

# Open Data for the Developing World

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Associazione Italiana per la Promozione della Scienza Aperta (AISA)  
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# A dream of science in the South



“...with man’s recent mastery of science and technology there is no physical reason left for the existence of hunger and want for any part of the human race.”

– Abdus Salam

## A dream of science in the South



In 1983, ceremonies at the University of Trieste and ICTP marked the founding of TWAS.

A voice for  
science in  
the South

The logo for The World Academy of Sciences (twas) is written in a blue, lowercase, cursive font. The letters are connected and have a slight shadow effect.

The World Academy of Sciences

- 1,172 elected Fellows
- 127 women
- 15 Nobel laureates
- 90 countries
- 228 Young Affiliates and Alumni

# TWAS global networks



TWAS is based in Trieste, Italy, with regional offices in Brazil, China, Egypt, India and South Africa



## TWAS's guiding principles

With science and engineering, countries can address challenges in agriculture, climate, health, energy, water and other areas.



# The role of TWAS

TWAS works in four key areas:

- prizes
- research grants
- education and training
- science policy and diplomacy

## TWAS: A focus on Africa

Of the world's

**48**

Least Developed  
Countries

**34** are in Africa





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- **Biodiversity:** One-third of species threatened
- **Climate change:** Impacts across the spectrum



## United Nations Sustainable Development Goals

- 17 goals
- 169 targets

## The data revolution

“An unprecedented explosion in the capacity to acquire, store, manipulate and instantaneously transmit vast and complex data volumes”





# The data revolution



**Big data**

# The data revolution

When we communicate, travel, buy and sell goods, and search for information online, we produce “big data”.

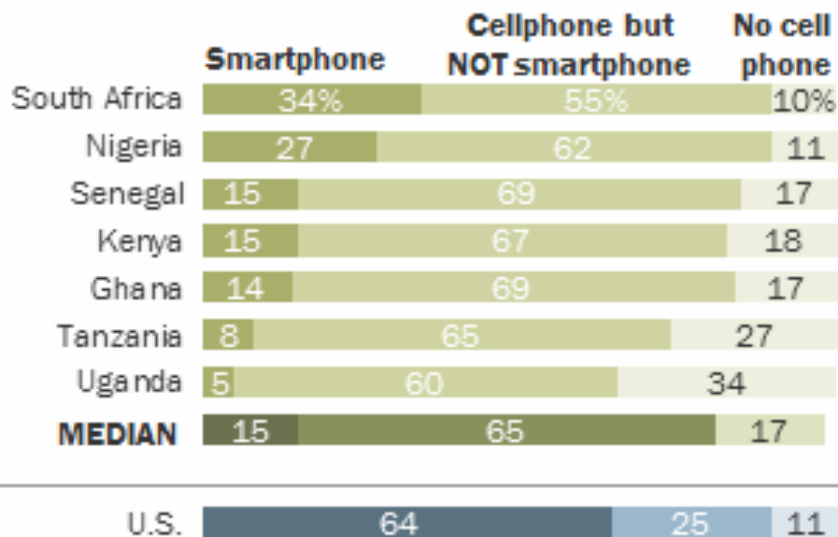
# The data revolution

Big data can support sustainable development.

- guide agriculture
- track the spread of disease
- assess deforestation
- improve disaster relief

## Few Own Smartphones in Africa, But Cell Phones Common

*Do you own a cell phone? Is it a smartphone?*



Note: Percentages based on total sample. U.S. data from December 2014 Pew Research Center surveys. Median percentage excludes the U.S.

Source: Spring 2014 Global Attitudes survey. Q68 & Q69.

PEW RESEARCH CENTER

Cell phones are pervasive, and that shows us the potential power of big data

The question:

**Should big data  
be open data?**



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*twas*

NEWSLETTER

A PUBLICATION OF THE WORLD ACADEMY OF SCIENCES

# The Big Data Revolution

Why it's important for the South

Big data,  
open data –  
these are  
issues of  
great interest  
for TWAS



# Big data, open data



From the  
western  
highlands of  
Kenya...



# Big data, open data



...a story about malaria and cell phones.

