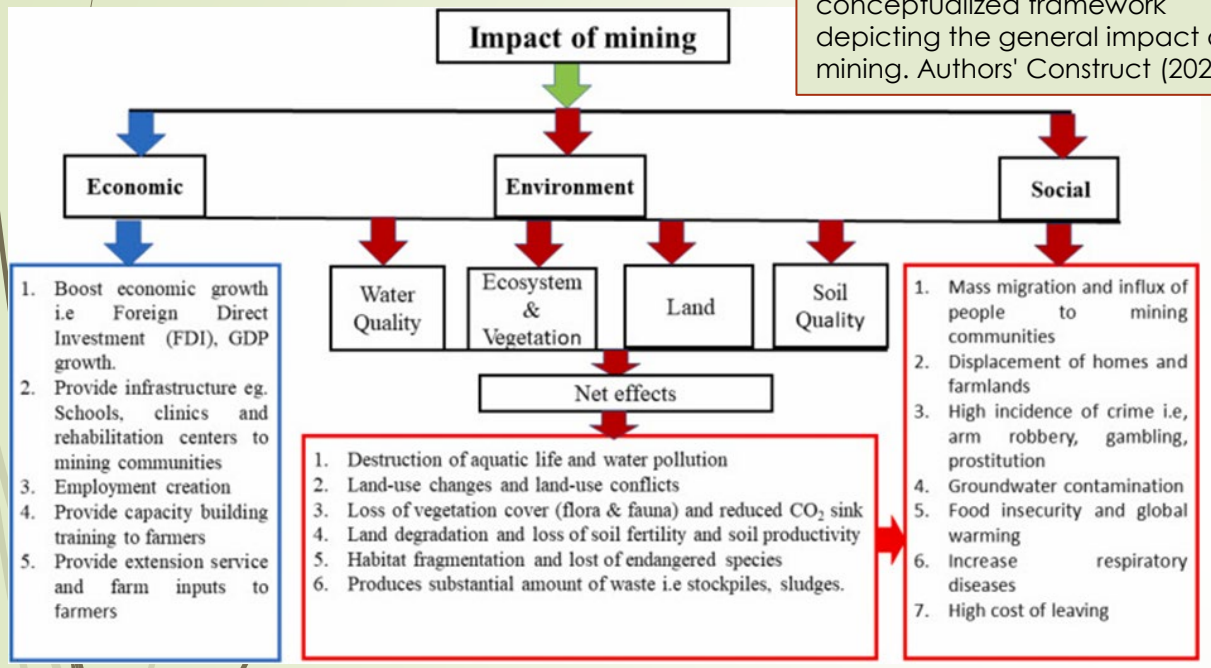
6. Socio-ekonomické aspekty využívání nerostných zdrojů (…a s nimi spojeného průmyslu)

…další významnější rys průmyslu nerostných surovin a s nimi svázaných zdrojů

Socio-economic impact of mining I.



conceptualized framework depicting the general impact of mining. Authors' Construct (2020)

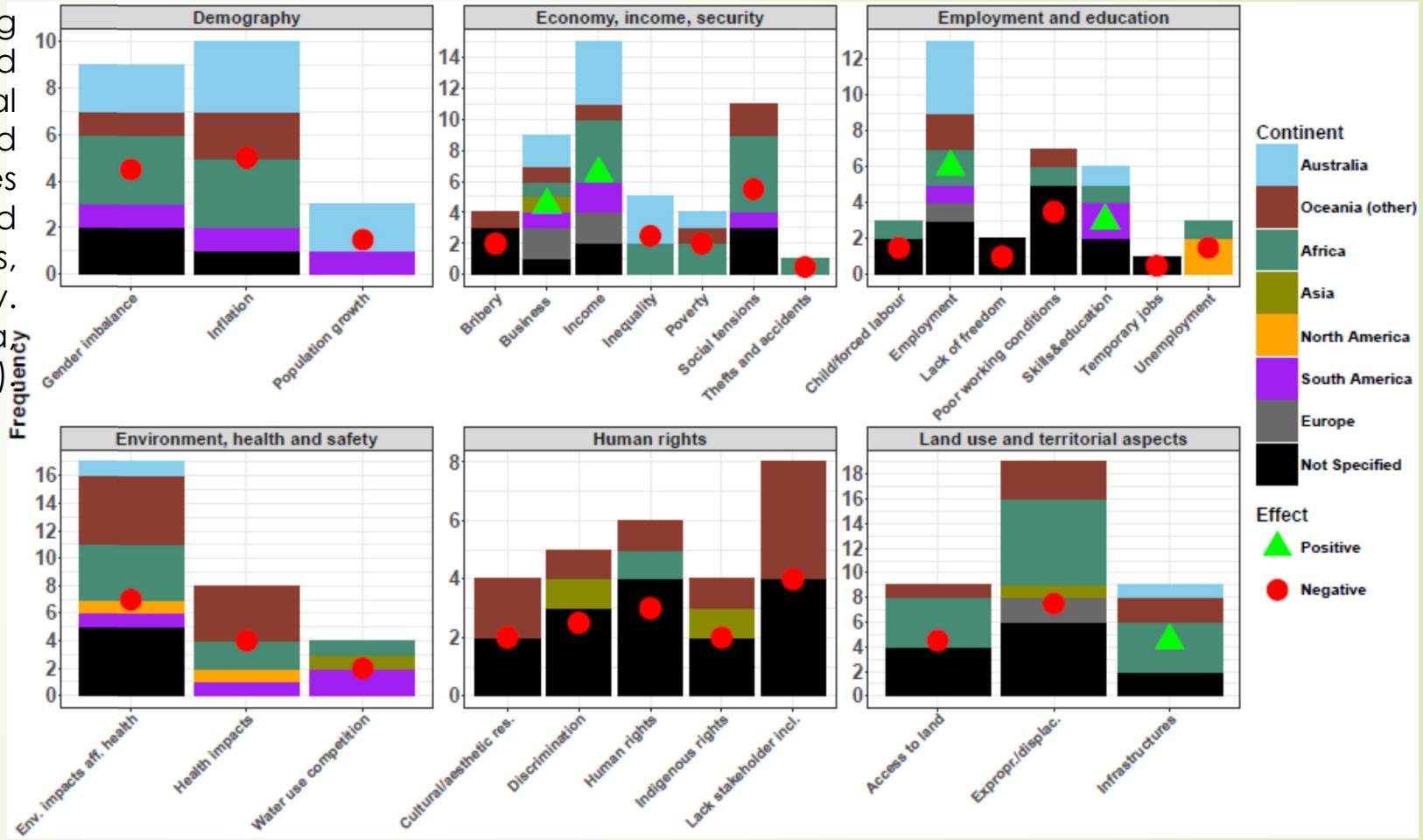
Serial No.	Type of Impacts	Nature of Impact
Socio-economic impacts		
1	Income	(+)
2	Employment	(+)
3	Livelihood	(+) or (-)
4	Poverty	(+) or (-)
5	Exports	(+)
6	Training & skills development	(+)
7	Education & literacy	(+) or (-)
8	Community development	(+)
9	Community access to services	(+) or (-)
10	Water (scarcity and quality)	(-)
11	Land impacts	(-)
12	Assets impacts	(-)
13	HIV/AIDS/STDs	(-)
14	Security	(-)
15	Gender	(+) or (-)
16	Safety and accidents	(-)
17	Violence, drug trade and money laundering	(-)
18	Cultural pollution	(-)
19	Child labour	(-)
20	Social transformation	(-)
21	Migration	(-) or (+)
22	Impacts on indigenous and tribal people	(-)
23	Impacts on agriculture	(-)

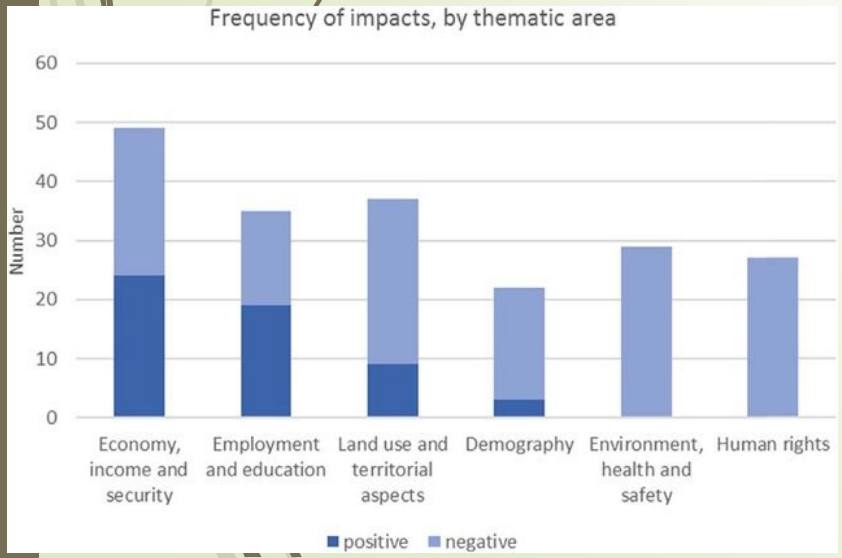
Mining provides inputs for other industrial sectors that are vital for sustaining population wellbeing and the functioning of global economies. At the same time, it can generate social and environmental impacts, which could compromise public acceptance of the sector. Given this twofold role in human society, the improvement of the sustainability performance is a very important objective both for industry and for the European policy, willing to boost a sustainable supply of raw materials. In various contexts, social impacts of mining are assessed with different sets of indicators and targets.

Adator Stephanie Worlanyo, Li Jiangfeng, Evaluating the environmental and economic impact of mining for post-mined land restoration and land-use: A review, Journal of Environmental Management, Volume 279, 2021, 111623, ISSN 0301-4797, https://doi.org/10.1016/j.jenvman.2020.111623

Socio-economic impacts of mining II.

