MANGANESE MATTERS

A metal of consequence for women and communities in South Africa affected by mining and the global energy transition

June 2021

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Manganese Matters, ActionAid Netherlands
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Vuyiswa Nombesi looks through the window of her two-bedroom house
built with materials that contain asbestos. Blasting by the mines releases it into the air. (c)Sam Reinders/ActionAid

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ABBREVIATIONS

DM - District Municipality
DMRE - Department of Mineral Resources and Energy
EMM - Electrolytic Manganese Metal
ESS - Energy Storage Systems
EU - European Union
EV -Electric Vehicle
FPIC - Free, Prior and Informed Consent
JTG - John Taolo Gaetsewe (District Municipality)
LM - Local Municipality
LMO - lithium-ion manganese oxide battery
MACUA - Mining Affected Communities United in Action
MPRDA - Minerals and Petroleum Resources Development Act 28 of 2002 (as amended by the Mineral and Petroleum Resources Development Amendment Act 49 of 2008)
NCM or NMC - Lithium-ion nickel manganese cobalt oxide battery
SOMO - Centre for Research on Multinational Corporations
SLP - Social and Labour Plan
UN Comtrade - United Nations Commodity Trade Statistics Database
WAMUA - Women Affected by Mining United in Action

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EXECUTIVE SUMMARY

Many countries, including the Netherlands, have set goals for shifting towards more sustainable energy sources in an effort to limit global warming to less than 2 degrees Celsius above pre-industrial levels. As a consequence of these moves towards more sustainable energy sources in the Global North, great pressure is being applied to resource-rich countries in the Global South.

Renewable energy sources such as wind turbines and batteries for electric vehicles and energy storage are increasing the demand for several key minerals that come from low and middle-income countries such as Zambia, Democratic Republic of Congo, and South Africa, where mining poses serious threats to the environment and human rights, particularly the rights of women and girls. One of the 17 key minerals identified by the World Bank as being essential for the energy transition is manganese, which is primarily found and mined in South Africa. This research report focuses on manganese, drawing on empirical research on the ground in South Africa to identify and document the adverse social and environmental impacts of manganese mining, and tracing manganese supply chains from South Africa to their end uses in renewable energy technologies such as wind turbines and electric vehicles in the Netherlands and Europe.

This research revealed that local communities and particularly women in the South African Kalahari, home to the world's largest manganese resources, are not being provided meaningful opportunities for their views to be taken into account in mining companies' decision-making that impacts them, and that their right – as recognised by the South African Supreme Court – to free, prior and informed consent (FPIC) concerning mining activities that impact them is not being respected. The research further found that communities living near mines are exposed to a variety of health risks, including asbestosis and respiratory diseases, and are deprived of the already scarce water supplies, in addition to the fact that water sources available are also being polluted, in violation of their right to a healthy environment and in contradiction to the OECD Guidelines for multinational enterprises.

The research found that manganese mined under these conditions and causing or exacerbating these impacts makes its way from the South African Kalahari to countries around the world, including the Netherlands, where it is primarily found in steel, one of the most widely used metals in the world. One-third of all European imports of manganese comes directly from South Africa, with a much larger share entering the European Union indirectly after being refined in China and Norway. In 2019 alone, the Netherlands imported 62 kilotonnes of manganese ore, of which 70% came directly from South Africa. The Netherlands is the world's fourth largest importer of ferromanganese, which is a key alloy necessary for the production of steel. Indeed, steel production accounts for 90% of global manganese demand, and several low-carbon technologies, including wind turbines and electric vehicles (EV) rely heavily on steel, and thus also on manganese. The Netherlands also imports manganese as part of finished products such as the high-tech lithium batteries powering EVs and storing the energy from wind turbines, as these batteries contain manganese in their cathodes. This means that the growing demand for manganese needed for the energy transition and steel production in the Netherlands and Europe is directly linked to the adverse human rights impacts identified in this report.

Based on the findings of this research, the authors formulate recommendations for six different types of government and corporate actors, calling on them to take action to identify, prevent, mitigate, and remediate adverse impacts on manganese mining-affected communities, particularly women and girls. Recommendations are addressed specifically to 1) governments in manganese-rich countries, 2) governments in countries in which demand for manganese is increasing due to a transition to low-carbon technologies, 3) Manganese mining companies, 4) companies involved in the manufacturing of low-carbon technologies containing manganese such as steel, batteries and wind turbines, 5) companies involved in the end use of low-carbon technologies containing manganese such as wind park developers and automobile companies and 6) banks, pension funds and other financial institutions with financial links to companies mining or using manganese.

The Dutch and European growing demand for manganese needed for the energy transition and for steel production can be linked to the human rights abuses by manganese mining companies in South Africa

1. INTRODUCTION

Despite temporary reductions in emissions due to COVID-19, 2020 was one of the top three warmest years on record and concentrations of greenhouses gases continued to increase.[1] Finding solutions for this continuing climate crisis is rising to the top of the global agenda[2]. More specifically, the shift from polluting fossil fuels such as coal, gas and oil to renewable energy and low carbon technologies is picking up steam in the Global North. Many countries, including the Netherlands, have set goals for shifting towards more sustainable energy sources. By 2030, the Netherlands aims to increase electricity production from renewables to 84 TWh (as compared to 17 TWh in 2017) and for all new cars sold to be emissions-free, in an effort to limit global warming to less than 2 degrees Celsius above pre-industrial levels.

Renewable energy sources such as wind turbines and batteries for electric vehicles are increasing the demand for key minerals that come from countries like Zambia, Congo and South Africa.

However, in contrast to these moves towards more sustainable energy sources in the Global North, great pressure is being applied to resource-rich countries in the Global South. Renewable energy sources such as wind turbines and batteries for electric vehicles and energy storage are increasing the demand for several key minerals that come from least developed countries (Zambia and Congo) and middle-income countries such as South Africa. Currently the most known and talked about key minerals for the energy transition are copper, cobalt, nickel and lithium. The World Bank[3], however, identified 17 additional key minerals, including graphite, manganese and aluminium, that are key for the energy transition.[4] It is widely documented that mining such minerals poses serious threats to human rights and the environment, particularly in resource-rich countries.[5] In particular, negative impacts on local communities and women are expected to increase along with growing mineral demand unless something is done about it.[6]

While the impacts of key minerals like cobalt[7], copper[8] and lithium have been widely researched in relation to the energy transition, manganese has not received the same amount of attention, despite it also being a key mineral. Without manganese, steel can't be produced, and the latter is one of the most widely used metals in the world. Steel production accounts for 90% of global manganese demand (and 8% of global greenhouse emissions). Steel and manganese use is widespread in several low carbon technologies, including wind turbines and electric vehicles (EV). Though estimates vary per company and type of turbine, a single wind turbine can contain up to 7,500 kg of manganese, while an average car contains around 900 kg of steel. Furthermore, the batteries powering EVs or storing the energy from wind turbines contain manganese in their cathodes. Manganese is thus an essential mineral for industry and for the energy transition.

This research focuses on South Africa because it hosts 75% of manganese resources, and is therefore particularly important for the world's efforts towards decarbonisation.[9] The authors of this research report do not question the importance of phasing out fossil fuels and the urgent need to shift towards renewable energy. However, we are convinced that this transition cannot be realised through human rights abuses and exploitation. Furthermore, besides reducing emissions, the transition should reduce inequality, leave no one behind and distribute costs and benefits equitably among all the parties involved.

The community-driven social audit baseline report done by ActionAid South Africa in cooperation with Mining Affected Communities United in Action (MACUA) and Women Affected by Mining United in Action (WAMUA) in 2018 also concluded that communities are facing adverse effects due to manganese mining in the Northern Cape Province of South Africa[10]. These range from health issues to severe air and water pollution. The social audit highlighted several communities in this area that have been negatively affected by manganese mining.

The 2018 social audit found that women and men alike must deal with the health impacts of pollution such as coughs, sinusitis, and asthma, but that women have the extra burden of taking care of sick family members. In addition, women are forced to walk long distances to access health facilities as well as to fetch water. Beyond this, women also have had to contend with limited access to employment and other economic activities, making it very difficult to support themselves and their families, and they are often forced to find other solutions, such as sex work, to survive.

Results from the social audit conducted in Postmanburg, a remote town in the Northern Cape, show some worrying trends that warrant further study to ascertain whether the pursuit of renewable energy in isolation from social, political and economic realities will simply exacerbate existing inequalities. This cost will inevitability be borne by women in marginalised mining-affected communities.

As a follow up to the 2019 social audit, this research report focuses on the following main research question:
To what extent is manganese mined in South Africa and used in the Netherlands and Europe (in steel and renewable energy technologies) linked to human rights abuses and environmental impacts?

1 World Meteorological Organization (2021). "State of the Global Climate 2020." https://library.wmo.int/doc_num.php?explnum_id=10618
2 IPCC (2020): Global warming of 1.5 °C. https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf
3 WorldBank (2020). "Minerals for Climate Action. The Mineral Intensity of the Clean Energy Transition" https://pubdocs.worldbank.org/en/961711588875536384/Minerals-for-Climate-Action-The-Mineral-Intensity-of-the-Clean-Energy-Transition.pdf
4 The complete list includes: aluminum, chromium, cobalt, copper, graphite, indium, iron, lead, lithium, manganese, molybdenum, neodymium, nickel, silver, titanium, vanadium and zinc.
5 'EJOLT | "Environmental Justice Organisations, Liabilities and Trade", accessed October 29, 2020, http://www.ejolt.org/; Marta Conde, "Resistance to Mining. A Review" Ecological Economics 132 (February 1, 2017): 80-90, https://doi.org/10.1016/j.ecolecon.2016.08.025; Antistatique, "Home | RMI Report 2020", accessed October 29, 2020, https://2020.responsibleminingindex.org/en/results/thematic/31
6 ActionAid (2020). "Principles for Just Transitions in Extractives and Agriculture: Shaping energy and food systems that work for women, communities and the climate." https://actionaid.nl/2020/12/17/principles-for-just-transitions-in-extractives-and-agriculture-shaping-energy-and-food-systems-that-work-for-women-communities-and-the-climate/
7 Amnesty International (2016). "This is what we die for: Human Rights Abuses In The Democratic Republic Of The Congo Power The Global Trade In Cobalt."https://www.amnesty.org/download/Documents/AFR6231832016ENGLISH.PDF
8 SOMO (2016). "Cobalt Blues." https://www.somo.nl/cobalt-blues/
9 USGS (2020), Mineral Commodity Summaries 2020, https://doi.org/10.3133/mcs2020.
10 ActionAid (2018). "Social Audit Baseline report. Mining in South Africa; Whose benefit and whose burden?" https://macua.org.za/wp-content/uploads/2019/08/Social-Audit-Baseline-Full-Report-5.3_Online.pdf

Very little attention is being paid to women by companies and local governments, even though the South African Constitution names anti-sexism as a specific focus.

First, the research study *will identify the human rights and environmental impacts of manganese mining in South Africa in three communities (Maipeng, Vergenoeg, Magojaneng) located close to the Kalahari Manganese Field.* A specific focus will be on women, and the gendered aspects of these human rights violations. The 2019 social audit baseline report already showed clearly that very little attention was being paid to women by companies and local governments, even though the South African Constitution names anti-sexism as a specific focus. Furthermore, the mining sector is known to be male-dominated and is therefore exploitative towards women, with barely any jobs for them and limited inclusion of women in decision-making processes regarding mining in the communities they are part of.

Second, the research will map the manganese supply chain from the mines (in South Africa) to its end-use in the Netherlands (and Europe) with particular attention to its application for the production of steel and low carbon technologies such as electric vehicles, wind turbines and energy storage. This has the aim of identifying leverage points to be used by affected communities and supporting organisations to advocate for the prevention and remediation of the negative impacts of manganese mining, as well as to support calls to the renewable energy industry to use its leverage and momentum to improve mining conditions and prevent negative impacts. Another aim of this research is to create more awareness within the communities on the end uses of the manganese that is being mined in their backyard and their role in the energy transition. The results of this research could then be used to advocate for a more inclusive and just transition for all. Recommendations will also be made toward governments and companies to ensure human rights are respected while sourcing manganese.

2. RESEARCH METHODS AND SCOPE

This research used multiple methods to answer the main research question. Social audit, literature review and secondary data analysis were the main methods.

2.1 SOCIAL AUDIT

The research team conducted a social audit, which is a community-driven research process that uses the experiences and narratives of communities to measure whether state or private actors have fulfilled their social and legal commitments.
The methodology was chosen because it facilitates the goal of developing the agency of marginalised communities in that "[s]ocial audits seek to engage citizens and communities directly in monitoring the delivery of public services and holding the government to account for poor performance, mismanagement or, in some cases, outright corruption."[11]

A purposive sampling process was used to select communities. Working in collaboration, the leaders of MACUA and WAMUA identified three communities in the strip of villages bordering the Kalahari Manganese Field that were at different distances from the mines and therefore had different experiences of them. The social audit was done in these three communities because they are near the mines in the area that contribute to the largest amount of manganese produced in South Africa.

Upon selection of the communities, the MACUA and WAMUA coordinators were tasked with identifying and selecting a core group of volunteers who were charged with driving the process at the local community level. The core group participated in an extensive training workshop to unpack and understand the social audit methodology, and its potential for building community organisation and developing and affirming the agency of the communities. Training of the core group was conducted in partnership with ActionAid South Africa. The social audit guide developed by the Social Audit Network was used as the primary directive.

A social audit is a community-driven research process that uses the experiences of communities to measure whether state or private actors have fulfilled their social and legal commitments.

Following the training, the core group of volunteers, MACUA and WAMUA coordinators, and ActionAid South Africa staff worked for three days to develop the survey questions. The research questionnaire was then distributed to the core group, who collected the primary data through door-to-door visits and community mapping. This helped to identify the key impact of manganese mines on the socio-economic wellbeing and development of communities surrounding mines in the Northern Cape. The data was then tentatively compiled and assessed by the core groups.
The next phase of data collection, after the initial analysis of the survey data, comprised focus groups and loosely structured individual interviews. This allowed for greater contextualisation of the concerns previously highlighted and provided a deeper understanding of the issues faced by communities in the Northern Cape. The data was then compiled into a draft report by the MWAO team and presented to the community for feedback and verification.

11 Kidambi Sowmya, "Social Audit: What Happens When the Government Does Not Collaborate?" Global Partnership for Social Accountability Knowledge Platform (blog), February 28, 2021. https://gpsaknowledge.org/social-audit-what-happens-when-the-government-does-not-collaborate/.

The researchers and methods employed were constrained by COVID-19 pandemic-related lockdown restrictions in that large gatherings were not allowed and only a sample group of 50 persons could be surveyed in order to curb the potential spread of COVID.

Table 2.1: Number of participants engaged in different phases of primary data collection

RESEARCH PHASE	MAIPENG	MAGOJANENG	VERGENOEG
Questionnaire surveys	46 people	47 people	50 people
Focus groups (mixed)	24 people	24 people	9 people in the first group, then 10 people in the second group
Focus groups (women only)	N/A	13 people	26 people
Individual interviews	2	2	2
Interviews with local government	Ten local government officials who operated across all three communities		

Where possible, focus groups of women only were held in order to better understand the unique experience of women in mining-affected communities. Both governmental and traditional leaders, as well as mineworkers, tend to be men. Women's voices are therefore often neglected in socio-political discourse.
The disparities have been normalised to such an extent that few respondents readily introduced them as an issue in focus groups. However, a sample of 74 community members across the three villages illustrates the differential levels of participation.

While the rate of completion of high school does not differ significantly, with 21% of women and 23% of men having completed high school, the rate of employment at mines is highly skewed: 77% of respondents know a man who works at a mine, while only 16% of respondents know a woman who works at a mine.

Men were twice as likely to say that they are comfortable raising issues with their LM (38% as compared to 19%); and more than three times as likely to say that they are comfortable raising issues with the Traditional Council (23% as compared to 7%). When asked about the lack of gender parity in positions of leadership, a young man in Maipeng, Abel Mabihi, said: "The youth see it, but we have leaders and you can't tell your leader how to do his job."

Women experience mining's effects on socio-economic wellbeing because of the role they are required to play in fulfilling the basic needs of their family. This often leaves them responsible for many of the resultant burdens of mining – such as having to spend extra time accessing clean water or caring for sickly family members. In Maipeng it was not possible to organise a women's-only focus group because of the tensions that exist between the youth (who were responsible for organising in the community) and the traditional leadership that sits in Maipeng. Those tensions almost resulted in no focus groups being held in Maipeng. None of the 18 community members in Maipeng who were asked said that they felt comfortable bringing concerns to traditional leadership. Ultimately, young people were willing to engage with the researchers without their views being mediated by traditional leadership, whereas women were concerned that holding a women's-only group might appear to be a slight against the traditional leaders in Maipeng, all of whom are men.

Women experience mining's effects on socio-economic wellbeing because of the role they are required to play in fulfilling the basic needs of their family.

Across the three communities, three main themes came out of the preliminary audit – the right to free and prior informed consent (FPIC) and participatory governance, the right to health, and the right to water. Communities attributed the violation of these rights to the operation of manganese mines in their area. As such, further research centred on these three themes.

Requests for mines' Social and Labour Plans (SLPs), and for a meeting, were sent to Black Rock Assmang Mine, Kalagadi Manganese Mine, Kudumane Manganese Resources, Mokala Manganese Mine, Sebilo Resources, Tshipi Borwa Mine, South 32 and United Manganese of Kalahari. South32 shared their SLP with the researchers and made it available on their website. None of the other companies provided their Social Labour Plans or have them available on their websites.[12]

12 The social audit methodology usually makes use of written commitments, such as legislation or plans, against which the real situation is compared. Since we were not able to access the SLPs, the Constitution of the Republic of South Africa, 1996, was used as a basis to assess the fulfilment of the rights guaranteed therein.

2.2 DESK RESEARCH

To map the manganese supply chain, the researchers conducted a literature review of academic journals, research publications and company and NGO reports. In addition, the researchers gathered and analysed data from secondary sources such as the UN International Trade Statistics Database, the International Energy Agency, the World Bank and the International Manganese Institute.
The research team collaborated with Aura Cy (Pty) Ltd, a broad based black economic empowerment (BBBEE) research consultancy based in Johannesburg, South Africa. Aura Cy (Pty) conducted secondary source scoping research focusing on the manganese ore extraction process in South Africa, including domestic transportation, processing, and export.

As part of the research, a questionnaire was sent to companies and other relevant stakeholders in the wind, battery and automotive industries.
The contacted companies (and relevant stakeholders) included:

- Wind energy: Enercon, SiemensGamesa, Ørsted, Eneco, Vattenfall, Nordex, Engie, MHI Vestas and the Netherlands Wind Energy Association (NWEA) and WindEurope.
- Car companies: Renault, BMW, Jaguar, Tesla, Nissan, Volkswagen, Hyundai
- Battery manufacturers: LG Chem, CATL, BYD, Panasonic

Only Ørsted, Eneco, NWEA, WindEurope, Vattenfall and Volkswagen responded to the questionnaire. Prior to publication, the report was also shared for company review with the following mining companies: South32, Assmang, Kalagadi Manganese (Pty) Ltd, Kudumane Manganese Resources, United Manganese of the Kalahari (UMK), Tshipi é Ntle Manganese Mining, and Manganese Metal Company. South32 and Manganese Metal Company were the only companies that provided feedback to the report.

