



Tom Kariuki

Director of Programmes/AESA Platform

STRENGTHENING AFRICAN R&D

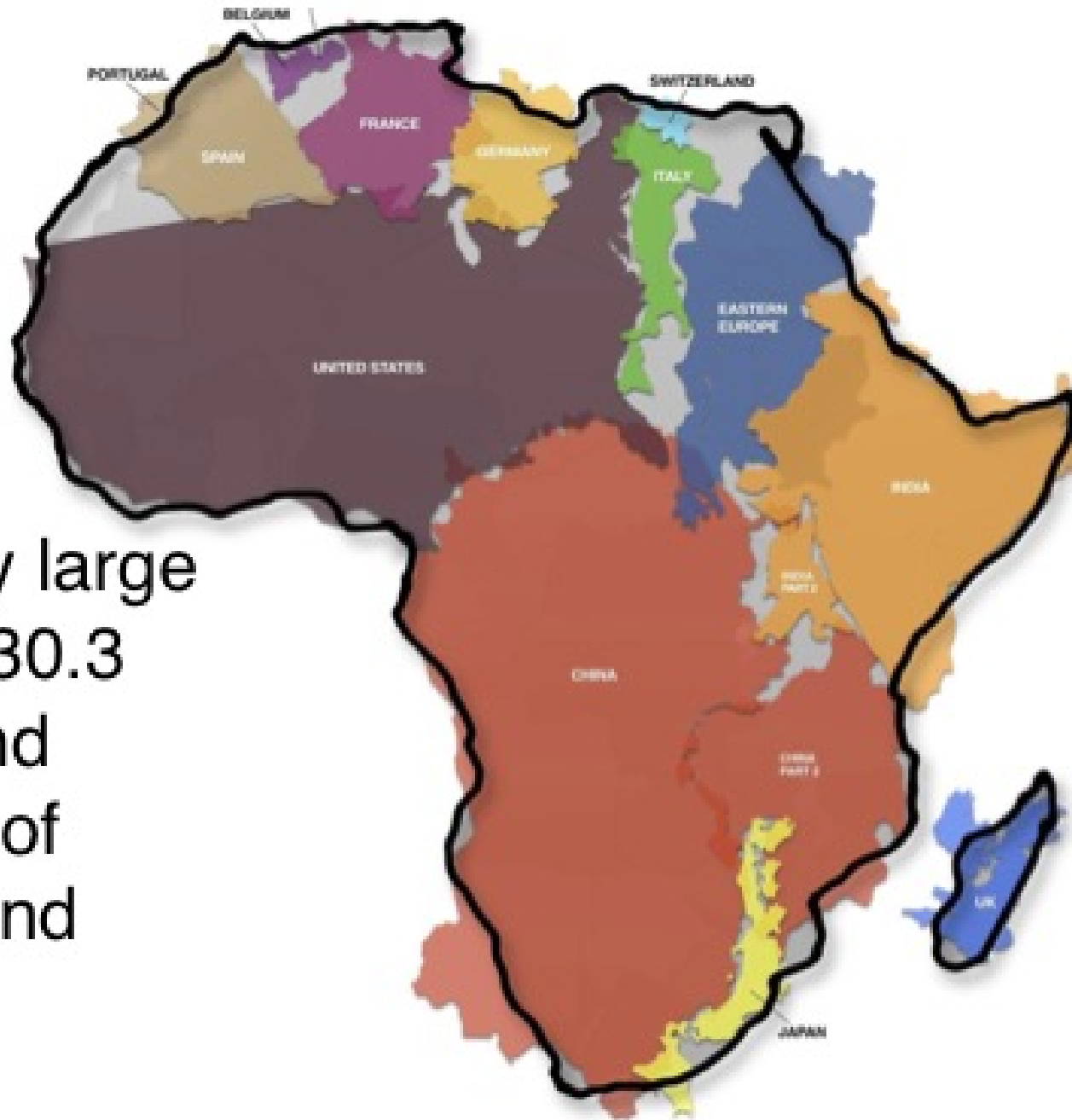
Structure of the talk:

Transitions

The AAS approach

Hope arising

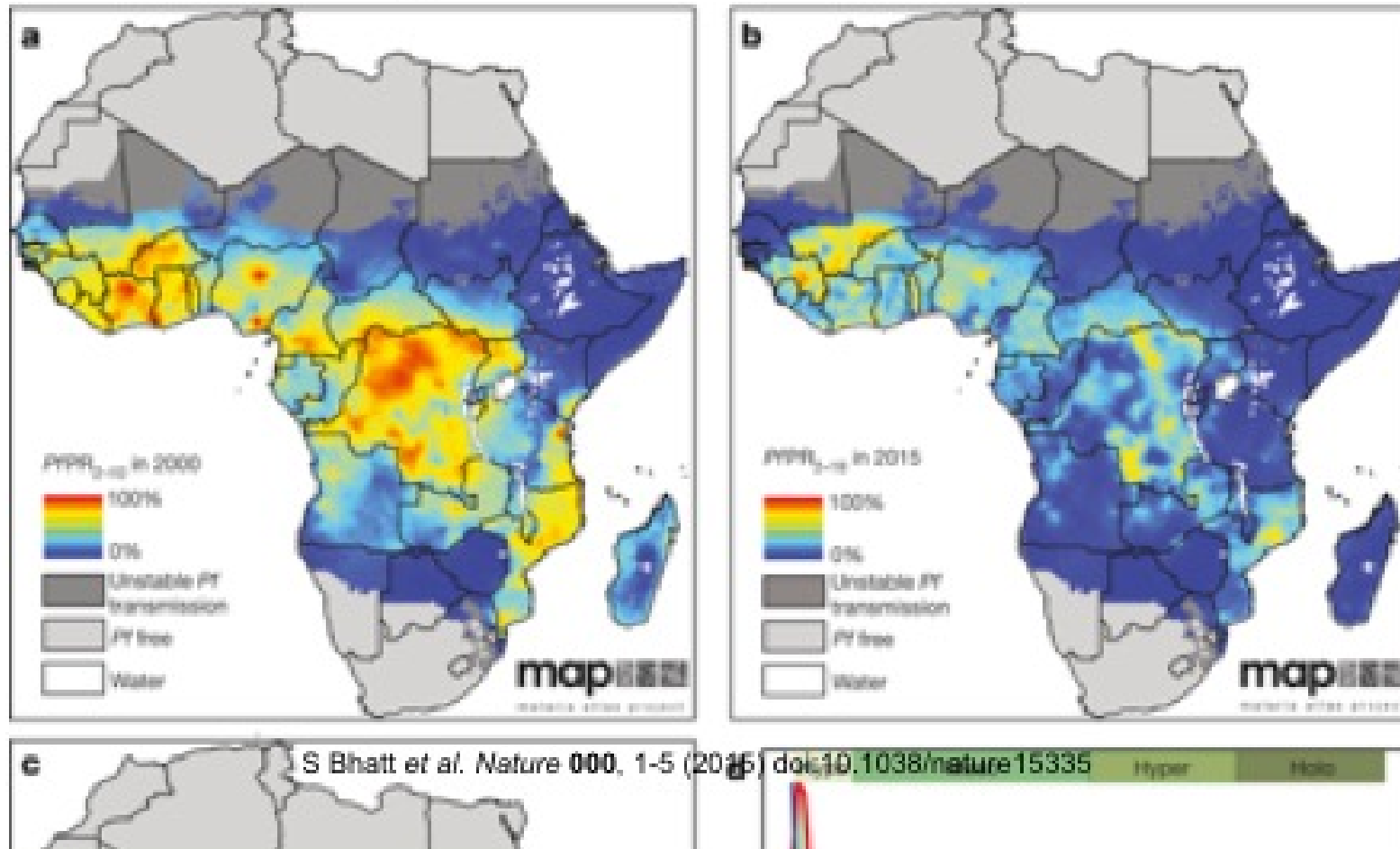
Africa is a very large
Continent!30.3
million km² and
covers 20.4% of
Earth's total land
area



The interaction of a
set of major
transitions will
profoundly shape
the future of
science (health) in
Africa

