



▷ What do they see ▷ What can we see ▷ What we often don't see

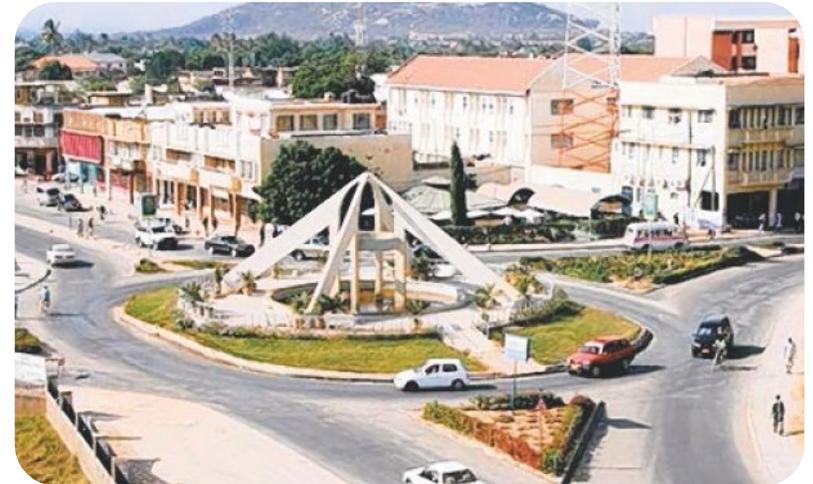
Evidence from health impact assessment study using Global, National and Sub-national data sources



Programme Suisse de Recherche sur les Enjeux Mondiaux du Développement (programme r4d)

Isaac Lyatuu, Mirko Winkler

HIA4SD Project stakeholder meeting
Dodoma, Tanzania
11 August 2021





Background info & rationale

- The extractive industry (i.e., ext. of gold, copper, oil, natural gas) can contribute to a wide range of impacts on environment and social determinants of health
- If un-attended, negative effects can outweigh positive effects and impact the overall wellbeing of the people
- Impact assessment → an approach to minimize adverse environmental, social and health impacts of projects, policies or programs, while fostering opportunities for equitable and sustainable development





This presentation

- Share evidence from data (global, national and subnational)
- Reflect
- Stimulate/Provoke a policy movement towards a comprehensive inclusion of HIA in EIA



1. What do they see

Using global data source (an international perspective)

Data: Bank Development Indicators (WDI)

URL: <https://databank.worldbank.org/>

The screenshot shows the World Bank DataBank interface. At the top, it says "THE WORLD BANK" and "IBRD · IDA". Below that, it indicates the page is in English, Español, Français, عربي, and 中文. The main heading is "DataBank | World Development Indicators". There are buttons for "Table", "Chart", "Map", and "Metadata". On the left, there are tabs for "Variables", "Layout", "Styles", "Save", "Share", and "Embed". A sidebar lists filters: Database (82 available, 1 selected), Country (266 available, 1 selected), Series (1443 available, 3 selected), and Time (61 available, 51 selected). The main area is titled "Preview" and shows a dropdown for "Tanzania". Three indicators are highlighted: "Total natural resources rents (% of GDP)", "GDP (constant 2010 US\$)", and "Life expectancy at birth, total (years)".

1. What do they see (continuous scale)

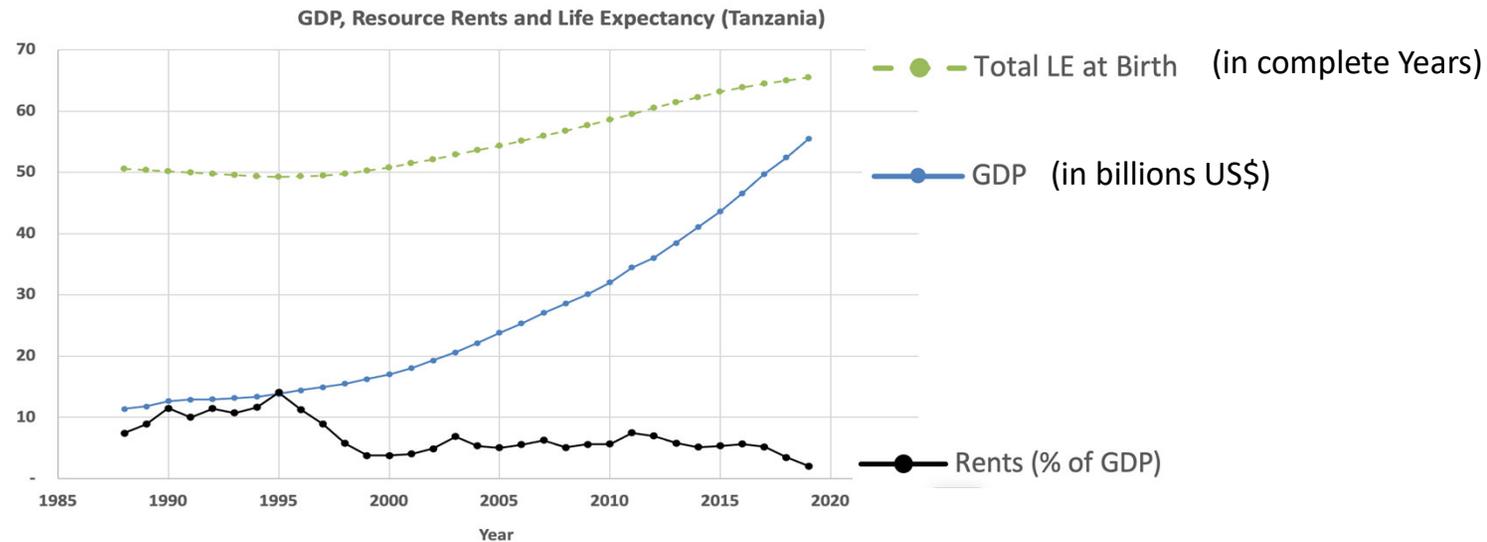
Using global data source (an international perspective)

Data: Bank Development Indicators (WDI)

Picked 3 indicators

1. Total LE
2. GDP
3. Rents

Plot them on continuous scale over time

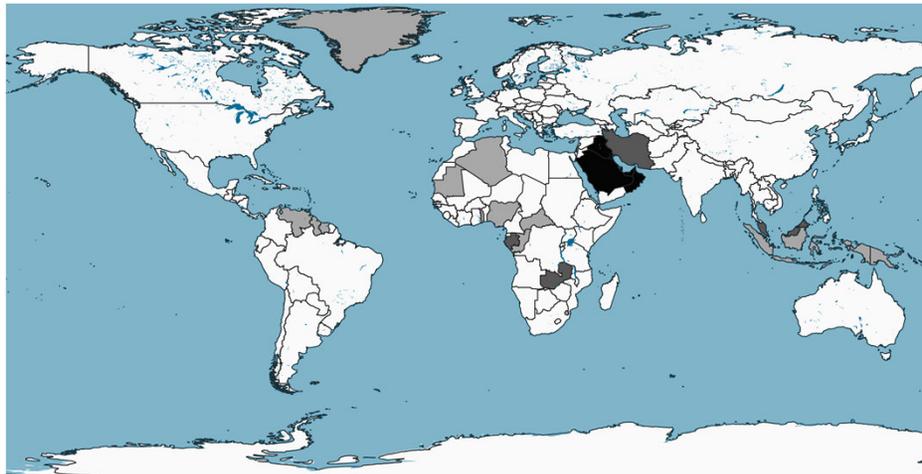




1. What do they see (discrete, 5 years interval)

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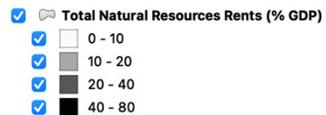
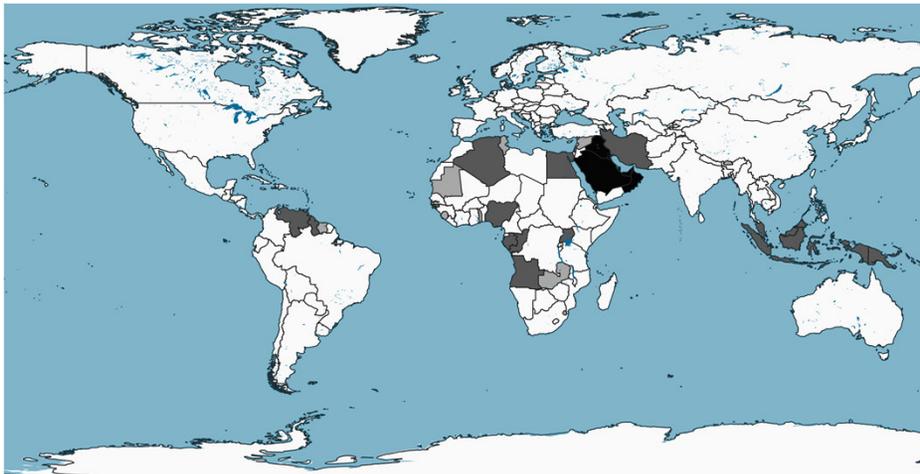
Total Natural resources rents (% GDP) in 1971-75



