Technology Justice

Rebooting our relationship with technology

Technology as if people and planet mattered

Rethink, Retool, Reboot

Technology underpins human development. We need it to provide the very basics of a minimum standard of life – food, water, shelter, health and education. But a significant proportion of the world's population do not have these basics today. And whilst a fifth of the world's population lacks access to technologies fundamental to a basic standard of living, unfettered use of technology by those who have it brings its own problems – including pollution, global warming and threats to the sustainable future of humanity. So why are we so slow to address these issues? Why is it that the drivers of innovation mean we are more likely to see research into a cure for male baldness than a malaria vaccine or into methods for extracting shale gas as opposed to solutions to store renewable energy?

We need to **rethink** the purpose of our technological endeavour and how we provide access to and govern the use technology today.

We need to **retool** – to change the alignment of our innovation systems to deliver technology that is socially useful and addresses the key challenges of poverty and environmental sustainability.

Above all, our relationship with technology needs a **reboot**. We need a different frame of reference – Technology Justice – to provide a radically different approach to our oversight and governance of the development and use of technology.

Rethink, Retool, Reboot addresses vital questions regarding the future of our world and the people living in it. It should be read by academics, students, activists and all those interested in international development and the environment.

Simon Trace is an international development consultant with over 30 years of working in the field of international development, with a particular emphasis on technology in relation to energy, water, food and natural resource management. He has an MBE and was formerly the CEO of Practical Action.

"" *Anyone interested in how technology can work for people, justice, sustainability and development should read this book.*
Ian Scoones, Director ESRC STEPS Centre,
Institute of Development Studies, University of Sussex

"" *Covering all today's big issues, Simon Trace provides a fresh and eloquent approach to innovation, governance issues and access to technology.*
Jonathon Porritt, Founder Director, Forum for the Future

PRACTICAL ACTION Publishing

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Rethink, Retool, Reboot Technology as if people and planet mattered Simon Trace

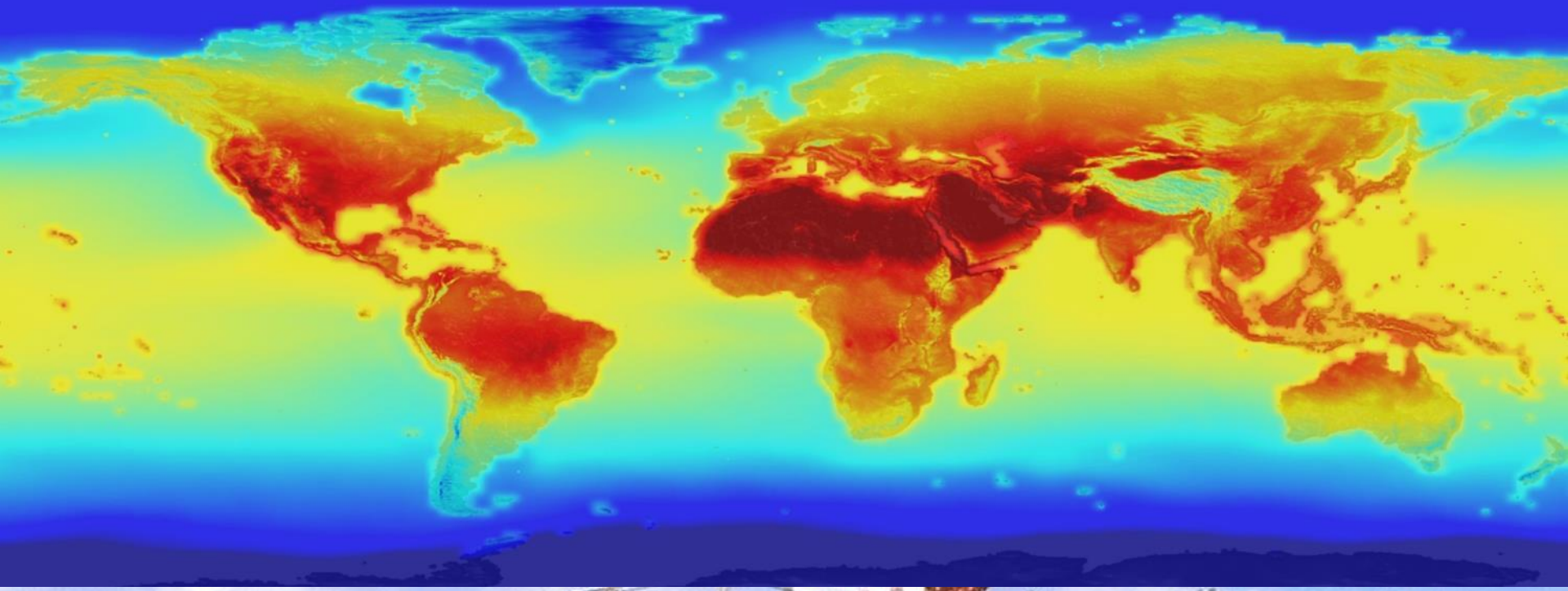
Rethink, Retool, Reboot

Technology as if people and planet mattered

Simon Trace

Technology =

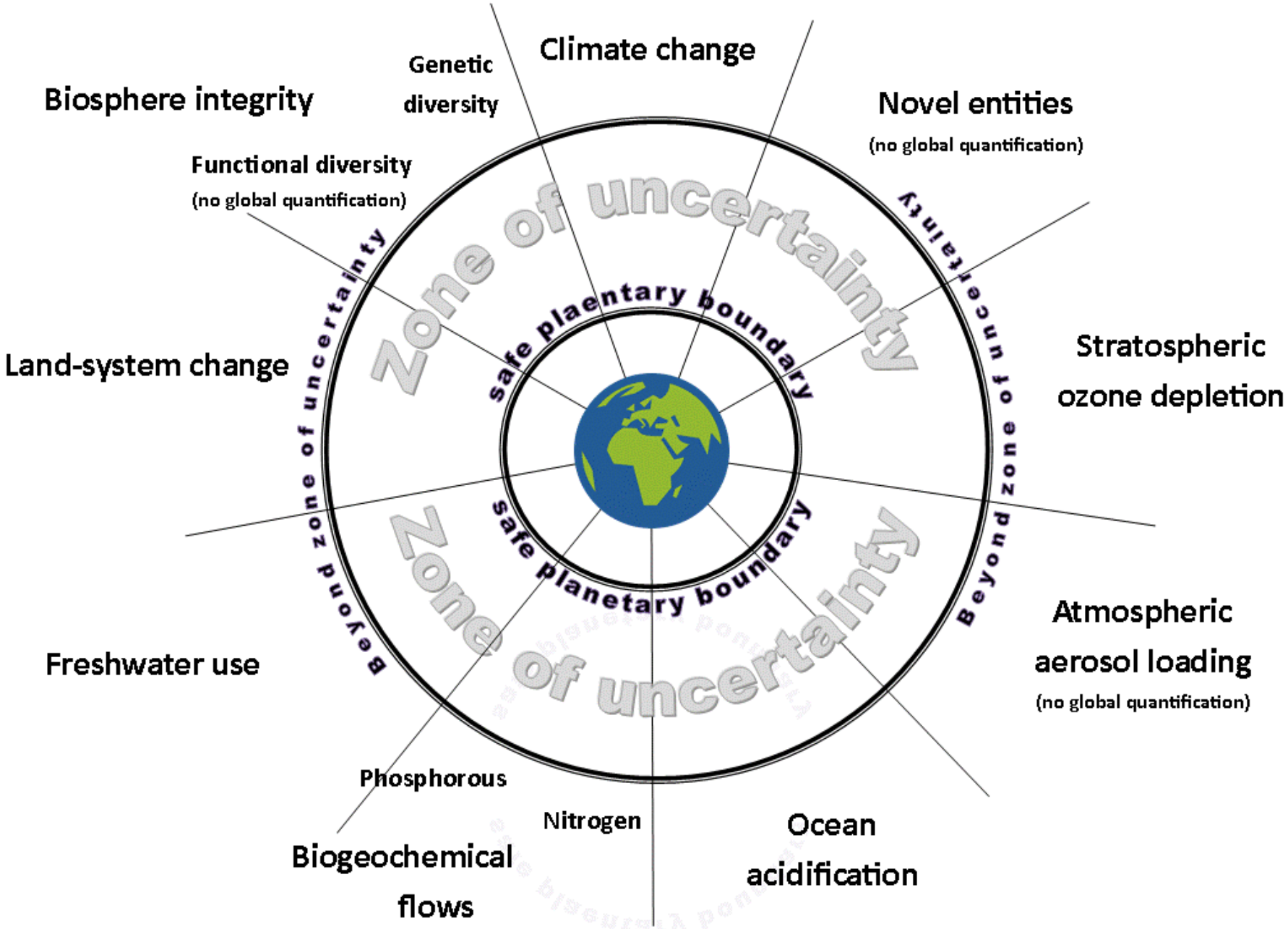
physical infrastructure, machinery and equipment, knowledge and skills, and the capacity to organise and use all of these.



