What is Open Science

(and is it something that LMICs should care about)?

Dr Louise Bezuidenhout

Following on From Session 1

- Locating discussions on openness and ownership in LMICs
- Dealing with resource limitations
- Building infrastructures that are truly global
- Getting diverse opinions and many voices into one discussion

- Please write down three things that concern you about engaging in Open Science practices in your home environment. Use one post-it per issue.

Feedback from Session 1

- Getting citations and credit
- Trusting other people's data
- Lack of knowledge about OS tools
- Lack of training
- Promotion criteria/rewards
- Lack of funds – no money for APCs
- Lack of resources
- Publics with low science literacy
- Ethics
- Older software
- Lack of institutional support
- Being scooped
- Lack of support from mentors
- Infrastructures
- Time to run analyses
- Technical support
- Governmental support
- Access to datasets
- Licensing and legal protection

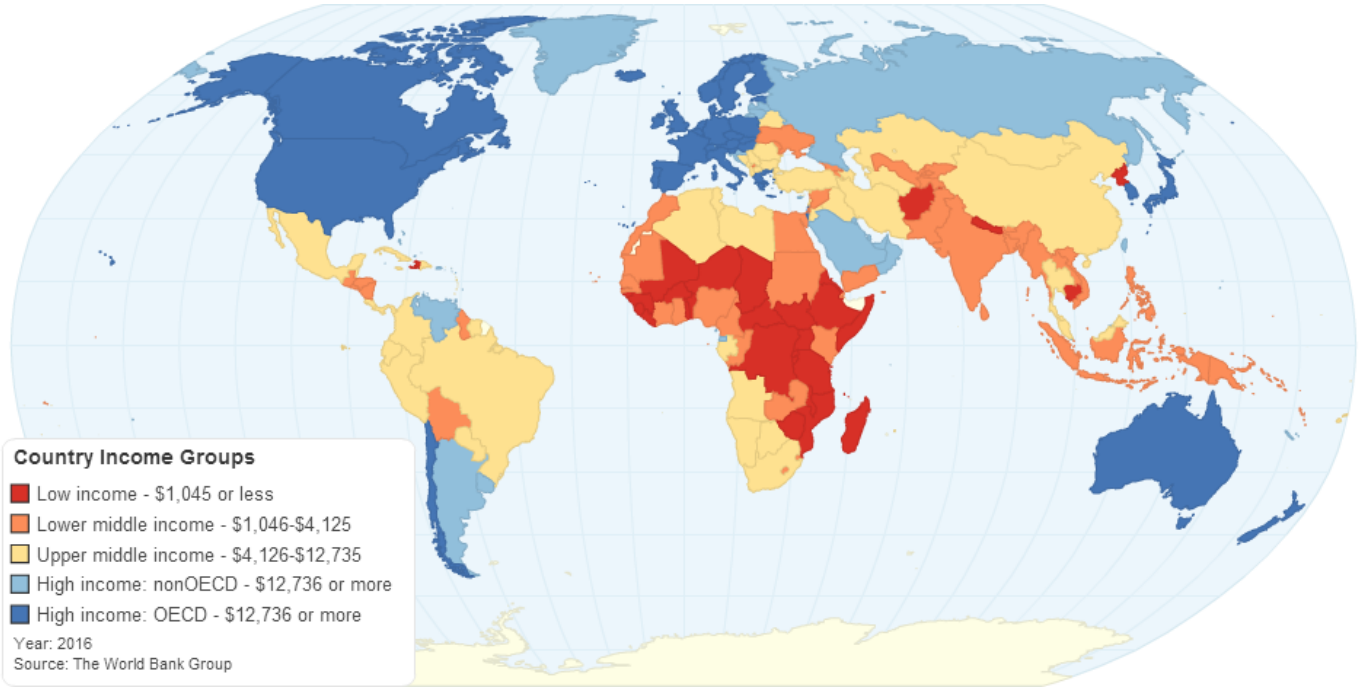
It’s A Nice Idea … In Theory …

SA1/3: *I think it leads to better science*

KY1/1: *I won’t release data unless I first of all publish*

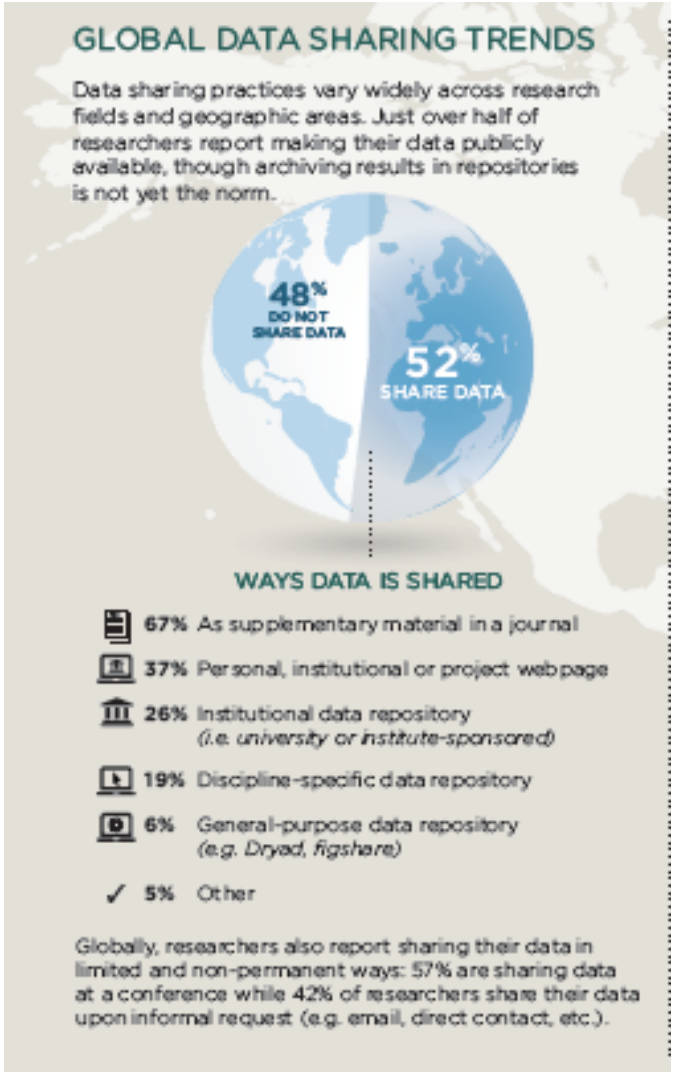
Being Open in a Low/Middle-Income Country

- Open Science discussions originated in Global North
  - Can feel like “someone else’s issue”
  - Lack of consultation and representation in OS discussions continue to make rhetoric and focus alienating to LMIC researchers
- Imposed rather than desired
- “Ideal/real gap”



http://chartsbin.com/view/2438