- Total Natural Resources Rents (% GDP)
- 0 - 10
- 10 - 20
- 20 - 40
- 40 - 80

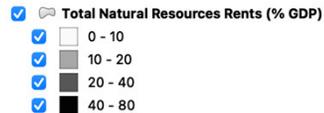
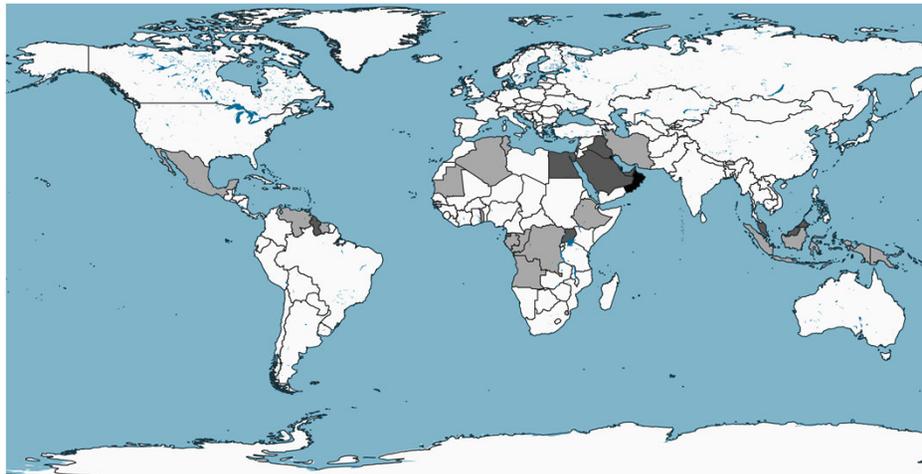
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Total Natural resources rents (% GDP) in 1976-80



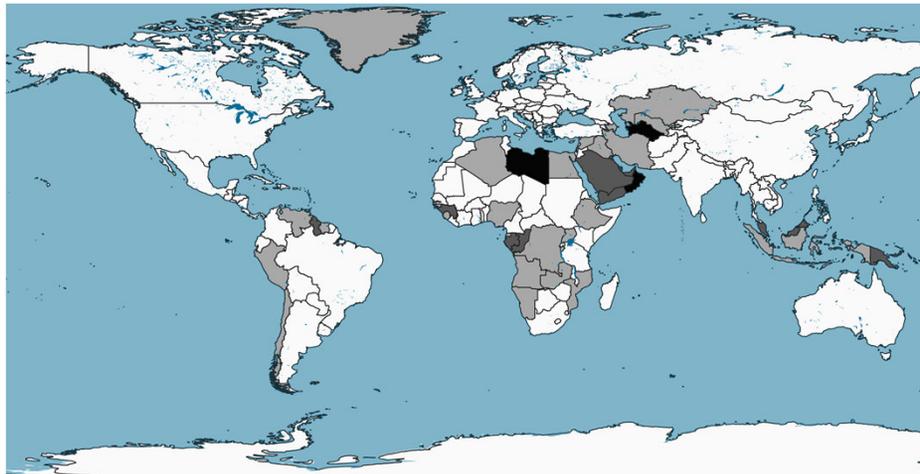
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Total Natural resources rents (% GDP) in 1981-85



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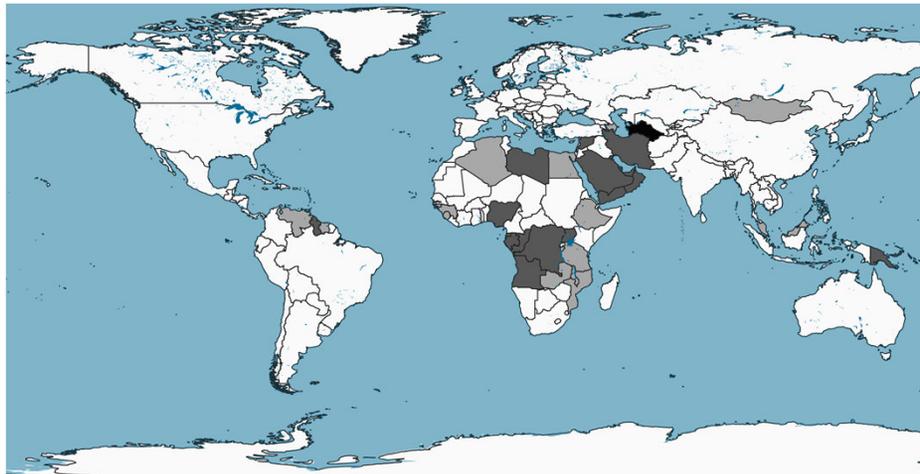
Total Natural resources rents (% GDP) in 1986-90



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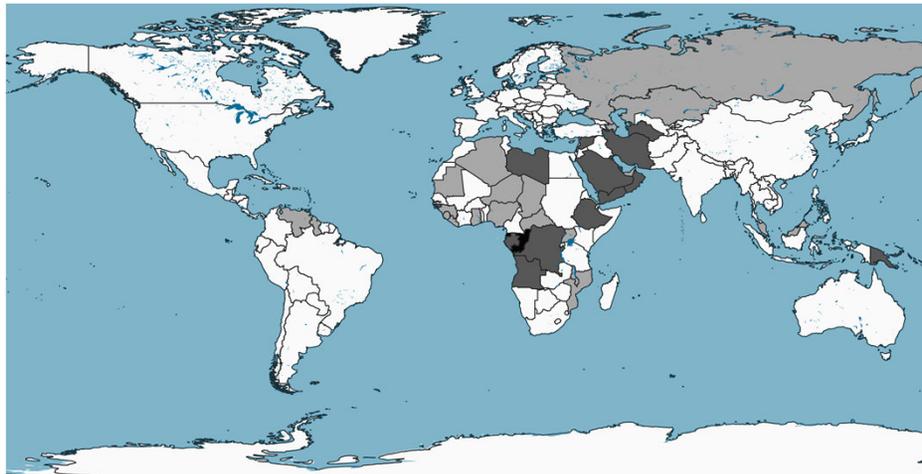
Total Natural resources rents (% GDP) in 1991-95