Transitions: Africa is in the throes of an epidemiological transition

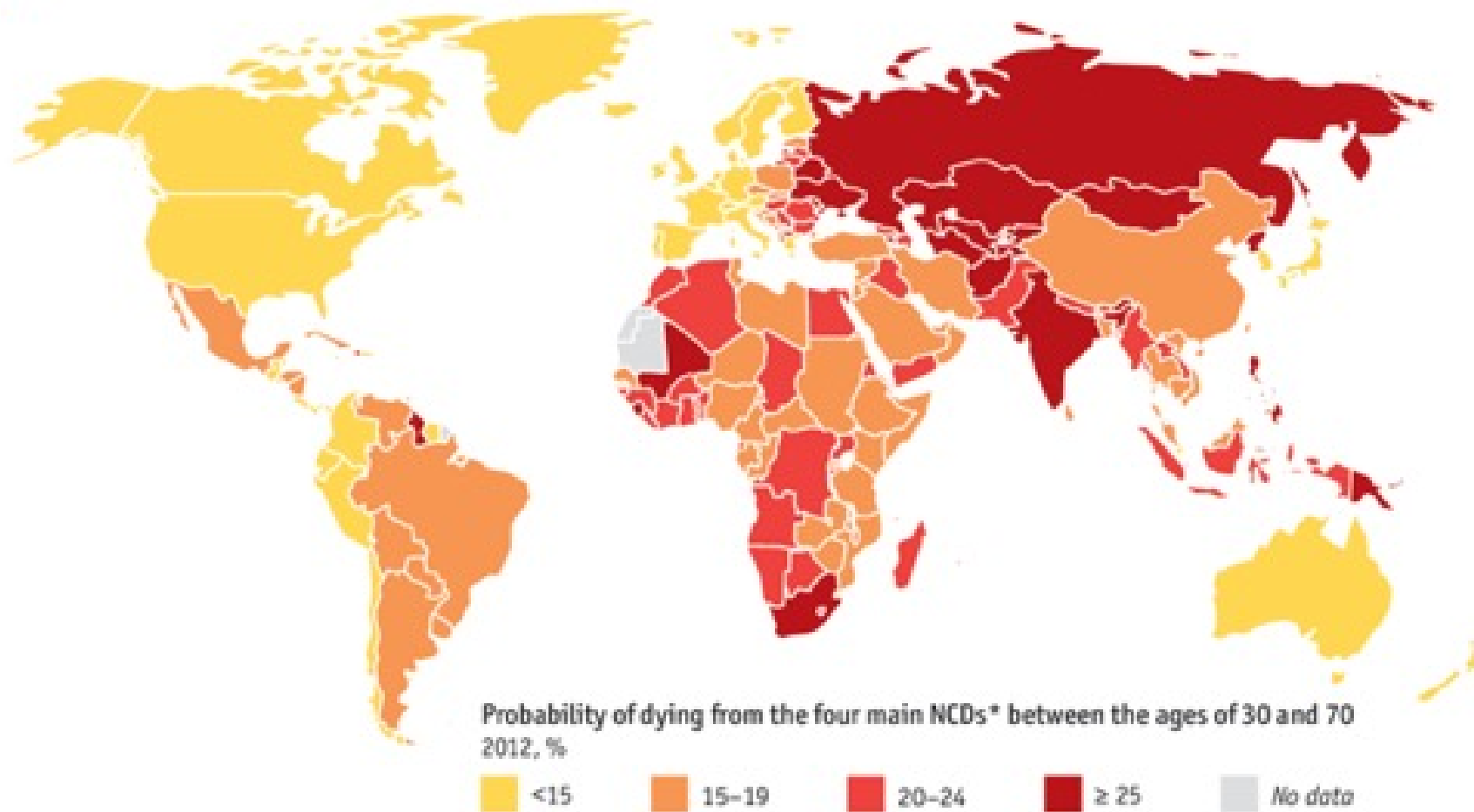
Changes in Malaria 2000–2015.



663 million cases averted (542-753), Malaria mortality reduced by 63%

Transitions: Epidemiological transition to more NCDs

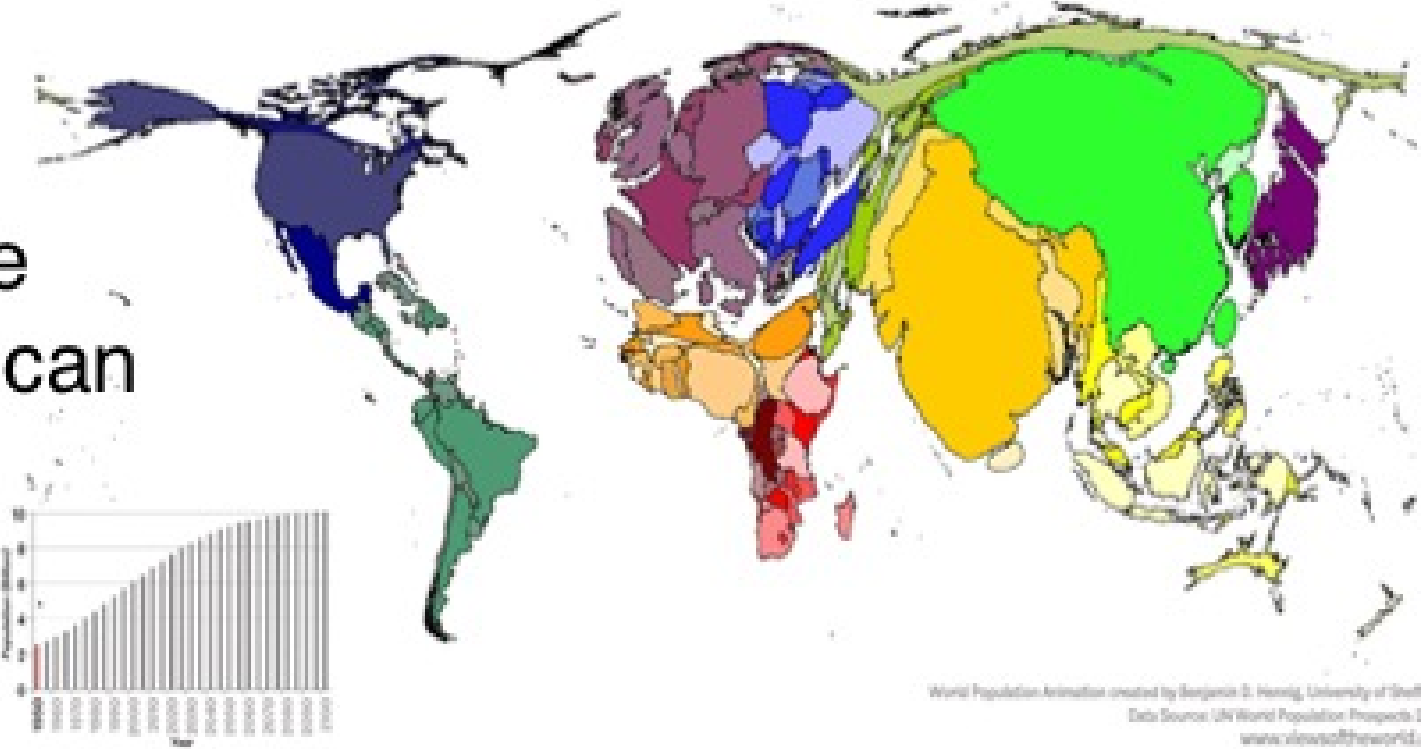
Probability of dying prematurely from non-communicable diseases



Transitions: Africa's Population growth will change the world

World Population 1950

Of the worlds 9.5B people by 2050, more than 2.3B will be African

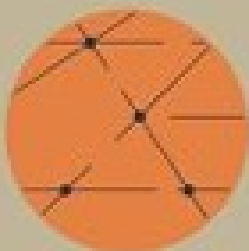


African Cities have:
40% fewer neighbors
to interact with compared
to Asia and Latin America

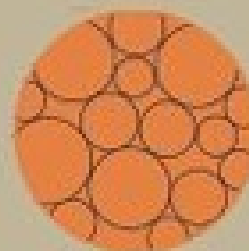


**Cities
can be:**

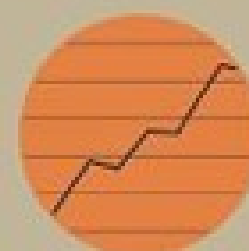
DISCONNECTED



CROWDED



COSTLY



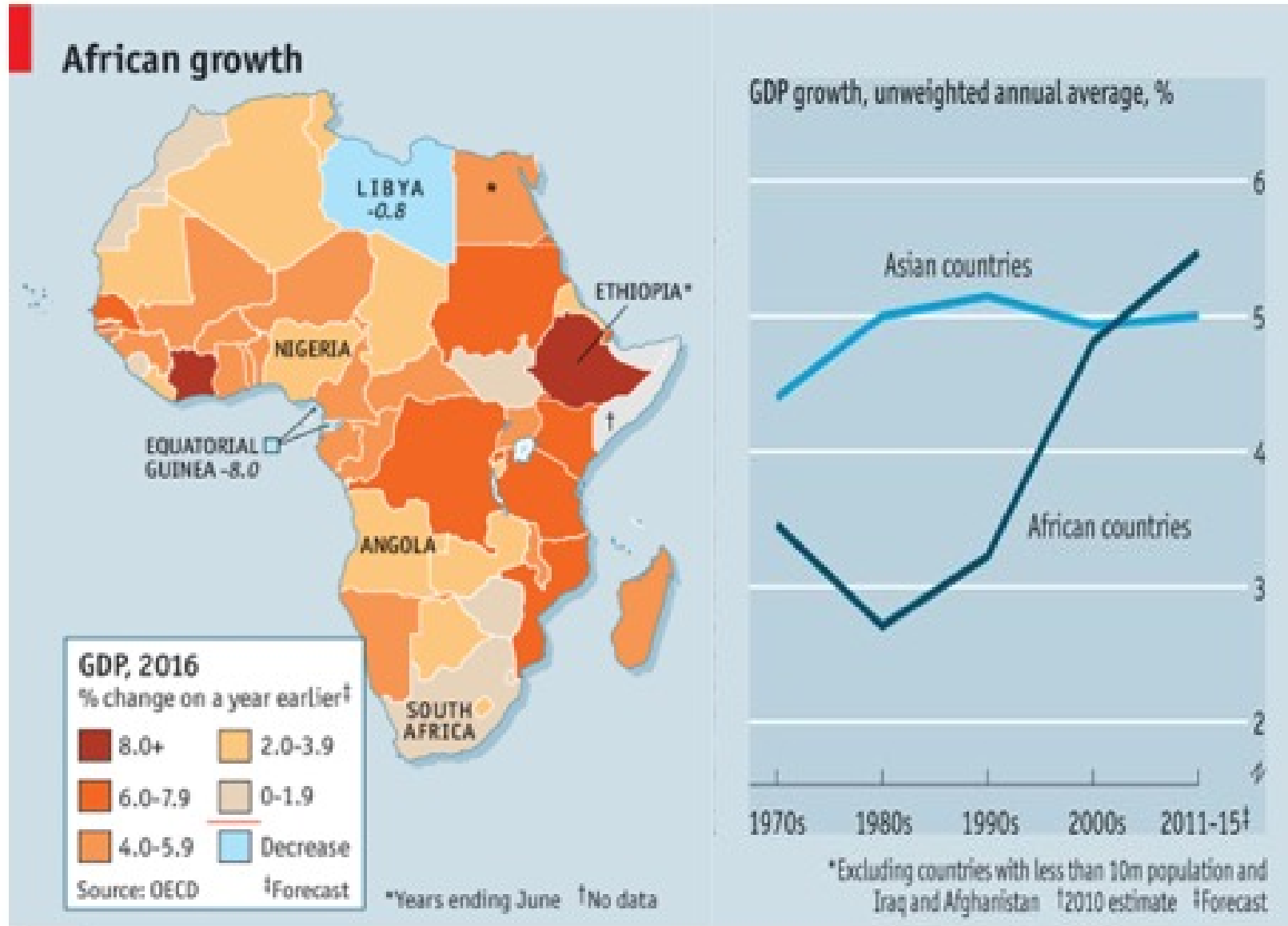
Africa's current
urban population:
472 million