As part of the research, a questionnaire was sent to companies and other relevant stakeholders in the wind, battery and automotive industries.

3. MANGANESE FROM SOUTH AFRICA

Manganese is an essential mineral for industry and for the energy transition. Without manganese, steel can't be made. Manganese and steel are both widely used by low carbon technologies (such as wind, electric vehicles, and energy storage) which are rapidly being deployed in many countries to mitigate the climate crisis. South Africa, which hosts 75% of manganese resources, is therefore particularly important for the world's efforts towards decarbonisation.[13]

Manganese is one of the most abundant minerals on Earth; however, it is unevenly distributed and rarely found in high enough concentrations to be suitable for mining. Global manganese production is highly concentrated. In 2019, nearly 60% of production came from only three countries: South Africa (33%), Australia (14%) and Gabon (11%). This means that one third of global manganese production comes from South Africa.

3.1 THE HISTORY OF THE KALAHARI MANGANESE FIELD

The largest land-based manganese ore body in the world is concentrated in the Kalahari Basin, 60 km northwest of Kuruman in the Northern Cape province. It constitutes 75% of the world's manganese resources. South Africa's first high-grade manganese deposits were discovered in the Northern Cape in the 1920s.[14] The birth of the Kalahari Manganese Field in the John Taolo Gaetsewe (JTG) District of the Northern Cape led to the establishment of railway links in the province, allowing South Africa to develop the largest manganese mining ore production rate in the world. All of the major manganese mining companies in South Africa operate in the Kalahari Manganese Field, indeed 18 out of 22, including all the largest ones.[15]

The largest land-based manganese ore body in the world is concentrated in the Kalahari Basin

The Kalahari Manganese Field is the biggest known manganese deposit in one single area and can be measured over a distance of about 425 km^2.[16] The specific region where the manganese is deposited extends from the South of Postmasburg to the north of Hotazel, including both the Wessels and Black Rock Mine farms. The three communities that took part in this research study are 8 to 30 km away from the closest mines in the Kalahari Manganese Field and all are part of the JTG District of Northern Cape Province: Vergenoeg (part of Ga-Magara Local Municipality) and Maipeng and Magojaneng (both part of Joe Morolong Local Municipality). Because the Kalahari manganese field is an expansive area of 425 km^2, the distance of 8–29 km from communities to mines is relatively close. In comparison, communities have to travel over 30 km to find the nearest health clinic.

13 "Mineral Commodity Summaries 2020".
14 "History of Mining in the Northern Cape", The Northern Cape Mining Community, last modified 2021, 2020, http://www.northerncapeminingcommunity.co.za/mining-in-the-northern-cape/history-of-mining-in-the-northern-cape.
15 Creamer, Martin. "South Africa has 22 operating manganese mines – AmaranthCX", Mining Weekly, September 28, 2020. https://www.miningweekly.com/article/south-africa-has-22-operating-manganese-mines-amaranthcx--2020-09-28/rep_id.
16 Bonga, Mpumzi. "An Analysis of the Impact of a Third Player on South Africa's Manganese Industry", Pretoria: The Department of Mineral Resources, 2006. Accessed October 19, 2020, https://www.dmr.gov.za/LinkClick.aspx?fileticket=uQGDUYZDVRU%3D&portalid=0:3.

Table 3.1: Focus communities

MAIPENG	MAGOJANENG	VERGENOEG
Ward 5 of Joe Morolong Local	Ward 10 of Joe Morolong Local	Ward 10 of Ga-Segonyana Local
Municipality in John Taolo Gaetsewe District Municipality	Municipality in John Taolo Gaetsewe District Municipality	1 community member from the focus group was employed by a mine. Others predominantly rely on grants, and 2 on family support
+/- 22 Km from the closest mine, Black Rock (Nchwaineng), and 28 Km from the furthest mine, South 32 (Mamtwan)	+/- 8 Km from the closest mine, Kudumane, and 24 Km from the furthest mine, South 32 (Mamtwan)	+/- 29 Km from the closest mine, South 32 (Mamtwan), and 50 Km from the furthest mine, Black Rock (Nchwaning)
+/- 7Km from Tshineng Clinic and 33Km from Maruping Clinic	+/- 12Km from Tshineng Clinic and 36Km from Maruping Clinic	+/- 7 Km from Tshineng Clinic and 37 Km from Maruping Clinic
Primary School built by the state	No school. Former Primary and Secondary Schools were demolished by the government due to asbestos contamination	Crèche and a Primary School that is under construction since 2018. Primary School built by South 32 after previous schools was demolished due to asbestos contamination
Traditional Council sits in Maipeng as well as Bathlaros	1 community member from the focus group was employed by a mine. Others predominantly rely on grants, and 2 on family support	Youth is Vergenoeg are largely unemployed, and most residents live on grants.
None of the community members in the focus group were employed. They rely on family support, grants and pension to surivive		

3.2
SOCIO-ECONOMIC PROFILE OF COMMUNITIES IN AND AROUND THE KALAHARI MANGANESE FIELD

> "People face a lot of challenges here. You'll find that in one house more than 23 people are living there, and it's a five-room or a four-room. It's a sitting room, a kitchen, and the bedrooms are only two. So during these times [COVID-19], there's no real possibility of social distancing. It's impossible."

Although Northern Cape Province is a mineral-rich province, it has one of the highest poverty and unemployment rates in South Africa.[17] Most revenues derived from mining are realised outside the country's borders – the industry contributes 8.3% to GDP despite representing 25% of South Africa's total exports.[18]

In rural areas of the Northern Cape province, where mining predominates as the main economic activity, communities are characterised by high levels of poverty and unemployment, and low levels of education. Women are worse off: In 2015, 56.5% of women in Northern Cape were living below the poverty line, compared to only 51.8% of men. Living in a female-headed household in the Northern Cape renders a person almost 15% more likely to be living in poverty.[20]

In describing the many facets of poverty in the area, concerns that were especially burdensome for the interviewed women, Lillian Ntekang explained[21]:

<<

The socio-economic state of the three communities is worse in comparison to the numbers in the total of Local Municipalities, which are comprised of more communities than just the three we researched. The latest government census, conducted in 2011, found that 58.7% of people in Joe Morolong Local Municipality (LM) and 41.3% of people in Ga-Segonyana LM were unemployed.[22] Only 6.8% and 10.9% of people in those municipalities, respectively, have achieved a secondary school leaving certificate.[23] Records show that only 11.86% of people in Ga-Segonyana LM and 3.65% of people in Joe Morolong LM have access to water inside their homes.[24] Throughout the district, most people use plain pit latrines. Only 29.7% have water-based sanitation facilities and 9.5% have no form of sanitation whatsoever.[25]

17 National Department of Tourism, Annual Report 2016/17 Kimberly: The Department of Economic Development and Tourism, 2017. Accessed November 12, 2020. http://www.northern-cape.gov.za/dedat/index.php?option=com_phocadownload&view=category&download=15:annual-report-2016-17&id=9:annual-reports&Itemid=193.
18 Minerals Council South Africa, "Facts and Figures 2019", Johannesburg: Minerals Council South Africa, 2020. Accessed November 29, 2020. https://www.mineralscouncil.org.za/downloads/send/18-current/1250-facts-and-figures-2019
19 Statistics South Africa (2018) "Men, Women and Children: Findings of the Living Conditions Survey 2014/15" page 15.
20 Ibid. page 19.

21 Lillian Nthekang, individual interview, November 13, 2020.
22 Zenande Leadership and Linkd Environmental Services "John Taolo Gaetsewe District Municipality Integrated Waste Management Plan 2014-2019"
The Department of Environmental Affairs, 2013. Accessed November 12, 2020. http://ga-segonyana.gov.za/downloads/Gasegonyana%20%20IWMP.pdf:30.
23 Ibid. Known as a Matric Pass.
24 John Taolo Gaetsewe District Municipality "Spatial Analysis and Synthesis Phase 2: Review of Spatial Development Framework John Taolo Gaetsewe District" February 2016:151.
25 "John Taolo Gaetsewe District Municipality Integrated Waste Management Plan 2014-2019"

3.3 MANGANESE COMPANIES IN SOUTH AFRICA

The South African Department of Mineral Resources and Energy (DMRE) includes 36 manganese mines in their database, of which 23 are operating in the Northern Cape. DMRE data is not updated regularly and backlogs spanning 4–5 years are common. According to more recent industry analysis, there are 22 operating manganese mines in South Africa, almost all of them operating in the Northern Cape with the exception of 4 small ones.[26] The biggest manganese mining companies operating in South Africa, in terms of production, are mentioned in the following table, as well as their ownership, capacity, and names of the mines.

Table 3.3: Top manganese mining companies in South Africa

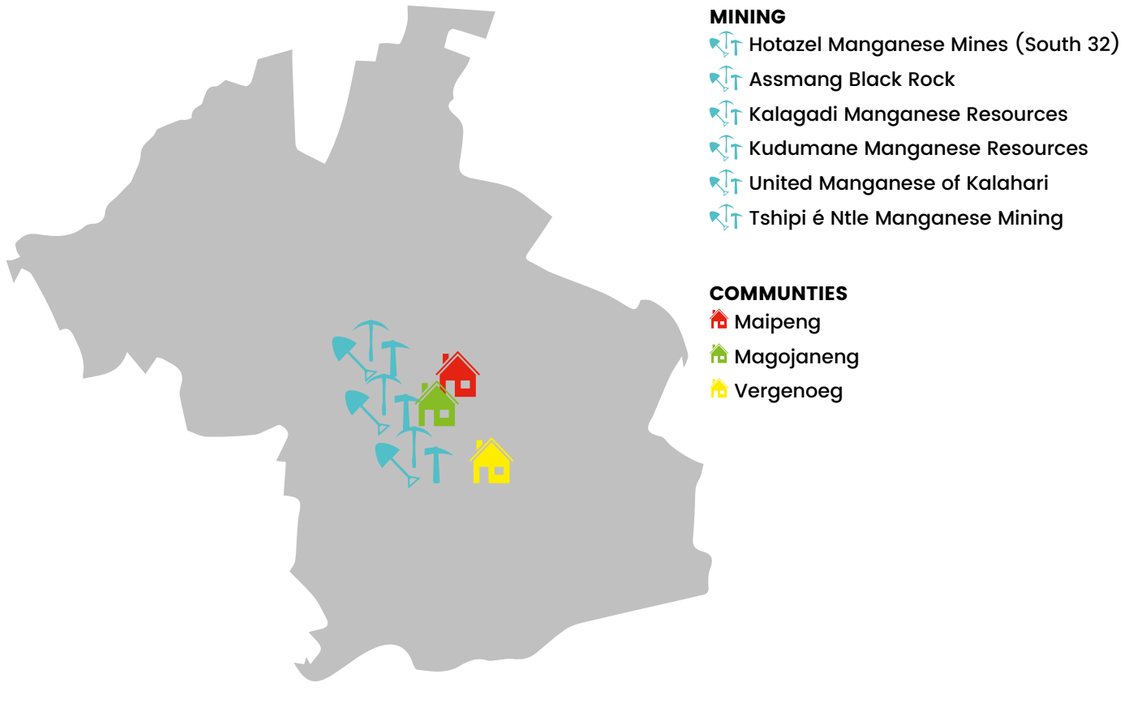
COMPANY NAME	OWNERS	MINES NAME(S)	PRODUCTION CAPACITY
Assmang	Assore Limited (50%) African Rainbow Minerals (50%)	Black Rock, Nchwaning and Gloria	4.6 mtpa
Tshipi é Ntle Manganese Mining (Pty) Ltd.	Ntsimbintle Mining (Pty) Ltd. (37%) Jupiter Mines Limited (49,9%) OM Holdings (13%)	Tshipi Borwa	3.6 mtpa
Hotazel Manganese Mines (Pyt) Ltd.	South 32 (44%) Anglo American pic. (30%) B-BBEE entities (26%)	Mamatwan & Wessels	3.5 mtpa & 1.2 mtpa
Kalagadi Manganese (Pty) Ltd.	Kgalagdi Alloys (44%) Kgalagdi Resources (36%) Industrial Development Corporation (20%)	Kalagadi Manganese	3 mtpa
Kudumane Manganese Resources	Kudumane Investment Holdings Limited (49%) Bold Moves 1715 (Pty) Ltd. (25,5%) Afris Manganese (Pty) Ltd. (25,5%)	Kudumane Manganese Mine	1.8 mtpa
United Manganese of Kalahari	Majestic Silver Trading 40 (Pty) Ltd. (51%) Renova Manganese Investments Ltd. (49%)	UMK Mine	2.7 mtpa

Source: SOMO, based on various sources.

26 Martin Creamer, "South Africa Has 22 Operating Manganese Mines – AmaranthCX", Mining Weekly, accessed April 12, 2021, https://www.miningweekly.com/article/south-africa-has-22-operating-manganese-mines-amaranthcx--2020-09-28/rep_id

The following image illustrates the locations of the biggest manganese mines in the Kalahari basin.

Map 3.3: The three communities within the proximity of the top six manganese mines in the Kalahari mangenese field in South-Africa.



3.4 ECONOMIC INEQUALITY

While the local communities are struck by poverty and unemployment, the mining companies generate disproportionate profits. For instance, in 2020 South32 generated USD 342 million in revenues from their South African manganese operations, of which only USD 3.2 million was destined for community investment (which represents less than 1% of revenues).[27] South32 barely meets the extremely low minimum requirement set by the South African Mining Charter, according to which mining license holders must contribute only 1% of Net Profits after Tax (NPAT) to socio-economic development.[28]

While the local communities are struck by poverty and unemployment, the mining companies generate disproportionate profits.

A closer look at South32 SLP for the Hotazel Manganese Mines (2019-2023) reveals that most of the budget (60%) is allocated to Human Resource Development Programmes which build up skills of the workforce "geared towards ensuring effective business operations".[29] In turn, less than 40% of the budget is allocated to Local Development Programmes.

Within the *Local Development Programmes budget,* 42% is allocated to build or upgrade roads and bridges; 25% is destined to health and 22% to education programmes.

This means that in practice, the combined allocated budget for health and education programmes (areas that are very relevant for communities) only represent 11% of the total budget of the SLP. In response to this statement, South32 replied that each component of their SLP follows the regulatory requirements and that they aim to spend 1% NPAT minimum for mine community development.[30]

A look at South 32's global results gives a more striking view of inequality. Over the last 5 years, the company paid USD 1900 million in dividends, while only USD 93 million was allocated for community investment (less than 5% of dividend payments).[31 / 32]

Such stark contrast shows that maximising profits for shareholders and investors is the main priority of the mining company, while contributing towards local development pales in comparison. Low national requirements with regards to community investment, paired with companies investing the bare minimum, results in a situation whereby the local communities receive an exceedingly small fraction of the economic benefits of mining in their area while they must live with the negative social and environmental impacts.

Maximising profits for shareholders and investors is the main priority of the mining company, while contributing towards local development pales in comparison.

27 South32, "2020 Annual Report", https://www.south32.net/docs/default-source/sustainability-reporting/fy20-sustainability-reporting/2020-annual-report.pdf?sfvrsn=2f82e7cf_6
28 "Mining Charter, 2018 | South African Government", accessed May 31, 2021, https://www.gov.za/documents/mining-charter-2018-27-sep-2018-0000.
29 South32, "Social and labour plan for South32 Hotazel Manganese Mines, July 2018." https://www.south32.net/docs/default-source/south-africa-manganese/social-and-labour-plan-hotazel-manganese-mines.pdf?sfvrsn=74d918f7_4

30 Email exchange with Noleen Dube, head of Corporate Affairs Africa at South32, date May 26,2021.
31 South32, "2020 Annual Report", https://www.south32.net/docs/default-source/sustainability-reporting/fy20-sustainability-reporting/2020-annual-report.pdf?sfvrsn=2f82e7cf_6
32 The budget allocation and spending on what the company reports as community investment at global level deserves further research but remains beyond the scope of this paper.

4. HUMAN RIGHTS IMPACT

Communities identified various ways in which they were impacted by manganese mines, including pollution of land and water, unfair compensation while employed, absence of free prior and informed consent (FPIC), and health issues. The main concerns of the communities were impacts to their right to FPIC, water and health; therefore these three rights were selected as the main focus of this research and will be elaborated on further in this chapter.

4.1 GOVERNANCE IN SOUTH AFRICA

In South Africa, administrative governmental responsibilities are divided between national, provincial and local governments. The local government is made up of District Municipalities (DMs), and Local Municipalities (LMs). Municipalities are constitutionally mandated to ensure access to basic services such as water, electricity, and refuse disposal. They must also secure the promotion of economic development within their precincts and are thus responsible for mineral resource governance within their territory.

Local Municipalities that host mining companies are three times more likely to have poor service delivery.

Local Municipalities (LMs) that host mining companies are three times more likely to have poor service delivery.[33] In part, this is attributed to the fact that the LMs where mining takes place are often located in regions with a history of underfunding and poor governance, and therefore are grossly ill-prepared for the influx of people that the mining industry attracts. Furthermore, LMs receive no direct tax benefit from mining companies. This means that municipalities must squeeze out benefits from the presence of mines in other ways. Municipalities often justify the presence of mines by saying they will result in an increase in employment in the area, economic growth due to migration and improved transport systems directly tagged to the transportation of minerals. Municipalities are seemingly desperate to attract mining companies to their jurisdiction to secure these alleged benefits even when environmental and other reports strongly warn that increased mining activity risks causing damage to human life and the environment.

33 Tracy Ledger, "The Mining Sector: Local Profiles and Impact", Trade & Industrial Policy Strategies, 2015: 19.

Traditional leadership structures add to the complication of the already unhealthy relationship that exists between the state and mining industry. Traditional leaders share authority with local government over many parts of rural South Africa. Nicholas Hanties, a former member of the traditional council that sits in Bathlaros, within the JTG District, explained that historically Magojaneng, Maipeng, and Vergenoeg have been administered under traditional leadership. This has meant that the community does not own the title deeds to the land on which they live and on which they have done so for decades. Instead, the traditional authority, under whose jurisdiction these communities fall, is seen as the legitimate landowner, meaning that the chief is empowered to make decisions on all matters in the community (this includes but is not limited to resolving disputes, assigning land, etc.).

The jostle for power between traditional, local, provincial and national government is certainly a contested arena wherein party politics, corruption, and vile corporate profiteering play out. Today, the only traditional leaders who are afforded decision-making authority are those officially recognised by the state. Unfortunately, this means that traditional leaders' power is now more dependent on appeasing the state than on supporting communities.

Environmental and other reports strongly warn that increased mining activity risks causing damage to human life and the environment.

4.2
FREE PRIOR AND INFORMED CONSENT AND THE RIGHT TO PARTICIPATORY GOVERNANCE

According to South African Law mining companies are required to consult interested and affected communities in the process of applying for a mining right.