# Big data, open data



# Big data, open data

- government health records
- satellite images
- travel patterns
- cell phone towers
- cell phones



# Data-driven agriculture



Agriculture accounts for 65% of Africa's workforce and 32% of its GDP.

## Data-driven agriculture

- satellites for evaluating weather, soil, pests and crop disease
- data on food storage patterns
- shifting market prices for crops
- food supplies and demand
- a new field: “predictive analysis”



**How can we improve  
agriculture, food  
and nutrition  
with open data?**

To feed Africa, “progress will be driven largely by providing better access to accurate, timely information for individual smallholder farmers, businesses and policy-makers alike.

**“Open data can and should be part of the solution.”**

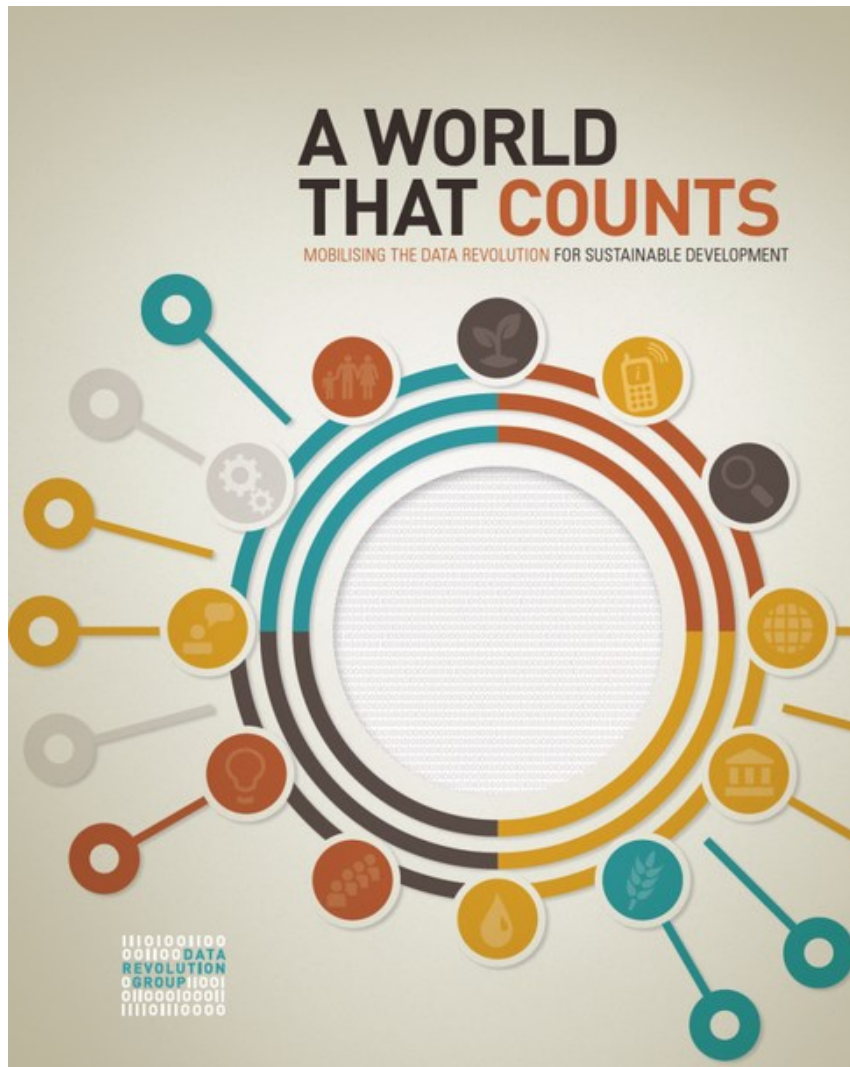
## An emerging consensus

“A partnership of all data communities that upholds the principles of official statistics as well as openness across the data value chain, which creates a vibrant data ecosystem providing timely, user driven and disaggregated data for public good and inclusive development.”

– “African Data Consensus”  
African Union-Economic Commission for Africa  
High Level Conference on Data Revolution (2015)



# An emerging global consensus



“Too many people, organisations and governments are excluded because of lack of resources, knowledge, capacity or opportunity. There are huge and growing inequalities in access to data and information and in the ability to use it.”

