Volume 4

March 2025

Namibian Journal of Social Justice

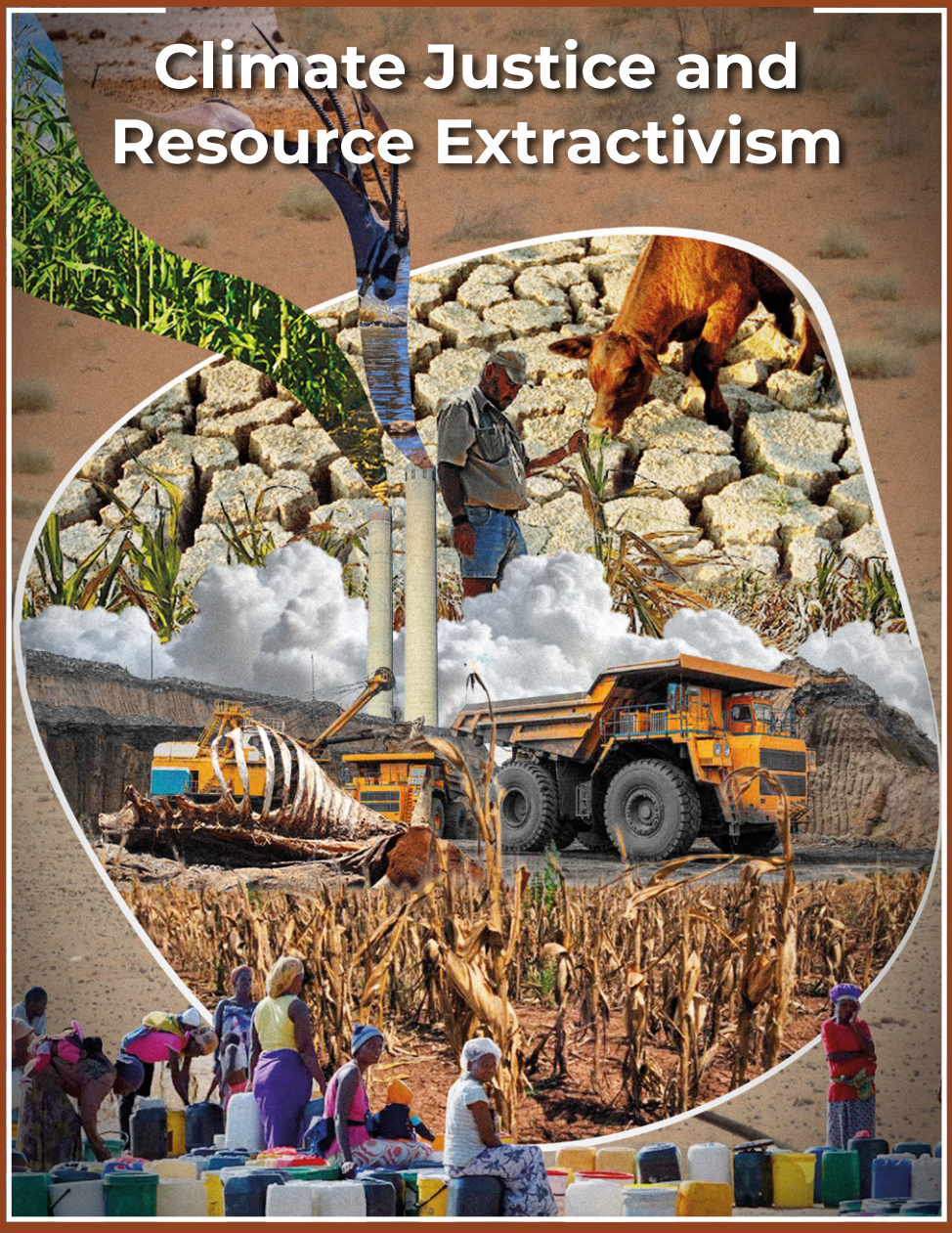


Table of Contents

Climate change finance

Green jobs

Extractivism

Ownership and governance of natural resources

Sacrifice Zones

Acknowledgements

The Economic and Social Justice Trust is proud to present the fourth edition of the Namibian Journal of Social Justice. The publication of this edition, which deals with climate justice and resource extractivism, was made possible by the dedication of an entire team. We wish to thank the editor of this edition, Prof. Lucy Edwards-Jauch, and the co-editor, Dr Ndumba Kamwanyah. We are likewise grateful for the contributions of the other members of the Namibian Journal of Social Justice editorial collective, Ms Ndeshi Namupala, Dr Guillermo Delgado, Dr Ellison Tjirera, Dr Nashilongweshipwe Mushaandja, Mr Rui Tyitende, Ms Elsemi Olwage, and Mr Claudius Riruako. We deeply appreciate the commitment shown by all our authors and peer reviewers and thank them for their contributions to this volume.

We thank Mr Titus Shitaatala for making his artwork "The Land Mourns" available for the cover page. We also thank Mr William Hofmeyr, who enhanced the publication with a comprehensive and meticulous language edit; Ms Bryony van der Merwe, for the layout; and all photographers, for making their photos available for publication in this volume of the journal (they are individually mentioned in the photo captions). We thank Dr Claudia Haarman for her assistance with the translation of the article on arsenic poisoning in Tsumeb.

A special word of thanks goes to medico international, with whom the Economic and Social Justice Trust worked on areas of common interest, including the proposed green hydrogen projects. We are grateful for medico international's financial support, which enabled us to cover the costs of language editing, the layout, the cover page design, and printing.

Acronyms and Initialisms

AF	Adaptation Fund
BMBF	(German) Federal Ministry of Education and Research
BMWK	(German) Federal Ministry of Economics and Climate Protection
CBNRM	Community-based Natural Resources Management
COP	Conference of Parties
CVCA	Climate Vulnerability and Capacity Analysis
DPM	Dundee Precious Metals
ECC	environmental clearance certificate
EIA	environmental impact assessment
EPL	Exclusive Prospecting Licence
EU	European Union
FAC	Republic of Namibia: First Adaptation Communication
FAO	Food and Agriculture Organization
FGD	focus group discussion
FPIC	free, prior, and informed consent
GCF	Green Climate Fund
GEF	Global Environment Facility
GH2	green hydrogen
GHG	greenhouse gas
GMO	genetically modified organism
GRN	Government of the Republic of Namibia
HHP	Hyphen Hydrogen Project
HINTCO	Hydrogen Intermediary Company GmbH
HRBC	human rights-based approach
HRC	United Nations Human Rights Council
HRIFCPE	Human Rights Integration Framework for Climate Policy Evaluation
ICJ	International Court of Justice
IFS	international financial subordination
IMF	International Monetary Fund

IPC	Integrated Food Security Phase Classification
IPCC	Intergovernmental Panel on Climate Change
IPPR	Institute for Public Policy Research
ISL	in situ leach (mining)
IXM	Swiss based base metal commodity trading company
LDC	Louis Dreyfus Company
MAWLR	Ministry of Agriculture Water and Land Reform
MEFT	Ministry of Environment, Forestry and Tourism
MME	Ministry of Mines and Energy
NACSO	Namibian Association of Community Based Natural Resource Management Support Organisations
NCCSAP	National Climate Change Strategy & Action Plan 2013 – 2020
NCE	Namibian Chamber of Environment
NDC	nationally determined contribution
ND-GAIN	University of Notre Dame Global Adaptation Initiative
NPCC	National Policy on Climate Change for Namibia – 2021
OECD	Organisation for Economic Cooperation and Development
OHCHR	Office of the High Commissioner for Human Rights
PSNR	Permanent Sovereignty over Natural Resources
SAB	Stampriet Artesian Basin
SAUMA	Stampriet Aquifer Uranium Mining Association
SADC	Southern African Development Community
SEA	Strategic Environmental Assessment
SESA	Strategic Environmental and Social Assessment
TA	Traditional Authority
tCO2e	tonnes of CO2 equivalents
TKNP	Tsau ||Khaeb National Park
UN	United Nations
UNDC-2	Namibia's nationally determined contribution 2023: Second update
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollars
WHO	World Health Organization

Editorial

Lucy Edwards-Jauch & Ndumba Kamwanyah

Background

Climate change refers to long-term changes in global temperature, winds, precipitation and atmospheric pressure. The climate change that the earth is experiencing is manifest in global warming (increasing average temperature at the earth's surface), rainfall variability, and rising sea levels. In Namibia, climate change has resulted in an 18% increase in the frequency of floods and droughts over the last four decades (Lubinda, 2015).

Notwithstanding the dispute about whether the world is in the geological epoch of the Anthropocene, there is general consensus that climate change is primarily caused by human, or anthropogenic, actions. The most damaging of these is the burning of fossil fuels. Fossil fuels like oil, gas and coal release and trap greenhouse gases (GHG), most notably carbon dioxide (CO2), in the earth's atmosphere. The burning of fossil fuels, together with the clearing of forests, is the most important source of GHG emissions (Chen et al., 2017).