Free Prior and Informed Consent (FPIC) is a principle embedded in the right to self-determination and has been recognised and protected under United Nations and International Labour Organization instruments. In the context of natural resource governance, it means that mining companies must obtain the consent of affected communities before starting operations. Such consent should be freely given after the communities receive full disclosure of all aspects related to the proposed project. South Africa's High Court, in the *Baleni and Others v Regional Manager Eastern Cape Department of Mineral Resources and Others*[34] judgment, recognised the power of mining-affected communities to give or withhold consent to mining operations in their area. But South Africa's national legislation has yet to recognise that right, and currently only requires robust consultation, not consent. As the main people affected by mining, host communities must have a seat at the negotiating table when it comes to consultations.

Under South Africa's Minerals and Petroleum Resources Development Act 2004 (MPRDA), and its associated regulations, mining companies are required to consult interested and affected communities in the process of applying for a mining right. Mining legislation also requires that mining companies develop SLPs and submit them as part of their application for a mining right.[35] SLPs describe how the mining companies will support and capacitate surrounding communities within a renewable period of five years, and should be developed in consultation with those communities. SLPs become legally binding if companies are awarded mining rights.

In a survey of 140 community members across the three communities visited, 94% of respondents had never been consulted by a mining company and 98% did not know what a SLP is. Furthermore, at the time of the field research none of the mines had made their SLPs available in the manner required by legislation (publicly and in the local language) nor provided the researchers with their SLPs on request.[36] Close to publication, South 32 informed the research team that the local translation of their SLP was available.[37]

In response to the comment that mines claim in their annual reports to have good relationships with communities, one community member in Magojaneng, James Masiane, said: "They don't even know of our areas. Some of us are dead because of their nice words." Since a key feature of the obligations imposed on mines in relation to SLPs is publishing the SLPs widely and conducting far-reaching, meaningful consultations with communities, the responses received seem to suggest that mining companies in the area have breached the communities' right to FPIC.

In a survey of 140 community members across the three communities visited, 94% of respondents had never been consulted by a mining company.

34 Baleni and Others v Regional Manager Eastern Cape Department of Mineral Resources and Others 2020 4 All SA 374 (GP).
35 Nicholas Hanties, individual interview, November 11, 2020.

36 Mining companies operating in a community have a responsibility to publish recent SLPs on their websites, have the physical document available in public areas within that community (such as schools, libraries, municipalities, etc.), and announcements about the availability and content of the approved SLPs must be made via radio and in local newspapers.
37 Email exchange with Noleen Dube, head of Corporate Affairs Africa at South32, date May 26,2021.

These figures indicate disregard for the obligations that mining companies assume as part of their mining permits. According to the interviewees, even when communities attempt to initiate consultation, companies refuse. A resident of Vergenoeg expressed the problem as follows, *"We don't get a response from mining companies when we want to engage [with] them."*

> "For them to come operate here, they work through political ways, because municipalities are also authorities."

When the communities were asked about how exactly mining was introduced into the area, one respondent said, *"For them to come operate here, they work through political ways, because municipalities are also authorities."* This was affirmed again during the focus group discussions where there was overwhelming consensus regarding the uncertainty of mining operations and the lack of community consultation.

Table 4.2: Community members' knowledge of their surrounding mining operations

	DO YOU KNOW HOW MANY MINES ARE IN YOUR AREA?					
	DON'T KNOW	NO MINES	1 – 2	3 - 4	5 - 6	7 OR MORE
MAIPENG	10	0	7	8	3	18
MAGOJANENG	2	0	1	2	11	31
VERGENOEG	3	0	15	13	8	11
TOTAL (NUMBER)	15	0	23	23	22	60
TOTAL (%)	10%	0%	16%	16%	15%	42%

The table above reveals that while everyone in the sample set knows there are mines operating in their communities, there is uncertainty about how many mines. This speaks to the lack of consultation with local communities by mining companies operating in the area: most respondents knew there were many mines (of those who provided a number, 47% said there were over seven mines in their area), but most were unable to give the names of the mines that surrounded them.

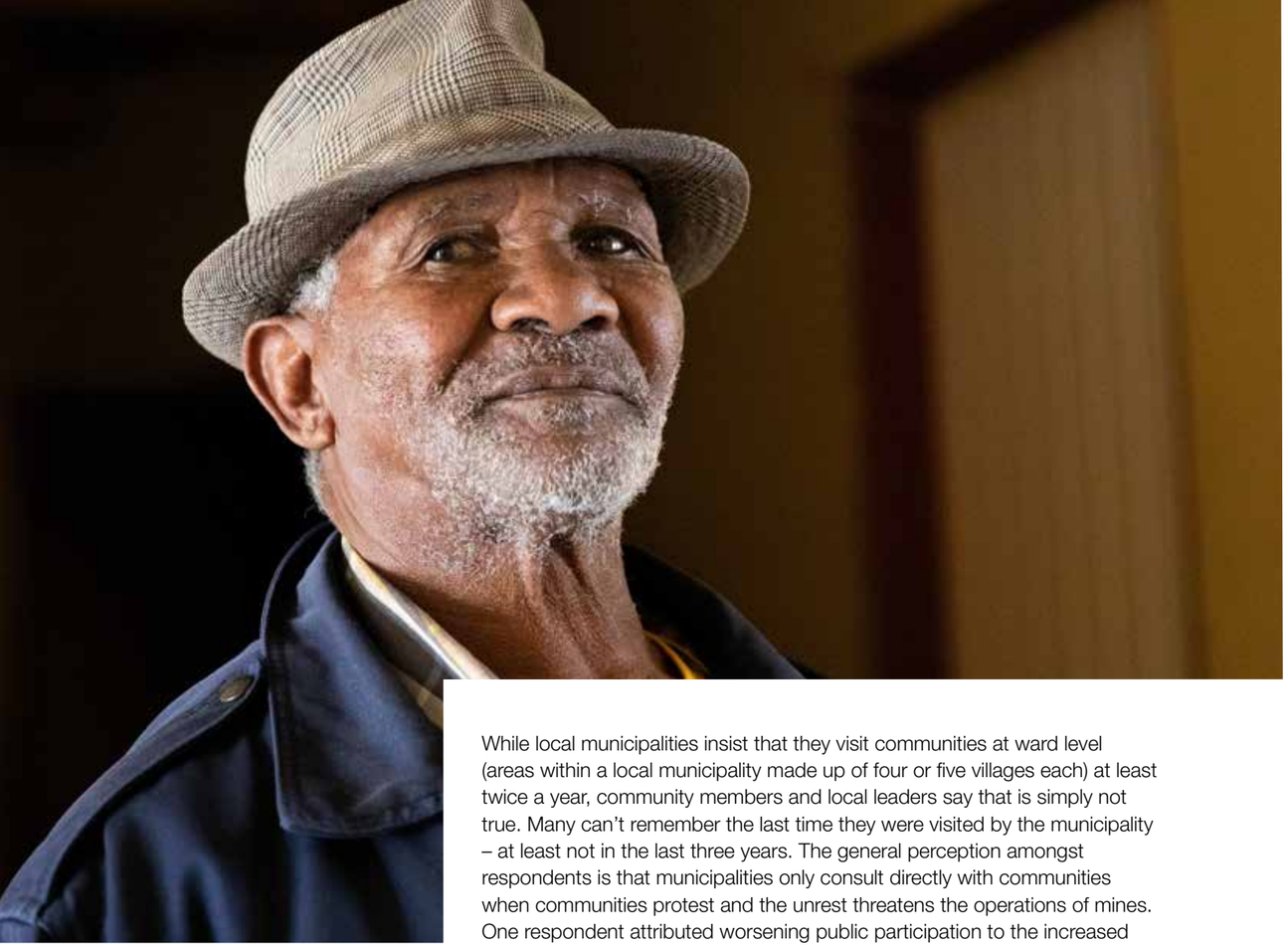
In each area, mines have a separate obligation to consult affected communities and contribute to the development of those areas. Mining companies are able to ignore their legal obligations to consult because municipalities have requested that they not consult with communities, municipality representatives indicated.[38] Local government has completely subsumed the role of consulting with affected communities. While local government is mandated to conduct Integrated Development Plans (IDP) consultations, these consultations have been conflated with the responsibility of mines to consult host communities. This allows mining companies to justify their failure to consult with host communities, despite the legal obligation to do so, by claiming that their SLPs are based on municipalities' development plans, which are themselves the result of robust consultation. However, interviewees stated that municipalities rarely meet with communities, and when they do, they present finalised plans rather than consult with them on draft plans. Never do they suggest that they are open to hearing suggestions and revising plans.

> Mines have a separate obligation to consult affected communities and contribute to the development of those areas.

MUNICIPALITIES FAILING TO CONSULT ALONG WITH MINES

In Magojaneng, the community mentioned that they had never had any consultations with local municipalities about integrated development plans that inform the needs of the community. Their first consultation was supposed to be on 30 November 2020, but it cannot be said to have taken place because the community did not know about the consultation nor were they provided beforehand with the documents that would form the subject of the consultation.

38 The ten local government officials with whom we spoke confirmed this to be the case, citing efficiency and fairness as the main reasons for doing so. The LMs, they felt, have the best understanding of which communities are most in need and which projects are most urgent.



While local municipalities insist that they visit communities at ward level (areas within a local municipality made up of four or five villages each) at least twice a year, community members and local leaders say that is simply not true. Many can't remember the last time they were visited by the municipality – at least not in the last three years. The general perception amongst respondents is that municipalities only consult directly with communities when communities protest and the unrest threatens the operations of mines. One respondent attributed worsening public participation to the increased presence of mines:

"When mines are around, the municipality engages with us less, the councillor is just the middleman now, and never comes back to report to us." [39]

"As the youth, we are often told that we are causing trouble and attempting to destroy traditional rule. Especially when we start asking questions about these mines and look for information".

While some traditional leaders have been invited and given access to meetings and spaces with local government and relevant mining companies, their degree of influence and underlying political motivation is questionable. According to Nicholas Hanties, a former member of the traditional council, "municipalities can suppress the chief's presence," by discounting any objections that the chief may raise about how developments are shaped in the area. This is particularly the case where there is a direct conflict of interest between the preferences of a chief – which should be aligned with the best interest of the communities under their administration, but usually are not – and the priorities of the municipality and mining companies. This leads to the undermining of the chief's authority and the erosion of his reputation within the communities. A participant in the focus group in Maipeng indicated that this dynamic has a particular bearing on the youth in the area, explaining: **<<**

Given that it is women and specifically young women who unduly carry the burden of mining and its impacts at both household and local community level, the exclusion of women from even the paltry consultation that does happen, both in the traditional council and local government spheres, is a fundamental and persistent failing.

39 Man respondent in the Maipeng Focus group.

The interplay of power between the various governing structures has created an accountability gap that mining companies in the Northern Cape are exploiting to their benefit.

Mines not only fail to meaningfully engage communities, but it can also be argued that the industry has an inordinate and adverse influence over governance structures. This can dangerously frustrate a young democracy like South Africa. In the context of underfunded local government, power-stripped traditional authorities, and poverty-stricken host communities – mines wield disproportionate power. They have willingly relegated their responsibility to consult with communities to municipalities – without monitoring whether municipalities do, in fact, conduct community consultations in the manner prescribed. This is significant because while many community members have been living in their villages for decades, they have never been involved in a consultation process with mining companies. If meaningful consultation were taking place within these affected communities, the name of these companies, the arrival of mining companies, and resultant benefits from their activities would be common knowledge.

Amongst the communities we spoke to, there is a widely held belief that the presence of has rendered the community less in control of future development in their villages. Communities feel excluded and unrecognised.

COMMUNITY LEADERS, COMMUNITY NEEDS AND NO WAY TO MEET THEM

In Maipeng, the research team spoke to 81 year-old Ditiro Andries Dince whose uncle had been the chief who, it is believed, was the first to grant permission for mining in the area in the early 1900s. Ditiro explained that no community consultation happens at any point – when a new mine arrives, when projects are started or when mines change ownership. Alluding to the large billboards that mines erect to advertise their involvement in a development project, he explained; "For fifteen years in this village we have seen no projects, but we see boards, boards, boards!" He explained further (and this was confirmed by multiple others) that while previously communities used to be able to approach mines directly for financial assistance for development projects, the mines now work through municipalities and the projects communities request do not get implemented unless they align with LMs' development plans (which are, in turn, developed without the requisite community consultation).

Similarly, a common experience amongst respondents is that the Traditional Council (which sits in Maipeng) has been rendered powerless. As an example, Ditiro explained how his community had noticed the need for streetlights to light up the village at night, because when women and girls walk to the nearest pit latrine they are exposed to sexual violence. Community leaders prepared a funding proposal, dressed formally, travelled to various mines and presented their proposal. They were met with support. Later, when they followed up, they were told that Mokala Manganese Mine was willing to fund the project but wanted to do so under the LM's guidance. It appears that the Municipality did not see it as a priority, as years later the project has not come to fruition. Instead, he heard through word of mouth that a 30-kilometre road was built for R30 million, but it is not close to Maipeng and, he feels, will not substantially improve their lives. A similar sentiment was shared among youth during a focus group held in Maipeng in reference to the Traditional Council: "[T]here's a committee that makes decisions on our behalf. We want to know who those decisions benefit because we don't see anything positive happening in our village."

4.3 WATER

Communities in the Maipeng, Magojaneng, and Vergenoeg areas are primarily dependent on boreholes for their water supply. Manganese mines infringe on host communities' right to water by reducing the amount of water available to the community and worsening the quality of water available.

4.3.1 Water quantity

Of the 143 residents surveyed, 57% of respondents indicated that they had either no access to water or only had access to water at a distance or during intermittent periods. 62% of all respondents were unhappy with the quality of water, citing concerns about lime, saltiness, discolouration, and contamination evident in the water.

In focus group discussions and interviews, there was widespread consensus on the crisis of water quantity in the Kalahari Manganese Field and surrounding areas. Respondents explained:

You can see taps all over the place, but some of them don't have water... Sometimes we can spend a week without water or even a month. And you'll have to see how you work around it. When there's no water, where do we bathe?
Quote provided by Lillian Nthekang, woman

There's not enough water for agriculture, there's a lot of lime in the water and very few taps, so we have to travel pretty far to get water. The water is on once a week if we're lucky.
Quote provided by a woman in the Magojaneng Focus Group

Since mining started, access [to water] is worse because there are so many people.
Quote provided by a woman in the Maipeng Focus Group

So there is water, but it's little and the problem is that because of the location of the taps, the water is very difficult to access. A person must usually walk quite a distance before they can access water, meaning that they cannot gather enough to also do any farming. Water is far to access. Some people must even get water from the shop.
Quote provided by man in the Vergenoeg Focus Group

For example, right now we have COVID, and the government says you must wash your hands every 20 minutes, but there's no water. The biggest problem is that there is no water to drink, we're not going to go as far as even talking about animals, but for human consumption. Because without water, there is no life.
Quote provided by Nicholas Hanties, man

The burden of collecting water falls to women, who not only have to expend energy and time collecting water, but also put themselves at risk of violence when they walk long distances to collect water alone. Women in the Northern Cape explain:

We need water and it's been a long time that I've had to carry water. And it's not safe, there's nowhere that's safe.
Quote provided by Vergenoeg Women Only Focus Group

The mining industry uses significant amounts of water in its actual operations[40] and manganese mining also directly decreases the amount of water available to communities through a process of "dewatering" the natural aquifer system in the ground.[41] This is to ensure that opencast pits, which are commonly used for manganese mining, are not flooded. In turn, this leads to a depletion of the amount of groundwater available for extraction from boreholes. A 2017 environmental scoping report commissioned for a prospective manganese mining operation, in the Kalahari Manganese Field, found that reduced water levels would be a massive after-effect, stating that

> There's no water in most communities, people are suffering as a result of a lack of water.
>
> Quote provided by Mokgweetsi Sewedi, man

> As you're speaking about water, it's hard to think that life has only improved a little bit since I've been here. And we still have to fetch water from far when we need water.
>
> Quote provided by Elsie Setshogela

40 "John Taolo Gaetsewe District Municipality Integrated Waste Management Plan 2014-2019"
41 Synergistics Environmental Services (Pty) Ltd "Environmental Impact Assessment And Environmental Management Programme Report For The Development Of The Proposed Coza (Jenkins Section) Mine: Groundwater Impact Assessment Report" April 2016: 14.
42 Synergistics Environmental Services (Pty) Ltd, "Environmental Impact Assessment And Environmental Management Programme Report For The Development Of The Proposed Khwara Mangenese Mine" September 2017201: iii

"groundwater levels would not recover within the 100-year simulation period."[42] A 2017 groundwater study on Tshipi é Ntle Manganese Mining (Pty) Ltd, which is located around 20 km from the closest community researched, found that "since the commencement of the mine, there has been a decrease in the groundwater levels."[43] It predicted a low to high risk of a drop in water levels of up to 22 metres that would continue to affect borehole users up to 5.5 km to the east and 8.3 km to the west of the mine, even decades after the mine ceased operations. It noted that "the presence of several mines in close proximity will have a combined effect" on water levels.[44]

A JTG District report notes with concern that "mines are enormous consumers of water in an area that is dry and already hugely dependent on water transfers from other water management areas."[45] To mitigate the risk to mining activities, an R8 billion (USD 561 million) state-funded water project, the Vaal-Gamagara Water Project, was initiated to upgrade a previously existing pipeline. Phase one of the project is now complete. Twelve mines, ten of which are manganese mines, and only three out of 186[46] communities benefit from it.[47] The communities in which we conducted our research did not benefit from the project. The mines use approximately three times as much water as the three communities in the project area[48]. The water needs of communities are clearly a secondary concern.

43 Synergistics Environmental Services (Pty) Ltd, "Tshipi Borwa Manganese Mine Groundwater Study", July 23, 2017. Accessed 3 December 3, 2020 at https://sahris.sahra.org.za/sites/default/files/additionaldocs/App%20M%20-%20Groundwater%20study.pdf.
44 "Tshipi Borwa Manganese Mine Groundwater Study".
45 "John Taolo Gaetsewe District Municipality Integrated Waste Management Plan 2014-2019"
46 "Geography, History & Economy", John Taolo Gaetsewe District Municipality (DC45), last modified 2021, https://municipalities.co.za/overview/135/john-taolo-gaetsewe-district-municipality#:~:text=It%20comprises%20the%20three%20local,majority%20(80%25)%20are%20villages.
47 South African Governmental News Agency, "Water scheme to benefit Gamagara residents", SAnews.gov.za, October 21, 2016. Accessed at https://www.sanews.gov.za/south-africa/water-scheme-benefit-gamagara-residents; BIZCommunity, "All systems go for Northern Cape mega water project", 21 October 2016. Accessed at https://www.bizcommunity.com/Article/196/494/152574.html.
48 Nemai Consulting (2019) "Basic Assessment Report: Vaal Gamagara Regional Water Supply Scheme Phase 2: Upgrading of the Existing Scheme", 12, accessed at https://nemai.co.za/documents/10689-VGRWSS-II/DraftBAR/10689-20191203-VGRWSS-II%20Upgrade%20BAR%20(Draft).pdf.