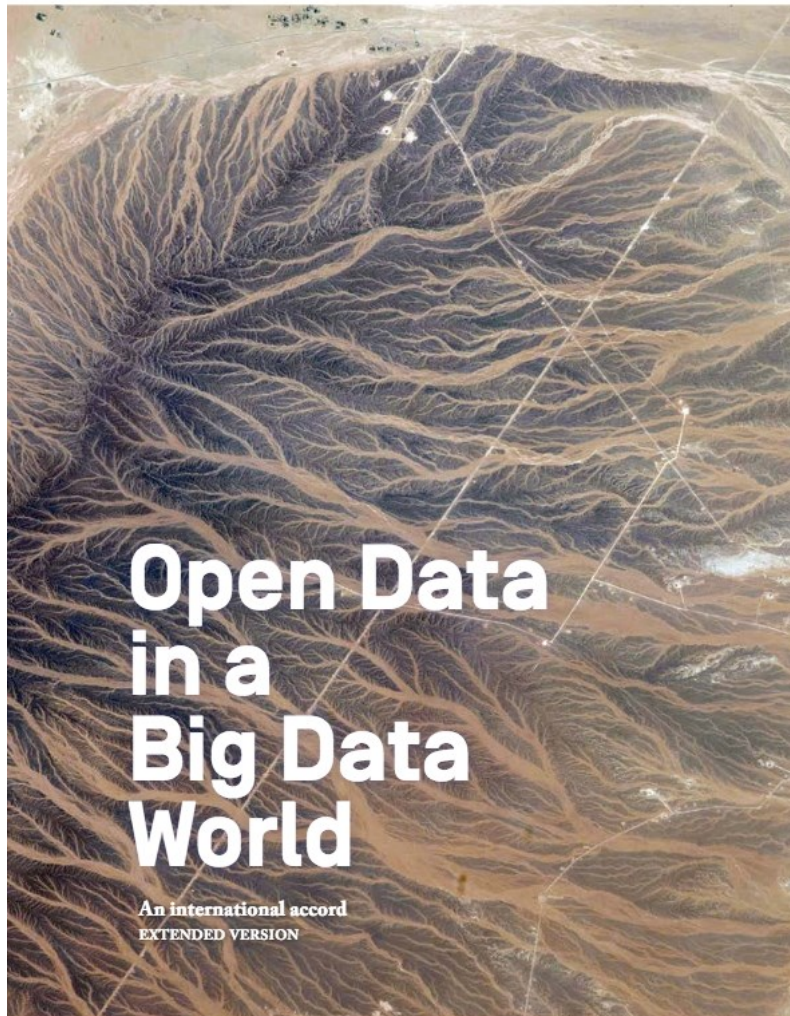
– UN Independent Expert Advisory Group on a Data Revolution for Sustainable Development (2014)

# A global commitment to open data



The four partners represent more than 280 national, regional and global organizations, with individual members at the highest levels of scientific research, policy and education.