Johan Rockström et al. Stockholm Resilience Centre

Planetary Boundaries

Technology as if people and planet mattered


Climate change
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Biosphere integrity
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Novel entities
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Land-system change
Stratospheric ozone depletion
Freshwater use
Atmospheric aerosol loading
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Ocean acidification
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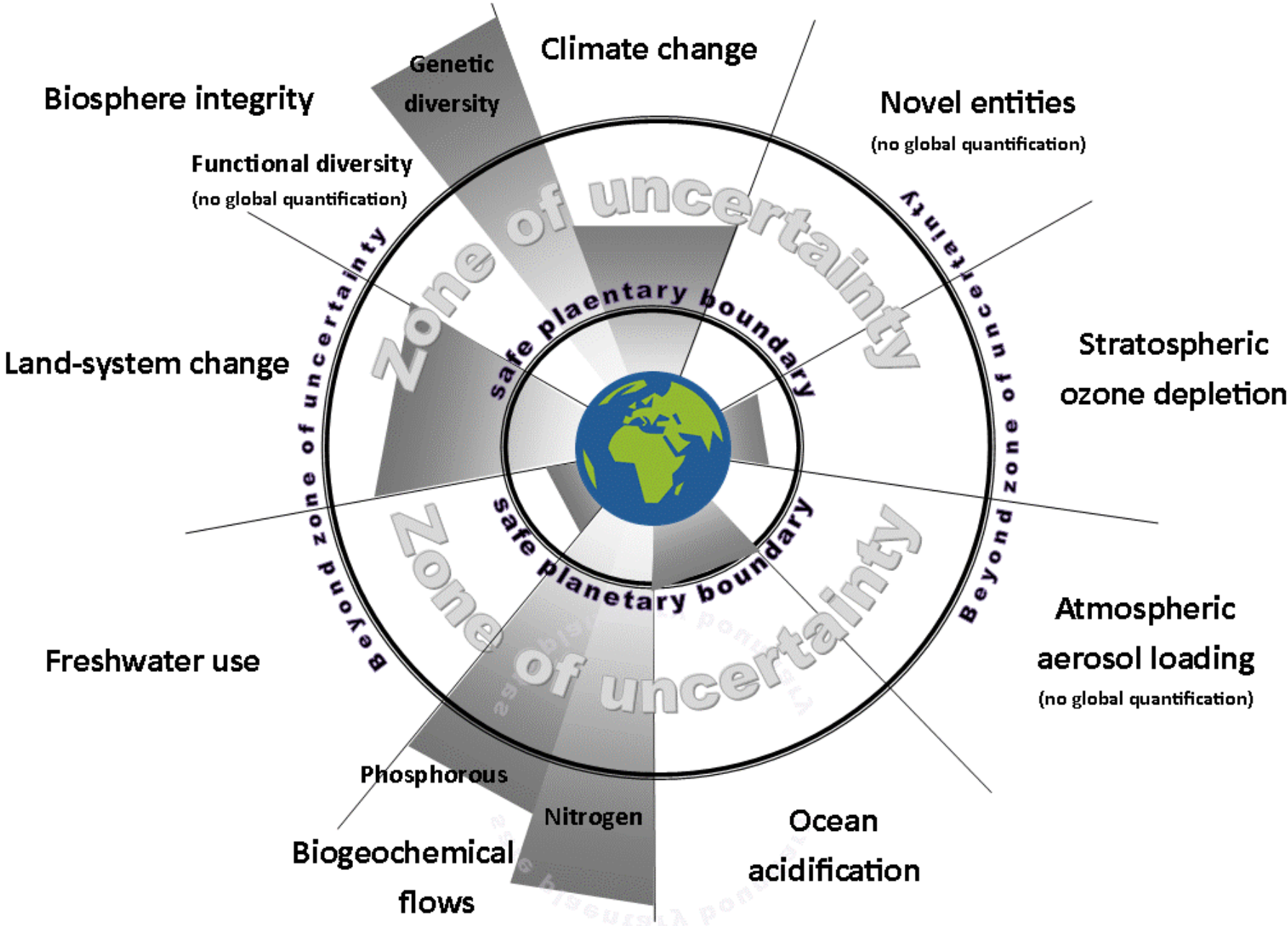
Zone of uncertainty
Beyond zone of uncertainty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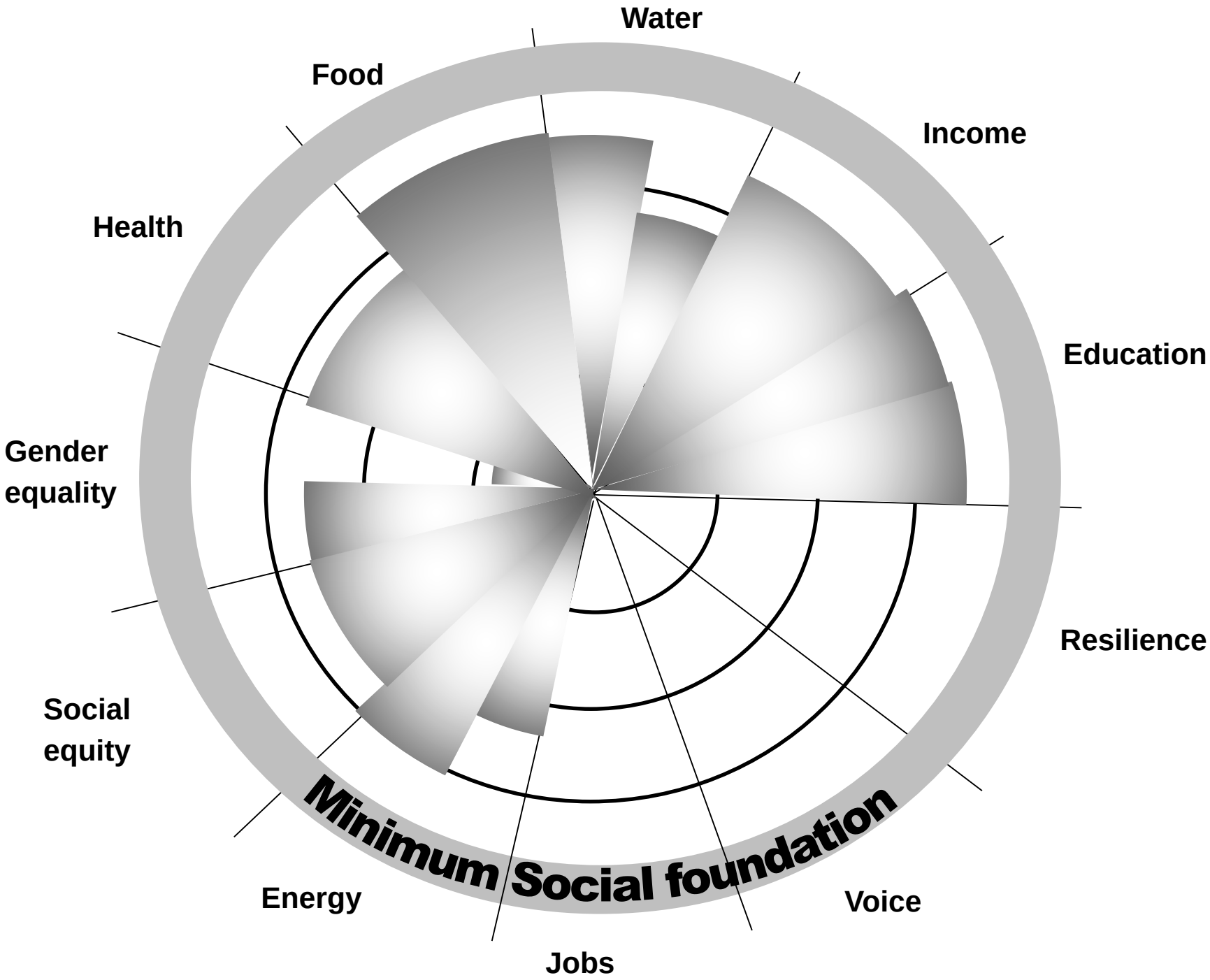
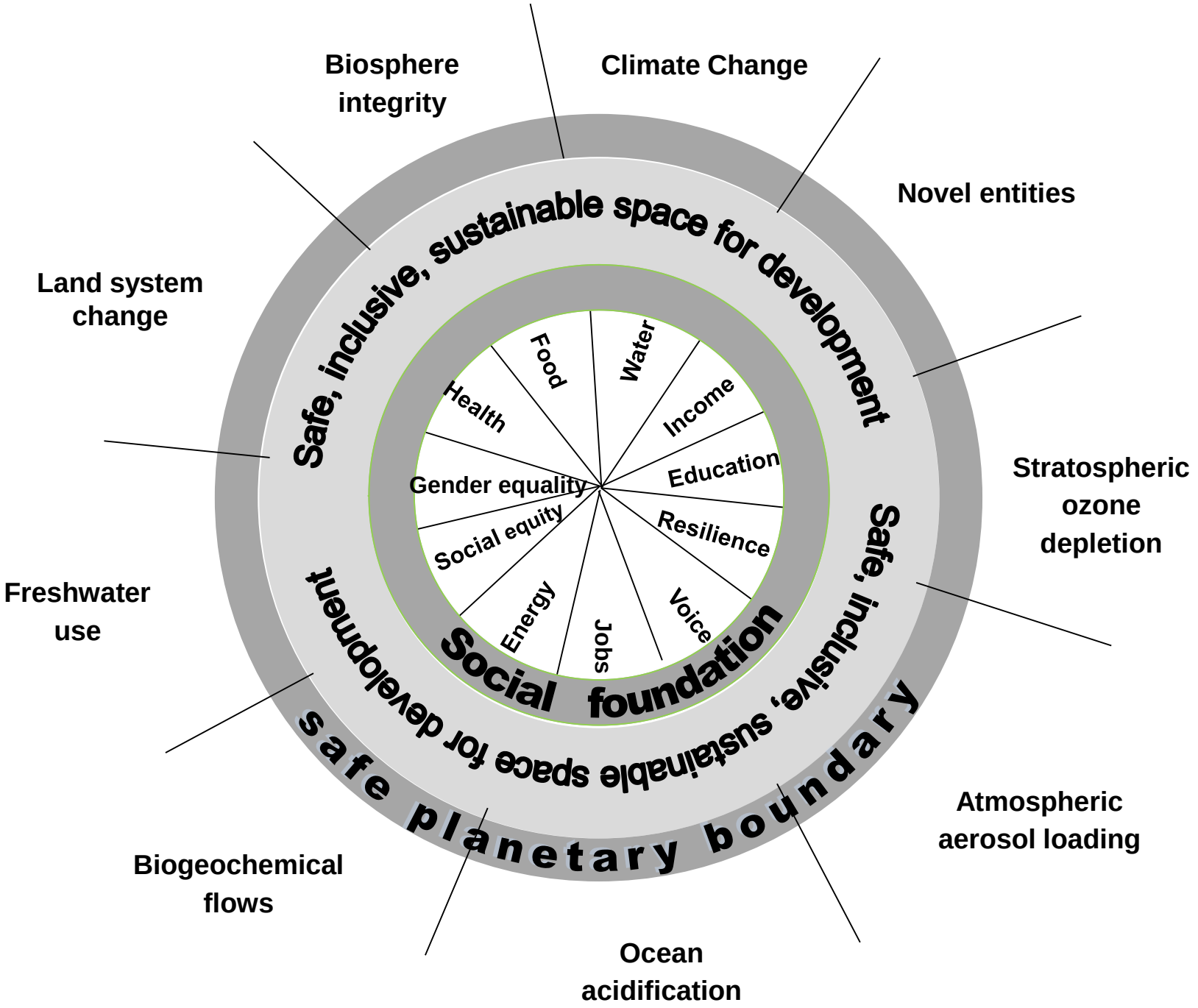
Kate Raworth, Oxfam

Doughnut Economics

Technology as if people and planet mattered


Water
Income
Education
Resilience
Voice
Jobs
Energy
Social equity
Gender equality
Health
Food
Minimum Social foundation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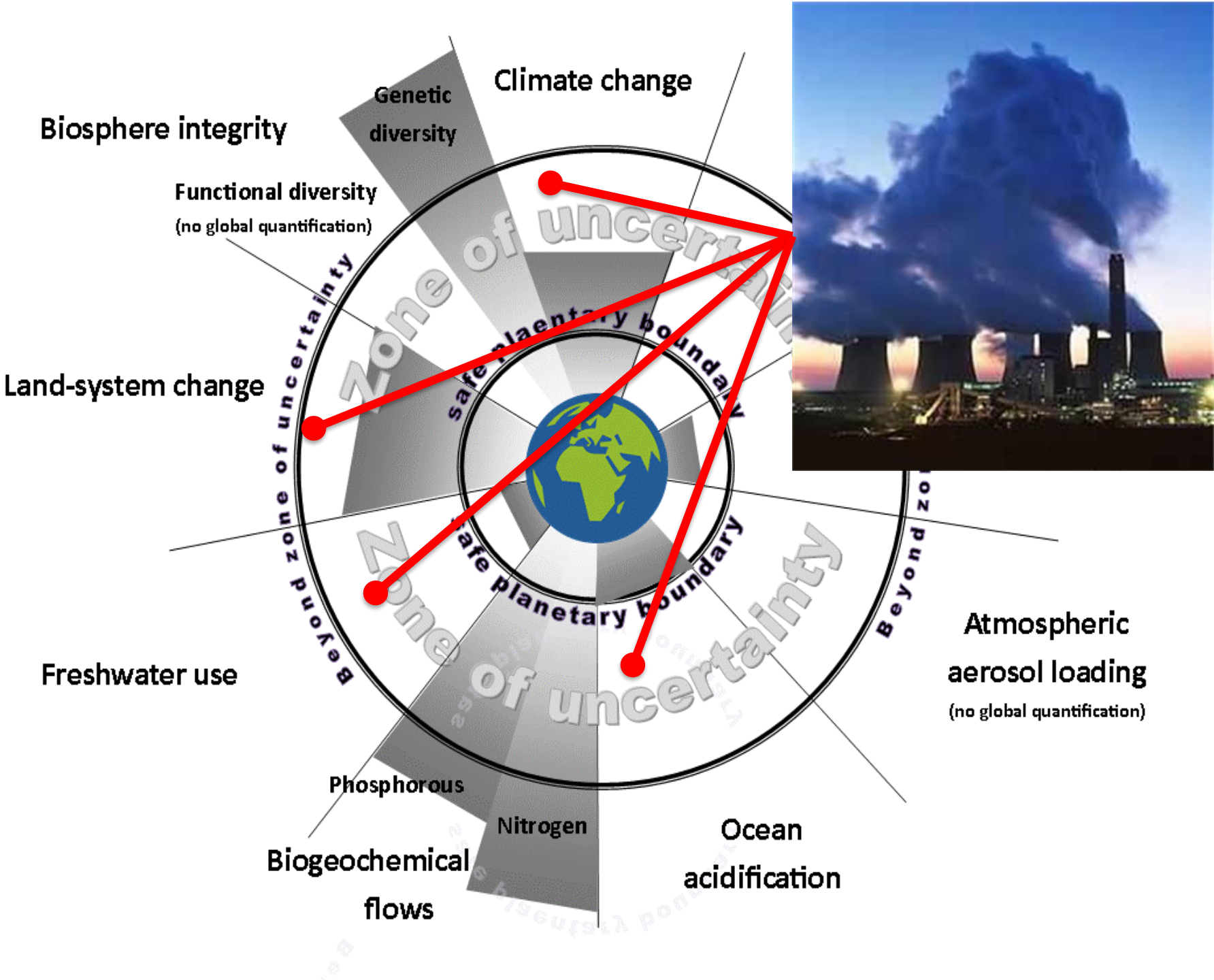
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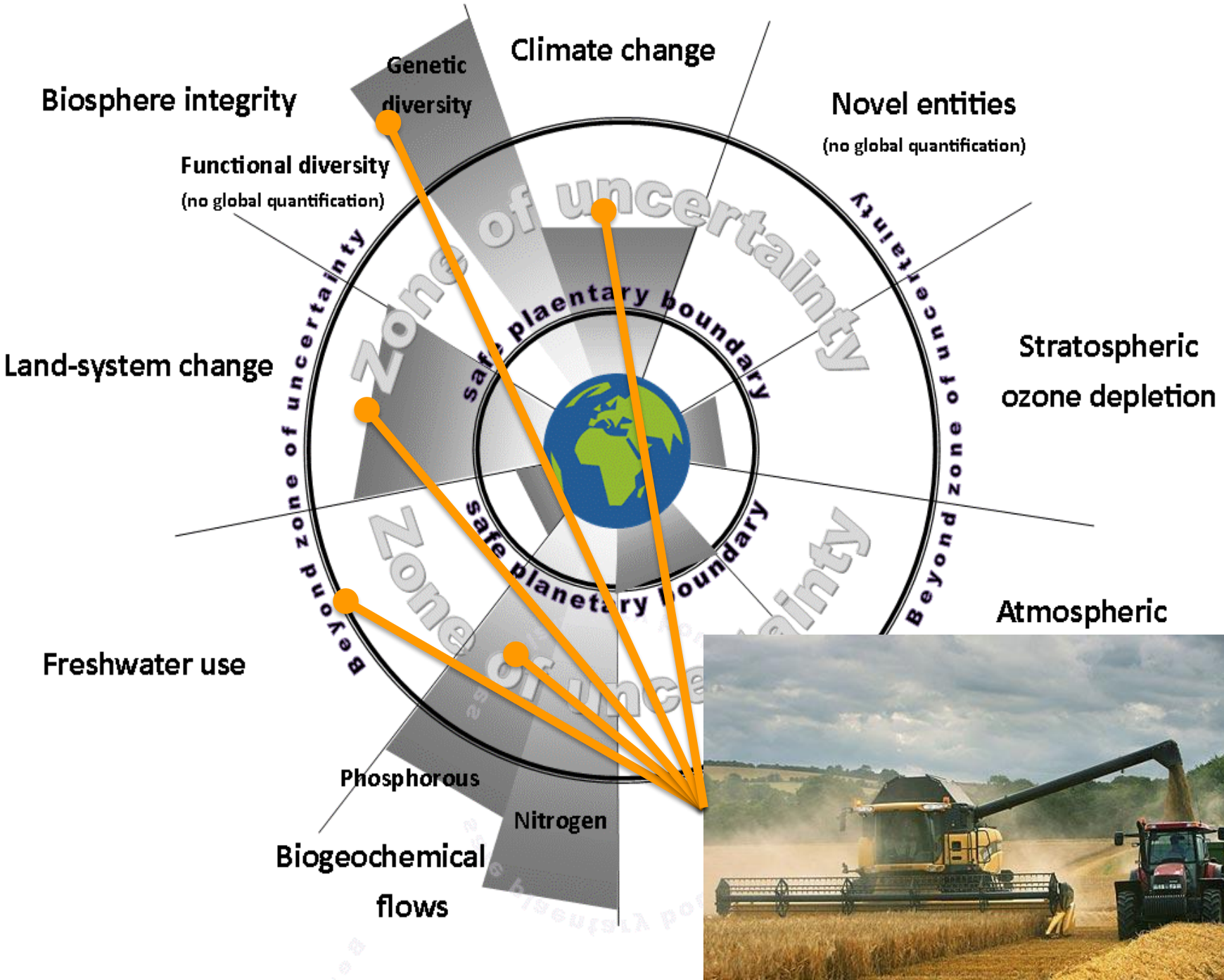
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Water
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Jobs


