

Sektorvorhaben Rohstoffe und Entwicklung

Just Transition: the environmental justice aspects of coal mine closure

Authors: María-Elena Huertas, Andrés Ángel, Teresa Bornschlegl

1. WHAT DOES A “JUST TRANSITION” (JT) MEAN, AND WHAT DO THE ENVIRONMENT AND COAL MINE CLOSURE HAVE TO DO WITH IT?

The concept of JT is said to have its roots in the 1970s when labor unions in the United States argued for support for workers whose jobs were threatened by environmental regulations¹. With organizations such as the International Trade Union Confederation, the global labor movement proposed JT to integrate social justice into the climate protection debate. That discourse initially centered on coal mines and their closure, mainly from a labor-oriented perspective. Since then, the concept has broadened to include other aspects regarding the benefits and costs of the “low-carbon transition”. Despite its importance for global discussions, there is currently no consensus on the definition of JT.

Transitioning from fossil fuels to other energy sources leads to the eventual closing of coal mines. While the debate on mine closure in the context of JT often discusses social and economic issues regarding equity and social justice, environmental aspects tend to receive less attention. However, poorly planned closures or abandonment of mines generate detrimental environmental conditions which compromise ecological sustainability and cause adverse health impacts. For instance, according to a recent report by Human Rights Watch, hundreds of abandoned coal mines in South Africa put people at risk of accidents and

drowning and negatively impact the quality of surface and groundwater resources.² A Just Transition in environmental terms thus implies that adverse environmental impacts ideally are prevented or, if that is not possible, reduced and mitigated to acceptable levels.

2. WHICH BMZ PARTNER COUNTRIES HAVE OPERATIVE COAL MINES?

Worldwide, the five most significant producers of coal in 2021 were China, India, Indonesia, the USA, and Russia.³ Operative coal mines (hard coal and lignite) exist in almost half of the 65 BMZ partner countries (see table 1) – and all these mines need to be closed one day.

3. WHAT ENVIRONMENTAL RISKS ARE TYPICALLY ASSOCIATED WITH AN IMPROPER CLOSURE OF COAL MINES?

Although mine closure is frequently misrepresented as just decommissioning infrastructure, closure and post-closure stages constitute critical phases of the mine life cycle. Mine closure is a dynamic and iterative process whose design should start even before the licensing phase and must be continuously reviewed during the project in the light of new evidence. The same holds true for coal mines.

¹ Sweeney, S. and Treat, J. 2018. Trade Unions and Just Transition. The Search for a Transformative Politics. Working Paper, 11. Trade Unions for Energy Democracy, Rosa Luxemburg Stiftung New York Office, Murphy Institute at the City University

² Human Rights Watch. 2022. The Forever Mines Perpetual Rights Risks from Unrehabilitated Coal Mines in Mpumalanga, South Africa.

³ VDKI. 2022. Jahresbericht 2022 – Fakten und Trends 2021/2022.

TABLE 1: COAL PRODUCTION (HARD COAL AND LIGNITE) IN MIO T IN BMZ PARTNER COUNTRIES (2021)¹⁾

BMZ Partner Country	Production volume in Mio t
Ethiopia	< 0.01
Nepal	0.01
Malawi	0.06
Afghanistan	0.11
Peru	0.14
Georgia	0.15
Niger	0.25
Albania	0.36
Bangladesh	0.75
Tanzania	0.98
Zambia	1.00
Nigeria	1.44
Uzbekistan	4.78
Brazil	6.66
Pakistan	7.00
Mexico	7.00
Kosovo	8.50
Mozambique	10.50
Bosnia & Herzegovina	12.79
Laos	14.32
Ukraine	29.39
Mongolia	32.32
Serbia	36.43
Vietnam	48.31
Colombia	55.29
South Africa	228.65
Indonesia	613.99
India	825.68
China	4070.00
World	8102.26

1) BGR – Bundesanstalt für Geowissenschaften und Rohstoffe (2022): BGR Energiedaten 2022 – Daten zu Entwicklungen der deutschen und globalen Energieversorgung; Hannover (in preparation, expected in December 2022).

If coal mines are not closed adequately, they risk leaving environmental legacies behind. These risks include:

- ▶ **Loss of productive land and biodiversity:** Surface mining takes up vast areas of land. It is essential to rehabilitate those areas in ways that either regenerate the ecosystems or create land-use options that can coexist with the new ecological conditions. Such land-use options can include, for instance, parks or the installation of renewable energies. The feasibility of these alternatives will depend on the ecological conditions (soil, water, air quality) after the mine closure.
- ▶ **Impacts on regional and local water supply:** Due to the sometimes significant groundwater lowering, the groundwater is refilled after mine closure – if local climatic conditions allow that. Until reaching a balance, the water supply can be severely impaired locally and regionally (e.g., due to the loss of supply to rivers, which may have previously transported the pumped-off water volumes).
- ▶ **Water pollution by acid mine drainage and subsequent metals leaching:** Coal deposits are often associated with the occurrence of sulfur-bearing minerals. When these minerals come into contact with water and air, sulfuric acid is generated, which, in turn, can leach heavy metals – a process called “acid mine drainage (AMD) generation. AMD can pollute soils and water, affecting water supply and health.
- ▶ **Emissions of gases and air pollution:** Spontaneous combustion of coal, which remains on the soil and in situ close to the surface, can release carbon dioxide (CO₂), carbon monoxide (CO), nitric oxide (NO), nitrogen dioxide (NO₂), and particulate matter emissions, contributing to air pollution and greenhouse gas emissions (GHG). Coal mines can also release large volumes of methane (CH₄) during and after their lifetime, a potent GHG several times more harmful than CO₂ in the short term.⁴

