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# ▷ 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)

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**HIA4SD Project stakeholder meeting**  
Dodoma, Tanzania  
11 August 2021



**HIA4SD**

HEALTH IMPACT ASSESSMENT  
FOR SUSTAINABLE DEVELOPMENT

## 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





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## This presentation

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

**HIA4SD**

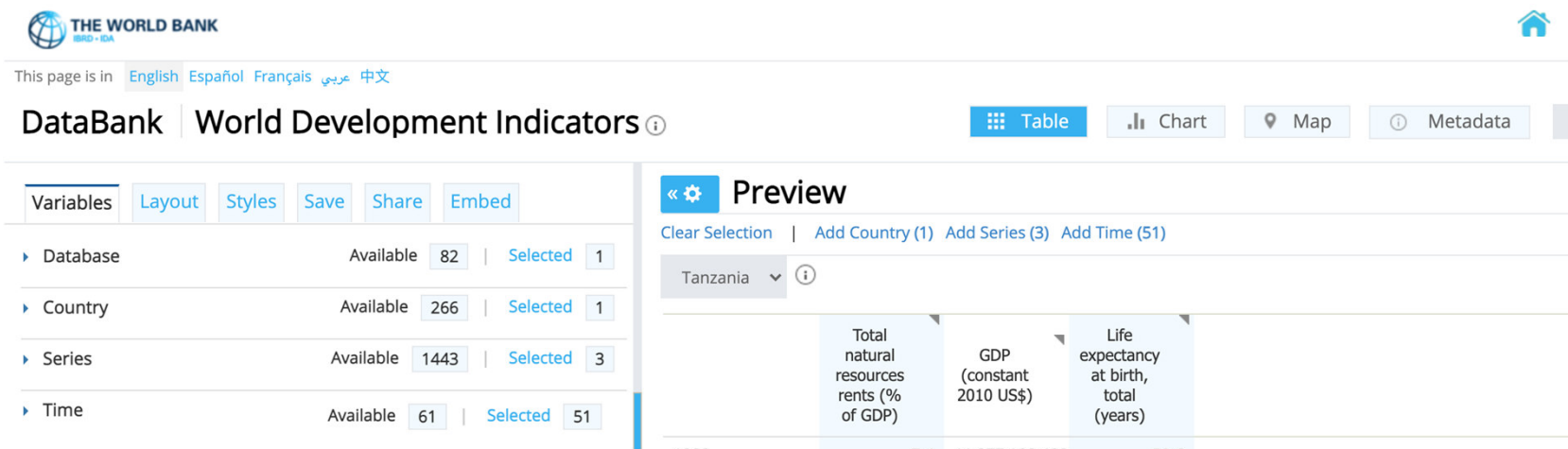
HEALTH IMPACT ASSESSMENT  
FOR SUSTAINABLE DEVELOPMENT

# 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, there's a navigation bar with the World Bank logo and a home icon. Below it, a language selector shows 'English' as the active language. The main heading is 'DataBank | World Development Indicators'. To the right of the heading are buttons for 'Table', 'Chart', 'Map', and 'Metadata'. Below the heading, there's a 'Preview' section. On the left, there's a sidebar with 'Variables' and 'Layout' tabs. Under 'Variables', there are four categories: Database (82 available, 1 selected), Country (266 available, 1 selected), Series (1443 available, 3 selected), and Time (61 available, 51 selected). The 'Preview' section shows a dropdown menu for 'Tanzania' and a table of indicators. The table has three columns: 'Total natural resources rents (% of GDP)', 'GDP (constant 2010 US\$)', and 'Life expectancy at birth, total (years)'. The first row of data shows values for 1998: 7.4, 11,377,108,483, and 50.6.

Indicator	1998
Total natural resources rents (% of GDP)	7.4
GDP (constant 2010 US\$)	11,377,108,483
Life expectancy at birth, total (years)	50.6

# 1. What do they see (continuous scale)

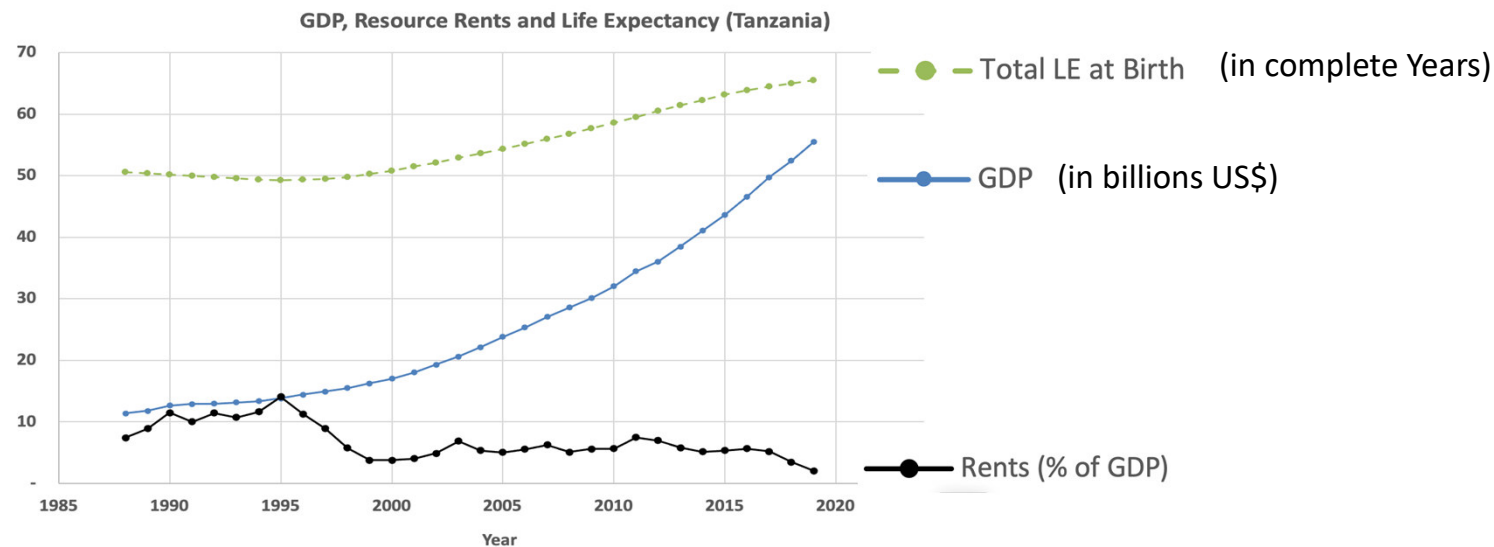
Using global data source (an international perspective)

Data: Bank Development Indicators (WDI)

Picked 3 indicators

1. Total LE
2. GDP
3. Rents

Plot them on  
continuous scale  
over time





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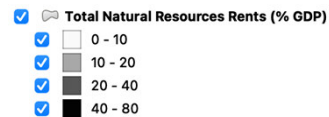
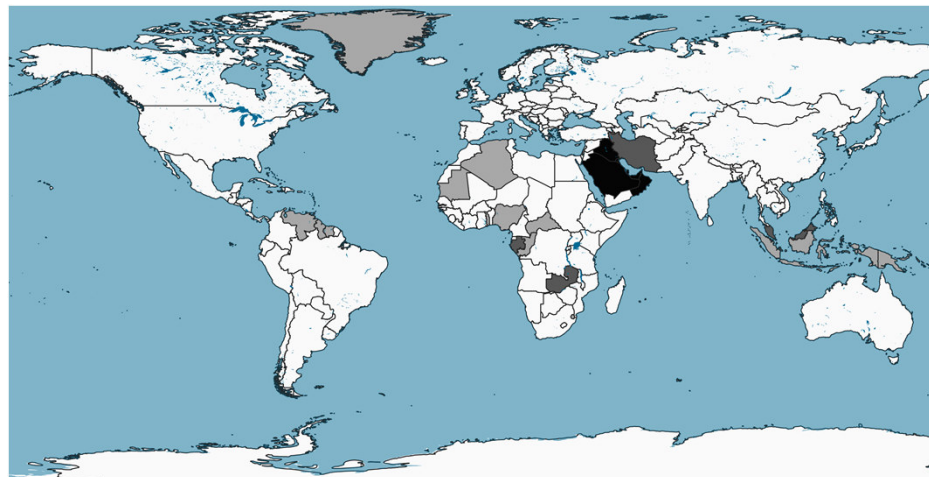