Safaricom
M-KOPA SOLAR
2yr M-KOPA warranty
SOLAR POWER

Food

Water

Health

Income

Education

Gender

Water

Income

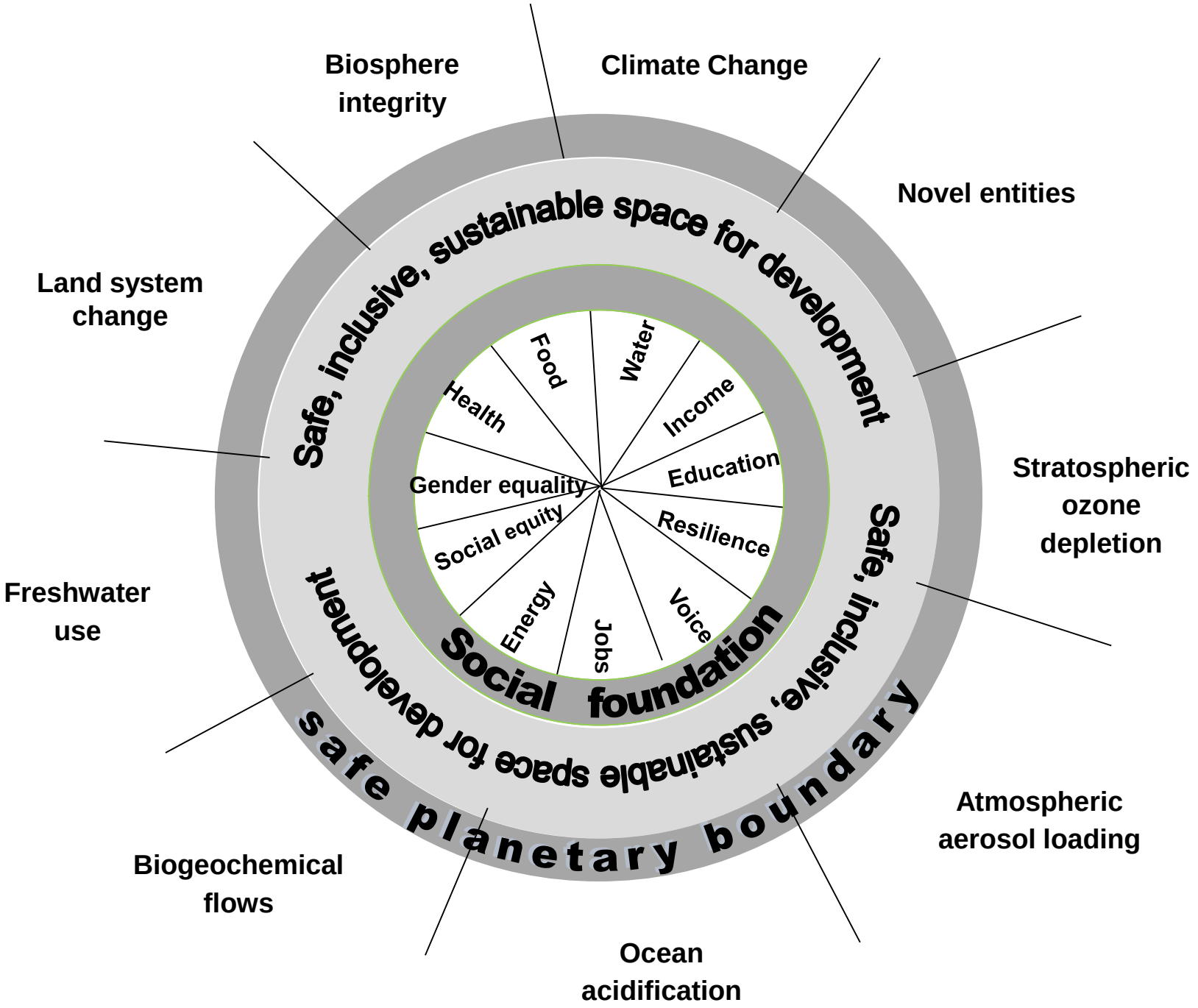
Education

Resilience

Voice

Jobs

Social foundation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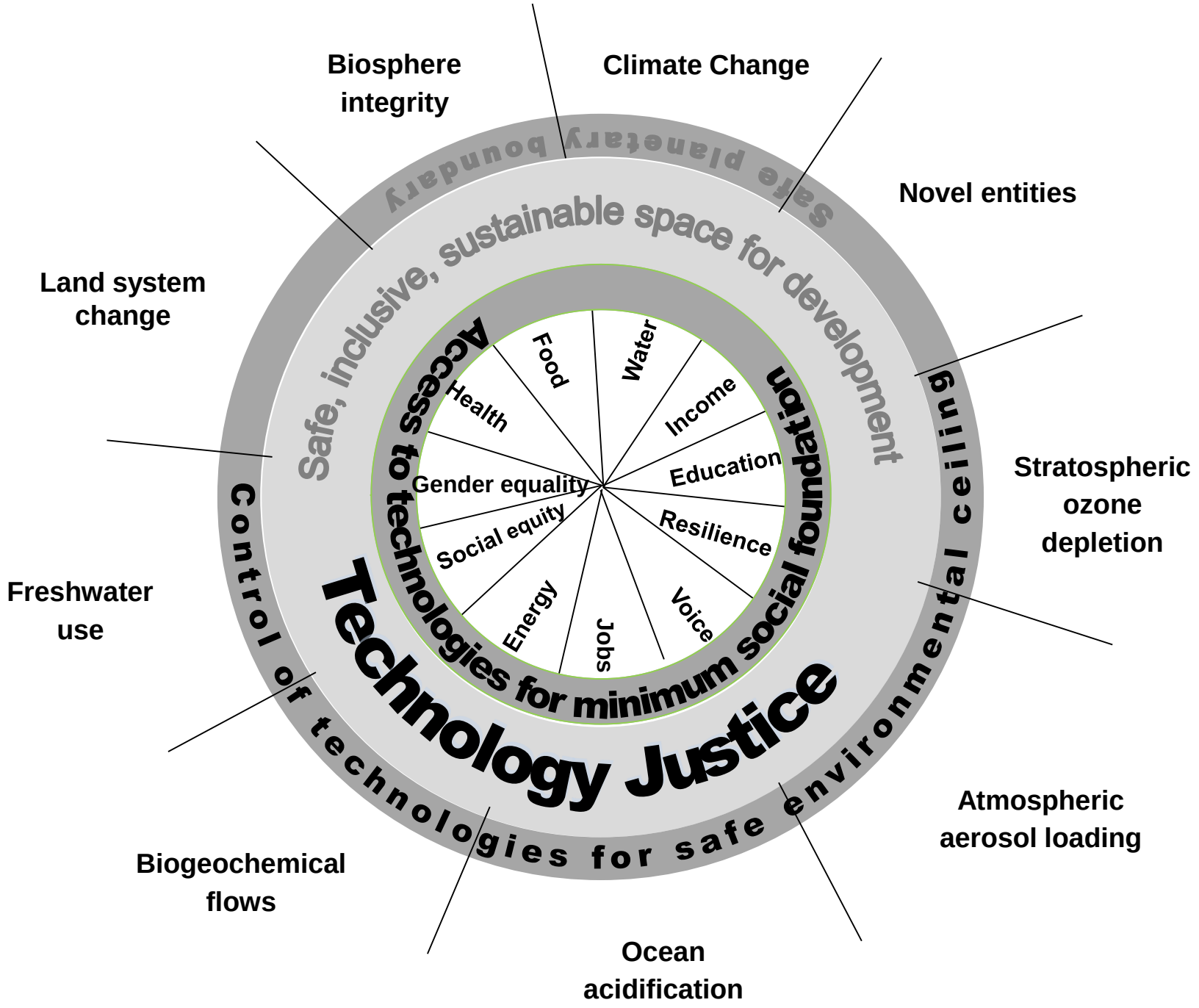
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Safe, inclusive, sustainable space for development
Control of technologies for safe environmental ceiling
Access to technologies for minimum social foundation
Food
Water
Income
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Resilience
Voice
Jobs
Energy
Social equity
Gender equality
Health
Technology Justice

Technology Justice

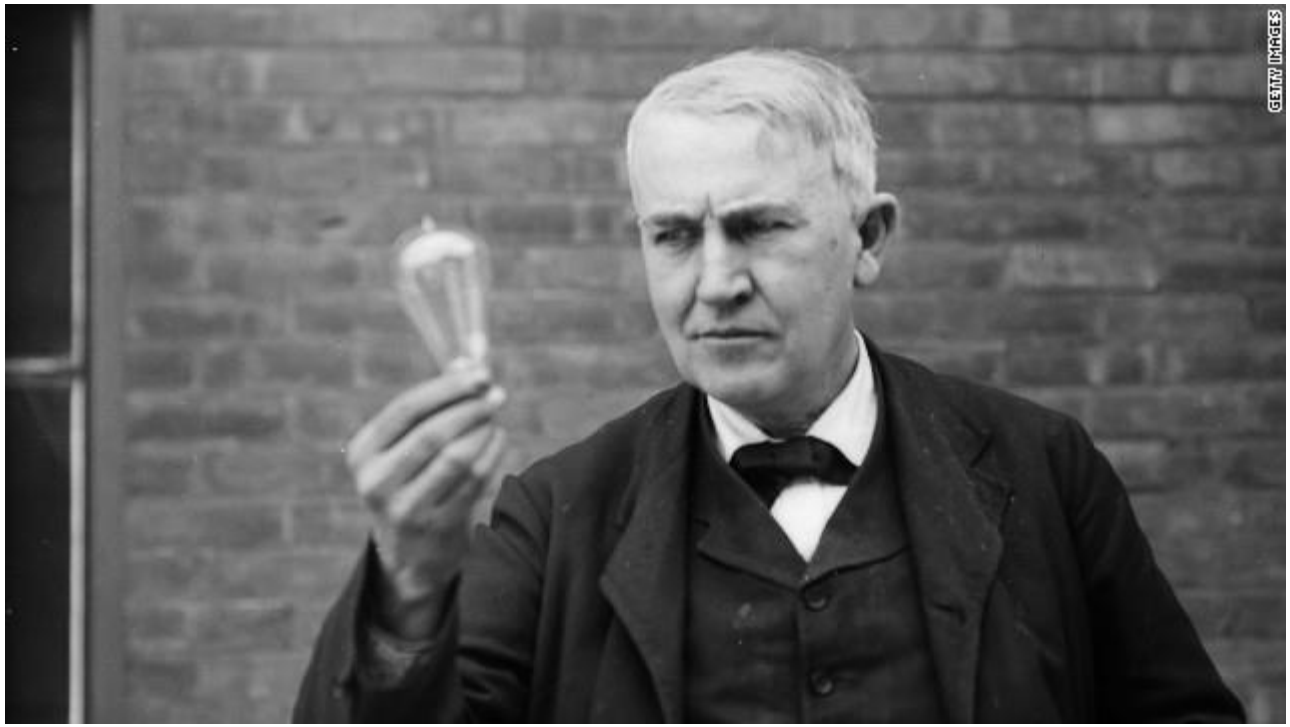
Where everyone has access to the technologies that are essential for a basic standard of life, in a sustainable way that doesn't prevent others now, or in the future, from doing the same.

Technology Injustices

- Access
- Use
- Innovation

PRACTICAL ACTION

1879

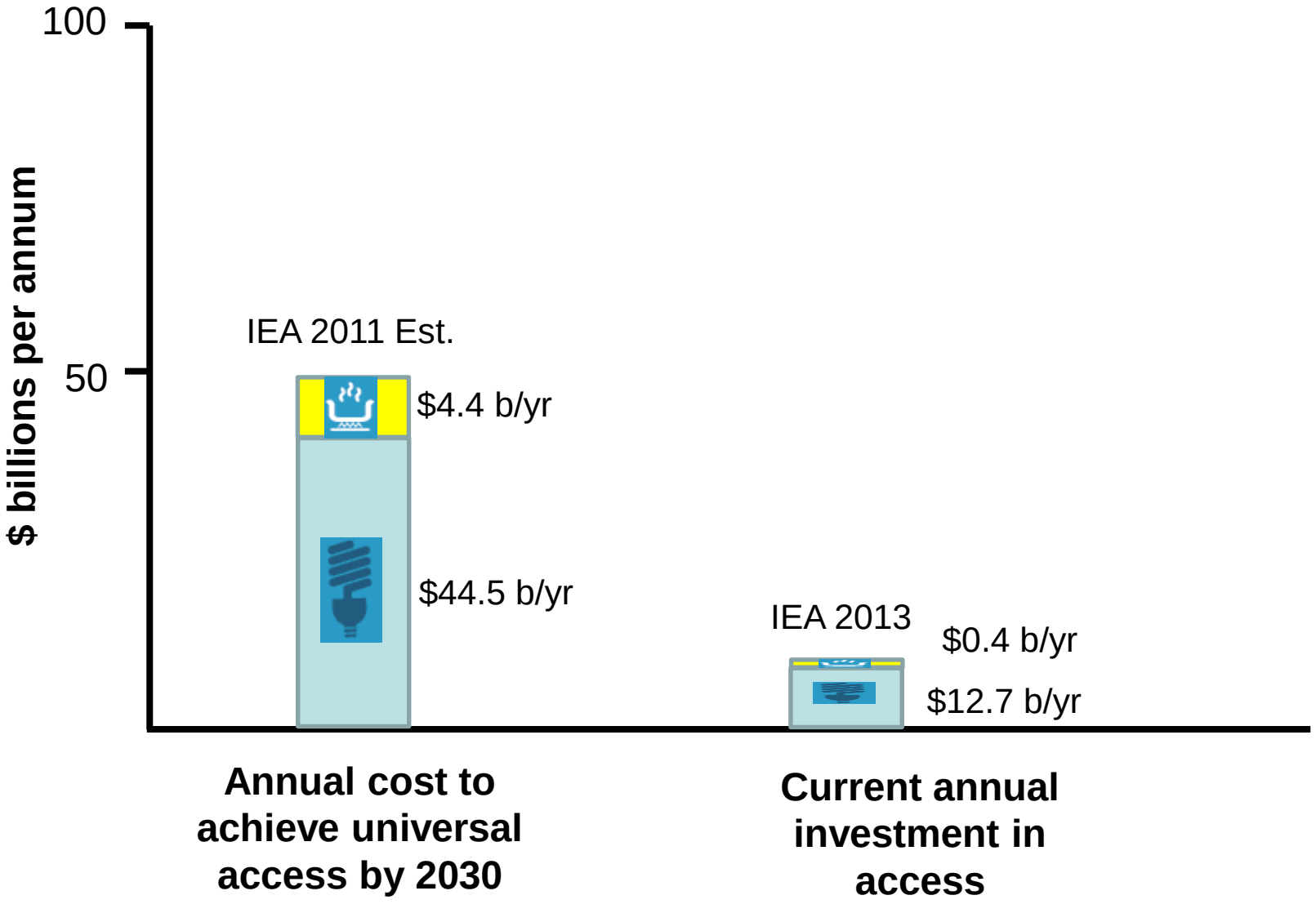


2015

1.1 billion

2.9 billion

Finance- requirement vs available



To achieve universal access to electricity by 2030 we need to invest $890 billion in new generating capacity as follows (i):

