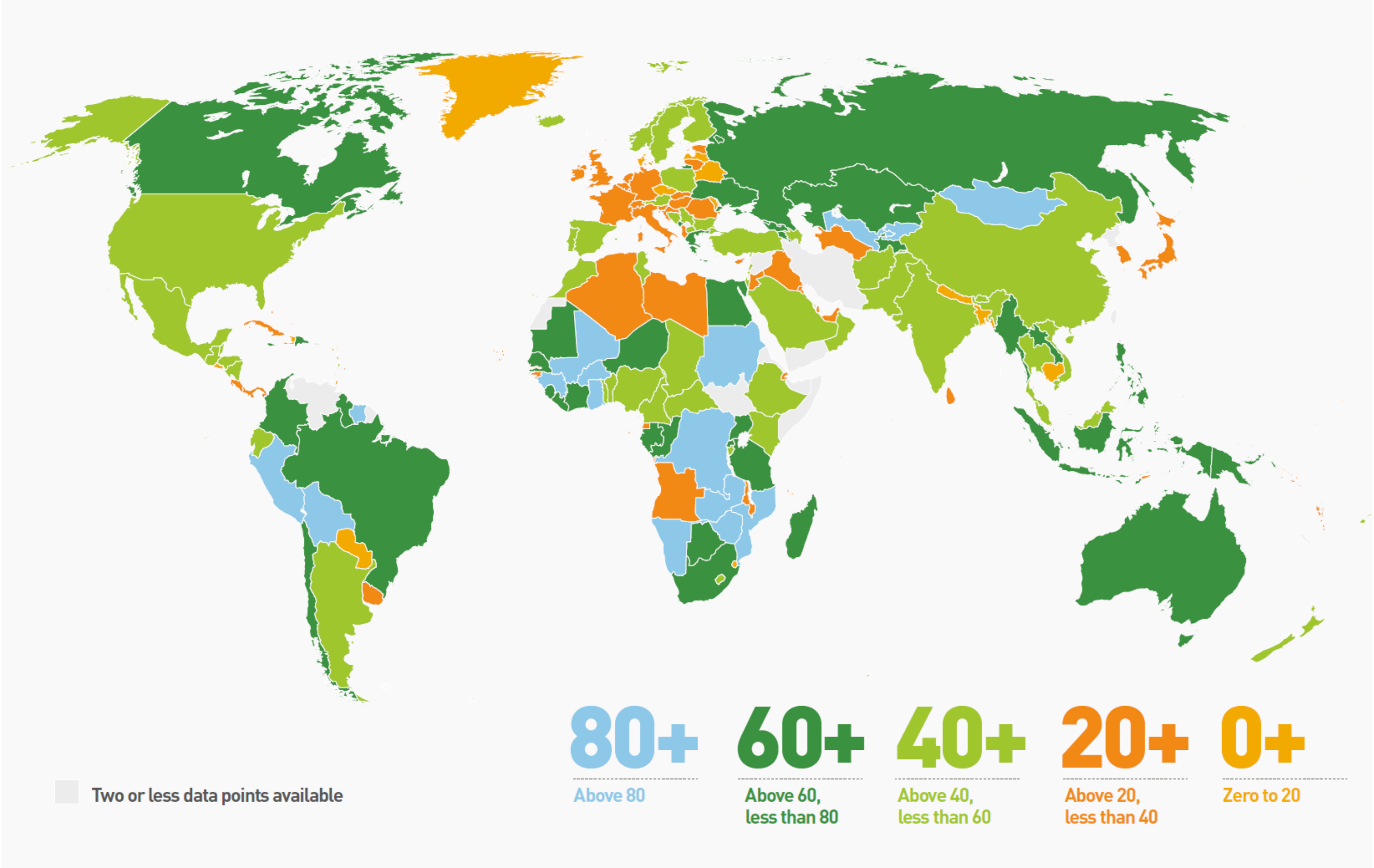


Mining and post-mining perspectives in India

Dr.-Ing. Alexey Alekseenko

Adjunct Professor

Global Mining Overview



Role of Mining in National Economies

Mining Contribution Index, 2020

