

# Africa's Awakening: The role of science and technology

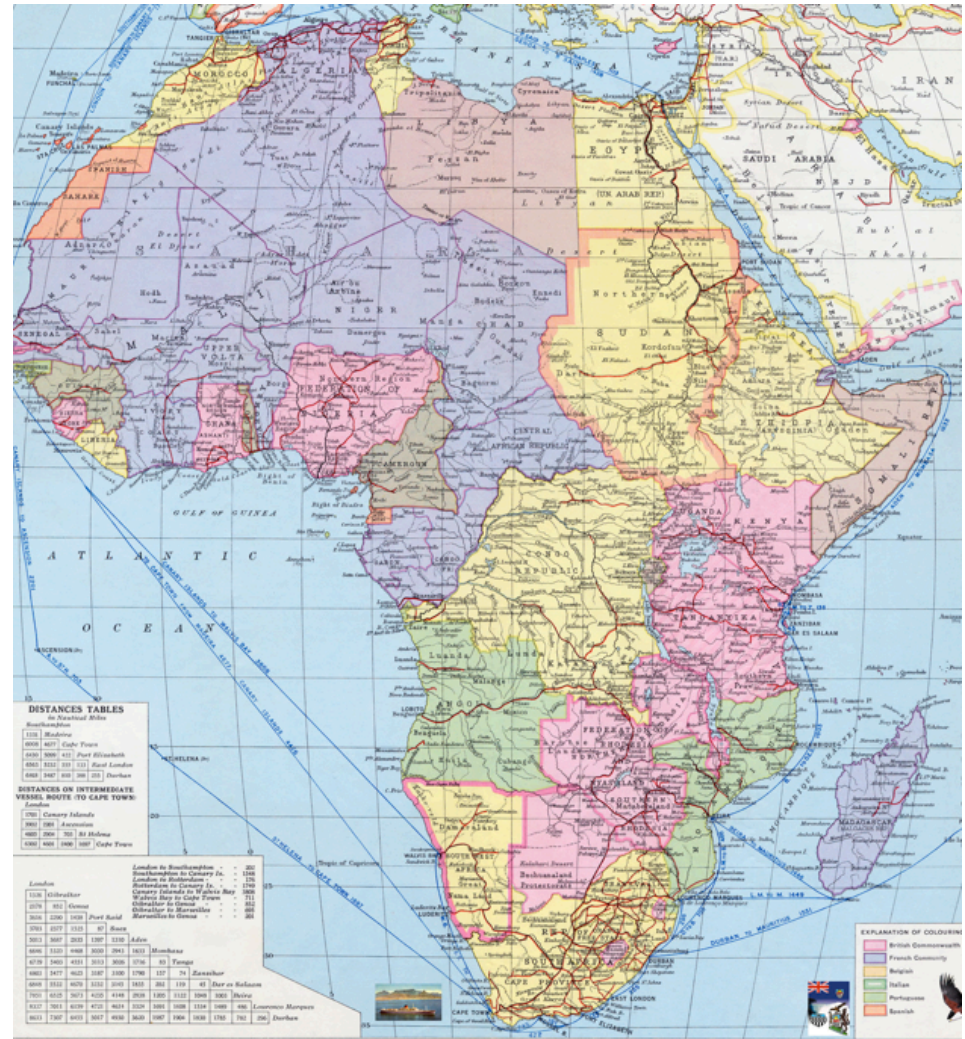
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Romain Murenzi, Executive Director  
The World Academy of Sciences (TWAS)

**ICTP: 50 Years of Science for the Future**  
**Abdus Salam International Centre of Theoretical Physics**  
Trieste, Italy – 07 October 2014

