

Phosphate Pollution in Gabès – Impacts and Possible Ways Out.

Departing from a fieldwork conducted in March 2023, this policy report examines pollution's impact on health and livelihoods, contextualizes phosphate production within the political economy, and proposes alternative solutions for a just energy transition and cleaner environment.

BUILDING RESILIENCE IN THE SOUTH SERIES – POLICY REPORT By Yasmine Akrimi – North Africa Research Analyst

INTRODUCTION

If you have ever been to the coastal town of Gabès in southeastern Tunisia – one of the world's last coastal oases – what I am about to describe will sound painfully familiar to you. Stinging eyes, itchy throat, burning nose, coughing; passing by Gabès feels like passing by a post-Chernobyl site. Pollution is visible to the naked eye – the Gulf of Gabès is even listed as one of the Mediterranean's "pollution hotspots" by the UN Environment Program (UNEP). When looking for the reasons behind such large-scale pollution, it is impossible to miss the phosphate-transformation site run by the state-owned *Groupe Chimique Tunisien* (GCT).

If you are not a Gabès resident, barely a few days spent in the city will leave you with a few daunting questions: What are we talking about when we say Gabès is polluted? Why is it so polluted? And what are some possible solutions to industrial pollution in Gabès?

EXTRACTIVISM, EXPORT AND DEVELOPMENT IN TUNISIA: A WIN-WIN SITUATION?

Phosphate mining in Gabès is part of a larger phenomenon called *extractivism*: a mode of extraction of natural resources mainly directed towards exports "whose social and environmental costs are not included in the prices of products",¹ traced as far back as to the conquest of the Americas and European colonial expansionism. Phosphate is a highly valuable good used as an agricultural fertiliser to enhance crop growth and improve soils' fertility. Considering global demographic growth's projections (8.7 billion by 2030), fertilisers like phosphate are seen as a vital resource to nourish a growing number of human beings.²

Following the twentieth century's decolonisation wave, most resource-rich, newlyindependent states followed a development model that relied on extracting and exporting natural resources towards the global North, in part as a way of ensuring regular foreign currency inflows. In Tunisia, extractivist is clearly displayed in large oil and gas projects as well as in phosphate mining, the country's main natural resource.

Phosphate production in the country has been in crisis for more than a decade. And the problem starts at extraction itself. Prior to 2011, the *Compagnie des Phosphates de Gafsa* accounted for 70% of Gafsa's economic activity, 4% of the country's GDP, and 10% of its exports. Over the 2011-2020 period, phosphate production declined

¹ Acosta, A., (2013) "Extractivism and neoextractivism: two sides of the same curse", in Lang, M. & Mokrani, D. (eds.) *Beyond Development: Alternative Visions from Latin America*. Quito & Amsterdam: Rosa Luxemburg Foundation & Transnational Institute as cited in Hamouchene, H., (2019) "Extractivism and Resistance in North Africa", *Transnational Institute (TNI)*.

² Rousselin, M., (2018) "A study in dispossession: the political ecology of phosphate in Tunisia", *Journal of Political Ecology* 25(1), 20-39.

significantly. By 2021, production had reached 3.726 million tons, up by 32% compared to 2020 (2.830 million tons) but down by 54% compared with 2010's normal production rate (8 million tons).

This decrease – fueled by the numerous citizen-led blockades – paralyses the entire chain, from production to transport to processing. As a result, the GCT's transforming sites in Gabès and Sfax have had little raw material available in the past years. So little, in fact, that the country had to import phosphate from Algeria in 2021 for the first time in its history so as to increase the *Groupe*'s production capacities.

But why are local inhabitants sabotaging the extraction and production of the country's most valuable natural resource, which, by ricochet, should be their most valuable resource? Well, it is because phosphate revenues rarely translate into benefits for localities where the ore is extracted and produced. Worse, it substantially degrades the environment and, ironically, the livelihoods of those living near extraction and transformation sites.

Extractivism does not only entail extracting natural resources; most importantly, it is a process of "accumulation by dispossession"³ at the expense of local communities in which land, water and energy are reserved for an economic activity that does not benefit them. Often, resources mobilised in the extractivist process render local communities more economically and ecologically vulnerable (water and land scarcity, displacement, pollution, mono-economy, etc.).