Illustrative results showing impacts occurrence and their geographical distribution, in the selected studies. Dots and triangles represent negative and positive impacts, respectively. Mancini, Lucia & Sala, Serenella. (2018)





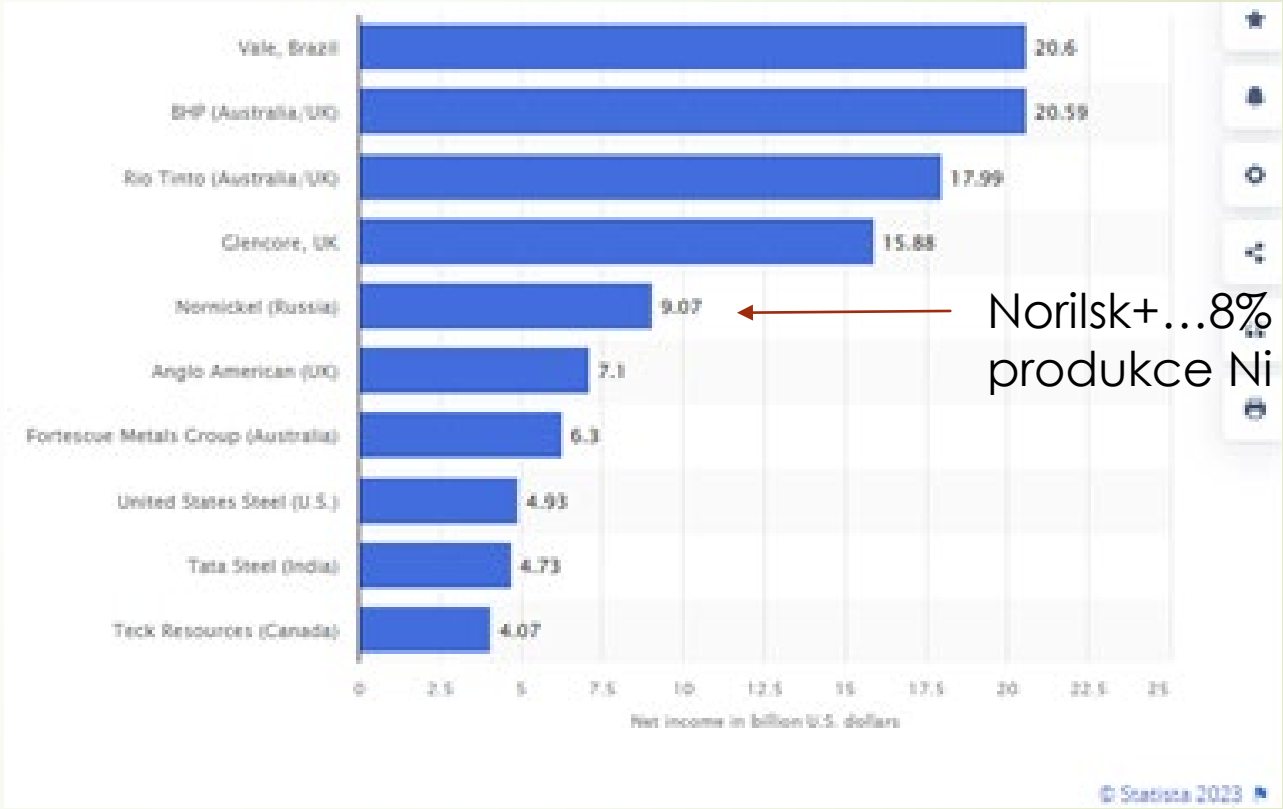
Frequency of positive or negative impacts in the selected studies, by macro area of impact. Mancini, Lucia & Sala, Serenella. (2018).

Net income

Příjmy a čistý zisk

Net Income

Rank 2020	Company	2020, C$ millions		NI/ Revenue
		Revenue	Net income	
16	Wheaton Precious Metals	1,469	681	46.6%
18	Turquoise Hill	1,445	663	45.9%
21	Centerra Gold	1,263	548	43.4%
28	Pretium Gold	828	351	42.4%
11	B2Gold	2,397	900	37.5%
6	Kinross Gold	5,645	1,821	32.3%
8	Kirkland Lake Gold	3,296	1,055	32.0%
29	Dundee Precious Metals	817	261	31.9%
2	Barrick Gold	16,977	4,843	28.5%
15	IAMGold	1,664	466	28.0%
20	Franco-Nevada	1,367	351	25.7%
9	Newcrest Mining	2,910	741	25.5%
3	Newmont	15,405	3,372	21.9%
26	Alamos Gold	1,002	193	19.3%
23	SSR Mining	1,143	188	16.4%
7	Agnico Eagle	4,205	685	16.3%
33	Ero Copper	434	70	16.1%
30	Champion Iron	785	121	15.4%
37	Copper Mountain	342	50	14.6%
25	Torex Gold	1,057	146	13.8%
14	Pan American Silver	1,794	236	13.2%
22	China Gold Int'l	1,158	153	13.2%
12	Yamana Gold	2,092	273	13.0%
38	Sierra Metals	331	36	10.9%
19	Eldorado Gold	1,376	130	9.4%
10	Lundin Mining	2,736	253	9.2%
32	First Majestic Silver	488	31	6.5%
34	Argonaut Gold	429	19	4.4%
24	Equinox Gold	1,130	28	2.5%
1	Nutrien	28,017	615	2.2%



Norilsk+…8% svět. produkce Ni

2022 ranking of global leading mining companies based on net income(in billion U.S. dollars) https://www.statista.com/statistics/272708/top-10-mining-companies-worldwide-based-on-net-income/

Income, careers

Careers in mining: how do salaries compare around the world?

Global mining stocks are worth close to $500bn, yet an individual worker's income can vary greatly based on where their operations are based: the average Australian miner earns $46,956 per year, compared to just $3,672 for a Thai miner.

The Rank of 25 World's Biggest Mining Companies Based on Net Income in 2020

Rank	Name of Company	Revenue	Revenue	Net Income	Net Income
		Origin Currency	US Dollar	Origin Currency	US Dollar
1	Rio Tinto PLC	44.6 Billion US Dollar	44.6 Billion US Dollar	10.4 Billion US Dollar	10.4 Billion US Dollar
2	Fortescue	22.2 Billion US Dollar	22.2 Billion US Dollar	10.2 Billion US Dollar	10.2 Billion US Dollar
3	BHP Group Ltd.	42.9 Billion US Dollar	42.9 Billion US Dollar	8.6 Billion US Dollar	8.6 Billion US Dollar
4	China Shenhua Energy Co. Ltd.	233.2 Billion CNY	37.3 Billion US Dollar	43.9 Billion CNY	7 Billion US Dollar
5	Vale SA	40 Billion US Dollar	40 Billion US Dollar	4.5 Billion US Dollar	4.5 Billion US Dollar
6	Barrick Gold	12.6 Billion US Dollar	12.6 Billion US Dollar	3.6 Billion US Dollar	3.6 Billion US Dollar
7	NORILSK NICKEL	15.4 Billion US Dollar	15.4 Billion US Dollar	3.6 Billion US Dollar	3.6 Billion US Dollar

US$ 202 / 243 / 1,9 / 2,7–3,3

Kongo – DRC, příjmy/výdaje

The mining industry of the Democratic Republic of the Congo produces copper, diamonds, tantalum, tin, gold, and more than 63% of global cobalt production. Minerals and petroleum are central to the DRC's economy, making up more than 95% of value of its exports.

In Eastern Congo, a couple, typically parents sustaining a household of six members, working full-time in artisanal mining can earn around US$ 202 per month, but with four dependents, they would need around US$ 243 to cover the expenditures for the basic needs of the family.
Still, ASM is one of the best sources of income in Eastern DRC, especially for populations with limited education or qualifications, who do not own land or other assets. Miners seem to be significantly better off than other populations in DRC, where 73% of the population live below 1.90 USD per day. In comparison, miners can make 2.7 – 3.3 USD per day.

A representative image of gold mining in Congo. (Photo credit: @ADFmagazine)
https://www.news9live.com/videos/congos-mountain-of-gold-turns-fortunes-overnight-12728.html

© UNICEF/Patrick Brown
Children at work mining for gold in Luhihi village, South Kivu Province in DRC.

An artisanal miner or small-scale miner (ASM) is a subsistence miner who is not officially employed by a mining company, but works independently, mining minerals using their own resources, usually by hand.

Kongo - těžba

A young boy carries a sack at a small-scale cobalt mining site in the Democratic Republic of the Congo
(Siddharth Kara)

A Sky News investigation has found children as young as four working in Congolese mines where cobalt is extracted for smartphones.

https://news.sky.com/video/inside-the-congo-mines-that-exploit-children-10784310

Minerál: Carrollite
$Cu(Co,Ni)_2S_4$
Composition:

Cobalt	28.56 %	Co
Copper	20.53 %	Cu
Nickel	9.48 %	Ni
Sulfur	41.43 %	S
	100.00 %	

https://www.independent.co.uk/climate-change/news/phone-electric-vehicle-congo-cobalt-mine-b2277665.html

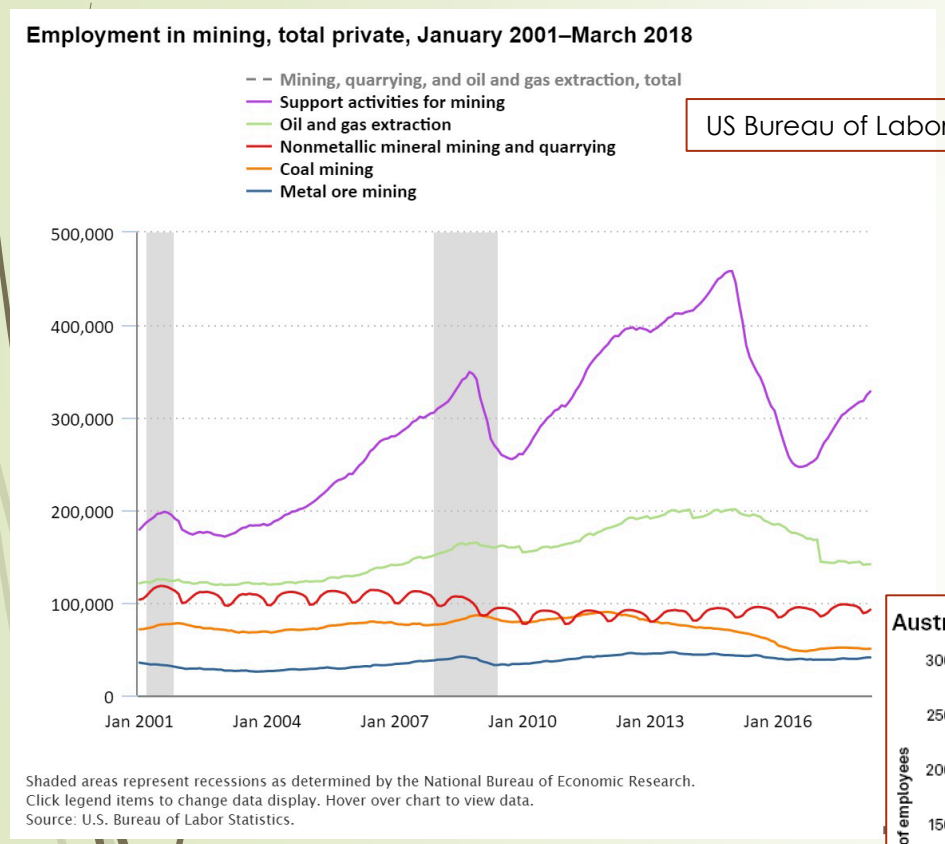
Half of the workforce of the artisanal mining sector is comprised of children. Without viable economic alternatives, most children must join their parents in rudimentary mining pits. Children as young as two years transport, wash, and crush minerals to earn half a dollar a day.