Differing Priorities and Concerns



Wiley 2014

- Concerns about loss of credit or IP dominate
- Tempting to think LMIC scientists have "same but intensified concerns" and thus will benefit from same solutions
- Concerns linked to environments that are markedly different from Global North

Understanding Infrastructures and Context

- Key challenges to embedding Open Science
  1. Historic legacies – parachute research
  2. Infrastructural issues (environments unsupportive of OS activities) and Lack of resources – overburdening fragile research systems
  3. Differences in research cultures and preferences
- Physical, social and regulatory contexts influence perceptions of Open Science and ability to engage in Open Science activities

1. Historic Legacies of Inequality

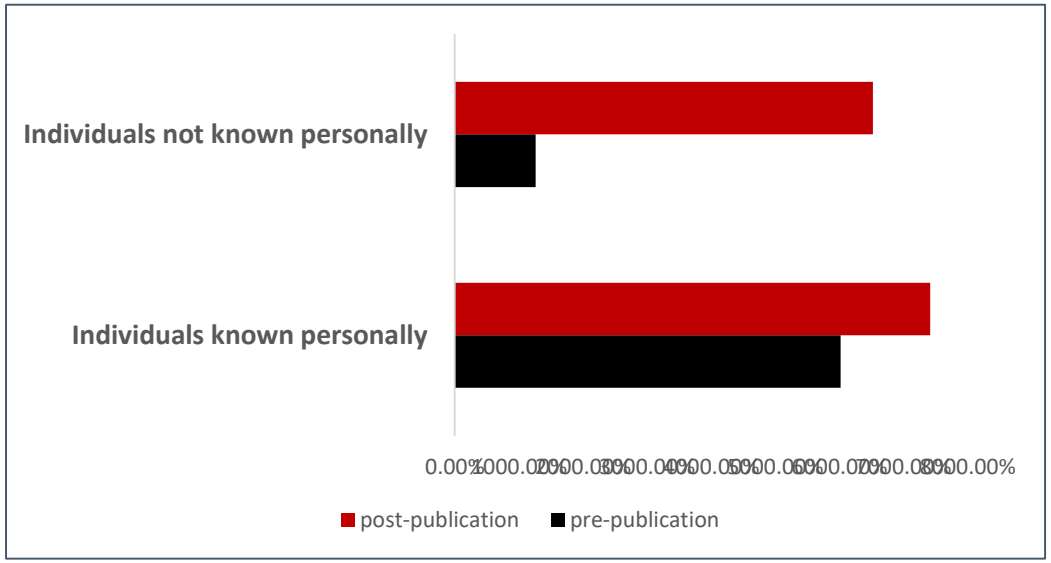
- Inherited colonial academic systems
- Historic lack of funding and resources limiting research scope
- “Parachute research”
- Systematic de-valuing of LMIC researcher contributions

Concerns Should Not Be Minimized

- Being concerned about sharing data is fine
- In particular, without legal and institutional safeguarding, this can seem like a risky activity

Biggest concerns about sharing data amongst African Scientists

Having other researchers take my results	30.11%
Losing out on opportunities to maximize publications from my data sets	13.98%
Missing out on opportunities to maximize the intellectual property from my data sets	22.58%
Having my data mis-interpreted or mis-attributed	29.03%
Other (please specify)	4.30%