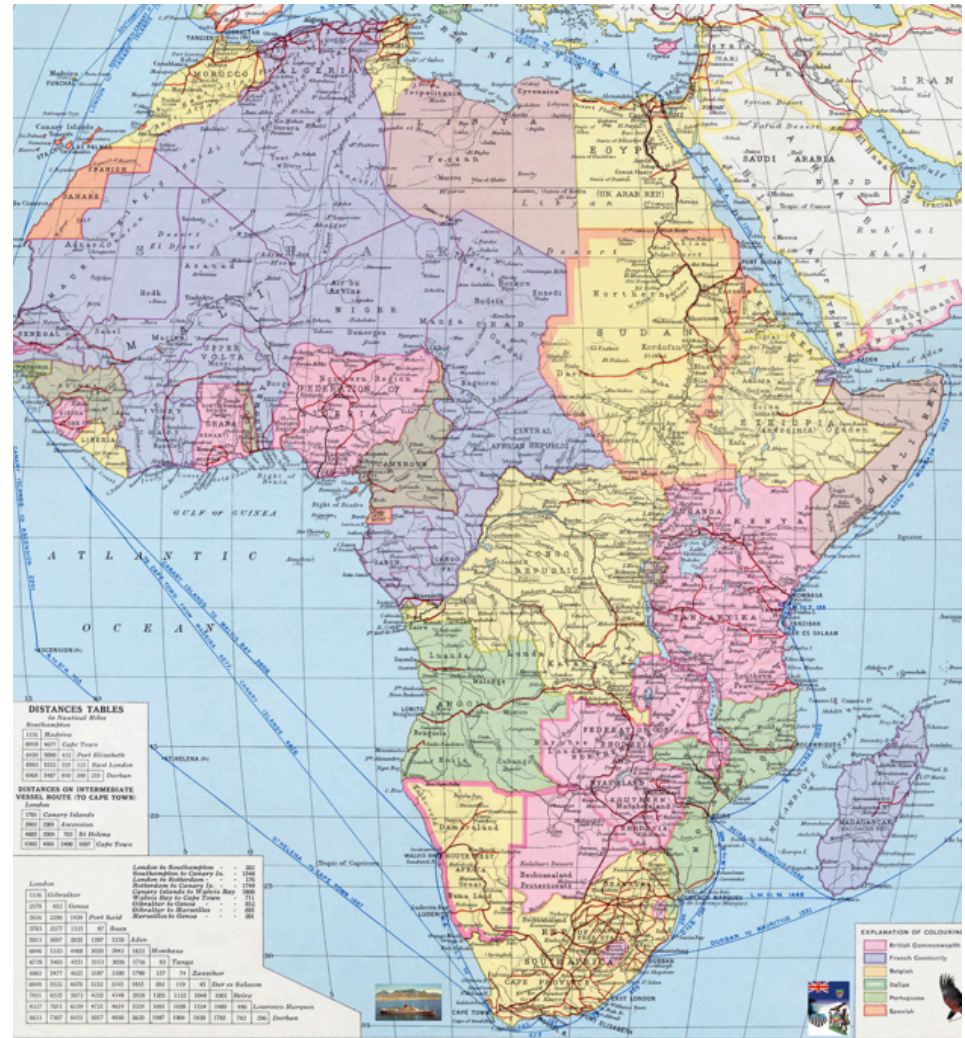
# Africa: A time of transformation

For much of the 20<sup>th</sup> century, the developed world viewed Africa as a source of resources, and as a battleground in the Cold War.



# Africa: A time of transformation

Africans suffered from poverty, hunger and poor health, but few thought of Africa as a continent where science capacity could be cultivated



# Africa: A time of transformation

Today, with the help of partners  
worldwide...

# Africa: A time of transformation

Today, with the help of partners worldwide...

**Africans are working to  
change that history.**



## Africa's new commitment

“Historically, whether one considers the role played by indigenous technologies in Africa, or the 19th century industrial revolution that transformed Europe and North America, or contemporary Asian experiences – it has been all about using scientific and technological applications to achieve fundamental socio-economic transformation.”

– President Paul Kagame, Rwanda (2007)

## Africa's new commitment

“High-quality university programs in Africa, particularly in areas such as the applied sciences, technology, and engineering, could dramatically increase the region’s competitiveness, productivity and growth.”

– Makhtar Diop, World Bank Vice President for Africa (2014)

Africa's new  
commitment

The challenges  
remain enormous



# Africa: A time of historic challenge

Of the world's

**48**

Least Developed  
Countries...



## Africa: A time of historic challenge

Of the world's

**48**

Least Developed  
Countries...