The inegalitarian choices of the post-independence development model have resulted in unjust disparities between the north and the south, urban and rural areas, the coast and the interior. Polluting and resource-consuming extractivist

³ El Amine, Y., (2023) "Tunisia's Energy Sector: A Just Transition Analysis", *Arab Reform Initiative*.

activities are mainly concentrated in the country's south, which has historically been marginalised in terms of public investment in life quality. Without redistributive justice and communal governance over energy, profits generated in a locality do not translate into jobs, infrastructure and overall development for the region responsible for the wealth. Historically important phosphate-producing cities like Moulares, Redeyef, Medlaoui, Mdhilla for extraction and Sfax, Gabès, Skhira, and Ghannouch for transformation are statistically among the poorest in the nation,⁴ combining high rates of unemployment and environmental degradation with inadequate provision for basic needs. This "paradox of abundance", to quote Hamza Hamouchene⁵, is fueling anger and resistance in marginalised regions, where multimillion industries are translating to "high rates of unemployment, environmental deterioration, lack of proper infrastructure (bridges, streets, railways, sewage, tunnels, airports), and deficient public services (public transportation, water and electricity, health care, educational facilities, entertainment and clubs, etc.)".⁶

In 2018, former head of government Youssef Chahed gave his agreement to dismantle phosphate's six production units in Gabès and replace them with an industrial zone in compliance with international standards. Yet the cost of the operation, estimated at several billion dinars, hinders its execution as the GCT has been losing significant amounts of money and already declared it will not be able to bear that cost. In addition, political instability in Tunisia renders implementing and following up on decisions an extremely tedious task for communities which have demanded social justice for years.

⁴ Hamdène, Z., (2016) "Where are poor in Tunisia?", *Socioeconomica-the Scientific Journal for Theory and Practice of Socio-Economic Development, 5*(9), 109–118.

⁵ Hamouchene, H., (2019).

⁶ Hamed, Y. et al., (2022) "Phosphate mining pollution in southern Tunisia: Environmental, epidemiological, and socioeconomic investigation", *Environment, Development and Sustainability*.

PHOSPHATE-INDUCED POLLUTION IN GABÈS: WHAT ARE WE TALKING ABOUT?

Amongst the various contaminants contained in phosphate, some are radioactive, like uranium and thorium.⁷ These elements amass in the byproducts of transforming and processing phosphate like wastewater and phosphogypsum. Studies published in 2014 and 2018⁸ concluded that metals like uranium and radium are to be found in strong doses in phosphogypsum – an element that results from transforming phosphate.

In Gabès, along with the localities of Skhira and Sfax, the industrial complex generates an average of 6000 tons of phosphogypsum residues daily, discharged into the sea without preliminary treatment via the Chott Essalam beach. This not only causes maritime pollution – which has been decimating the Gulf of Gabès' rich fisheries – but also air pollution, especially when the complex operates its routine draining.

"You can feel the burn in your skin", as many testified to me during my recent fieldwork in the city.

"We have to shut down our windows and doors not to inhale the toxic fumes coming from the chemical complex, even during summer. On days routine draining is operated by the GCT, we do not leave the house nor see the sunlight."

⁷ Al-Hawaiti, M.S., Brumsack, H.J., & Schnetger, B. (2016) "Suitability assessment of phosphate mine waste water for agricultural irrigation: an example from Eshidiya Mines, South Jordan", *Environmental Earth Sciences*, *75*, 276.

⁸ Wali, A., Colinet, G., & Ksibi, M. (2014) "Speciation of heavy metals by modified BCR sequential extraction in soils contaminated by phosphogypsum in Sfax, Tunisia", *Environmental Research, Engineering and Management, 4*(70), 14–26; Reta, G., Dong, X., Li, Z., Su, B., Hu, X., Bo, H., Yu, D., Wan, H., Liu, J., & Li, Y. (2018) "Environmental impact of phosphate mining and beneficiation: review", *International Journal of Hydrology, 2*(4), 424–431.

And it is not just a feeling, but a fact supported by research. A study conducted in 2003 already concluded that over 95% of air pollution in Gabès comes from GCT's factories.⁹

Converting phosphate to phosphoric acid and fertilisers releases a variety of toxic gases, particles and heavy metals that have a detrimental impact on the environment.¹⁰ Carbon combustion produces CO and CO2 gases – major contributors to greenhouse gas emissions and global warming.¹¹ Carbon dioxide accounts for about 65% of global greenhouse gas emissions¹² and is responsible for some of climate deregulation's most salient aspects, such as extreme weather and unbreathable air/poor air quality.¹³ Research has established that uncontrolled emissions from mining activities cause severe air pollution leading to chronic and severe respiratory illnesses, and can even be lethal.¹⁴ In addition, phosphate mining activities increase the concentration of polluting particles which exposure to is linked to respiratory and cardiovascular diseases, cancer, infertility, and deformities in newborn babies.

