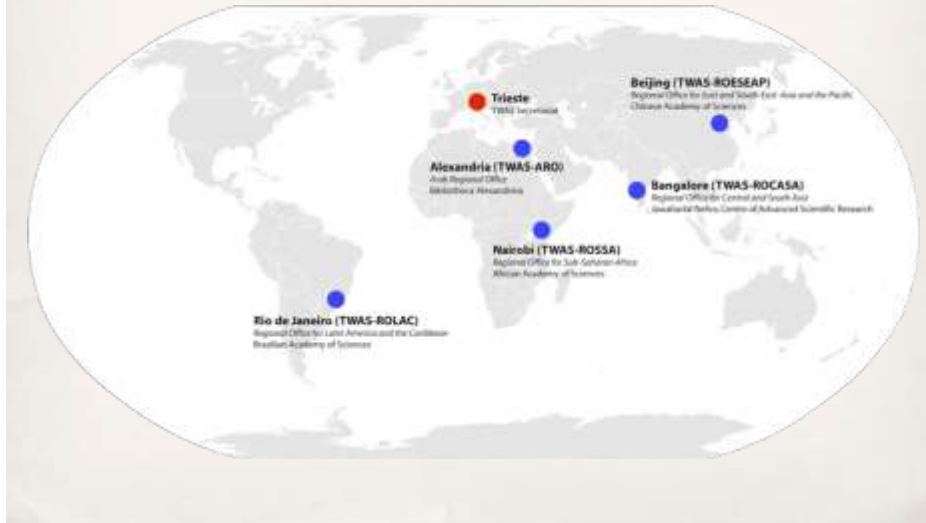
Mission

- ✦ As a merit-based global science academy for promoting science in the developing world, TWAS will seek to:
 - ✦ ensure that all developing countries have sufficient scientific and technological capacity and benefit from excellent scientific leadership.
 - ✦ assist developing countries to resolve through STI global sustainability challenges, and to engage in international scientific initiatives as full and equal partners.

To fulfill its mission TWAS must

- ✦ Decentralize its operation by upscaling activities of Regional Offices
- ✦ Strengthen collaboration with key partners
- ✦ Engage more women and talented young scientists in activities
- ✦ Support fully its Future Action Committee

Regional Offices



Global Partners

Trieste System	Intergovernmental Organizations	Others
ICTP	UNESCO	ICSU
OWSD, IAP, IAMP (hosted by TWAS and ICTP)	AU	UNU
ICGEB	EU	RISE
FIT	COMSTECH	ISTIC
SISSA	COMSATS	AAAS

Global Challenges

Sustainability Challenges

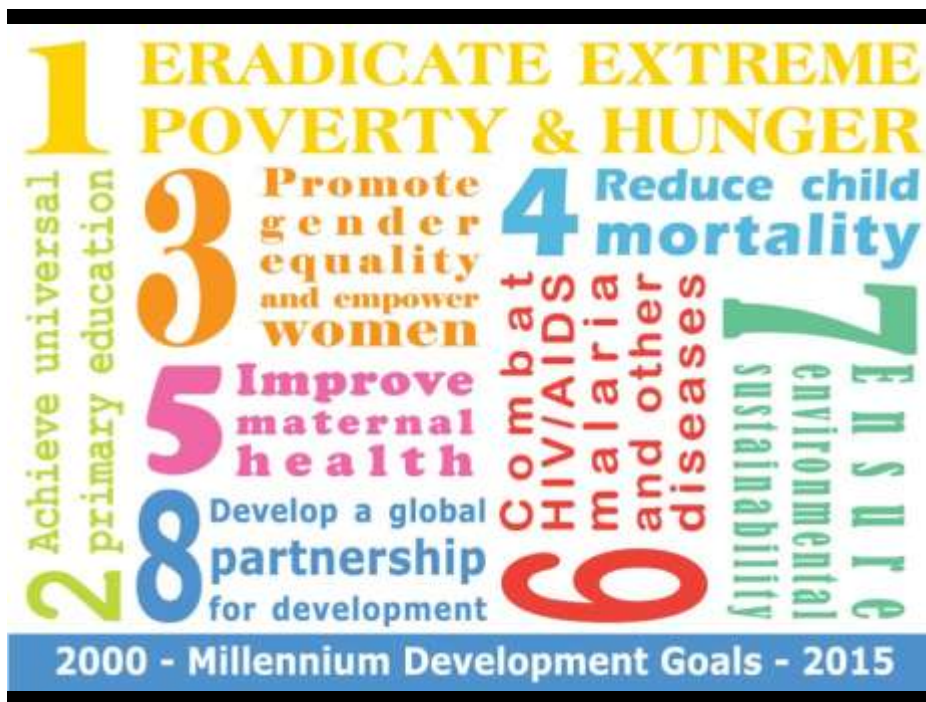
WSSD (2002)