# 1. What do they see (discrete, 5 years interval)



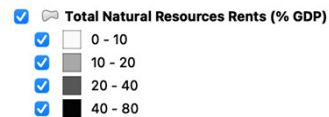
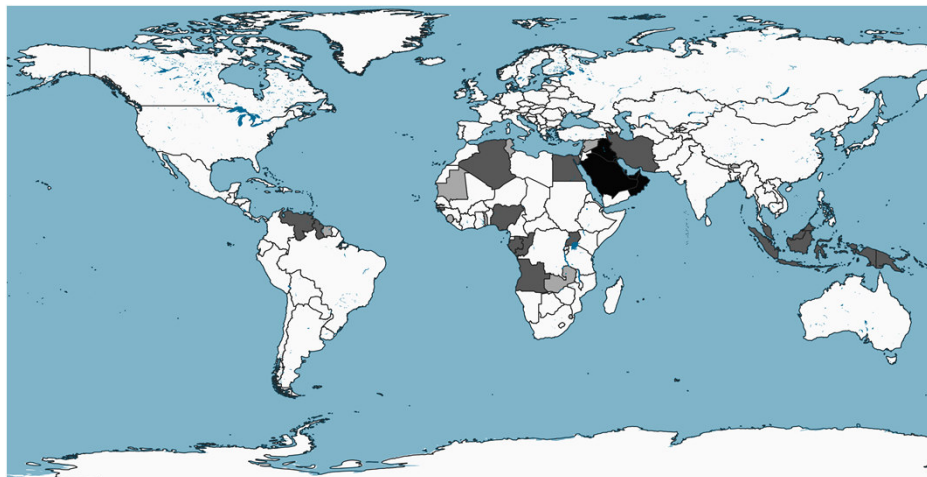
# 1. What do they see (discrete, 5 years interval)

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



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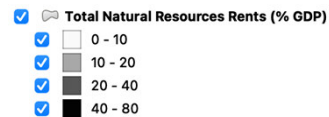
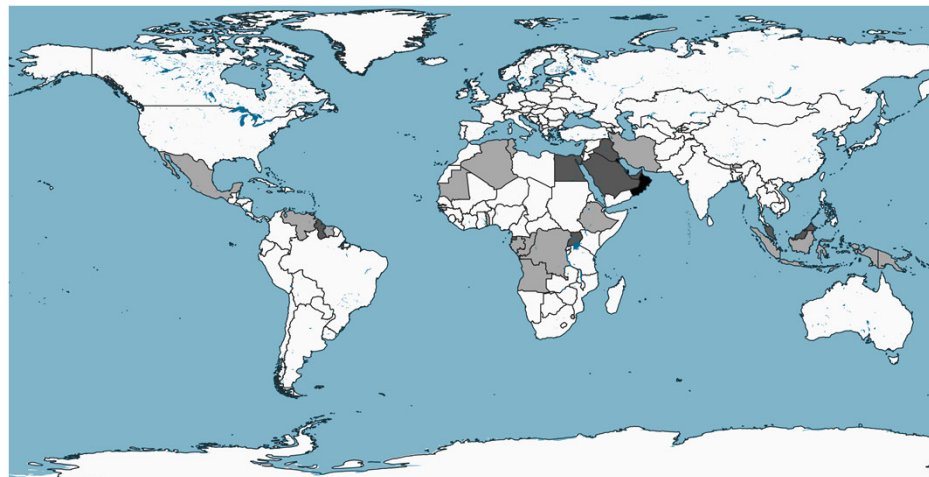
Total Natural resources rents (% GDP) in 1976-80





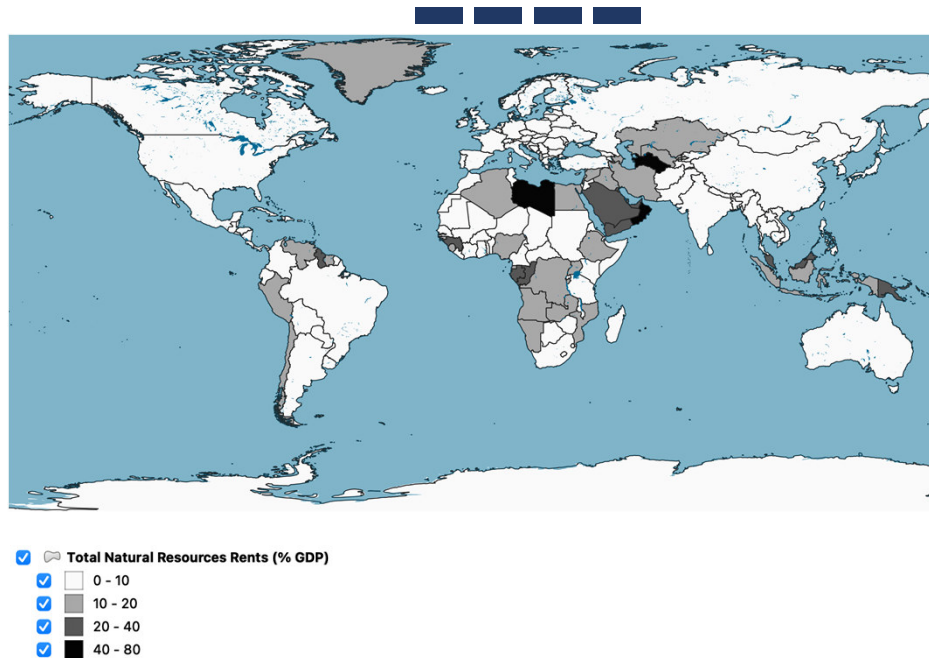
# 1. What do they see (discrete, 5 years interval)

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



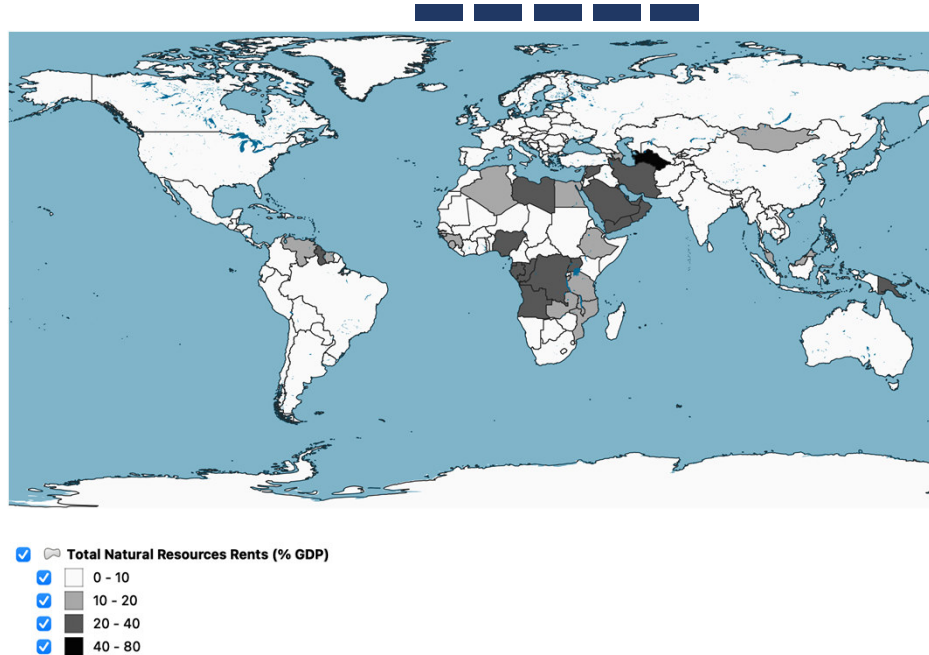
# 1. What do they see (discrete, 5 years interval)