By 2040:
**1
billion**



African Cities are:
29% more expensive
than cities in countries
at similar income levels

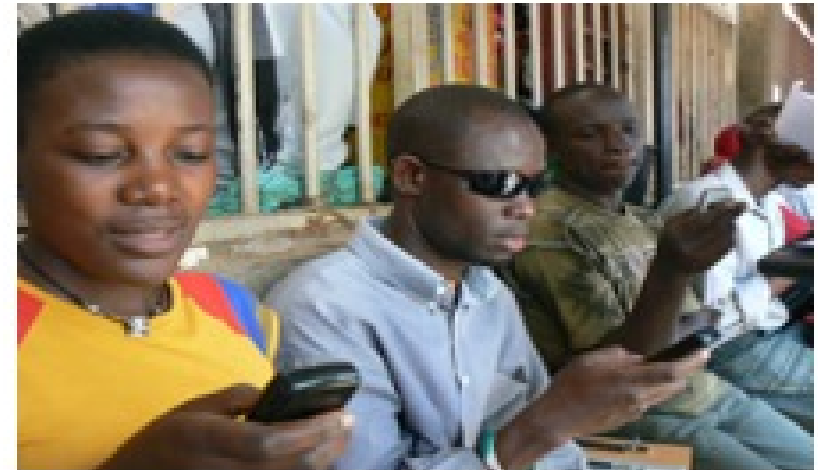
Transitions: Africa is undergoing rapid economic growth



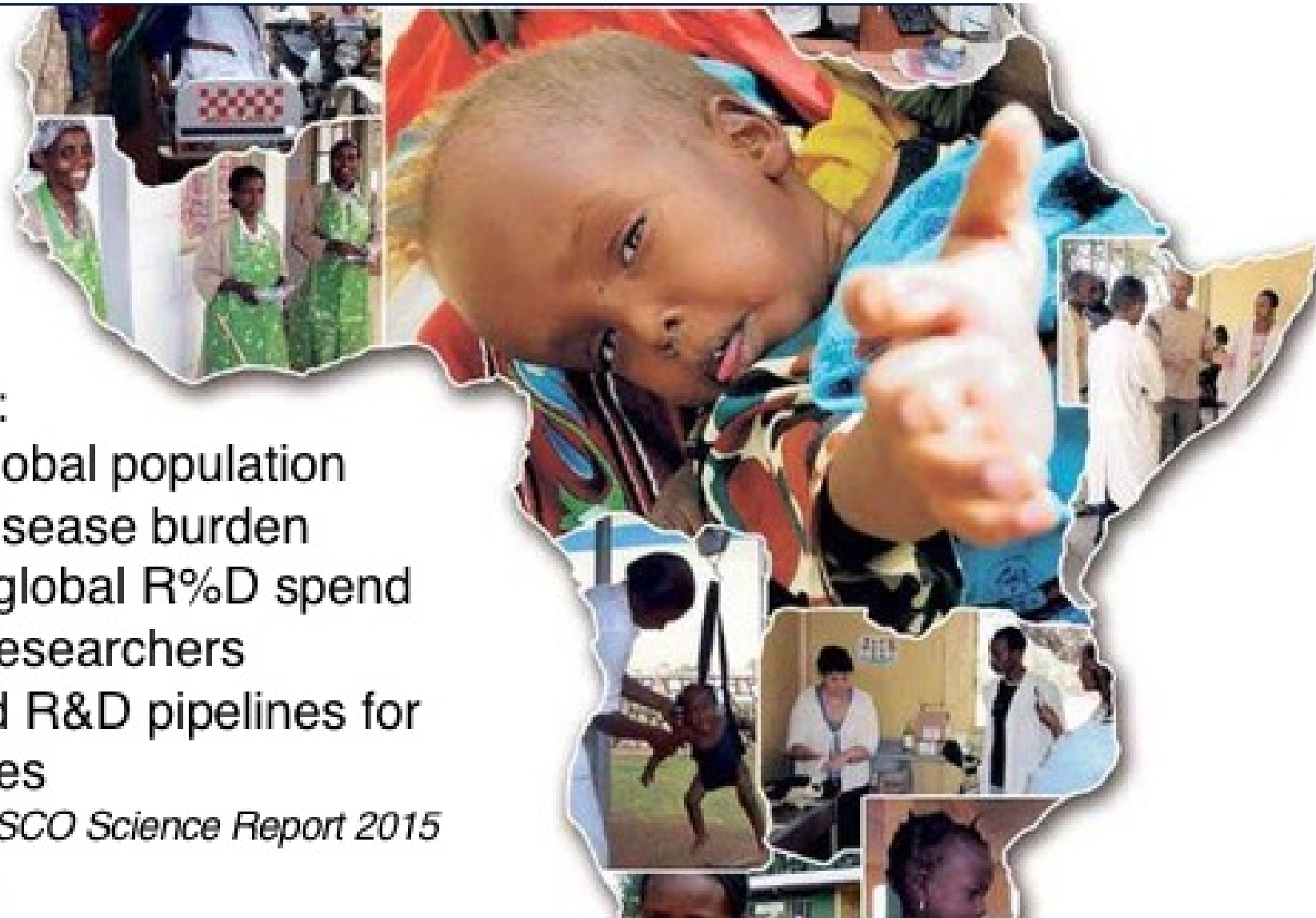
Transitions: mobile phones, E health, telemedicine

Technology can help Africa deliver UHC quicker...

Total African Mobile Connections and Penetration Rate (million, % penetration)



Challenges for Science Technology & Innovation in Africa



Africa has:

- 16% global population
- 25% disease burden
- 1.3 % global R%D spend
- 2.6% researchers
- Limited R&D pipelines for diseases

Source: UNESCO Science Report 2015

AAS: Our Approach to addressing STI challenges in Africa

The AAS triple mandate



**Recognising
excellence**



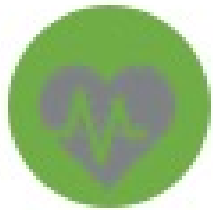
**Think tank &
Advisory functions**



**Implementing
science programmes**

The AAS Strategic Plan 2018-2022

5 Strategic Focus Areas Driven by Excellence, Investing in People, and Partnerships



Health &
wellbeing



Environment &
Climate change



Social sciences
& Humanities



Natural
sciences



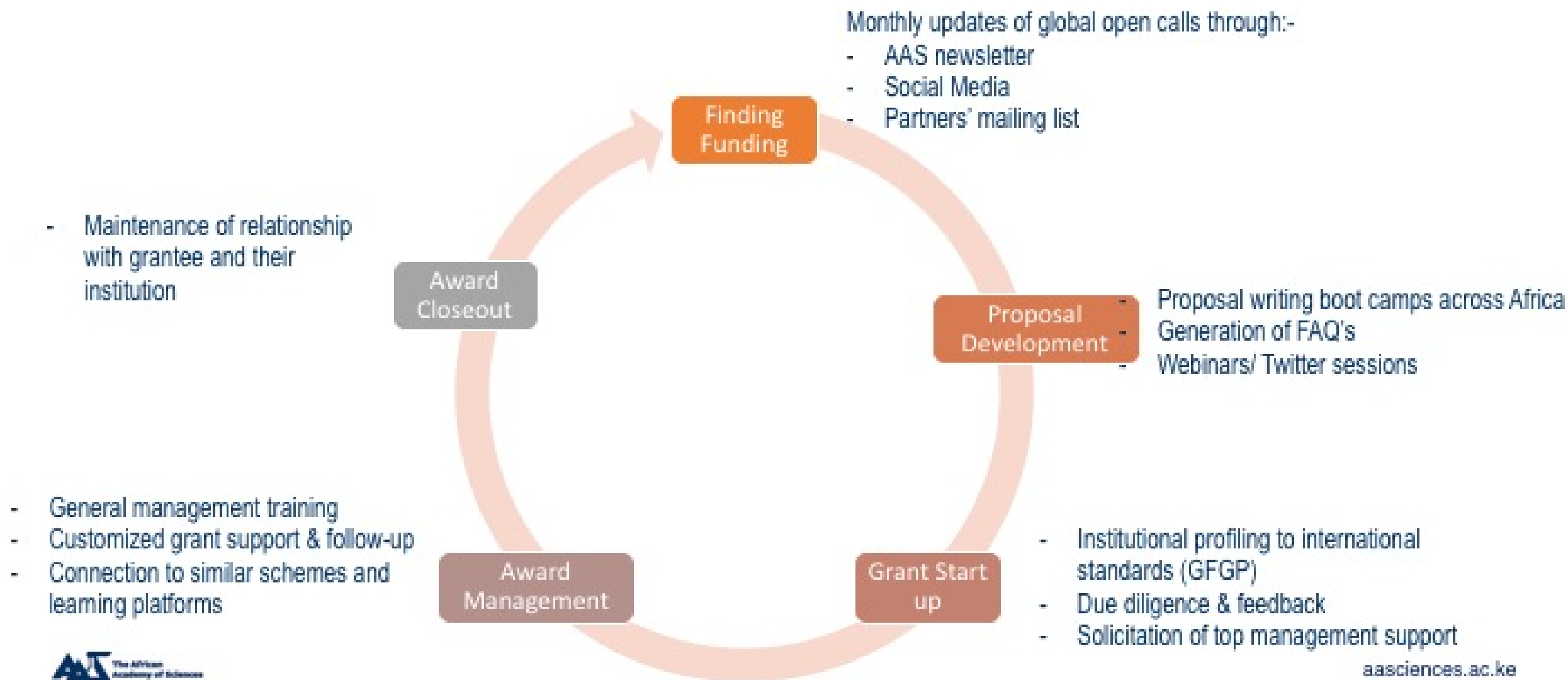
Policy &
governance

AESA Business Plan 2016-2021 Strategic Goals:

Shifting the Centre of Gravity of African Science



AESA Platform grant support processes



AESA Platform @ AAS

Investments and Theory of Change

Building R&D Infrastructure

Innovation & Entrepreneurship

Developing Young Scientists
Affiliates + Post Docs

Filling Critical Gaps in
Ecosystem

DELTA Africa
H3AFRICA

Grand Challenges Africa
Industry Partnerships

AFFILIATES
CIRCLE
RISE
FLAIR
APTI

Good Financial Grant Practice
Research Management
Community Engagement
STEM Advocacy
Open Publishing
Science Communication
CARI



IMPACT OF INVESTMENTS


AESA Platform Grants Portfolio Exceeds \$200M in 2018



Key

- DELTAS Africa
- Postdoctoral Programme
- Grand Challenges (GC) Africa
- H3 Africa
- AESA Core Support
- Critical Gaps Support





BUILDING R&D LEADERSHIP & INFRASTRUCTURE



DELTA Africa

A partnership of AAS, Wellcome and DFID

DELTA Africa's ultimate goal is to produce researchers with the capacity to publish and lead locally relevant and high-quality research to impact health science, policy and practice in Africa

Collaborations among lead grantees and their partners

21 African countries and >50 organizations host DELTAS activities

DELGEME

● DELGEME - MALI

MARCAD

● MARCAD - SENEGAL

WACCBIP

● WACCBIP - GHANA

AFRIQUE ONE

● AFRIQUE ONE CSRS - COTE'D'IVOIRE

SANTHE

● SANTHE - SOUTH AFRICA

SSACAB

● SSACABT - SOUTH AFRICA

CARTA

● CARTA - KENYA

MUI

● MUI PLUS - UGANDA

IDeAL

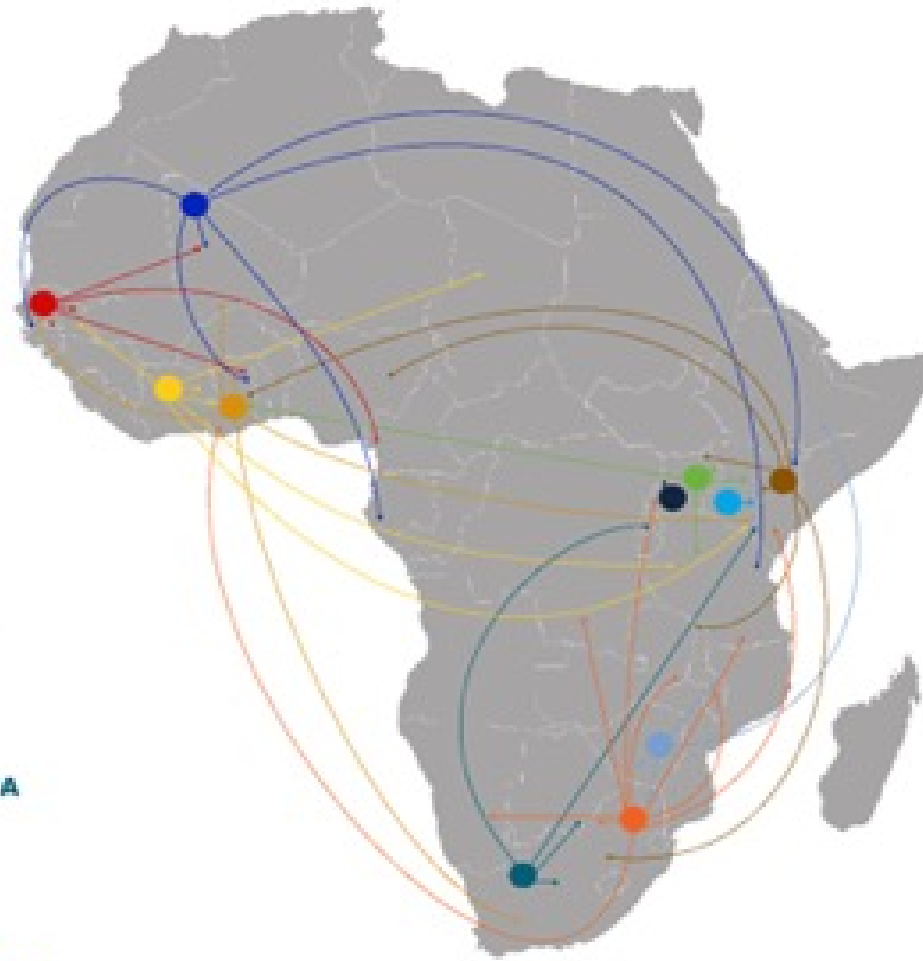
● IDeAL - KENYA

THRIVE

● THRIVE - UGANDA

AMARI

● AMARI - ZIMBABWE



120 Major and sub awards awards since 2015

DELTA Africa (D)

11 Networks

Côte d'Ivoire, Ghana, Kenya, Mali, Senegal, South Africa, Uganda & Zimbabwe

H3Africa (H)

4 new networks

Ethiopia, The Gambia, South Africa & Uganda

GC Africa (G)