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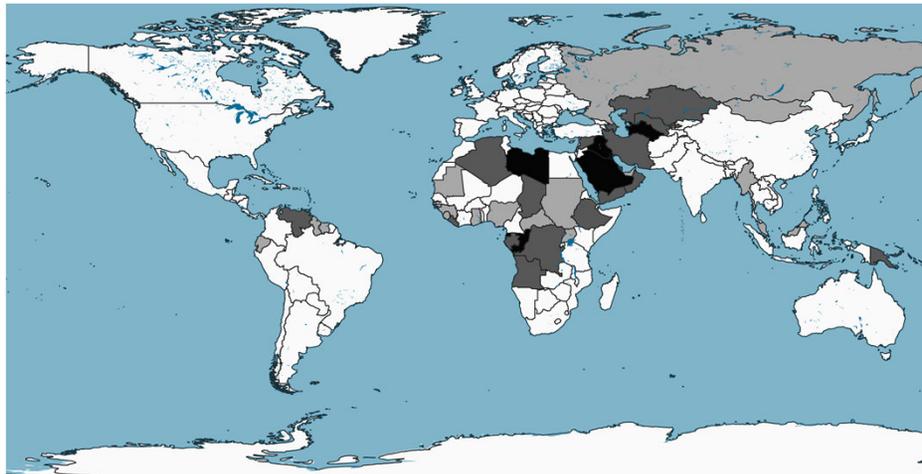
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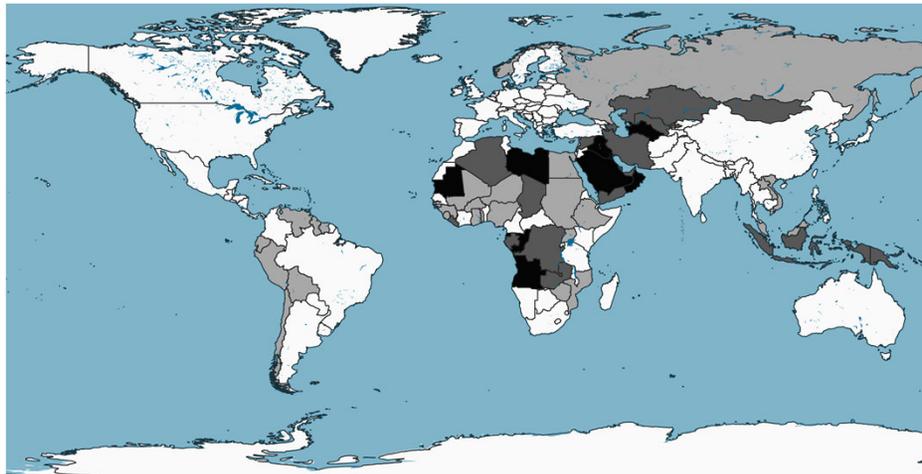
Total Natural resources rents (% GDP) in 2001-05



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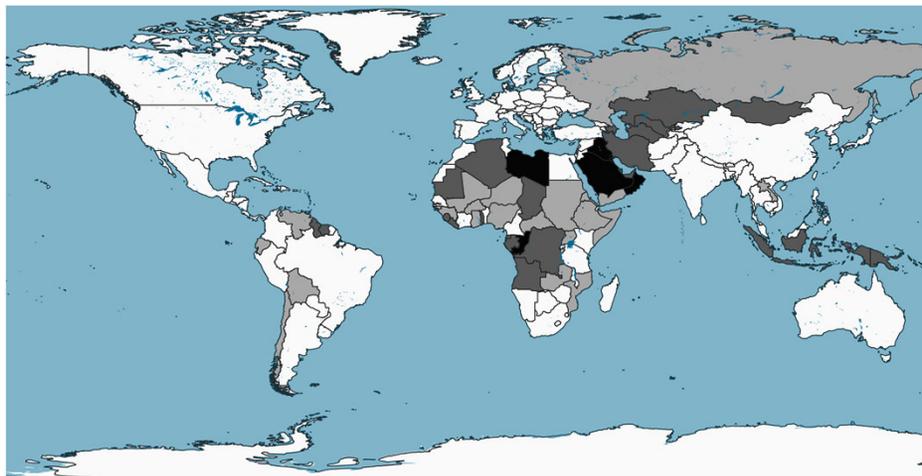
Total Natural resources rents (% GDP) in 2006-10



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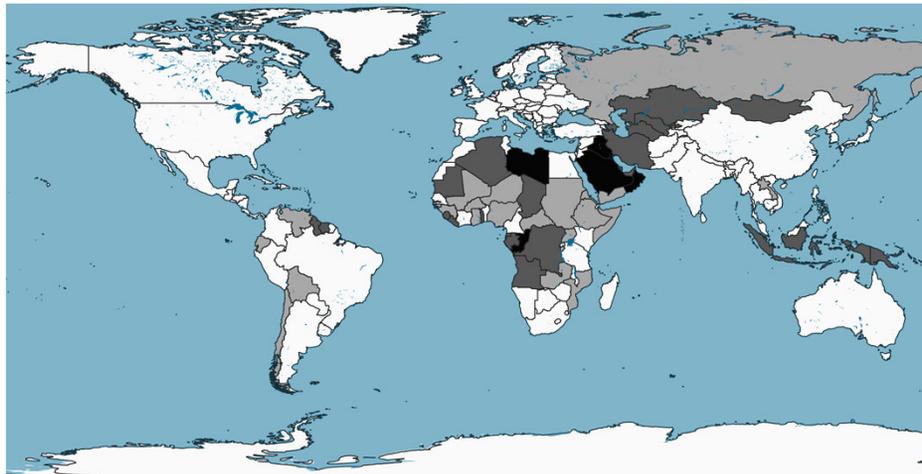
Total Natural resources rents (% GDP) in 2011-15



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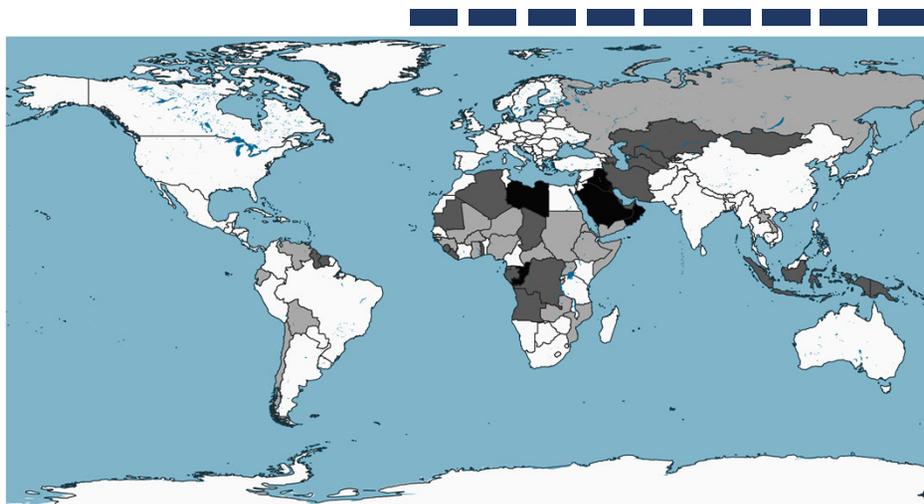