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



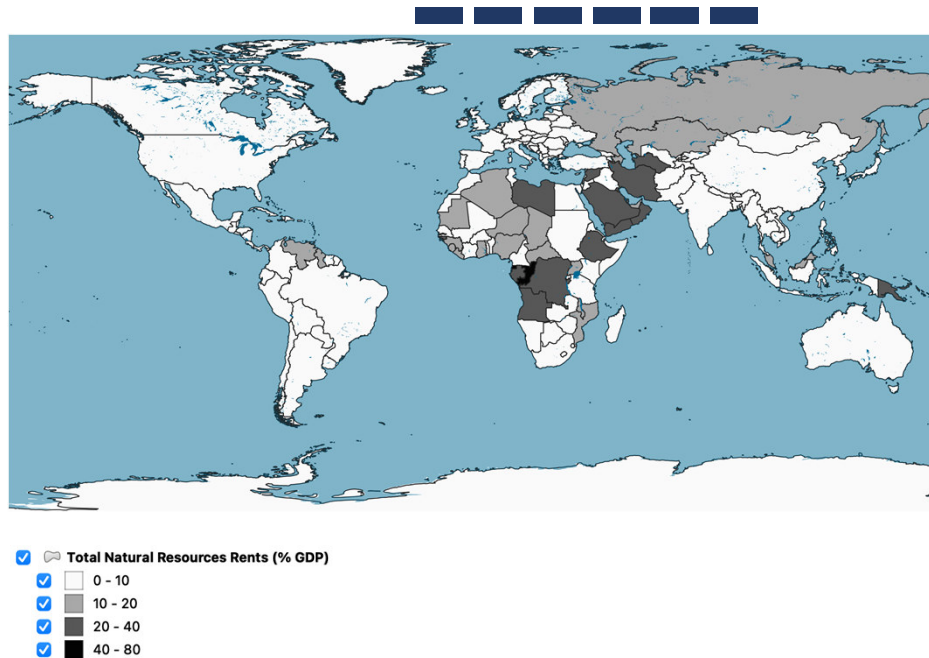
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Total Natural resources rents (% GDP) in 1991-95



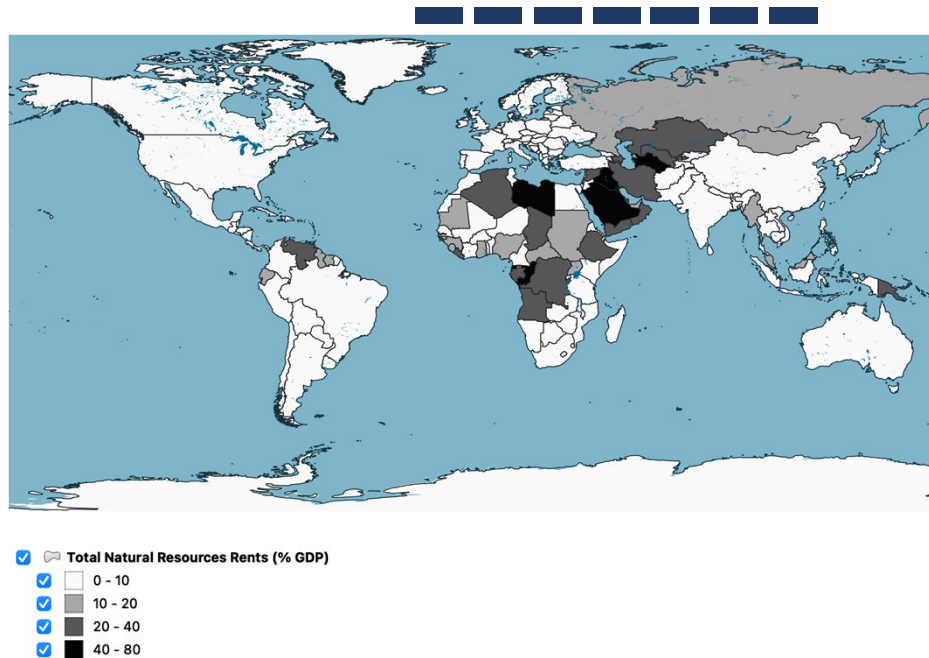
# 1. What do they see (discrete, 5 years interval)

Total Natural resources rents (% GDP) in 1996-00



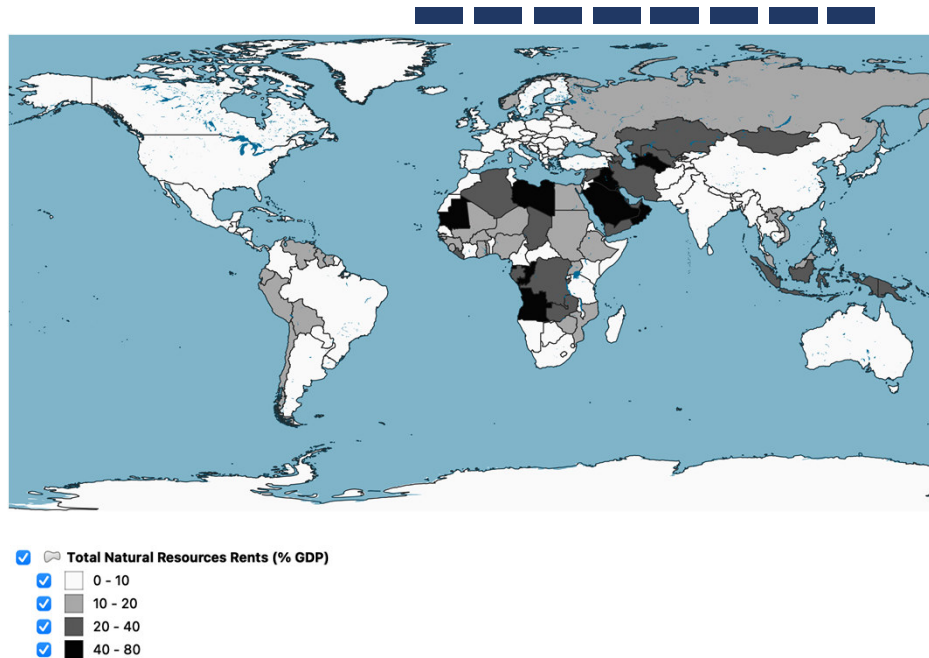
# 1. What do they see (discrete, 5 years interval)

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



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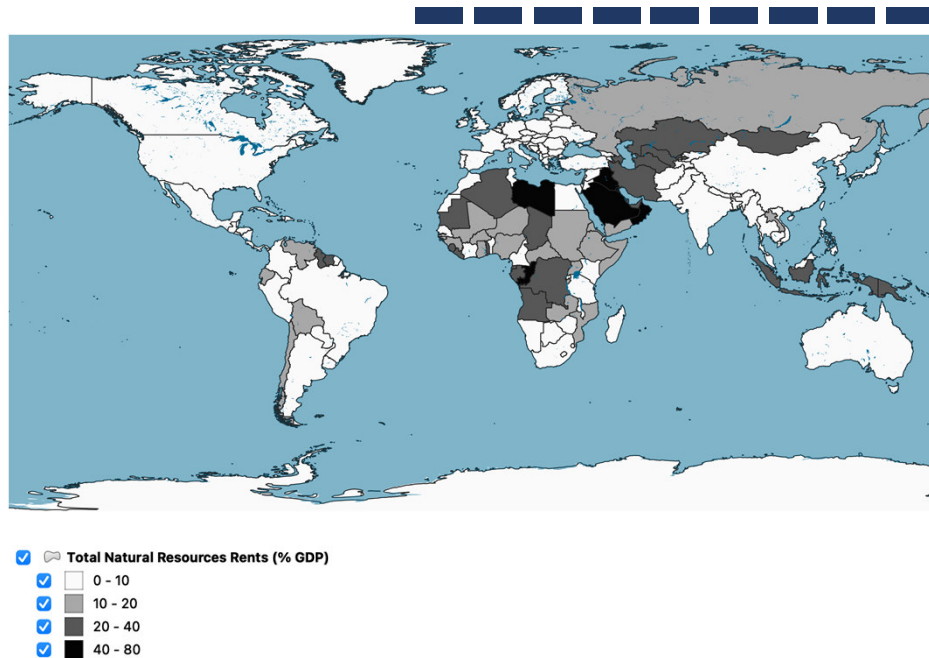
Total Natural resources rents (% GDP) in 2006-10





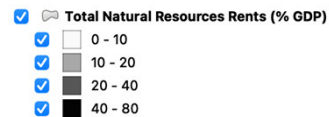
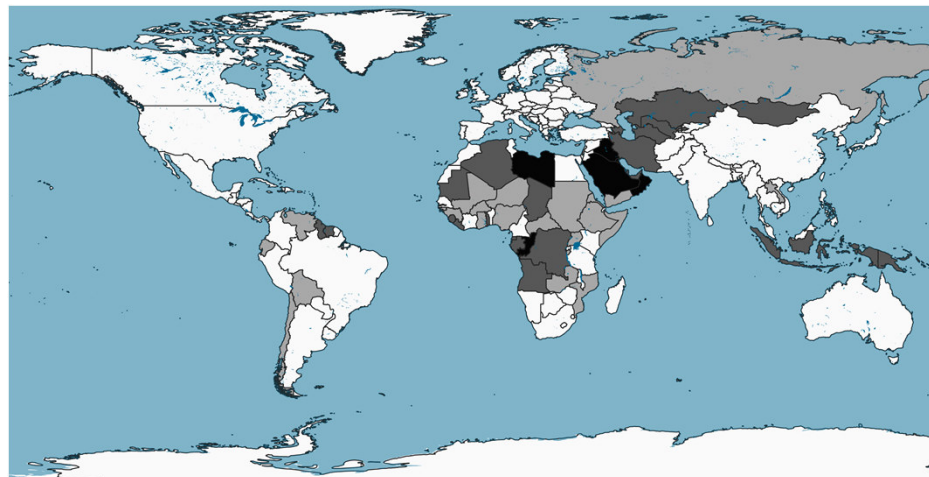
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Total Natural resources rents (% GDP) in 2011-15