The Mutanda copper mine in Katanga province, Democratic Republic of Congo, in 2012.Photographer: Simon Dawson/Bloomberg.
Glencore Plc could reopen its Mutanda Mining copper and cobalt project in Democratic Republic of Congo by the end of 2021.

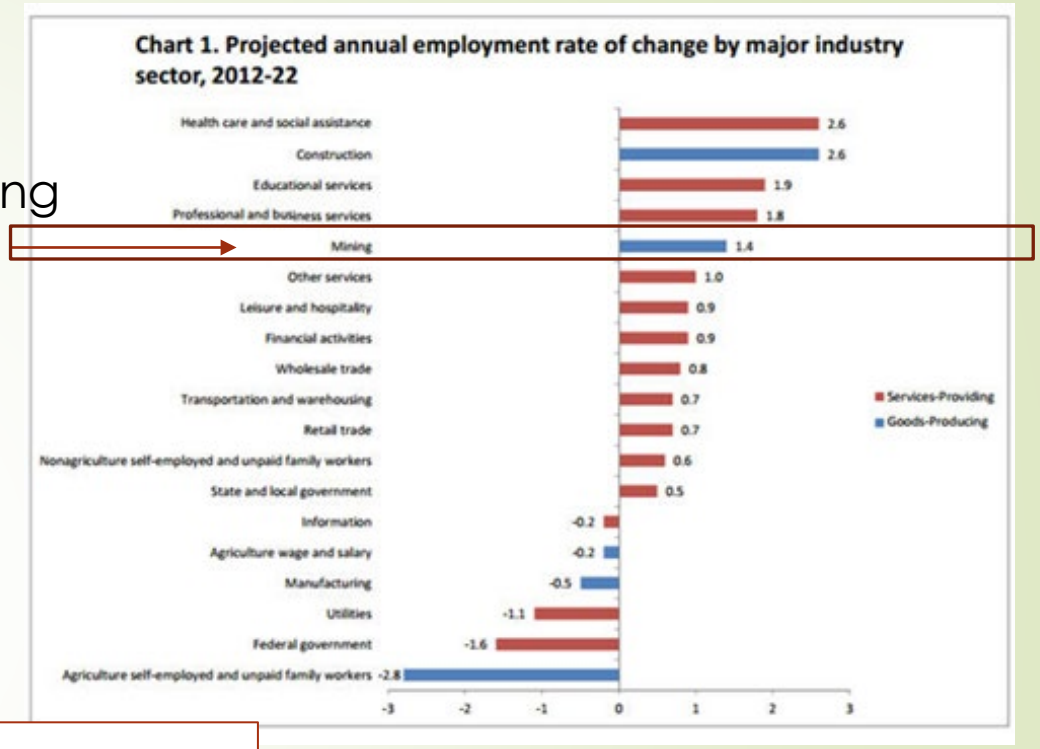
https://mineralsmakelife.org/blog/mining-top-jobs-contributor-through-2022/

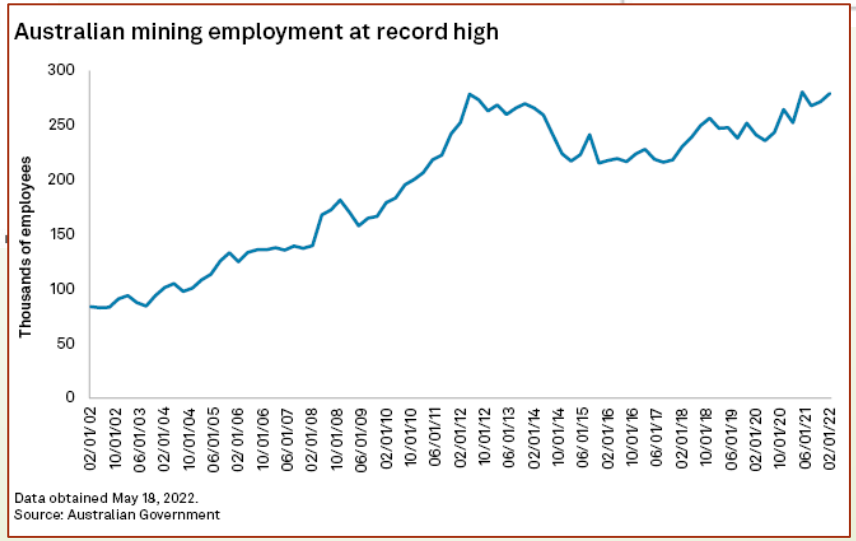
Employment

US, mining



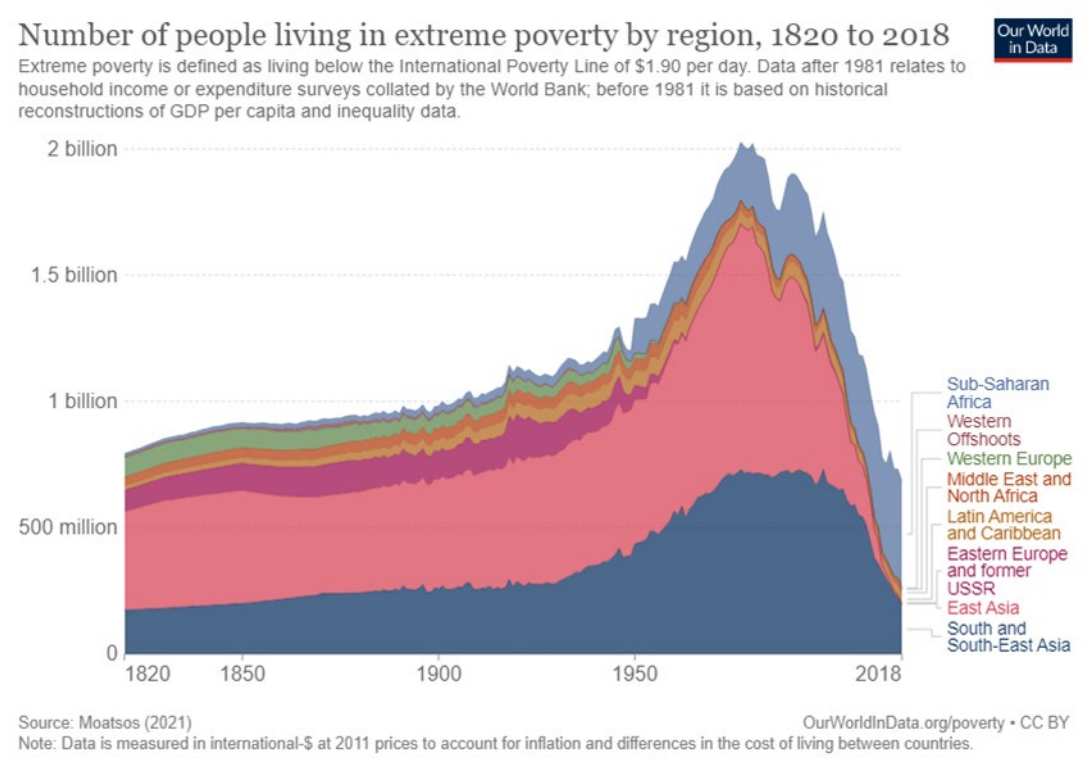
US Bureau of Labor Statistics

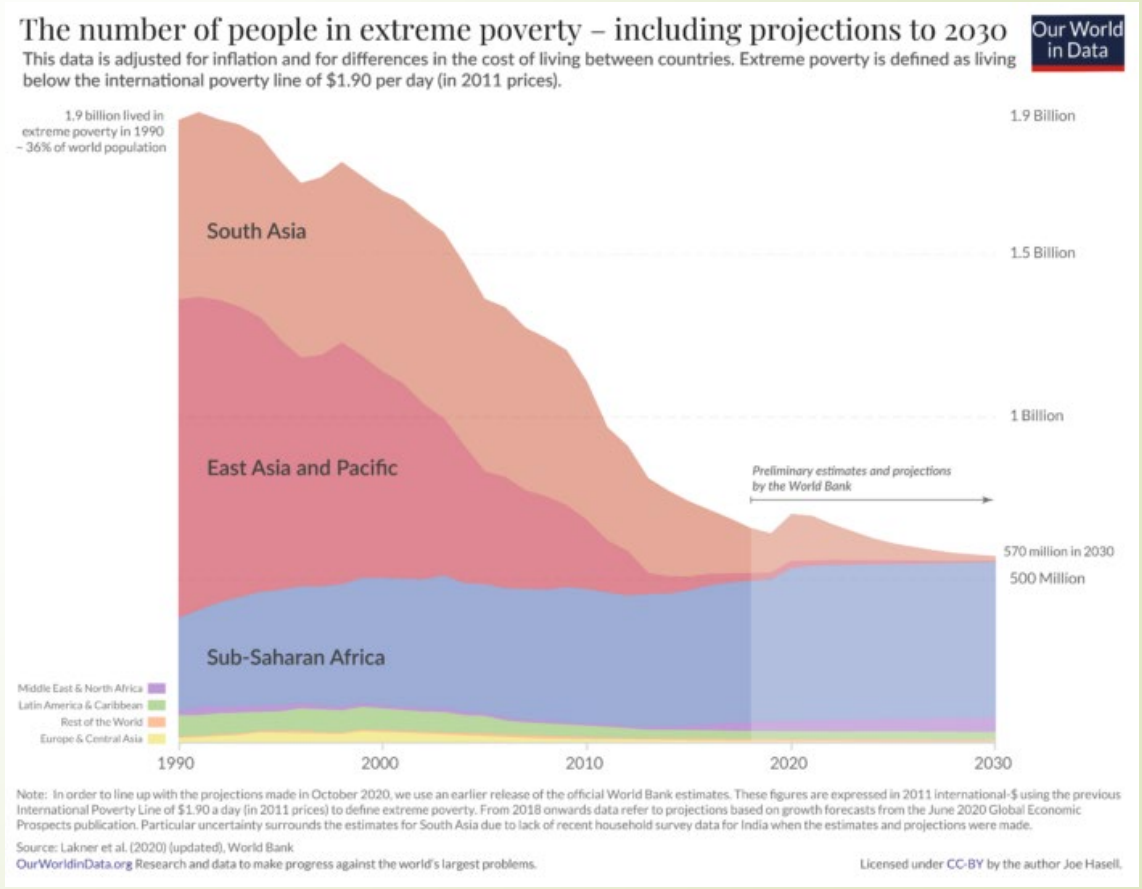




Poverty

$ 1,9 / den





Příklad: Heidelberg, … Mokrá…

Community development

Collaborative Governance Approach to Sustainable Community Development in Resource regions (Franco, I.B. et al.. Sustainability 2018, 10, 504. https://doi.org/10.3390/su10020504)