Coal in India



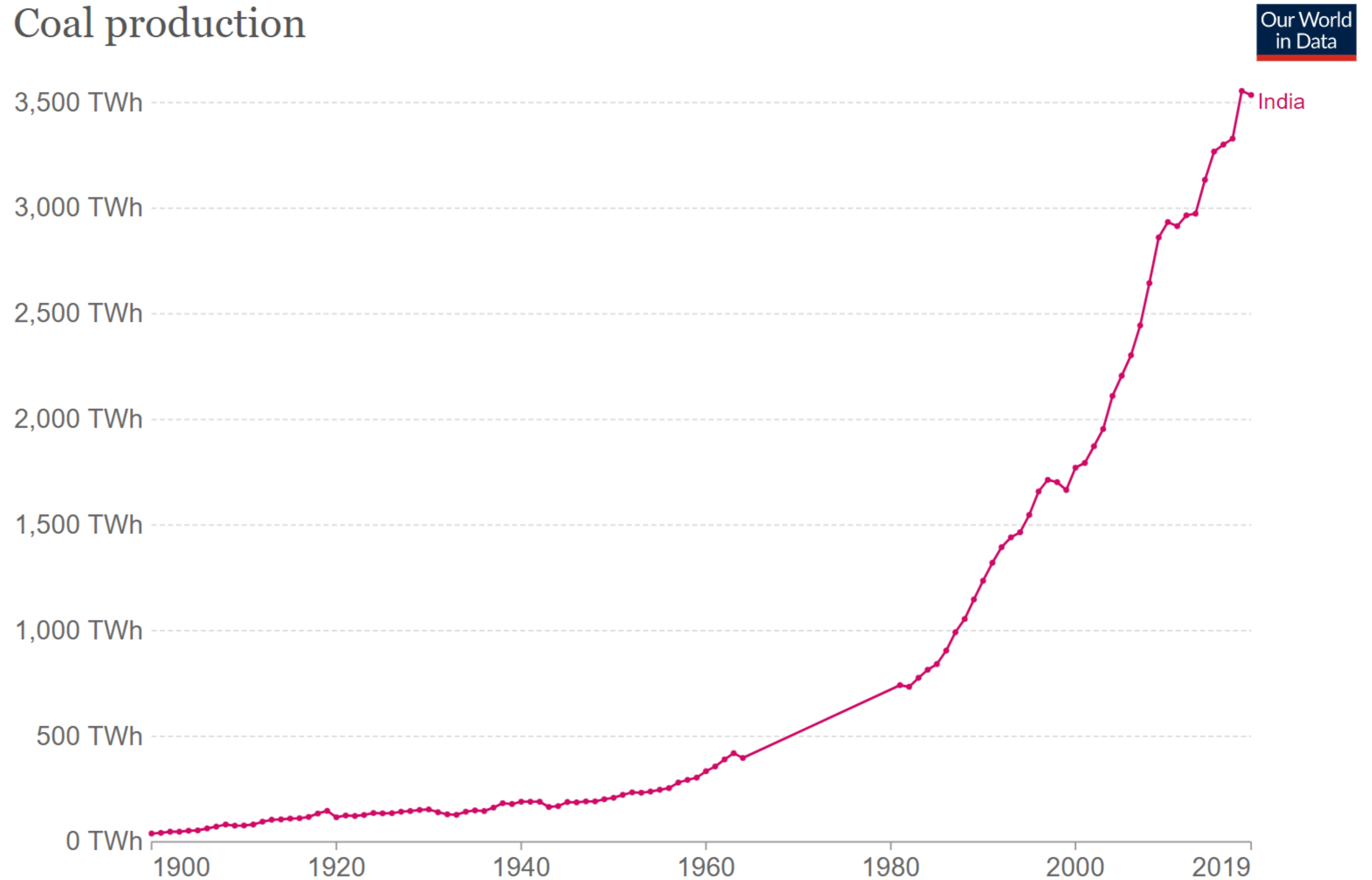
Coal in India

The largest coal producer in the world after China.

Major consumers:

- the electricity sector (65%),
- iron and steel,
- cement, and
- fertilizer industries.