⁴ Global Methane Initiative. (n.d). Methane from coal mines: reducing climate change impact. <https://www.globalmethane.org/>

PERPETUAL IMPACTS:

Some of those impacts may require monitoring, maintenance, and mitigation in the long term or even in perpetuity (at a human scale). Perpetual impacts can be understood as “*impacts ... that are expected to persist for centuries, millennia or longer, whose end date cannot be predicted with reasonable and substantial evidence, and which entail wicked institutional challenges.*” These impacts demand financial resources in perpetuity. For instance, in Germany, the Ruhr region and Lusatia mining area face perpetual costs in water management and subsidence control.

- ▶ **Geotechnical instability:** The spontaneous combustion of coal seams and deep coal excavations (underground mining) can lead to subsidence. Furthermore, runoff water can generate erosion of the remnant rock piles, and post-mining rising groundwater levels can affect the static dump stability, promoting slope failure and landslides.

4. WHAT ARE GOVERNANCE CHALLENGES IN TERMS OF AVOIDING ENVIRONMENTAL LEGACIES?

A good governance is essential for avoiding environmental legacies and minimizing risks. Mine closure plans (MCP) and their monitoring are a critical foundation for a good governance. Mine closure plans are a series of science-based, coordinated, and SMART⁵ programs and actions aimed at preventing, remediating, mitigating, and/or compensating for adverse impacts in decreasing order of preference. They must contain explicit provisions for post-mining physical, chemical, and ecological stability, security measures for infrastructure, and socioeconomic post-closure alternatives. Operator liability should only cease with reasonable and sufficient evidence that unacceptable long-term/perpetual costs will not occur or be adequately managed.

Coal mine closure faces challenges that vary from country to country. In general, the most pressing governance issues commonly found in the Global South are:

- ▶ Lack of baseline and specific policies, regulations, guidelines, and standards to elaborate, implement

and evaluate closure plans, including post-closure liability regimes and financial insurance

- ▶ Inadequate environmental monitoring and control in both the closure and post-closure stages to identify the risks and problems and determine the need for action
- ▶ Inadequate environmental prevention, remediation and mitigation
- ▶ Gaps in adequate local participation both in the design and implementation of closure plans
- ▶ Lack of concrete economic reorientation plans that provide alternatives for the local population considering adverse health effects and new ecological conditions after mining

Governance challenges are often embedded in more structural problems, such as institutional weaknesses, lack of financial resources, lack of awareness from decision-makers, in some cases, corruption and State capture, undefined responsibilities, and the absence of due diligence from relevant stakeholders in the value chain.

5. HOW COULD INTERNATIONAL COOPERATION FURTHER SUPPORT JT IN PARTNER COUNTRIES?

The Ministry for Economic Development and Cooperation (BMZ) currently supports the study “Sustainable Transformation in Coal Regions of the Global South: Challenges from a Resource Nexus perspective“ by UNU-Flores, which investigates how to implement a Just Transition in countries of the Global South with a particular focus on challenges in the mining sector. International cooperation plays a vital role in supporting Just Transitions. Countries with experience

⁵ Specific, Measurable, Attainable, Relevant, and Timely.

in JT could contribute with expertise, advisory, and resources e.g. in the following areas:

- ▶ Implementation of experience exchange programs on coal mine closure between professionals from the Global South and JT countries.
- ▶ Creation of area-specific conditioned scholarships to advance knowledge of technical mine closure aspects, environmental control, monitoring, JT, etc.
- ▶ High-level political outreach and advocacy through the Federal Ministries to support regulatory progress.
- ▶ Knowledge exchange among stakeholders at the decision-making level that aims at bringing JT issues to the forefront of the public agenda (legislators, local/regional authorities, etc.).
- ▶ Support national and local governmental oversight agencies responsible for controlling the mining sector, such as environmental, water, and mining authorities
- ▶ Support independent community monitoring initiatives that aim to collect baseline data in cases where mining has not yet taken place and monitoring data in cases where impacts have already been experienced.
- ▶ Support and endorse environmental due diligence and mineral supply chain regulations at the European and national level, as well as international treaties that aim to protect human rights and the environment in jurisdictions of the coal value chains.
- ▶ Creation and enforcement of strict standards for companies that include appropriate measures in cases of non-compliance
- ▶ Assistance to affected communities in international litigation cases.

IMPRINT

Contact:
Sektorvorhaben Rohstoffe und Entwicklung
Bundesanstalt für Geowissenschaften und Rohstoffe (BGR)
Stilleweg 2
30655 Hannover (Germany)