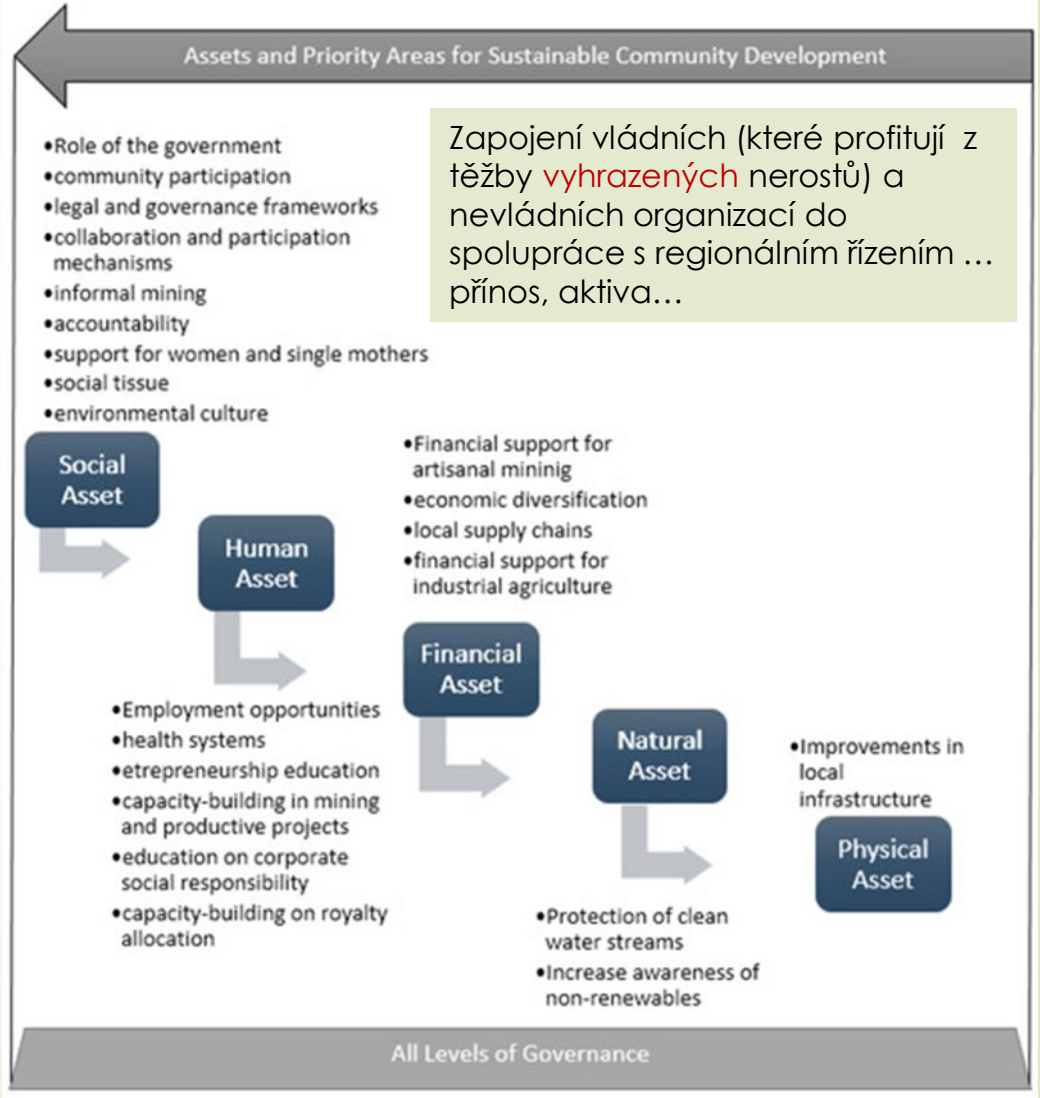
Deepwater Horizon – havárie vrtné plošiny v Mexickém zálivu, duben 2010, značné finanční náklady na likvidaci havárie a sanace a odškodnění pro oblast okolo Mexického zálivu.

Hasičské lodě se snaží uhasit požár na Deepwater Horizon 21. dubna 2010

Cerro de Pasco sits in the middle of the Peruvian Andes, at 4,300 meters above sea level. The department of Pasco is among the eight poorest departments in Peru, and a quarter of its children are chronically malnourished. The only paved road……

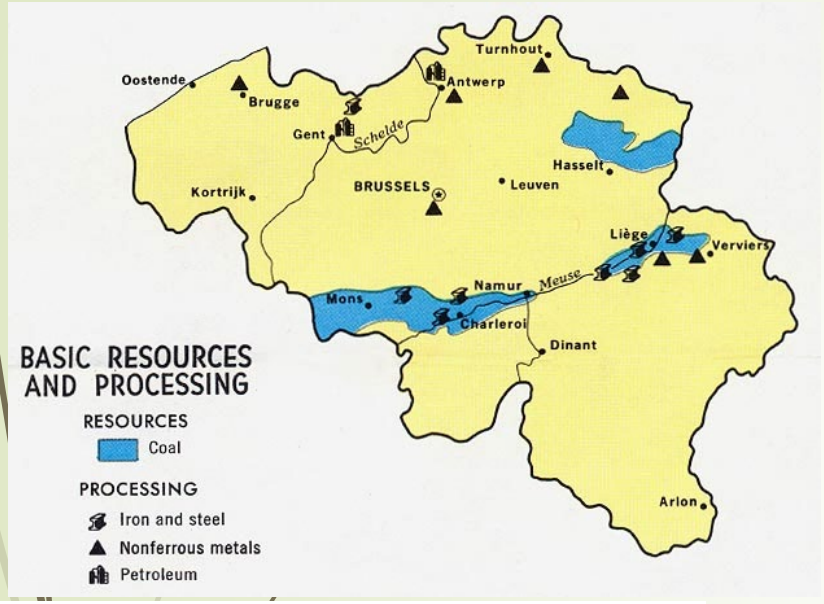
…pomoc ale asi nesměřuje moc na původní obyvatelstvo…

https://blogs.worldbank.org/developmenttalk/do-local-communities-benefit-mining

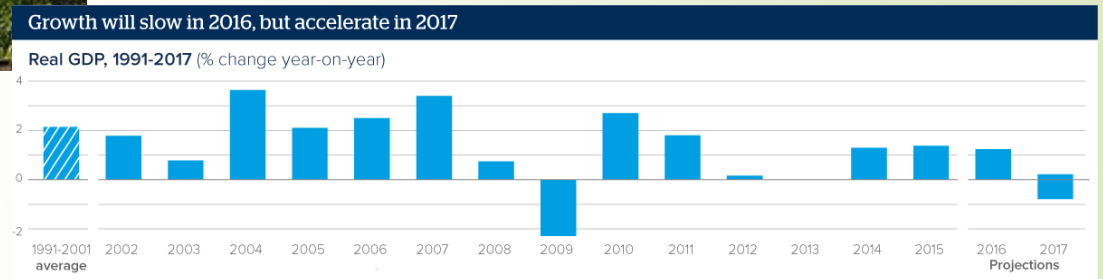


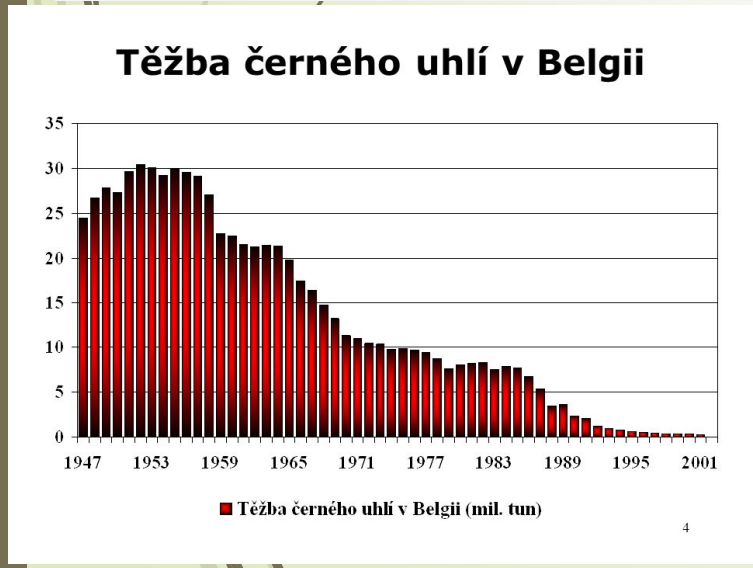
Zapojení vládních (které profitují z těžby vyhrazených nerostů) a nevládních organizací do spolupráce s regionálním řízením … přínos, aktiva…

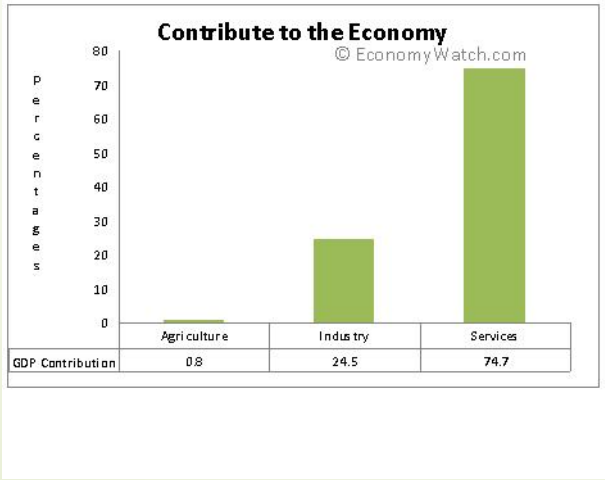
Např. Belgie – regionální rozdíly a zdroje