- ✦ Water
- ✦ Energy
- ✦ Health
- ✦ Agriculture
- ✦ Biodiversity

Rio+20 (2012)

- ✦ Poverty
- + Climate Change





Global Challenges

- ❖ **Poverty**
- ❖ 1.2 billion people live on less than 1 dollar a day
- ❖ 3 billion people live on less than 2 dollars a day
- ❖ Some 300 million children go to bed hungry every night



Global Challenges

- ❖ **Water**
- ❖ Over 1 billion people lack access to safe drinking water.
- ❖ 80% of infectious diseases in developing countries caused by contaminated water.



Global Challenges

- ❖ **Energy**
- ❖ 1.5 billion people in developing countries have no access to electricity.
- ❖ 2.5 billion rely on traditional biomass for fuel.



Global Challenges

❖ Health

- ❖ 1 million people die of malaria each year, half of them children under 5 years.
- ❖ HIV infects some 36 million people worldwide.



Global Challenges

❖ Agriculture

- ❖ 2 billion people worldwide face food insecurity.
- ❖ 40% of the world's agricultural land is seriously degraded.
- ❖ 70% of the population in developing countries depend on agriculture for their livelihoods.



Global Challenges

- ❖ **Biodiversity**
- ❖ 60% of ecosystem services degraded over the last 50 years.
- ❖ 30% of all species will be extinct by 2050.



Global Challenges

- ❖ **Climate change**
- ❖ Most serious global problem with multiple impacts on water, health, agriculture and biodiversity.
- ❖ Poor countries are most vulnerable because of their fragile ecosystems and weak adaptation capacity.



Sustainability Science

- ❖ Global sustainability challenges are complex and interrelated
- ❖ Await solutions based on interdisciplinary cutting-edge S&T
- ❖ A minimum S&T capacity in each country is essential to generate local solutions and to enable effective participation in global efforts.

Knowledge Gaps

- ❖ Big disparities still exist in scientific productivity between North and South; although the gap is slowly narrowing.
- ❖ Small number of developing countries rapidly advancing in STI and slowly changing global patterns.
- ❖ Gaps in production of scientific knowledge are widening among developing countries.



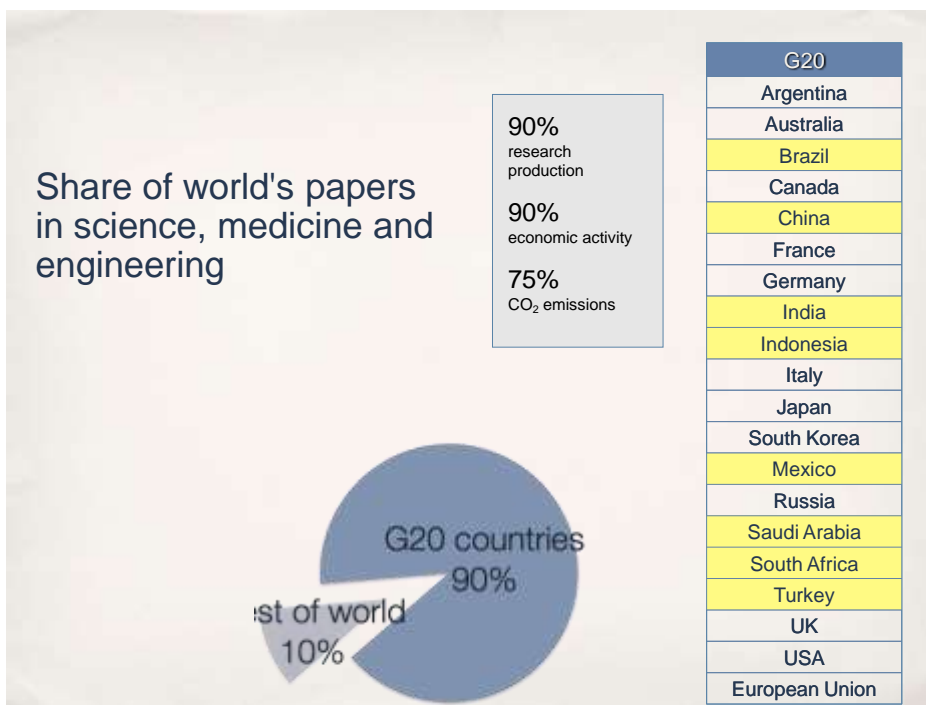
World's top countries, ranked by their share of world's papers in science, medicine and engineering