Transforming phosphate is a water-intensive activity in a water-poor country, which has been depriving locals – especially farmers – of precious water resources and,

⁹ Medhioub, K., (2003) « Étude pollution de l'air des unités du GCT Sfax, Gabès et Mdhilla 2011 », *Données GCT 2016.*

¹⁰ Mokadem, N., Hamed, Y., Ben Sâad, A., & Gargouri, I. (2012) "Atmospheric pollution in North Africa (Ecosystems-Atmosphere interactions): A case study in the mining basin of El Guettar-M'Dilla (Southwestern Tunisia)", *Arabian Journal of Geosciences*.

¹¹ Jatmiko, A. R., Suryani, E., & Octabriyantiningtyas, D. (2019) "The analysis of greenhouse gas emissions mitigation: A system thinking approach (case study: East Java)", *Procedia Computer Science*, *161*, 951–958.

¹² USEPA (US Environmental Protection Agency), (2021) <u>https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data</u>.

¹³ Hartmann, D. L., Wallace, J. M., Limpasuvan, V., Thompson, D. W. J., Holton, J. R. (2000) "Proceedings of the national academy of sciences, 97", 1412–1417.

¹⁴ Zhou, W., Li, Y., Min, M., Hu, B., Chen, P., & Ruan, R. (2011) "Local bioprospecting for high-lipid producing microalgal strains to be grown on concentrated municipal wastewater for biofuel production", *Bioresource Technology*, *102*(13), 6909–6919; Munawer, M. E. (2017) "Human health and environmental impacts of coal combustion and post-combustion wastes", *Journal of Sustainable Mining*, *17*(2), 87–96.

hence, livelihoods. Furthermore, industrial activities in the region have meddled with water tables, undermining the quality of drinking and irrigation water.

A comprehensive study on the impact of this type of pollution on locals' health is yet to be conducted in Gabès, but in Gafsa – a site of phosphate extraction at 155 kilometres – a study published in 2022 concluded "that concentrations of minerelated pollutants in Gafsa basin are above the safe levels for healthy ecological functions".¹⁵ The study also found a concordance between the percentage of residents who have at least one family member working in phosphate and that of respondents with dental fluorosis and/or kidney dysfunction.

Between 2014 and 2018, an EU-funded project named *Programme d'appui à la Gouvernance environnementale locale de l'activité industrielle de Gabès / PGE-Gabès* was implemented in order to tackle industrial pollution in Gabès and bolster the work of local CSOs fighting the phenomenon. The project's final assessment found that phosphate-induced pollution translates into lower productivity for agriculture, fisheries and tourism in Gabès. The annual cost of environmental degradation on the city's economy in 2015 alone has been estimated at 76 million Tunisian dinars (approximately 35 million euros at the time). Fishing is the most impacted sector, making up 47% of total estimated losses, followed by tourism at 33% and agriculture at 7%.

For a coastal town, Gabès has indeed very few tourists and almost no tourism infrastructure. The impact is reflected in low hotel occupancy rates compared to the neighbouring Djerba and Zarzis, as well as to the national average.

For fisheries, only a few dozens of boats remain in activity in Gabès when, according to some fishermen I spoke with, they amounted to hundreds a few decades ago.

¹⁵ Hamed, Y. *et al.* (2022) "Phosphate mining pollution in southern Tunisia: Environmental, epidemiological, and socioeconomic investigation", *Environment, Development and Sustainability*.

93% of the gulf's biodiversity has been decimated according to the collective Stop Pollution, a coalition active in Gabès since 2012. Fishermen who managed to survive had to invest in bigger, more expensive boats to fish farther. Naturally, only those who could afford to do so maintained a livelihood, albeit diminished. As a fisherman testified to me:

"The seabed is empty. We barely fish enough to feed ourselves and our families. In the 1970s, there were more than 200 varieties of fish in the Gulf of Gabes. A large boat used to catch 1000 boxes of fish a day. Now, we're earning barely a few dozen dinars per day."