Sharing pre- and post-publication with people you know and those you don't

Bezuidenhout and Chakauya 2017

Key Resources

wellcome

Data-sharing Agreements

COPE

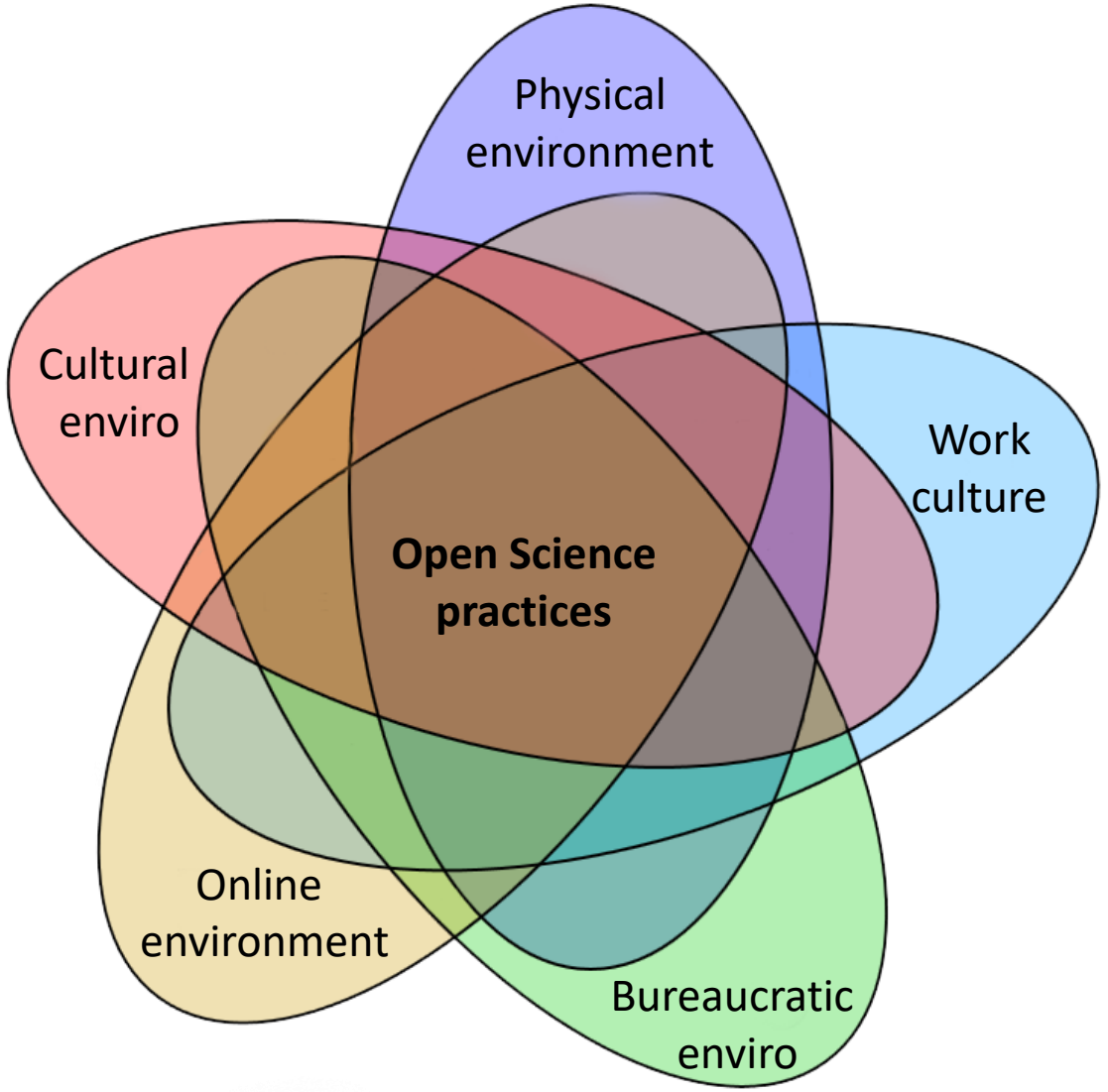
PROMOTING INTEGRITY IN RESEARCH AND ITS PUBLICATION

Still Needed: Positive Examples

- Need for more positive examples to dispel “urban myths” and lurking ghosts
- Need enthusiastic champions and mentors
- Effective personal networks
- Support for institutional and national regulation development