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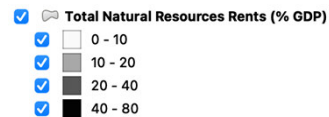
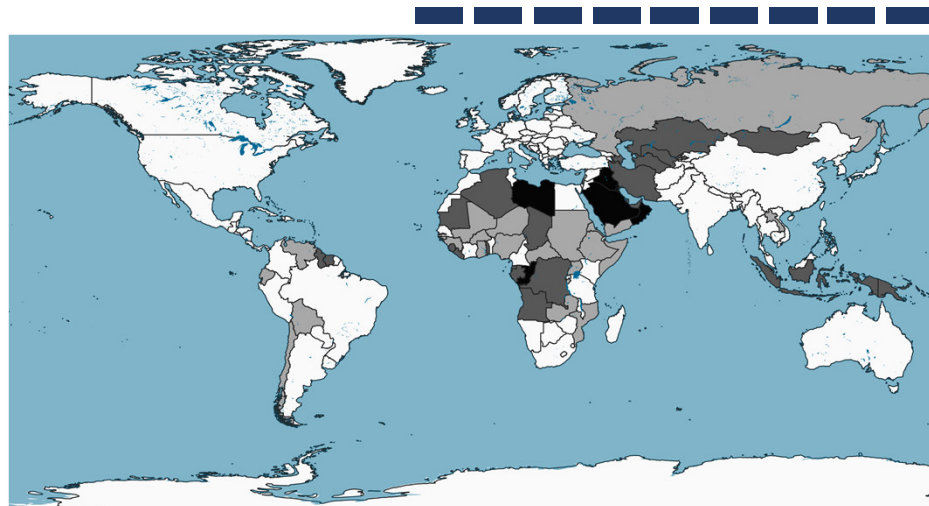
Total Natural resources rents (% GDP) in 2011-15



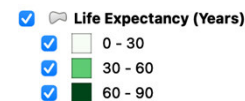
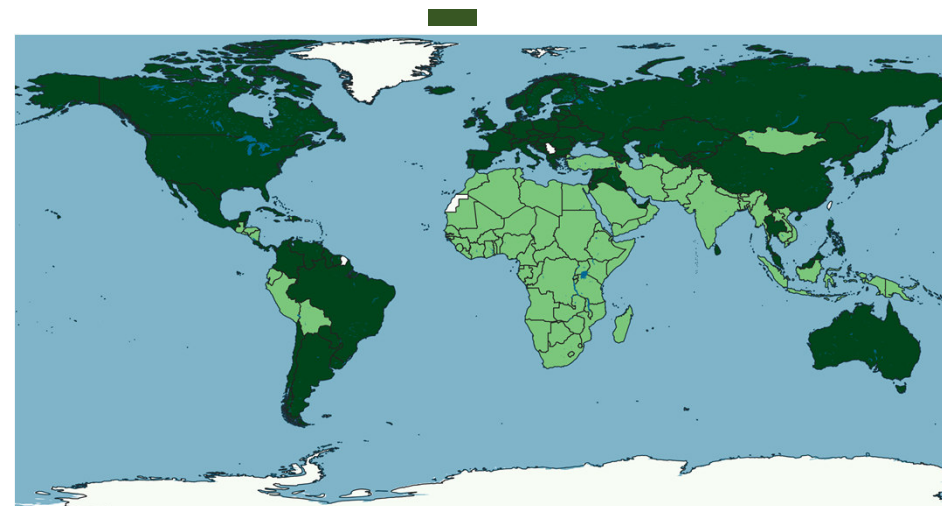
VS Change in LE

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

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

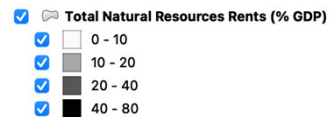
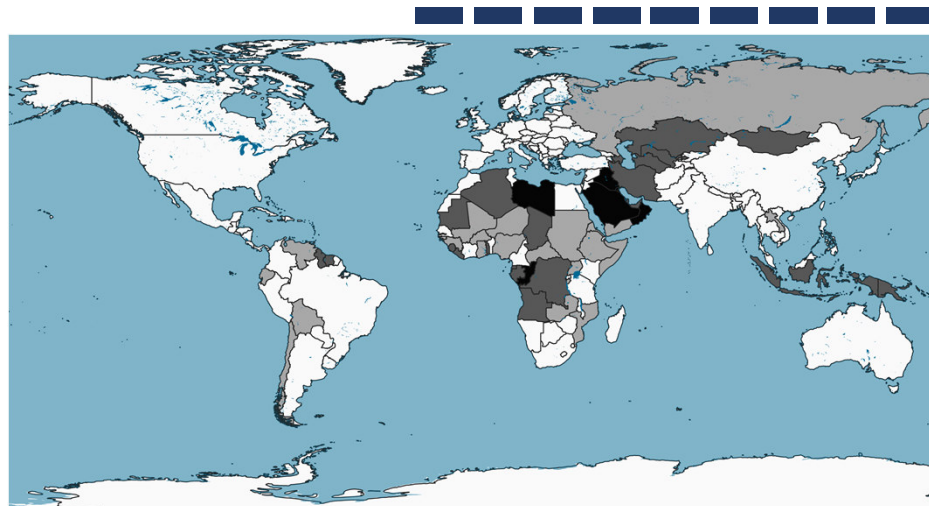


Life Expectancy (Years) 1971-75

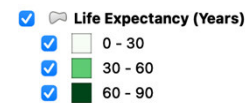
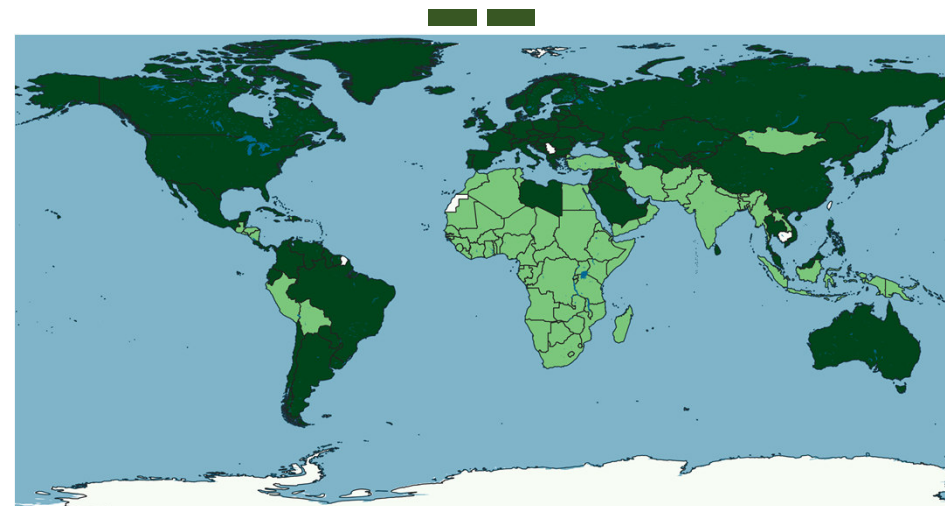