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VS Change in LE

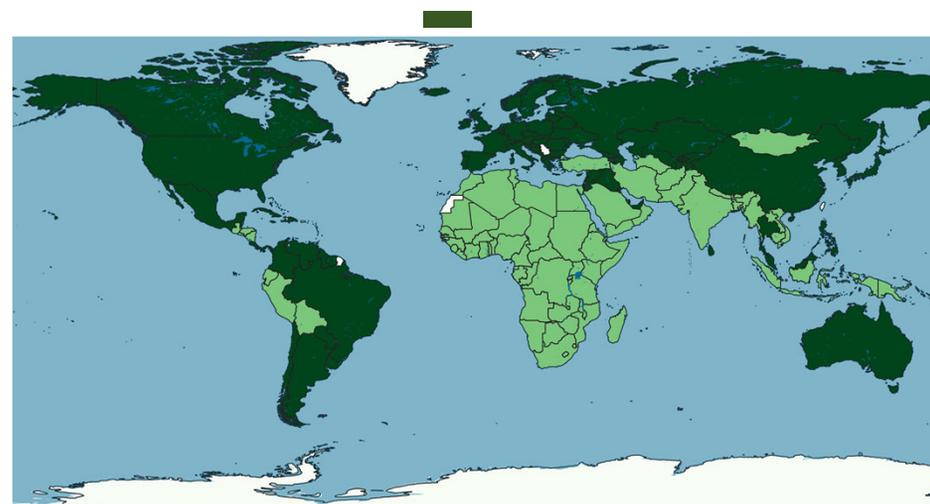
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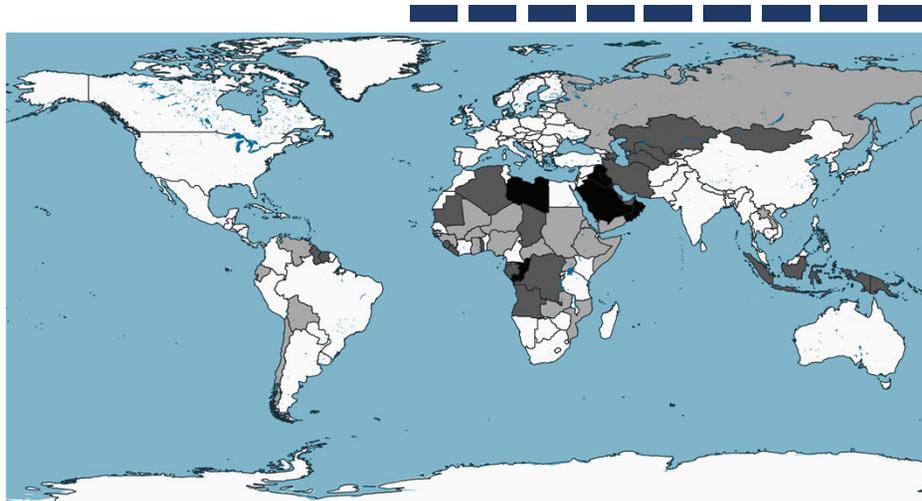
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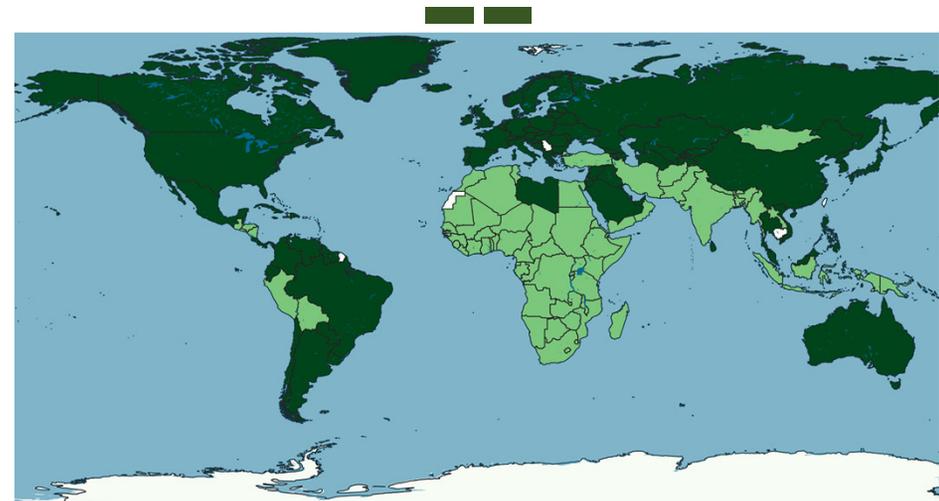
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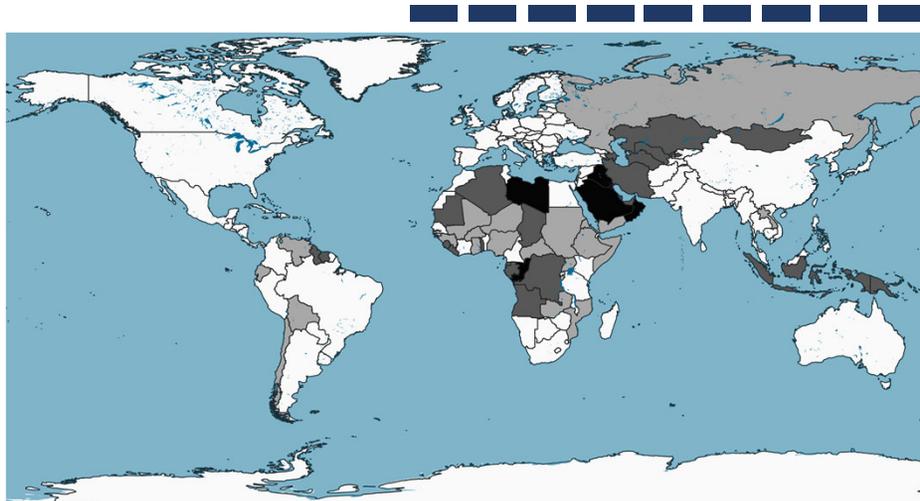
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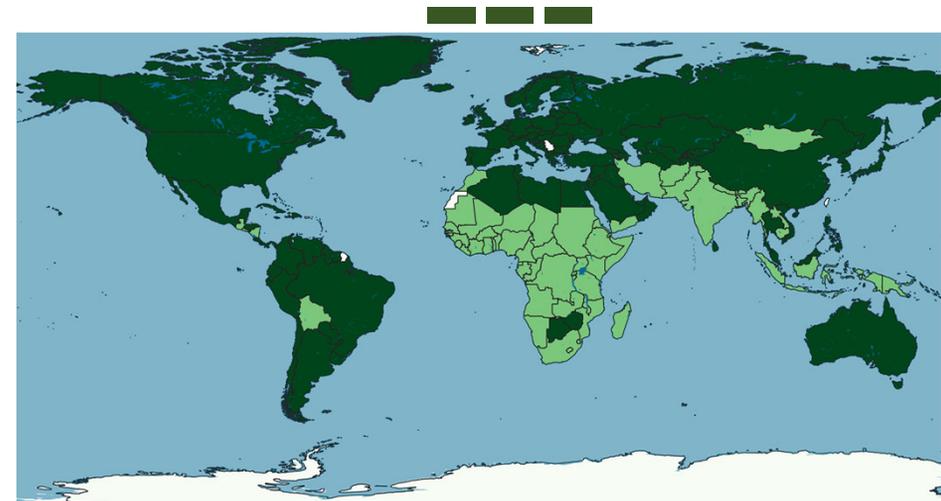
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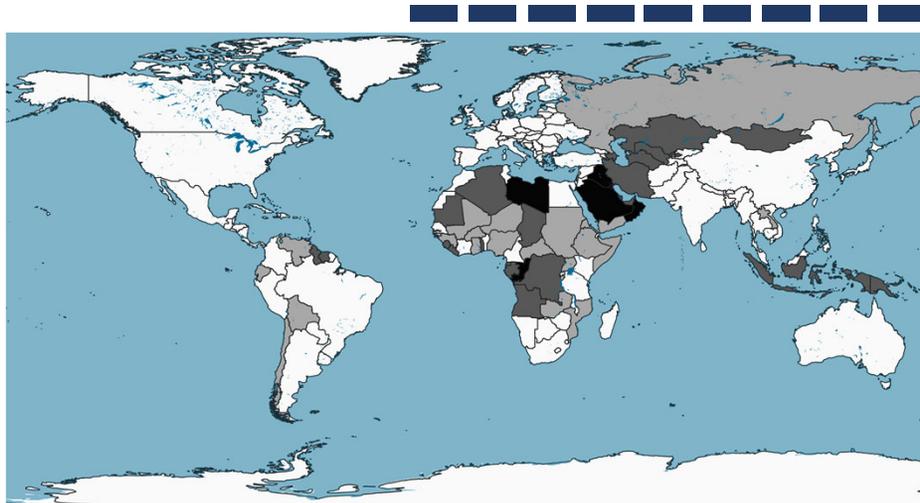
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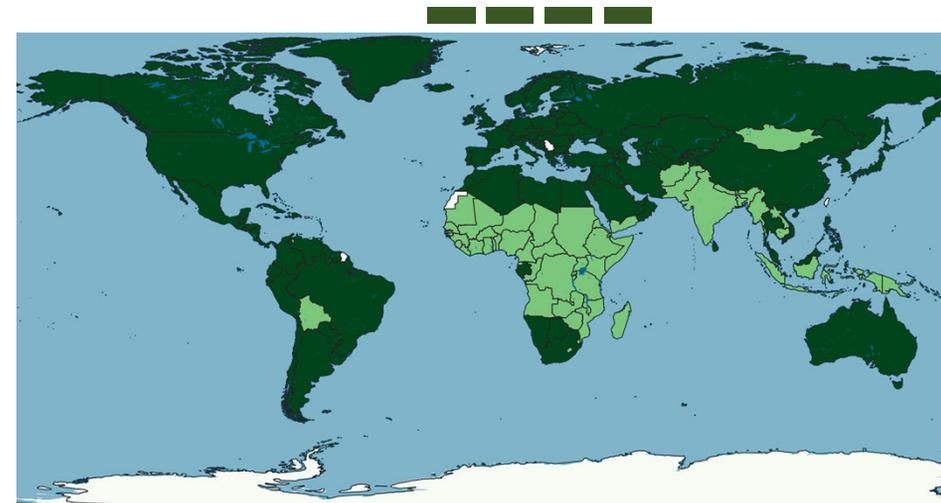
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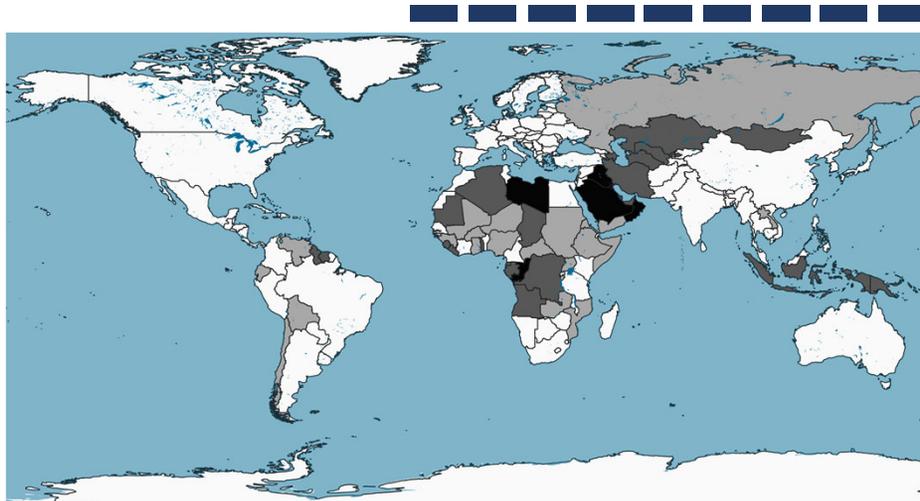
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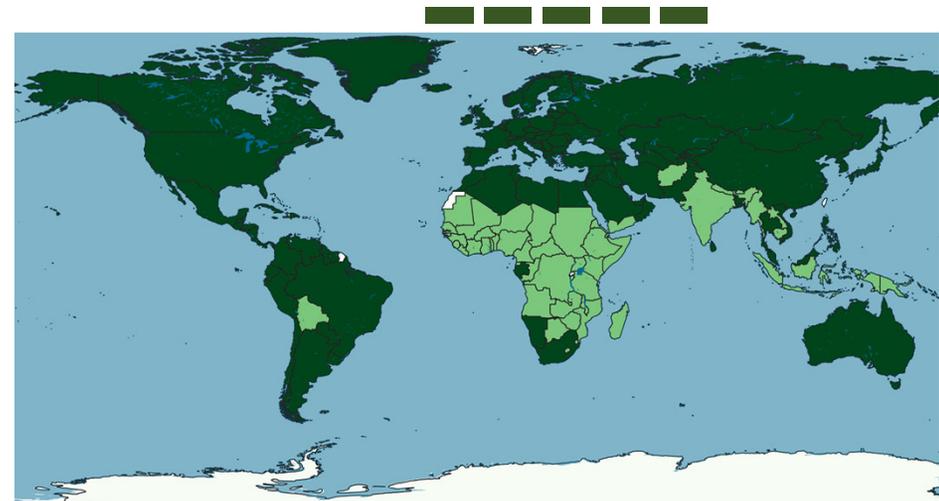