www.bbc.com

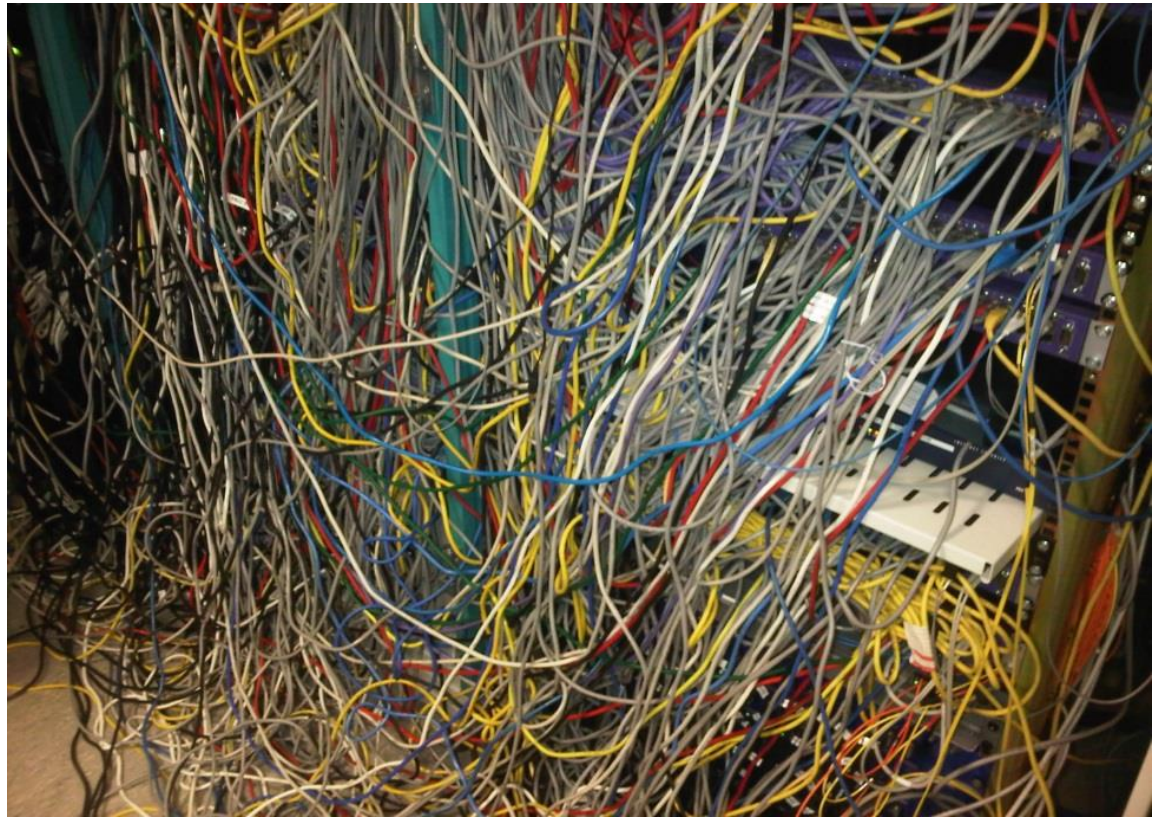
2. Infrastructures that Support Openness



An African Perspective

- **Personal**
  - Data management and curation skills
  - Technical servicing:
- **Communal**
  - Mentorship
  - Endorsement
  - ICT sharing
  - Ownership
- **Organizational**
  - Policies
  - Procurement
  - Discretion
  - Workplace demands
- **Infrastructural**
  - Remote access
  - Basic provisions
  - Transfers
- **Epistemic**
  - Research continuity
  - Dependency
  - Lack of standards
- **Economic**
  - Access payments
  - Personal provisions
- **Funding**
  - •Small grants
  - •No ”core” funding
  - •Mix of personal investment and traditional grants

Just Because the Resources Are Online …



…. doesn’t mean they’re accessible

Key Resources

RDA
RESEARCH DATA ALLIANCE

APC waivers and discounts

BMC offers waivers and discounts for article processing charges (APCs) for papers whose corresponding authors are based in low-income countries.

BMC offers APC waivers to papers whose corresponding authors are based in countries classified by the World Bank as low-income economics as of July 2017.

Access to resources

Research Databases and data sources

There is a wealth of research data in various databases around the world – much of it publicly available. Here are a few examples of where to look:

- Global Partnership for Sustainable Development Data www.data4sdgs.org/
- Flowminder: http://www.flowminder.org/
- Worldpop: http://www.worldpop.org.uk/
- University of Connecticut Research Database Locator: http://rdl.lib.uconn.edu/byTitle.php
- Listing of Open Access Databases (LOADB): http://www.loadb.org/
- Research4Life programme:
  - **AGORA** - Access to Global Online Research in Agriculture http://www.fao.org/agora/en/
  - **HINARI** - Access to Research for Health programme http://www.who.int/hinari/en/
  - **OARE** - Online Access to Research in the Environment http://web.unep.org/oare/
  - **ARDI** - Access to Research for Development and Innovation http://www.wipo.int/ardi/en/

African databases:

- OpenAFRICA: https://africaopendata.org/
- African Development Bank Statistical Data Portal http://dataportal.opendataforafrica.org/
- Directory of Data Repositories in Africa (DODRIA) https://researchdatadirectoryonafrica.com/
- FAO Agricultural databases http://www.fao.org/statistics/databases/en/

Offline databases:

- TEEAL (The Essential Electronic Agricultural Library) https://teeal.org/
- eGranary Digital Library https://www.widernet.org/eGranary/
- **Wiki Project Med Foundation** http://medbox.iiab.me/home/
- See also the Wikipedia list of academic databases and search engines

Thanks to Andy Nobes, INASP

Support Networks

Academic support networks - organisations and NGOs

There are many international organisations and NGOs providing support to academics, ranging from free resources and access, training, Networking and subject-specific advice. Some useful organisations are listed below

AuthorAID www.authoraid.info

Eifl (Electronic Information for Libraries) www.eifl.net

Equator Network www.equator-network.org

CoDATA (Committee on Data of the International Council for Science) www.codata.org