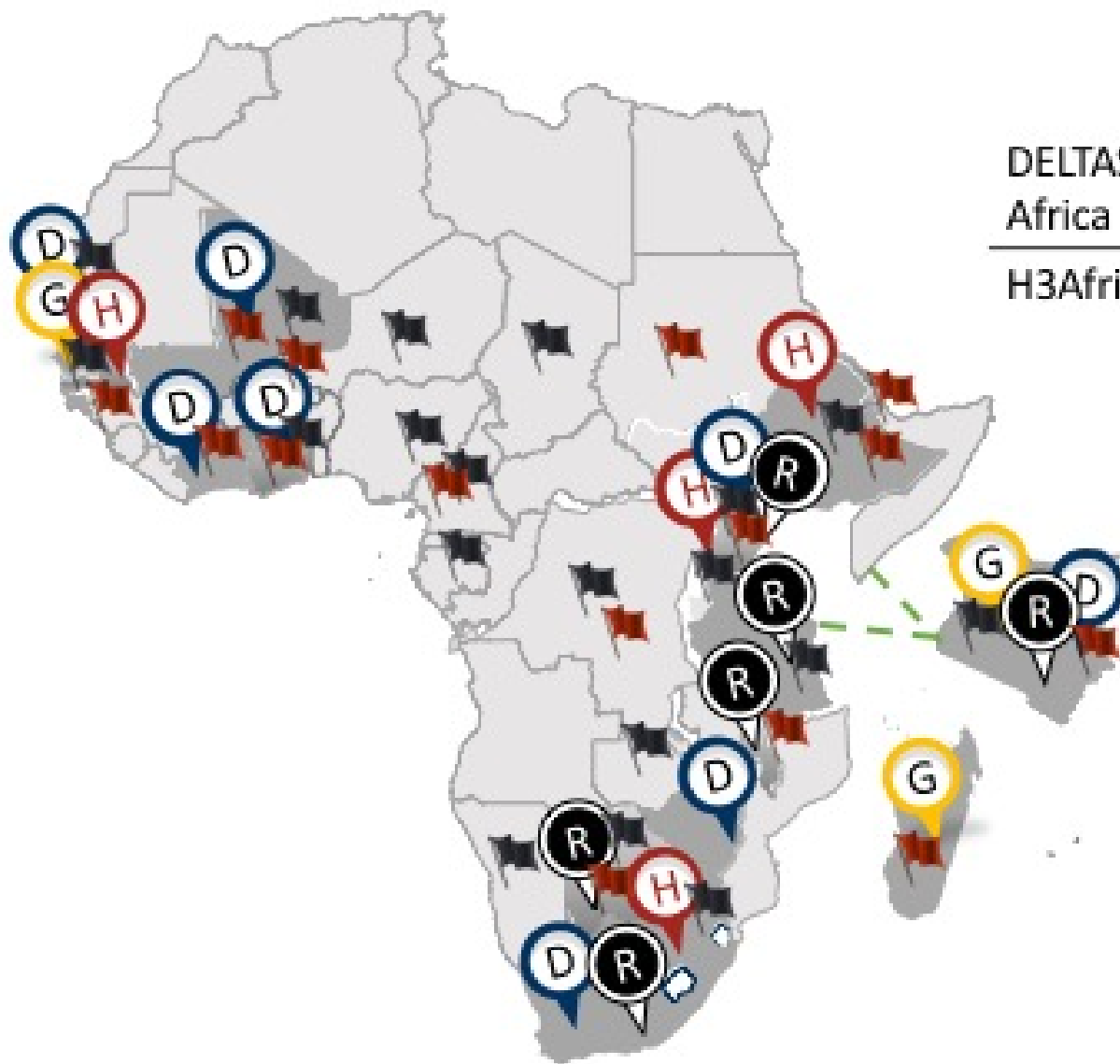
22 awards

Kenya, Madagascar & Senegal

Postdoc

130 + ?? awards

Botswana, Ethiopia, Kenya, Malawi, South Africa, Tanzania & Uganda



DELTA Africa

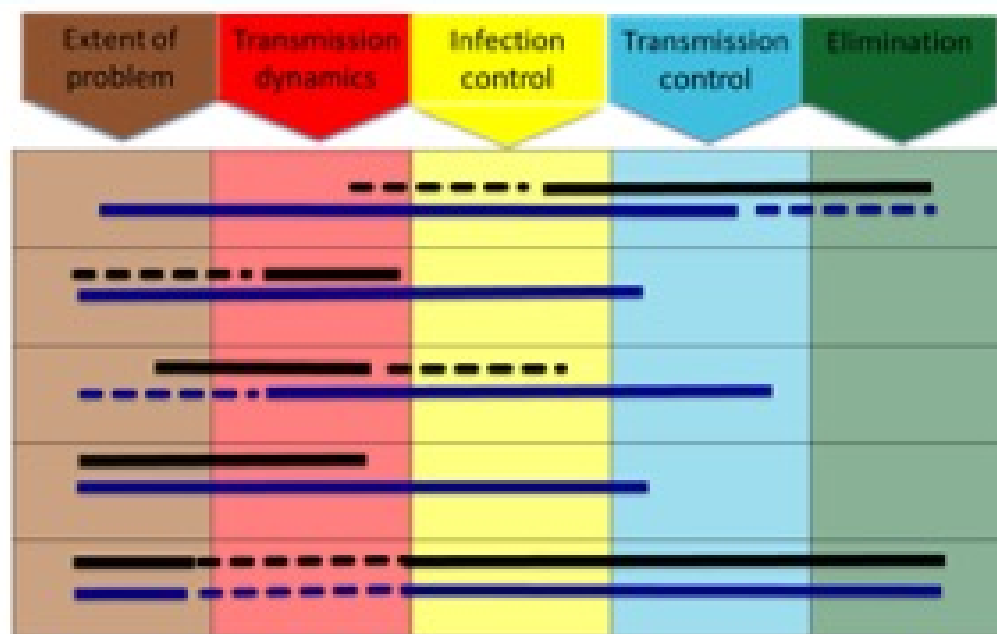
54 sub-awards in 27 countries

H3Africa

24 sub-awards in 15 countries

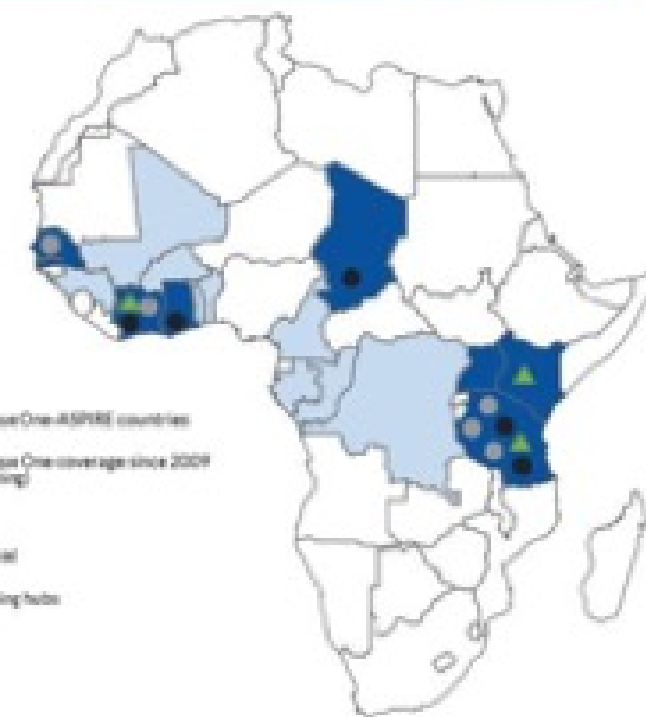
(1) Pathways to zoonosis control

(2) Zoonosis elimination models



Adapted from Uttinger, 2012, *Plus NTDs*

— Ea:
— Wi



- **Strong institutions** → One health research platform
- **Scientific leaders** → integrated health system
- **Impacts/ changes** → health policy and intervention

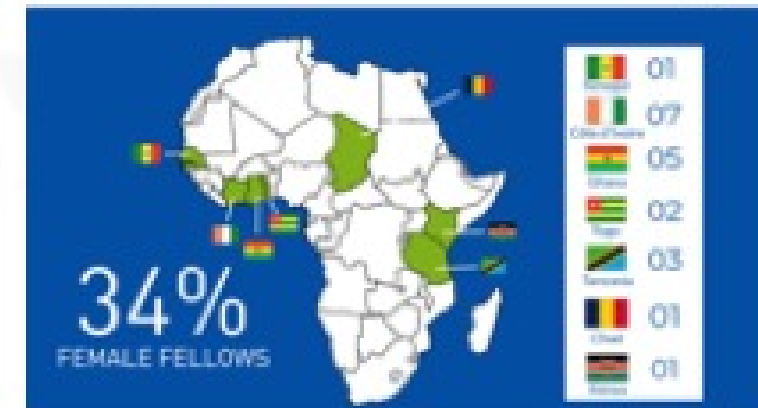
One health champions in Africa (2016-2021)



- 60** One Health fellows (Master, PhD, Postdocs)
- 12** countries covered by case studies
- 64** Supervisors & mentors
- 3** training hubs (Abidjan, Arusha, Nairobi)
- 1** MOOC on One Health (runs: 2016, 2017, 2018)
- 12** supporting staff



Women in One Health



33%
MSc

31%
PhD

44%
Postdocs

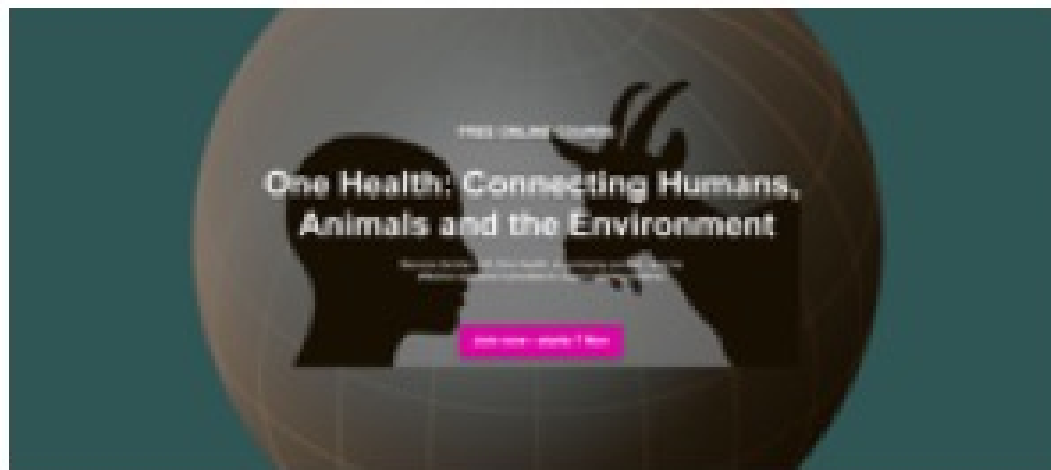
Afrique One-ASPIRE

Afrique One African Science Partnership for Interdisciplinary Research Excellence (ASPIRE) is a Pan-African research consortium leading research and training on One Health to tackle priority diseases in Africa. Afrique One-ASPIRE is one of the beneficiaries of the grant DELTAS Africa.

DELTA Africa

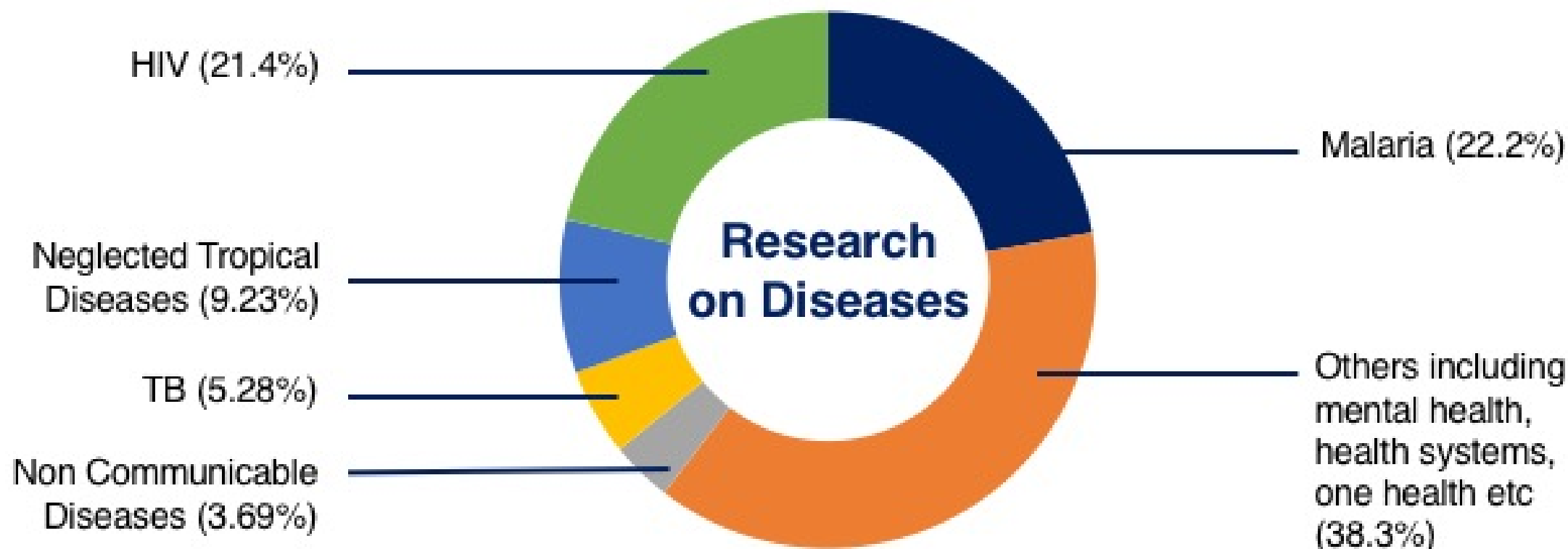
DELTA Africa is a programme of The African Academy of Sciences being implemented with the support of Wellcome and OPRF to train and develop world class researchers and research leaders in Africa. At The AAS DELTA Africa is implemented through the Alliance for Accelerated Excellence in Science in Africa (AAESA), a funding and agency sub-partnership of The AAS and the African Development Agency (AfDB) (2018).