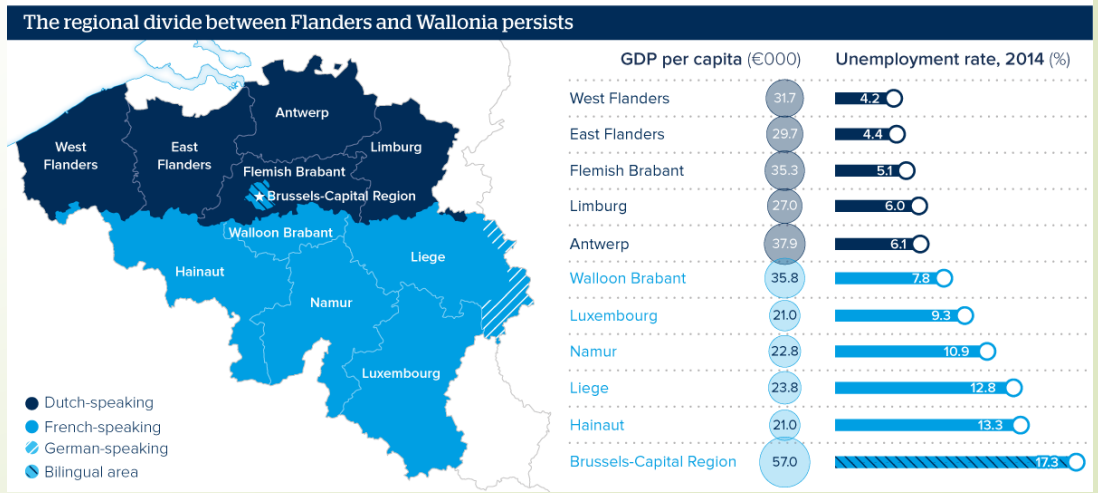


Steelmaking along the Meuse at Ougrée, near Liège





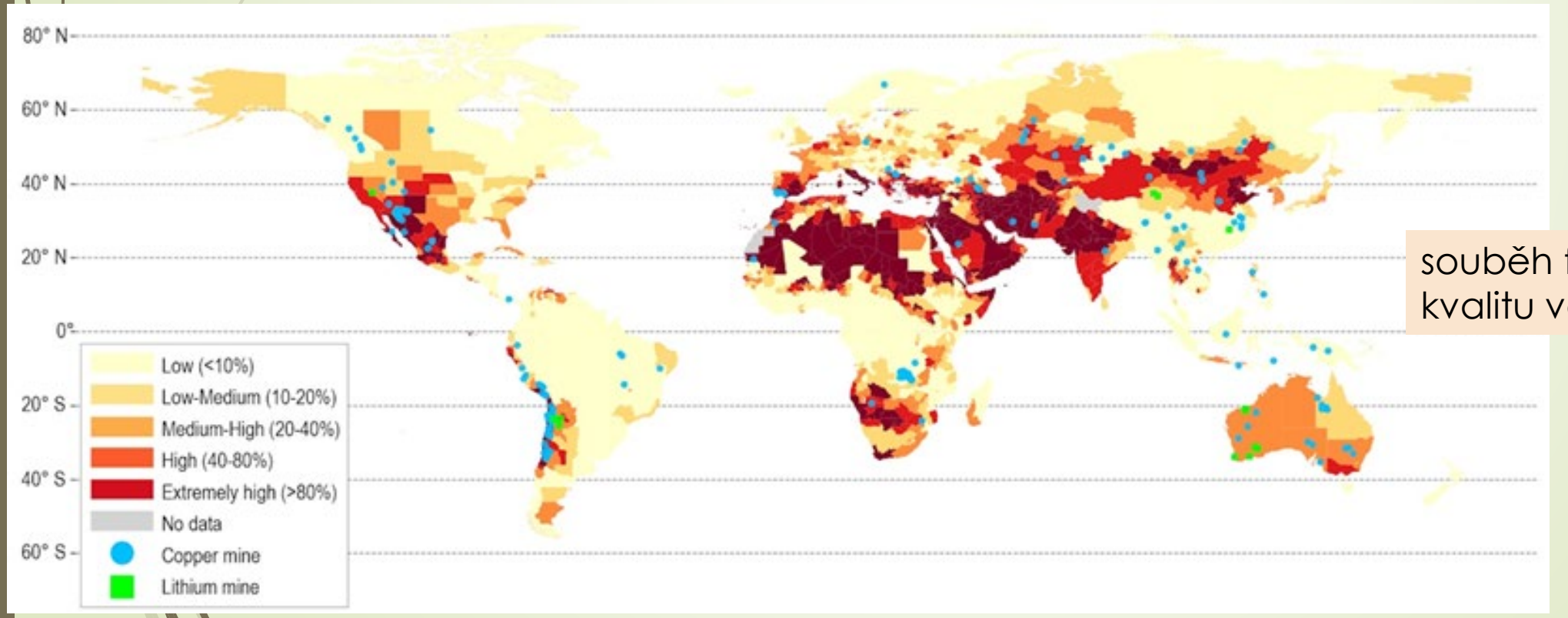




Water

Supplying oil, natural gas, coal and the critical minerals used in the energy sector requires billions of cubic metres of water each year. Water is used along the entire supply chain, from exploration to processing and transport, as well as in many standard operations, such as cleaning, cooling, dust control and pumping.

Location of copper and lithium mines and water stress levels, 2020



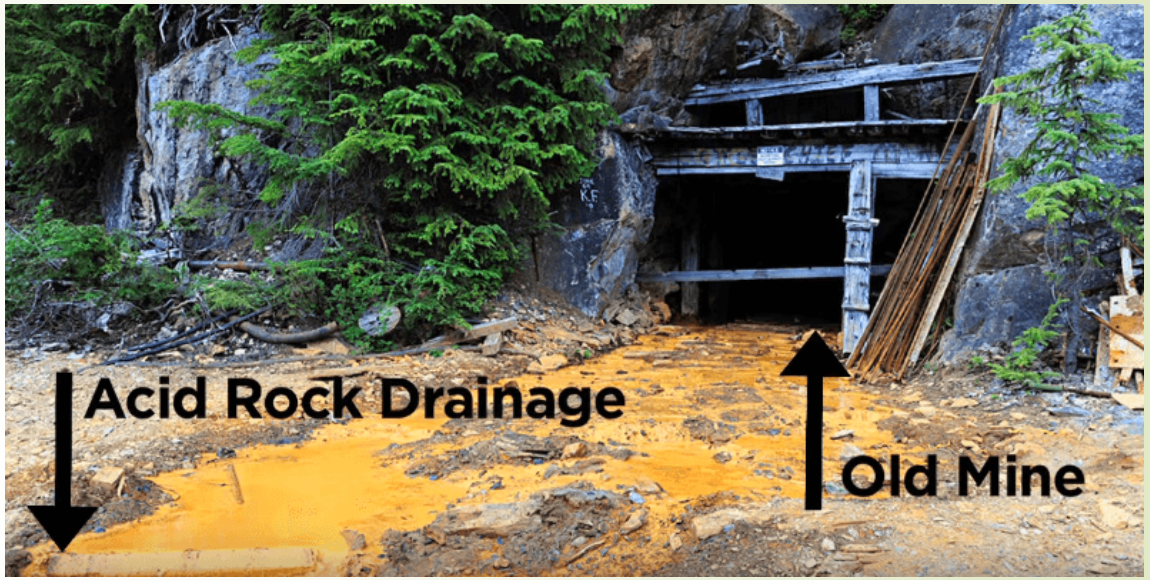
souběh faktorů = riziko pro kvalitu vody

Turów, Polsko

Hnědé uhlí, povrchový lom, ohrožení režimu podzemní vody

AMD – acid mine drainage

Staré haldy a opuštěné doly bez rekultivace a zajištění po těžbě



(1) $FeS_2 + 7/2\ O_2 + H_2O = Fe^{2+} + 2SO_4^{2-} + 2H^+$

(2) $Fe^{2+} + 1/4O_2 + H^+ = Fe^{3+} + 1/2\ H_2O$

(3) $Fe^{3+} + 3H_2O = Fe(OH)_3 + 3H^+$

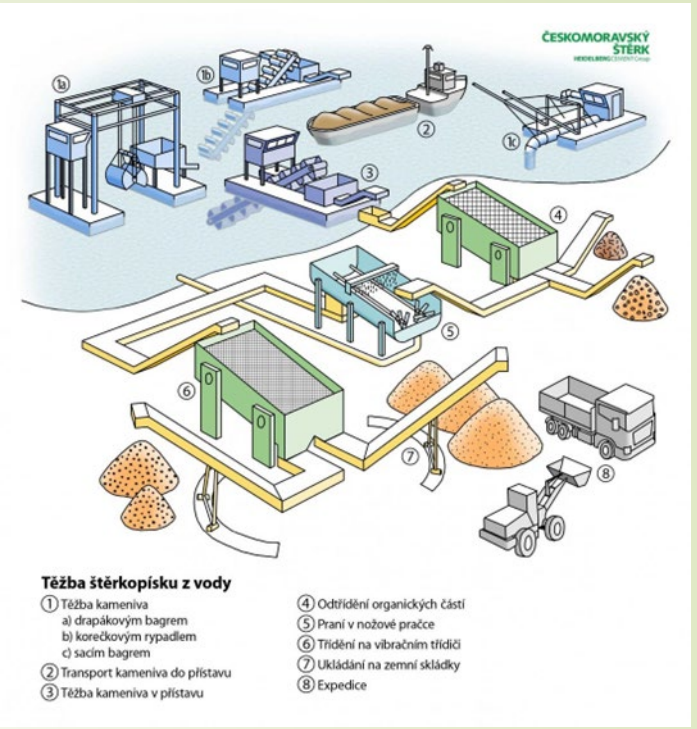
(4) $FeS_2 + 14Fe^{3+} + 8H_2O = 15Fe^{2+} + 2SO_4^{2-} + 16H^+$

pyrit ---- hydroxidy Fe

Upozornění na nebezpečí ohrožení zdraví v rozkrytých označených haldách na Kaňku u Kutné Hory (arzen)

Voda a těžba (štěrkopísků)

zdroje štěrkopísků: říční terasy, nížiny a povodí velkých řek



Těžba z vody (mechanická zařízení)

Jezera u Spytihněvi (povodí Moravy) po těžbě štěrkopísku.
… ale má to zřetelně i pozitivní efekt☺

Child labor

Child miners can be found in parts of Asia, Africa, Latin America and Europe. Most of these children, from economically downtrodden backgrounds, are either uneducated or school-dropouts, with the exception of a few who attend both work and school. They work in inhumane and dangerous conditions to extract minerals and ores in high demand in the global market.

Mining is considered one of the worst forms of child labor as the hazardous working conditions in mines adversely affect the safety and health of children.