Global Health Network https://tghn.org/

Global Young Academy https://globalyoungacademy.net/

Healthcare Information for All www.hifa.org

INASP www.inasp.info

Mendeley network https://www.mendeley.com/research-network/community

MedicineAfrica http://medicineafrica.com/

OWSD (Organisation for Women in Science in the Developing World) www.owsd.net

Scholars at Risk Network https://www.scholarsatrisk.org/

ResearchGate https://www.researchgate.net/

Research4Life http://www.research4life.org/

TWAS (The World Academy of Sciences for the advancement of science in developing countries) https://twas.org/

Indepth Network http://www.indepth-network.org/

International Health Policies http://www.internationalhealthpolicies.org/

Wessex Global Health Network

http://www.wessexghnetwork.org.uk/

Thanks to Andy Nobes, INASP

Support Networks

National research and education networks

NRENs are specialised internet service providers who support the needs of research and education communities within a country. They promote access to global educational resources and facilitate interaction at both national and regional levels among higher education and research institutions.

Major NRENs in Africa and South Asia

Africa

- WACREN - West and Central African Research and Education Network
- GARNET - Ghana
- NgREN - Nigeria
- ENREN - Egypt
- SudREN - Sudan
- SomaliREN - Somalia
- UbuntuNet Alliance for Research and Education Networking - the Alliance of NRENs of East and Southern Africa
- EthERNet - Ethiopia
- KENET - Kenya
- MAREN - Malawi
- RENU - Uganda
- RwEdNet - Rwanda
- TENET/SANReN - South Africa
- TERNET - Tanzania
- ZAMREN - Zambia

South Asia

- BDREN - Bangladesh
- ERNET - India
- NKN - India
- NREN - Nepal
- PERN - Pakistan
- LEARN - Sri Lanka

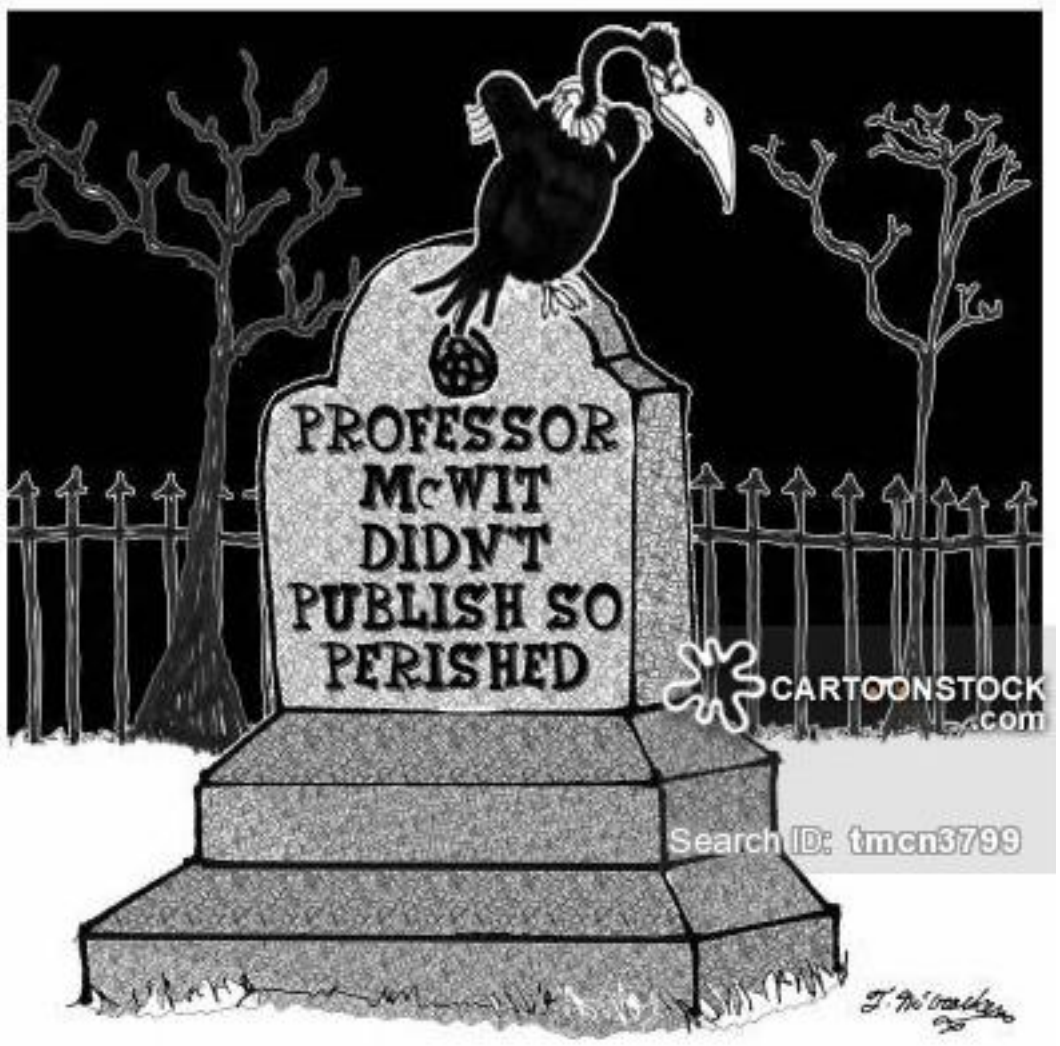
Thanks to Andy Nobes, INASP

Still Needed: Confronting The Resource Conundrum

- Open Science activities require financial, technical and human resources
- In resource-constrained research systems, who decides what are priorities for spending?
- Need to engage with institutions to present cases for why investing in Open Science can be beneficial