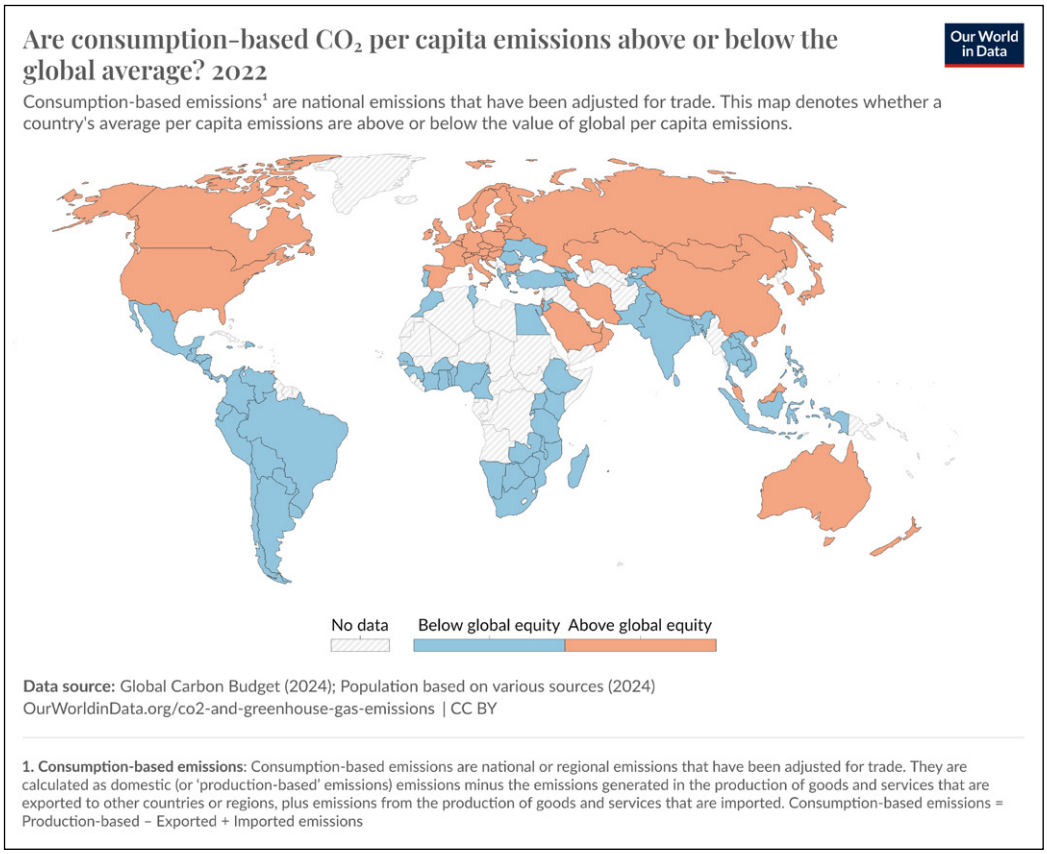
Globally, climate change has increased and intensified adverse weather events. In 2024, the world saw super-typhoons in Taiwan and the Philippines; floods in Mali, Chad, Morocco, Algeria, Libya, Tanzania, South Africa, Dubai, Bahrain, Oman, Qatar, Bangladesh, India, Pakistan, Spain, France, Nepal, China and Brazil; severe storms in Australia and central Europe; cyclones and hurricanes in the Unites States of America and Mauritius; and wildfires in the United States (Atlas Magazine, 2024). At the same time, most of southern Africa experienced a severe drought that has left 23 million people severely food insecure in Angola, Boswana, Mozambique, Lesotho, Malawi, Namibia, Zambia, and Zimbabwe (World Food Programme, 2024).

The greatest climate change injustice is that poor people and poor countries pay the heaviest price for the ecological destruction caused by high levels of carbon emitted by rich people and rich countries (Mager & Chaparro, 2023). Those most adversely impacted also emit the least GHGs, and happen to be mainly black people and people of colour; climate justice must therefore be linked to racial justice. Environmental racism entrenches the poverty of many formerly colonised and currently racialised groups. The

higher environmental health burden carried by these groups has increased calls for reparations and redress – not only for past colonial injustices like slavery and colonial wealth extraction that occurred at the expense of black and indigenous populations, but also climate reparations for the disproportionate effects climate change has on groups who suffered under colonial exploitation and wealth extraction (Donoghoe & Perry, 2023).

There are global and local level inequalities in the distribution of carbon dioxide emissions, inequalities in the distribution of climate change impacts, and inequalities in resilience to those impacts. Figure 1 below illustrates global inequalities in consumption-based carbon dioxide (CO2) emissions.

Figure 1 *Global consumption-based CO_2 emissions*



Source: Our World in Data (2023)

Climate Change Impacts for Namibia

Increased frequency and intensity of droughts

Global circulation models predict temperature rises in Namibia of between 1.7°C and 5.4°C. At the same time, despite global precipitation increasing as an inevitable consequence of increased evaporation, precipitation rates in Namibia will decline by around 19%. Some models predict higher levels of rainfall decline in the more populous northern parts of Namibia and extreme weather conditions that will lead to declines in Namibia's staple crop production and deteriorations in Namibia's rangelands (World Bank Group, 2021). The latter will negatively affect livestock production. Global warming will also cause a rise in sea levels and water temperatures. This may affect fish stocks and threaten coastal livelihoods. Increased flooding will increase water and vector-borne epidemics, and previously eliminated diseases may re-emerge. Droughts will increase the incidence of wildfires, water stress, and competition for water sources. Flash floods may damage infrastructure, including communication and transport infrastructure, and therefore impede access to essential services.

The Namibian government has taken the bold step of joining a group of small island states in bringing a case before the International Court of Justice (ICJ). In one of the largest cases before the ICJ, nearly a hundred countries that are adversely affected by climate change seek to hold countries with the highest GHG emissions accountable for the ecological destruction such GHGs cause. Namibia's case will focus on droughts, violations of human rights, and environmental destruction (Smit, 2024). The adverse effects of droughts in Namibia are so severe that the government has declared a national emergency. Declines in food production have resulted in starvation and more than a million Namibians being food-insecure, as food reserves in silos get depleted (National silos drying up, 2024), in addition to failed crops and livestock deaths. Declines in food production have also led to food price increases (Shikololo, 2024; Kooper, 2024). The Namibian government's action in seeking to enforce accountability at the ICJ is commendable, but such accountability is not always sought at home. Some articles in this volume of the NJSJ illustrate some of the most egregious violations of Namibian laws by transnational companies. The perpetrators are seldom held accountable for their violations of environmental standards and indigenous rights.

In their article Examining Namibia's Climate Vulnerability through the

Lens of Climate Justice, Romie Nghitevelekwa and Nelson Mlambo explore Namibia's vulnerability to climate change impacts. Their article specifically focuses on droughts to illustrate Namibia's climate vulnerability, the climate risks it faces, and its exposure and sensitivity to climate change. They point out that at a global level, the impacts of climate change are differentiated, uneven and disproportionate. There are uneven levels of exposure, sensitivity, and adaptive capacity, and these contribute to disparities. They further stress Namibia's urgent need for targeted support and justice-oriented climate policies, and advocate for a more transformative, just and equitable climate response that is appropriate to the Namibian context.

Effects of climate change on women

Women are more likely to suffer the effects of climate change because they are subject to more resource constraints and are more likely to live in poverty than men (United Nations Economic Commission for Africa, 2020). Due to adverse weather events, women's unpaid care work increases as water and energy sources decline. This includes the time spent on procuring food, firewood and household water supplies. The greater demand on their unpaid domestic labour also affects their ability to acquire the new skills needed to procure alternative livelihoods (Nabalamba et al., 2011).

Women are 14 time more likely to be injured or to die from adverse weather events than men. This is mainly attributed to poor nutrition, the lack of survival skills like swimming or tree climbing, and or restrictive dress codes. Their ability to escape danger speedily is impeded by their care roles for the young, sick and vulnerable (Nabalamba et al., 2011). Women are also at greater risk of sexual violence when they traverse greater distances to procure firewood and water. Climate-related shocks may result in stress migration that may expose them to sexual violence. Flood-damaged transport and communication infrastructure may cause disruptions in services, particularly sexual and reproductive health services like contraceptive services. This in turn could increases the risk of unintended pregnancies. The hardships caused by climate shocks may also increase the incidence of early and child marriages and transactional sex as survival strategies (World Food Programme, 2021).

Namibia's female subsistence farmers who rely on rain-fed agriculture are extremely vulnerable. They are mainly responsible for household food supply, and as droughts and floods increase, the likelihood of crop failures increases.

These threaten food security and incomes (World Food Programme, 2021). Droughts also increase the risk of wild fires, and therefore the destruction of forests. Biodiversity losses limit possibilities for accessing alternative food sources and income generation possibilities (Southern African Development Community [SADC], 2019). Climate shocks generally increase women's poverty and exacerbate pre-existing inequalities between women and men (United Nations Economic Commission for Africa, 2020).

Emma Nangolo's article The Impacts of Climate Change on the Livelihoods of Rural Women: A Case Study from Onalusheshete District, Namibia demonstrates the effects of climate change on women in rural Namibia, particularly with respect to food security, water availability, and income generating opportunities. Her empirical study was conducted in three neighbouring villages in Namibia's Oshikoto Region, namely Omatope, Elavi, and Emanya. The villages all fall under the Nehale LyaMpingana Constituency of the Onalusheshete District, and the Ondonga Traditional Authority. She found that women's gender roles and social reproductive responsibilities make them particularly vulnerable to changing rainfall and temperature patterns. Although they have little information about climate change and its causes, they have observed significant changes in their villages and the disappearance of certain species of fauna and flora, as biodiversity losses become more pronounced.