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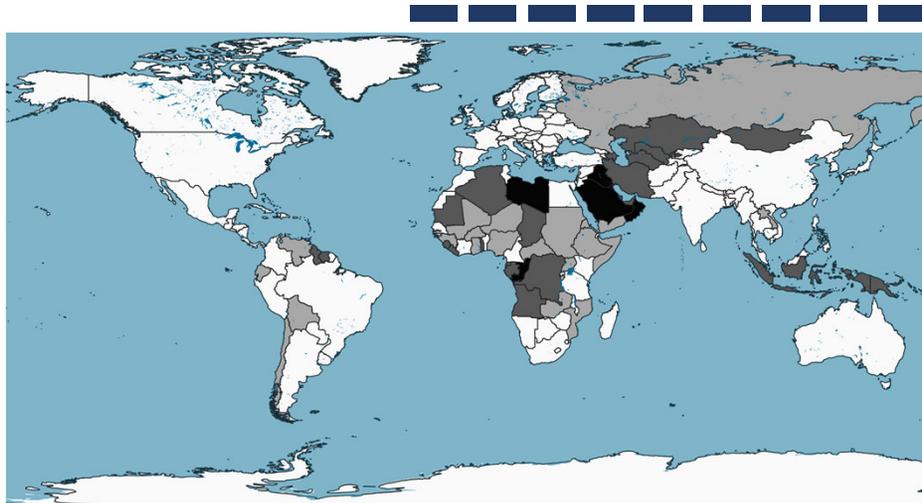
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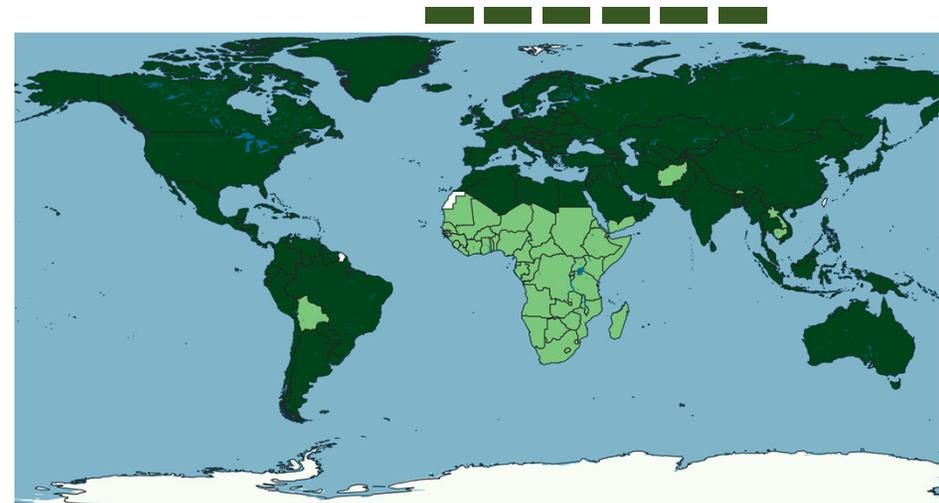
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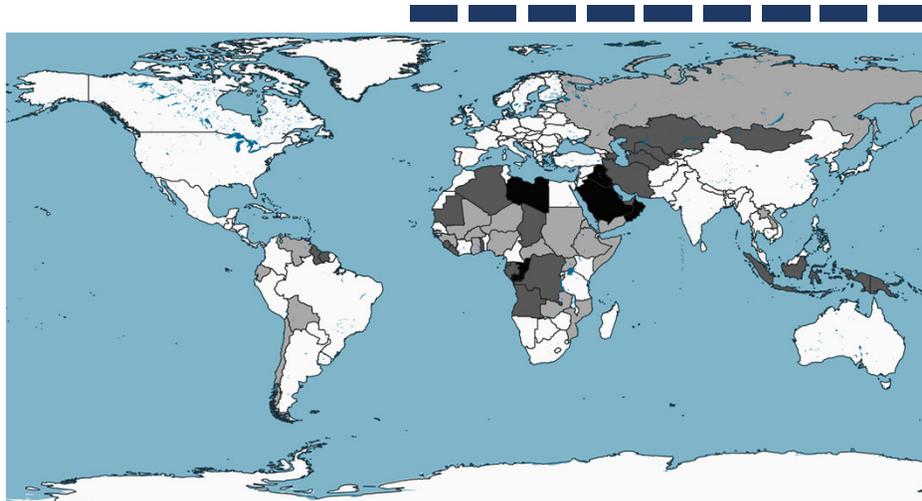
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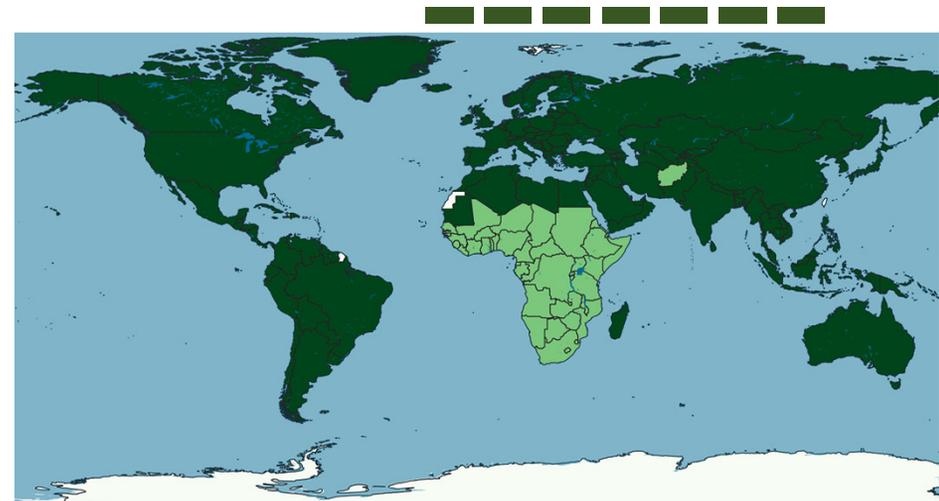
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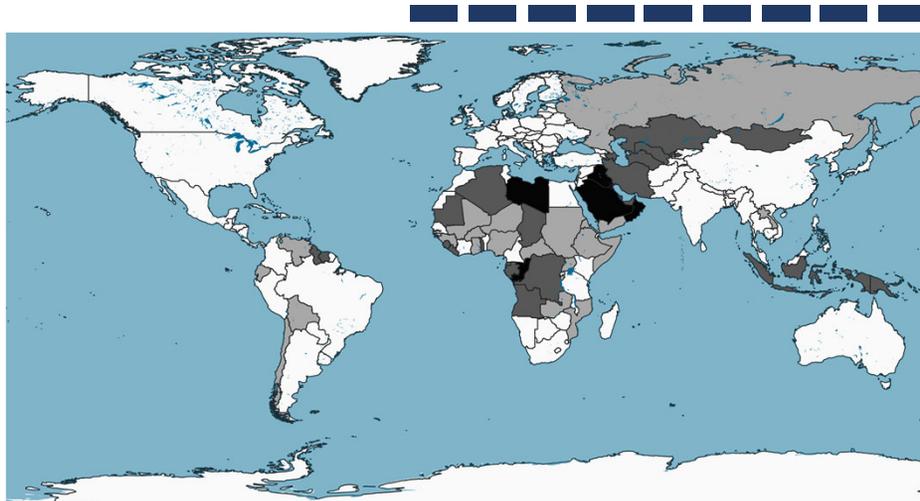
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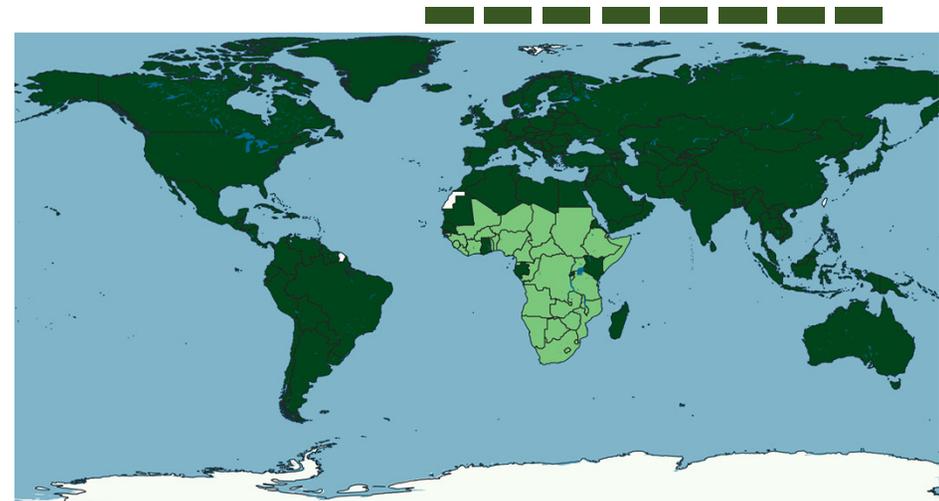
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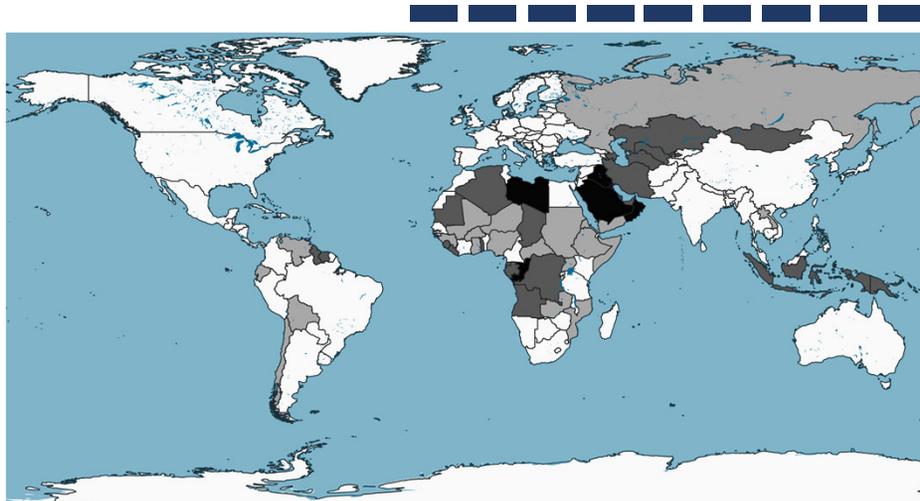
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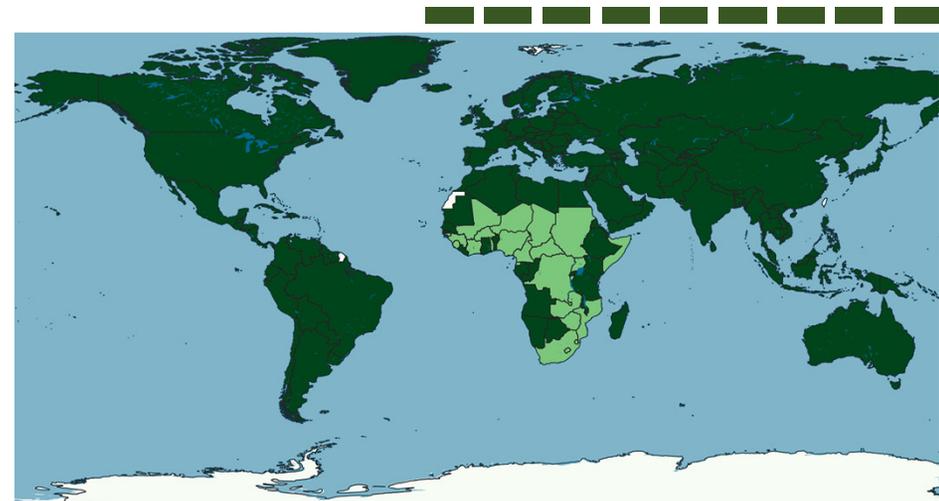
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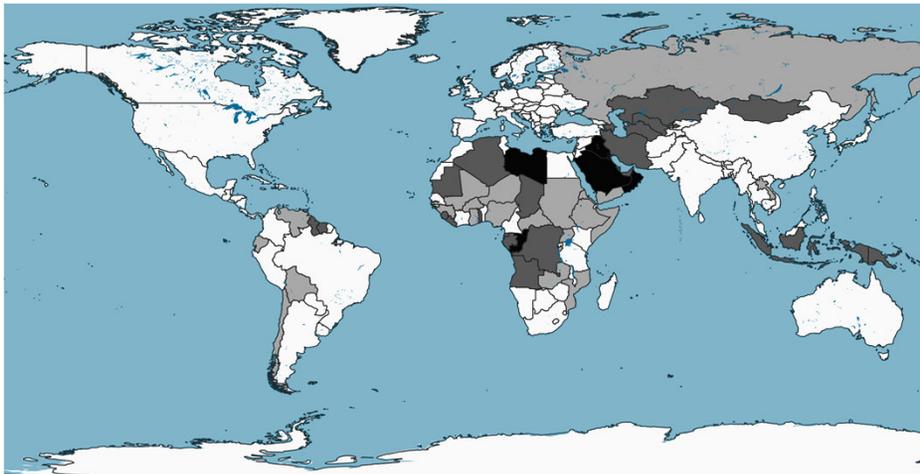