www.afriqueoneaspire.net



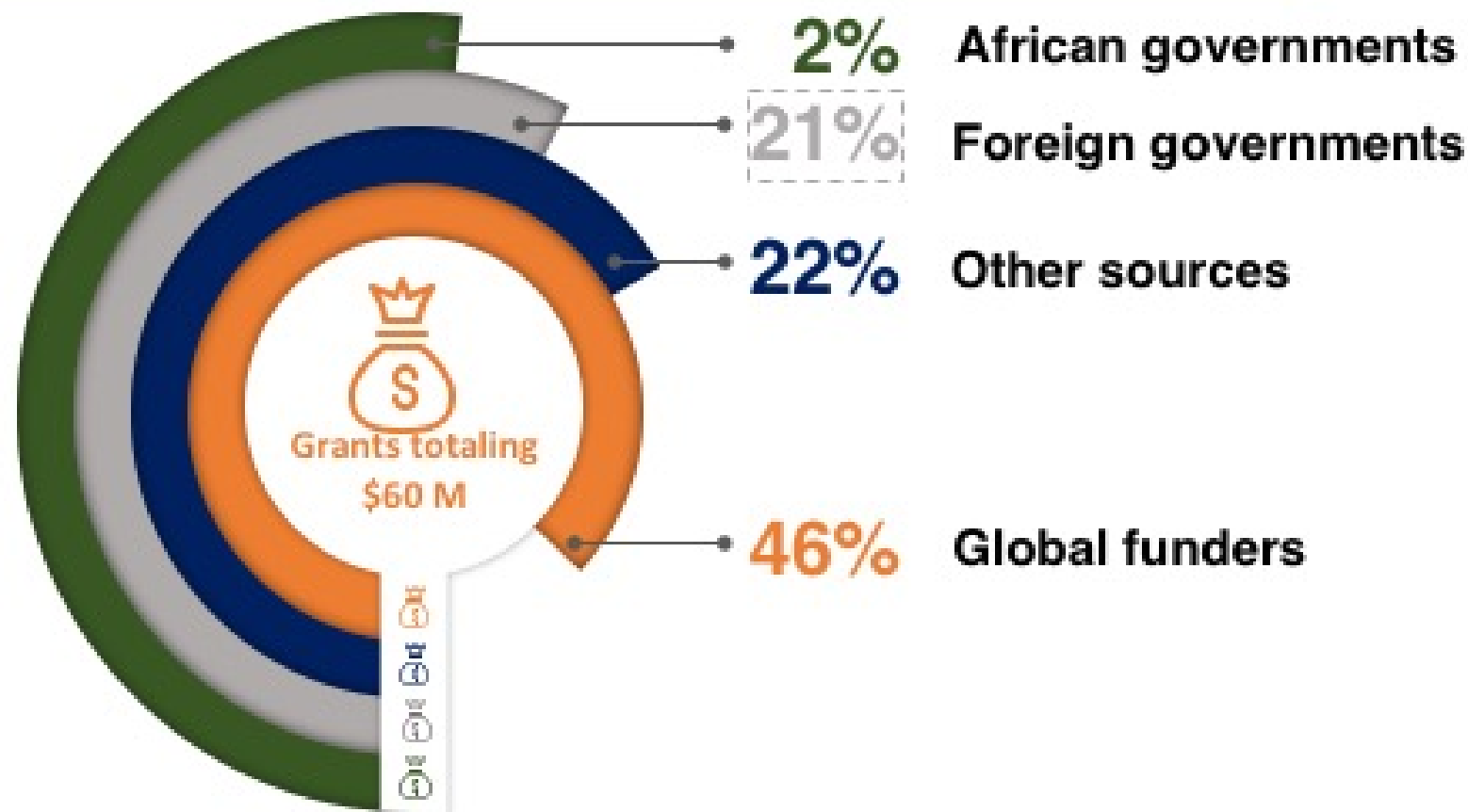
Diseases being researched across major programmes

Others include: Health economics and systems, ethics, social science topics etc



In three years DELTAS leaders have attracted 113 new grants totaling \$60 M

Percentage of total additional funding



Scientific Productivity: Publications in 2017

174

Total peer reviewed publications are 174

50

DELTA Africa acknowledged publications are 50

First author publications



17

64

Type of publications

174

Peer reviewed

4

Policy briefs

17

Conference publications

23

Thesis and dissertation

Impact - Beyond Publications

WACCBIP's laboratory testing has been integrated into national health surveillance systems

Programme Directors being globally recognised and shaping policy decisions

Women's participation and leadership throughout the programme

01

02

03

04

05

06

Biostatistics service offered by SSACAB to other networks and partners to enhance their research

DELTAS-SANTHE led from UKZN has developed a new HIV drug resistance test

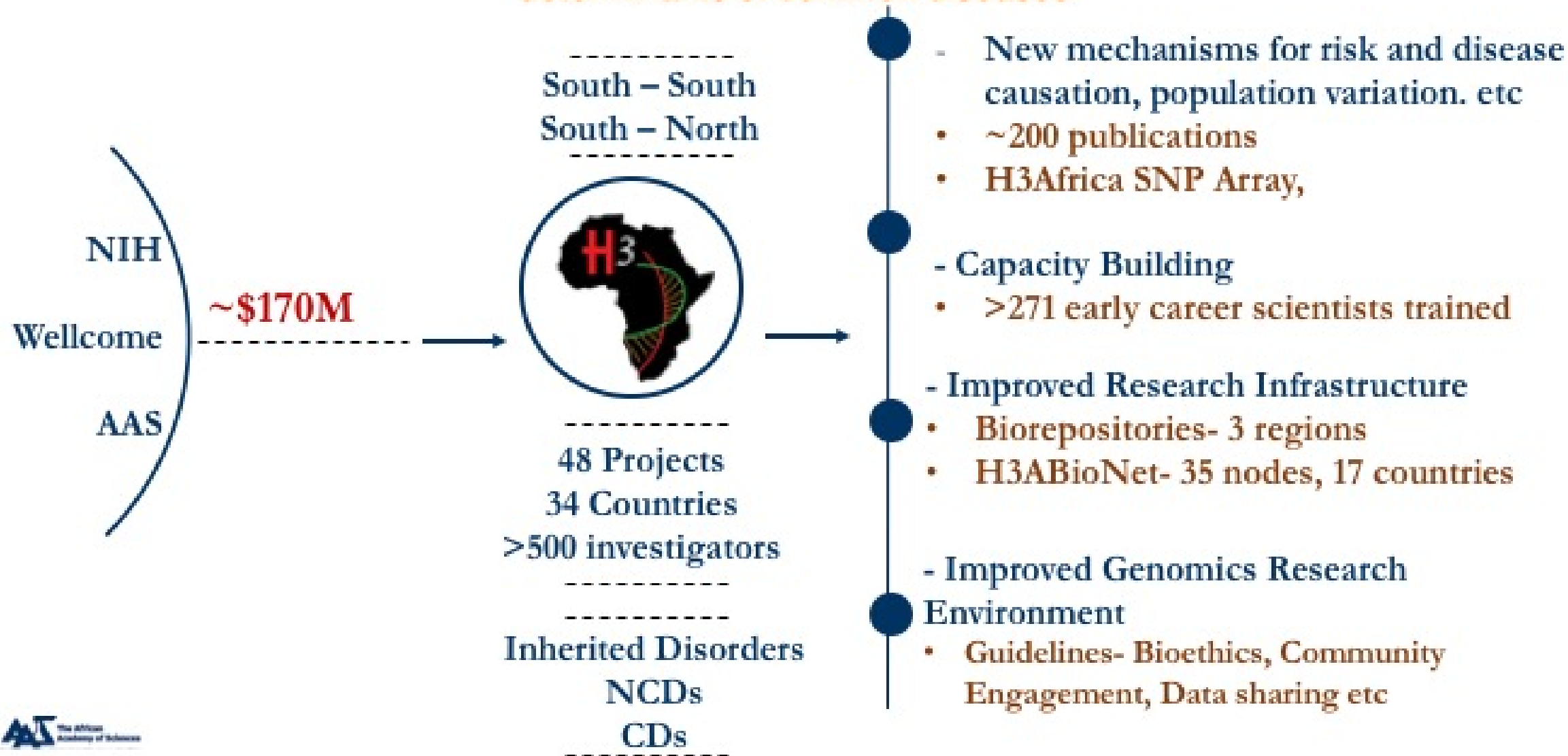
Good practices are becoming embedded in host institutions