4.3.2 Water quality

Mining broadly presents a risk of contaminating water stores; this is particularly seen in the case of manganese in the Northern Cape, given that it is the primary metal mined in the area. Chemicals used in the mineral extraction process often leach underground and sully water supplies.
In 2017 an environmental assessment was conducted for a prospective mine in the Kalahari Manganese Field. Part of the assessment included groundwater sampling across several sites. The tests found that in certain areas there was evidence of elevated nitrate levels.[49] A review of Black Rock Mining Operations, which also assessed the impact of other mines in the area, found that although there was a low risk of contamination, "negligent actions on the part of the mines, leading to contamination of groundwater could be responsible for this contamination lingering in the groundwater for potentially millions of years."[50]

Kalahari Manganese Mine operations were found to pose a medium to high risk of groundwater contamination, even with mitigation, due to "seepage from the slimes dam into the underlying aquifer."[51] A similar review for Tshipi é Ntle Manganese mine found that "a number of metals are leachable at concentrations in excess of relevant water quality standards" including aluminium, arsenic, barium, iron, and manganese.[52] This report found that nitrate levels in the water rendered it "unsuitable for use without treatment" noting that "chronic effects may occur."[53] Further studies found dangerous levels of salinity, manganese, and nitrate in boreholes, and in one study researchers felt compelled to instruct the owner of a borehole "not to use the water even for livestock watering."[54]

Concerns about the quality of water and the use of chemicals were also raised by the communities interviewed.

In 1998 we were told by the municipality that we should not drink the water because of asbestos. They never returned to give us an update. We don't know if it is still dangerous, but when we boil it we can see lime in the water.
Quote provided by James Masiane

Furthermore, water scarcity combined with certain geographical traits such as the depth of the water table, the topography and the soil type render the Kalahari Manganese Field squarely within an area deemed extremely vulnerable and susceptible to contamination.[55] This can be seen in the map below, drawn from a scientific framework developed to assess the impact of open-pit mining on groundwater in South Africa.[56] The Kalahari Manganese Field sits in the dark red area just above Kimberley.

When speaking of the accountability of mines, firstly mines extract minerals from the earth and they use a lot of water and electricity. So, the outcry that we have is that when mines use the water, whether it's to clean it or whatever, they use chemicals. Now the chemicals they use, there's no control over the water and chemicals in the water, so that water that's diluted with chemicals can just flow underground, because we use underground water... Nobody cares.

Quote provided by Nicholas Hanties

49 Synergistics Environmental Services (above not 18) at 10
50 Escience Associates (Pty) Ltd "Assmang (Pty) Ltd Black Rock Mine Operations, Hotazel, Northern Cape: Basic Assessment Report" 22 May 2019: 30.
51 Strategic Environmental Focus (Pty) Ltd "Final Environmental Impact Assessment for the Proposed Kalahari Manganese Mine" April 2007: V.
52 Synergistics Environmental Services (above note 19) at 17.
53 Ibid at 25.
54 Goussard, Ferdinand. "The Development of a Premining Groundwater Monitoring Network for Open Pit Mines in South Africa", Master's Thesis, University of the Free State. May 2017: 20.
55 JTG District (Op cit. note 9): 148.
56 "The Development of a Premining Groundwater Monitoring Network for Open Pit Mines in South Africa".

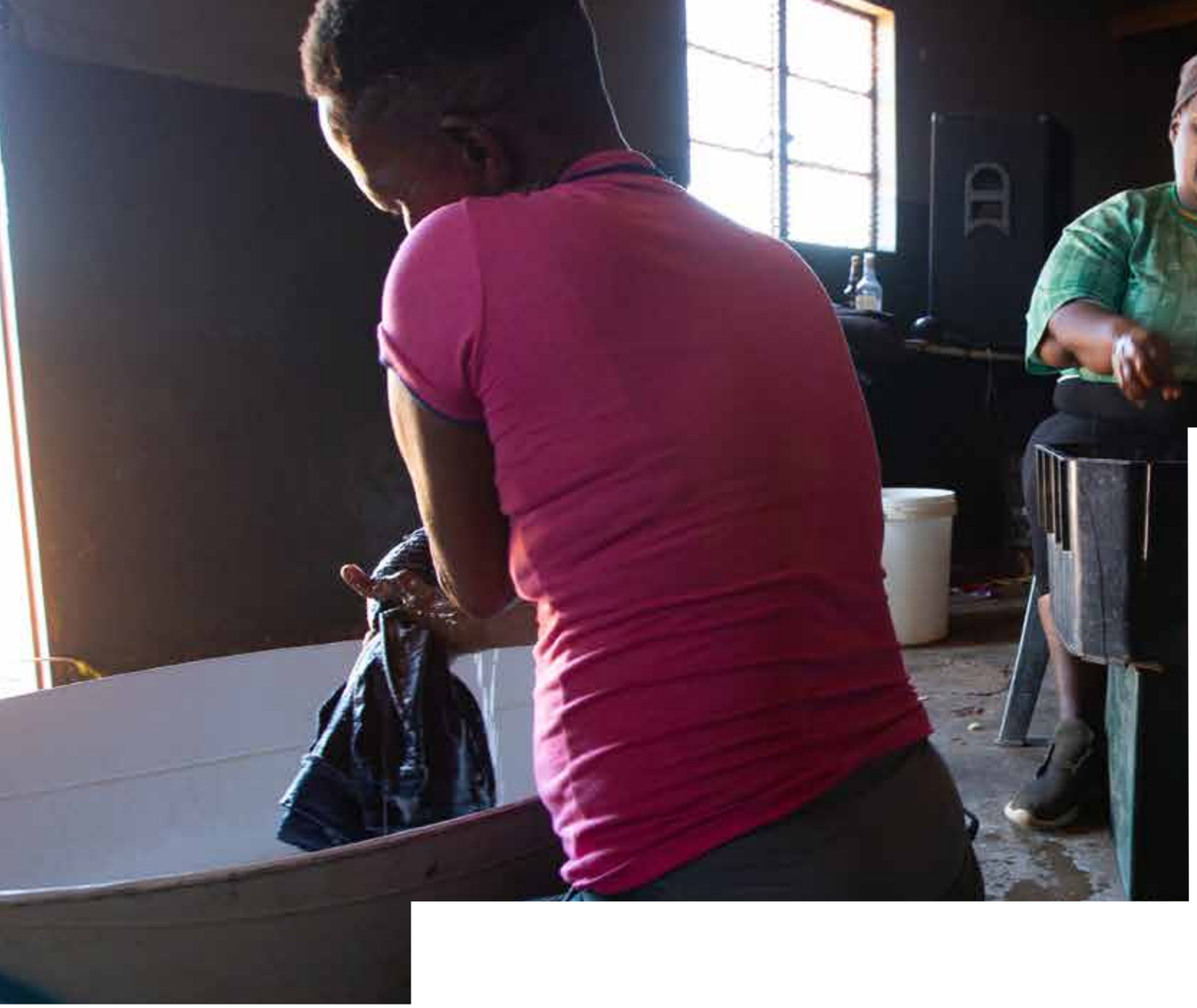
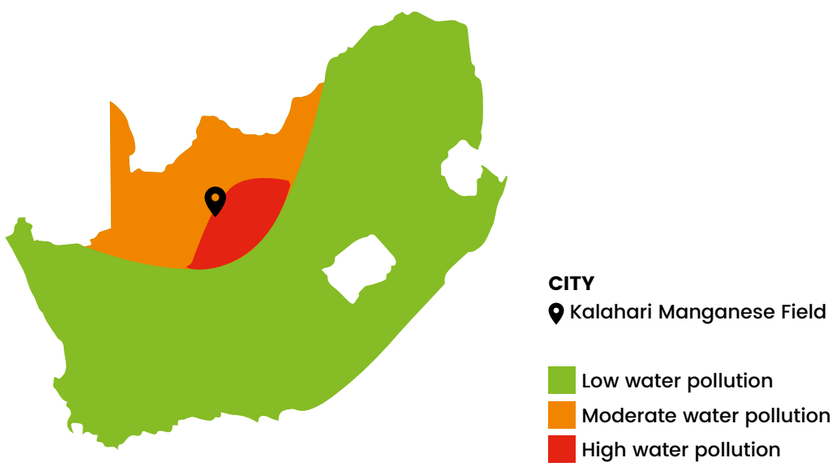


Figure 4.3.2: A map illustrating the susceptibility and vulnerability of different aquires of contamination in South Africa.



Measuring the exact impact that mining operations have on water quality is difficult. Water is not tested regularly and consistently in the JTG District.[57] A new water quality monitoring system, the Blue Drop certification programme, was introduced nationally in 2009 to try to address this situation.

Municipalities are required to test water quality regularly in various location under their jurisdiction and update the Blue Drop database. It was envisioned that the Department of Mineral Resources and Energy (DMRE) would then be able to access that data when assessing applications for mining rights in specific areas.

In theory, LMs should be testing regularly so that the DMRE can know whether their area can handle the presence of another mine. Unfortunately, the system is neither updated nor utilised by municipalities. LMs and DMs lack capacity to keep the database updated while the DMRE continues to blindly license mining operations. A senior official responsible for environmental health in the JTG district stated plainly that if a mine was harming the quality of water, air, or soil in the area, the municipality would have no knowledge of this. A former member of the traditional council made similar assertions:

A 2016 JTG District Municipality report stated similarly that[58]:
Due to the absence of detailed groundwater resource data, there is no accurate information on the status of groundwater quality and reserves in the district, but it is generally accepted that this resource is hugely impacted upon, especially so in the areas where urban settlements and heavy industry are located.

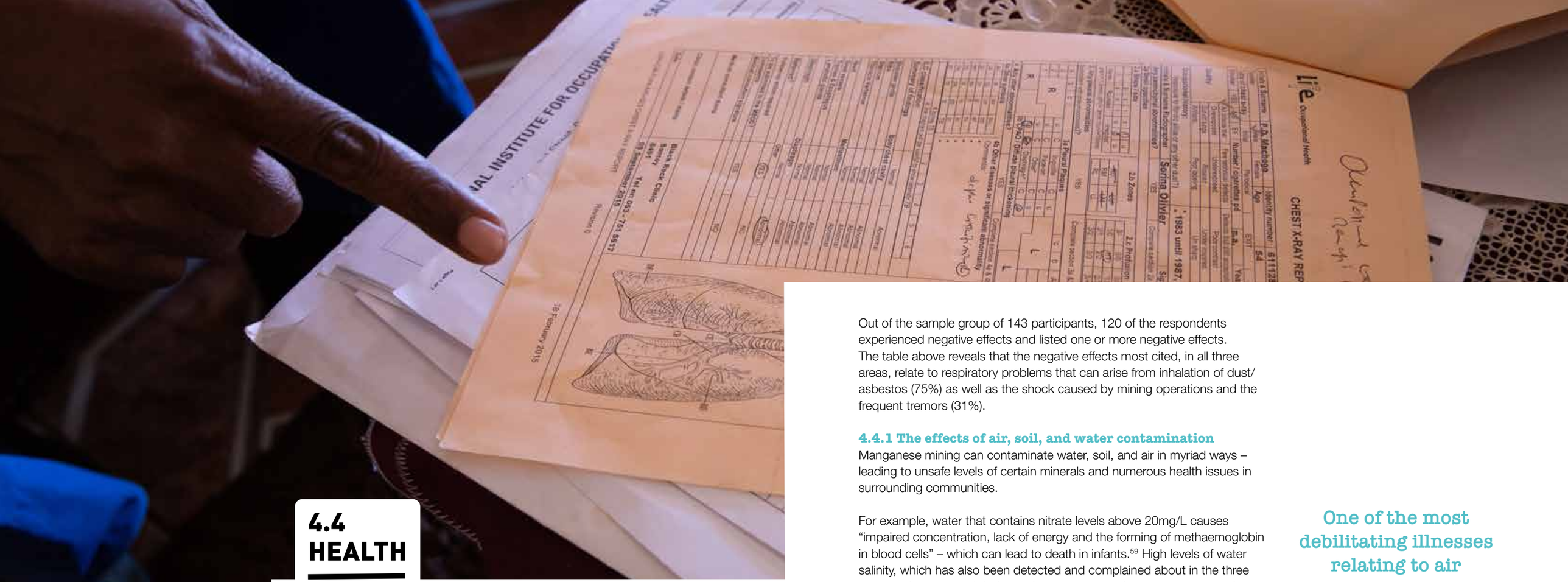
Community residents, who rely solely on groundwater for drinking, sanitation, and farming are forced to measure the quality of the water consumed simply based on its taste and appearance.
Sometimes there is some lime in the water, and because it's water from the earth we drink it.
Quote provided by Lillian Nthekang

Water tastes good because we are used to it and drink it all the time, but we don't know if it would treat you well. We're used to it. Water does have lime in it though.
Quote provided by Magojaneng Focus Group, Women Only.

"Our health and the animals that depend on that water are in danger. Because the people that are supposed to check the water and the chemicals, the Department of Water Affairs, are doing nothing."

Quote provided by
Nicholas Hanties

57 JTG District (Op cit. note 9) at 32
58 Ibid.



4.4 HEALTH

84% of respondents indicated that manganese mining, specifically mines operating at close proximity to their villages, places individuals' health at risk of harm.

The most common health issues that the communities of Vergenoeg, Magojaneng, and Maipeng linked to mining activities are summarised in the table below.

Table 4.4.1: Health issues identified by communities.

HOW DOES THE MINE AFFECT YOUR HEALTH? (REASONS)					
	EFFECT 1: RESPIRATORY ILLNESSES	**EFFECT 2:** PANIC ATTACK/ SHOCK FROM BLASTING	**EFFECT 3:** HEART PROBLEMS	**EFFECT 7:** EYE PROBLEMS & HEARING LOSS	**EFFECT 4:** AIR POLLUTION & UNSAFE ENVIRONMENT
MAIPENG	**37**	**4**	**3**	**5**	**0**
MAGOJANENG	**28**	**26**	**11**	**2**	**0**
VERGENOEG	**25**	**7**	**1**	**0**	**7**
TOTAL (NUMBER)	**90**	**37**	**15**	**7**	**7**
TOTAL (%)	**75%**	**31%**	**13%**	**6%**	**6%**

Out of the sample group of 143 participants, 120 of the respondents experienced negative effects and listed one or more negative effects. The table above reveals that the negative effects most cited, in all three areas, relate to respiratory problems that can arise from inhalation of dust/ asbestos (75%) as well as the shock caused by mining operations and the frequent tremors (31%).

4.4.1 The effects of air, soil, and water contamination

Manganese mining can contaminate water, soil, and air in myriad ways – leading to unsafe levels of certain minerals and numerous health issues in surrounding communities.

For example, water that contains nitrate levels above 20mg/L causes "impaired concentration, lack of energy and the forming of methaemoglobin in blood cells" – which can lead to death in infants.[59] High levels of water salinity, which has also been detected and complained about in the three communities, can agitate the salt balance in infants and is dangerous to people with heart disease, high blood pressure, and renal and kidney failure. Mining generates a vast amount of dust. Such dust may be contaminated with several toxic metals affecting workers and communities. Long-term exposure to respirable dust is likely to lead to silicosis, silico-tuberculosis, pulmonary tuberculosis, obstructive airways disease, and occupational asthma.[60]

For mineworkers, the risk of developing one of these illnesses has, shockingly, remained steady over the decades. A 33-year study focusing on the health risks of mining in South Africa found "no reduction in the proportion of miners coming to autopsy with pathologic evidence of silicosis."[61] Moreover, mining dust and air pollution are also toxic to surrounding communities. In terms of air pollution, research has found a strong correlation between proximity to mines and levels of asthma, pneumonia, emphysema, chronic bronchitis, wheeze, and chronic cough among communities in South Africa.[62]

One of the most debilitating illnesses relating to air contamination in the Kalahari Manganese Field is asbestos poisoning. Before manganese, asbestos was mined aggressively in a strip of land bordering the mining

One of the most debilitating illnesses relating to air contamination in the Kalahari Manganese Field is asbestos poisoning.

59 Linda Munro & Mihai Muresan, "Khwara Manganese (Pty) Ltd: Groundwater study for the proposed Khwara Manganese Mine" https://sahris.sahra.org.za/sites/default/files/additionaldocs/Groundwater%20Impact%20Assessment.pdf
60 W Utembe et al, "Hazards identified and the need for health risk assessment in the South African mining industry", Human & Experimental Toxicology 34(12).
61 "Hazards identified and the need for health risk assessment in the South African mining industry".
62 Vusumuzi Nkosi, Janine Wichmann, Kuku Voyi, "Mine dumps, wheeze, asthma, and rhinoconjunctivitis among adolescents in South Africa: any association?" Int J Environ Health Res, 2015, 25(6): 583–600; and Nkosi, V., Wichmann, J. & Voyi, K., "Chronic respiratory disease among the elderly in South Africa: any association with proximity to mine dumps?" Environ Health, 2015, 14 (33).(2015)

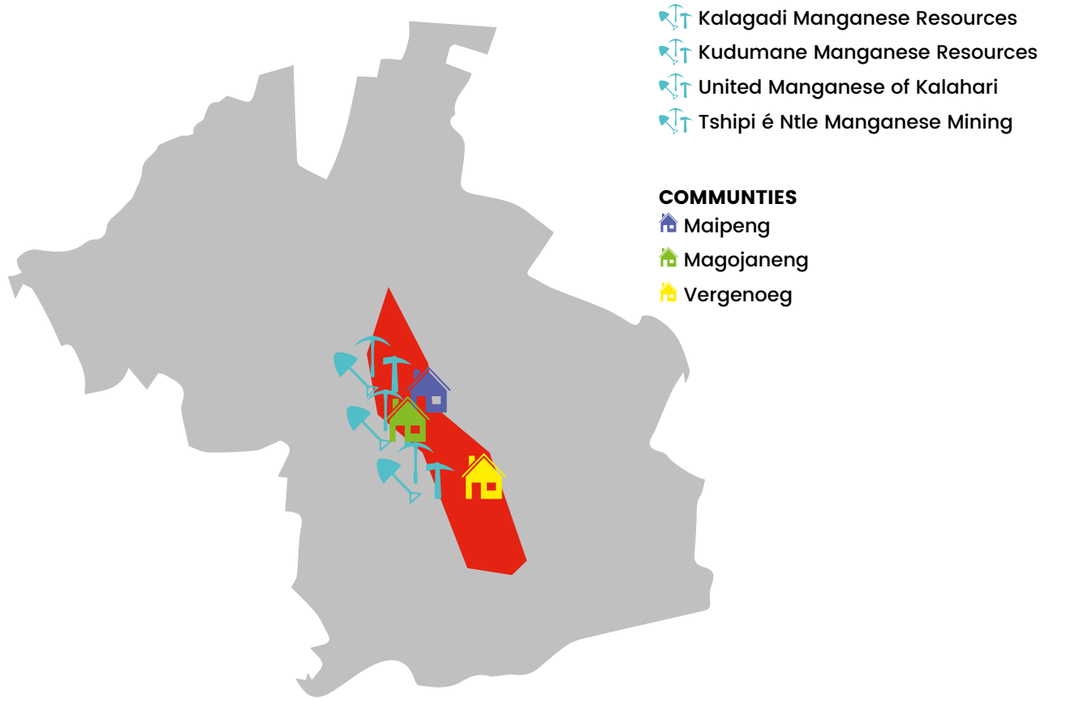
corridor that is now home to JTG District's manganese mines. Most buildings in the strip were made with asbestos-containing materials and the soil in the area has been found to contain unsafe levels of asbestos.[63] For these reasons, the strip of land where asbestos mining used to take place has been declared off-limits for development and housing. However, communities still live here, and the area is experiencing continuous population growth due to the manganese mining boom and the promise of employment.