1	USA	25.99%
2	China	7.63%
3	Japan	6.07%
4	Germany	5.95%
5	United Kingdom	5.69%
6	France	4.3%
7	Italy	3.46%
8	Canada	3.4%
9	Spain	2.71%
10	India	2.56%
11	Korea, South	2.34%
12	Australia	2.2%
13	Russia	1.97%
14	Netherlands	1.82%
15	Brazil	1.77%
16	Taiwan, China	1.54%
17	Switzerland	1.4%
18	Turkey	1.37%
19	Sweden	1.36%
20	Poland	1.19%

Top 6 countries contribute $\frac{3}{4}$ of the South's share

World shares of ISI-listed S&E papers of the top 20 countries in the South

1	China	7.632%
2	India	2.565%
3	Korea, South	2.339%
4	Brazil	1.769%
5	Taiwan, China	1.535%
6	Turkey	1.372%
7	Iran	0.699%
8	Mexico	0.613%
9	Singapore	0.521%
10	Argentina	0.455%
11	South Africa	0.400%
12	Thailand	0.292%
13	Egypt	0.282%
14	Chile	0.271%
15	Pakistan	0.177%
16	Malaysia	0.175%
17	Tunisia	0.139%
18	Saudi Arabia	0.125%
19	Nigeria	0.116%
20	Colombia	0.095%



Shares of S&T-lagging Countries

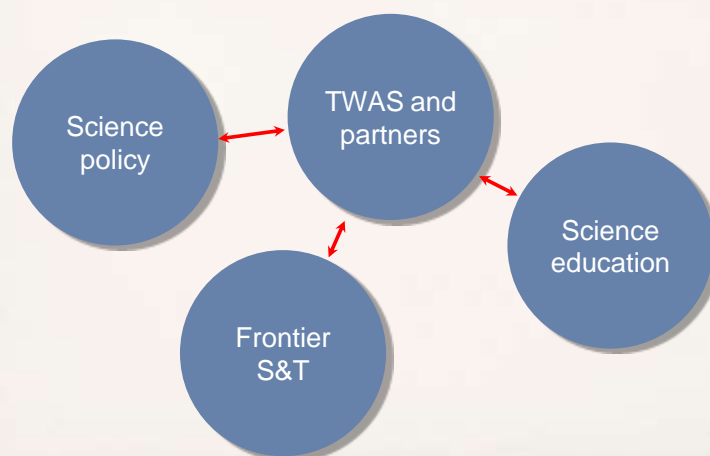
Region	Number of S&T-lagging countries	Share % of developing world	Share % of entire world
Africa	44	2.25	0.56
Asia & Pacific	24	1.13	0.28
Latin America & Caribbean	13	0.38	0.09
Total	81 (1.6 billion people)	3.76	0.93

Two main challenges

- ❖ The future of science in developing countries lies in addressing two interrelated challenges:
 - ❖ Improving quality of education and problem-solving research, especially in S&T-Lagging Countries (to increase their share in global knowledge from 1% to 10% in 20 years)
 - ❖ Taking the lead in driving STI-based solutions to global sustainability problems?