To demonstrate women's agency in combatting the effects of climate change, Nafiimane Hamukoshi, in her case study Preserving Heritage: The Importance of Seed Banking in Namibia, provides a critical and timely exploration of seed banking as a cornerstone for sustainable agriculture, cultural preservation, and food sovereignty. Women are crucial contributors to the agricultural sector worldwide, and particularly so in sub-Saharan Africa (Von Maltitz & Bahta, 2024). The case study focuses on the role of rural women as custodians of traditional agricultural practices, amidst mounting challenges of climate change and the proliferation of genetically modified organisms (GMOs). The article offers valuable insights into the intersection between environmental sustainability, cultural heritage, and gendered agency in agricultural systems. The case study underscores the resilience and agency of communities in preserving their agricultural heritage. It also highlights the tension between indigenous agricultural practices and modern agribusiness paradigms, and draws attention to the impacts of climate change and GMOs on agricultural

diversity. By foregrounding the contributions of women, the article aligns with global movements that advocate for gender equity and the preservation of indigenous knowledge systems in sustainable development. The author therefore situates seed banking within pressing global challenges such as food insecurity and biodiversity loss.

Climate change, human rights and the law

The negative effects of climate change, like droughts, floods, sea-level rise, heatwaves, extreme weather events, biodiversity loss, and ecosystems collapse, violate a number human rights. These include the rights to life, self-determination, development, health, food, water, sanitation, and adequate housing. They also violate clauses of various global human rights instruments, including the Universal Declaration of Human Rights; the International Covenant on Civil and Political Rights; the Declaration on the Rights of Indigenous Peoples; the Declaration on the Right to Development; and the United Nations Agenda for Sustainable Development (Office of the High Commissioner for Human Rights [OHCHR], 2017). Article 95 of Namibian Constitution compels the country to maintain ecosystems, biodiversity and essential ecological processes. Article 95 also requires the sustainable management and utilisation of the country's natural resources to the benefit of all Namibians (Government of the Republic of Namibia [GRN], 1998).

In their article Assessing Namibia's Climate Law and Policies: Applying the Human Rights Integration Framework for Climate Policy Evaluation, Oliver Ruppel and Atieh Khatibi argue that Namibians, especially the most vulnerable, face climate change-induced threats to human rights. The socioeconomic effects of climate change violate important rights and entitlements, for example, access to water, food, land, and health. They use the Human Rights Integration Framework for Climate Policy Evaluation (HRIFCPE) to assess Namibia's integration of human rights into its climate laws and policies. They also focus on the inclusion and protection of vulnerable groups such as women, children, people living with disabilities, and indigenous groups. The article identifies legislative gaps and makes recommendations for legal and policy reforms to promote, uphold and protect rights.

Climate change mitigation and adaptation

Mitigation measures are actions that prevent or limit GHG emission in order slow down or even reverse

global warming. Adaptation measures are intended to protect populations, economies. infrastructure, the environment and incomes against the impacts of climate change and to help build resilience to such impacts (Chen et al., 2017). For the Global South, which contributes very little to GHG emissions and global warming, the emphasis should be on climate change adaptation to boost resilience to adverse weather events.

Climate change transcends national boundaries and requires coordinated global action. The energy transition to low carbon or carbon neutral forms of energy generation is a tangible response. In his article Climate Change, Exploitative Paradigms and Neocolonial Energy Transitions in Africa, Bruno Venditto argues that the climate change demands that we urgently rethink not only our energy systems, but also our consumption patterns. He further argues that climate change presents an opportunity to redefine our relationship with energy, resources, and modes of production. He further argues that the climate crisis forces humanity to fundamentally re-evaluate societal values and behaviours related to energy consumption. He critiques the current "green" energy transition that entrenches and perpetuates inequalities and injustices, and calls for a just energy transition that goes beyond technological transformation to address forms of ownership, control, and the fair distribution of benefits obtained from the African resources that enable this energy transition.

Namibia is currently at net carbon sink. This means that the country locks in more carbon than it releases through GHG emissions. Namibia's share of global aggregated emissions is a paltry 0.00026%. Despite its minute contribution to global GHG emissions, the country has undertaken a number of mitigation measures to reduce such emissions in the areas of AFOLU (agriculture, forestry and other land use), IPPU (industrial processes and product use), and waste management (GRN, 2023). Namibia has also commenced with the construction of the Otjikoto Biomass Power Station that could both reduce carbon emissions and restore rangelands (Matthys, 2024c). It is believed that Namibia still has the capacity to further reduce its carbon emissions by 4.890 Mt CO2 e (million tonnes of carbon dioxide equivalent), i.e. by 5.7%, by 2030 (GRN, 2023).

The irony is that Namibia's net sink status provides it with the opportunity to source revenue that can fund adaptation through carbon trading markets, where carbon credits are traded with high GHG emitting companies and countries for their emissions – a scheme that enables

carbon offsetting. Carbon trading, as opposed to carbon taxation, has been pushed by European governments. It represents the commodification and financialisation of pollution for high GHG emitting companies and countries. They can evade responsibility for the climate catastrophe they are causing by buying carbon credits from low carbon emitting countries like Namibia. Some argue that the system of carbon markets perpetuates climate injustice and exacerbates inequalities and uneven development, and does not reduce carbon emissions (Pearse and Böhm, 2014).

Namibia's Community-based Natural Resource Management (CBNRM) programme seeks to balance communities' rights to access, use, control, and benefit from natural resources and environmental conservation. Under the rubric of CBNRM, communities can engage in the protection of ecosystems and biodiversity while utilising natural resources in a sustainable manner. The CBNRM programme is underpinned by the Nature Conservation Amendment Act (5 of 1996) and the Forest Act (12 of 2001). Through CBNRM, local natural resources are co-managed by community-based self-governing entities (GRN, 2013).

In their case study Social Justice amidst Climate Change in Namibia's Community-based Natural Resource Management Programme, Selma Lendelvo and Sian Sullivan outline the intersections between social justice and climate change in Namibia's CBNRM programme. They confirm the role that CBNRM plays in Namibia's nature conservation through landscape protection, the promotion of ecosystems, and genetic diversity. The programme is also a source of income and employment for rural communities through joint-venture tourism, conservancies/associations, conservation hunting, and member benefits. They further explore some of the challenges and barriers some CBNRM projects face.

Namibia has introduced adaptation measures that have mitigation co-benefits like CO2 sequestration through green urban corridors and agroforestry; the application of conservation agriculture principles; the combatting of bush encroachment; biodiversity conservation; carbon capture; and water recycling (GRN, 2023). Namibia's climate goals include measures to improve food security; water resources; biodiversity; energy supply; tourism; sustainable resource base management; and urban development (GRN, 2023). Namibia has recognised impediments to these goals, including technical capacities, appropriate agricultural practices and breeds, and policy harmonisation

(World Bank Group, 2021). There is an urgent need for policy coherence as some policies contradict and may even impede Namibia's climate change mitigation and adaptation efforts. While implementing mitigation and adaptation programmes, Namibia is also pursuing economic growth through neo-extractivism, and some of these extractivist activities cause ecological destruction that is diametrically opposed to Namibia's own climate change goals.

Various Namibian government departments have introduced programmes to strengthen food security and food sovereignty. Under the auspices of the United Nation's Build Back Better programme, the Namibian Ministry of Agriculture, Water and Land Reform is piloting a climate-smart, technology-based project to strengthen food systems. The project provides solar powered pumping and irrigations systems, and solar powered storage systems to increase adaptive capacities and resilience to climate shocks and improve incomes and agricultural productivity (Agriculture Ministry to strengthen food systems, 2024). In addition, the Ministry of Agriculture in partnership with a donor agency has introduced small-scale gardening projects (Shigweda, 2024); and the Ministry of Fisheries and Marine Resources has introduced and supports 150 small-scale fresh water aquaculture and inland fishing projects in areas where water is available (Pinehas, 2024).

To improve resilience to the agricultural impacts of climate change, Namibian experts recommend sustainable water management; efficient water use in farming systems through drip irrigation and rainwater harvesting; crop diversification to reduce dependency on single crops; agroforestry to reduce soil erosion and protect crops against extreme heat; conservation agriculture, with crop rotation, minimal soil disturbance and permanent soil cover for soil moisture retention and minimised soil erosion; and improved livestock management to prevent over-grazing and promote pasture recovery (Louw, 2024).

In his article Exploring Climate Justice through Environmental Adaptation: A Case Study of Namibia, Jasper Kasoma explores Namibia's climate change adaptation agenda. He draws the linkages between climate justice and adaptation to argue that unequal resource distribution affects resilience, adaptation and the survival of communities and individuals adversely affected by climate change. He further explores the differential gender impacts of climate change and the number of financial, technical and capacity gaps that impede the implementation of Namibia's adaptation agenda.

Climate change finance

As is the case with most countries in the Global South, Namibia has already identified the lack of climate finance, technologies and institutional capacity as the biggest stumbling block jeopardising the implementation of its climate change programmes (GRN, 2023).

The CBDR principle ("common but differentiated responsibilities") was declared at the Rio Earth Summit in 1992 (Centre for International Law, 2019). The principle recognises climate change injustices emanating from the unequal distribution of global GHG emissions and compels high GHG emitters, to take greater responsibility for funding mitigation and adaption measures. In keeping with the same principle, and to address climate change funding gaps, the concept of a Loss and Damage Fund was adopted by the 27th Conference of Parties (COP) in 2022. The fund is still in its formative stages and operational and access modalities are still to be clarified (International Centre for Climate Change and Development, 2024).

It is estimated that an amount of US$400 billion per year will be needed by 2030 to fund climate change mitigation and adaptation. So far, global voluntary funding pledges and actual donations have fallen far short of the funds required (Mager & Chaparro, 2023). Climate finance was a key focus area of the United Nations Framework Convention on Climate Change (UNFCCC) COP29 conference in Azerbaijan in 2024. The conference deadlocked on climate finance, and the Namibian Minister of Environment, Forestry and Tourism lamented the fact that those who cause global warming refuse to provide adequate and predictable finance to developing countries to address climate change challenges. They have failed to fulfil their pledge of contributing US$100 billion (0.1 % of global GDP) to the Green Climate Fund annually (Nakale, 2024). Instead, public funds are still used for fossil fuel subsidies. In 2023, developed countries spent a total of US$370 billion on fuel subsidies. This is more than the US$ 300 billion they pledged at COP29 to finance responses to climate change (Energy World, 2024).