**34** are in Africa



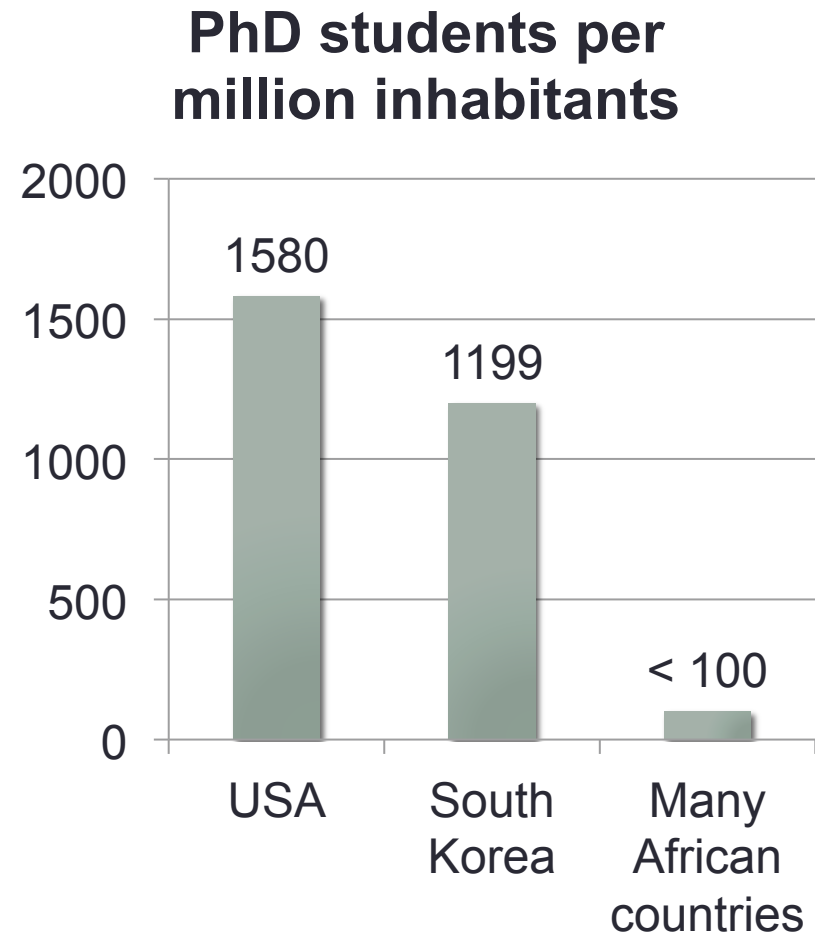
# African challenges: R&D investment

- Africa has 14% of the world's population, yet accounts for only 0.8% of global R&D expenditure.
- R&D investment in the Least Developed Countries is growing slowly, if at all.



# African challenges: the PhD deficit

- Many nations of Africa have **fewer than 100** PhD students.
- Some have fewer than 20.



# African challenges: scientific output

- Africa accounts for only 2.4% of global research publications (2014)
- South Africa and Egypt alone contribute two-thirds of Africa's scientific output.



# African challenges: ITC

- Of 40 countries that rank lowest in ICT development, 30 are African.
- The 22 countries that rank lowest for ICT development are all African.





# Africa: A time of transformation

Despite these challenges, we are seeing

**Evidence of historic progress  
achieved in a very short time**





## Africa: A time of transformation

Africa is now the world's fastest-growing continent. Estimated economic growth:

- +4.8% in 2014
- +5 to 6% in 2015

(-AfDB/OECD/UNDP)

## Africa: A time of transformation

- In Africa's major cities, more than half of people already have Internet-capable devices, many running on 3G networks. (McKinsey)
- Internet use on mobile phones could increase 20-fold by 2019 – double the growth globally. (*Guardian*)

# Africa: A time of transformation

- Zewail City of Science and Technology in Egypt
- Square Kilometre Array (Africa and Australia) will be one of the most ambitious science projects in history



# Africa: A time of transformation

- Ethiopia: two universities in 1996  
→ today, 31
- Kenya: 15 new universities focused on S&T
- Uganda: adding a seventh public university
- Rwanda: 3,000 university students in 1995-96  
→ today, 84,000.
- U.S.-based Carnegie-Mellon University has opened a campus in Kigali.

## Africa: A central challenge

Africa will need hundreds of thousands of new scientists and engineers in the coming decades...