Action

Action by TWAS & Partners



Science Education

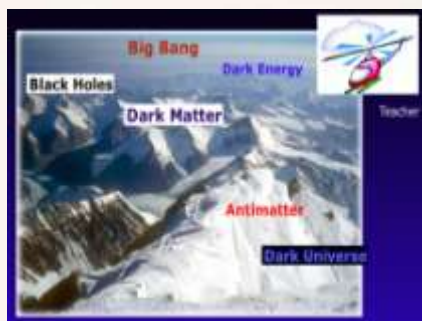
New Methods of Teaching Science: Inquiry-Based Science Education (IBSE)

- ❖ IBSE engages students in the learning process through experimentation, promotes their critical thinking and develops their problem-solving skills.
- ❖ IBSE has been a flagship program of IAP, lead by US; France; Chile; India, Sri Lanka; South Africa and Uganda
- ❖ IBSE has so far been introduced mainly in primary schools.
- ❖ Training of teachers in IBSE



New Methods of Teaching Science: Teacher Training

- ❖ UNESCO-CERN Science Education Programme in Africa
 - ❖ Show teachers how to inspire and motivate students with wonders of physical world: big bang, black holes, dark energy, Higgs boson...



Science Centres and Museums

- ❖ Interactive science centres are important hubs for “informal”, hands-on science education.
- ❖ They bring science to society, promote critical thinking and scientific literacy, stimulate curiosity and develop enquiring minds.
- ❖ About 300 million citizens participate yearly in interactive exhibitions organized by nearly 2,500 science centres globally.
- ❖ Majority of science centres are in the Americas, Europe and Asia-Pacific.
- ❖ Of the 54 African Countries only 4 have science centres.
- ❖ The 6th WCSC held in SA strongly recommended establishing more science centres in Africa .



At least one science centre
in every country

Research universities

- ✦ Each developing country should have at least one top-class research university
 - ✦ To connect research and education
 - ✦ To set standard for quality and excellence
 - ✦ To attract best and brightest students
 - ✦ To link knowledge to action



Revitalize national universities in Africa

- ✦ Nigeria
University of Ibadan
- ✦ Tanzania
University of Dar-es-Salaam
- ✦ Kenya
University of Nairobi
- ✦ Sudan
University of Khartoum
- ✦ Uganda
Makerere University

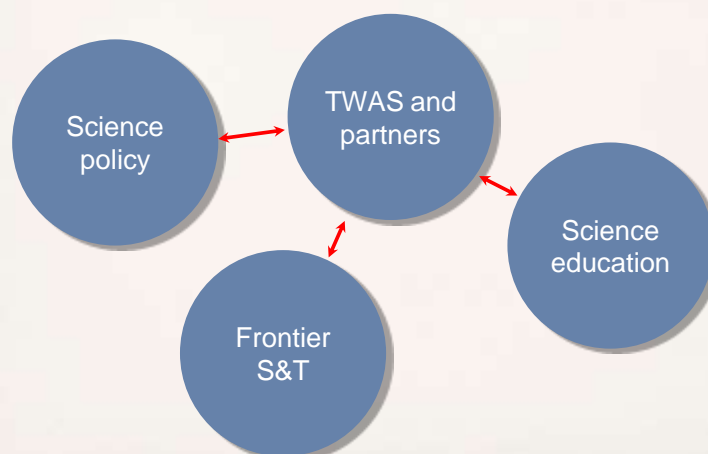


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- ❖ Further development of IBSE in schools and universities
- ❖ Assist in building science centres in Africa
- ❖ Expand South-South fellowships for postgraduate and postdoctoral training (1,000 per year)
- ❖ Expand grants to research units

Science
education

Action by TWAS & Partners



Frontier S&T

Biotechnologies

- ✦ Substantial improvement to agriculture and health
- ✦ Hot issues: biofuels, GMOs, stem cells
- ✦ Require proper communication to decision-makers and general public on benefits and risks, based on best available scientific evidence



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FEATURES

Biotechnology unveils secrets of Chinese medicine

Source: Bulletin of the World Health Organization
7 August 2012 | EN | ES | 中文

Traditional Chinese medicine is generally treated with scepticism by medical professionals outside China. Now, scientists in China and the United States have enlisted the help of biotechnology to show that drugs used in it have legitimate science-based value, and represent an untapped source of treatments.