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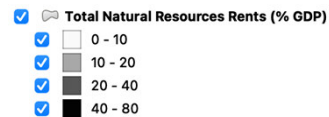
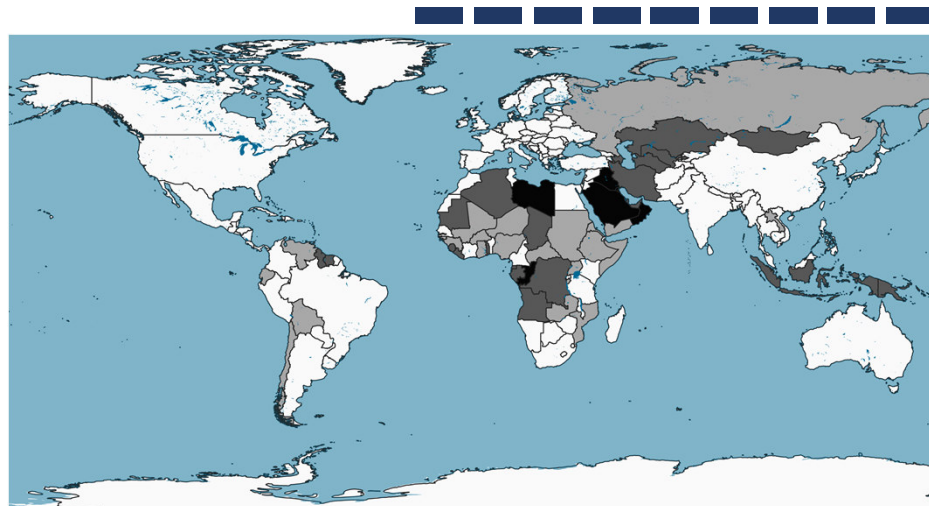
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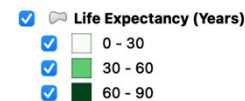
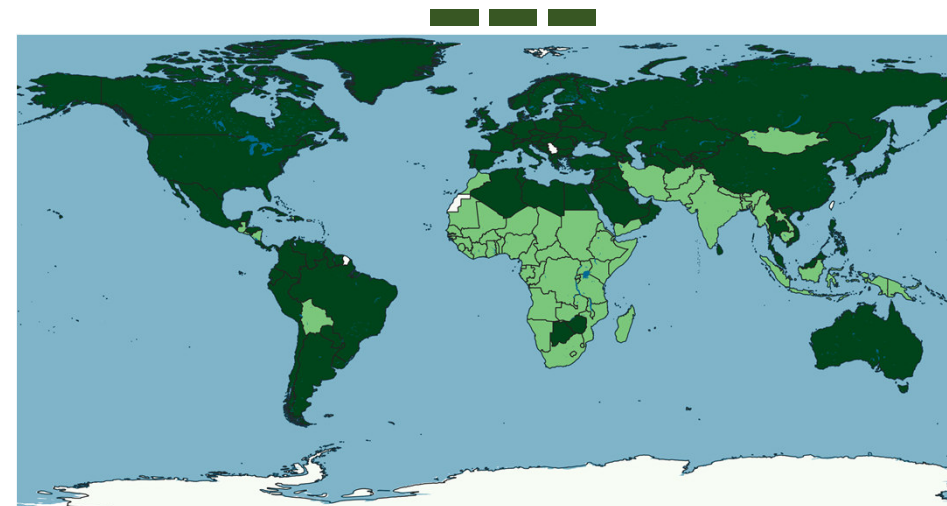


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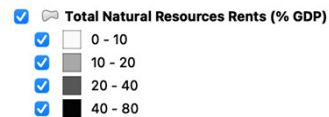
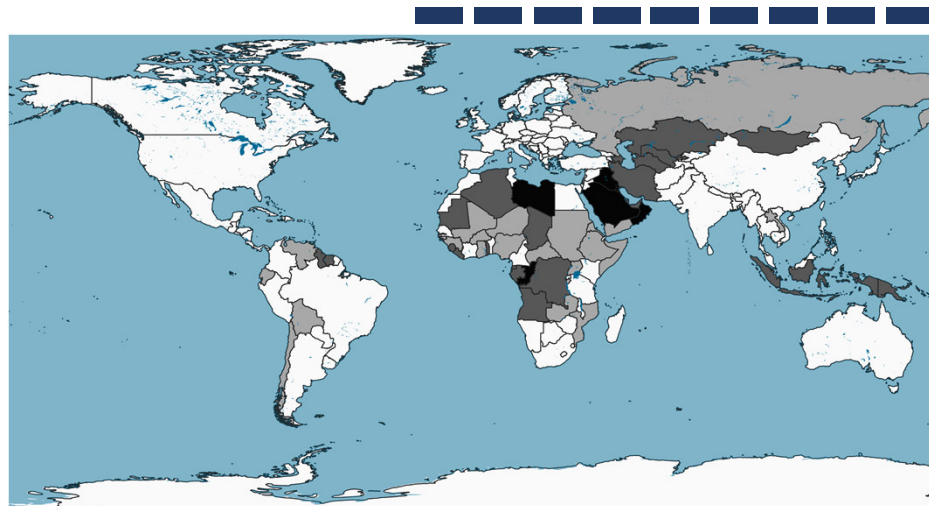


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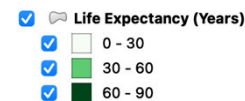
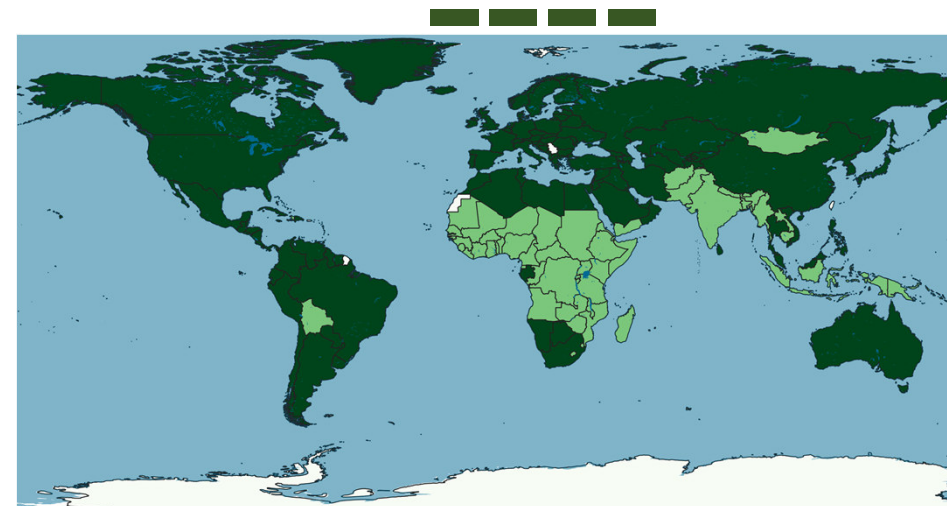


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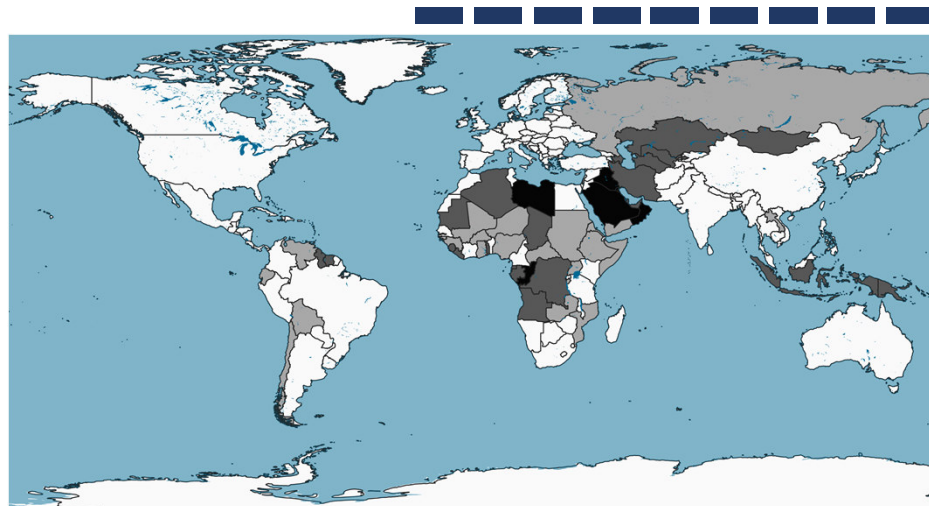
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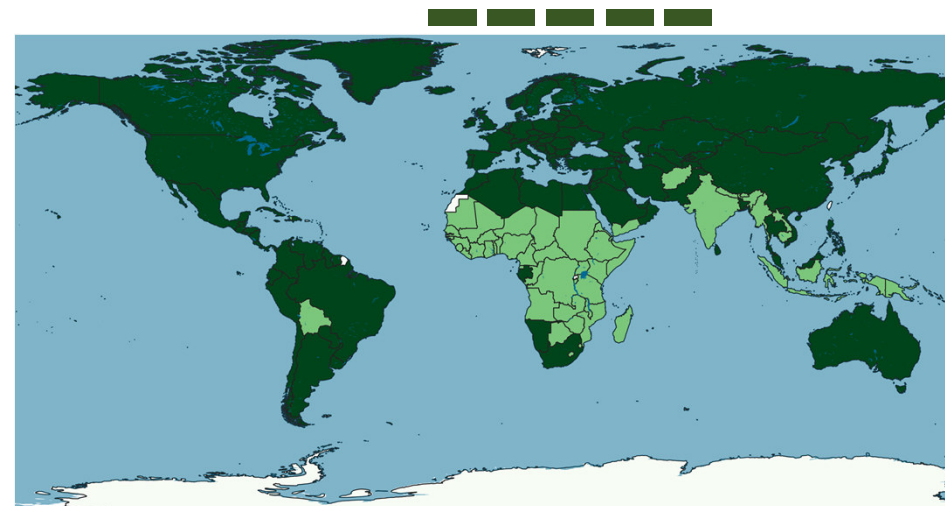
# 1. What do they see (discrete, 5 years interval)