3. Traditional Academic Structures

- Promotion closely linked to publication
- Few (if any) incentives to engage in Open Science activities
- Pressure from institutions and senior staff to maximise article output



https://medium.com/open-science-indonesia/publish-or-perish-app-9e76b5bf6cd9

Key Resources

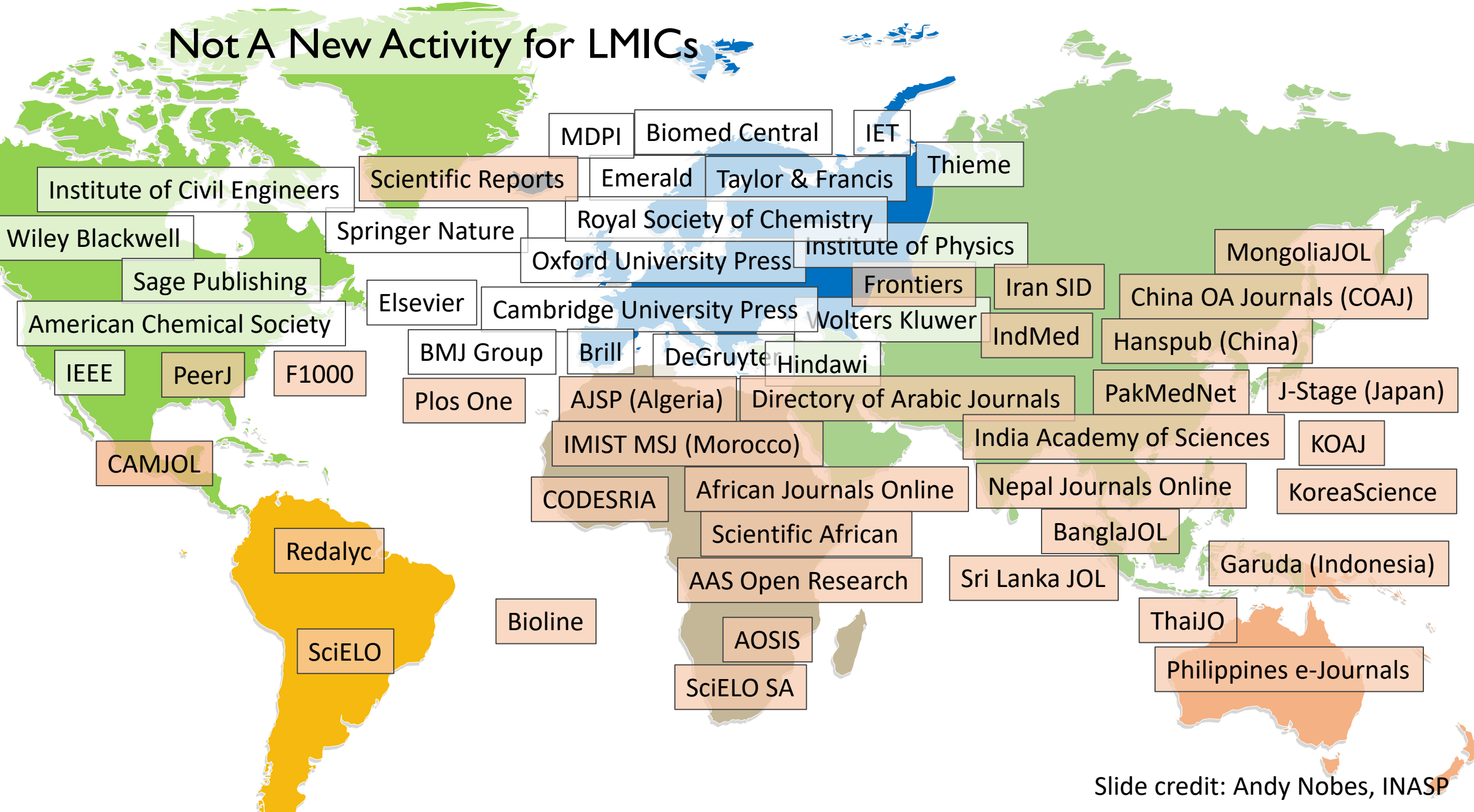
Open Science Career Assessment Matrix (OS-CAM)	
Open Science activities	*Possible evaluation criteria*
RESEARCH OUTPUT	
Research activity	Pushing forward the boundaries of open science as a research topic
Publications	Publishing in open access journals Self-archiving in open access repositories
Datasets and research results	Using the FAIR data principles Adopting quality standards in open data management and open datasets Making use of open data from other researchers
Open source	Using open source software and other open tools Developing new software and tools that are open to other users
Funding	Securing funding for open science activities
RESEARCH PROCESS	
Stakeholder engagement / citizen science	Actively engaging society and research users in the research process Sharing provisional research results with stakeholders through open platforms (e.g. Arxiv, Figshare) Involving stakeholders in peer review processes
Collaboration and Interdisciplinarity	Widening participation in research through open collaborative projects Engaging in team science through diverse cross-disciplinary teams
Research integrity	Being aware of the ethical and legal issues relating to data sharing, confidentiality, attribution and environmental impact of open science activities Fully recognizing the contribution of others in research projects, including collaborators, co-authors, citizens, open data providers
Risk management	Taking account of the risks involved in open science
SERVICE AND LEADERSHIP	
Leadership	Developing a vision and strategy on how to integrate OS practices in the normal practice of doing research Driving policy and practice in open science Being a role model in practicing open science
Academic standing	Developing an international or national profile for open science activities Contributing as editor or advisor for open science journals or bodies
RESEARCH IMPACT	
Communication and Dissemination	Participating in public engagement activities Sharing research results through non-academic dissemination channels Translating research into a language suitable for public understanding
IP (patents, licenses)	Being knowledgeable on the legal and ethical issues relating to IPR Transferring IP to the wider economy
Societal impact	Evidence of use of research by societal groups Recognition from societal groups or for societal activities
Knowledge exchange	Engaging in open innovation with partners beyond academia
TEACHING AND SUPERVISION	
Teaching	Training other researchers in open science principles and methods Developing curricula and programs in open science methods, including open science data management Raising awareness and understanding in open science in undergraduate and masters' programs
Mentoring	Mentoring and encouraging others in developing their open science capabilities
Supervision	Supporting early stage researchers to adopt an open science approach
PROFESSIONAL EXPERIENCE	
Continuing professional development	Investing in own professional development to build open science capabilities
Project management	Successfully delivering open science projects involving diverse research teams
Personal qualities	Demonstrating the personal qualities to engage society and research users with open science Showing the flexibility and perseverance to respond to the challenges of conducting open science