Grid electricity 35%

Off Grid electricity 65%

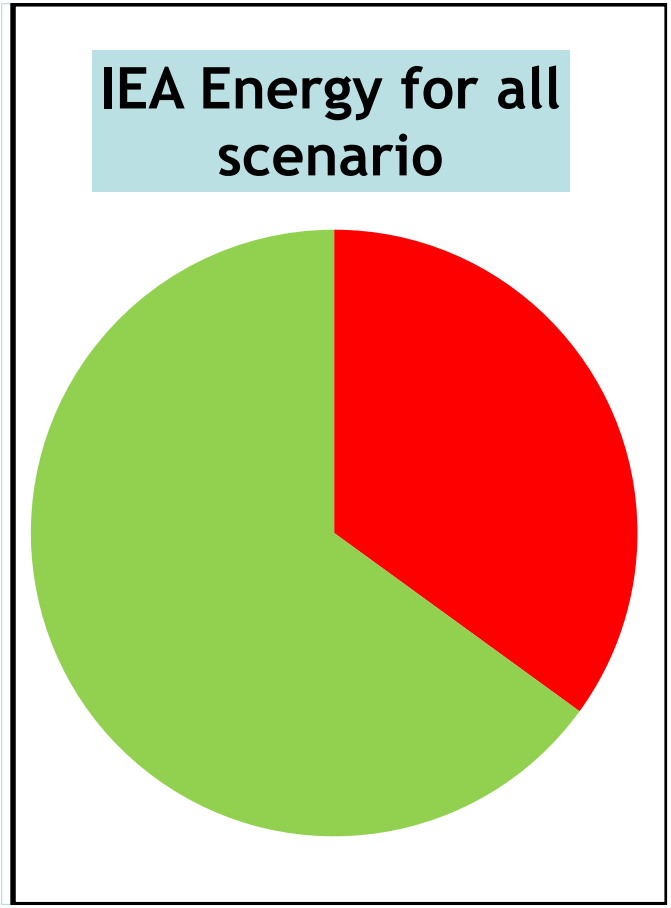
Current investment is:

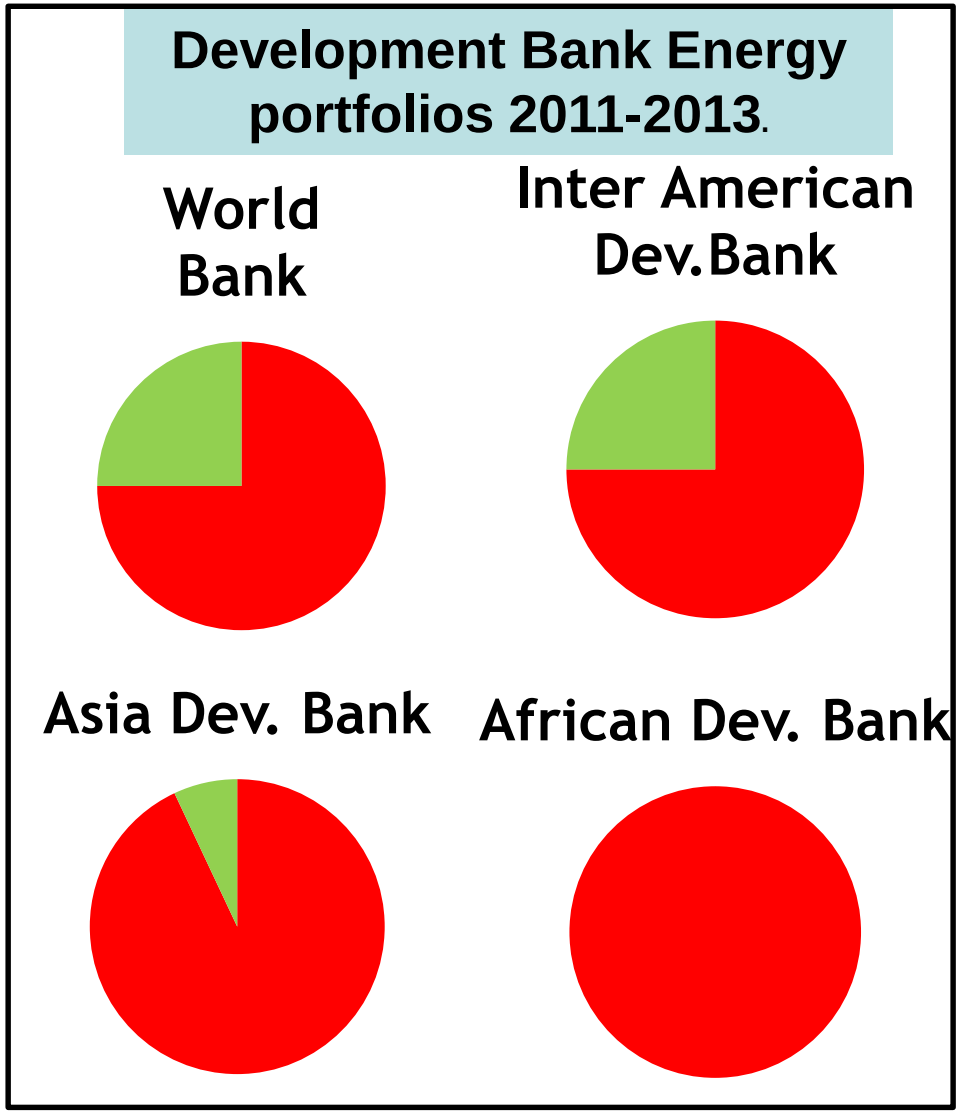
? %

? %

(i) Based on UNSE4ALL Global Tracking framework report 2013

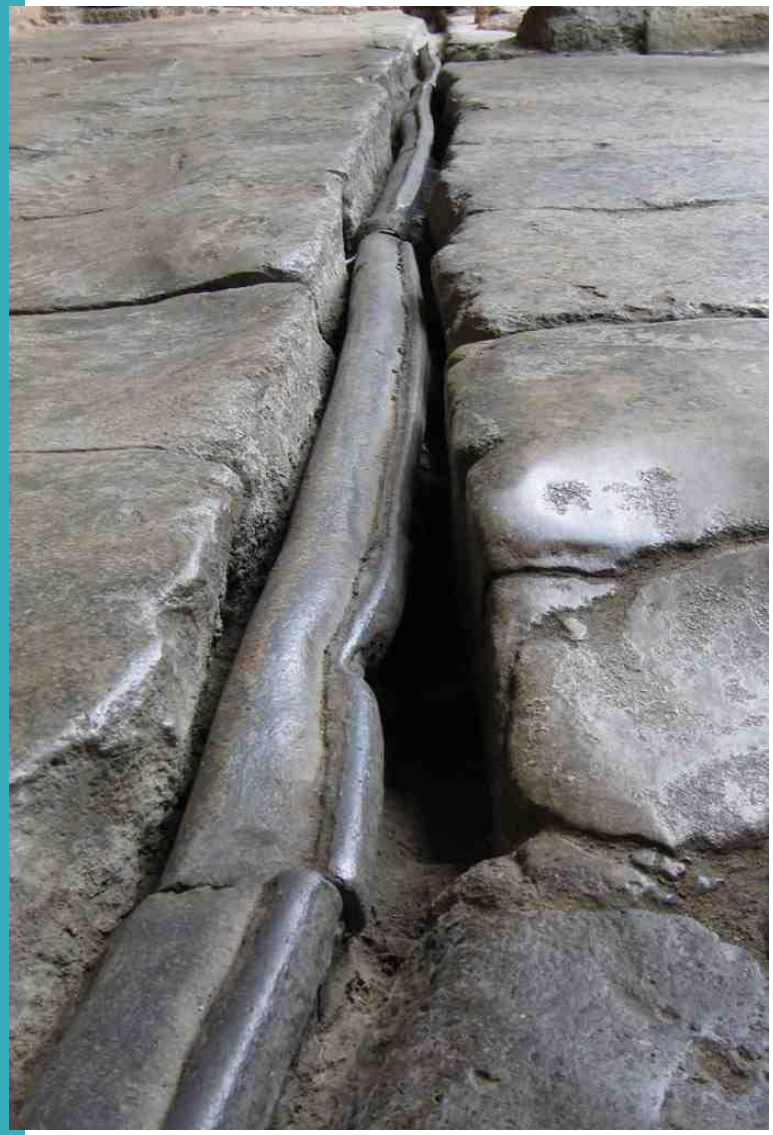
Funding going to the wrong technology





A choice is being made:

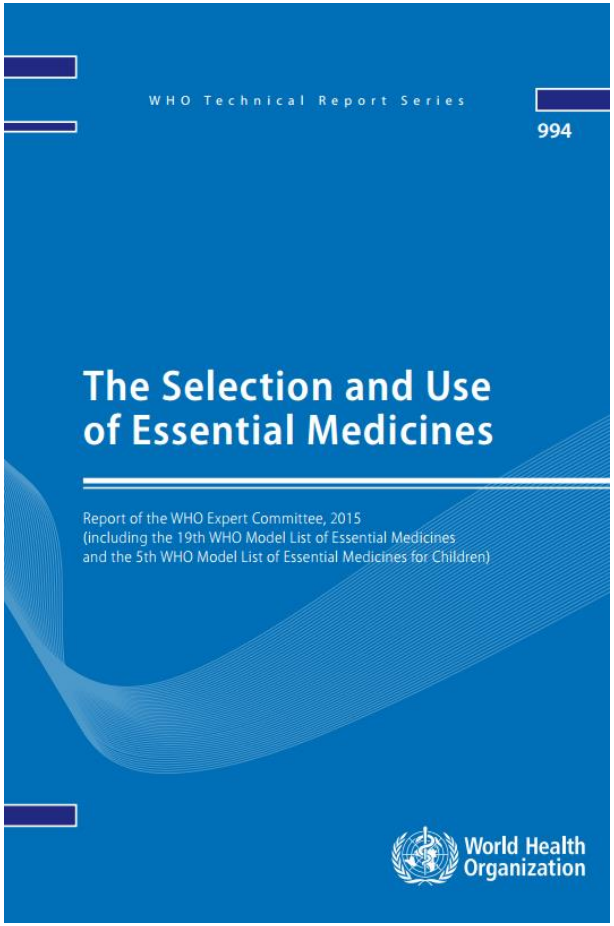
VS



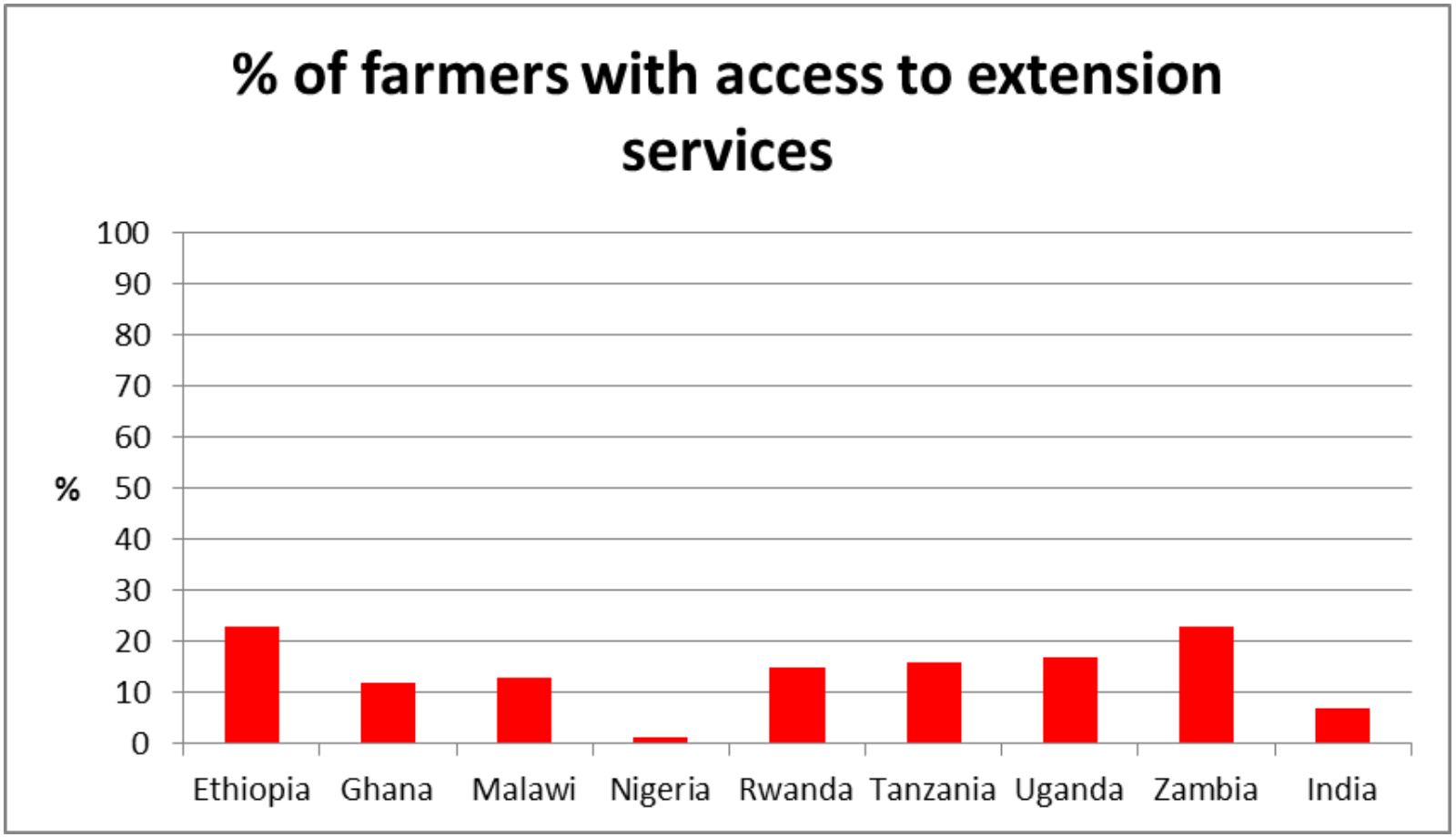
750 million

2.5 billion

30% of the world's population lacks access to WHO's list of essential medicines

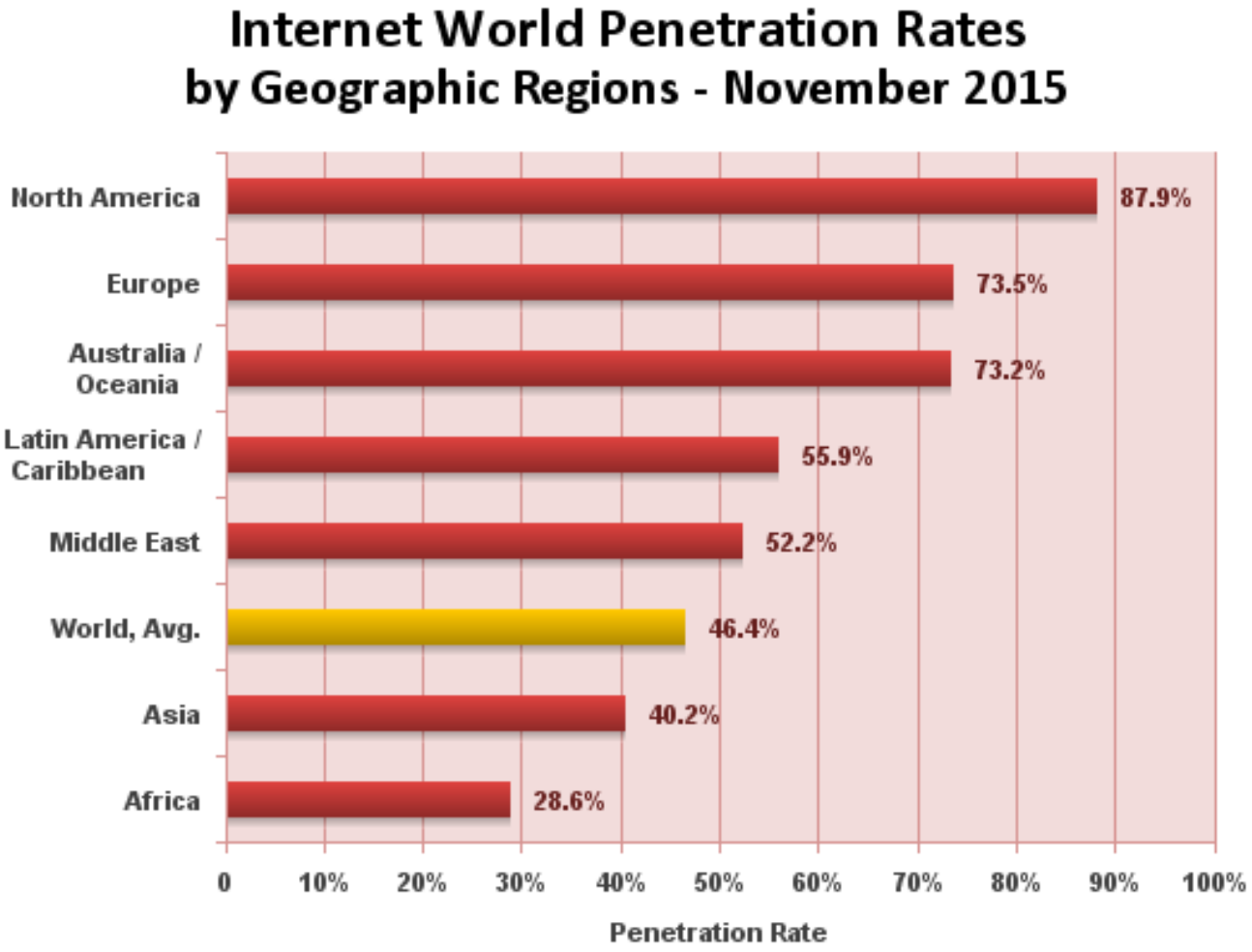


Most developing country farmers have no access to technical advice



ActionAid. (2013). *Walking the Talk: Why and how African governments should transform their agriculture spending.* London: ActionAid.
GFRAS. (2012). *Fact Sheet on Extension Services Position Paper.* Lindau: Global Forum for Rural Advisory Services.

3.2 billion people in Africa and Asia lack internet access

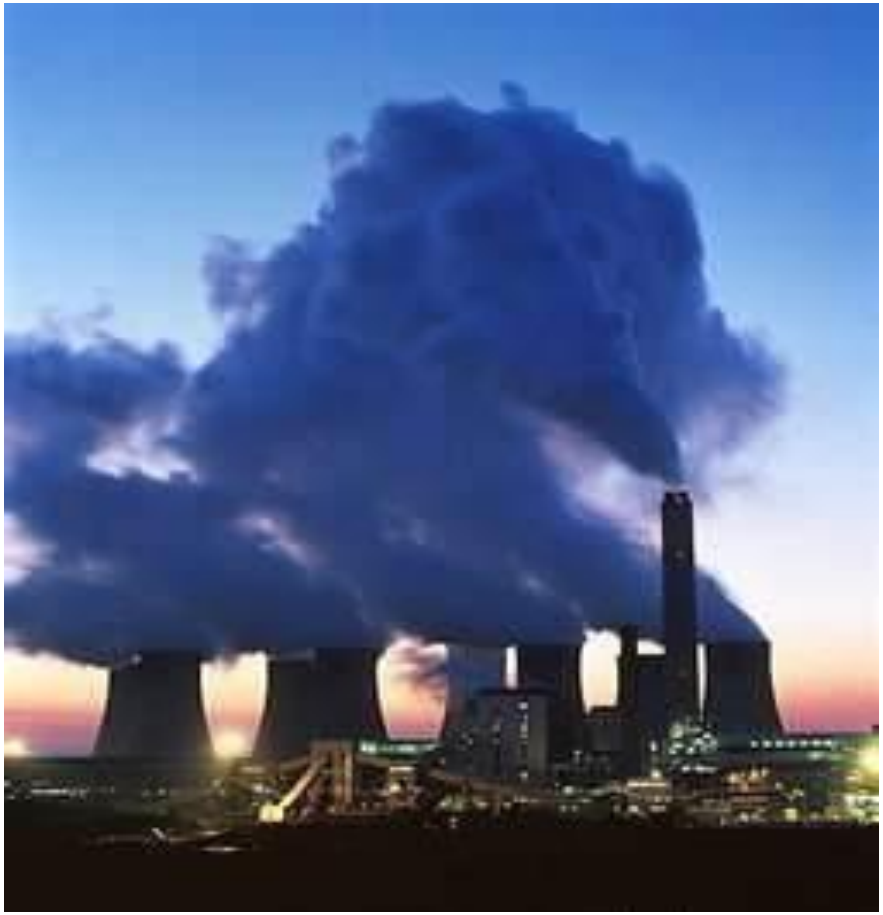


Source: Internet World Stats - www.internetworldstsats.com/stats.htm

Technology Injustices

- Access
- Use

An addiction to fossil fuels

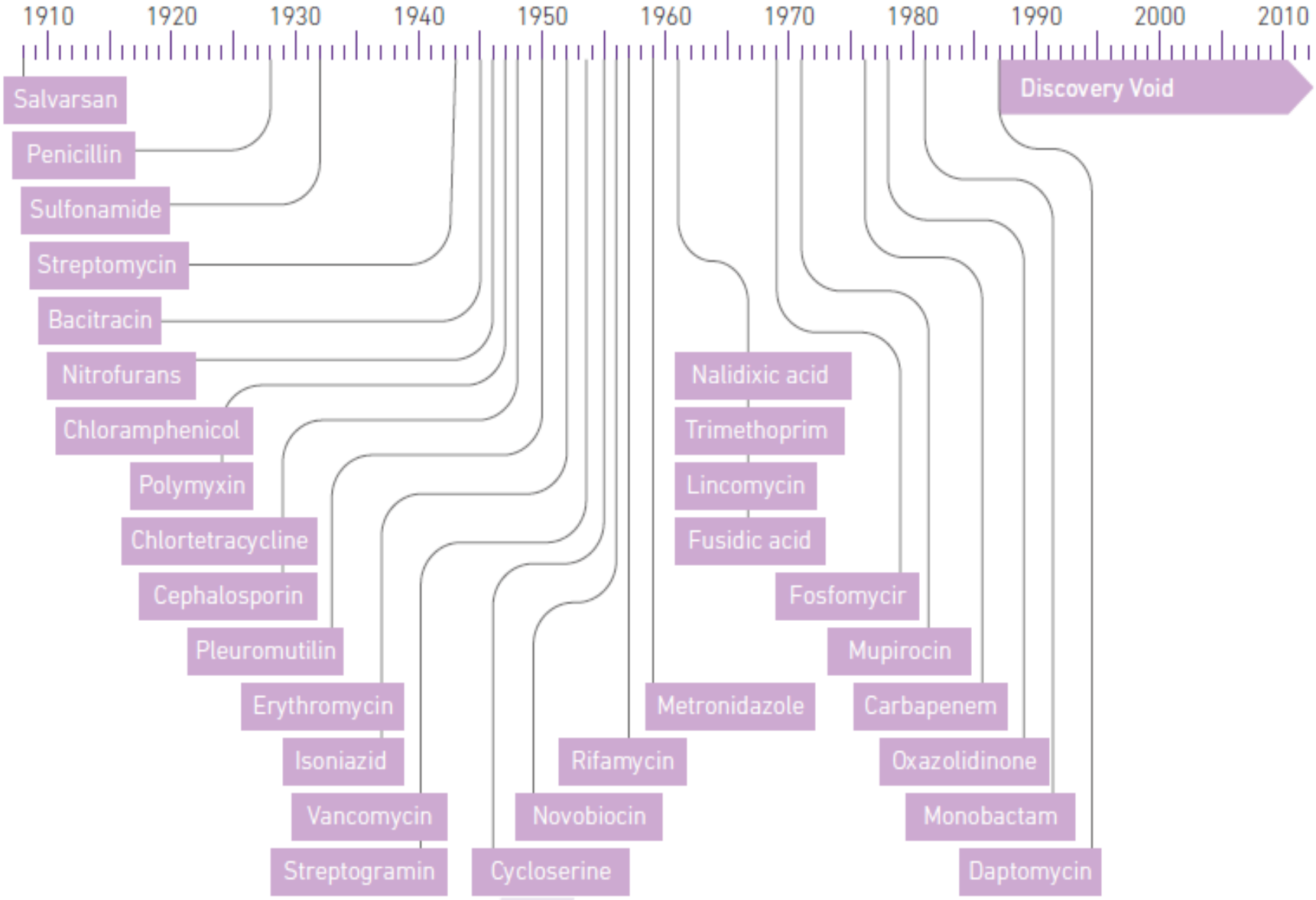


Misuse of antibiotics

- Inappropriate prescription
- Affordability and under-dosage
- Use as prophylactic and growth stimulator in animal feed

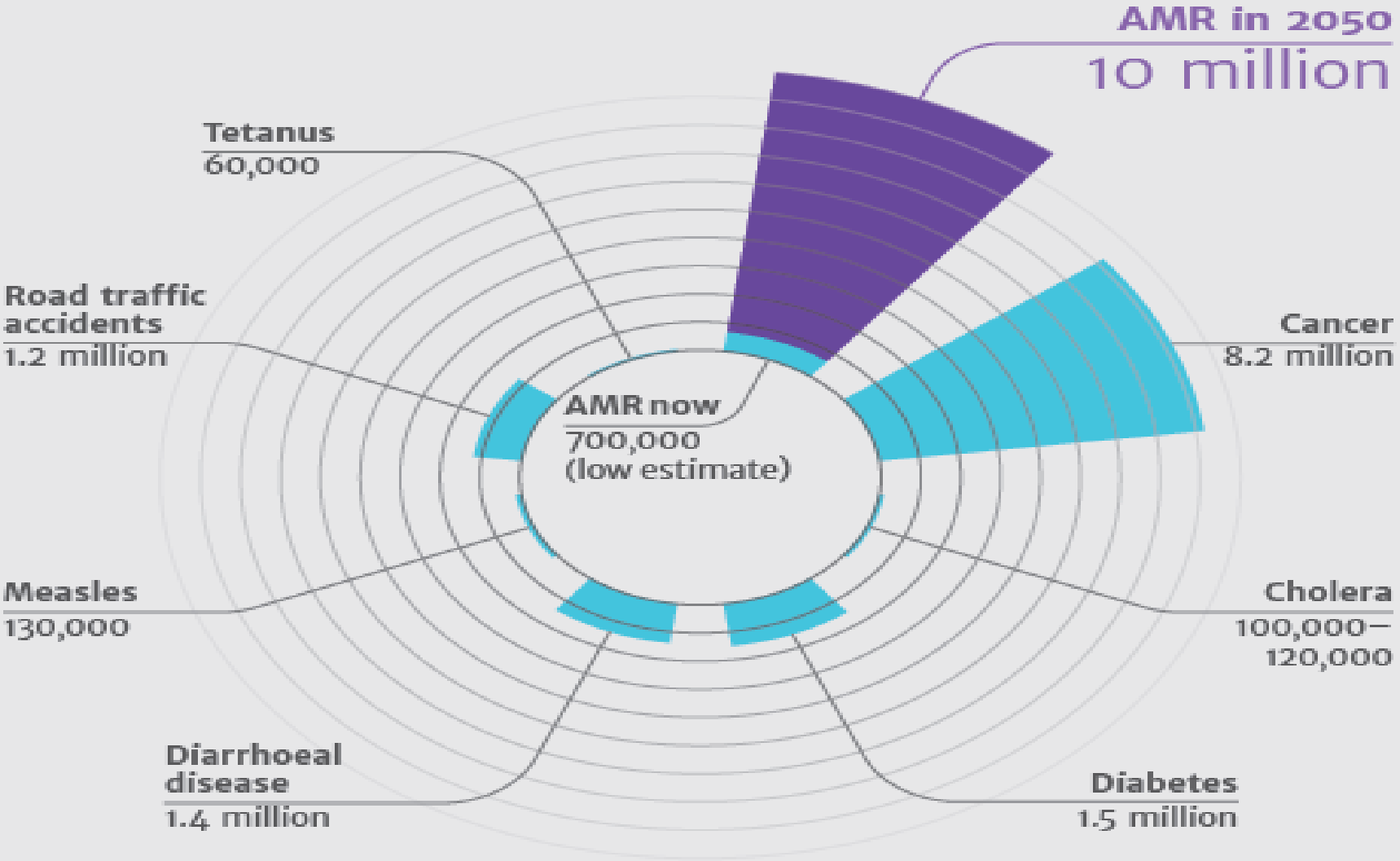
Figure 1 Dates of discovery of distinct classes of antibacterial drugs

Illustration of the "discovery void." Dates indicated are those of reported initial discovery or patent.



Adapted from Silver 2011 (1) with permission of the American Society of Microbiology Journals Department.

Deaths attributable to AMR every year compared to other major causes of death



Destabilising the global food supply

Food and Agriculture Organization of the United Nations

Since the 1900s, 75 % of plant genetic diversity has been lost as farmers worldwide have left their multiple local varieties for genetically uniform, high-yielding varieties.