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



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

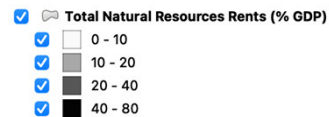
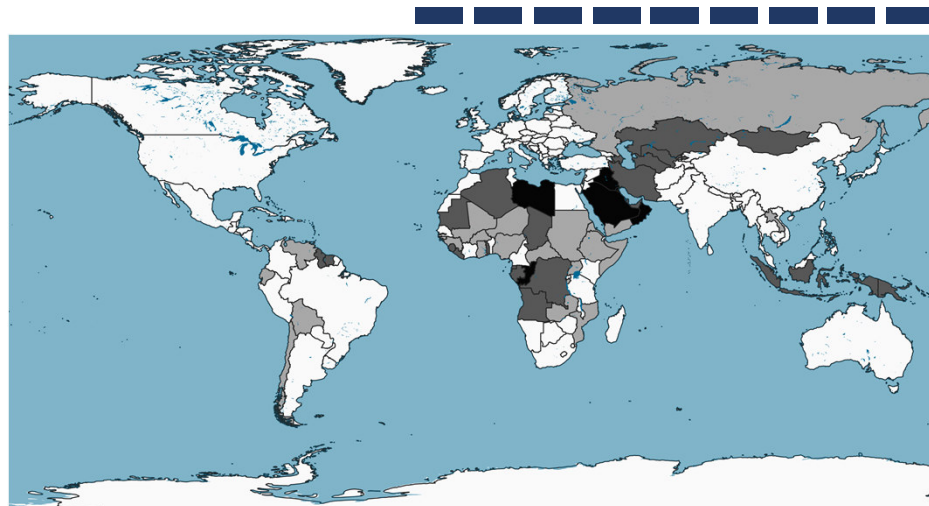
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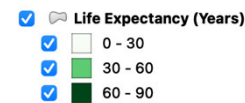
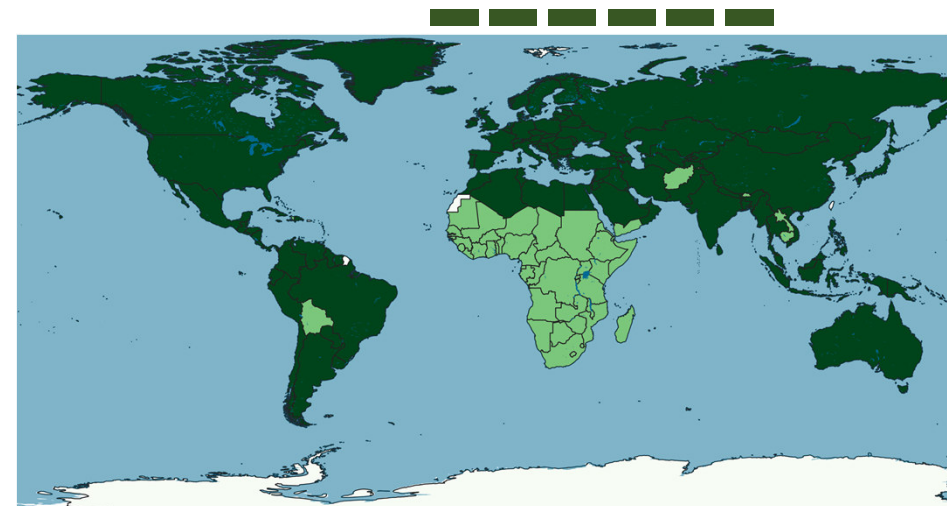
- ☒  Life Expectancy (Years)
- ☒ 0 - 30
- ☒ 30 - 60
- ☒ 60 - 90

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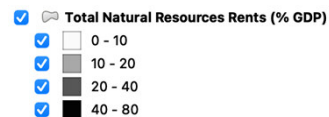
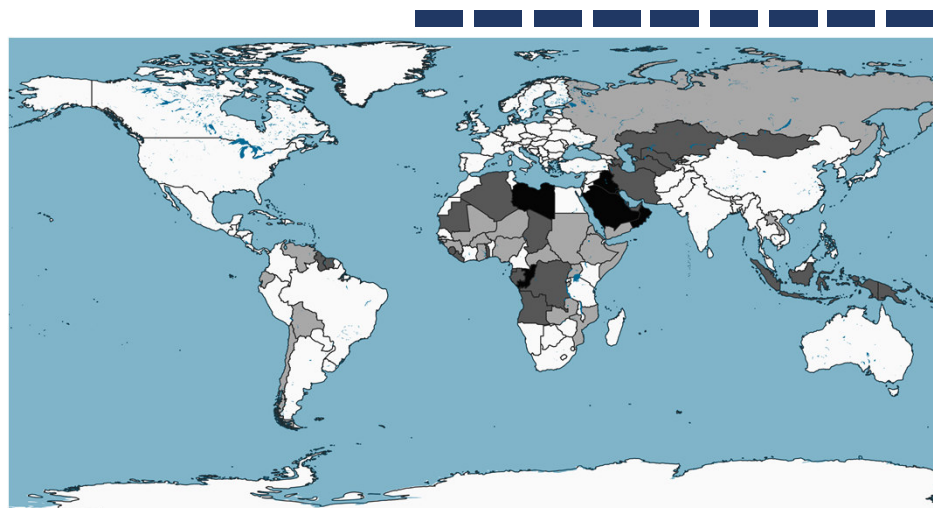


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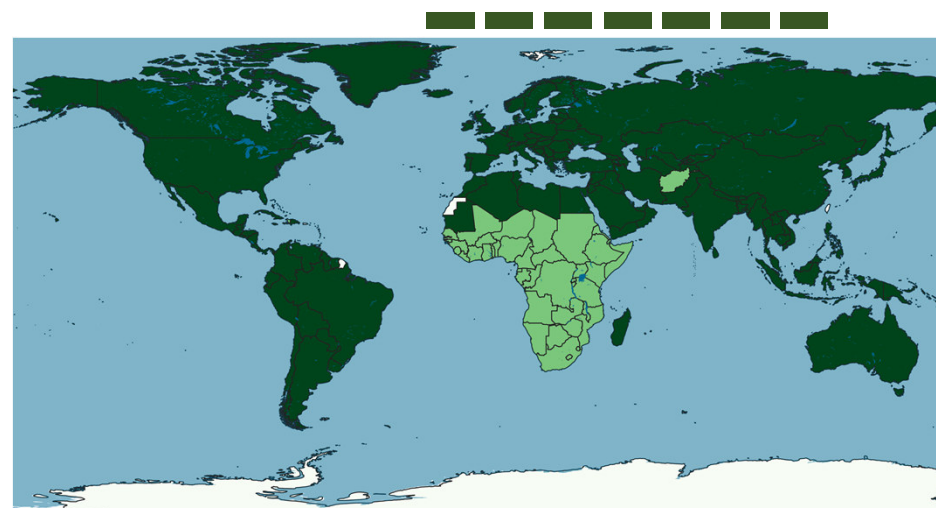