"There are around 100,000 formulas going back 2000 years, drugs that can be used to treat a range of illnesses, from depression to osteoporosis," says Karl Wah-Kaung Tsim from Hong Kong's University of Science and Technology, quoted in an article in the *Bulletin of the World Health Organisation*.

Traditional medicine represents around 40 per cent of China's pharmaceutical market, with an annual turnover of US\$21 billion. The government says its support for the industry is increasing rapidly: last year it invested around US\$1 billion in traditional medicine research and projects — almost three times the amount provided in 2010 — according to China's deputy health minister, Wang Guoqiang.

But few drugs or techniques from China's ancient texts and traditional culture have been incorporated into mainstream medical practice outside the country, where attitudes towards Chinese medicine remain largely characterised by suspicion, due to the lack of evidence supporting its medicinal value, as well as concerns about product quality.



According to the government, 80 per cent of people in China regularly use traditional medicines
Flickr/Verity Borwick

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Discovering Africa's drug potential

Kelly Chibale
30 June 2010 | EN | ES | FR | 中文

How can modern drug discovery methods enhance the value of African traditional medicines, asks South African drug expert Kelly Chibale.

Africa's biodiversity has the potential to be a major resource for developing pharmaceuticals to treat endemic diseases such as malaria, tuberculosis and HIV/AIDS. It is already the source of a wealth of traditional medicines used by at least 80 per cent of people on the continent.

But unfortunately, much of Africa's biodiversity remains unexploited for health and economic benefits. Decades of research into African traditional medicines by Africans have yet to translate into modern pharmaceutical products.

There are several reasons for this lack of progress. Drug discovery and development efforts are fragmented across the continent, African researchers, in addition to lacking the finance and infrastructure to tackle the disease burden, are also challenged by a limited skills base and poor access to the technological platforms needed for drug research.



African scientists must create a database and physical collection of traditional medicines and their active ingredients
WHOIP/Visal

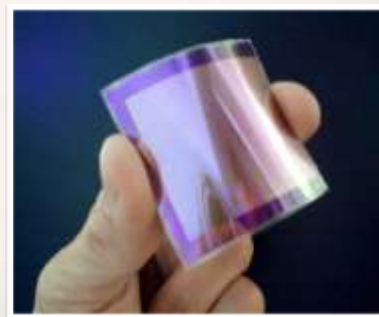
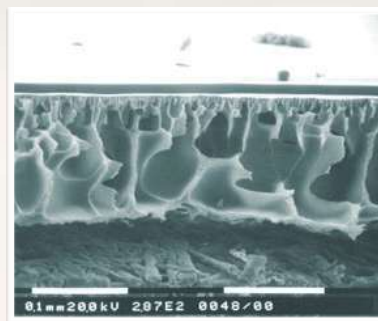
Space and Communication Technologies

- ✦ Wireless information and communication technologies
 - ✦ Rapid growth in ICTs in developing countries, including rural areas
 - ✦ Distance education for poor and isolated rural communities
 - ✦ Monitoring environmental change and natural resources
 - ✦ **SKA coming to Africa!**



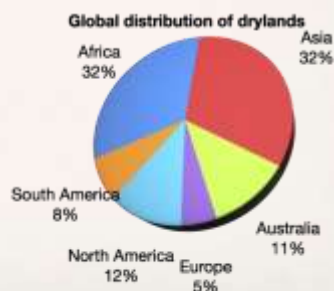
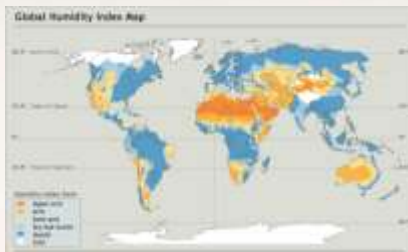
Nanotechnology

- ✦ has the potential to provide inexpensive decentralized and efficient water purification filters that detect molecule-size contaminants
- ✦ promises a new generation of nanosolar cells much cheaper and more efficient than current solar cells based on silicon