(o'Carroll, Rentier, et al. 2017)

Getting Individual and Institutional Buy-In

- While access to papers, data and other resources is an obvious benefit, embedding Open Science in institutions has other benefits
  - Enhances visibility of LMIC researchers
  - Opens up new avenues for research through collaboration
  - Streamline engagement with funders and collaborators
  - Maximize resources and facilitate innovation

Not A New Activity for LMICs



Slide credit: Andy Nobes, INASP

Building on Existing Good Will

Perspectives of Open Science in Africa

The exposure that it brings my research	10.53%
That it contributes to the advancement of science	40.00%
That it brings networking and collaboration opportunities	46.32%
I don't believe there is a benefit for sharing my data	1.05%
Other (please specify)	2.11%

Bezuidenhout and Chakauya 2017

Getting Buy-In From Researchers

- Create safe spaces for discussion
- Do not minimize concerns
  - It’s ok to have challenges, but need to reach out for solutions
- Openness is not a new topic … don’t treat it as something entirely different

Open Science: an Extension of RCR Values

- A just distribution of resources (public funds and research products)
- A way of maximizing the benefits of research
- A safeguard against possible harms arising from research
- As a means of improving accountability and transparency
- An enactment of collegiality

Openness in RCR

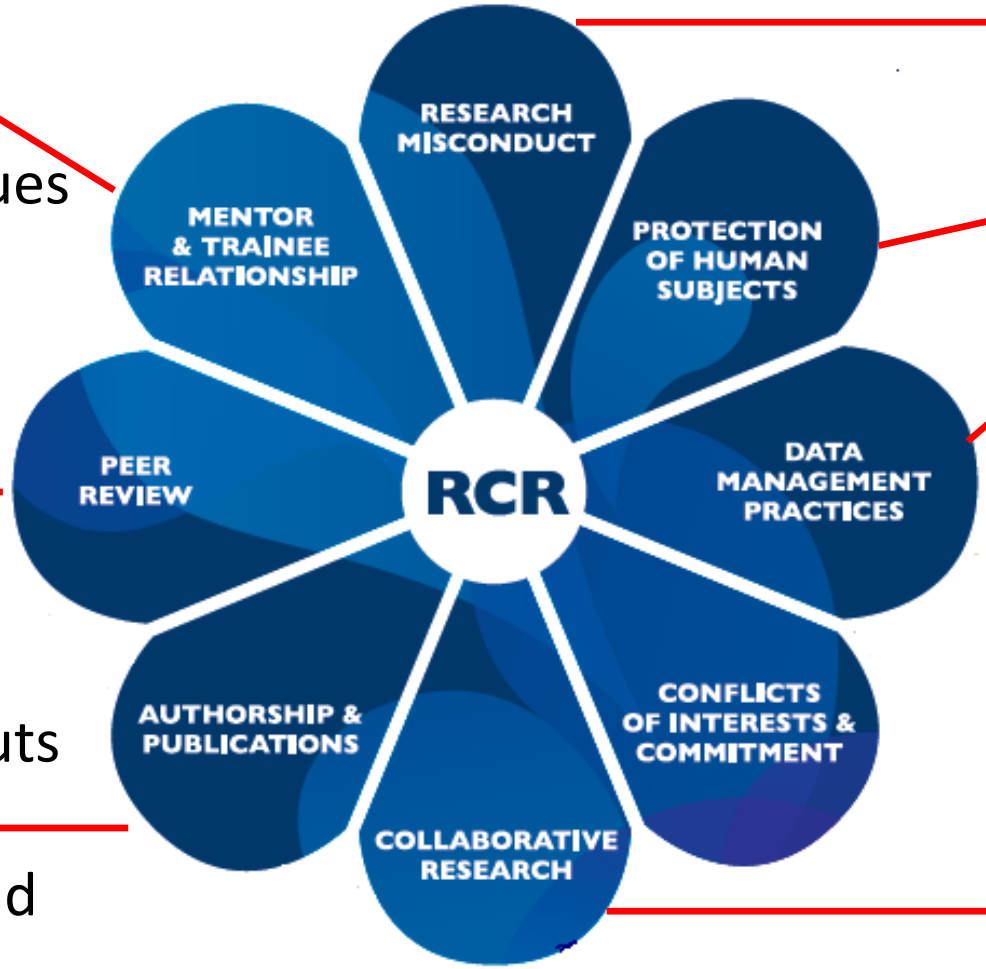
Open Lab Books: Transparency in research practices