The Tax Justice Network is lobbying the UN for global tax reform to bring about a more inclusive and equitable taxation regime. It opposes the system of carbon credit trading, for it misdirects responsibility for pollution away from the major corporations responsible for the majority of GHG emissions. Instead, they propose global tax reform (rather than voluntary pledges) to fund global mitigation and adaptation measures. They have outlined five principles ("five r's")

for global tax reform through which countries like Namibia could cover the huge costs of climate change adaptation (Mager & Chaparro, 2023). They are:

- revenue to fund universal public services and sustainable infrastructure;
- redistribution to curb inequality between individuals and between groups;
- repricing to limit public "bads" like carbon-intensive consumption or investment;
- representation to strengthen democratic processes and improve democratic governance; and
- reparation to redress the historical legacies of colonisation and ecological damage.

In a short article, Climate Change Funding, Bernadette Shalumba-Shivute argues that the onus is on the 12 high GHG emitting Annex I countries that are OECD (Organization for Economic Cooperation and Development) members to reduce carbon emissions. According to the UNFCCC, these countries are also responsible for providing financial and technical assistance to poorer countries severely impacted by climate change through a system of grants and loans channelled through the Global Environment Facility, the Green Climate Fund, and the Adaptation Fund. She further sheds light on the funding gaps for Namibia's climate change mitigation and adaptation agendas.

Green jobs

Namibia is set to emerge as Africa's leading centre for renewable energy (World Economic Forum, 2021). This will involve harnessing the country's abundant renewable energy resources, such as biomass, wind, solar, and hydroelectric power (Energy Transition: The Global Energiewende, 2018). The emphasis on renewable energy, particularly solar and wind, highlights Namibia's natural advantages. Yaloo Shikongo's opinion piece, Green Jobs: Pioneering Sustainable Growth and Environmental Stewardship, is a timely analysis of the critical role green/climate jobs play in fostering both economic development and environmental sustainability. She identifies key challenges, including skill gaps and robust policy frameworks, to realise this development pathway and calls for green education and workforce training in the light of Namibia's high youth unemployment rates.

Extractivism

As far back as 2017, an estimated 100.6 billion metric tonnes of minerals and metals had been extracted and transported around the world; global

mineral extraction has grown on average by 4% per annum since 1950. It has shaped economies, altered patterns of wealth distribution and fundamentally transformed social structures. It has also transformed the biophysical environment, as it flattens mountains, excavates canyons, bores shafts into the crust of the earth, redirects rivers, destroys forests and contaminates the air, earth and water resources, often with impunity (Peša & Ross, 2021).

The Namibian economy is based on the extractive industries, mainly mining and fisheries. Extractivism has structured the Namibian economy as a raw material exporter. The imperatives of climate change have increased global demand for critical minerals that facilitate the energy transition. This "green" extraction is projected to increase between six and 13 times in the future (World Bank Group, 2024).

Various Namibian politicians and high-ranking officials have declared extractivism to be crucial for Namibia's development (Maximise oil benefits, 2024; Markowitz, 2024b; Uanguta, 2024). However, the UN Special Rapporteur on Contemporary Forms of Racism, Racial Discrimination, Xenophobia and Intolerance has cautioned against the pitfalls of this neo-extractivism, which is driven by the governments of former colonies for "developmental" purposes. The risk is that it follows the same racist and exploitative practices as colonial extractivism. It approximates the same removal of raw materials from territories for processing, sale and consumption elsewhere; it uses the same unequal systems of exchange and the same disproportionate benefit distributions between the Global North and the Global South (United Nations General Assembly, 2019).

Extractivism, whether of "green" or colonial ilk, remains ecologically destructive. The extraction of resources for the energy transition in the Global North leads to environmental degradation, biodiversity destruction, human rights abuses and land grabs in the Global South (Mager & Chaparro, 2023). It is also responsible for the displacement of indigenous groups and local communities. As the demand for critical minerals for the production of smartphones, solar panels and electric vehicles increases, so has the destruction of the most carbon-rich and biodiverse tropical rainforests in Indonesia, Brazil, Peru, Ghana, Suriname, Myanmar, Australia, and Guyana (Milko, 2024).

Oil and gas discoveries

There has been a surge in oil and gas exploration in Namibia (Baunsgaard et al., 2024). Namibian government

officials hail such exploration and extraction as a much-needed platform from which Namibia could increase economic growth, diversify the economy, create jobs, develop infrastructure, ensure energy security, attract further investments, and fund renewable energy production (Uanguta, 2024). The International Monetary Fund (IMF) cautions that such mega projects could have a transformative but temporary impact. The IMF anticipates a decline in the demand for hydrocarbons as a result of the energy transition. This could result in some of these resources becoming stranded assets (Baunsgaard et al., 2024). There are also fears that, if realised, Namibia's oil wealth could exacerbate inequalities, as has been experienced in other countries that rely on single dominant sectors like oil and gas (Kalondo, 2024).

Phasing down will have socioeconomic implications for oil and gas export-dependent economies. Although there is a global imperative to curb GHG emissions, there are also debates about whether fossil fuel-producing low and lower–middle income countries (LLMICs) with very low carbon emissions, like Namibia, should continue to extract such resources to overcome their underdevelopment. Some argue that based on their low carbon emissions and their economic and energy needs, there should be multiple fossil fuel production phasing-down pathways that are country-specific and address the needs of low and lower–middle income countries (Forster, et.al, 2024). Some take a more systemic perspective to critique the very concept of economic growth. They argue that the logic of growth is at the root of ecologically unsustainable and environmentally destructive economic models. They propose degrowth in the highly industrialised and high carbon-emitting economies. Degrowth denotes a fundamental economic reorganisation that reduces resource and energy dependency throughput (Kallis et al., 2018).

Namibia has an estimated 11 billion barrels of oil off its coast (Eco Atlantic Oil and Gas, n.d.), as revealed through the exploration activities of big transnational companies. Shell, for example, has discovered at least 500 million recoverable barrels of oil in the Orange Basin; Galp Energies discovered high quality light oil in the Mopane well; Total Energies found two billion barrels of recoverable oil at the Venus 1 and Graf 1 sites (Dlamini, 2024); Enigma Oil & Gas, owned by Chariot Oil & Gas, is prospecting along Namibia's southern coast, and estimates reserves of about four billion barrels of oil (Eco Atlantic Oil and Gas, n.d.); exploration activities in the Orange Basin are continuing, with

additional companies like Chevron and Exxon Mobil entering the field (Oil companies to double down, 2024).

Oil exploration and extraction carry environmental risks. Oil contains amines, azides, heavy metals, polycyclic aromatic hydrocarbons, and benzene compounds. All these have high levels of toxicity that can have short- and long-terms impacts on marine life and human health (Sharma et al., 2024). Physical disturbances to the marine ecology can destroy fishing grounds and habitats well beyond the actual drilling sites as increased sedimentation can smother seabed resources and repulse mobile species. This may have short- and long-term behavioural effects on marine life, threaten the stainability of certain species and, by extension, livelihoods based on the blue economy (United Nations Environment Programme Finance Initiative, 2022).

In a visual essay titled the fish that sees its water is getting shallow cannot be stranded: a curatorial essay, Nashilongweshipwe Mushaandja verbally curates the art works of various Namibian visual artists using water as a metaphor for life threatened by environmental destruction. The title repeats a popular African proverb that metaphorically and literally speaks to experiences of survival, livelihoods and mobility. Water is at the centre of all these experiences. Mushaandja connects the various art works of prints, photography, mixed-media works, installations, sculpture and performances to the political and socioeconomic uses of oceans, rivers, reservoirs, springs, lakes and groundwater. As emphasised by different contributions in this journal, these water sources are all threatened by extractivism and climate change.

Uranium

Namibia, is the world's third largest uranium producer, and government officials see uranium mining as being crucial to Namibia's economic development, and to carbon-neutral energy production (Markowitz, 2024b). Uranium also has a high energy content, as1kg of uranium can produce the energy equivalence of 22 700 kg of coal (Radzyminski, 2021).

Uranium mining, irrespective of whether it is open pit, underground or in-situ leach mining, holds multiple risks. The long-term health and environmental consequences of such mining have not been fully investigated. Uranium tailing deposits are unstable and can cause landslides, air pollution and wildlife exposure; small particles of radioactive substances in tailings can be transported by wind; leaks in tailing ponds can contaminate underground water with heavy metals; it can also

pollute dams and rivers and cause serious damage to entire ecosystems (Radzyminski, 2021).

The negative environmental effects of uranium are sometimes pitted against the need for employment creation and income generation. This is a false dichotomy, because no life is possible without clean drinking water. Uranium mining in Namibia's Omaheke Region is a case in point. While the governor of region posited extraction of the region's uranium resources as a means of generating income that could stave off malnutrition and starvation, Namibia's Minister of Agriculture, Water and Land Reform pointed to the contamination risks such mining holds for the area's water and food sources (Ndjavera, 2024b). The risk to drinking water is so grave that the UN Special Rapporteur on Water Rights labelled the leaching method of uranium extraction in Namibia as ecocide and a crime, and called for an immediate end to these activities. He also referenced Peru as a cautionary case in point, where similar mining operations led to heavy metal poisoning of 30% of the population (Shipena, 2024).