GENOMICS RESEARCH IN AFRICA: BECAUSE BLACK GENES MATTER

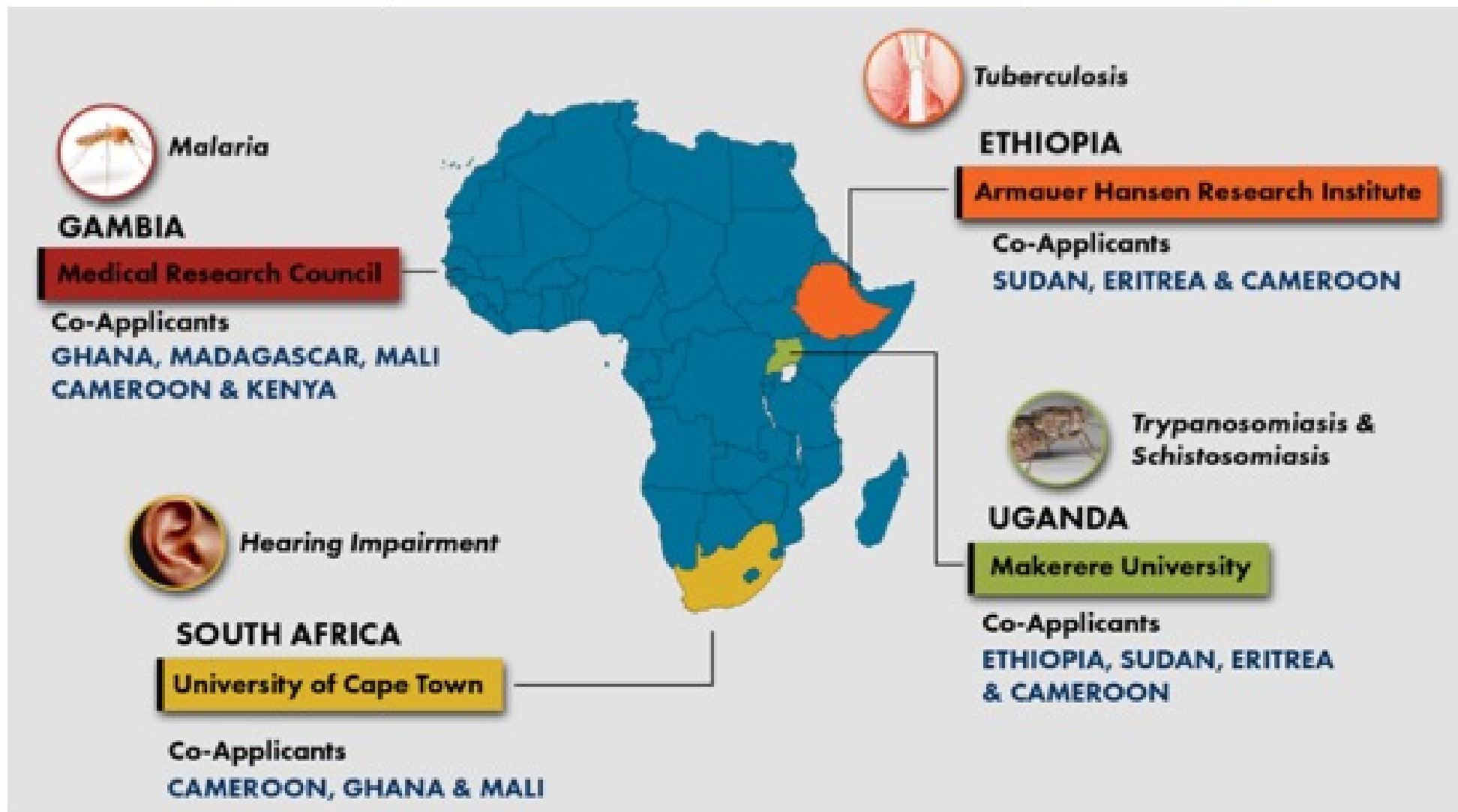


Human Heredity and Health In Africa (H3Africa)

Supports contemporary research approach to the study of genomics and environmental determinants of common diseases



H3Africa Phase II: AESA 2017 Grantees



Grand Challenges Africa

PROMOTING INNOVATION & ENTERPRENUERSHIP



Grand Challenges Africa seeks to support innovations that address Africa's health and developmental challenges.

The scheme seeks to promote Africa-led scientific innovations to help countries better achieve the Sustainable Development Goals (SDGs) by:

- Awarding **Innovation Seed Grants (ISG)** of up to \$100,000
- Awarding **Innovation Transition Grants (ITG)** of up to \$500,000 to the continent's most impressive solutions.

GCA IS TACKLING CHALLENGES OF:

Antimicrobial Resistance (AMR)

New Approaches to Characterise the Global Burden of AMR

Global Grand Challenges Partners- GCA, Brazil, India, South Africa and BMGF

Surveillance, data sources/bioinformatics, biomarkers, low cost technologies e.g. to remove antibiotics from effluent.

Water, Sanitation and Hygiene (WASH Challenge in Urban Settings)

Funding technology-based solutions to improve access to water and sanitation

Global Grand Challenges Partners- GCA, UNICEF, ARM Technology and BMGF:

Clean drinking water, household sanitation and hygiene, and urban pollution

Drug Discovery

Discovery of new drugs for diseases endemic to Africa

Global Grand Challenges Partners- GCA, University of Cape Town Drug Discovery and Development Centre (H3D), Medicines for Malaria Venture and BMGF

Malaria, TB and NTDs (Biological targets, screens/assays, small molecules, DMPK/ADME technologies



TACKLING CHALLENGES OF:

Maternal, Neonatal and Child Health (MNCH)

Solutions to reduce MNCH deaths in Africa

Global Grand Challenges Partners- GCA, Bill & Melinda Gates Foundation, German Ministry of Education and Research (BMBF)

better health during pregnancy

better care at birth

better post-birth care for women and their newborns

better hospital care of sick newborns

Scale up grants

Support translation and scaling up of promising Phase I grants, both from the existing portfolios and new Phase I

Global Grand Challenges Partners- GCA, SIDA, BMGF, BMBF

> 600 legacy projects in Africa looking for scale up partners



GCA awards for MNCH 2017



Diagnostics for TB
in Pregnancy



POCs to improve
ante-natal screening



GPS tracking to
Provide lab Services



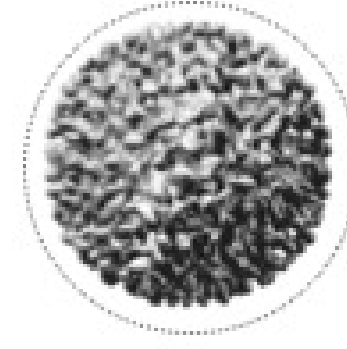
TBAs for
Maternal depression



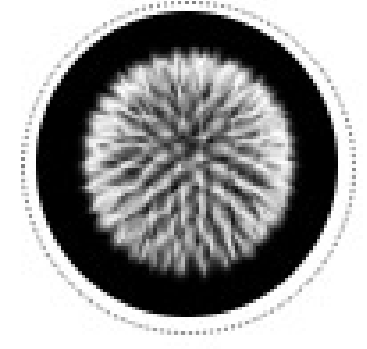
Rapid Zika detection
To aid MNCH



Algorithms for
Neonatal sepsis



Develop Hepatitis
B LAMP assays



Multiplex diagnosis for
Bacteria Infections

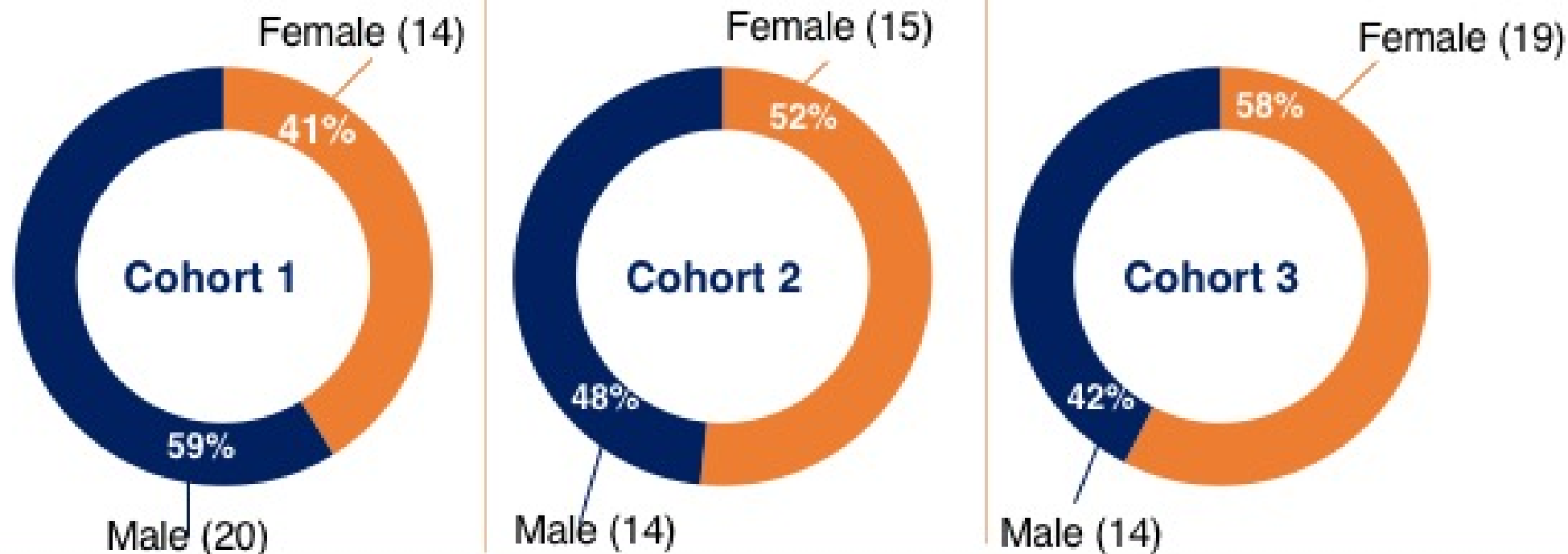
SUPPORTING RISING RESEARCH LEADERS

The Postdoctoral Fellowships

- 1 Climate Sciences (CIRCLE and CR4D):** Two programmes to develop the skills and research results of the next generation of climate scientists (ACU, DFID, UNECA)
- 2 AESA-RISE (Regional Initiative in Science and Education):** support the building of a critical mass of world class researchers, provide access to quality research facilities and mentors from Africa and abroad and promote the production, reproduction and transition of knowledge (Carnegie Corporation of NY)
- 3 African Postdoctoral Training Initiative (APTI):** to train a cadre of African scientists so they return to their home institutions and become scientific leaders in their community to help solve Africa's challenges in global health and development, and in turn become trainers of the next generation (NIH, BMGF)
- 4 Future Leaders – African Independent Researchers (FLAIR):** provide the opportunity to build an independent research career in a sub-Saharan African institution and to undertake cutting-edge scientific research that will address global challenges facing developing countries (Royal Society/GCRF funding)
- 5 DELTAS:** Supporting 100 Post-docs across the continent thru the 11 DELTAS Networks



CIRCLE- achieving gender parity in recruitment



| Gender | Cohort 1 | Cohort 2 | Cohort 3 | Grand Total |
|-------------|----------|----------|----------|-------------|
| Female | 14 | 15 | 19 | 48 |
| Male | 20 | 14 | 14 | 48 |
| Grand Total | 34 | 29 | 33 | 96 |

The AAS key STI Programmes

ADDRESSING CRITICAL STI GAPS

Mobility grants: South-South collaborations

Africa India Mobility Fund

Science and Language Mobility Scheme Africa

Research Systems Strengthening

Research Management programme

Research Dissemination & Uptake

Open Publishing; Science Communication & Advocacy; Policy &

Think tank, Community and Public Engagement



New platforms are being nurtured and piloted



PLATFORMS

AAS Open Research

Publishes scholarly articles reporting any basic scientific, translational, applied and clinical research (including quantitative and qualitative studies) by researchers affiliated with the African Academy of Sciences.