Sharing and openness: enhance transmission of values

Open Peer Review: Transparency in peer review leads to better dialogue and collegial behaviour

Open Access: Improves availability of research outputs

Open publishing: leads to improved citations, credit and collaboration

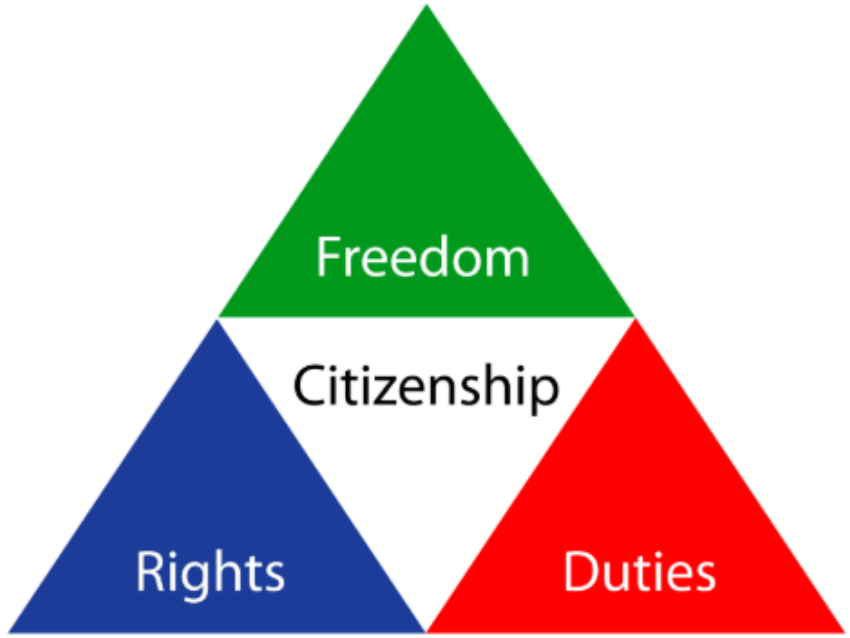


Open Data and Open Methodologies: Improve transparency and reproducibility of research

Open Science Tools: Improve collaboration

Responsible and Open Research as Citizenship

- Citizenship:
  - ethical obligations arising out of social living
  - being part of a community requires the acceptance of civic responsibilities and contribution to the overall public good
- As a citizen you have duties and expected ways of acting
  - Follow rules
  - Participate in community activities
  - Protect the community and its resources from misuse



Responsible and Open (Data) Science Citizenship

- Research is a community endeavour
  - involves social actions such as resource sharing and communal practice
  - responsible researchers are “citizens” of the research community
- Citizenship is a give and take
  - Benefits to facilitate freedom of research
  - Structures to safeguard rights as researcher
  - Responsibilities to assume to protect culture
- Support and grow culture instead of just living in it

Responsible and Open (Data) Science Citizenship

- RCR and Open Science form the blueprint for a form of ”science citizenship”
- Research relies on the use of “community resources”
  - data, papers and so forth
- As a “citizen” of the research community you therefore have responsibilities for these resources
  - follow community determined rules (such as citation, licensing and so forth)
  - Contribute to communal resources (data sharing)
  - Maximise good for the community by participating in civic service (reviewing, curating etc)

Thoughts to Take Home (1)

- Each element of the research process should:
  - Be publicly available: it is difficult to use and benefit from knowledge hidden behind barriers such as passwords;
  - Be re-usable: research outputs need to be licensed appropriately so that prospective users know clearly any limitations on re-use;
  - Induce collaboration between researchers through better access and better online tools;
  - Be transparent and have appropriate metadata to provide clear statements of how research output was produced, and can be re-used

https://www.fosteropenscience.eu/content/introduction-open-science-funders-powerpoint-presentation

Thoughts to Take Home (2)

- It’s ok to have concerns
- Having challenges are common
- Creating, joining and interlinking networks of support is key to fostering Open Science
- The precedent is there for Open Science in LMICs – it just needs champions
- There are a lot of resources that are available to assist you

Openness Is A Lifelong Journey

Publish Preprints

FAIRify data

Make code available

Publish Lab-Notebooks

Use version control

Preregister your project

Do science communication