The communities of Leonardville and Stampriet have raised their concerns about the proposed uranium mining by a Russian-owned company in their area. Through the in-situ leaching method, copper and uranium will be extracted by drilling boreholes into the mineral deposits (Ngatjiheue, 2024). In a case study titled Environmental Threats Posed by the Proposed In-situ Leach Mining of Uranium to Underground Potable Water Aquifers in the Stampriet Artesian Basin, Roy Miller cautions against the possible contamination risks to water aquifers if the proposed in-situ leach mining for uranium goes ahead. The uranium extraction requires the injection of a leach solution containing sulphuric acid and oxidizing chemicals through boreholes into the uranium ore body. The dissolved ore is then pumped to the surface and bled in evaporation ponds. Small amounts of uranium, dissolved radionuclides and heavy metals may end up in the water aquifers, especially through leaks and spills, and contaminate drinking water.

Green hydrogen

Green hydrogen (GH2) holds the promise of decarbonisation. To meet their own legal requirements for decarbonisation, European countries have intensified their push towards GH2 production in Namibia and elsewhere in Africa. Through a process of electrolysis, solar, hydro-and wind power can be converted to energy for transport, industrial processing and power generation (Hassan et al., 2024). There is ongoing technological research aimed at making GH2 electyrolysis

and storage processes stable and cheaper (Franco, 2024; Tripathi, 2024; Hampson, 2024). However, due to its high costs and the complex technical adjustments required to facilitate the use of GH2, interest in purchasing it is still limited. To date, very few binding GH2 purchasing agreements have been signed (Baker, 2024).

By 30 August 2024, Namibia had eight active GH2 projects, namely Hyphen Hydrogen Energy (the biggest); Elof Hansson; HDF Energy; HyIron; Zhero Cleanergy Solutions; Daures Hydrogen Village; and Hyrail. By then, these GH2 projects had created 400 jobs (Namibia's green hydrogen projects, 2024). GH2 promoters project that by 2040, the industry will have created 250 000 Namibian jobs, (180 000 direct jobs in the GH2 industry itself, and 70 000 indirect and direct jobs in the green manufacturing sector (Green hydrogen projects create jobs, 2024). Most of the GH2 projects are either in their pilot or prefeasibility phases and the cited job creation and economic diversification potential is therefore still to be realised. Experts have cautioned against the exaggeration of GH2's job creation potential, for renewable energy projects rely on capital-intensive technology and will therefore employ very little labour beyond the construction phase (Matthys, 2024b). Research has shown that most of the jobs that will be created through GH2 will require higher levels of skills and will mainly benefit wealthier Namibians (Schütte, 2024).

Advocates of GH2 argue that it will support small business development through outsourcing and subcontracting. They also point to its potential for infrastructural development, capacity-building and industrialisation (Green hydrogen projects create jobs, 2024). Scholarships have been made available for direct research and training geared towards the sector (Mnyupe, 2024). It is anticipated that GH2 will boost Namibia's export earnings and economic diversification, as Namibia hopes to export ammonia and related products from these ventures (Ndjavera, 2024b). Due to legal requirements to decarbonise in certain industrialised countries, GH2 production in Namibia may attract other industries to the country. A case in point is the Hylron Oshivela Project, which is set to produce zero emissions iron ore for carbon-free steel production on the Bloemhof and Geluk farms near the Namib-Naukluft National Park. The iron ore production facility will use GH2 as its energy source. The project will create 200 jobs in the construction phase and 50 jobs in its operational phase (Smith, 2023; Grobler, 2024).

There are plans to establish a cross-border green hydrogen pipeline between Namibia and South Africa. The Namibian government has also

signed off on an ambitious research project between various Namibian and South African entities to investigate the technological, commercial, financial, legal, environmental, socioeconomic and operational viability of GH2 (Namibia, South Africa sign energy agreement, 2024).

There are environmental hazards associated with GH2 production. The Namibian Chamber of Environment (NCE) has cautioned that GH2 is expensive, explosive, and prone to leakage, and that its production at certain ecologically sensitive sites in Namibia should therefore rather be framed as red hydrogen (NCE, 2024). They take particular issue with the location of the Hyphen Hydrogen Energy project, situated in the Tsau ǁKhaeb National Park. This is the most biodiverse natural park in Namibia. Environmentalist have raised concerns about the short- and long-term effects of GH2 infrastructural developments like solar panels, desalination plants, road infrastructure or wind turbines on various flora and fauna species in the park. One example is the possible harm to birds caused by energy turbine blades (Brown, 2024). The NCE called for a stop to GH2 projects in the south of Namibia until a comprehensive independent environmental impact assessment has been conducted. The NCE has challenged the European Union, particularly Germany, to be transparent and not to export the environmental costs of their energy requirements to Namibia (Prins, 2024).

In a joint letter to authorities, a group of civil society organisations raised their concerns about the lack of inclusive consultation which, they argue, impedes communities' rights to free, prior and informed consent. They also objected to the lack of access to information; the lack of transparency and accountability; the long-term economic, ecological and social implications of GH2; and the neocolonial nature of agreements based on asymmetric power relations that privilege the interests of European countries over the concerns of local communities (Economic and Social Justice Trust (ESJT), 2022).

Müller et al. (2022) point out a number of paradoxes in green hydrogen production that unmask global injustices and asymmetrical power relations. These include issues of energy and water access for communities where such GH2 production sites are located. They also raise the injustice of using the natural resources, like water, of countries in the Global South to produce energy, while populations in those countries suffer from water and energy poverty.

In this volume we have two case studies, both on the Hyphen Hydrogen

Project, to illustrate the various interests, benefits, asymmetric power relations, environmental threats, and financial pitfalls associated with GH2 production in Namibia.

In their article Derisking of Dependency? A Political-economic Analysis of the Hyphen Hydrogen Project in Namibia, Fabio Banet and Armin Höpfner presents a political-economic analysis of GH2 in the context of colonial dependencies and asymmetrical power relations. They argue that derisking is akin to publicly financed risk minimisation for private investors. An example of this is the role of the German Federal Ministry of Economics and Climate Protection in funding the price gap between production costs and the price the market is willing to pay. Given the high capital costs for such investments, the Namibian state's ability to initiate and support such investments is limited, as is the long-term strategy of shifting green hydrogen-based value chains to Namibia's national economy. They explore the roles of various actors in the global model of capitalist accumulation, and identify the role of the Namibian state as subordinate and primarily aimed at realising the international class-based division of labour; negotiating and pacifying social antagonisms; and establishing and securing the national accumulation regime. With reference to international financial subordination theory, they explain the asymmetrical power relations that undergird GH2 production in Namibia, and conclude with three scenarios of possible outcomes of such production.

German involvement in Namibia's GH2 production is rich in irony: three-dimensional digital modelling and cutting-edge archaeological analysis by Forensis and Forensic Architecture shows that the proposed extension of the Lüderitz harbour for GH2 export will destroy parts of the historic Shark Island, the site of a concentration camp and probable mass graves that date back to the German colonial genocide against and Ovaherero and Nama people. Together with the traditional authorities of affected groups, they fear the erasure of part of this history and have called for the protection of the sanctity of Shark Island (Forensis and Forensic Architecture, 2024).

There are also concerns that GH2 projects may increase public debt. There are already indications that this could happen to the Dâures green hydrogen project, as the German government has threatened to pull out of the project (Shihepo, 2024).

Maximillian Ritscher's article Development for Whom? Unveiling Socioeconomic Potential and Value: A Case Study of the Hyphen Project in

Namibia empirically explores Lüderitz community members' knowledge, perceptions and concerns about the Hyphen GH2 project in their area. The case study poses an important question about whose interests the project serves. Rischer identifies the lack of information shared with the community as a threat to the internationally recognised principle that the free, prior, and informed consent of local communities must be obtained. He draws attention to community members' fear of exclusion from benefits, in particular jobs, environmental pollution from brine waste discharge by desalination plants, ammonia leakage into the ocean, and pollution from large vessel traffic. All these may negatively impact the fishing industry. Some community members raised social justice concerns around access. These include access to desalinated water and electricity produced from GH2 production. There are also concerns that the influx of workers from other areas may exacerbate the existing housing shortage and place strain on municipal services.

Ownership and governance of natural resources

There is a debate about who actually owns Namibia's oil resources and how the eventual benefits will be distributed. The Namibian state-owned National Petroleum Corporation (NAMCOR) holds a 10% share in some Namibian oil finds (Maximise oil benefits, 2024). The multiple discoveries of oil, gas and minerals bring the governance of these resources into focus. To increase transparency and avoid corruption and misgovernance, civil society organisations have implored the government to join the extractive Industries Transparency Initiative and to implement reforms aligned the standards it wants to see upheld (Matthys, 2024a). The IMF has echoed the same concerns by arguing that the petroleum sector is vulnerable to governance and corruption challenges, and that the government should therefore pre-emptively implement the highest standards of transparency and governance (Baunsgaard et al., 2024). Due to weak institutions for environmental oversight, the Namibian news media play an important role in exposing environmental violations and injustices. The Namibia Media Trust has called for the protection of journalists and other media practitioners who through their reporting hold powerful groups accountable (Markowitz, 2024a).

The ownership of Namibia's natural resources is disputed. In an opinion piece titled Who Owns Namibia's Wealth and Natural Resources? A Response to Geingob, John Nakuta takes issue with politicians

who argue that foreign transnational companies who currently control Namibian extractive industries rightfully own these natural resources. He cites national and international law to rebut such arguments, and argues that in terms of international law, the sovereign State or the people of a country are regarded as the owners of natural resources.