# A global commitment to open data

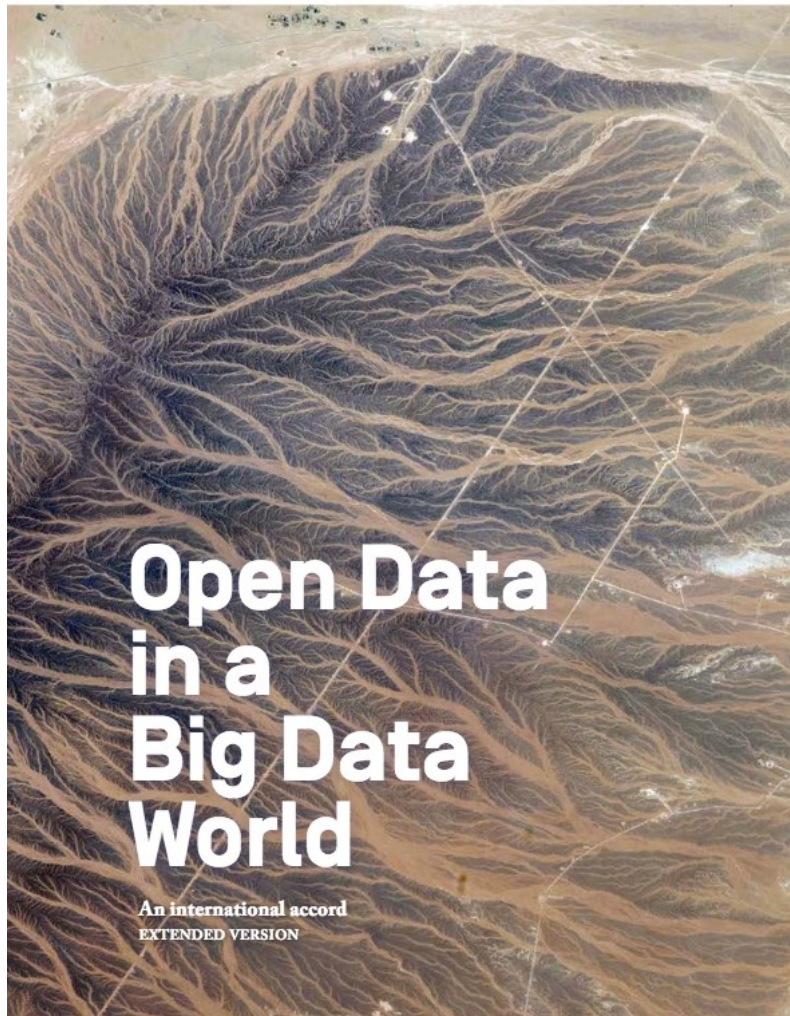


Open data is essential for:

- the health of science
- the advance of science in the developing world



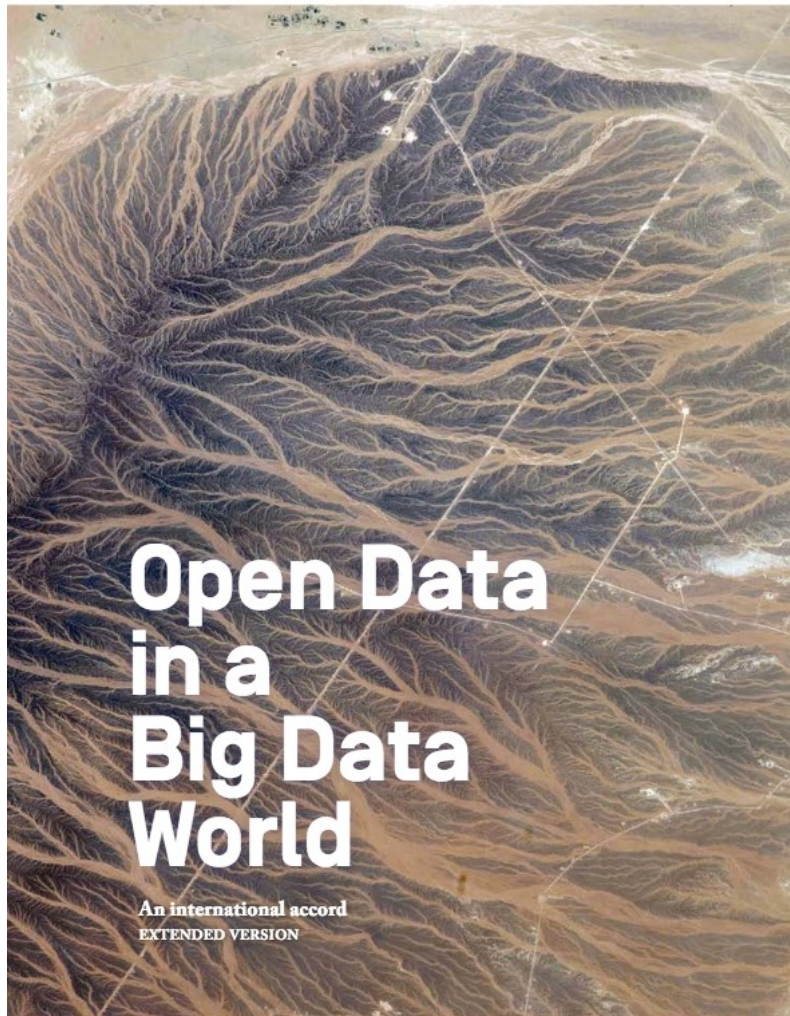
# A global commitment to open data



## Six stakeholders:

- Scientists
- Research institutions
- Publishers
- Funding agencies
- Professional societies
- Libraries and archives