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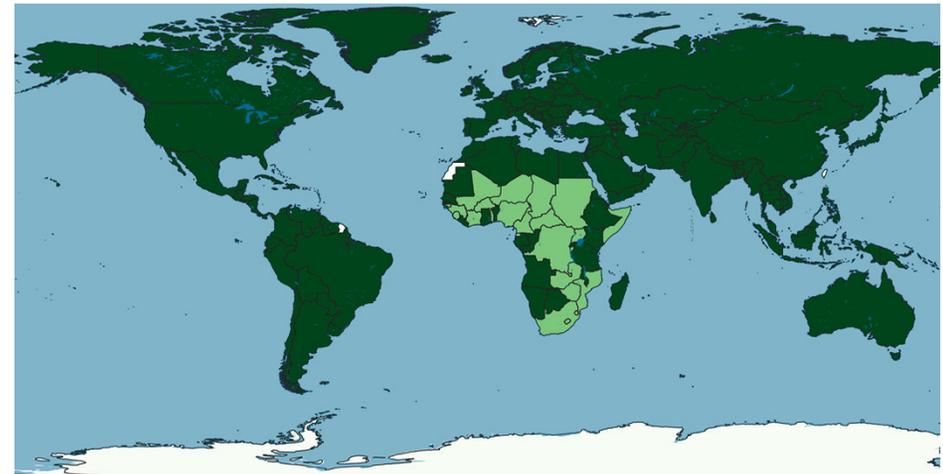
1. What do they see (discrete, 5 years interval)