Coal production



Source: BP Statistical Review of World Energy; and Shift Data Portal

OurWorldInData.org/fossil-fuels/ • CC BY

Coal in India

COP27

India seeks COP27 deal to 'phase down' all fossil fuels

By Simon Jessop ▾

November 12, 2022 9:32 PM GMT+2



India was not the first to push for a “phase down” of coal.

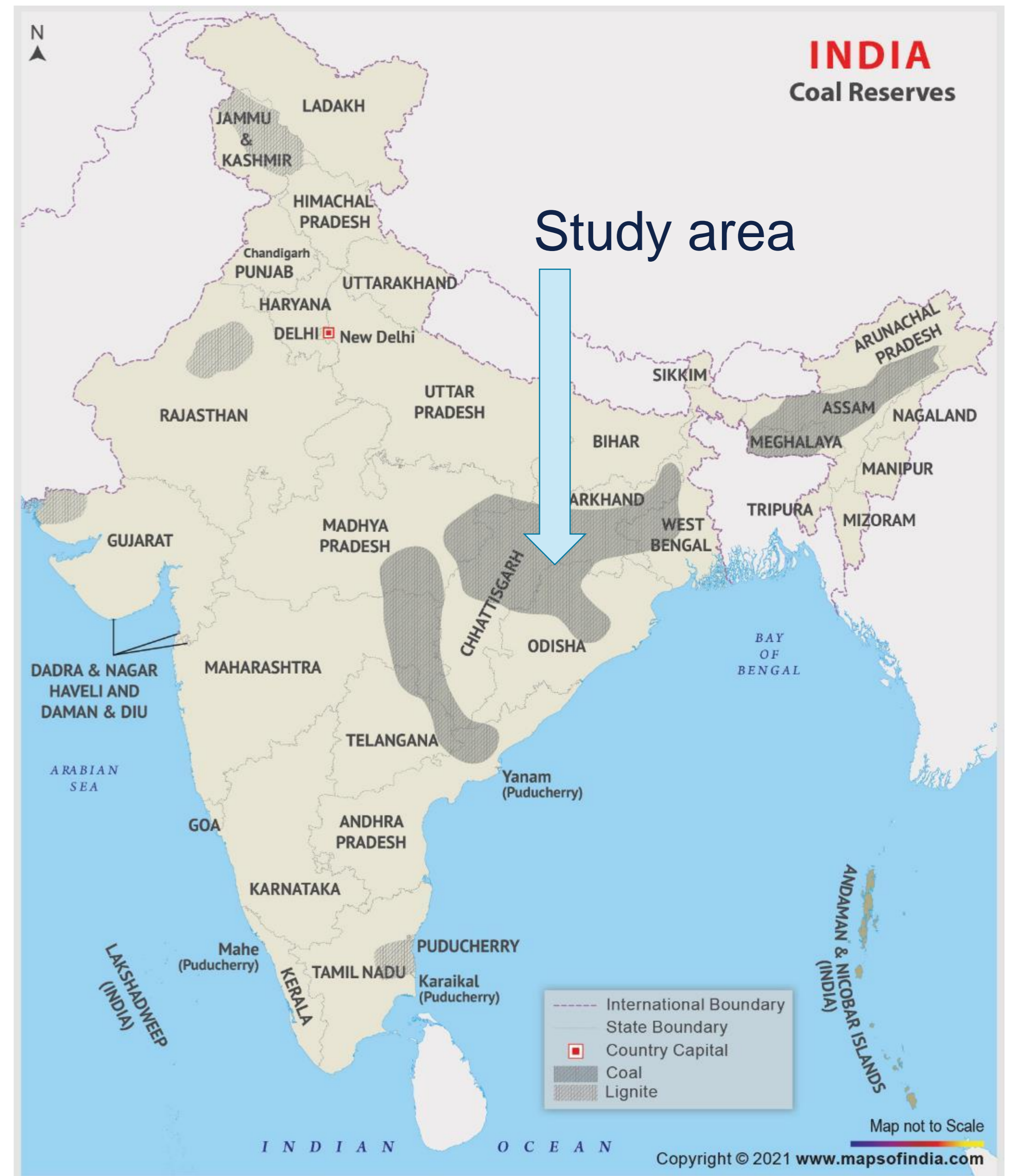
The US and China had already used the “phase down” language in the bilateral climate agreement signed in 2021.