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

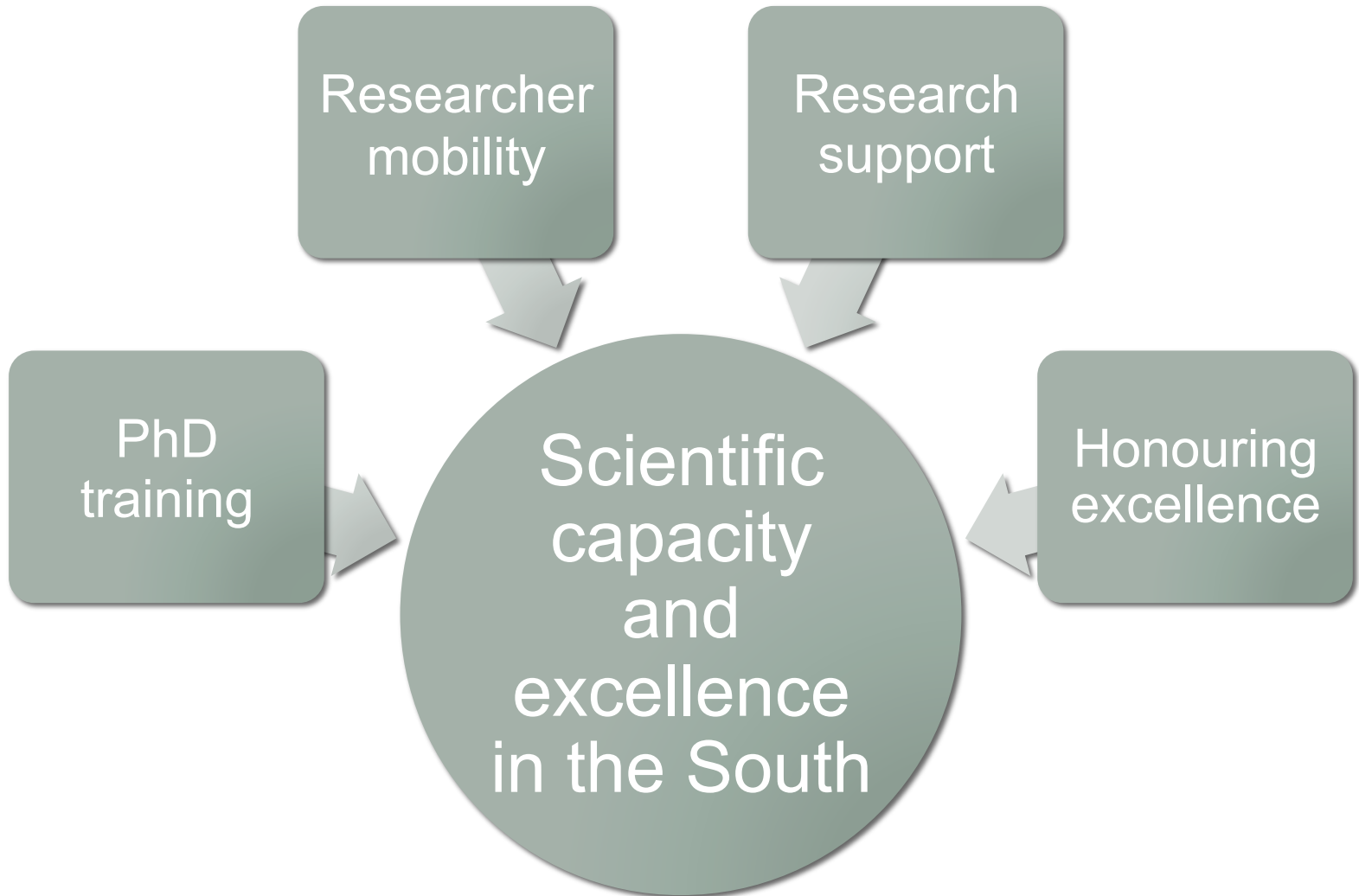
## TWAS's Guiding Principle

Building a corps of advanced scientists helps a country not only in research and education, but also in science policy, business and international relations.