The evaluation also found that pollution is reflected in a higher morbidity and mortality rate among inhabitants most exposed to airborne particulate matter compared with the national average. According to research conducted by the GCT itself in 2017, the local population reported olfactory nuisances – sometimes accompanied by respiratory and ocular irritation – linked to the gases released during the production processes. This is consistent with my own fieldwork in which, out of the eleven people residing in Gabès I conducted interviews with, seven declared suffering from some form of respiratory disease/discomfort. All feared for the future of their health and that of their loved ones. One individual, who resides near the factories, shared with me the following perspective:

"We have death cases due to pollution, especially amidst those living nearby the site. This is a crime, it is not a normal sanitary situation."

"It is very hard to raise children in Gabès. Not just because of pollution, but because of what it represents. It is hard to imagine a future when there are no jobs et such a threat on our health", a mother of two testified to me.

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Unsurprisingly, the Tunisian healthcare system itself bears the cost of phosphateinduced pollution by an estimated 10 million dinars a year (approximately 3 million euros – 13% of the global cost of Gabès' chemical pollution). During my interviews, many have mentioned the numerous health diseases they and their loved ones were (self)diagnosed with. A woman in her forties who can breathe only through an oxygen machine even assured me her doctor advised her to leave Gabès, but would not deliver her with a certificate that links her health problems with phosphateinduced pollution. Another family I spoke to is a telling example of what repetitive exposure to pollution could lead to. Two family members suffer from severe asthma, and one died from cancer a few years back. Although these health troubles cannot be undoubtedly connected to GCT's activities in Gabès in the absence of a largescale study, all those I spoke with are convinced phosphate-related activities are slowly killing them. Many studies already conducted in other mining sites link proximity to mining sites to increased cancer morbidity and mortality.¹⁶

Although agriculture is the least impacted sector according to statistics, Gabès' residents will tell you otherwise. I spoke to a family that owns agricultural land in the palm groves surrounding the city, who simply cannot cultivate it anymore as "everything we plant perishes". The elder son, who had no choice but to work for the CGT and is considered lucky to have found a job, shared his nostalgia with me:

"Our land used to be a heavenly place. We planted melons, tomatoes, lettuce, pomegranates, figs. Nowadays, the moment the wind brings in the toxic air released by the factories, everything in here dies."

¹⁶ Brown, S. C., Alberts, R., & Schoenberg, M. (2011) "Cancer incidence and mortality among workers exposed to benzidine", *American Journal of Industrial Medicine*, *54*, 300–306; Ayuso-Álvarez, A., García-Perez, J., Triviño-Juárez, J.-M., Larrinaga-Torrontegui, U., González-Sánchez, M., Ramis, R., Boldo, E., López-Abente, G., Galán, I., & Fernández-Navarro, P. (2020) "Association between proximity to industrial installations and cancer mortality in Spain", *Environmental Pollution*.

The collective Stop Pollution did not hesitate to qualify Gabès' ongoing pollution as an "environmental crime" and a form of "industrial terrorism". One of the members I spoke to decided he and his family would leave the country as soon as possible.

"I consider we are environmental refugees. My whole family suffers from respiratory complications. Gabès is unlivable."

As researcher Mathieu Rousselin noted, pollution in southern Tunisia also reinforces class divisions. Large landowners who can afford to invest in modern farming practices and rely on irrigation-intensive crops directed towards export are overexploiting drilling permits, with projections estimating water resources will dry up in a few decades; meanwhile, small farmers with more ecological practices investing in crops destined to the local market are denied investment resources. Local authorities *"are supposed to regulate and control drilling permits, [yet] they are also responsible for accompanying restructuring and modernising the economy – not to mention that they often turn a blind eye in exchange for backhanders."*¹⁷

WHY CENTRALISED GREEN EXTRACTIVISM IS NOT THE SOLUTION

In recent years, Tunisia has joined the "green extractivism" wagon through renewable energy and low-carbon initiatives. Yet green extractivism without a just transition reproduces the patterns of marginalisation and dispossession observed for decades. It also bolsters communities' resistance to the implementation of projects in their regions, which has been observed across Tunisia before and after 2011. It is noteworthy that many scholars trace the origins of the 2011 uprising to the 2008 social movement in the mining basin of Gafsa, which saw unemployed youth, trade unionists, workers and teachers protest the impact of the mining industry's neoliberal restructuring on unemployment and deteriorating labour

¹⁷ Rousselin, M., (2018) "A study in dispossession: the political ecology of phosphate in Tunisia", *Journal of Political Ecology* 25(1), 20-39.

conditions, as well as the politics of exclusion, dispossession and resource extraction that have historically resulted in Gafsa's – and neighbouring cities – marginalisation.