Most of the communities (including the three communities which were part of this research) surrounding the manganese mines in the Kalahari Manganese Field are situated in the no-go zone: an area deemed *"not suitable for human settlement purposes."*[64] A traditional leader in Magojaneng, K P Zondo, said of this reality: "Our community is unable to achieve anything or have any development, because whenever we try we are told, 'asbestos'". Since the no-go area borders the mining corridor, it is to be expected that, due to the absence of mine-led or municipality-led residential development elsewhere, existing communities within the no-go area will expand rapidly.

Given that the areas immediately adjacent to the mines are former asbestos mining areas, many houses and other infrastructure are built with asbestos – likely leading to high rates of asbestos poisoning. The blasting done by manganese mines creates tremors in surrounding areas, shaking asbestos-contaminated earth and buildings and exposing community members to further poisoning.

63 JTG District (Above note 9).
64 JTG District (Above note 9) at 55.

Figure 4.4.1: A map illustrating in red the 'asbest no-go area' in de Kahalari manganese field where communities still reside and mining activities still take place.



COMMUNITY MEMBERS EXPLAIN THE DIRE SITUATION:
People with TB [tuberculosis] are many and the community is scared of them. And [this is] combined with the issue of asbestos which has left us with many problems. The mines closed down, and when they did, they took their money and just left. And now our people are dying because of asbestos. – quote provided by Lillian Nthekang
The Primary and Secondary Schools were shut down and demolished by the government because they were built with asbestos. However, the structures are still there, and our children can still play there. – quote provided by Vergenoeg Focus Group[65]

I had to destroy the walls in my home and break them down because every time [the Manganese mines] blast, the asbestos is just everywhere in the air. – quote provided by Vergenoeg Focus Group

There was a school built in Magojaneng there, and then it was closed because the kids and teachers had asbestos poisoning. And still now, they have not fully recovered. And who is responsible? No one is responsible, even though many people have been affected. – quote provided by Magojaneng Focus Group[66]

65 The respondents said that they had been told of the asbestos contamination once before in a health assessment.
66 In response to this testimony, South32 responded "South32 typically respond to any requests for meetings from companies and we have evidence for this if required. We also have a grievance and complaints mechanism that allows communities to reach out to us including a toll free number. It should also be noted we conduct 3 stakeholder engagement forums which communities can also participate in and give their views." Email exchange with Noleen Dube, head of Corporate Affairs Africa at South32, date May 26,2021.

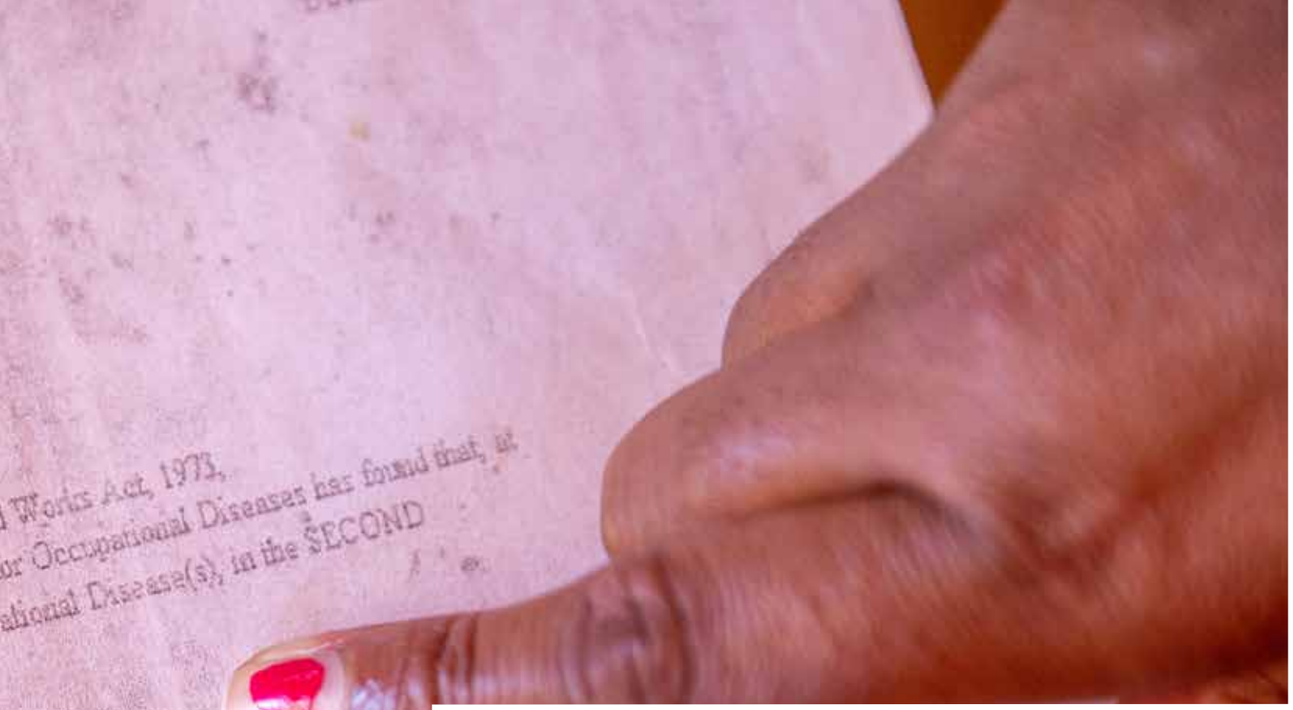
In Vergenoeg, community members do not even know if they are considered an "affected community" as per mining legislation. The local primary school was deemed unsafe due to asbestos contamination and was partly demolished by the government. The principal and School Governing Body, with the support of the Ward Councillor, approached mines directly seeking assistance for the construction of a new school. South 32 agreed to fund the new school – reportedly at a cost of R30 million. It remains unfinished almost three years after construction commenced. In the meantime, children learn in the unfinished school building that shares its premises with the half-demolished asbestos-contaminated building. No barriers prevent children from playing amongst the asbestos-contaminated rubble. While concerned, community members do not know who to approach: project managers keep changing (it's now on its third project manager) and each time they enquire about progress with the school, there appears to be a different person in charge.

In 2016 the municipality agreed a resolution that Ward Councillors, the most local arm of government based at the ward level, should not approach mines directly. While the LM visited in 2019 to give a presentation on the school, attendees noted that it was not for consultation and that they were never given an opportunity to speak in the session. Their attempts to elicit answers from South32 and their Local Municipality have failed, leaving them in the dark.
With regards to the construction of the school and the asbestos contamination, South32 responded:

"1. Please note that the construction of the school being referred to was done in 2 phases. The first phase was completed in 2018 and the second phase was planned to be completed in 2020 – however due to lockdown and covid, there were delays and plan is to have this completed by end of July 2021.

2. The asbestos building was demolished, and rubble was covered/protected away from the children. There was restricted access to this area [...] The delays in removing the building have also been due to unavailability of inspectors to be present while the demolition and removal of rubble happened. It has been removed under the supervision of the inspector and we have since received a certificate."

South 32 also responded that they were not aware of any questions from the community about the school and referred to their complaints and grievance mechanism. The communities indicated something different from South 32 illustrates a mismatch of finding each other that still needs some work.



The inaccessibility of healthcare: the financial constraints of community members (it costs R200-2000 (USD 14–144 to rent a vehicle to the nearest hospital, depending on the time of day and the distance), the lack of access to ambulances, the distance and sparce public transport options, as well as underequipped clinics, adds to the predicament of many of these affected communities. As a result, much of their exposure to these illnesses goes undetected. Communities informed us that, at the nearest clinic, they were given a specific day that they could attend depending on where they live: if they arrived sick on a day other than the day assigned to them, they would be turned away. However, the frequent blasting by manganese mines and the resultant tremors almost certainly contributes to the degradation of asbestos-contaminated buildings and further exposes communities to asbestos poisoning.

4.4.2 Blasting anxiety and trauma

Communities surrounding the mines are affected by frequent blasting. Mine blasts are extremely loud and can cause measurable ground tremors.

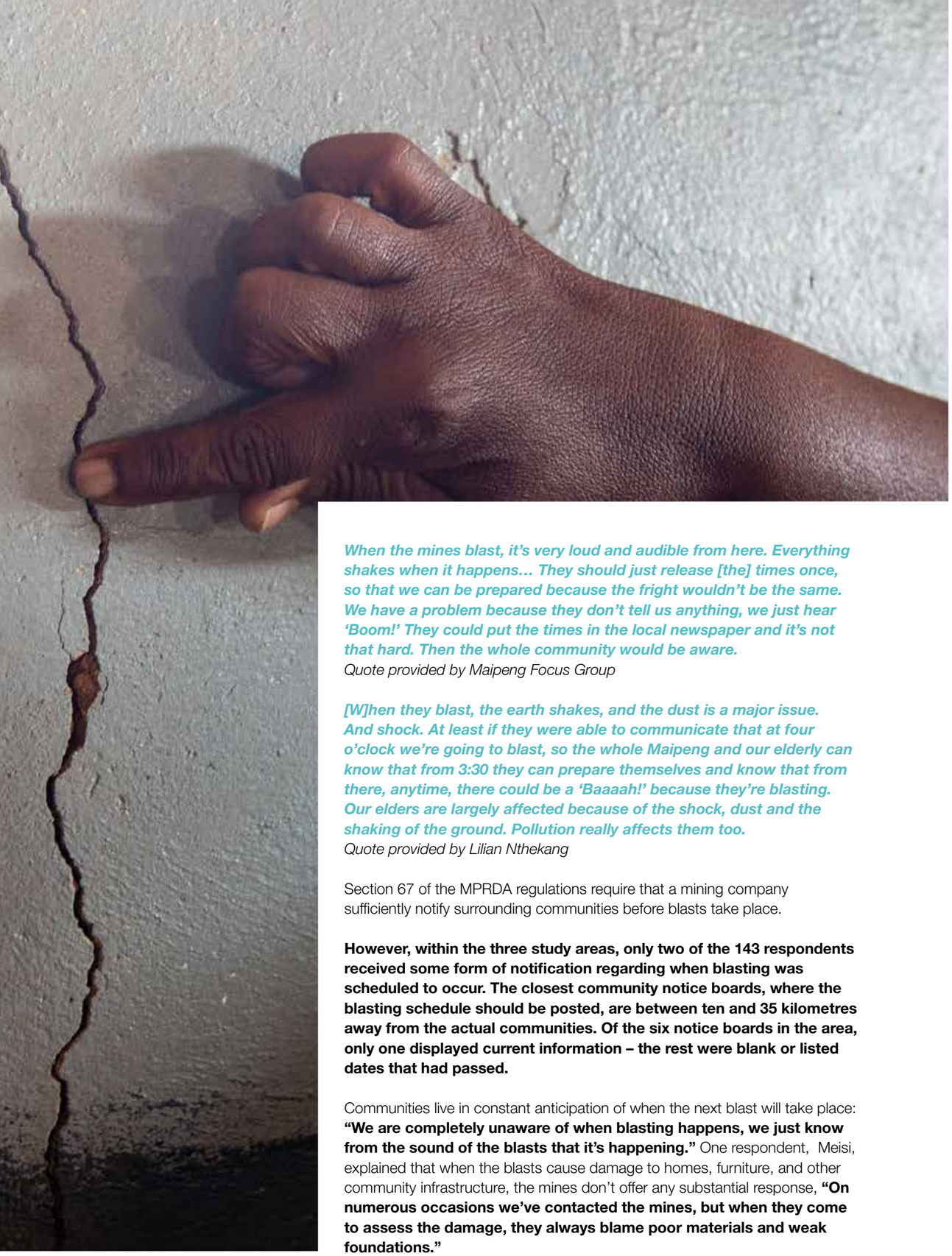
In the Kalahari Manganese Field, 71% of respondents said they experienced blasting more than once a week, with 13% answering that they experienced blasting multiple times a day.

The heightened levels of anxiety, trauma, and damage to infrastructure directly precipitated from the blasts were a common and acute grievance shared during interviews and focus groups:

You'll just be sitting and hear, boom! Boom! Boom! It frightens us right, and our furniture starts trembling, we wonder what is going on and then we find out it's just the blasting. It really does scare us because the ground starts shaking.
Quote provided by Elsie Setshogela

CASE STUDY

Vuyiswa Nombesi, aged 36, lives in a two-bedroom house with twelve other individuals. The youngest in the household is only five months old. A few years ago Vuyiswa was informed that her house was built with materials that contained asbestos. Lacking the financial means to build another home or get clear information about the risks, Vuyiswa continues to stay in the home with her family. She attributes the cracks in the walls to decades of mine blasting and worries that with each blast, and the resulting tremor, she and her family are left more exposed to asbestos. Vuyiswa has been diagnosed with tuberculosis six times while her sister, who lives with her, has been diagnosed for the disease twice. Vuyiswa suspects she may have asbestosis but is unable to confirm this since she has not been able to obtain her test results. It costs an average of R50 to access an individual's medical file.



When the mines blast, it's very loud and audible from here. Everything shakes when it happens… They should just release [the] times once, so that we can be prepared because the fright wouldn't be the same. We have a problem because they don't tell us anything, we just hear 'Boom!' They could put the times in the local newspaper and it's not that hard. Then the whole community would be aware.
Quote provided by Maipeng Focus Group

[W]hen they blast, the earth shakes, and the dust is a major issue. And shock. At least if they were able to communicate that at four o'clock we're going to blast, so the whole Maipeng and our elderly can know that from 3:30 they can prepare themselves and know that from there, anytime, there could be a 'Baaaah!' because they're blasting. Our elders are largely affected because of the shock, dust and the shaking of the ground. Pollution really affects them too.
Quote provided by Lilian Nthekang

Section 67 of the MPRDA regulations require that a mining company sufficiently notify surrounding communities before blasts take place.

However, within the three study areas, only two of the 143 respondents received some form of notification regarding when blasting was scheduled to occur. The closest community notice boards, where the blasting schedule should be posted, are between ten and 35 kilometres away from the actual communities. Of the six notice boards in the area, only one displayed current information – the rest were blank or listed dates that had passed.

Communities live in constant anticipation of when the next blast will take place: **"We are completely unaware of when blasting happens, we just know from the sound of the blasts that it's happening."** One respondent, Meisi, explained that when the blasts cause damage to homes, furniture, and other community infrastructure, the mines don't offer any substantial response, **"On numerous occasions we've contacted the mines, but when they come to assess the damage, they always blame poor materials and weak foundations."**

4.4.3 Rising rates of HIV, other STIs, and exploitative relationships

Mineworkers are some of the only salaried residents of the villages near the Kalahari Manganese Fields, and the mining profession is overwhelmingly dominated by men. The paltry legal requirement that only 10% of general labourers are women does little to enhance gender equality within the sector. This means that for many women, proximity to mineworkers is their only visible avenue for upward mobility and attaining a less precarious financial status. This has created an unhealthy power dynamic between mineworkers, who are often from outside the area, and predominantly young women who want to escape economic precarity:[67]

The young girls pick up men from the mines and they're just everywhere. The mineworkers have big homes. Our children aren't working; they're not even getting opportunities at these mines, even though we do have some educated children here. There's a place near the road where the mine is where there's a [sex work] 'stop and go' and that's where some end up working.

The power imbalance of these relationships is both well-understood and well-exploited by many mineworkers. The unequal dynamic is epitomised by the high spread of HIV between the young women in the mining area and mineworkers' permanent partners usually residing outside of the mining area. Migrant labourers who travel between temporary work residences and home are a large spreader of sexually transmitted diseases because they often have a permanent life partner at home and engage in more casual sex while away for extended periods.[68] In Vergenoeg, over 300 mineworkers from out of town stay temporarily in hostels. In comparison, fewer than 50 people from Vergenoeg are employed in the mines. A JTG District report noted a similar trend:[69]

The mining industry, through its propensity for single-male employment, which often entails young men being away from "home" for long periods of time, provides a fertile breeding ground for socially undesirable and dangerous behaviours, such as prostitution and substance and alcohol abuse. An unforeseen consequence of mining development in a rural area is the introduction of a group of persons from outside the district that earn huge salaries relative to those of the indigenous inhabitants of the district.

This means that for many women, proximity to mineworkers is their only visible avenue for upward mobility and attaining a less precarious financial status.

67 Lillian Nthekang, individual interview, November 13, 2020.
68 Corno, Lucia "Mines, migration and HIV/AIDS in southern Africa" (2012) Journal of African Economies 21(3).
69 JTG District (Above note 9) at 188.