Sacrifice zones

Globally, heavy and extractivist industries have created sacrifice zones where communities that reside in close proximity to environmentally hazardous sites experience the negative health effects of pollution, contamination and toxic waste (Scott & Smith, 2017). The UN Special Rapporteur on Human Rights and the Environment (2022) identifies sacrifice zones as areas where residents suffer devastating physical and mental health consequences resulting from human rights violations emanating from heavily polluting and hazardous facilities located near their residential areas. These hazardous facilities include open-pit mines, smelters, petroleum refineries, chemical plants, coal-fired power stations, oil and gas fields, steel plants, garbage dumps, and hazardous waste incinerators. Sacrifice zones often exist with the full knowledge of governments and the businesses that are responsible for environmental hazards. Sacrifice zones are often inhabited by groups that already face racial, ethnic, class and gender oppression and discrimination. Due to power inequalities, such communities are often ignored and excluded from decision-making. Their human rights, notably rights established under international agreements and conventions, for example the right to a safe, clean, healthy and sustainable environment and the right to full, prior and informed consent, are trampled upon. Namibia has its own sacrifice zones. In this volume we focus on two such zones: the first is Tsumeb, where arsenic and other heavy metal pollution pose serious health risks to local residents; the second is Uis, where lithium mining is causing pollution, disruption, displacement, and the criminalisation of dissent.

The UN Special Rapporteur on Human Rights and the Environment (2022) identified Tsumeb as a sacrifice zone as a result of the copper smelter that discharges significant volumes of arsenic, copper and lead. Consequently, one sixth of all Tsumeb residents have elevated levels of arsenic in their blood. Emissions from the smelter place children, in particular, at risk. The poisonous substances in the environment also place residents at a higher risk of cancer and other diseases.

In a journalistic case study titled Namibia's Sacrifice Zone: A Case Study

of Arsenic Poisoning in Tsumeb, Samuel Schlaefli, assisted by Ester Mbathera, delves deeper into the environmental consequences of the Canadian company Dundee Precious Metals' copper smelting operation. Dundee Precious Metals smelts heavily arsenic-laden copper ore on behalf of the Geneva-based metal trading company IXM at the Tsumeb smelter. In the main, it is not Namibian copper being smelted. The copper comes from countries like Bulgaria where such smelting operations are not permitted, precisely because of the threats they pose to the environment and to human health. The evidence they unearthed shows high levels of arsenic in soil and hair samples. They also cite documentary evidence that shows that both the company and Namibian government are fully aware of the level of toxic emissions. The continued existence of these toxin-releasing activities demonstrates that decision-makers are willing to sacrifice the health of residents in Tsumeb to retain foreign direct investments and protect the profits of foreign transnational corporations.

Some companies in the extractivist industries act illegally and with impunity. There is suspicion of collusion between the industry and government officials who undermine laws and basic democratic principles of transparency and accountability. In their case study Mining and Community Struggles for Economic Justice: A Case Study of Uis, Herbert Jauch and Lucy Edwards-Jauch document the struggles of the Uis community for social, economic, environmental and administrative justice. In the view of community members, mining companies are breaking a number of Namibian laws with impunity. The official structures specifically set up to investigate and prosecute malfeasance have dragged their feet. The study exposes how the indigenous community used the limited resources they have to bring the violations of their rights, and the destruction of their livelihoods and the environment to the attention of various governmental structures.

References

Agriculture Ministry to strengthen food systems. (2024, March 22). *New Era*, p. 3. https://neweralive.na/agriculture-ministry-to-strengthen-food-systems-2/#:~:text=The%20Ministry%20of%20Agriculture%2C%20Water,emergencies%20and%20disease%2Drelated%20shocks.

Atlas Magazine. (2024). *Natural disasters in 2024*. https://www.atlas-mag.net/en/natural-disasters

Baker, D. (2024, August 13). *Why almost no one is buying green hydrogen*. TechCentral. https://techcentral.co.za/almost-no-one-is-buying-green-hydrogen/249545/

Baunsgaard, T., Chagali, C., & Harris, P. (2024, June). *Namibia: Petroleum fiscal regime review*. IMF (HLS/24/023).

Brown, C. (2024, June 5). The pristine national park and the planned hydrogen plant. *The Namibian*, p. 5.

Centre for International Law (2019) *1992 Rio Declaration on Environment and Development*. https://cil.nus.edu.sg/wp-content/uploads/2019/02/1992-Rio-Declaration-on-Environment-and-Development.pdf

Chen, W.-Y., Suzuki, T., & Lackner, M. (2017). *Handbook of climate change mitigation and adaptation*. Springer. https://doi.org/10.1007/978-3-319-14409-2

Dlamini, M. (2024, January 29). Oil sector upbeat as new discoveries are made. *The Namibian*. https://www.namibian.com.na/oil-sector-upbeat-as-new-discoveries-are-made/#:~:text=While%20Shell%20has%20discovered%20at,prospects%20after%20Galp's%20oil%20find

Donoghoe, M., & Perry, A. M. (2023, March). *The case for climate reparations in the United States.* The Brookings Institute. https://www.brookings.edu/articles/the-case-for-climate-reparations-in-the-united-states/

Eco Atlantic Oil and Gas. (n.d.). *Namibia sees 11 billion barrels in offshore oil reserves.* https://www.ecooilandgas.com/namibia-sees-11-billion-barrels-in-offshore-oil-reserves/

Economic and Social Justice Trust (ESJT) (2022, November 27). *Appeal to Refrain from Signing any Binding Trade Agreements Related to the EU–Namibia Strategic Partnership Agreement on Critical Raw Material Value Chain and Renewable Hydrogen*. Windhoek. Civil Society Petition Letter.

Energy Transition: The Global Energiewende. (2018, November 29). *Africa's energy transition: opportunities and challenges for decent work*. https://energytransition.org/2018/11/africas-energy-transition/

Energy World. (2024). *Developed countries spent more on fossil fuel subsidies in 2023 2023 than new climate finance package.* https://energy.economictimes.indiatimes.com/news/oil-and-gas/developed-countries-spent-more-on-fossil-fuel-subsidies-in-2023-than-new-climate-finance-package/116487278

Forensis and Forensic Architecture. (2024, April 12). *Shark Island: An architectural reconstruction of a death camp*. https://content.forensic-architecture.org/wp-content/uploads/2024/04/Shark-Island-Report.pdf

Franco, M. (2024, June 21). *Green hydrogen breakthrough swaps in water iridium*. New Atlas. https://newatlas.com/energy/green-hydrogen-water-iridium/

Green hydrogen projects create over 200 jobs and N$170 million in SME contracts. (2024, July 21). *The Brief*, p. 13. https://thebrief.com.na/2024/07/green-hydrogen-projects-create-over-200-jobs-and-n170-million-in-sme-contracts/

GRN. (1998). *The Constitution of the Republic of Namibia*. Office of the Prime Minister. https://www.refworld.org/legal/legislation/natlegbod/1990/en/33543

GRN. (2013, March). *National policy on community based natural resource management.* Ministry of Environment and Tourism. https://www.npc.gov.na/wp-content/uploads/2022/06/National-Policy-on-Community-Based-Natural-Resources-Management-March-2013.pdf

GRN. (2023, April). *Namibia's first nationally determined contribution: Second update.* Ministry of Environment, Forestry and Tourism. https://unfccc.int/sites/default/files/NDC/2024-01/FINAL%20UPDATED%20NAMIBIA%20NDC%202023.pdf

Grobler, J. (2024, July 9). Green energy innovations are being developed in Namibia's desert. *The Namibian*. https://www.namibian.com.na/green-energy-innovations-are-being-developed-in-namibias-desert/

Hampson, M. (2024, May 16). *Hydrogen storage could slash renewables' costs: Modeling competing storage technologies reveals H2's grid-scale strengths*. IEEE Spectrum. https://spectrum.ieee.org/hydrogen-storage-grid-scale

Hassan, Q., Algburi, S., Sameen, A., Salman, H., & Jaszcur, M. (2024, January 2). Green Hydrogen: A pathway to a sustainable energy future. *International Journal of Hydrogen Energy*, *50*, *Part B*, 310–333. https://doi.org/10.1016/j.ijhydene.2023.08.321

International Centre for Climate Change and Development. (2024, August 15). *Progress of the operationalization of the loss and damage fund: Key takeaways from the board proceedings and what lies ahead.* https://icccad.net/blog/progress-of-the-operationalization-of-the-loss-and-damage-fund-key-takeaways-from-the-board-proceedings-and-what-lies-ahead/

Kallis, G., Kostakis, V., Lange, S., Muraca, B., Paulson, S., & Schmelzer, M. (2018, October). Research on degrowth. *Annual Review of Environment and Resources*, *43*, 291–316. Annual Reviews. https://doi.org/10.1146/annurev-environ-102017-025941

Kalondo, T. (2024, January 12). Ndeunyema: Oil discovery a beacon of hope. *New Era*, p. 3. https://neweralive.na/ndeunyema-oil-discovery-a-beacon-of-hope/

Kooper, L. (2024, July 24). Malnutrition kills 67 children in

Zambezi region. *The Namibian*. https://www.namibian.com.na/malnutrition-kills-67-children-in-zambezi-region/

Louw, B. (2024, May 27). Opinion – strategies for farmers to adapt to changing weather patterns. *New Era*, p. 7. https://neweralive.na/opinion-strategies-for-farmers-to-adapt-to-changing-weather-patterns-2/

Lubinda, M. (2015). *Think Namibia: Fact sheet on climate change*. Desert Research Foundation of Namibia. https://www.thinknamibia.org.na/images/projects/enviro/Climate_Change_Factsheet_01.pdf

Mager, F., & Chaparro, S. (2023). *Delivering climate justice using the principles of tax justice: A guide for climate justice advocates* [Position Paper]. Tax Justice Network.