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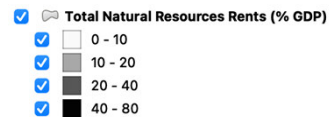
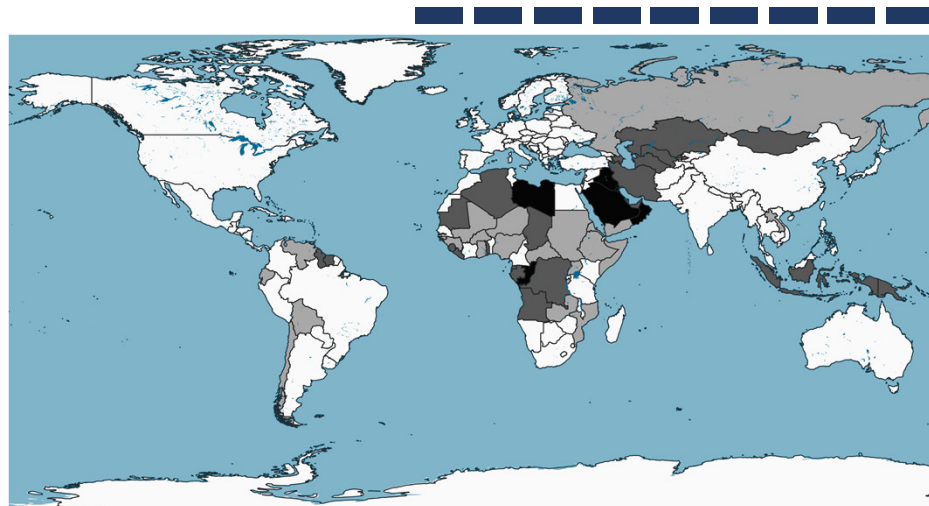


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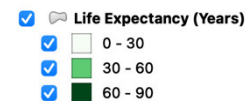
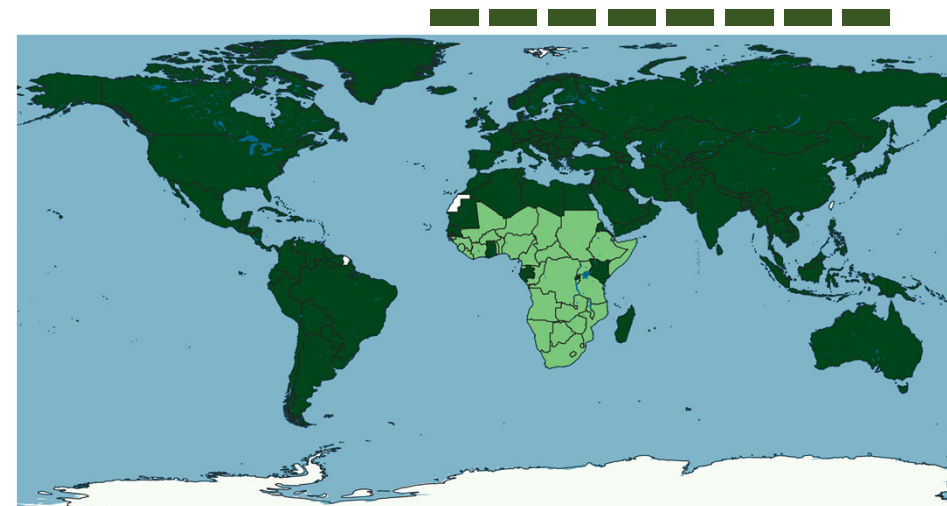


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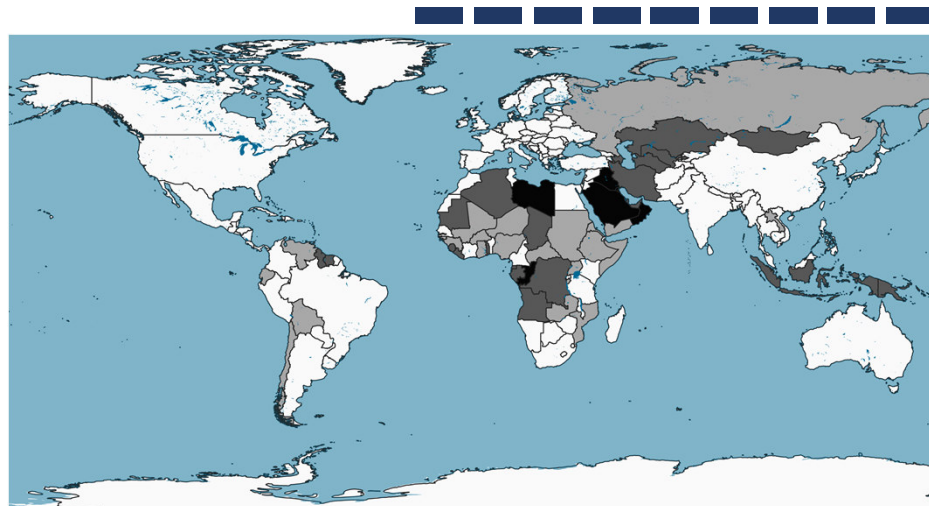
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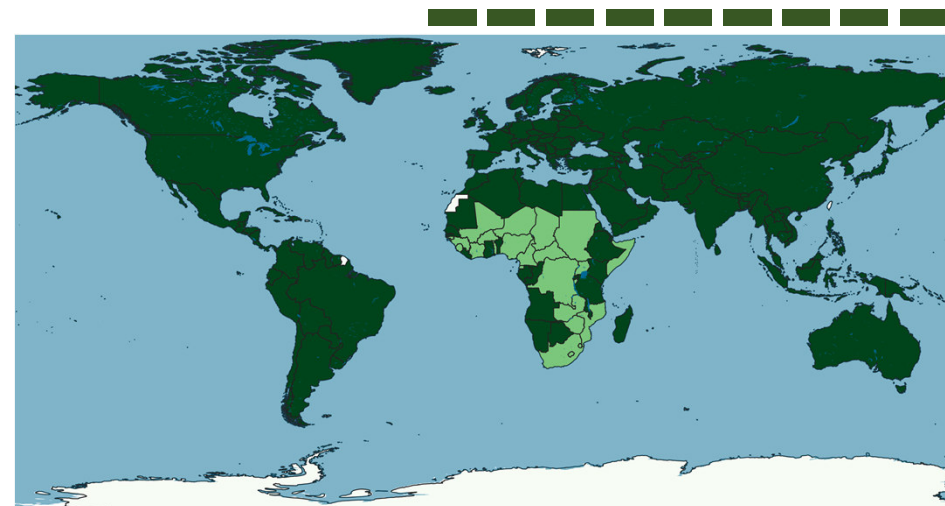
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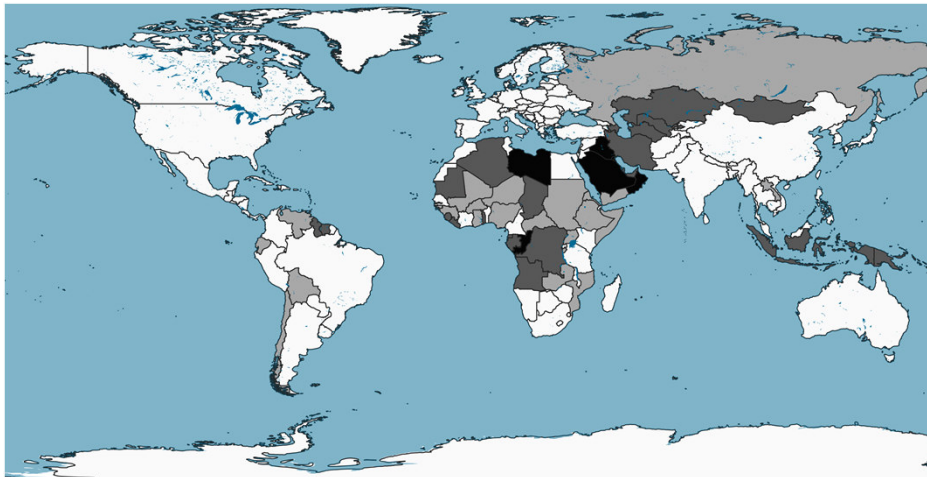