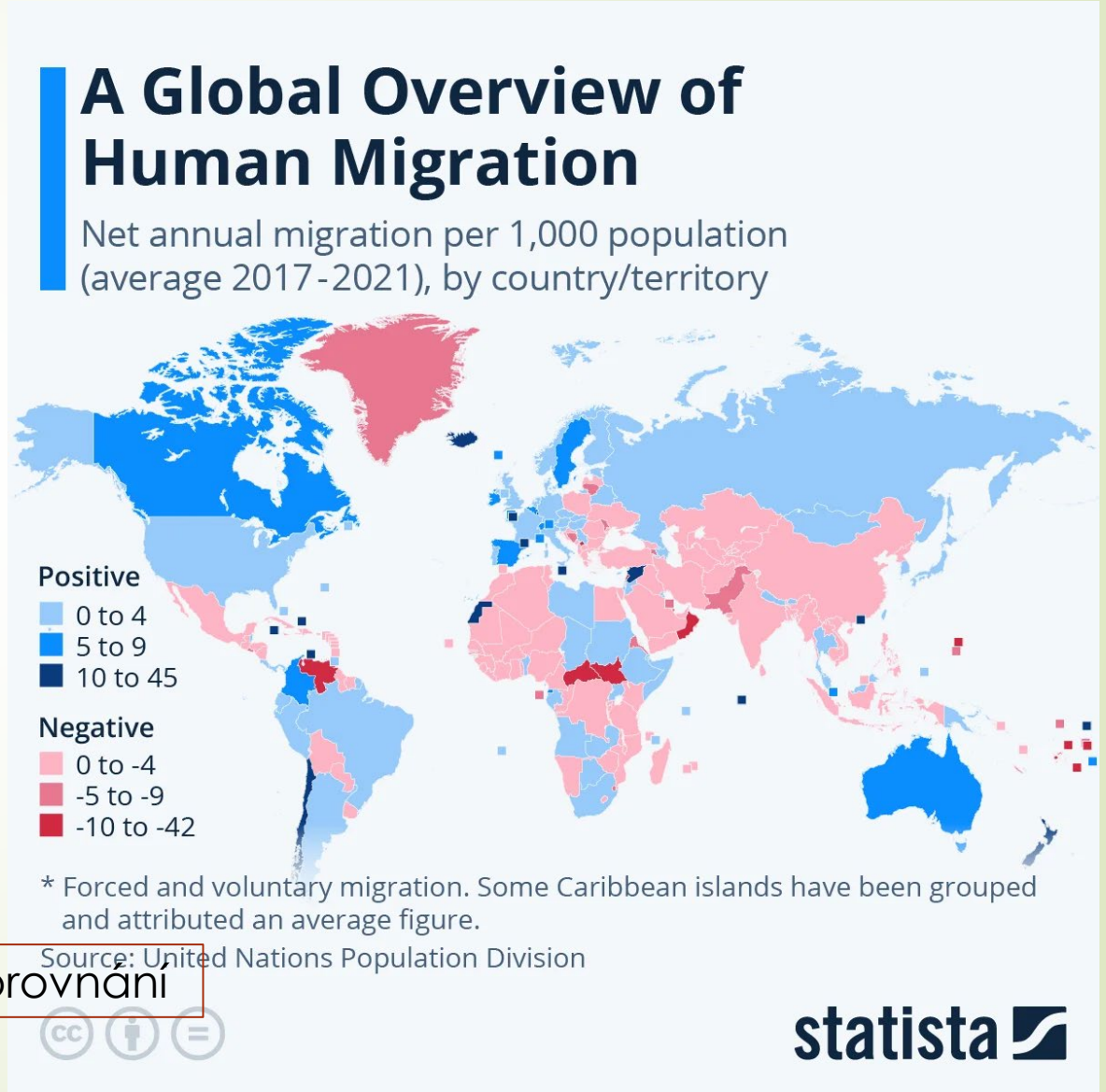
……If Pooja's lucky, she'll make between 20 to 30 rupees for a day's work (converted to roughly 29 to 43 cents in U.S. currency at time of publication). Not only is her work keeping her from attending school, but it also puts her in harm's way every single day. If a mine collapses while she's inside — a daily risk for the estimated 22,000 kids that work in the mica mines in neighboring states of Jharkhand and Bihar — it could leave her injured, paralyzed, or dead. It's a risk she's all too aware of. The tops of her hands are already scarred from sharp, fallen rocks and she often thinks about a boy her age who died in a nearby mine when it collapsed.

Pooja has no idea where the mica goes after it's sold to brokers in town — she just knows that it's the only way to feed her family……..

Raw mica is milled into shimmer for the cosmetics industry. | photographed by Jack Pearce.

Migrace obyvatel (…v souvislosti s využíváním nerostných zdrojů)

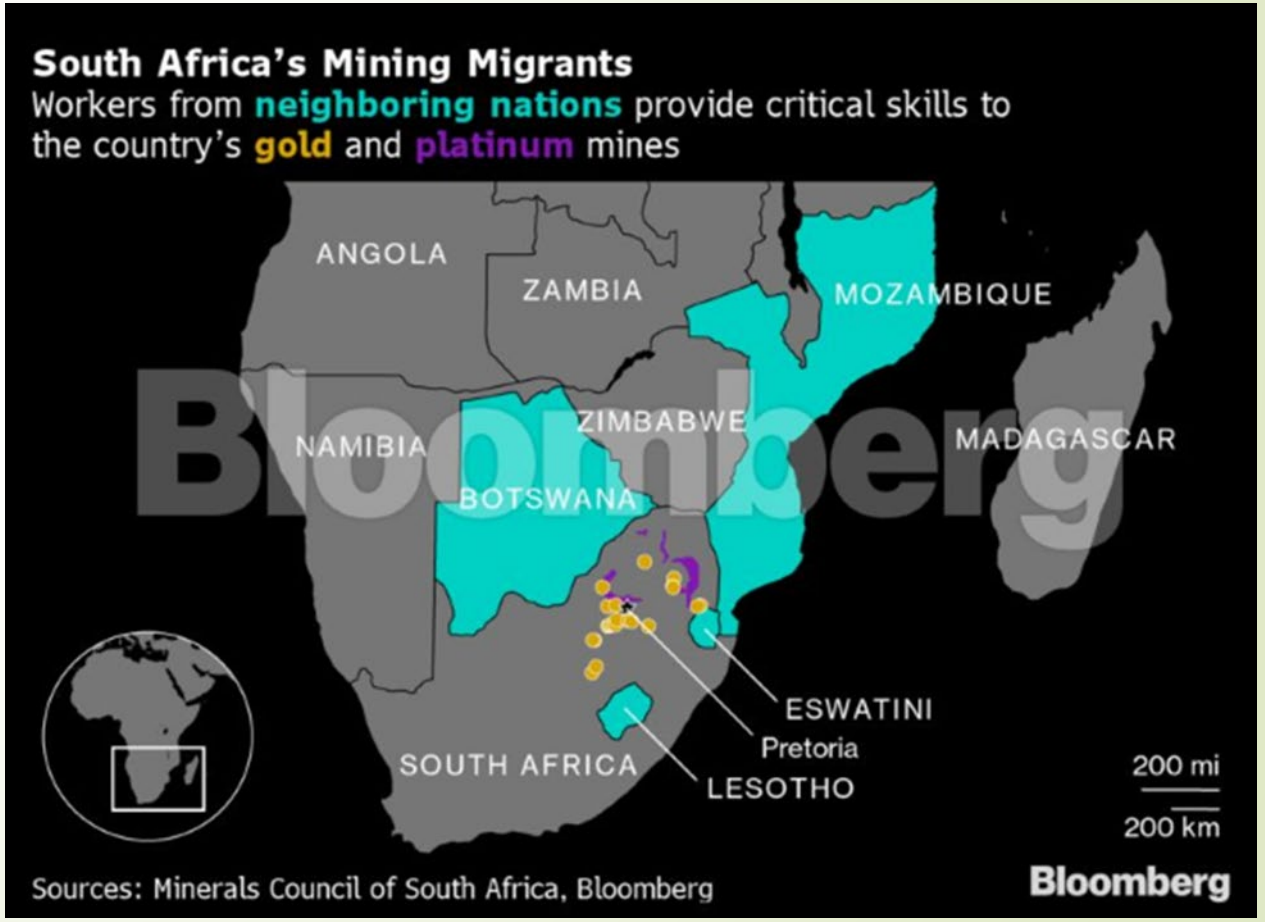
- Např.…
- Afrika
- Jižní Amerika
- Střední Evropa
- Kalifornie
- Aljaška



Jen globální statistika… pro porovnání

Jižní Afrika

South Africa's gold and platinum miners are racing to bring back thousands of skilled migrant workers who are crucial to ramping up output following the easing of the nation's coronavirus lockdown.
For almost 150 years, South Africa's deep-level mines relied on cheap labour from neighbouring Lesotho, Eswatini, Mozambique and Botswana. They still account for about 10% of the industry's 450 000-strong workforce, and their skills are key to rebooting the nation's mines.



https://www.bnnbloomberg.ca/rebooting-world-s-deepest-mines-sparks-massive-labor-migration-1.1448697

Amazonie

……With 9.6m hectares (23.7m acres) of wild forest – an area bigger than Portugal – Yanomami is Brazil's largest reserve. A fifth of its indigenous population died from diseases after 40,000 garimpeiros flooded the reserve in the 1980s, according to Survival International. The miners were expelled and the area declared a reserve in 1992 following a campaign by Survival, photographer Claudia Andujar and Davi Kopenawa, director of the Hutukara Yanomami Association, which invited the Guardian to visit the reserve…..

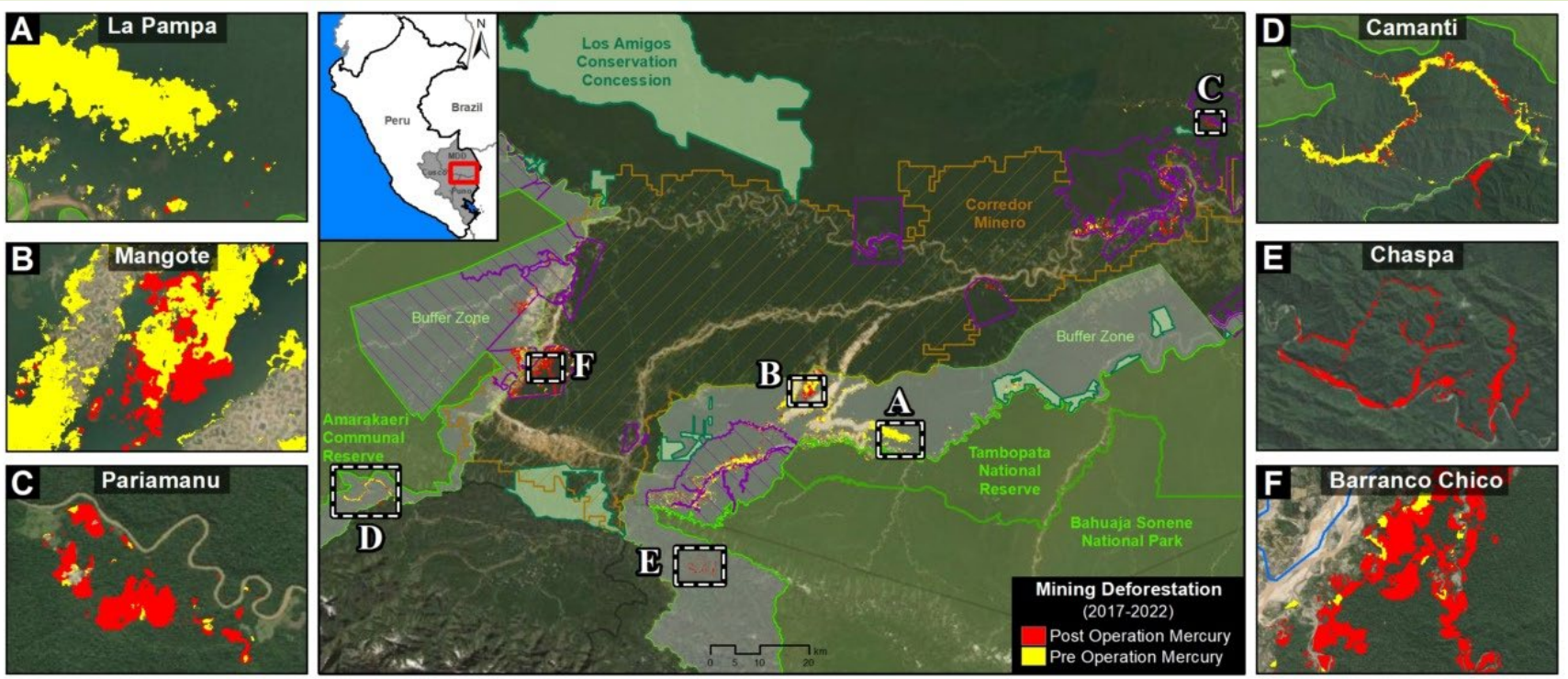
Many of the garimpeiros are from small towns in Brazil's impoverished north and north-east. Photograph: João Laet/The Guardian