Energy: Renewable Energies from Drylands

- ❖ Drylands constitute 40% of total land surface on Earth
- ❖ 40% of the world's population (about 2 billion people) live in arid zones
- ❖ Drylands support livelihoods of one billion poor people in rural areas



Renewable energies from drylands

- ❖ Production of bioenergy from agricultural waste and non-edible plants



Dr. J.O. Ogunwole (Nigeria) in a *Jatropha curcas* plantation during his TWAS fellowship at a CSIR institute in Gujarat, India

Renewable energies from drylands

- ❖ Saharan electricity:
Solar thermal plants
- ❖ **Desertec**: plans to invest more than 500 billion Euros in solar thermal energy in Sahara desert



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Algeria plans rapid green energy ramp-up

Toula Stroganidis
19 January 2011 | EN | FR | 中文

[ALGIERS] Algeria is aiming to generate 40 per cent of its electricity from renewable sources by 2020, energy minister Youcef Yousofi has announced.

About 60 renewable energy projects will be launched to give a capacity of 3,000 megawatts, he told a press conference held to announce the strategy (2 January).

"The main purpose of this new policy is to prepare the country for the post-petrol era," Yousofi said.

Currently, fossil fuels account for 96 per cent of export revenue, and are the basis of the national economy. The country hopes to supplement this revenue from exports of renewably sourced energy.

"Algeria has been late in developing the renewable energy sector, but by stepping up the launch of projects we can catch up," said Omar Bouhadjar, research manager at Algeria's Centre for Development of Renewable Energies (CDER).

A vast Saharan solar project is amongst Algeria's plans
PHOTO: CDER

Green Technologies

- ❖ Developing countries to take the lead by agreeing to commit at least 1% of GDP to development of green technologies, as recommended for OECD countries
- ❖ China and South Korea each spend about 3% of GDP on green technologies

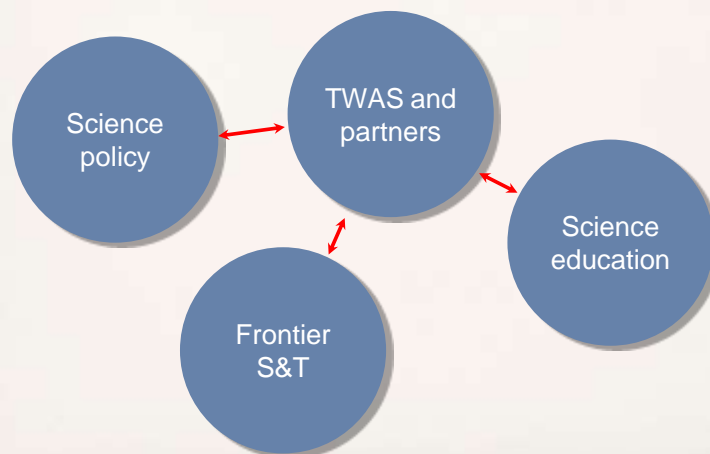


Action by TWAS & Partners

- ❖ Assist in establishing networks of centres of excellence in frontier S&T for research collaboration and advanced training
- ❖ Assist in establishing international centres of excellence in green technologies (e.g. international centre for biofuels in Brazil)
- ❖ Interdisciplinary workshops to exchange best practices in solving sustainability problems
- ❖ Publication of successful experiences in the application of S&T to real-life problems



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Science Policy

Role of Science Academies

- ❖ Science academies are merit-based independent national, regional or global associations of the most accomplished scientists.
- ❖ Traditional role of academies as purely honorific (honoring age and experience) is slowly changing, thanks to IAP