What can we reflect from this?

Resource Curse?



- Exploitation of the Africa's natural resources
- Presence of natural resources dependency



- Slow gains in LE
- Less improvements in the overall population wellbeing

1. What do they see (systematic assessment model)

A mathematical model: Conditional convergence framework with Instrumental Variable approach

$$\Delta LE_{it,it-5} = \beta_1 LE_{it-5} + \beta_2 (GDP/cap)_{it-5} + \beta_3 Rents_{it-5} + \beta_4 X_{it} + \mu_i + \gamma_i + \varepsilon_{it}$$

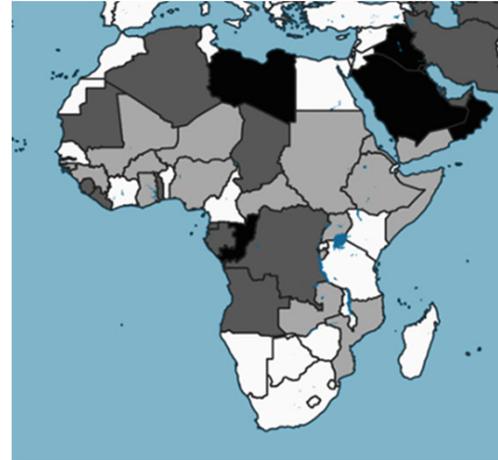
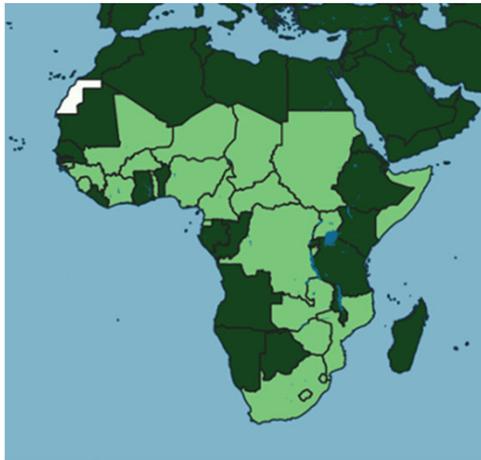
Rents \equiv *Resource Commodities*

| Variables | Coefficients | |
|--|-------------------|-------------------|
| [Log (rents)] _{t-5} | 0.027*** (0.009) | 0.028*** (0.010) |
| Log (life expectancy) _{t-5} | -0.240*** (0.040) | -0.255*** (0.049) |
| Log (GDP/Cap) _{t-5} | -0.003 (0.006) | -0.001 (0.007) |
| [FDI, net inflows (% of GDP)] _t | | 0.000 (0.000) |
| [Urban Pop (% of total population)] _t | | 0.000 (0.000) |
| [Prev. of HIV (% of population ages 15-49)] _t | | -0.003* (0.002) |
| [School Enroll, sec. female (% Gross)] _t | | -0.000 (0.000) |
| [School Enroll, tertiary (% Gross)] _t | | -0.000 (0.000) |



1. What do they see (systematic assessment using mathematical models)

Increase in natural resources rents is associated with increase in LE.





1. What do they see (What does this mean?)

- This suggests that changes in government revenue increase government ability to invest on public health services, which all together contribute to improving the overall well-being.
- Furthermore, governments in stable settings (i.e., with strong institutions and fiscal management) can be better able smooth income over time either by building up reserves or by hedging and therefore contribute to sustainable development
- Similar results from DHS, shows that communities around major resource extraction projects have benefited from improved housing infrastructure, access to safe and clean water, access to financial services, improved sanitation as well as availability of better cooking fuels. Also construction of roads, schools and health care points

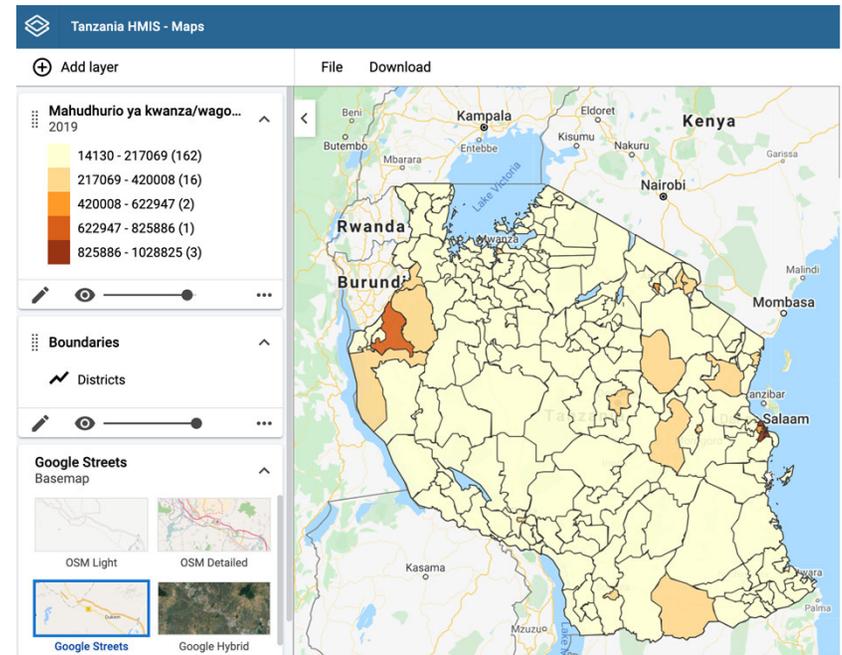


2. What can we see (A case of Tanzania)

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<https://portal.madini.go.tz/map/>



<https://dhis.moh.go.tz/>



2. What can we see (A case of Tanzania)

| No | Region | District | Name of Mine | Opened |
|----|-----------|------------|-------------------------|--------|
| 1 | Shinyanga | Kishapu | Williamson Diamond Mine | 1940 |
| 2 | Mwanza | Geita | Geita Gold Mine | 2000 |
| 3 | Shinyanga | Kahama | Bulyanhulu Gold Mine | 2001 |
| 4 | Manyara | Simanjiro | Merelani | 2001 |
| 5 | Mara | Tarime | North Mara Gold Mine | 2002 |
| 6 | Kagera | Biharamulo | Tulawaka Gold Mine | 2005 |
| 7 | Kagera | Biharamulo | Biharamulo | 2005 |
| 8 | Shinyanga | Kahama | Buzwagi Gold Mine | 2009 |
| 9 | Songea | Ruvuma | Ngaka Coal Project | 2011 |
| 10 | Mbeya | Chunya | New Luika Mine | 2012 |
| 11 | Manyara | Simanjiro | Merelani Block C | 2013 |
| 12 | Manyara | Simanjiro | Merelani Block A | |
| 13 | Manyara | Simanjiro | Merelani Block D1 | |