Good Financial Grant Practice

Innovative and integrated tool to standardise, simplify and strengthen financial governance of grant funding worldwide

Coalition for African Research & Innovation (CARI)

Brings together various partners – governments, private sector, philanthropy, funders- to raise advocacy, resources and collaborations to achieve future sustainability for the various programmes.

Why Africa needs a Clinical Trials Database

- *Showcase what is available (sites & their capacities)*
- *Identify gaps in skills, infrastructure etc*
- *Make investment decisions*

Findings: the clinical trial sites inventory study commissioned by AAS/CARI

01

R&D not well aligned to disease burden

- NCDs and lower respiratory infections which have a high burden in Africa are overlooked
- Concentrated on drugs/treatment not vaccines
- Limited to early stage R&D

02

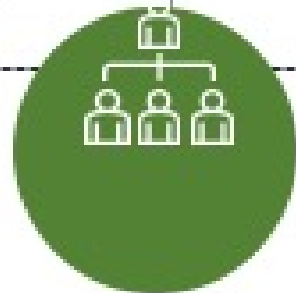
Sites are unevenly distributed

Of the 28 top tier institutions: **concentration in South Africa (12); Egypt (7) and East Africa (5)**. Only 2 of these centers are in West Africa, and none are in Central Africa

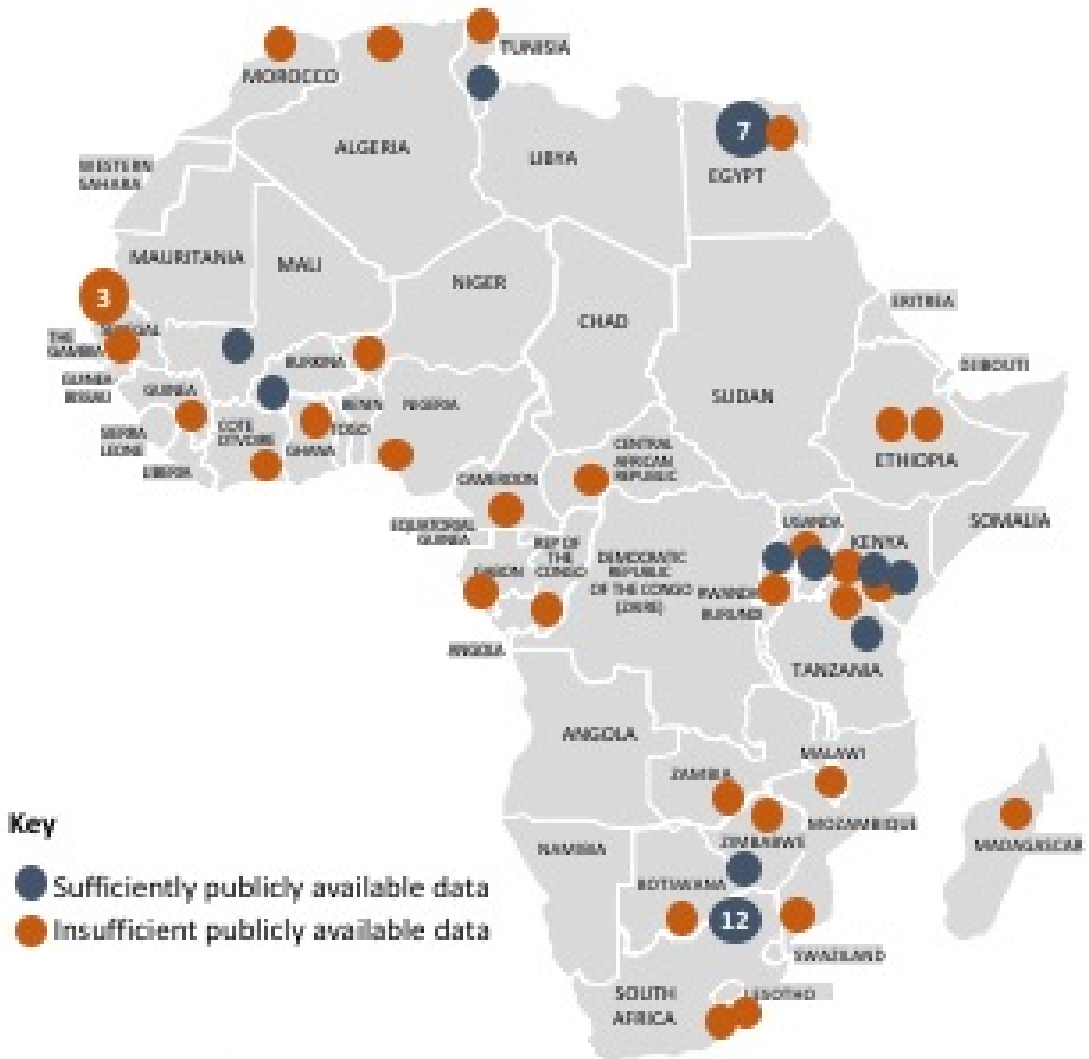
03

Pressing constraints/ gaps

- Skills
- Infrastructure
- Networks
- Institutional governance
- Funding



Finding 2: Clinical research activity is unevenly distributed, and advanced capacity is concentrated in 28 sites across 9 countries (1 of 2)



- 28 top-tier institutions were identified and verified
- Top-tier institutions have experience in conducting advanced phase 1 trials, as well as capacity to conduct trials across multiple phases.
- Most of the 28 top tier institutions are concentrated in South Africa (12); Egypt (7) and East Africa (5). Only 2 of these centers are in West Africa, and none are in Central Africa
- Majority of verified top tier institutions, were public institutions (mainly universities), 5 were private clinical research centres or hospitals, mainly located in South Africa, while the rest are non-profits.



Next steps: The AAS & Partners to steer efforts to bridge key gaps identified

Focus area

Description

Proposed actions

1 Site validation Tier 1 and 2

- Integrating the existing inventory with **additional site-specific data** from biopharma/funders/R&D partners to further improve the utility of the inventory.

- A proposal to **create a technical working group** has been floated to continue receiving information, while more info will be gathered at GC Berlin

2 Building of networked capacity

- Creating capacity in research institutions through **coordinated support by partners** including Pharma.

- In partnership with BMGF, AAS has drafted an RFI to **create a centralized, open-access database** of sites capabilities in Africa to be discussed at GC Berlin

3 Regulatory harmonisation

- Collaborative effort among Africa's regional institutions currently mandated to **improve regulatory harmonization.**

- Ideas on how to move this forward **to be discussed** at the GC Berlin meeting



**Research & Innovation in Africa is being constrained by five key issues
(Opportunities for Collaboration with UK Universities and others):**

1

Skills

2

Infrastructure

3

Networks

4

Institutional Governance

5

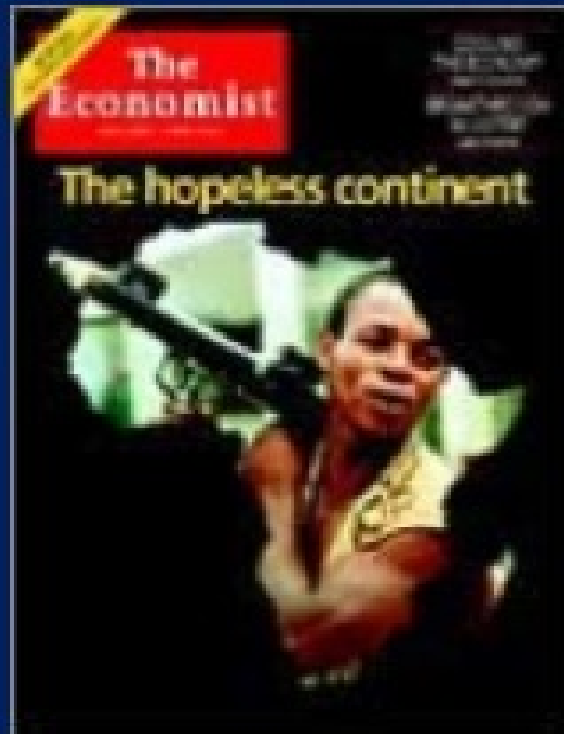
Funding

HOPE IS RISING

- **Scientific productivity** is rising (publications, patents etc.)
- More governments are creating **funding mechanisms**/science granting councils- and committing more funds to science e.g. South Africa, Kenya
- More governments are **adopting good practices** e.g. signing up to GFGP – Rwanda, and negotiations being initiated with Uganda, Botswana and Kenya,
- More **Africans professionals are returning home**, and want to stay in Africa
- But Africa will need more **support from the North**, capacity building, technology transfer, more private investments, equitable collaborations.

Africa Rising...is Science Rising?

2000



2013



2030



AAS Partners



NEPAD
TRANSFORMING AFRICA



Republic of Kenya



Federal Republic of Nigeria



Republic of Botswana



INDIA ALLIANCE





Contact The AAS for more information or to join mailing list



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