Food and Agriculture Organization
of the United Nations

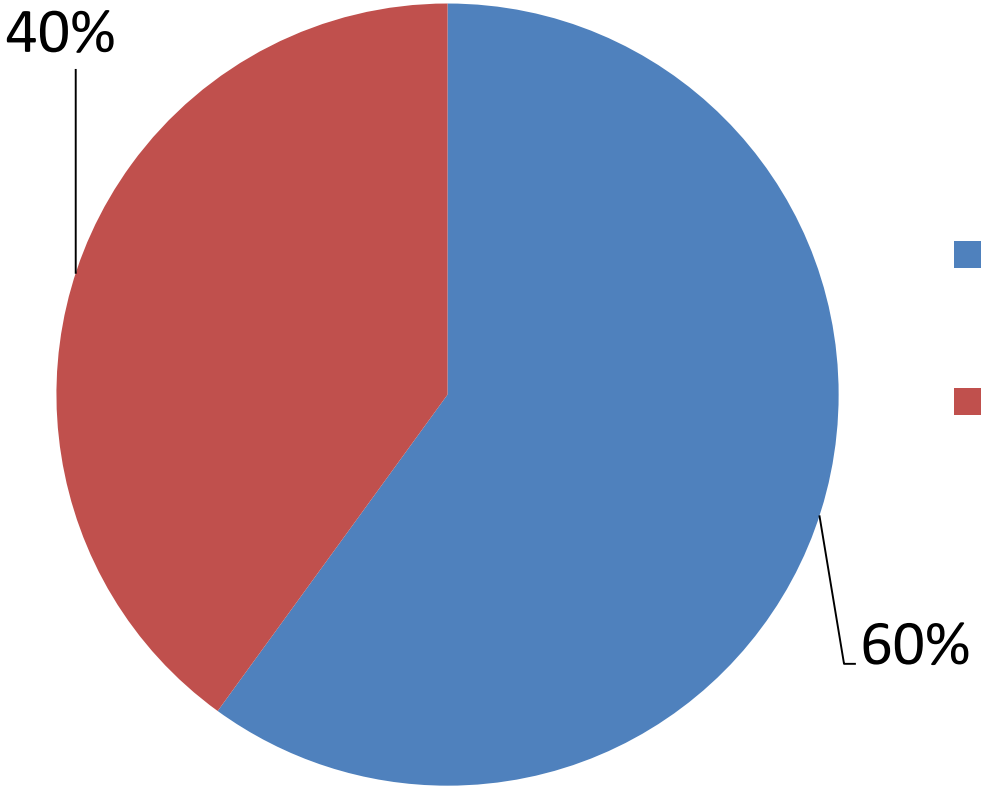
30 percent of livestock breeds are at risk of extinction; six breeds are lost each month

Technology Injustices

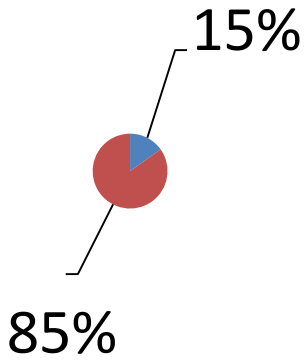
- Access
- Use
- Innovation

10/90 Gap today

$214b Global health R&D spend



$2.5b R&D on neglected diseases of poverty



Røttingen, J; Regmi, S; et-al, The Lancet, May 2013

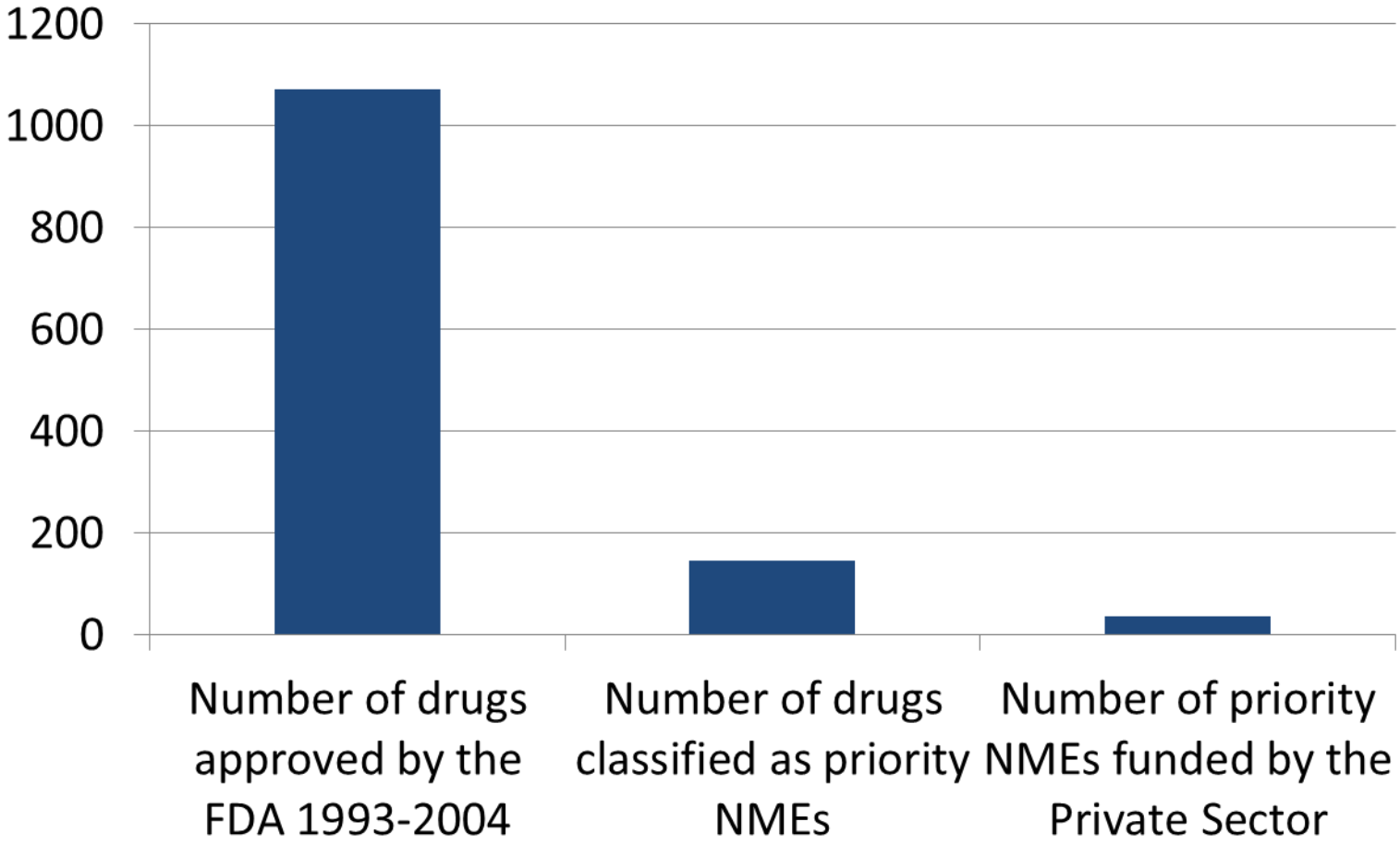
Weak market signals for R&D on diseases of poverty

‘Our priorities are tilted by marketplace imperatives. The malaria vaccine in humanist terms is the biggest need. But it gets virtually no funding. But if you are working on male baldness…you get an order of magnitude more research funding’

Bill Gates 2013

vs

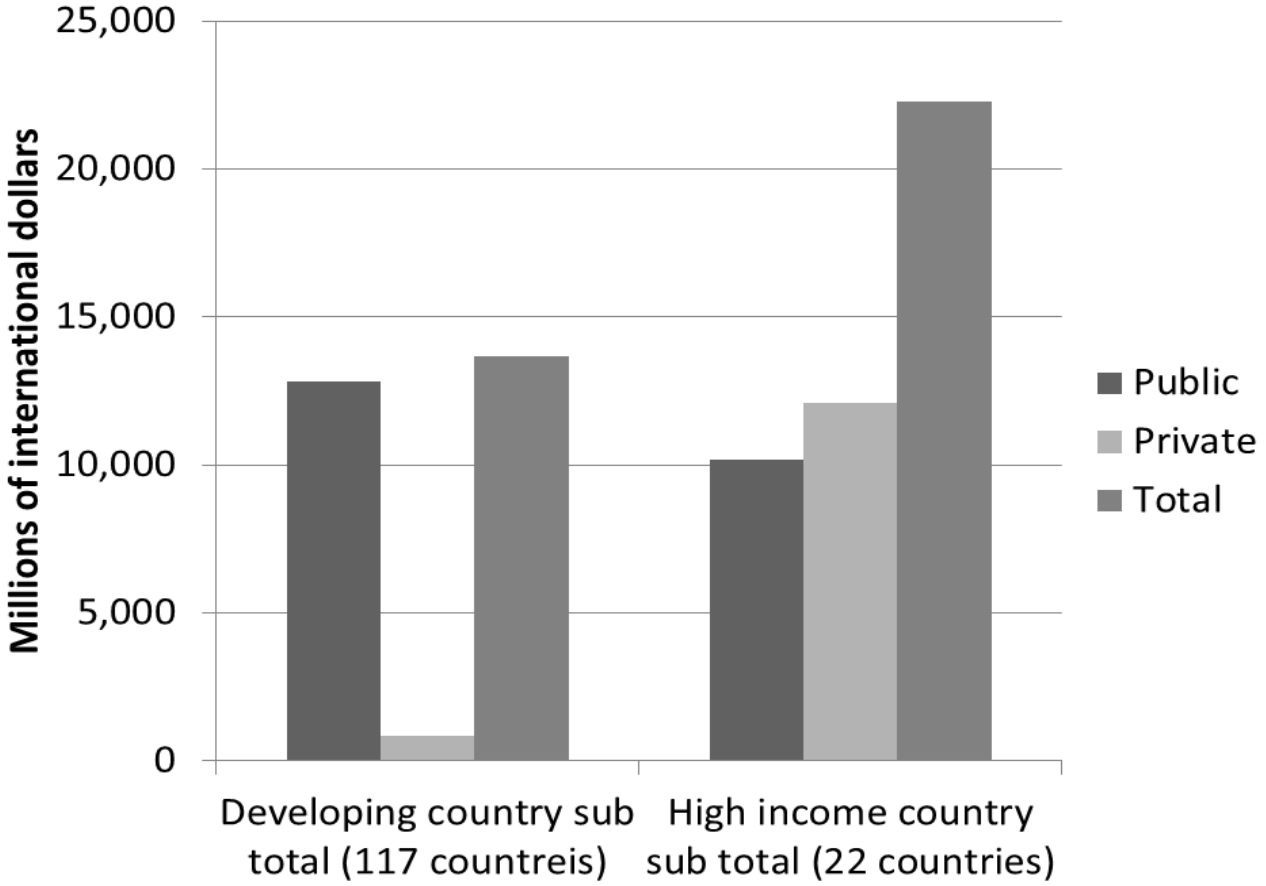
But weak market signals for new medicines in the US too!



Prof Marianna Mazzucato, The Entrepreneurial State (2014)

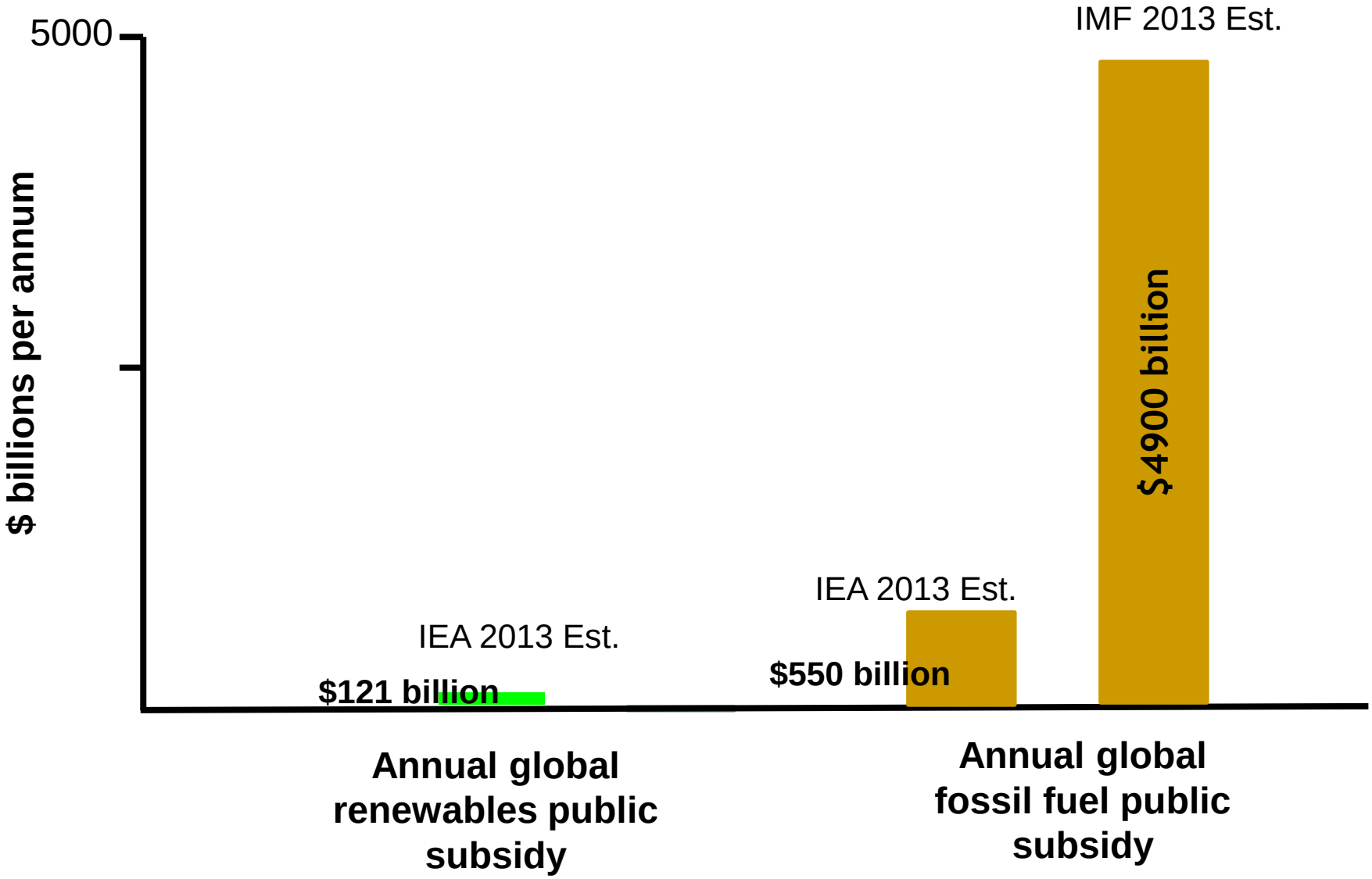
IPR doesn't help

Agriculture R&D - different sector, same story



Global expenditure on agricultural R&D, 2000, based on figures from (Pardey & et_al, 2006)

Renewable vs fossil fuel subsidy



Technology Justice

- Access
- Use
- Innovation

Access

- Define the social foundation and identify the technologies needed to support it