# What does TWAS do?



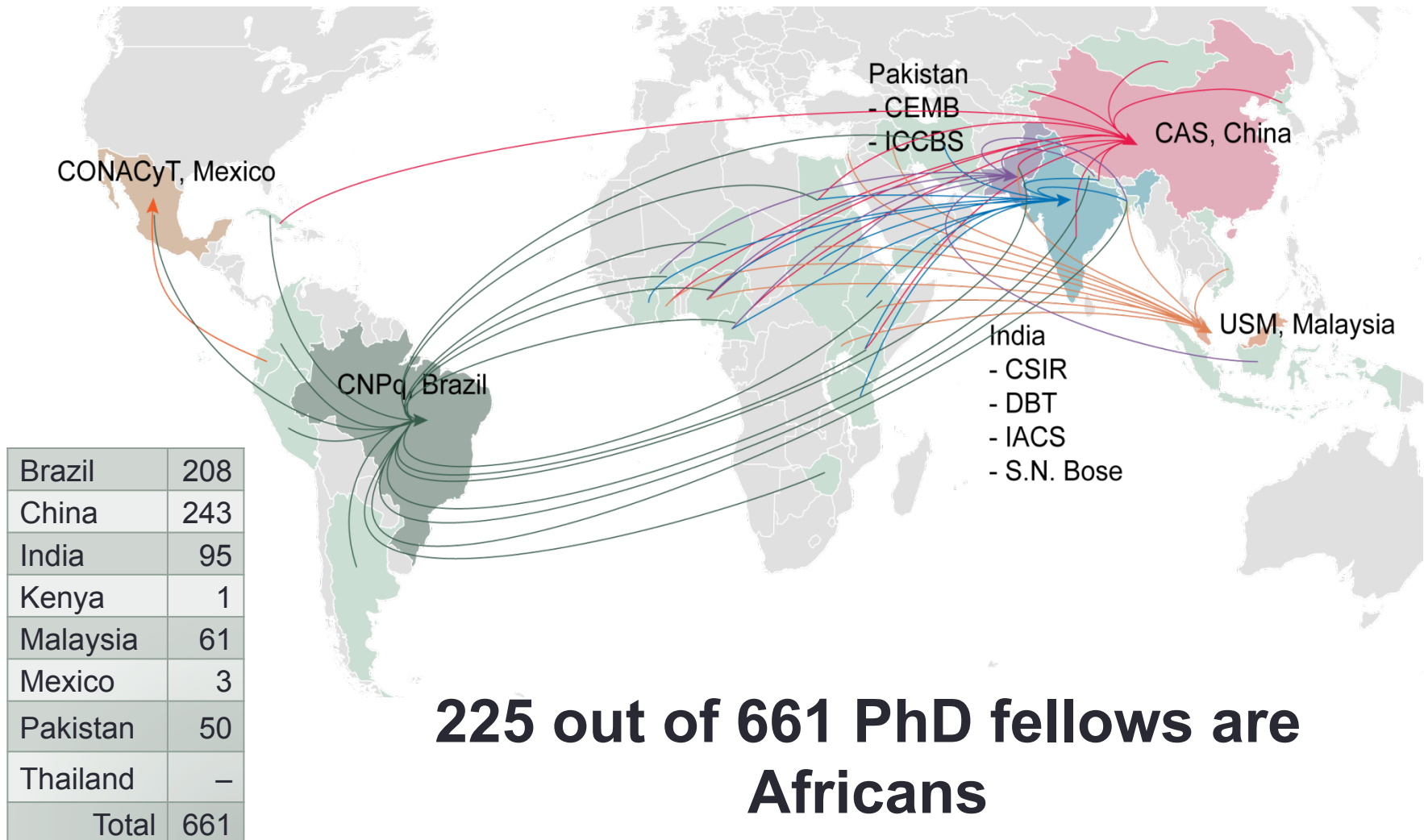
# South-South Fellowships

*Working with partners in 9 nations, TWAS has built the world's largest South-South fellowship programme*