Mining has heavily impacted water quality. Photograph: João Laet/The Guardian

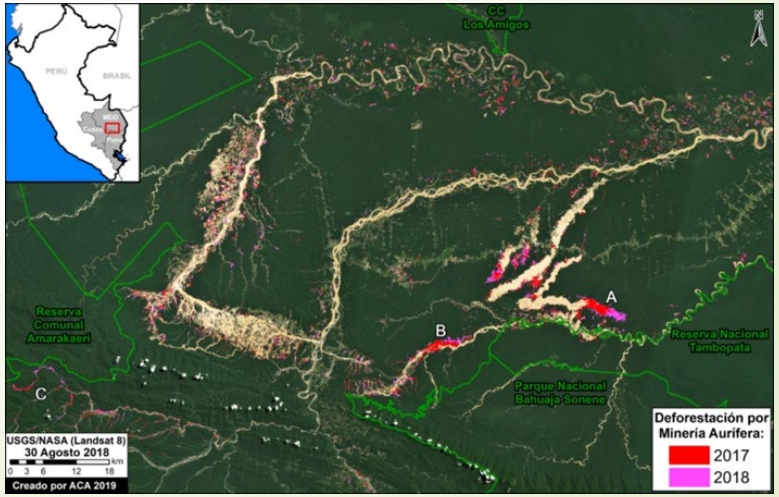
Peru

https://maaproject.org/2022/gold-mining-peru-update/

Peru's government has spent millions of dollars on raids of illegal miners as the industry has continued its advance into protected areas of the Amazon jungle.



Results Map. Major gold mining fronts in the southern Peruvian Amazon before (yellow) and after (red) Operation Mercury. Data: MAAP.



Deforestation in the Peruvian Amazon as a result of illegal gold mining hit record numbers in 2017 and 2018, according to an analysis of satellite imagery by the Monitoring of the Andean Amazon Project (MAAP). During that period, more than 180 square kilometers (70 square miles) of forest was destroyed,
….. According to Guzmán, between 6,000 and 7,000 people have entered into and settled in this area…..

Peru – gold mining, social and envi issues

Gold miner Reynaldo Cavero walks on a gold mining raft in the Malinowski River of the Madre de Dios region in Peru.Danielle Villasana for Al Jazeera America

http://america.aljazeera.com/multimedia/2015/9/Peru-mining.html

Jáchymov, … příklady migrace ve střední Evropě

Na počátku 16. století zde bylo objeveno bohaté ložisko stříbra. V roce 1516, na místě osady Konradsgrün, bylo založeno Štěpánem Šlikem město sv. Jáchyma, dnešní Jáchymov. Nově založené město bylo v roce 1520 povýšeno na svobodné a královské. Bohatá naleziště kvalitního stříbra přilákala řadu prospektorů a horníků nejen z Čech, ale také ze Saska, Tyrol a z Porýní. Počet obyvatel vzrůstal a tak již počátkem roku 1520 zde žilo 4 963 osob, v roce 1533 dokonce 18 000. Jáchymov byl v Čechách druhým největším městem po Praze.

Joachimsthaler (28.58 g). Dated 1525.

Počty obyvatel významných měst v roce 1534

Město	počet obyvatel
Jáchymov	18200 (2300 v roce 2022)
Praha	50000
Cheb	15000
Plzeň	3300
Karlovy Vary	600
Norimberk	40000
Drážďany	6500

Jáchymov – muzeum, královská mincovna

Nesmíme zapomínat na UHLÍ (19.-20.stol.): ostravsko = uhlí + průmysl

Jihlava, Freiberg, …Kutná Hora…

Tzv. exemplář „A“ jihlavského horního a městského práva, konec 70. let 13. století. Moravský zemský archiv v Brně - Státní okresní archiv Jihlava.
(1234 těžba stříbra, 1249 Jihlavské horní právo)

Jihlava was originally a Slavic market village with a small Church of Saint John the Baptist, established on a trade route around 1200. The first written mention of Jihlava is from 1233. The mining of silver began here in 1234 and the royal mining town was established between 1233 and 1240. Jihlava thus became the oldest mining town in what is today the Czech Republic.
The village was originally located on the left bank of the river Jihlava, but with the expansion of mining and the influx of inhabitants, the town spread to the right bank, where its historic centre was established. The regular plan of the rectangular network of streets with a large square in the middle was given by the building regulations of King Ottokar II of Bohemia from 1270. Royal privileges guaranteed prosperity and Jihlava soon became one of the most powerful cities in the kingdom. It was protected by a massive fortification and coins were minted here. It became the first city in Central Europe where mining law was codified.
Mining attracted settlers from Bavaria, Saxony and other German-speaking regions to the city. Gradually a large German-speaking community was established here.[5]

Vzácná knižní miniatura s motivem těžby a zpracování stříbra v Kutné Hoře. Dílo vytvořil koncem 90. let 15. století malíř z okruhu přední pražské iluminátorské dílny tohoto období a byla původně úvodním listem dnes již neznámé velké chorální knihy, z níž byla vyříznuta.

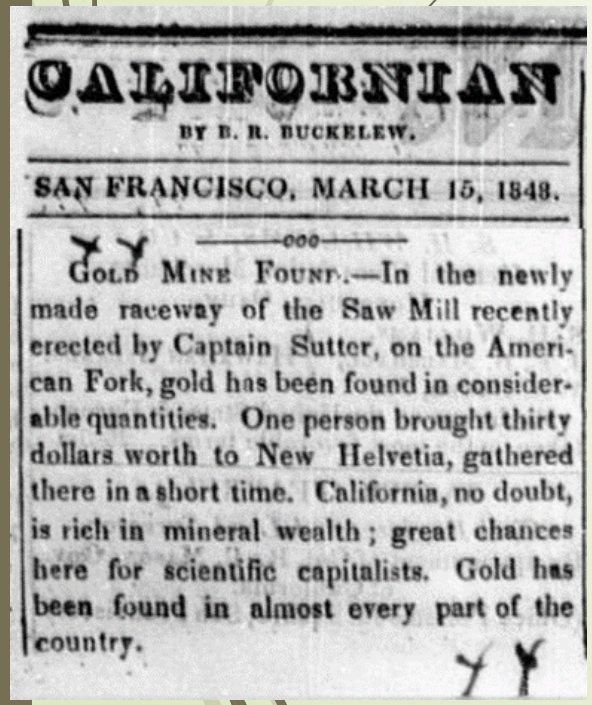
Sasko 1 tolar, 1765
Freiberg Mining Academy /Frederick Augustus III/

In 1168 silver ore was discovered near Christiansdorf. From the middle of the 15th century, the search for silver deposits spread to the upper Erzgebirge south-west of Freiberg and led to a revival of silver production in the region. Rich silver deposits were found in 1470 in Schneeberg, in 1491/92 near Schreckenberg (today Annaberg-Buchholz), and in 1516 near St. Joachimstal (Jáchymov) in the Bohemian area of the Erzgebirge.

1848, Kalifornie – zlatá horečka

The California Gold Rush (1848–1855) was a gold rush that began on January 24, 1848. The news of gold brought approximately 300,000 people to California from the rest of the United States and abroad. In 1848, San Francisco was a town of 1,000 people, mostly Mexican American and white merchants. By 1849, the first year of the California Gold Rush, the city boomed to 25,000 people from the eastern United States, Europe, Asia, Africa, and South America.
The importance of San Francisco was validated when it was decided that the first transcontinental railroad, a train line that connected the east coast and the west coast of the United States, would have its western terminus in the growing city.

California goldfields (red) in the Sierra Nevada and northern California



CALIFORNIAN

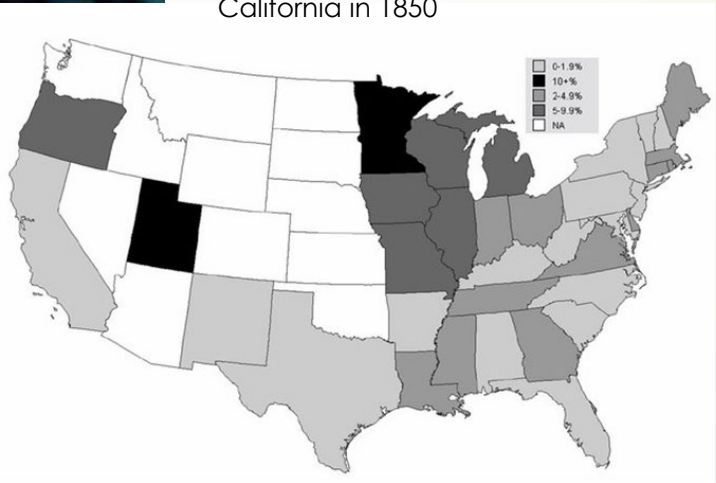
BY B. R. BUCKELEW.

SAN FRANCISCO, MARCH 15, 1848.

GOLD MINE FOUND.—In the newly made raceway of the Saw Mill recently erected by Captain Sutter, on the American Fork, gold has been found in considerable quantities. One person brought thirty dollars worth to New Helvetia, gathered there in a short time. California, no doubt, is rich in mineral wealth; great chances here for scientific capitalists. Gold has been found in almost every part of the country.