IAP, the global network of science academies

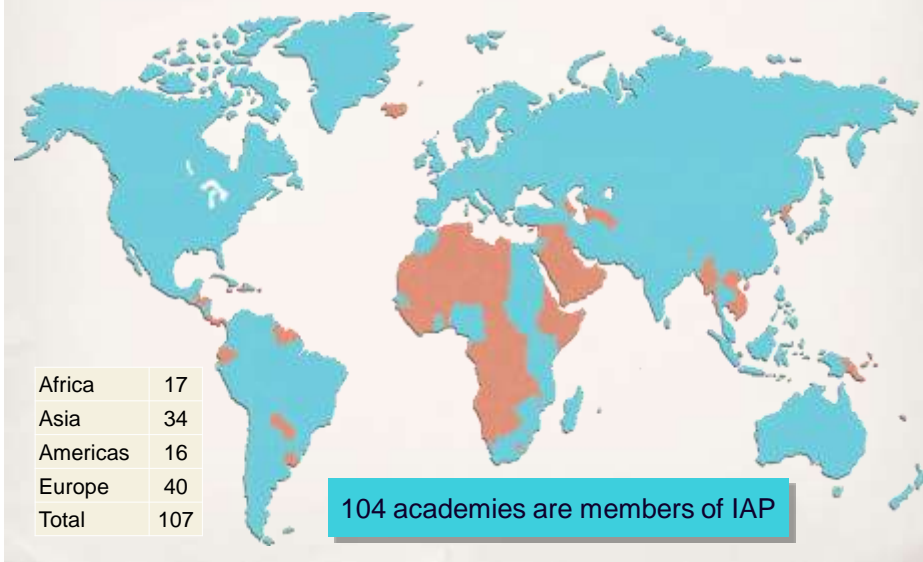
- ❖ Launched in 1993, IAP is a global network of more than 100 science academies in 90 countries
- ❖ Located at ICTP
- ❖ Managed by TWAS



IAP, the global network of science academies

- ❖ Aim: IAP brings together merit-based academies globally and regionally
- ❖ to discuss scientific issues of global and regional concern, and
- ❖ to influence policy by producing and disseminating joint statements and reports on such issues

IAP, the global network of science academies



COSTIS

- ❖ Established in September 2006 by Ministers of S&T and Ministers of Foreign Affairs of G77 as successor to the Third World Network of Scientific Organizations (TWNISO)



COSTIS

- ❖ Officially launched in November 2009 at the World Science Forum held in Budapest, Hungary
- ❖ Secretariat currently hosted by UNESCO



COSTIS



- ✦ Ministers responsible for S&T
- ✦ National Research Councils
- ✦ National Science Foundations
- ✦ National Science Academies
- ✦ Science-based private-sector institutions

COSTIS



- ✦ Provide unique platform for governmental agencies responsible for policy and for funding research to interact strongly with leadership in academies and science-based industry
- ✦ Exchange information on best practices in integrating science policy into national development plans

Action by TWAS & Partners

- ❖ Assist in establishing a merit-based Academy in each developing country that has no such organization
- ❖ Improve the advisory role of academies in developing countries
- ❖ Revive TWNSO/COSTIS
- ❖ Produce policy-relevant reports on critical issues




Science
policy

- ❖ Promoting the pursuit of scientific excellence and fostering the next generation of leaders in STI in developing countries has been at the core of TWAS operation for the past three decades...

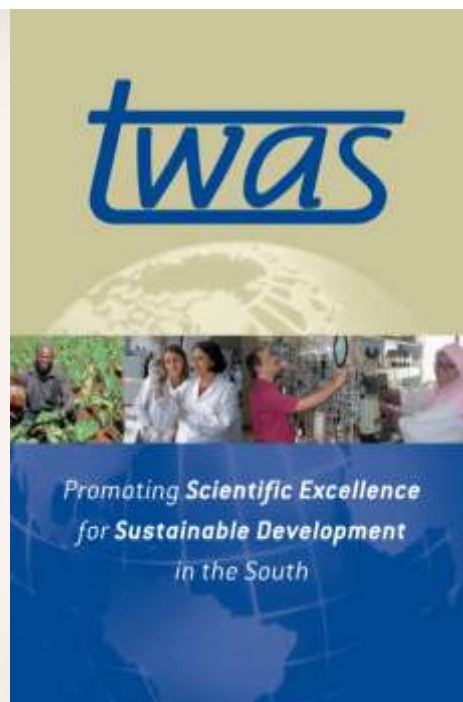


twas



Promoting *Scientific Excellence*
for *Sustainable Development*
in the South

- ❖ ... thanks largely to the generous financial support from Italy, Sweden, Brazil, China, Kuwait, India and many others, as well as excellent management and support of UNESCO , ICTP, and the dedicated staff in TRS



What does TWAS stand for??