Markowitz, J. (2024a, May 3). Protection of environmental journalists crucial amid oil discoveries – media activists. *The Namibian*. https://www.namibian.com.na/protection-of-environmental-journalists-crucial-amid-oil-discoveries-media-activists/

Markowitz, J. (2024b, August 9). Uranium mining vital to economic growth – Nandi-Ndwaitwah. *The Namibian*. https://www.namibian.com.na/uranium-mining-vital-to-economic-growth-nandi-ndaitwah/

Matthys, D. (2024a, June 26). Namibia considers joining oil deal transparency project. *The Namibian*. https://www.namibian.com.na/namibia-considers-joining-oil-deal-transparency-project/

Matthys, D. (2024b, October 8). Govt cautioned not to 'overhype' green hydrogen jobs. *The Namibian*. https://www.namibian.com.na/govt-cautioned-not-to-overhype-green-hydrogen-jobs/

Matthys, D. (2024c, November 18). Construction of 40MW Otjikoto biomass power plant kicks off. *The Namibian*. https://www.namibian.com.na/construction-of-40mw-otjikoto-biomass-power-plant-kicks-off/

Milko, V. (2024, October 3). *Miners are razing forests to meet surging demand for metals and minerals, report says*. AP. https://apnews.com/article/mining-deforestation-indonesia-climate-emissions-3bf4395f4a16d6097727da0793e311e4

Mnyupe, J. (2024, September 21). The 'faces' of green hydrogen in Namibia. *The Namibian*, p. 16. https://www.namibian.com.na/the-faces-of-green-hydrogen-in-namibia/

Müller, F., Tunn, J., & Kalt, T. (2022, November 2). Hydrogen justice. *Environmental Research Letters*, *17*(11) 115006. https://iopscience.iop.org/article/10.1088/1748-9326/ac991a

Nabalamba, A., Munila, M,. & Alexander, P. (2011, November). Climate change, gender and development in Africa. *AfDB Chief Economist Complex*, *1*(1), 1–46. African Development Bank. https://www.afdb.org/sites/default/files/documents/publications/climate_change_gender_and_development_in_africa.pdf

Namibia, South Africa sign energy agreement. (2024, July 16). *New Era*. https://neweralive.na/namibia-south-africa-sign-energy-agreement/

Nakale, A. (2024, November 18). Shifeta irked by inadequate climate financing. *New Era*, p. 4. https://neweralive.na/shifeta-irked-by-inadequate-climate-financing/

Namibia's green hydrogen projects reach key milestones. (2024, August 30). *Informanté*. https://informante.web.na/?p=362052#:~:text=NG-H2P%20revealed%20that%20the%20Hyphen,masts%20crucial%20for%20data%20collection

National silos drying up… as drought maintains grip on nation. (2024, April 25). *Africa Press*. https://www.africa-press.net/namibia/all-news/national-silos-drying-up-as-drought-maintains-grip-on-nation

NCE. (2024). *When green hydrogen turns red – Threatening a global biodiversity hotspot* [Position Paper]. https://n-c-e.org/wp-content/uploads/Green-hydrogen-Tsau-Khaeb-National-Park-NCE-Position-Paper.pdf

Ndjavera, M. (2024a, June 20). Nganate in desperate push for uranium …asks what dying residents have to lose. *New Era*, p. 1. https://neweralive.na/nganate-in-desperate-push-for-uranium-asks-what-dying-residents-have-to-lose

Ndjavera, M. (2024b, May 14). Namibia's green goal is flourishing … Mnyupe clarifies structural development issues. *New Era*, p.14. https://neweralive.na/namibias-green-goal-is-flourishing-mnyupe-clarifies-structural-development-issues-2/

Ngatjiheue, C. (2024, March 13). Uranium company welcomes independent assessments of operations. *The Namibian*, p. 11. https://www.namibian.com.na/uranium-company-welcomes-independent-assessments-of-operations/

OHCHR. (2017). *Frequently asked questions on human rights and climate change: Fact sheet 38*. United Nations. https://www.ohchr.org/sites/default/files/Documents/Publications/FSheet38_FAQ_HR_CC_EN.pdfOil companies to double down on Namibian exploration. (2024, April 26). *New Era*, p. 14. https://neweralive.na/oil-companies-to-double-down-on-namibian-exploration-2/#:~:text=Chevron%2C%20ExxonMobil%2C%20Galp%20Energia%20and,Conference%20in%20Windhoek%20on%20Wednesday

Our World in Data. (2023). *Per capita consumption-based CO_2 emissions*. https://ourworldindata.org/grapher/consumption-co2-per-capita

Pearse, R., & Böhm, S. (2014). Ten reasons why carbon markets will not bring about radical emissions reduction. *Carbon Management*, *5*(4), 325–337. https://doi.org/10.1080/17583004.2014.990679

Peša, I., & Ross, C. (2021). Extractive industries and the environment: Production, pollution, and protest in global history. *The Extractive Industries and Society 8*(4), 10093.

Pinehas, T. (2024, March 27). Challenges and Opportunities of Aquaculture. *The Namibian*, Agriculture insert, p. 7.

Prins, B. (2024, May 23). Dark cloud hangs over hydrogen project. *The Namibian*, p. 1. https://www.namibian.com.na/dark-cloud-hangs-over-hydrogen-project/

Radzyminski, R. (2021, March 27). *Environmental and health consequences of uranium mining* [Coursework for Introduction to Nuclear Energy, Stanford University]. http://large.stanford.edu/courses/2021/ph241/radzyminski2/

SADC. (2019). *Development of a SADC gender-responsive disaster risk reduction strategic plan and plan of action 2018-2030: SADC gender analysis and stakeholder consultation report: Deliverable 3*. https://drmims.sadc.int/sites/default/files/document/2020-03/SADC%20Gender%20Analysis%20and%20Stakeholder%20Consultation%20Report_Formatted.pdf

Scott, D. N., & Smith, A. A. (2017, March). Sacrifice zones in the green energy economy: Toward an environmental justice framework. *McGill Law Journal 62.3*. https://lawjournal.mcgill.ca/article/sacrifice-zones-in-the-green-energy-economy-toward-an-environmental-justice-framework/

Schütte, A. (2024, November 18). Hydrogen to benefit the rich Namibians – researcher. *The Namibian*, p. 3. https://www.namibian.com.na/hydrogen-likely-to-primarily-benefit-affluent-namibians-researcher/

Sharma, K., Shah, G., Singhal, K., & Soni, V. (2024, September). Comprehensive insights into the impact of oil pollution on the environment. *Regional Studies in Marine Science, 74*, 103516. https://doi.org/10.1016/j.rsma.2024.103516

Shigweda, A. (2024, March 29). Community gardens contributing to food security. *The Namibian*, Agriculture insert, p 6. https://www.namibian.com.na/community-gardens-contributing-to-food-security/

Shihepo, T. (2024, November, 19). Dâures hydrogen begs for more after

spending N$232m. *The Namibian*, p 1. https://www.namibian.com.na/daures-hydrogen-begs-for-more-after-spending-n232m/

Shikololo, A. (2024, September 12). Over 1 million grapple with food insecurity. *New Era*. https://neweralive.na/over-1-million-grapple-food-insecurity/

Shipena, J. (2024, October 30). UN Special Rapporteur slams Russian mining project in Namibia. *The Villager*. https://www.thevillager.com.na/mining/2024/un-special-rapporteur-slams-russian-mining-project-in-namibia/

Smith, T. (2023, November 8). *Namibia first in Africa to break ground on green steel project*. ESI Africa. https://www.esi-africa.com/africa/namibia-first-in-africa-to-break-ground-on-green-steel-project/

Tripathi, A. (2024, August 14). *Wood waste turned catalyst could unlock affordable hydrogen from the ocean*. Interesting Engineering. https://interestingengineering.com/energy/wood-waste-green-hydrogen-ocean

Uanguta, E. (2024, August 9). Namibia: Balancing sustainable and fossil energy for the future. *The Namibian*, p. 11. https://www.namibian.com.na/n.amibia-balancing-sustainable-and-fossil-energy-for-the-future/

United Nations Economic Commission for Africa. (2020, October). *Gender equality in climate change: Analysis report on gender in climate change policies, programs and NDC processes* (Second draft). https://archive.uneca.org/sites/default/files/uploaded-documents/ACPC/2020/gender_analysis_of_climate_change_in_africa.pdf

United Nations Environment Programme Finance Initiative. (2022, June). Harmful marine extractives: Understanding the risks & impacts of financing non-renewable extractive industries (deep-sea mining). United Nations. https://www.unepfi.org/publications/harmful-marine-extractives-deep-sea-mining/

United Nations General Assembly. (2019, May 14). *Global extractivism and racial inequality: Report of the Special Rapporteur on contemporary forms of racism, racism discrimination, xenophobia and intolerance* (A/HRC/41/54). https://www.ohchr.org/en/documents/thematic-reports/ahrc4154-global-extractivism-and-racial-equality-report-special

UN Special Rapporteur on Human Rights and the Environment. (2022). *Additional* sacrifice zones. Office of the High Commissioner for Human Rights. https://www.ohchr.org/sites/default/files/2022-03/Annex1_to_A_HRC_49_53.pdf