Tunisia's ambition is to reduce carbon intensity by 45% by 2030, compared with its 2010 level. The country also targets a 30% transition from fossil fuels to renewable energies for electricity generation by 2030. The minister for the environment in office since October 2021 boldly announced that Tunisia will be carbon neutral by 2050.

The British-Tunisian TuNur project, a massive concentrated solar power facility encompassing approximately 3.5 million km2 of land in the Saharan desert in Tunisia's south, is an example of green extractivism: a way of "importing the Saharan sun to supply Europe with clean and low-cost energy" ¹⁸ through submarine cables.¹⁹

Since TuNur fundamentally involves the acquisition of land and resources under false ecological pretences, it swiftly incited local opposition. In addition to requiring the control of large areas of land, the project would necessitate a sizable quantity of water usage for the upkeep of panels in an arid area, raising additional concerns for water-scarce Tunisia.

And it is not just TuNur. A map of ongoing protests against large-scale "green energy" projects in Tunisia highlights local communities' awareness of what could be called the "Gabès model": the false promises of development and employment instilled by energy projects. The construction of wind farms in Bizerte in 2010 has seen strong local opposition due to a failure to consult with citizens and the absence of development perspectives for the region; Borj Essahli's wind turbines, built on collective lands under Ben Ali's authoritarian regime, saw inhabitants refraining

¹⁸ https://www.journalismfund.eu/supported-projects/tunur-solar-exportation-project-unjustgreen-energy-project

¹⁹ El Amine, Y. (2023).

from paying their electricity bills as a sign of protest; Segdoud's solar concession, a French-Moroccan private endeavour, is criticised by locals in a site suffering from prolonged drought, unemployment and absence of public services.²⁰

As a campaigner for the collective Stop Pollution told me, echoed by other interviewees, the installation of CGT's factories in Gabès taught communities a valuable lesson.

"Concerns about the environment were not a thing in the 1970s. Now everybody is aware of the disastrous ecological impact of certain industries. Even those in charge of CGT's factories are not denying their activities' harm on the environment and the people. I believe Gabès served as a lesson for local communities to be more careful of what they're promised in terms of development and employment. We can't be fooled anymore."

Hence, Tunisia's decarbonisation process is currently following the same dispossession practices that bolstered community resistance for decades, and will result in an unjust, widely unpopular energy transition. Only a just transition capable of ensuring community ownership of energy projects would bear a chance of equally distributing benefits and burdens, address the transformation of the job market, counter the lack of inclusive decision-making process, and reduce existing vulnerabilities.

²⁰ El Amine, Y. (2023).

RECOMMENDATIONS

- Delocalising CGT's factories should represent a fundamental rupture with current confiscatory practices. In addition to relocation, there should be a restoration of contaminated environments, a general purification program for Gabès' industrial units, a commitment to corporate social responsibility and improved agricultural and fishing practices. The relocation must also include measures for environmental and social compensation.
- Conduct a state-sponsored study on the impact of phosphate-induced pollution on the health of residents in Gabès. The study should examine the cumulative impacts on health over time and consider the potential risks associated with chronic exposure to pollutants. This information will provide a comprehensive understanding of the health risks faced by the local population. In addition, the study should involve environmental, public health, and toxicology experts, and utilize rigorous methodologies. More importantly, engaging with residents, community leaders, and environmental organizations will not only ensure their participation but also help gather valuable insights, concerns, and local knowledge that can inform the study design and its implementation. It should provide actionable policy recommendations to mitigate health risks and promote public awareness through widespread dissemination. This study will enable policymakers to make informed decisions and implement interventions to address phosphate pollution and protect public health in Gabès.
- Engage with different stakeholders for a reasonable strategy of a just energy transition. This includes researchers, union representatives, CSOs, and most importantly, local communities themselves. As Tunisia's past and current social movements demonstrate, those bearing the socio-economic and environmental costs of an energy project must also benefit from it if the project is to succeed. Learning from the structures and dynamics of dialogue implemented by PGE-Gabès, which has facilitated community engagement and participation, can serve as a valuable model for fostering effective stakeholder collaboration. By engaging with different stakeholders, including researchers, union representatives, CSOs, and local communities themselves, a strategy for a just energy transition can be developed. This approach ensures that the transition is socially inclusive, environmentally sustainable, and aligned with the needs and aspirations of the communities affected by energy projects.

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