- ☒ ☐ Life Expectancy (Years)
- ☒ 0 - 30
- ☒ 30 - 60
- ☒ 60 - 90

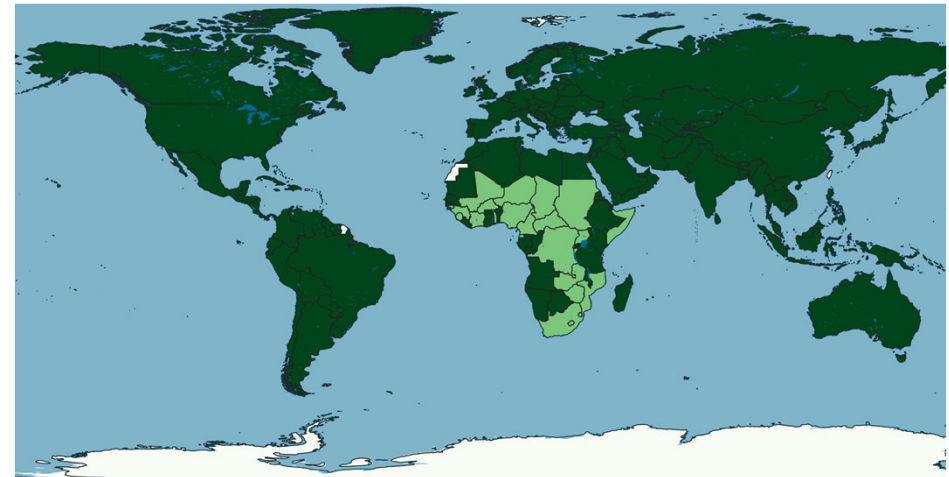
# 1. What do they see (discrete, 5 years interval)

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

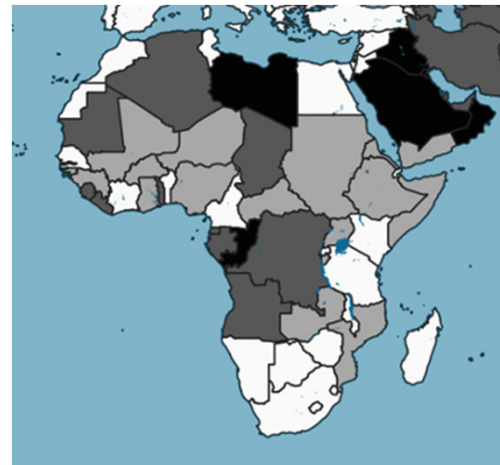
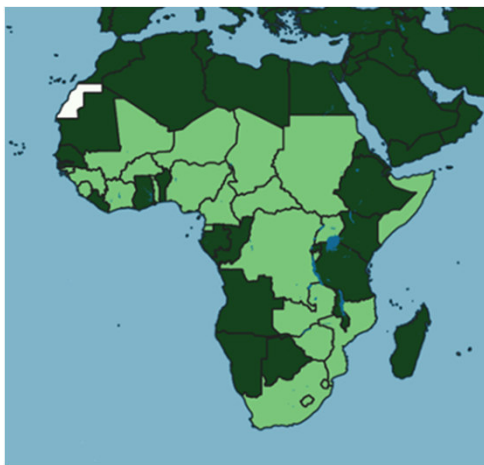
$$\Delta LE_{it,it-5} = \beta_1 LE_{it-5} + \beta_2 (GDP/cap)_{it-5} + \beta_3 Rents_{it-5} + \beta_4 X_{it} + \mu_i + \gamma_i + \varepsilon_{it}$$

*Rents*  $\equiv$  *Resource Commodities*

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

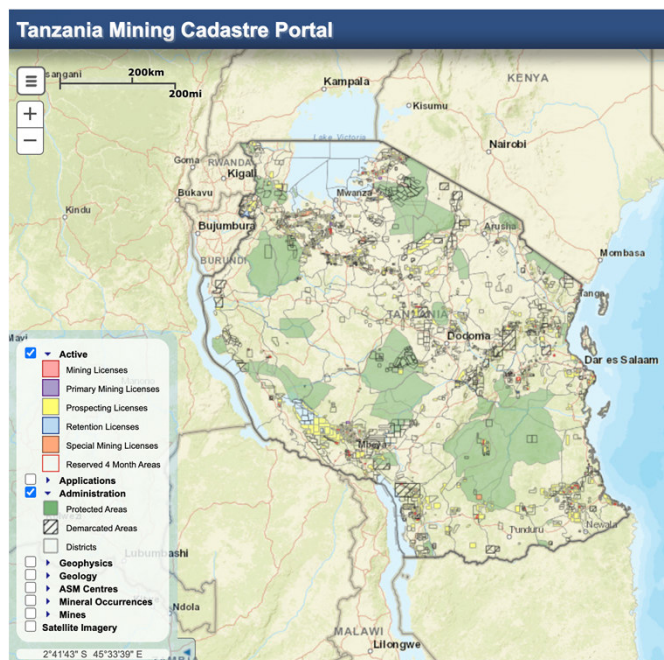


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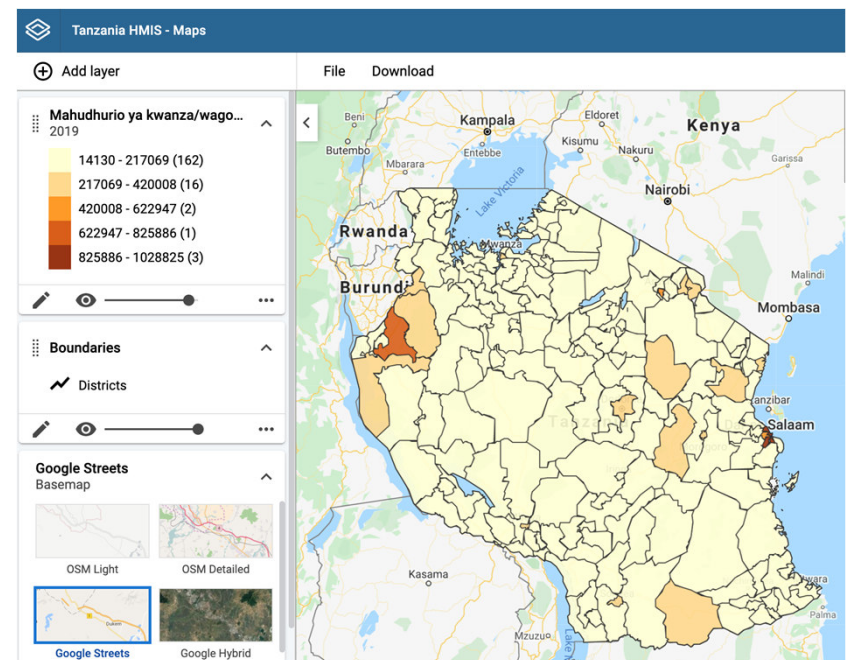


## 2. What can we see (A case of Tanzania)

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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	Mahuduhurio ya kwanza/wagonjwa wapya (kwenye kituo husika kwa tatizo fulani la kiafya)																		
3	Mahuduhurio ya marudio Mahuduhurio 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																		





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



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## 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





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### 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

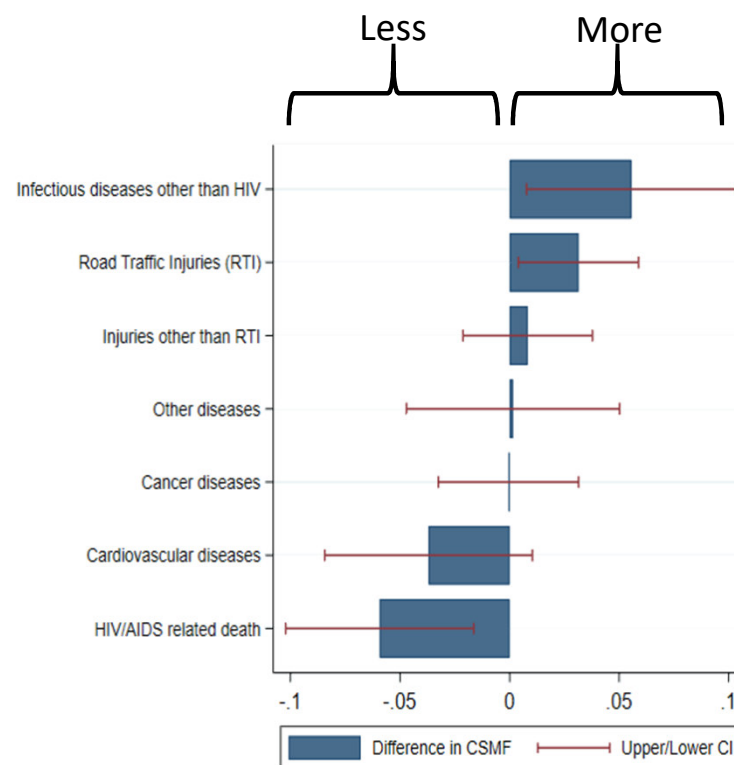
- **All cause mortality:** Miners had twice the risk of dying compared to non-miners
- The Relative Risk of dying from RTA and other non-RTA was 14 and 10 times respectively among miners versus non miners.,
- Overall mortality is significant elevated among miners, particularly male miners

### 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





## 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



End

Q&A