Coal in India

India is among the top five countries with the world's largest coal reserves.

Scoping Mission of UNCCD and UNU-FLORES to Odisha in April 2023:

what are the opportunities and challenges of mine closure?



Coal in Odisha state

“The coal production ... is likely **to peak in the next 10 years** and then sink post 2040.

Energy experts believe that this provides the opportunity to ensure a just transition for coal workers.”

Decarbonising Odisha’s largest coalfield reserve in Angul is a herculean task

by Manish Kumar on 8 September 2022



Challenges

Smog and dust

Virgin soil used to restore disturbed lands

Fly ash burial in open pits without bottom insulation

Coal mining

Immediate action needed

Pollution monitoring for PM2.5, gases, etc.

Soil fertility assistance with agricultural residues

Groundwater quality control



Uncontrolled fires



Ineffective ecosystem restoration

“Indian Lützerath”



Hensamul village demolition

OXFORD
ACADEMIC

Journals

Books

Impact of displacement on livelihood: a case study of Odisha [Get access >](#)

Neelmani Jaysawal ✉, Sudeshna Saha

Community Development Journal, Volume 53, Issue 1, January 2018, Pages 136–154,

“3–5 million people have been displaced since 1950 in Odisha on account of various development projects”



“Indian Silent Hill”



Coal dust in the air

“**High ambient air pollution load** triggers the vulnerabilities of respiratory illness risks in the mining neighbourhood.”



[Sustainable Development Insights from India](#) pp 281–301 | [Cite as](#)

[Home](#) > [Sustainable Development Insights from India](#) > [Chapter](#)

Ambient Air Pollution and Respiratory Illness: A Study in Opencast Coal Mining Region of Odisha

[Indrani Roy Chowdhury](#) , [Anusree Paul](#) & [Tapaswini Nayak](#)

Chapter | [First Online: 20 March 2021](#)

“Indian Maldives”



Fly ash in quarries

Old mines are filled with fly ash from thermal power plants

without bottom insulation.



Fly ash in quarries

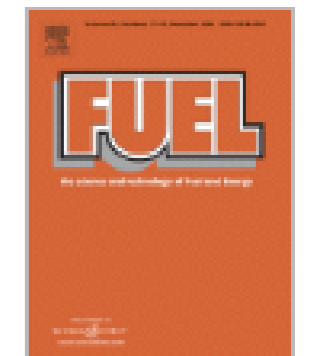
“Better management practices, increased utilization and proper disposal practices need to be undertaken

to minimize the adverse environmental impact.”



Fuel

Volume 85, Issues 17–18, December 2006, Pages 2676–2679



Short communication

Analysis of fly ash heavy metal content and disposal in three thermal power plants in India