První zmínka v novinách o nálezu zlata v Kalifornii

Percentage of Men Ages 20-40 from Last Residence Who Were in California in 1850



The transcontinental railroad began it's construction in 1862 and the Pacific Railroad officially opened in 1869. The opening of this railroad made the West even more accessible than before. This sparked a new era in US history, as more and more immigrants came from foreign countries. Instead of the journey to California taking several months, it could now take several weeks.

1896, Aljaška – au-horečka

The Klondike Gold Rush was a migration by an estimated 100,000 prospectors to the Klondike region of Yukon, in north-western Canada, between 1896 and 1899. Gold was discovered there by local miners on August 16, 1896; when news reached Seattle and San Francisco the following year, it triggered a stampede of prospectors. Some became wealthy, but the majority went in vain.

The largest gold nugget ever found in Alaska is named the Alaska Centennial Nugget. It weighs a whopping 294.10 troy ounces (9.14 Kilograms, 20.16 pound), and was found near the town of Ruby, Alaska in 1998.

To accommodate the prospectors, boom towns sprang up along the routes. At their terminus, Dawson City was founded at the confluence of the Klondike and Yukon rivers. From a population of 500 in 1896, the town grew to house approximately 30,000 people by summer 1898.

Chilkoot Pass (el. 1067 m./3057 ft.)

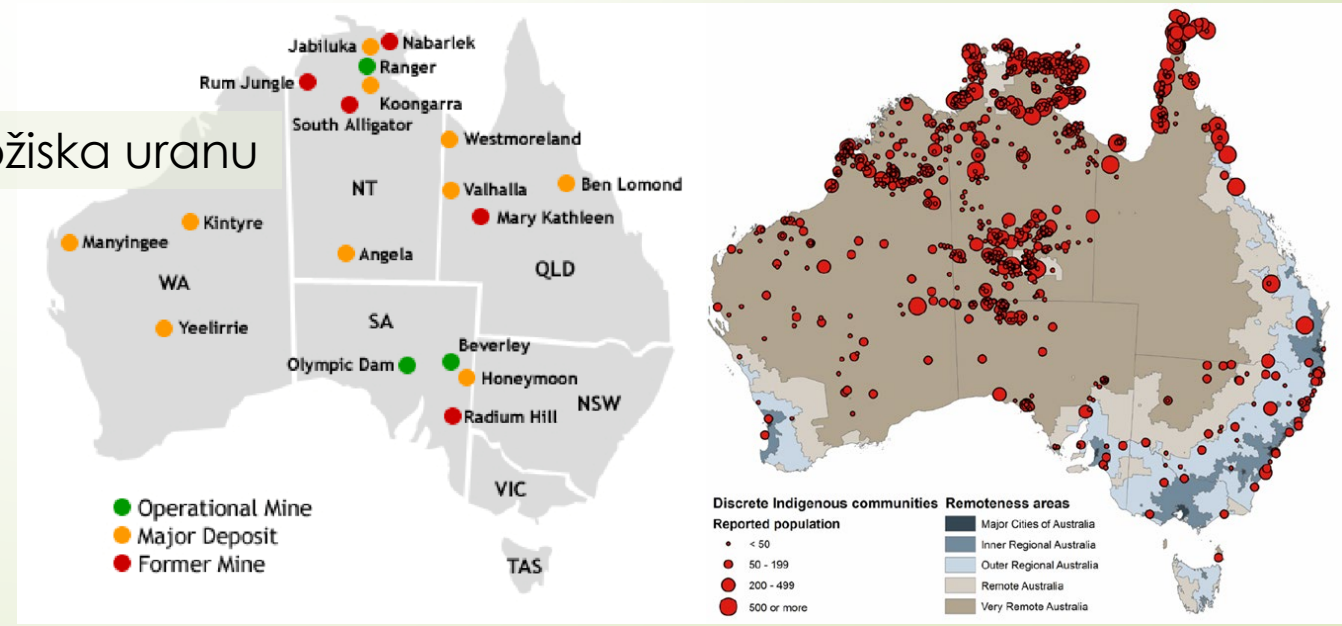
Impacts on indigenous and tribal people

Northern Territory, 1982. Aboriginal communities continue to be impacted by mining across Australia, including the Ranger Uranium Mine. National Archives of Australia, A6135, K2/3/82/93

Waanyi traditional owner Henry Aplin at the old Century zinc open-cut mine in NW Queensland. Picture: Brian Cassey

Aboriginal communities remain at a disproportionate risk because large uranium deposits exist in lands deemed sacred and significant, while the testing and dumping of nuclear material is rarely undertaken in areas inhabited by settlers.

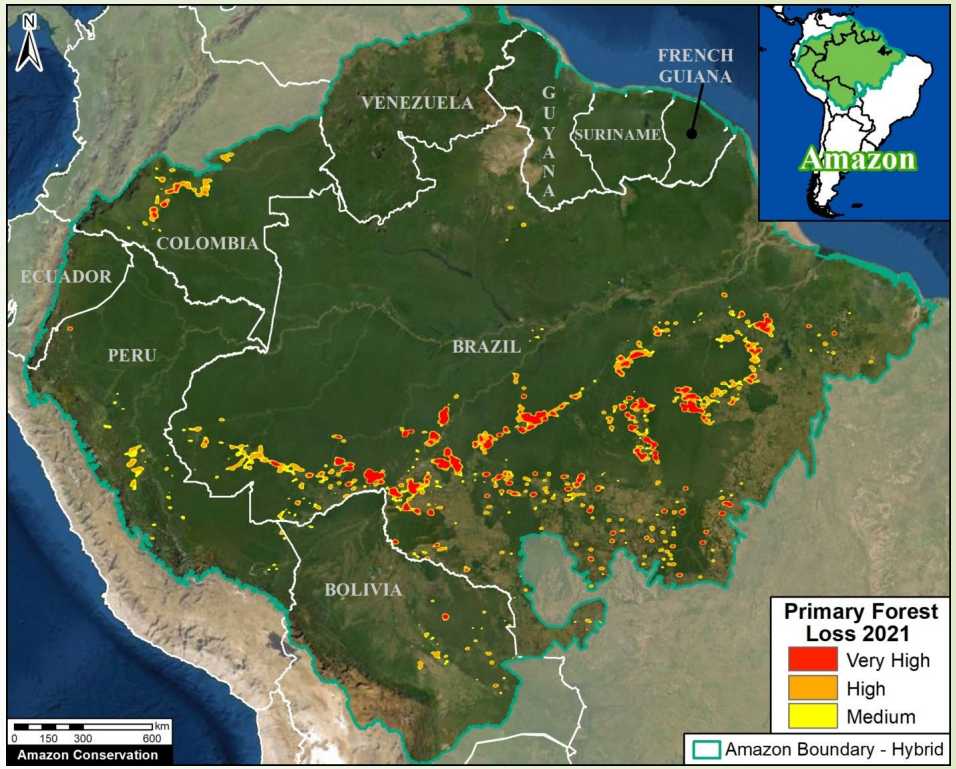
The federal government's ambivalence toward these impacts has most recently culminated in their decision to give Cameco the go-ahead for the Yeelirrie uranium mine, a blow to the traditional owners of Tjiwarl country.



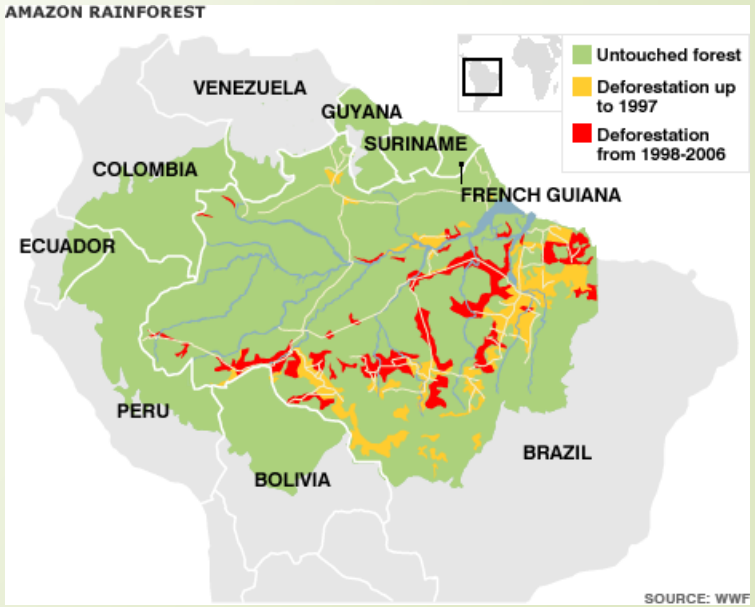
Jižní Amerika

Yanomami children, suffering from a lack of government healthcare and often underfed, suffer high rates of disease. Image by Fiona Watson / Survival International.

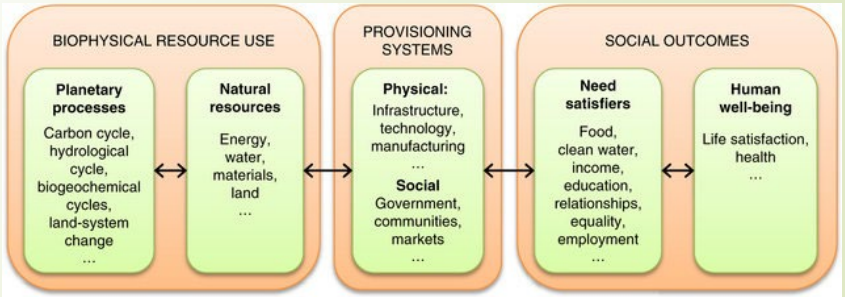
Base Map. Deforestation hotspots across the Amazon in 2021 (as of September 18). Data: UMD/GLAD, ACA/MAAP.



With 9.6m hectares (23.7m acres) of wild forest – an area bigger than Portugal – Yanomami is Brazil's largest reserve. A fifth of its indigenous population died from diseases after 40,000 garimpeiros flooded the reserve in the 1980s, according to Survival International. The miners were expelled and the area declared a reserve in 1992… But the current garimpeiro invasion worsened after Bolsonaro took office. But garimpeiros bring malaria, prostitution and violence, indigenous leaders argue, while scientists say the mercury the miners use to separate gold particles from mud and silt enters rivers and the food chain. Their pits and barges upset ecosystems, scare away wildlife, and fill rivers with mud that distorts fish behaviour and breeding……



Využívání planetárních zdrojů



O'Neill, Daniel & Fanning, Andrew & Lamb, William & Steinberger, Julia. (2018). A good life for all within planetary boundaries. Nature Sustainability. 1. 10.1038/s41893-018-0021-4.