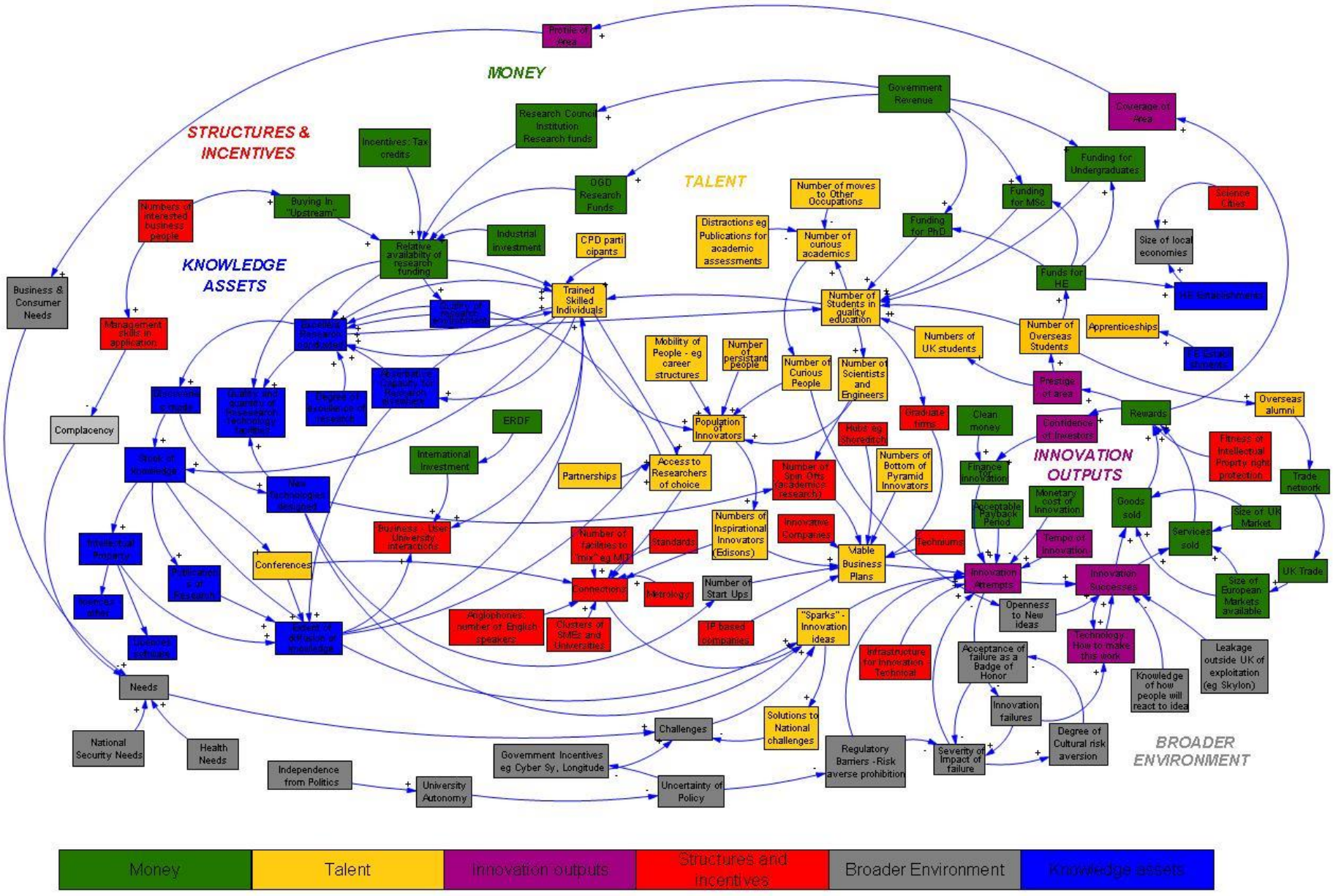
Technology as if people and planet mattered

Access

- Define the social foundation and identify the technologies needed to support it

- Improve our understanding of what influences the success of innovation and technology transfer in developing economies

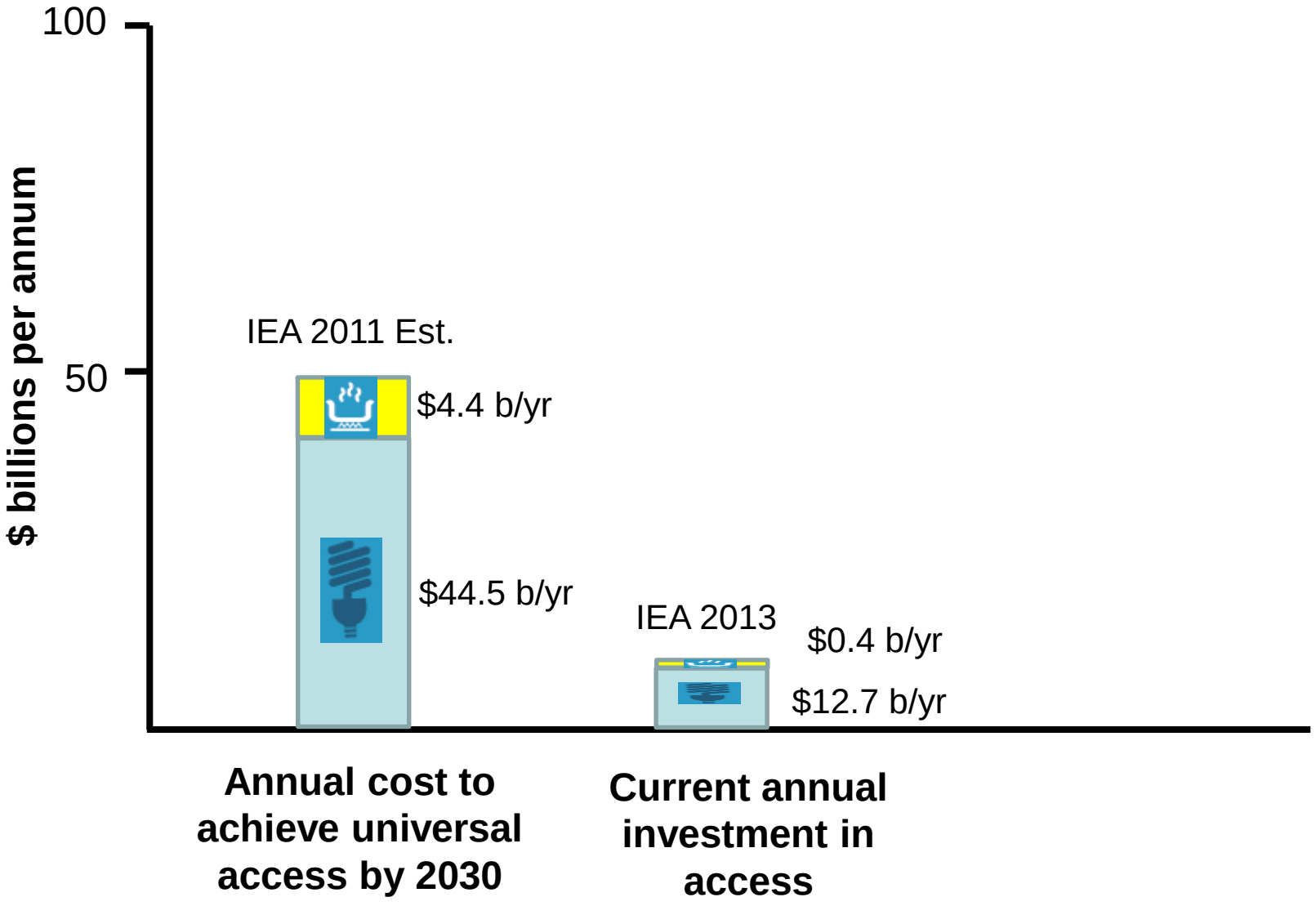
Science and innovation systems map



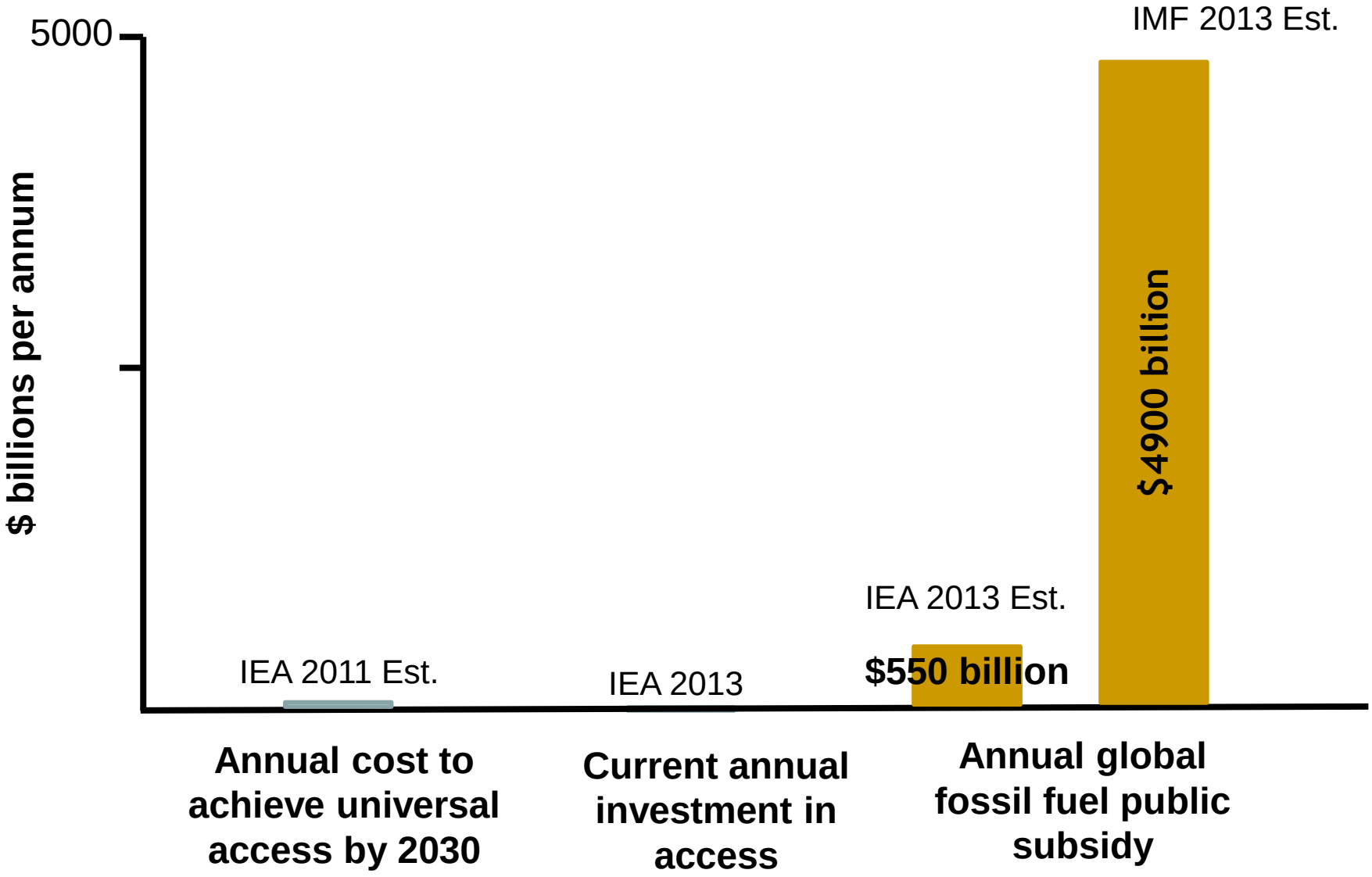
Access

- Can we agree the social foundation and the technologies needed to support it?
- Improve our understanding of what influences the success of innovation and technology transfer in developing economies.
- Change the finance debate

Finance- requirement vs available



Subsidy?

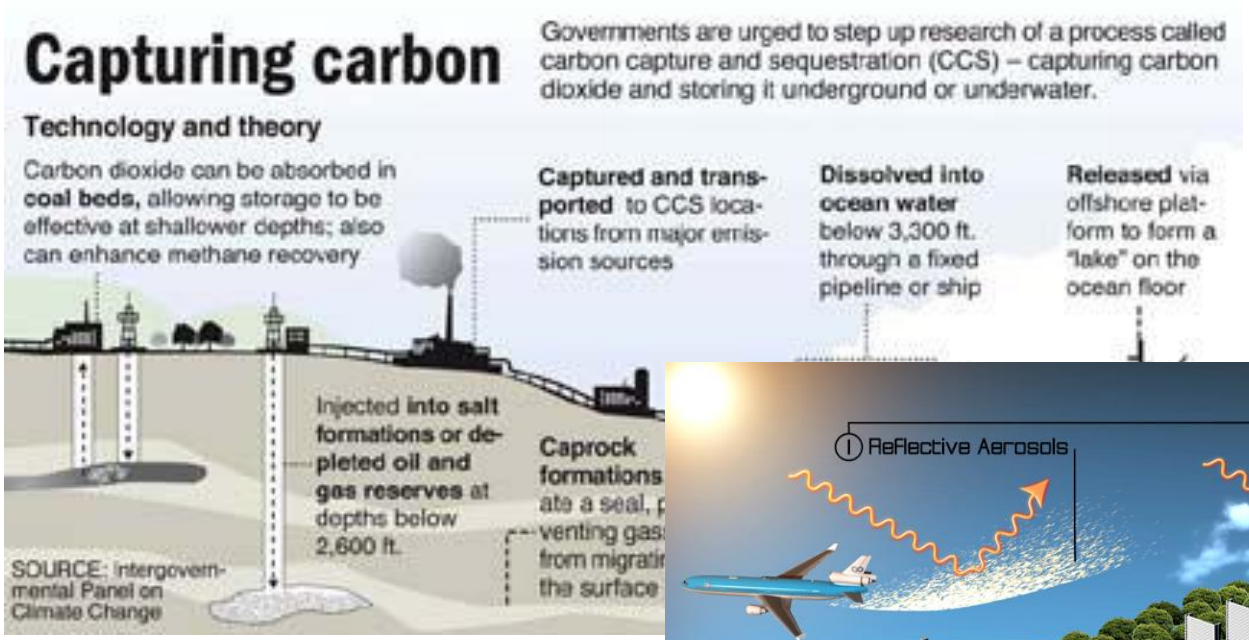

5000
$ billions per annum
IMF 2013 Est.
$4900 billion
IEA 2013 Est.
$550 billion
IEA 2011 Est.
IEA 2013
Annual cost to achieve universal access by 2030
Current annual investment in access
Annual global fossil fuel public subsidy