Biodiversity decline

Monospecies used
for land restoration



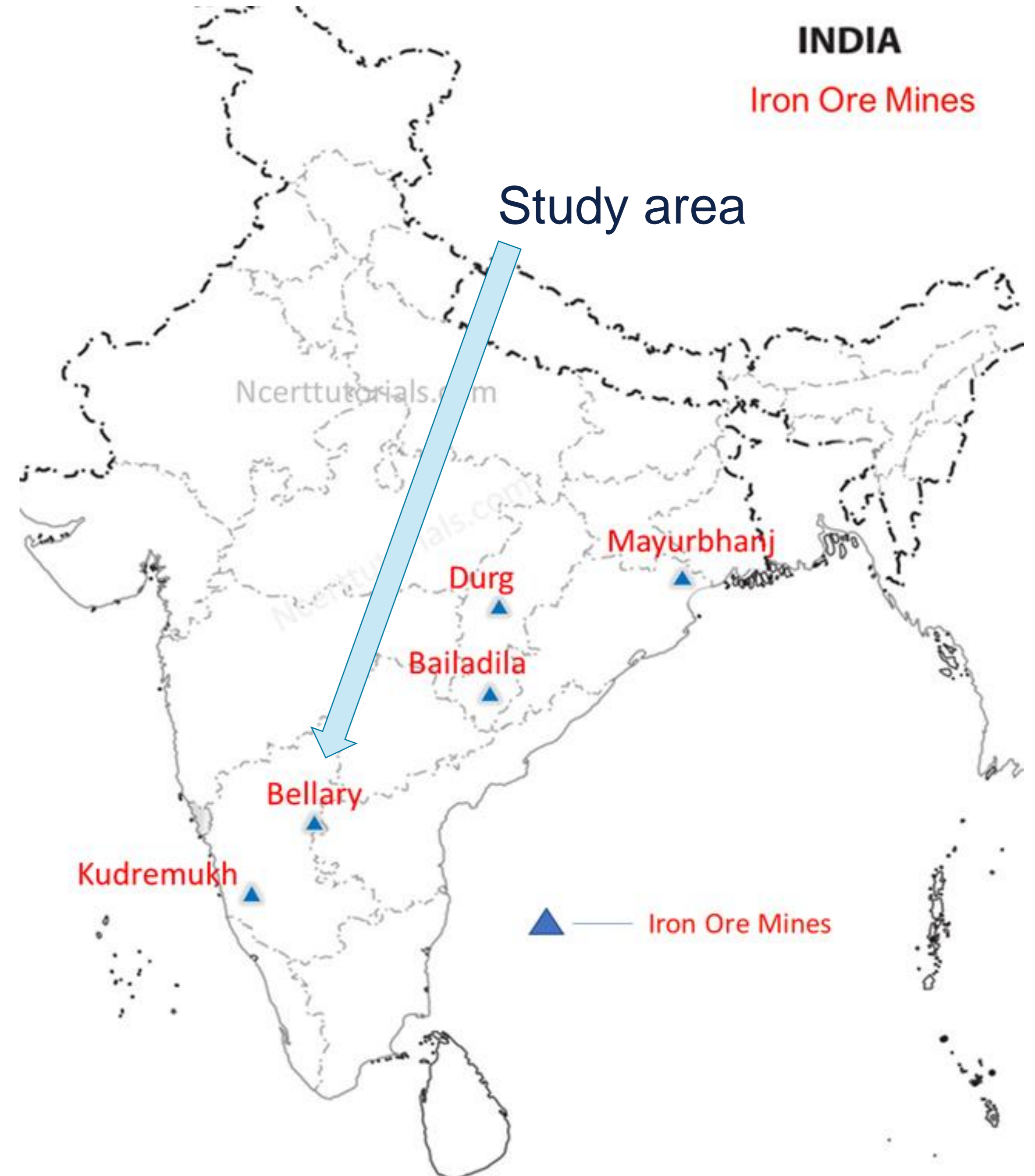
Iron ore in India



Iron ore mining

Scoping Mission to
Karnataka in April 2023:

key findings



Challenges

5,000 mining trucks go through villages, using unpaved roads

Restoration with few tree species

Mine closure projects ignore community needs

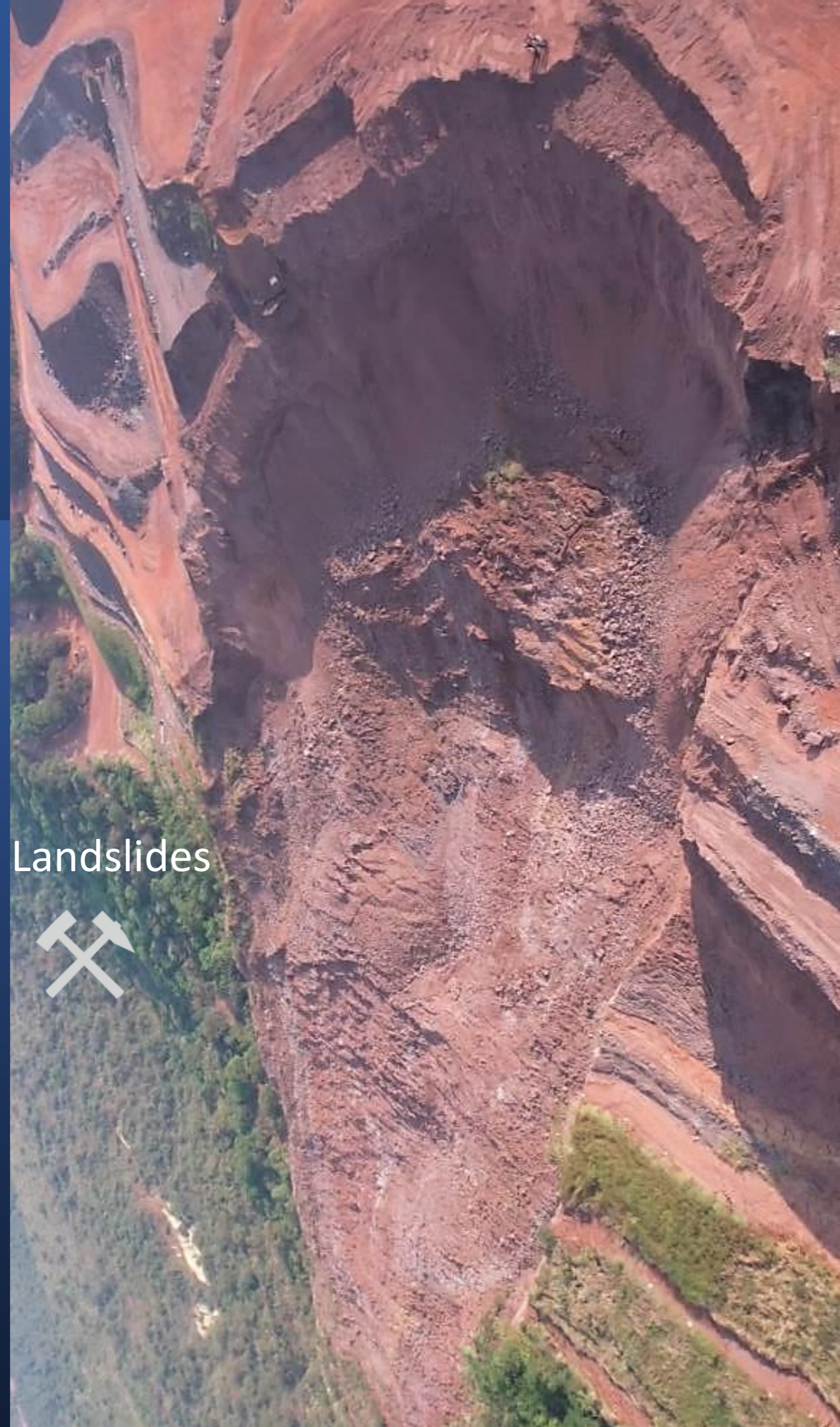
Iron ore mining

Immediate action needed

Dust abatement and road repair

Geotechnical stabilization of wasterock dumps

Pollution hotspot identification



Landslides



Biodiversity loss after restoration



Unstable mine dumps

Low effective prevention of erosion, landslides, debris flows, etc.



Competition for roads



Post-mining development in India



Restoration, reclamation, remediation, rehabilitation...

Restoration – recovery of an **ecosystem**



Reclamation – geotechnical **stabilization** of land



Remediation – **cleaning up** contamination



Rehabilitation – managerial return for **human use**



Renewable energy

Stabilized and cleaned man-made badlands can host wind farms or solar energy parks