MINES' EFFORTS TO HIDE THE DANGERS OF MANGANESE POISONING

Prolonged exposure to excess manganese in any medium can lead to manganism.[1] Manganism is a chronic disorder affecting the nervous system and leading to impaired movement, coordination and neurological functioning.[2] Three recent studies on the brain functioning of South African mineworkers with manganism found a significant correlation between years worked in manganese mines and signs of neurological dysfunction.[3]

As with other metals, poisoning is not limited to mineworkers. Various studies have found that airborne and water exposure to manganese significantly increases children's risk of developing mental and physical disabilities.[4] Furthermore, the exposure of pregnant women to high levels of manganese in air or water leads to increased infant mortality rates and early childhood development disorders.[5]
In the communities surrounding manganese mines, there is little awareness about the risk of prolonged exposure to heightened levels of manganese. One elder in Maipeng, Eli Mabilo, worked at what is now South 32 from 1978 to 1991 and was never informed of the risks of excessive manganese exposure. After the significant reputational shock experienced by some mines just over a decade ago, when a host of manganism cases were exposed, manganese mines appear eager to suppress information on the disorder: in what carries the classic markers of a Strategic Litigation Against Public Participation (SLAPP) case, one mine in the Kalahari Manganese Field, Assmang Manganese, is currently embroiled in a protracted court battle against a psychologist who diagnosed ten of its workers with manganism. After hearing evidence, South Africa's High Court recently gave permission to the psychologist to launch a court challenge against Assmang for malicious prosecution. One minework who was diagnosed with manganism after working at Assmang for 28 years said in response to the court victory: "The company knew the dangers of manganese but they never warned us about it; we were not required to use masks, we had no protective gear or goggles, they were just killing us slowly and no one will ever be held accountable."[6]

1 O'Neal, Stefanie L and Wei Zheng "Manganese Toxicity Upon Overexposure: a Decade in Review" (2015) Current Environmental Health Reports 2.
2 Bouchard, M, Mergler, D. et al. "Neurobehavioral functioning after cessation of manganese exposure: A follow- up after 14 years" (2007) American Journal of Industrial Medicine (50)11; Spadavecchia, Olivia "Manganism – Manganese Poisoning" (2007) Environment. Accessible at: https://www.environment.co.za/poisoning-carcinogens-heavy-metals-mining/manganism-manganese-poisoning.html
3 Gonzalez-Cuyar, Luis F, Gill Nelson et al. "Quantitative neuropathology associated with chronic manganese exposure in South African mine workers" (2014) NeuroToxicology 45.
4 Criswell, Susan R, Gill Nelson et al. "Ex vivo magnetic resonance imaging in South African manganese mine workers" (2015) NeuroToxicology 49; Duka, Ykateryna D, Ilchenko, Svetlana I. et al. "Impact of open manganese mines on the health of children dwelling in the surrounding area" (2011) Emerging Health Threats Journal 4; Bouchard, Maryse F, Sébastien Sauvé et al "Intellectual Impairment in School-Age Children Exposed to Manganese from Drinking Water" (2011) Environmental Health Perspectives (119)1; Chen, Pan, Megan Culbrth et al. "Exposure, epidemiology, and mechanism of the environmental toxicant manganese" (2016) Environmental Science and Pollution Research volume 23.
5 Henn, Birgit Claus, David C. Bellinger "Maternal and Cord Blood Manganese Concentrations and Early Childhood Neurodevelopment among Residents near a Mining-Impacted Superfund Site" Environmental Health Perspectives (125)6.
6 Medical Brief "SCA rules psychologist can sue over 'malicious' complaint to HPCSA" 11 November 2020. Accessible at: https://www.medicalbrief.co.za/archives/sca-rules-psychologist-can-sue-over-malicious-complaint-to-hpcsa/

5. MANGANESE IN THE NETHERLANDS

This chapter analyses whether manganese mined in South Africa's Kalahari Manganese Field, close to the communities of Vergenoeg, Maipeng and Magojaneng (our research sites), is being used in steel and renewable energy technologies (particularly electric vehicles, wind turbines and energy storage) in the Netherlands and Europe.

5.1 THE LINKS BETWEEN SOUTH AFRICAN MANGANESE A ND THE NETHERLANDS

We focus on renewable energy technologies because their mass deployment is resulting in soaring mineral demand, including manganese. While the energy transition is of paramount importance, it should not be based on social and environmental abuses. Furthermore, a truly just transition needs to contribute to the wellbeing of everyone involved, particularly workers and communities living close to the source of the minerals used for the transition. The energy transition offers a unique opportunity of not only reducing emissions but also contributing to alleviating poverty, tackling inequality and improving the mineral sourcing practices of the entire mining industry (including the practices of mining for steel production).

As mentioned in the introduction, we focus on steel production because it accounts for 90% of manganese demand. Notably, renewable energy technologies use vast amounts of steel. We consider that reducing the social and environmental impacts of steel production (which is responsible for 8% of global greenhouse emissions) should receive greater attention in global efforts to tackle the climate crisis.[70] The energy transition offers a unique opportunity and responsibility for the renewable energy industry and the steel industry to both improve their sourcing practices and reduce their material and energy demand and prevent negative social and environmental impacts.

Trade and production data reveal that manganese from South Africa is imported into the Netherlands and Europe in various forms. Various sources, including the United Nations Commodity Trade Statistics Database (UN Comtrade) and the International Manganese Institute, show that the Netherlands and Europe import manganese as manganese ore (mostly to be used in steelmaking in Europe); as an alloy such as ferromanganese and silicomanganese (also for steelmaking) and as manganese articles (such as manganese metal).

In addition to such imports, manganese is also contained in products and components imported into the Netherlands (such as batteries).

5.1.1 Manganese ore

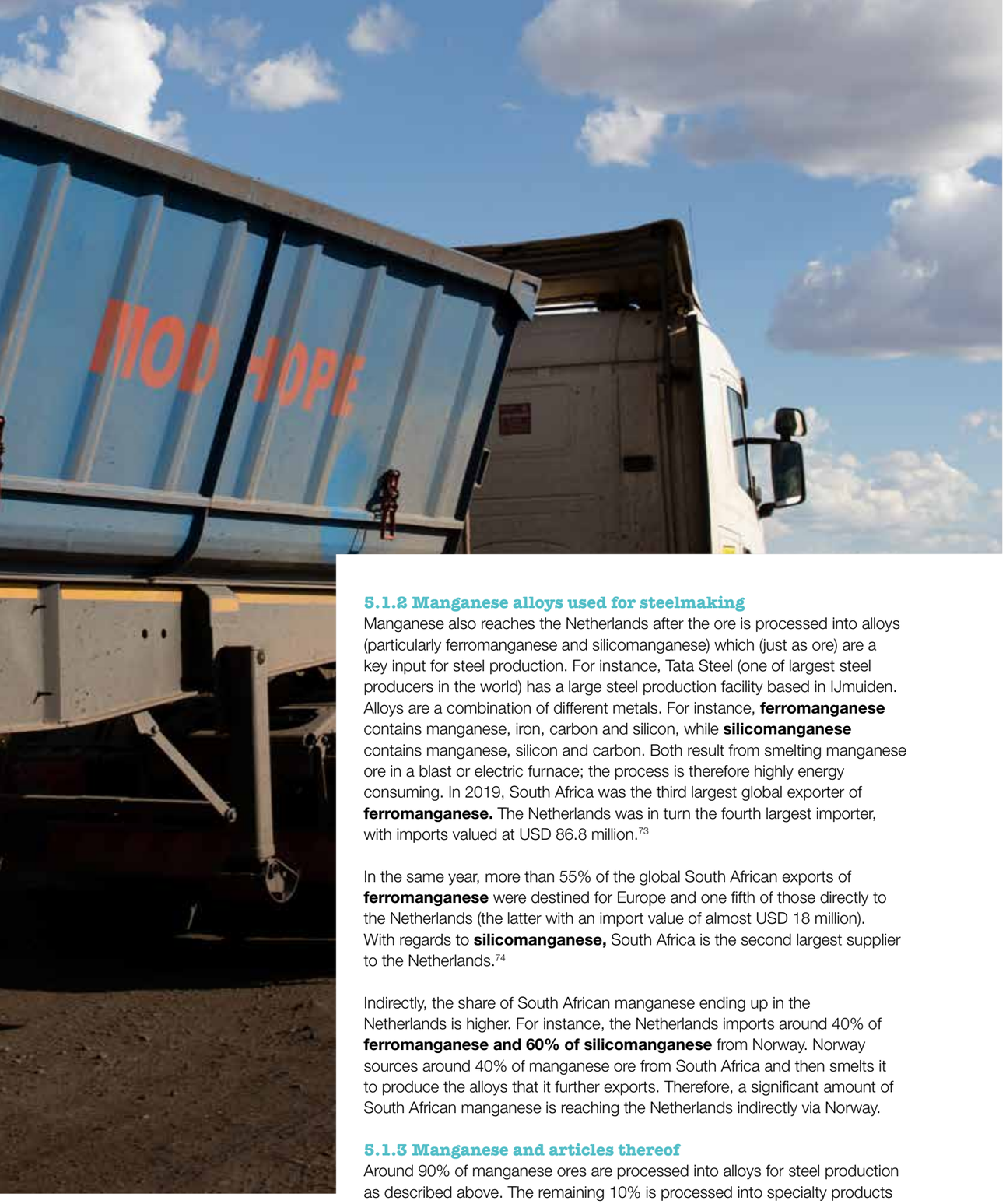
Almost 90% of the global manganese trade is done in the form of manganese ore. Data from UN Comtrade shows that the top countries exporting manganese ore correspond with the largest producers. In 2019, South Africa accounted for more than 40% of global exports while only five countries were responsible for more than 90% of exports (in descending order, South Africa, Australia, Gabon, Brazil and Ghana).[71]

In 2019, the Netherlands imported 62 kilotonnes of manganese ore valued at USD 15.4 million.[72] Around 70% of such manganese ore came from South Africa. As most of the South African manganese mines are located in the Kalahari Manganese Field, including the largest six companies, we can conclude that a big share of the manganese imported into the Netherlands comes from that region (likely close to 70% of all Dutch imports of manganese ore).

Around 70% of the manganese ore that the Netherlands imported came from South Africa.

70 “Decarbonization in Steel | McKinsey”, accessed April 21, 2021, https://www.mckinsey.com/industries/metals-and-mining/our-insights/decarbonization-challenge-for-steel.

71 “Manganese Ore (HS: 2602) Product Trade, Exporters and Importers”, accessed March 11, 2021, https://oec.world/en/profile/hs92/manganese-ore.
72 Chatham House (2020), ‘resourcetrade.earth’, https://resourcetrade.earth/ (Commodity: Manganese ores, concentrates, iron ores > 20% Manganese)



5.1.2 Manganese alloys used for steelmaking

Manganese also reaches the Netherlands after the ore is processed into alloys (particularly ferromanganese and silicomanganese) which (just as ore) are a key input for steel production. For instance, Tata Steel (one of largest steel producers in the world) has a large steel production facility based in IJmuiden. Alloys are a combination of different metals. For instance, **ferromanganese** contains manganese, iron, carbon and silicon, while **silicomanganese** contains manganese, silicon and carbon. Both result from smelting manganese ore in a blast or electric furnace; the process is therefore highly energy consuming. In 2019, South Africa was the third largest global exporter of **ferromanganese.** The Netherlands was in turn the fourth largest importer, with imports valued at USD 86.8 million.[73]

In the same year, more than 55% of the global South African exports of **ferromanganese** were destined for Europe and one fifth of those directly to the Netherlands (the latter with an import value of almost USD 18 million). With regards to **silicomanganese,** South Africa is the second largest supplier to the Netherlands.[74]

Indirectly, the share of South African manganese ending up in the Netherlands is higher. For instance, the Netherlands imports around 40% of **ferromanganese and 60% of silicomanganese** from Norway. Norway sources around 40% of manganese ore from South Africa and then smelts it to produce the alloys that it further exports. Therefore, a significant amount of South African manganese is reaching the Netherlands indirectly via Norway.

5.1.3 Manganese and articles thereof

Around 90% of manganese ores are processed into alloys for steel production as described above. The remaining 10% is processed into specialty products such as electrolytic manganese metal (EMM), electrolytic manganese dioxide (EMD) and manganese sulphate monohydrate (MSM). The three specialty products are produced both as conventional and high-purity grades. These specialty products are used to produce certain types of specialty steel as well as fertilizers, disposable alkaline batteries and rechargeable lithium batteries for electric vehicles and energy storage.[75]

Electrolytic manganese metal is traded (along with other products) under the customs Harmonized System (HS) Code 8111.00 Manganese and Articles Thereof, Including Waste and Scrap ("Manganese and articles thereof").

In 2019, the Netherlands was the third largest importer of manganese and articles thereof with imports valued at USD 121 million.[76] Most of the Dutch imports came from China, Gabon and South Africa. South Africa directly supplied 7.5% of total Dutch imports while around 75% of the imports came from China. Zooming into exports of manganese and articles thereof by South Africa shows that the Netherlands was their third largest destination, after Japan and the US.[77]

Just as alloys, manganese and articles thereof are produced from manganese ore. South Africa is by far the largest supplier of manganese ore to China, accounting for around 40% of total Chinese imports. Therefore, South African manganese is reaching the Netherlands and Europe indirectly via China. This is important to remember, as production of manganese metal is dominated by China, which produced 94% of the global output in 2019.[78] The largest producer of electrolytic manganese metal in the world is Chinese Ningxia Tinyuan Manganese Industry Co (TMI), with a market share of over 40%.[79] Other producers of manganese metal outside China are located in South Africa, Gabon and Indonesia.

The Netherlands imported 328 kilotonnes of manganese valued at USD 375 million in 2019.

The Netherlands in turn is the third largest global exporter of manganese and articles thereof. The Netherlands exports about 40% of its imports (by weight). In 2019, the main destinations of Dutch exports were Germany (52%), Austria (13%) and Belgium (8%).[80]

Only a very small fraction of electrolytic manganese metal (around 2%) is produced in the high-purity form suitable for battery production.[81] It is very important to note that production of high purity electrolytic manganese metal, which is the product of choice for battery makers, is only produced in a few plants in China and one plant in South Africa owned by Manganese Metal Company.

To sum up, adding up the trade data of all manganese forms (ore, alloys and manganese products) reveals that the Netherlands imported 328 kilotonnes of manganese valued at USD 375 million in 2019. Dutch exports reached 144

73 "Ferro-Manganese, >2% Carbon (HS: 720211) Product Trade, Exporters and Importers", accessed March 11, 2021, https://oec.world/en/profile/hs92/ferro-manganese-2-carbon?redirect=true.
74 "Ferro-Silico-Manganese (HS: 720230) Product Trade, Exporters and Importers", accessed March 11, 2021, https://oec.world/en/profile/hs92/ferro-silico-manganese?redirect=true.

75 EMD is the raw material used to produce lithium-ion manganese oxide cathodes while EMM and MSM are used to produce Lithium-ion nickel manganese cobalt oxide cathodes.
76 "Manganese, Articles Thereof, Waste or Scrap (HS: 811100) Product Trade, Exporters and Importers", accessed March 11, 2021, https://www.oec.world/en/profile/hs92/manganese-articles-thereof-waste-or-scrap?redirect=true.
77 "Where Does South Africa Export Manganese, Articles Thereof, Waste or Scrap to?" (2019) | OEC - The Observatory of Economic Complexity," accessed March 11, 2021, https://oec.world/en/visualize/tree_map/subnational_zaf/export/zaf/all/15811100/2019/.
78 "IMnI Statistics 2020" (International Manganese Institute), accessed January 21, 2021, https://www.manganese.org/wp-content/uploads/2019/05/IMnI_Statistics_2020.pdf.
79 "Manganese: Euromanganese Signs MOU with JFE Steel for High-Purity Manganese Metal", Roskill, February 3, 2020, https://roskill.com/news/manganese-euromanganese-signs-mou-with-jfe-steel-for-high-purity-manganese-metal/.
80 Chatham House (2020), 'resourcetrade.earth', https://resourcetrade.earth/?year=2019&exporter=528&category=1511&units=weight&autozoom=1
81 "Technical Report and Preliminary Economic Assessment for the Chvaletice Manganese Project, Chvaletice,Czech Republic" (Tetra Tech Canada Inc., March 15, 2019), https://www.miningnewsfeed.com/reports/Chvaletice_PEA_03152019.pdf.

5.2 END USE OF MANGANESE

kilotonnes valued at USD 182 million. In the same year, Dutch imports directly from South Africa reached 65.7 kilotonnes valued at USD 36.6 million.[82]

Looking at South African exports of manganese (all forms) shows that in 2019 the country exported 20 million tonnes representing 38% of global exports, positioning the country as the world's largest exporter. Such South African exports were valued at USD 4 billion.

Europe in turn imported 14% of global manganese trade (all forms). Almost a third of all European imports of manganese came directly from South Africa. If we add the South African manganese imported indirectly (for instance via Norway or China) then the share is significantly higher.

As almost all South African manganese production comes from the Kalahari Manganese Field, it is clear that a significant share of Dutch and European manganese imports comes from that region. This conclusion is further asserted by the fact that more than two thirds of all South African manganese mines (18 out of 22) are in the Kalahari, including the operations of the six biggest companies (see chapter 3). Dutch and European imports of manganese originating in the Kalahari Manganese Field are likely to continue, as 75% of the identified global manganese resources are located there.

Now that we have established that manganese sourced close to the communities of Vergenoeg, Maipeng and Magojaneng represents a significant share of Dutch and European imports, we turn to analyse what is the end use of such manganese.

82 Chatham House (2020), 'resourcetrade.earth', https://resourcetrade.earth/?year=2019&exporter=528&category=182&units=weight&autozoom=1

Steel production accounts for more than 90% of total manganese consumption. Steel is all around us, for instance in buildings, bridges, wind turbines, cars, tools, food packaging, domestic appliances, electricity transformers and electric motors.

This report focuses on manganese use by low carbon technologies related to the energy transition, in particular wind, electric vehicles and energy storage. Such technologies contain manganese in the steel used for their components (for instance the body of the vehicles, the masts of the turbines, etc.). Furthermore, manganese is used to produce battery cathodes for EVs and energy storage.

5.2.1 Manganese for steel and its use by the auto and wind industries

In the steelmaking process, manganese is primarily used for refining iron ore and as an alloy to convert iron into steel.There are currently no viable processes for making steel without manganese. Therefore, manganese is an essential mineral for industry and society.
Around 6 to 9 kilograms of manganese are required to produce a tonne of steel.[83] This may seem low; however, steel is one of the most used metals in the world.

In 2019, steel production reached 2 billion tonnes, requiring approximately 12–18 million tonnes of manganese.[84] The sector that consumes the most steel is construction of buildings and infrastructure, accounting for more than half of steel demand. After construction, the sectors that come next in steel demand are production of mechanical equipment and the automotive sector. Globally, the automotive industry accounts for 12% of steel demand, while at EU level it is even higher, reaching almost 20%.[85]

Steel production accounts for more than 90% of total manganese consumption.

83 William F. Cannon, Bryn E. Kimball, and Lisa A. Corathers, "Manganese", Report, Professional Paper (Reston, VA, 2017), USGS Publications Warehouse, https://doi.org/10.3133/pp1802L.
84 Considering 6 to 9 kilograms of manganese are required to produce a ton of steel.
85 "European Steel in Figures 2020" (The European Steel Association, June 2020).

In the automotive sector, steel is used throughout the car, including the body structure, drive train, suspension, wheels and braking system. An average car contains around 900 kg of steel, which requires 5.4 to 8.1 kilograms of manganese.[86] If we consider that in 2019 almost 93 million vehicles were produced globally, the automotive industry used 502,000–753,000 tonnes of manganese to produce cars. This excludes the manganese required to produce batteries for electric vehicles, which will be discussed further below. It is important to highlight that a quarter of total vehicle manufacturing takes place in Europe.[87]

The wind energy sector consumes vast amounts of steel. According to the World Bank's Report Minerals for Climate Action, "[t]he main components of turbines (towers, castings, nacelle, shafts, and so on) are primarily made up of steel."[88] Around 80% of the total mass of a wind turbine is made of steel.[89] WindEurope confirmed that the construction of nacelle and steel towers use tempering steel, construction steel and cast iron.[90]

The wind energy sector consumes vast amounts of steel. Around 80% of the total mass of a wind turbine is made of steel.