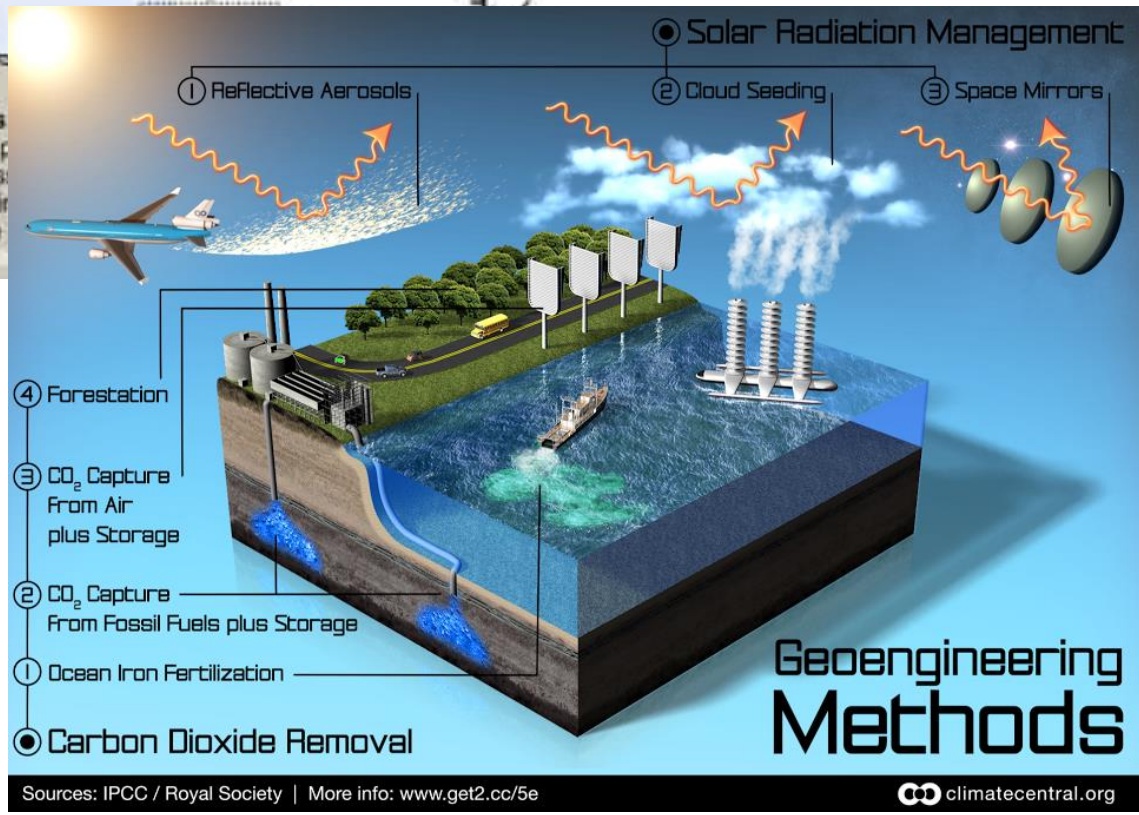
Use

- Foster public debate and consensus on managing risks associated with technology development and use

Choices

Choices

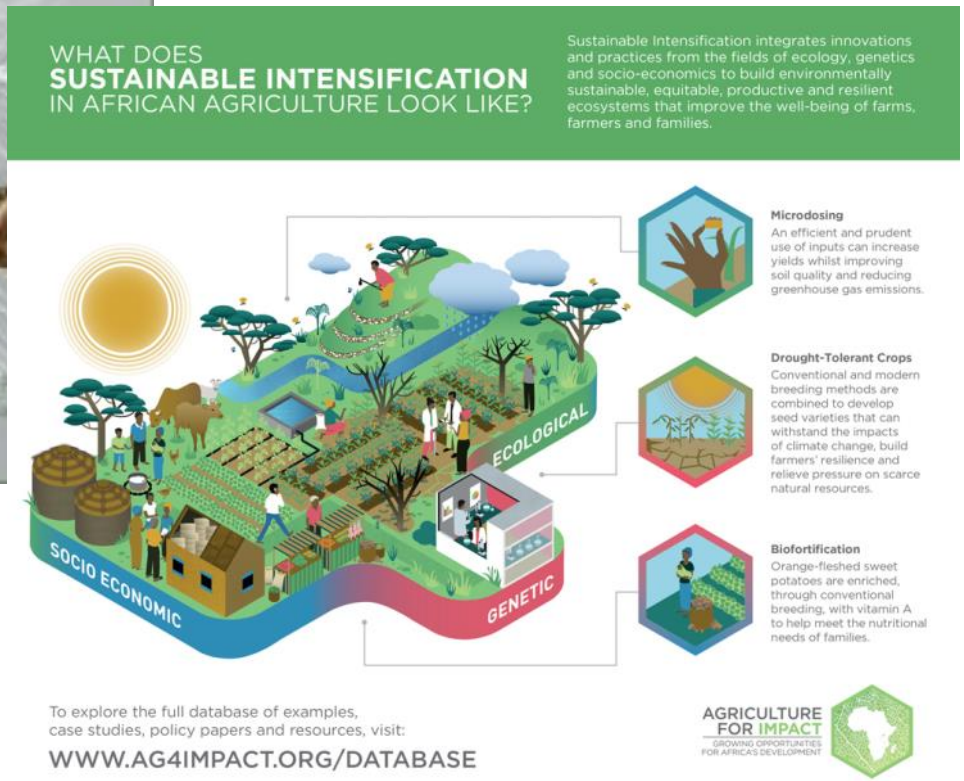

Capturing carbon
Governments are urged to step up research of a process called carbon capture and sequestration (CCS) – capturing carbon dioxide and storing it underground or underwater.
Technology and theory
Carbon dioxide can be absorbed in coal beds, allowing storage to be effective at shallower depths; also can enhance methane recovery
Captured and transported to CCS locations from major emission sources
Dissolved into ocean water below 3,300 ft. through a fixed pipeline or ship
Released via offshore platform to form a "lake" on the ocean floor
Injected into salt formations or depleted oil and gas reserves at depths below 2,600 ft.
Caprock formations
SOURCE: Intergovernmental Panel on Climate Change


Solar Radiation Management
1 Reflective Aerosols
2 Cloud Seeding
3 Space Mirrors
4 Forestation
3 CO_2 Capture From Air plus Storage
2 CO_2 Capture From Fossil Fuels plus Storage
1 Ocean Iron Fertilization
Carbon Dioxide Removal
Geoengineering Methods
Sources: IPCC / Royal Society | More info: www.get2.cc/5e
climatecentral.org

Choices


APPLICATIONS OF GENETIC ENGINEERING TECHNIQUES IN AGRICULTURE
SUBMITTED BY
B. DEVADATHA
M.SC BMB
DEPT. OF BMB
PONDICHEERY UNIVERSITY


agroecology
cultivating a beneficent agriculture
HOME
ABOUT AGROECOLOGY
ACADEMIC PROGRAM
MEET PEOPLE
NEWS & EVENTS


WHAT DOES
SUSTAINABLE INTENSIFICATION
IN AFRICAN AGRICULTURE LOOK LIKE?
Sustainable Intensification integrates innovations and practices from the fields of ecology, genetics and socio-economics to build environmentally sustainable, equitable, productive and resilient ecosystems that improve the well-being of farms, farmers and families.
ECOLOGICAL
SOCIO ECONOMIC
GENETIC
Microdosing
An efficient and prudent use of inputs can increase yields whilst improving soil quality and reducing greenhouse gas emissions.
Drought-Tolerant Crops
Conventional and modern breeding methods are combined to develop seed varieties that can withstand the impacts of climate change, build farmers' resilience and relieve pressure on scarce natural resources.
Biofortification
Orange-fleshed sweet potatoes are enriched, through conventional breeding, with vitamin A to help meet the nutritional needs of families.
To explore the full database of examples, case studies, policy papers and resources, visit:
WWW.AG4IMPACT.ORG/DATABASE
AGRICULTURE FOR IMPACT
GROWING OPPORTUNITIES FOR AFRICA'S DEVELOPMENT

Use

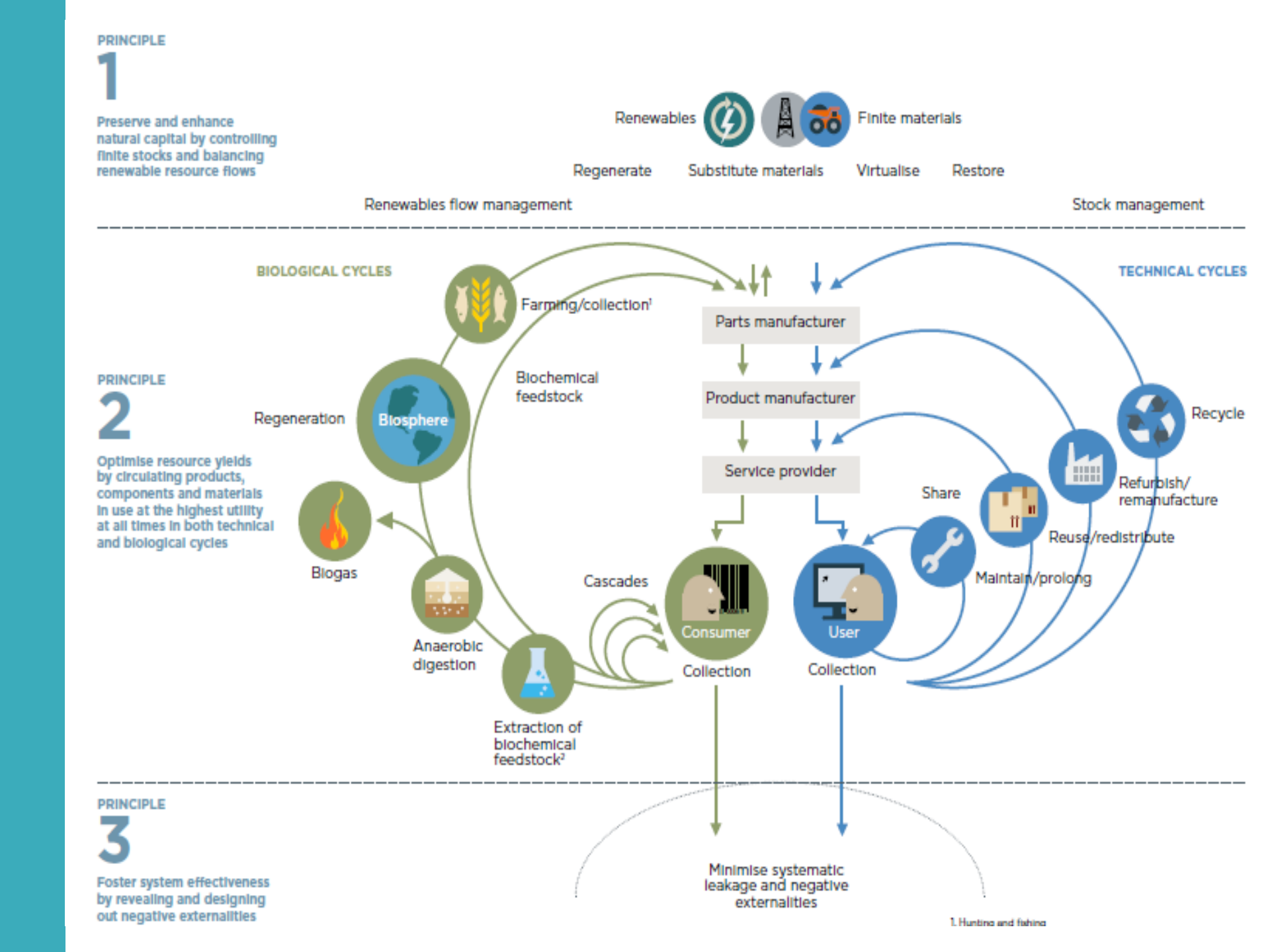
- Foster public debate and consensus on managing risks associated with technology development and use?

- Consider alternative economic models

PRINCIPLE

1

Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows



PRINCIPLE

2

Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles

PRINCIPLE

3

Foster system effectiveness by revealing and designing out negative externalities

1. Hunting and fishing

Innovation

- Agree the most urgent technology innovation needs and co-ordinate research agendas and funding

TECHNOLOGY FACILITATION MECHANISM

UNITED NATIONS INTER-AGENCY TASK TEAM

MULTI-STAKEHOLDER FORUM

ONLINE PLATFORM

TECHNOLOGY BANK

World Health Organization

Global Health Observatory

Innovation

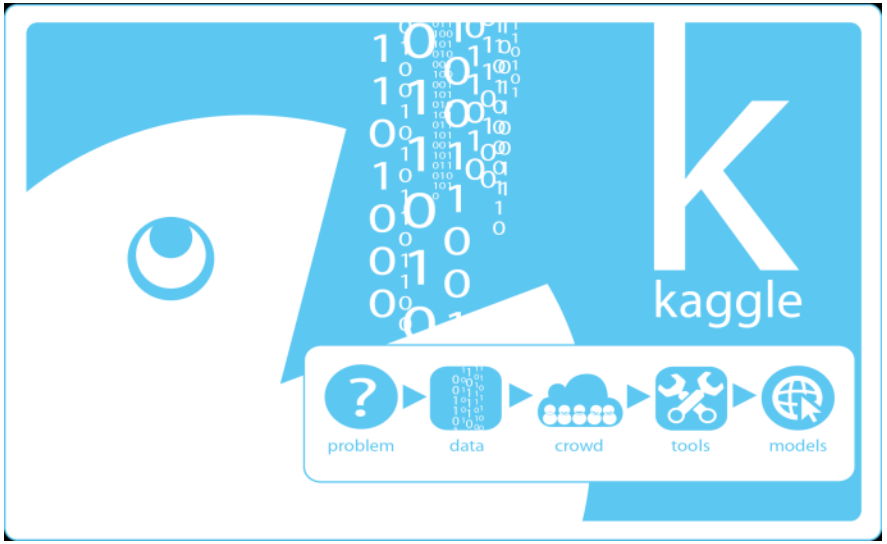
- How do we agree the most urgent technology innovation needs and co-ordinate research agendas and funding?

- More emphasis on collaboration as an alternative to competition

open source initiative

RepRap

open source seed initiative



OPEN SOURCE DRUG DISCOVERY

Innovation

- How do we agree the most urgent technology innovation needs and co-ordinate research agendas and funding?
- More emphasis on collaboration as an alternative to competition
- Accept and support a more entrepreneurial role for governments

Setting direction where market signals are too weak

Investing where risks, complexities, or costs are too high for the private sector to act alone.

Changing the rules to reward value addition and penalise parasitic and product-less behaviour by corporations.

Move from de-risking for private investors to the sharing of risk and reward