India is now producing the world's cheapest solar power

Jun 28, 2019



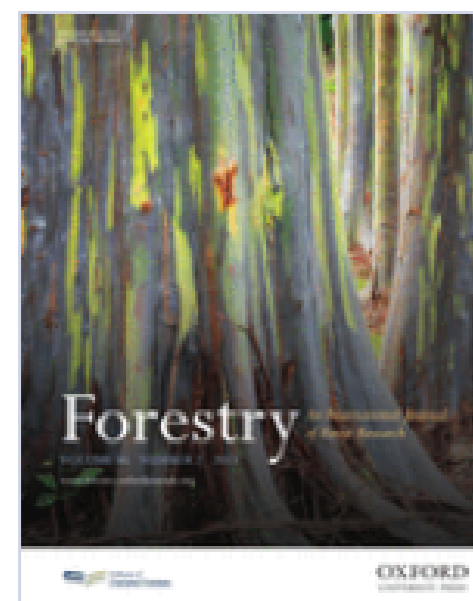
Renewable energy

Stabilized and cleaned man-made badlands can host wind farms or solar energy parks



Carbon sequestration

Restoration of formerly mined land can capture large quantities of atmospheric carbon. The carbon stocks are in five pools: aboveground, belowground, litter, debris, and soil.



Volume 86, Issue 2
April 2013

JOURNAL ARTICLE

Carbon sequestration potential of post-mining reforestation activities on the KwaZulu-Natal coast, South Africa FREE

M. W. van Rooyen ✉, N. van Rooyen, G. H. Stoffberg

Forestry: An International Journal of Forest Research, Volume 86, Issue 2, April 2013, Pages 211–223, <https://doi.org/10.1093/forestry/cps070>