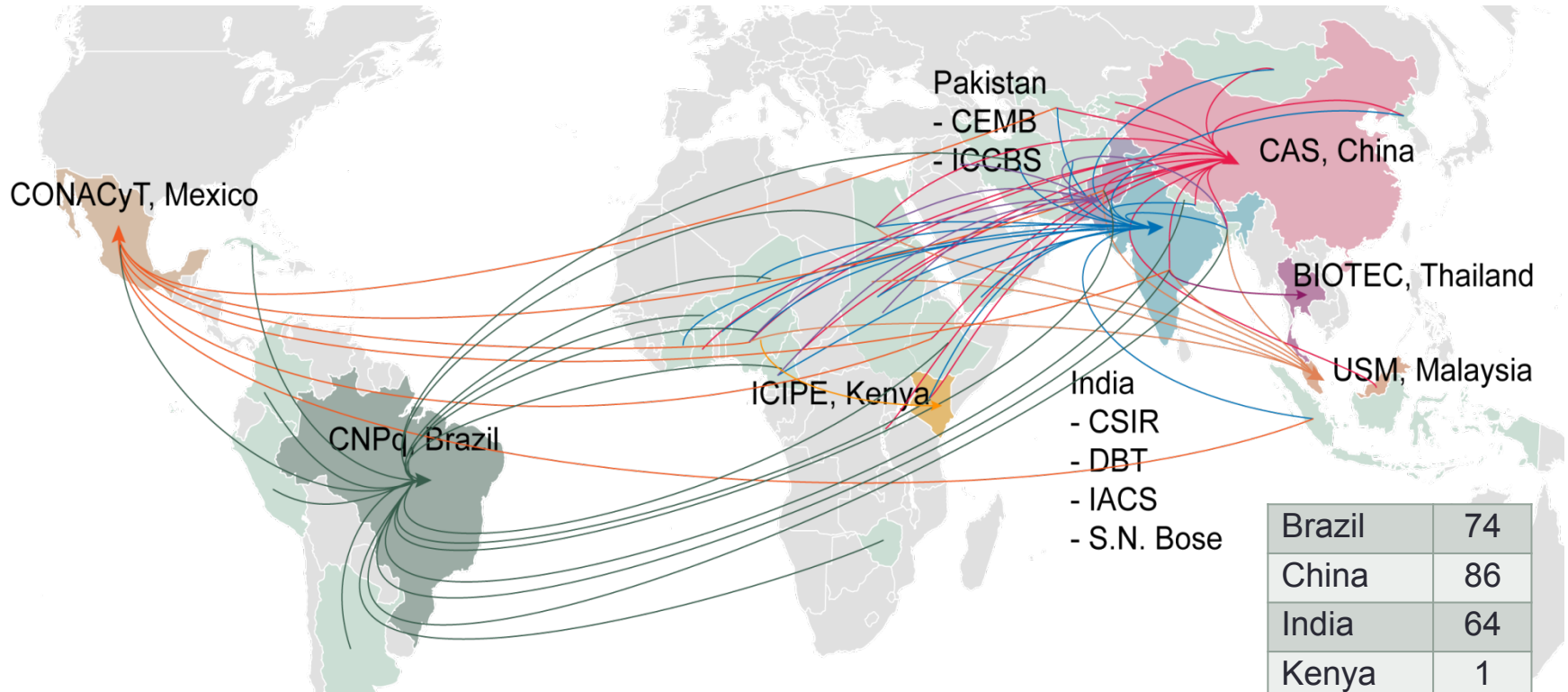
## Fellowships available per year

• PhD fellowships	313 per year
• Postdoctoral fellowships	141 per year
• Visiting scientists	48 per year
• Research and advanced training	10 per year
	<hr/>
	512 per year