# A global commitment to open data

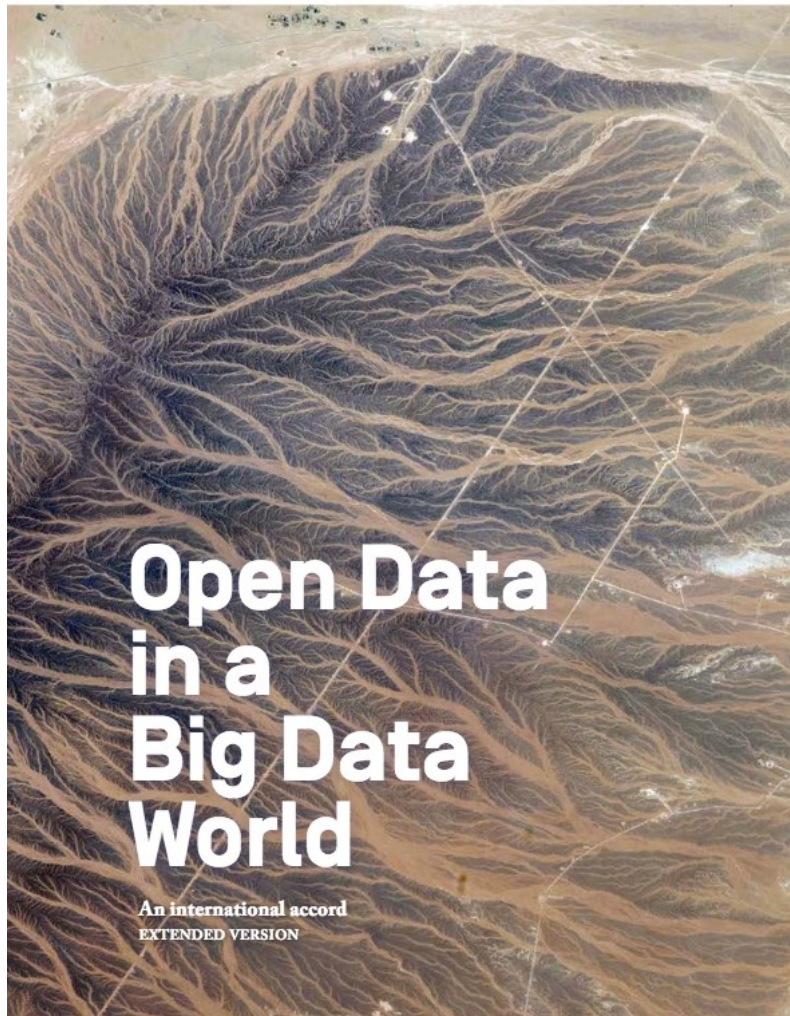


## Twelve principles:

- Responsibilities
- Boundaries of openness
- Enabling practices



# A global commitment to open data



100+ endorsements

- Royal Society
- International Union of Crystallographers
- Academies of science in Brazil, Switzerland and India

# Open data: practical requirements



**Computing power: analysis, storage, sharing**



## Open data: practical requirements

### **Computing power at the grassroots**

- 80% of households in developed countries have Internet access
- 46% of households worldwide
- 6.7% of households in the Least Developed Countries

# Open data: practical requirements

## Education and Training

- 1,000 PhD scholars studying under programmes offered by TWAS and OWSD
- Summer course on research data science sponsored by TWAS, ICTP and others  
→ students from 30 developing countries

# Open data: practical requirements



**Partnerships: South-South, North-South**



# Open data: the promise of progress



Square Kilometre Array, South Africa/Australia

# Open data: the promise of progress

## African Data Intensive Research Cloud

8 countries, including 3 LDCs

- astronomy
- green energy
- environmental monitoring
- health

# Ndiyabulela

**twas**

**Murakozi**



# Asante

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# Ngiyabonga