Taarifa ya Mwezi kutoka OPD

Jina la Kituo Wilaya

| Na. | Malezo | Umri chini ya mwezi 1 | | | Umri mwezi 1 hadi umri chini ya mwaka 1 | | | Umri mwaka 1 hadi umri chini ya miaka 5 | | | Umri miaka 5 hadi umri chini ya miaka 60 | | | Umri miaka 60 na kuendelea | | | Jumla Kuu | | | |
|-------------------------|---|-----------------------|----|-------|---|----|-------|---|----|-------|--|----|-------|----------------------------|----|-------|-----------|----|-------|--|
| | | ME | KE | Jumla | ME | KE | Jumla | ME | KE | Jumla | ME | KE | Jumla | ME | KE | Jumla | ME | KE | Jumla | |
| 1 | Wagonjwa waliohudhuria kwa mara ya kwanza mwaka huo (*) kituo chochote nchini | | | | | | | | | | | | | | | | | | | |
| 2 | Mahudhurio ya kwanza/wagonjwa wapya (kwenye kituo husika kwa tatizo fulani la kiafya) | | | | | | | | | | | | | | | | | | | |
| 3 | Mahudhurio ya marudio Mahudhurio ya OPD (2+3) | | | | | | | | | | | | | | | | | | | |
| Diagnoses za OPD | | | | | | | | | | | | | | | | | | | | |
| 4 | Acute Flacid Paralysis | | | | | | | | | | | | | | | | | | | |
| 5 | Cholera | | | | | | | | | | | | | | | | | | | |
| 6 | Dysentery | | | | | | | | | | | | | | | | | | | |
| 7 | Measles | | | | | | | | | | | | | | | | | | | |
| 8 | Meningitis | | | | | | | | | | | | | | | | | | | |
| 9 | Neonatal Tetanus | | | | | | | | | | | | | | | | | | | |
| 10 | Plague | | | | | | | | | | | | | | | | | | | |
| 11 | Relapsing Fever (Louse borne typhus) | | | | | | | | | | | | | | | | | | | |
| 12 | Yellow Fever | | | | | | | | | | | | | | | | | | | |
| 13 | Influenza | | | | | | | | | | | | | | | | | | | |
| 14 | Typhoid | | | | | | | | | | | | | | | | | | | |
| 15 | Rabies | | | | | | | | | | | | | | | | | | | |
| 16 | Onchocerciasis | | | | | | | | | | | | | | | | | | | |
| 17 | Trypanosomiasis | | | | | | | | | | | | | | | | | | | |
| 18 | Viral haemorrhagic fevers | | | | | | | | | | | | | | | | | | | |
| 19 | Diarrhea with no dehydration | | | | | | | | | | | | | | | | | | | |
| 20 | Diarrhea with some dehydration | | | | | | | | | | | | | | | | | | | |



2. What can we see (A case of Tanzania)



2. What can we see (A case of Tanzania)

+/-

on/off

on/off

OPD Disease Indicator = Extraction of Metals , Construction Materilas , ...

2. What can we see (A case of Tanzania)

+/-

on/off

on/off

OPD Disease Indicator = Extraction of Metals , Construction Materilas , ...

| Disease Group | Construction materials | | Metals | |
|--------------------------------------|------------------------|-----------|---------|-----------|
| | IRR | CI | IRR | CI |
| Chronic diseases | 1.47*** | 1.15–1.87 | 0.61*** | 0.47–0.80 |
| Diarrhea | 0.97 | 0.84–1.12 | 0.88** | 0.77–0.99 |
| Undernutrition | 0.90 | 0.67–1.20 | 0.69*** | 0.55–0.88 |
| Parasitic diseases | 1.08 | 0.93–1.26 | 0.84** | 0.72–0.98 |
| Sexually transmitted diseases | 1.13 | 0.94–1.37 | 0.85** | 0.74–0.97 |
| Road traffic accidents | 1.13 | 0.90–1.43 | 0.90 | 0.72–1.11 |
| Mental health | 1.08 | 0.79–1.49 | 0.66** | 0.47–0.92 |



2. What can we see (A case of Tanzania)

1.

Extraction of construction materials is linked with increased reporting of chronic diseases. This includes cancers, CVD, diabetes and bronchitis asthma

2.

Extraction of metal commodities (mostly Gold in Tanzania) is linked with lower reporting of several disease including chronic diseases, diarrhea, under nutrition, STI and mental health.



2. What can we see (A case of Tanzania)

Potential Explanation

Council's exposure to resource extraction can be linked to increase or decrease of disease incidences, and this linkage can be detected in our routine HMIS data

The combination of routine HMIS & DHIS2 provides a powerful resource for research studies including health impact assessment studies

The observed protective association between the presence of metal extraction projects and low reporting of diseases is likely a combination of several factors, i.e., (1) the formal and persistence existence location of the metal industries, (2) their visibility, (3) their economic contribution to surrounding communities and (4) adherence to local and international standards



3. What we often don't see (Voices from the community)

3. What we often don't see (Voices from the community)

KII



FGD



VA





3. What we often don't see (Voices from the community)

KII & FGD

- Loss of land due to mining operations (land conflicts)
- Household cracks due to mining operations
- Health equity issues: Gender imbalances and marginalized communities are less likely to benefit from improved infrastructure
- Despite broad implementation of EIA, some elements of pollution still persist, i.e.,
 - Air : movement of heavy traffic generate dust in communities
 - Water: leakage of hazardous materials into water stream affect the aquatic organism (fish and fish business)
 - Land pollution (crop destruction)



3. What we often don't see (Voices from the community)

VA (Verbal Autopsy study)

Steps

- Set up a surveillance system to report death events in mining communities
- For each reported death event, we followed with a VA interview
- Interviewed both, death occurred at community and health facilities

Results

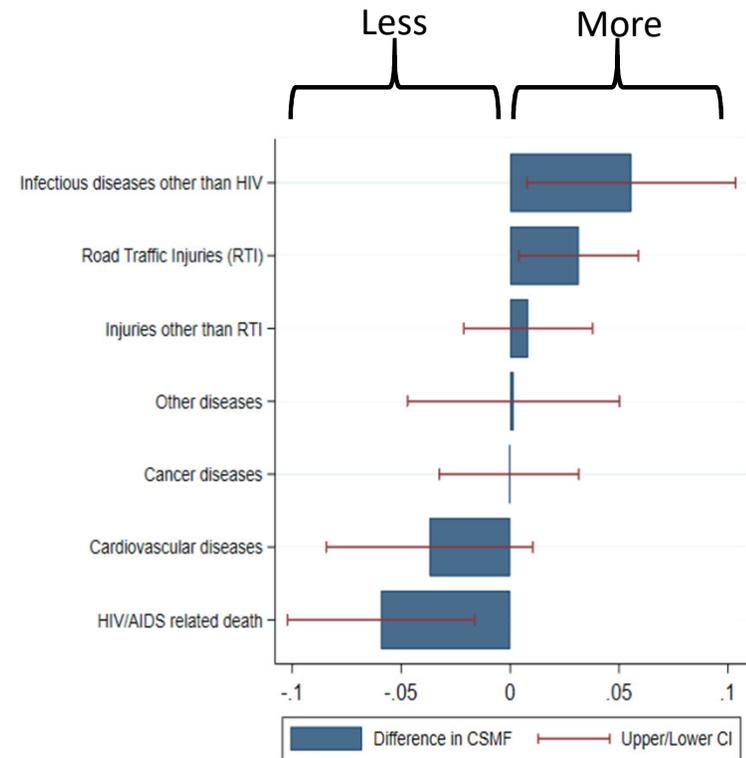
- **All cause mortality:** Miners had twice the risk of dying compared to non-miners
- The Relative Risk of dying from RTA and other non-RTA was 14 and 10 times respectively among miners versus non miners.,
- Overall mortality is significant elevated among miners, particularly male miners

3. What we often don't see (Voices from the community)

VA (Verbal Autopsy study)

Steps

- Set up a surveillance system to capture death events in mining communities
- For each captured death event, we followed with a VA interview
- Interviewed both, death occurred at community and health facilities





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Swiss Tropical and Public Health Institute

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Summary

A consistence message

- Despite negative relationship between resource extraction projects and health, such projects can potentially contribute to positive health outcomes in the population
- Negative effects can be prevented or reduced if proper measurements are put in place
- HIA as a tool can be employed to foresee the negative impacts of resource extraction projects and used to advice on mitigation measures

HIA4SD HEALTH IMPACT ASSESSMENT
FOR SUSTAINABLE DEVELOPMENT



End

Q&A