# PhD Fellowships 2007-2013



# Postdoctoral Fellowships 2007-2013



**172 out of 334 postdoctoral fellows are Africans**

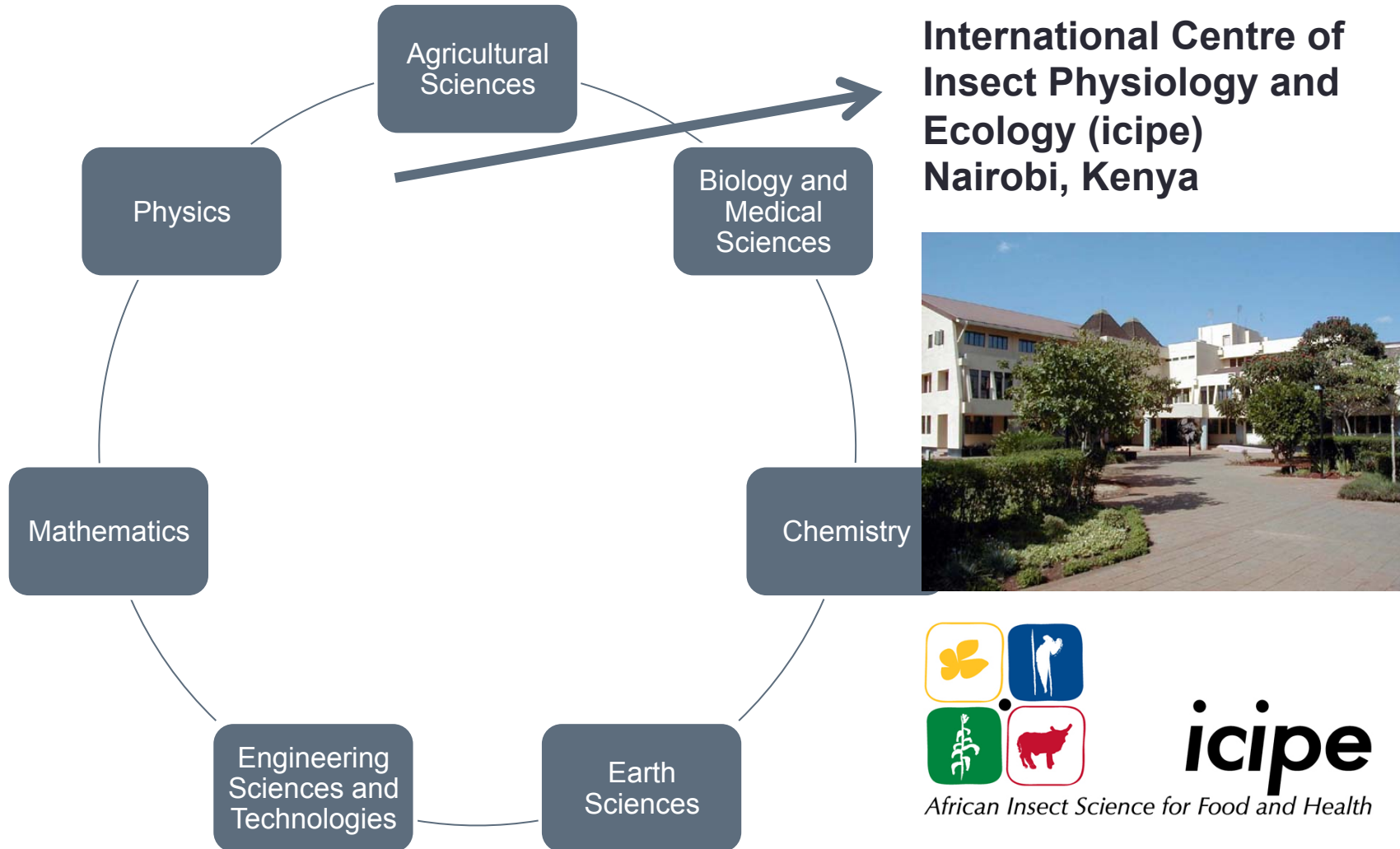
# Grants to Research Units

**80 out of 142** recent grants were awarded to research units in **Africa**



**Virima Mudogo,**  
**Department of Chemistry,**  
**University of Kinshasa,**  
**Dem. Rep. of Congo**  
*Macromolecules extracted  
from indigenous medicinal  
plants with potential  
antimalarial or anti-sickle  
cell anaemia effects*

# Joint Associateship Scheme





Organization  
for Women in  
Science  
for the  
Developing  
World (OWSD)



- OWSD Postgraduate Training Fellowships have helped 129 women earn their PhDs, most in sub-Saharan Africa
- A recent grant from Sida has doubled fellowships to 50 per year



## IAP, the global network of science academies



- Works with its 107 national academies of science, including 16 national academies in Africa. Membership applications under review include Benin, Burkina Faso and Togo.
- The Network of African Science Academies (NASAC) founded by IAP in 2001. It has increased its membership from 9 to 19.
- 2013 project promoted science culture and education in Sudan and Ethiopia.

## Inter-Academy Medical Panel (IAMP)



IAMP is a global network of 70 medical academies and medical sections of science academies

- 9 members in Africa, including the African Academy of Sciences.
- IAMP 2013 Conference on “Changing Patterns of Non-Communicable Diseases” hosted by the Academy of Science of South Africa (ASSAf).

# Science Diplomacy

## Higher Education:

Building regional and African institutions to serve science, technology and innovation

## Wildlife management:

Protecting mountain gorillas in East and Central Africa

## ICT:

Cooperative agreements to build fibre-optic networks that connect Africa to the world



*twas*



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# South-South Fellowships

*16 programme partners for TWAS Fellowships in 8 developing countries*

## **PARTNERS** cover

- stipend
- accommodation

## **TWAS** covers

- travel and visa costs
- administrative costs

Brazil

Malaysia

China

Mexico

India (4)

Pakistan

Kenya

Thailand

## Africa: A time of transformation

- 2014: an estimated 635m mobile subscriptions in sub-Saharan Africa. 2019: about 930m
- Internet use on mobile phones could increase 20-fold by 2019 – double the rate of growth in the rest of the world. (*Guardian*)
- In Africa's major cities, more than half of people have Internet-capable devices, many running on 3G networks. (McKinsey)