The construction of a single inland wind turbine requires 225 to 285 tonnes of steel.[91] Considering 6 to 9 kg of manganese per tonne of steel, an inland wind turbine requires 1,350–2,565 kgs of manganese. However, these estimates may be on the low side as some types of steel require even higher amounts of manganese. One of the wind turbine manufacturers reported estimates between 2,200–7,500 kilograms of manganese for their onshore wind turbines; a second manufacturer estimated 4,200 kg of manganese for a 105 metre high wind turbine, and a third manufacturer estimated 3000–4000 kg for a 4 MW onshore wind turbine.[92] Offshore wind turbines require even more steel (and thus manganese) due to their bigger foundations.

According to a study by Metabolic (research consultancy) and Leiden University "(T)o realise the electricity production targets set for 2030, the Netherlands would require some 2.4 to 3.2 million metric tonnes of metal. By 2050, that demand quadruples to 8.6–11.7 million metric tonnes. Most of this demand – about 87% – consists of iron and steel for the foundation and shaft of wind turbines."[93] If we assume a ratio of 80% steel / 20% iron in a wind turbine (and the use of 6 to 9 kg of manganese per tonne of steel), then the Netherlands will require 11,520–23,040 tonnes of manganese for renewable electricity by 2030, quadrupling to 41280–84240 tonnes by 2050. Here again, the estimate may well be on the low side as some types of steel require even more manganese.

The essential use of manganese to produce steel parts of low carbon technologies make it a key mineral for the energy transition. Furthermore, manganese is also a key mineral to produce batteries, including those used by electric cars and energy storage, as discussed in the next section.

86 "Steel in Automotive", accessed March 8, 2021, http://www.worldsteel.org/steel-by-topic/steel-markets/automotive.html.
87 "World Motor Vehicle Production | ACEA - European Automobile Manufacturers' Association," accessed October 21, 2020, https://www.acea.be/statistics/tag/category/world-production.
88 "Minerals for Climate Action:The Mineral Intensity of the Clean Energy Transition".
89 Elsa Dominish, Sven Teske, and Nick Florin, "Responsible Minerals Sourcing for Renewable Energy", (Report prepared for Earthworks by the Institute for Sustainable Futures, University of Technology Sydney, 2019); "ArcelorMittal Wind Towers," accessed March 9, 2021, https://industry.arcelormittal.com/windtowers.
90 Email exchange with Iván Pineda, Director of Public Affairs at WindEurope date May 20, 2021.
91 "Wind Turbines Made out of Steel", ArcelorMittal in Belgium, accessed March 9, 2021, https://belgium.arcelormittal.com/en/innovation/applications/wind-turbines/.
92 Email exchange with Iván Pineda, Director of Public Affairs at WindEurope, May 20, 2021. The names of the wind manufacturers were anonymized by the respondent.
93 Pieter van Exter et al., "Metal Demand for Renewable Electricity Generation in the Netherlands," 2018.

5.2.2 Manganese for batteries (electric vehicles and energy storage)

Manganese is a key mineral to produce disposable and rechargeable batteries. Disposable batteries refer to single use batteries such as AA alkaline batteries. Rechargeable lithium batteries in turn can be found in electric vehicles (EVs), Energy Storage Systems (ESS), e-bikes, medical devices, power tools and portable consumer electronics.
Manganese demand for rechargeable batteries is forecast to skyrocket, driven predominantly by electric vehicles and by energy storage (for instance from solar and wind renewables). We therefore focus on these two end uses of manganese in this section.

There are various battery types used by EVs which differ in their mineral content. Two of the most popular types use manganese:

- lithium-ion nickel manganese cobalt oxide battery (NMC or NCM);
- lithium-ion manganese oxide battery (LMO).

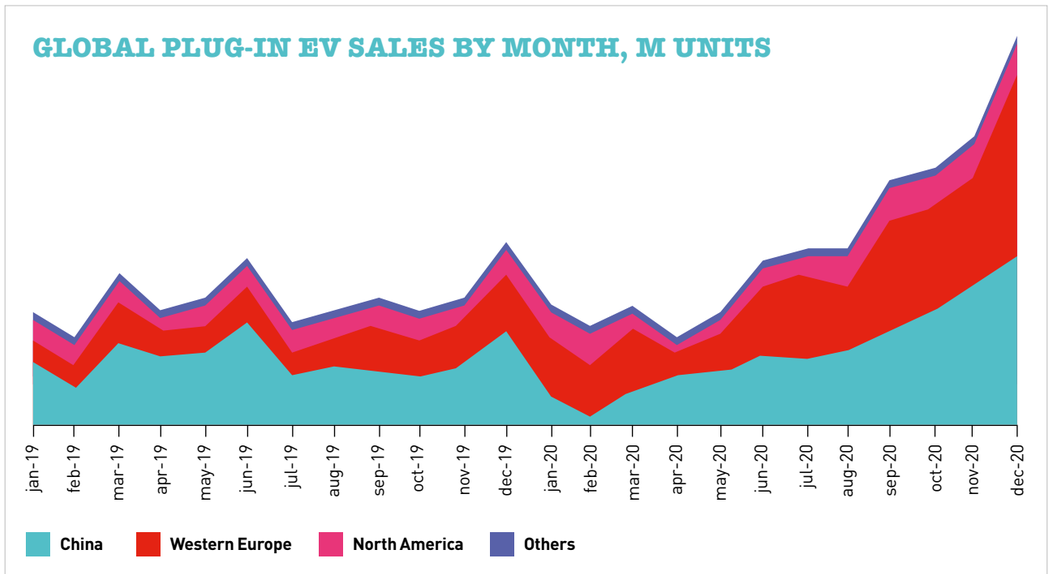
Almost half of the EV's lithium batteries produced in 2020 were NMC and around 10% were LMO. So, manganese was used in nearly 60% of all EV battery production last year.[94] Furthermore, Volkswagen recently announced that high-manganese batteries are a strong candidate for their next generation batteries.[95] This announcement may result in an even higher uptake of manganese-based batteries in the future by the industry.

94 "Roskill Webinar — The Evolution of Cathode Chemistries", Roskill, accessed March 12, 2021, https://roskill.com/event/the-evolution-of-cathode-chemistries/.
95 "Volkswagen Reinforces It Is Betting On High-Manganese Cells", InsideEVs, accessed May 3, 2021, https://insideevs.com/news/496535/volkswagen-bets-high-manganese-cell/.

Manganese is used in batteries due to its chemical properties.
The manganese-based chemical compound used in rechargeable batteries is manganese sulphate monohydrate (MSM). MSM itself is produced either from electrolytic manganese metal (EMM) or from manganese ore. For EV battery applications, the purity of these products is of the utmost importance, due to safety and performance considerations, and thus requires exclusively high-purity MSM and high-purity EMM.

Sales of electric vehicles is booming in Western Europe including in the Netherlands. In 2020 sales in Western Europe more than doubled as compared to 2019, even surpassing sales in China.[96] Europe is indeed the fastest growing global market for EVs, as can be seen in the next figure.

Figure 5.2.2: Electric vehicle sales by month



Source: Roskill webinar: The evolution of cathode chemistries[97]

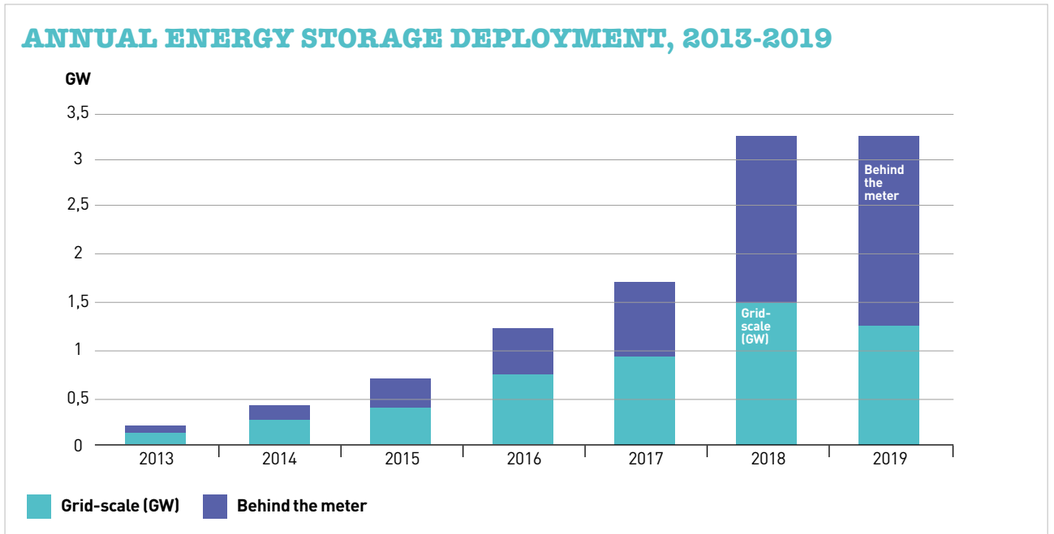
96 "Roskill Webinar — The Evolution of Cathode Chemistries", Roskill, accessed March 12, 2021, https://roskill.com/event/the-evolution-of-cathode-chemistries/.
97 "Roskill Webinar — The Evolution of Cathode Chemistries."

In the Netherlands, the number of electric cars doubled in 2020, reaching 145,000 units.[98] If we add hybrid cars, which are powered by both a battery and an internal combustion engine, then the Dutch fleet is even bigger, reaching 288,000 units in March 2021.[99]

The International Energy Agency's scenario based on current and announced governmental policies estimates that EV batteries will demand 177,000 metric tonnes of manganese by 2030.[100]

Besides their application for electric mobility, rechargeable lithium batteries are also used as energy storage systems (ESS). ESS applications include both residential use (for instance to store energy from solar panels) and large grid scale utility projects (for example, storing energy from solar and wind farms). ESS are particularly important for the renewable energy sector as they mitigate intermittent production and imbalances of supply and demand. ESS deployment has grown significantly in the last years, with 3 GW installed in 2019 compared to less than 0.5 GW five years before, as shown in the next figure.

Figure 5.2.3: Annual energy storage deployment 2013–2019



Source: International Energy Agency[101]

98 IEA (2020), "Energy Storage", IEA, Paris, accessed February 22, 2021, https://www.iea.org/reports/energy-storage"Consument kiest vaker voor elektrische auto | ANWB", rd_nieuws, December 3, 2020, https://www.anwb.nl/auto/nieuws/2020/december/elektrisch-rijden-monitor-consument-kiest-vaker-voor-elektrische-auto.
99 "Nederland Elektrisch - Cijfers En Statistieken EV's in Nederland," accessed June 7, 2021, https://nederlandelektrisch.nl/actueel/verkoopcijfers.
100 "Roskill Webinar — The Evolution of Cathode Chemistries".
101 IEA (2020), Energy Storage, IEA, Paris, accessed February 22, 2021, https://www.iea.org/reports/energy-storage

It is important to note that manganese-based rechargeable batteries are the most widely used battery type for grid energy storage. According to the International Energy Agency "(a)round 60% of grid-scale batteries are currently nickel-manganese-cobalt blends".[102]

Benchmark Minerals Intelligence forecasts manganese demand for lithium-ion batteries (all applications, including EVs and energy storage) to reach 61,068 tonnes in 2021 and 379,000[103] by 2029, which would represent about 2% of current levels of global production.[104]

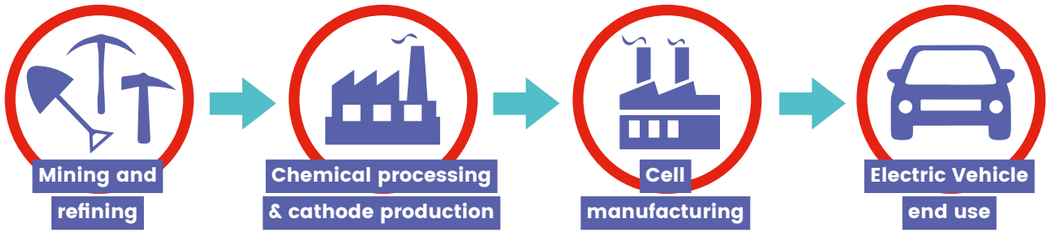
In the next section we review the route that rechargeable batteries follow to reach the Netherlands and Europe from mine to end product.

102 "Cijfers elektrisch vervoer | RVO.nl | Rijksdienst", accessed March 12, 2021, https://www.rvo.nl/onderwerpen/duurzaam-ondernemen/energie-en-milieu-innovaties/elektrisch-rijden/stand-van-zaken/cijfers. This includes both Battery Electric Vehicle (BEV) and Plug-in Hybrid Electric Vehicle (PHEV).
103 "Consument kiest vaker voor elektrische auto | ANWB", rd_nieuws, December 3, 2020, https://www.anwb.nl/auto/nieuws/2020/december/elektrisch-rijden-monitor-consument-kiest-vaker-voor-elektrische-auto.
104 Caspar Rawles (Head of Price Assessments, Benchmark Mineral Intelligence), email exchange December 11, 2020. This includes both Battery Electric Vehicle (BEV) and Plug-in Hybrid Electric Vehicle (PHEV).

5.3
THE MANGANESE ROUTE: FROM MINE TO ELECTRIC VEHICLE (EV) BATTERIES

Manganese reaches the Netherlands as part of a myriad of products made of steel. The analysis of the value chain of steel products is too broad and beyond the scope of this research study. In this section we focus on manganese reaching the Netherlands as part of EVs' Li-ion batteries. Li-ion batteries' soaring growth in demand is currently driven mainly by EVs, while stationary storage is predicted to ramp up in the upcoming years.

A simplified battery value chain shows the route of manganese from mine to EV:



During the first step (mining and refining) manganese ore is extracted from the ground, for instance in the Kalahari Manganese Field. As discussed above, South Africa is the world's leading producer and exporter of manganese ore. For battery applications, the ore is then refined into electrolytic manganese metal (EMM), electrolytic manganese dioxide (EMD) or manganese sulphate monohydrate (MSM).

The Manganese Metal Company in South Africa is the only company currently producing high purity electrolytic manganese metal outside of China. They use a selenium-free process for production, which is considered less harmful to the environment than the process used in China. Being

the only producer of this critical battery material outside of China places the Manganese Metal Company and South Africa as strategic players in the battery value chain.

The Manganese Metal Company sources its manganese ore from Hoatzel Manganese Mines located in the Kalahari Manganese Field.[105] South32 and AngloAmerican co-own the Hoatzel Manganese Mines consortium which operates the Wessels high-grade underground mine and the Mamatwan medium-grade open pit mine.[106] The Manganese Metal Company has a longstanding relationship with South32 for the supply of manganese ore, also placing the latter as a strategic player in the battery value chain. The Wessels mine is located approximately 20 kilometres away from Maipeng community.

In step two (chemical processing & cathode production), manganese undergoes a chemical process to convert it into a battery precursor, such as nickel-manganese-cobalt oxide, which is then used in the battery cathode. The production of both battery precursors and cathodes is heavily concentrated in Japan, South Korea and China. Indeed, these three countries are top export destinations for South African manganese ore. European companies BASF (DE) and Umicore (BE) are mayor producers of battery materials (precursors and cathodes) with facilities in Asia and are investing in new production sites in Europe. Other major global players include Sumitomo Metal Mining (JP), EcoPro (SK), Posco (SK), L&F (SK), Xiamen Tungsten (CH), Ningbo Shanshan (CH), Ningbo Ronbay New Energy Technology (CH), and Hunan Changyuan (CH).

In step three (cell manufacturing) the cathode is assembled with an anode, a separator and an electrolyte to produce a battery cell. Battery cell production is dominated by China, with over 70% of the market.[107] In 2019, Europe only produced 6% of the global output of battery cells; however, it is investing heavily in developing an entire battery value chain within its territory. There are more than 25 announced Li-ion factories in Europe, and it is expected that by 2029 Europe will have a 16% share of the global market, growing from its current production of 450 GWh to 2550 GWh.[108] Currently, the biggest battery cell manufacturers are LG Chem (SK), CATL (CH), BYD (CH), Panasonic (JP) and Samsung (SK).

In the final step (EV end use), cells are interconnected in a battery pack that is assembled into the electric vehicle. Battery pack assembly is mostly done by the car manufacturer, which then sells the EV to the public. The top brands of electric vehicles registered in the Netherlands are Tesla, Nissan, Volkswagen, Hyundai, Kia, Renault. BMW and Jaguar.[109]

The following table summarises the main steps, location and players in the battery value chain from mine to EV, starting with manganese mining in South Africa and ending with car use in the Netherlands.

Table 5.3.1: Battery value chain

STEP OF THE VALUE CHAIN	MINING AND REFINING	CHEMICAL PROCESSING & CATHODE PRODUCTION	CELL MANUFACTURING	EV END USE
LOCATION	Kalahari Basin, South Africa	Japan, South Korea or China	China, South Korea, Japan	Netherlands and rest of Western Europe
KEY PLAYERS	Top Mining companies in South Africa: Assmang Black Rock; Kalagadi Manganese; Kudumane Manganese; United Manganese of the Kalahari (UMK); Tshipi Manganese Refiner in South Africa: Manganese Metal Company (SA)	BASF (DE); Umicore (BE); Sumitomo Metal Mining (JP), EcoPro (SK), Posco (SK), L&F (SK), Xiamen Tungsten (CH), Ningbo	11 Biggest manufacturers: LG Chem (SK), CATL (CH), BYD (CH), Panasonic (JP) and Samsung (SK)	Top brands registered in the Netherlands: Tesla (US), Nissan (JP), Volkswagen (DE), Hyundai (SK), Kia (SK), Renault (FR), BMW (DE), Jaguar (UK)

Source: SOMO, based on various sources

To conclude, steel and manganese are often overlooked by studies focused on the impacts of minerals such as lithium and cobalt. However, steel is one of the most used materials by low carbon technologies (as shown by the wind turbine example, whereby it accounts for 80% of total mass) and manganese is a key mineral used to produce batteries.

This chapter has shown that manganese originating in the Kalahari Manganese Field is being used for low carbon technologies in Europe and the Netherlands, notably to produce steel (for wind turbines and electric vehicle bodies) and lithium-ion batteries used in electric vehicles and energy storage units (for both residential and grid scale applications). In fact, manganese sourced close

105 “Manganese Metal Company | LinkedIn”, accessed March 11, 2021, https://za.linkedin.com/company/mangenese-metal-company.
106 “South Africa Manganese”, accessed March 11, 2021, https://www.south32.net/our-business/southern-africa/south-africa-manganese; “Major Mines & Projects | Hotazel Mine”, accessed March 11, 2021, https://miningdataonline.com/property/3223/Hotazel-Complex.aspx.
107 “CHART: China’s Stranglehold on Electric Car Battery Supply Chain”, MINING.COM (blog), April 17, 2020, https://www.mining.com/chart-chinas-stranglehold-on-electric-car-battery-supply-chain/.