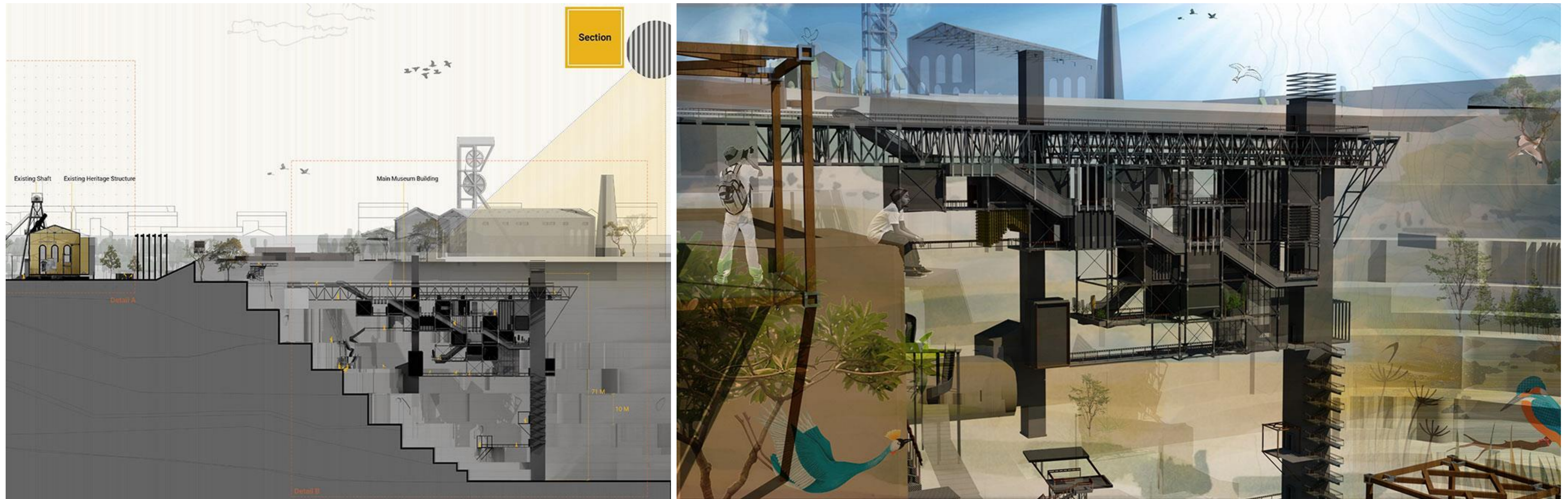
Geotourism

Geological attractions and destinations

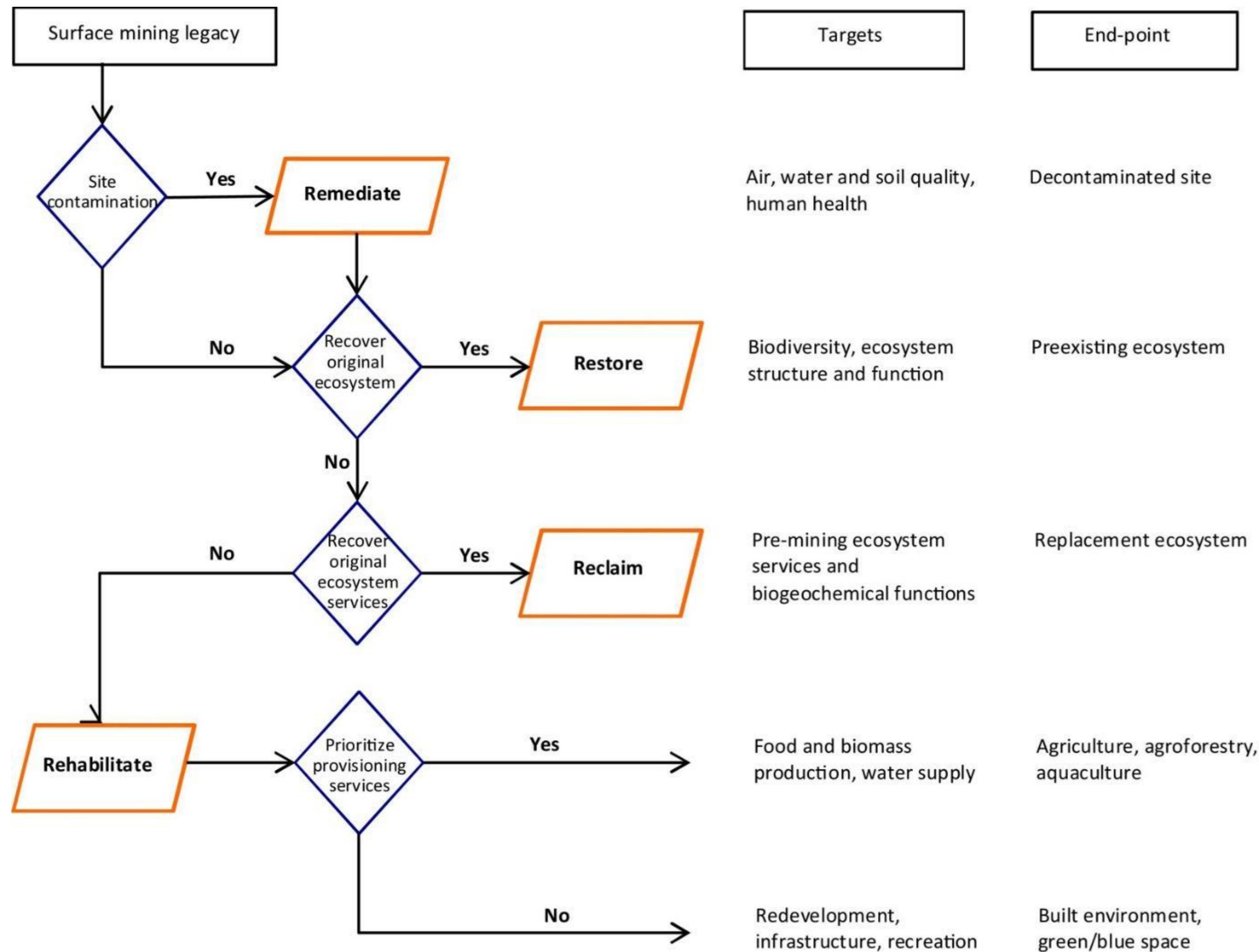


Open-air mining museum

The concept already proposed for abandoned gold mines in Karnataka



What to do?



A decision tree based on targets and end-goals for post-mining recovery

Thank you!

alekseenko@unu.edu

Scholarship for doctoral researchers

“Resource Nexus for Sustainability Transformations (NEXtra)”

From 2023 until 2030, we expect annual intakes of approximately 7 to 8 scholarship-funded candidates.

All candidates and supervisors will be connected to the UN system, an approach that is facilitated by regular consultations with the United Nations Development Cooperation Office.

The program coordination: nextra@unu.edu



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