108 “Batteries_europe_strategic_research_agenda_december_2020__1.Pdf”, accessed March 12, 2021, https://ec.europa.eu/energy/sites/ener/files/documents/batteries_europe_strategic_research_agenda_december_2020__1.pdf.
109 “Statistics Electric Vehicles and Charging in The Netherlands up to and Including October 2020 - 2.Pdf”, accessed March 12, 2021, https://www.rvo.nl/sites/default/files/2020/11/Statistics%20Electric%20Vehicles%20and%20Charging%20in%20The%20Netherlands%20up%20to%20and%20including%20October%202020%20-%202.pdf.

to the communities of Vergenoeg, Maipeng and Magojaneng, in the Kalahari Manganese Field, represents a significant share of Dutch and European manganese imports. Almost all South African manganese production comes from the Kalahari Manganese Field. This conclusion is further asserted by the fact that more than two thirds of all South African manganese mines (18 out of 22) operate in the Kalahari, including the six biggest companies (see chapter 3). Dutch and European imports of manganese originating in the Kalahari Manganese Field are likely to continue, as more than 75% of the manganese global resources are located there.

110 This research was able to establish a direct connection of South32 with the battery value chain, as the manganese they mine is used by Manganese Metal Company to produce electrolytic manganese metal. Manganese mined by the other companies is likely used by Chinese producers but the direct connection has not been established.

6. CONCLUSION

Manganese has been identified as one of the key minerals for the realisation of the energy transition needed to address the climate crisis. It is, however, important that the transition and thus the increasing need for certain minerals and metals such as manganese does not exacerbate or create new negative impacts for local communities, particularly women and youth in South Africa, the country with the world biggest manganese reserves. To research this issue, the following main question was formulated:

To what extent is manganese mined in South Africa and used in the Netherlands and Europe (in steel and renewable energy technologies) linked to human rights abuses and environmental impacts?

To answer the main question of the research study we conducted field research in the Kalahari Manganese Field (which hosts 18 of the 22 manganese mining companies in South Africa) to detect and analyse the impacts of mining activities on the local communities and their environment. Simultaneously, the supply chain was mapped to understand how manganese mining in South Africa reaches the Netherlands and Europe, with a specific focus on steel and low carbon technologies: wind, electric vehicles, and energy storage.

Through general surveys, individual interviews and focus groups it was concluded that the communities in the Kalahari Manganese Field are deprived of their rights to water, safe and accessible healthcare, FPIC and participatory governance.

The previous mining boom, that of asbestos, was characterised by reckless exploitation of resources, complete disregard for host communities and concerted efforts to disguise or downplay the dangerous effects of asbestos mining. Local government and traditional councils focused their attention toward attracting and retaining mining operations, while neglecting the immediate needs of their constituents. Now, the asbestos mines have left, and manganese mines have taken their place.

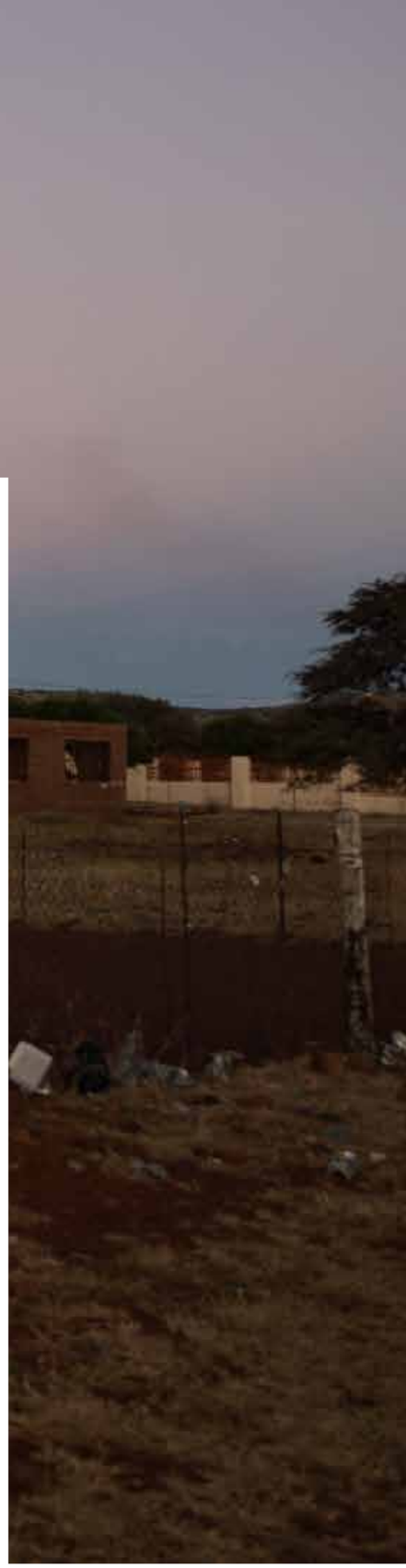
The manganese mining industry further exacerbates and facilitates a governance system under which community interests are neglected. Community members, many of whom have experienced waves of mining booms throughout their entire lives, expect only the worst from the current boom in manganese mining. They contend with less and less water even as large-scale, innovative pipelines are built around them to serve the needs of mines. They live with illness and chronic stress about their own and their families' health, nervously anticipating the almost-daily blasts and the repercussions thereof (including damage to dwellings and release of hazardous asbestos from housing materials). Resentment has replaced any hope that mines will improve their lives. At the same time, they notice the worsening levels of accountability between them and the leaders meant to represent their interests. Women in particular are burdened with walking further to fetch water, with all attendant consequences. Women also take care of ill family members and are excluded from most formal and informal governance structures because they are women, which further feeds the power imbalance that disadvantages them.

Mines pay little attention to community voices. Even though traditional leaders are partly co-opted, they are frustrated that municipalities seem focused only on appeasing mines, and both the mines and the municipalities engage in undemocratic scheming. The legislated requirement for consultation has been skirted by all stakeholders. By conflating the responsibility of the mines to consult and the separate obligation of municipalities to consult, the two entities completely disregard the aspirations of communities by forcing them to rely on the occasional presentation by a local municipality as their only avenue to express their grievances. By that time, it is often too late, as plans have already been set. Communities do not know who to go to in order to seek accountability for the daily human rights violations they experience.

Moreover, it can also be concluded that manganese from the Kalahari Manganese Fields reaches the Netherlands and Europe in abundance, notably to produce steel (for wind turbines and electric vehicle bodies) and lithium-ion batteries used in electric vehicles and energy storage units. This in turn means that the Dutch and European growing demand for manganese needed for the energy transition and for steel production can be linked to the human rights abuses identified in this report.

In fact, manganese sourced close to the communities of Vergenoeg, Maipeng and Magojaneng, in the Kalahari Manganese Field, represents a significant share of Dutch and European manganese imports, as almost all South African manganese production comes from the Kalahari Manganese Field. Eighteen of 22 South African manganese mines operate in the Kalahari Manganese Field, including the six biggest manganese mines in South Africa.

The Netherlands imports manganese in many forms, including as manganese ore, manganese alloys (used for steelmaking) and as manganese metal (key input for producing batteries). In 2019 alone, the Netherlands imported 63 kilo tonnes of manganese ore of which 70% came directly from South Africa. The Netherlands is the world's fourth largest importer of ferromanganese, which is a key alloy to produce steel. The Netherlands also imports manganese as part of finished products such as lithium batteries. A big part of all manganese that is imported to and consumed in the Netherlands and Europe originates in South Africa, which dominates global production and has the largest reserves and resources. In fact, around a third of all European imports of manganese comes from South Africa. Indirectly, the share is much bigger as manganese from South Africa also reaches the Netherlands after being refined in China and Norway.



Globally, 90% of manganese is used for steel production, which places it as a key mineral for industry. The automotive industry relies heavily on steel, accounting for 20% of total demand in Europe. Eighty per cent of the total mass of a turbine is made of steel, evidencing its relevance for wind technology. Furthermore, manganese demand for rechargeable batteries is forecast to skyrocket, driven predominantly by electric vehicles and by energy storage.

Dutch and European importing of manganese originating in the Kalahari Manganese Field is likely to continue, as 75% of the manganese global resources are located there. European countries, the automotive industry, battery manufacturers and wind energy companies therefore all have a responsibility to ensure that the manganese they source does not cause, contribute or is linked to human rights violations and environmental degradation.

The energy transition as planned now negatively impacts on communities in South Africa, and needs to address the human rights abuses identified to ensure it is truly just for everyone. Respecting human rights is not only a local matter, but also a global matter, meaning that the whole manganese supply chain, from South Africa to the Netherlands carries the responsibility to respect human rights and women's rights, and should be held accountable for any violations.

7. RECOMMENDATIONS

Based on the findings of this research, the authors have formulated the following recommendations for six different types of actor:

1. governments in manganese-rich countries,
2. governments in countries in which demand for manganese is increasing due to a transition to low-carbon technologies,
3. manganese mining companies,
4. companies involved in the manufacturing of low-carbon technologies containing manganese such as steel, batteries and wind turbines,
5. companies involved in the end use of low-carbon technologies containing manganese such as wind park developers and automobile companies,
6. banks, pension funds and other financial institutions with financial links to companies mining or using manganese.

For national and local governments in manganese-rich countries:

• **Guarantee meaningful and transparent consultation.** Any efforts to halt the degradation of livelihoods in the Kalahari Manganese Field must begin with meaningful and transparent consultation with communities. The voices of women participants must be prioritised in these consultations. Equally, youth should be encouraged to participate more and be taken more seriously. Mines urgently need to stop relegating their responsibility to local municipalities. Their development projects must reflect these consultations. For their part, municipalities must work with communities and traditional authorities to decide how best to incorporate mines' commitments into their development plans. Collective decisions must be made with the required oversight and reporting by all stakeholders to ensure that consultations culminate in verifiable benefits.

• **Acknowledge the effect of mining in communities that exhibit a high risk** of respiratory diseases and other illnesses caused by water and air contamination. Manganese mining companies are implicated in health issues that may have originated before their operations started, but which they exacerbate.

• **Provide housing that is safe** from asbestos contamination, close to essential services and transport, and far enough away from mines to avoid further exposure. Furthermore, **targeted health interventions and education campaigns** that speak honestly about the risks associated with mining must be rolled out.

• **At the United Nations level, support the development of a binding instrument on business and human rights** to regulate the conduct of multinational and domestic enterprises, including strong provisions for prevention and remediation of harm and enforcement through civil and criminal liability.

For governments in countries in which demand for manganese is increasing due to a transition to low-carbon technologies:

• **Develop and pass comprehensive mandatory human rights due diligence legislation** to hold companies headquartered or operating nationally accountable for addressing impacts associated with manganese mining, and thereby ensure more responsible and sustainable manganese supply chains. Mandatory national and international regulations must be put in place to ensure that corporations are held accountable for their violations of human rights and environmental laws. The growing consumption of renewable energy sources and electric vehicles in the Netherlands and the EU must not, as we have seen, worsen existing impacts but contribute to the eradication of poverty. Climate change solutions in one country must not lead to more problems in other countries. France has already passed a mandatory "duty of vigilance" law, Germany is poised to do so, and the Dutch parliament is currently considering a bill for a comprehensive law on mandatory due diligence. At the European level, the European Parliament has issued a report recommending the adoption of a mandatory due diligence directive, and the European Commission currently has a mandatory human rights due diligence legislation trajectory in place. It is crucial that the Netherlands and the EU commit to ensure these pieces of legislation are comprehensive and gender-responsive, apply to all business enterprises regardless of size and including those in the financial sector, are based on the OECD Guidelines for Multinational Enterprises and UN Guiding Principles on Business and Human Rights, and include strong provisions for enforcement through civil, criminal and administrative liability.

• **Ensure that the EU Battery Regulation currently being discussed in the European Commission includes manganese** in its scope.

• Develop policies and regulations that prioritise **reducing resource and energy use in absolute terms,** working towards a circular economy, but also by reducing unsustainable consumption and production.

For manganese mining companies:

• **Comply with domestic laws** relating to consultation, publication of Social and Labour Plans, notifications about upcoming blasts, and all other environmental requirements. Their current disregard for these requirements reveals a brazen disregard for basic human rights standards.

• **Commit to implementing the OECD Guidelines and the UNGPs** throughout their own operations.

• **Conduct robust and meaningful human rights and environmental due diligence in accordance with the UNGPs and OECD Guidelines.** As part of this due diligence, cease and prevent negative impacts from mining operations including by implementing management and monitoring systems to prevent pollution and depletion of water due to mining operations. Track and communicate on the implementation results of such systems and of their human rights risk assessments, and on how the negative impacts are being addressed. Where adverse impacts do occur, provide and cooperate in remediation for the affected communities.

• Throughout the entire due diligence process, **meaningfully engage directly with local communities** and ensure their participation in the decision-making of all activities that may potentially affect them, **respecting their right to free prior and informed consent as well as their right to say no to mining projects.**

• In collaboration with stakeholders and potentially-impacted rightsholders, set up an **effective operational-level grievance mechanism** that is transparent about the number of complaints received and how they are addressed.

• Given the lack of capacity at the level of local government, mines must support local municipalities to monitor the quality and quantity of water available in surrounding communities using independent monitors and must report transparently on findings. Furthermore, the piece-meal donation of water tanks by mines must be replaced by structural support: **Mines must use their immense influence to ensure that all development plans,** such as the Vaal Gamagara Pipeline, benefit communities as well as the mines. If necessary, mines must subsidise these projects to achieve this.

For companies involved in the manufacturing of low-carbon technologies containing manganese such as steel, batteries and wind turbines:

• **Commit to implementing the OECD Guidelines and the UNGPs** throughout the company's own operations and all of its supply chains and **publicly and actively support governments in passing mandatory due diligence legislation based on these standards.**

• In order to reduce resource use overall, **develop and prioritise designs that reduce resource use,** rely on recycled materials, extend the lifespan of the product, and facilitate recycling of materials at the end of the lifespan of the product.

• **Conduct robust and meaningful due diligence to identify and prevent adverse impacts in the supply chain,** in accordance with the OECD Guidelines and UNGPs. In consultation with stakeholders, **identify the ultimate source of the manganese used in the company's products and prioritise social and environmental impacts associated with manganese mining as salient impacts that must be addressed.**

• **Use the findings and recommendations of this report to engage directly with manganese mining companies and use leverage** to ensure the mining companies are following the recommendations provided above, including ceasing and preventing negative impacts from mining operations and respecting communities' right to free, prior and informed consent. Track and communicate on the aims and results of this engagement and on how the negative impacts are being addressed. Where adverse impacts do occur, use leverage to ensure mining companies provide and cooperate in remediation for the affected communities.

• If mining companies refuse to conduct due diligence and effectively address impacts, **responsibly disengage from the business relationship and find a source of manganese where the mining company is able to comply with social and environmental standards.**

• Throughout the entire due diligence process, **meaningfully engage with stakeholders, including engaging directly with local communities and rightsholders for prioritised salient impacts.**

• In collaboration with stakeholders and potentially-impacted rightsholders, set up an **effective company-level grievance mechanism** that can receive complaints about the company's own operations as well as its supply chain and is transparent about the number of complaints received and how they are addressed.

For companies involved in the end use of low-carbon technologies containing manganese such as wind park developers and automobile companies:

• **Commit to implementing the OECD Guidelines and the UNGPs** throughout the company's own operations and all of its supply chains, and **publicly and actively support governments in passing mandatory due diligence legislation based on these standards.**

• In order to reduce resource use overall, **develop and prioritise designs that reduce resource use,** rely on recycled materials, extend the lifespan of the product, and facilitate recycling of materials at the end of the lifespan of the product.

• **Conduct robust and meaningful due diligence to identify and prevent adverse impacts in the supply chain,** in accordance with the OECD Guidelines and UNGPs. In consultation with stakeholders, identify the ultimate source of the manganese used in the company's products and prioritise social and environmental impacts associated with manganese mining as salient impacts that must be addressed.

• **Use the findings and recommendations of this report to engage with companies manufacturing products containing manganese such as wind turbine and battery manufacturers, and use leverage** to ensure the manufacturing companies are following the recommendations provided above, including using their own leverage over mining companies to encourage them to cease and prevent negative impacts from mining operations and respecting communities' right to free, prior and informed consent. These engagements should be specific, goal-oriented, time-bound, and evidence-based. **Wind park developers** in particular should seek to exert leverage – and if necessary increase leverage by collaborating with other wind park developers – **to pressure steel manufacturing companies like Tata Steel to improve their due diligence.**

• **Track and communicate on the aims and results of this engagement** and on how the negative impacts are being addressed. Communicate publicly about which companies are engaged on which issues. This public communication should provide detail about the specific objectives of these engagements and the progress made so far, providing sufficient information to convince any interested stakeholder that the company has undertaken adequate (i.e. sufficient and commensurate with the risk) due diligence actions to avoid potential adverse impacts. Where adverse impacts do occur, use leverage to ensure manufacturing companies are acting sufficiently to pressure mining companies to **provide for and cooperate in remediation** for the affected communities.

• If manufacturing companies refuse to conduct due diligence, implement the expectations outlined above, and effectively address impacts, **responsibly disengage from the business relationship and find a manufacturer that does conduct effective due diligence and comply with social and environmental standards.**

• Throughout the entire due diligence process, **meaningfully engage with stakeholders, including engaging directly with local communities and rightsholders for prioritised salient impacts.**

• In collaboration with stakeholders and potentially-impacted rightsholders, set up an **effective company-level grievance mechanism** that can receive complaints about the company's own operations as well as its supply chain and is transparent about the number of complaints received and how they are addressed.

For banks, pension funds and other financial institutions with financial links to companies mining or using manganese:

• **Commit to implementing the OECD Guidelines and the UNGPs** throughout the institution's entire investment and lending portfolio, and **publicly and actively support governments in passing mandatory due diligence legislation based on these standards.**

• **Conduct robust and meaningful due diligence to identify and prevent adverse impacts throughout the investment and lending portfolio,** in accordance with the OECD Guidelines and UNGPs. In consultation with stakeholders, **identify the companies mining and using manganese in the portfolio and prioritise social and**

environmental impacts associated with manganese mining as salient impacts that must be addressed.

• **Use the findings and recommendations of this report to engage with investee companies mining and manufacturing products containing manganese and use leverage** to ensure the companies are following the recommendations provided above, including (seeking to) cease and prevent negative impacts from mining operations and respecting communities' right to free, prior and informed consent. These engagements should be specific, goal-oriented, time-bound, and evidence-based.

• Track and communicate on the aims and results of this engagement and on how the negative impacts are being addressed. Communicate publicly about which companies are engaged on which issues. This public communication should provide detail about the specific objectives of these engagements and the progress made so far, providing sufficient information to convince any interested stakeholder that the insurer has undertaken adequate (i.e. sufficient and commensurate with the risk) due diligence actions to avoid potential adverse impacts. Where adverse impacts do occur, use leverage to ensure companies are providing and cooperating in remediation for the affected communities.

• If investee companies refuse to conduct due diligence, implement the expectations outlined above, and effectively address impacts, **responsibly divest from them, and invest in companies that do conduct effective due diligence and comply with social and environmental standards.**

• Throughout the entire due diligence process, **meaningfully engage with stakeholders, including engaging directly with local communities and rightsholders for prioritised salient impacts.**

• In collaboration with stakeholders and potentially-impacted rightsholders, set up an **effective company-level grievance mechanism** that can receive complaints about the company's own operations as well as its investment/ lending portfolio and is transparent about the number of complaints received and how they are addressed.

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