Von Maltitz, L. & Bahta, Y. T. (2024, April 30). The impact of indigenous practices to promote women's empowerment in agriculture in South Africa. *Frontiers in Public Health*, *12*. https://pmc.ncbi.nlm.nih.gov/articles/PMC11091313/#B10

We are prepared to maximise oil benefits – Mbumba. (2024, March 19). *New Era*, p. 6. https://neweralive.na/we-are-prepared-to-maximise-oil-benefits-mbumba-4/

World Bank Group. (2021). *Climate risk country profile: Namibia*. https://climateknowledgeportal.worldbank.org/sites/default/files/2021-08/15931-WB_Namibia%20Country%20Profile-WEB.pdf

World Bank Group. (2024, August 29). *Extractive Industries*. https://www.worldbank.org/en/topic/extractiveindustries/overview

World Economic Forum. (2021, October 3). *Namibia is poised to become the renewable energy hub of Africa*. https://www.weforum.org/stories/2021/10/namibia-is-positioned-to-become-the-renewable-energy-hub-of-africa/

World Food Programme. (2021, June 17). *Climate change in southern Africa: A position paper*. https://www.wfp.org/publications/climate-change-southern-africa-position-paper

World Food Programme. (2024, 14 October). *Drought in southern Africa: Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, Zambia, Zimbabwe*. Public Health Situation Analysis (PHSA). https://reliefweb.int/report/angola/drought-southern-africa-angola-botswana-lesotho-malawi-mozambique-namibia-zambia-zimbabwe-public-health-situation-analysis-phsa-14-october-2024

"Rains are no longer there": Examining Namibia's Climate Vulnerability through the Lens of Climate Justice

Romie Vonkie Nghitevelekwa & Nelson Mlambo

Abstract:

This article examines Namibia's climate vulnerability through the lens of climate justice theory to highlight the entanglement of climate impacts with justice concerns. The article specifically focuses on droughts, illustrating Namibia's lived realities and experiences of climate vulnerability. The article is based on a desktop review and synthesis of secondary literature on climate change and climate vulnerability in Namibia, drawing on both global and local literature, including global databases, government reports, academic publications, and grey literature. The data were analysed using thematic analysis, which was instrumental in identifying the key themes on climate vulnerability and justice specific to Namibia. The findings indicate that despite contributing only minimally to global greenhouse gas emissions, Namibia is highly vulnerable to climate change impacts. Namibia's vulnerability results from the country's high exposure to climatic variations, the sensitivity of its populations, the country's socioeconomic and developmental context, and its

Ondjeombaranga, Erongo, Namibia- Droughts destroys grazing.
Source: Royal Mabakeng 2024.

limited adaptive capacity. As Namibia grapples with climate change, some population groups, particularly rural populations, subsistence farmers, marginalised communities, and women, face disproportionate vulnerabilities. At the global level too, the impacts of climate change are differentiated, uneven and disproportionate. The varying degrees of countries' exposure, sensitivity, and adaptive capacity contribute to these disparities. This underscores the need to centralise climate justice in climate change discourse and practice. The rationale is to advocate for a more transformative, just and equitable climate response that is appropriate to the Namibian context.

Keywords: climate change, climate justice, vulnerabilities, climate response, Namibia

Introduction

Namibia is characterised by an arid and semi-arid climate, which is intensified by climate change. Despite its minimal contribution to global greenhouse gas (GHG) emissions, Namibia faces multifaceted climate vulnerabilities. This article examines Namibia's climate vulnerability through the lens of climate justice theory to show how climate impacts are intertwined with issues of justice. The article specifically focuses on droughts, one of the manifestations of climate change to which Namibia is highly susceptible, to illustrate the lived realities and experiences of climate vulnerability on the part of Namibia's people. It addresses the disproportionate vulnerabilities faced by different population groups in Namibia, including rural populations, subsistence farmers and marginalised communities, and highlights gendered and intersectional vulnerabilities.

The key themes covered in the article include Namibia's projected climate risks and the global emission context; Namibia's exposure and sensitivity to climate change; the linkages between climate change and the country's already adverse socioeconomic and development conditions; Namibia's adaptive capacity to climate change; and the institutional and legal framework for climate change. The findings section concludes by threading out the social justice issues focusing on selected dimensions of climate change, namely global inequalities in the distribution of risks; the gendered and intersectional disproportionate vulnerabilities; climate finance; and adaptation, mitigation and the right to development. With the gendered analysis, in particular, the article shows that climate justice is inseparable from gender justice, highlighting the gender-specific barriers that hinder women in particular from coping with and adapting to climate change (Terry, 2009). On the right to development,

specifically, the article critiques the pathways to zero carbon emissions, questioning what this trajectory means for countries like Namibia that are still in the process of pursuing development. With these themes, the article aims to demonstrate that climate change is fundamentally a justice concern.

Theoretical Framework

The article examines Namibia's climate vulnerability through the lens of climate justice. Climate vulnerability refers to the degree to which a system, population, human society or region, in this case, Namibia, is susceptible to climate change and is unable to cope with its adverse impacts (Intergovernmental Panel on Climate Change [IPCC], 2001) as cited in Brooks (2003). The University of Notre Dame Global Adaptation Initiative (ND-GAIN) further defines vulnerability as the propensity or predisposition of human societies to be negatively impacted by climate hazards (Chen et al., 2023). Climate vulnerability encompasses three dimensions: exposure, sensitivity, and adaptive capacity. Exposure represents the extent to which a system, population or human society, or region and its supporting sectors, are exposed to and/or stressed by climatic variations and changing climate conditions (Brooks, 2003; Chen et al., 2023). Sensitivity is the degree to which a system, population, or human society, and a region, are affected by climatic stresses, such as the high dependency on climate-sensitive sectors like agriculture in Namibia. Adaptive capacity, on the other hand, reflects the ability of a system, population, human society or region and its supporting sectors to adjust to or cope with climate change and its consequences, involving the technological, economic, and social resources that enable an effective response to climate impacts and conditions (Brooks, 2003; Chen et al., 2023). Expressed as a formula by Hipondoka and Hamunyela (2024):

Climate Vulnerability = Exposure + Sensitivity – Adaptive Capacity

The article uses the conceptual framework of vulnerability to illustrate Namibia's exposure, sensitivity, and adaptive capacity to climate change. In addition to the conceptual framework of vulnerability, the article adopts climate justice theory, which is a political discourse surrounding climate change policy and practice that provides an understanding of the relationship between climate change and the conceptions of justice and fairness (Schlosberg, 2012). Porter et al. (2020 p. 293) define climate justice as "a framework that brings into view the intersection between climate change and the ways social inequalities are experienced as structural violence". It is widely recognised that climate change impacts countries and populations

unevenly and disproportionately, which underscores the need to address the resultant injustices in fair and equitable ways (Sultana, 2022). Schlosberg (2012) has argued that climate justice takes into its central frame the crucial element of justice theory, namely the identification of social and political misrecognition as the key underlying condition of the maldistribution of climate risks. In critical social theory, recognition is viewed as a remedy to injustice, with the type of recognition required in each context depending on the specific forms of misrecognition that need to be addressed (Fraser, 2003). Fraser's formulation refers to misrecognition resulting from either excessive ascribed or constructed distinctiveness or, in other cases, underacknowledged distinctiveness. The article relates this to the underacknowledged distinctiveness of climate vulnerability for countries like Namibia and its particular vulnerable population groups, and the misrecognition therein. This kind of approach aims to bring the "social and political recognition of specific and local vulnerabilities and the effects of climate change on the basic needs of human beings in various places and under different conditions" (Schlosberg, 2012, p. 446). Climate justice further involves the analysis of who is marginalised by climate change and who is excluded in climate change response processes, including the adaptation and mitigation measures pursued (Sultana, 2022)—again, highlighting the distinctiveness in vulnerability and response. With a focus on adaptation too, this formulation of climate justice departs from approaches that solely focus on discourses around prevention or mitigation, or the distribution of the costs of adaptation to climate change (Schlosberg, 2012). Holistic climate justice also focuses on who benefits, who loses out, and in what ways and why they do so (Sultana, 2022, p. 119). By so doing, a climate justice framework helps to identify and explain the relationships at different scales that co-create and maintain vulnerabilities and injustice.

Methodology

This article is based on a synthesis and review of secondary literature on climate change, climate vulnerability, and climate justice. The sources included a mix of national, regional and global scholarly literature, databases and indices; the Namibian government's reports to the United Nations Framework Convention on Climate Change (UNFCCC) and position papers submitted to the UNFCCC Conference of Parties (COP); and other relevant publications. A thematic analysis method was used to identify and analyse the different themes emerging from the literature, employing a structured matrix framework. The matrix framework

consisted of five columns: a 'List of Literature' column, and the themes of 'Exposure', 'Sensitivity', and 'Adaptive Capacity' (displayed horizontally), and 'Climate Justice' analysed across all three themes (displayed vertically).

The first step in the process was to identify and collect literature on climate change, climate vulnerability and climate justice. Each identified source became an entry in the List of Literature column. From each source, the process of identifying passages that speak to Exposure, Sensitivity and Adaptive Capacity followed. After that, the process involved threading out what these themes reveal about justice concerns both within the literature and conceptually, including questions of global inequalities in the distribution of climate vulnerabilities; the gendered and intersectional disproportionate vulnerabilities; climate finance; and adaptation, mitigation and the right to development. The themes identified are Namibia's projected climate risks and the global emission context; Namibia's exposure and sensitivity to climate change; the linkages between climate change and the country's pre-existing adverse socioeconomic and developmental challenges; and Namibia's adaptive capacity to climate change, the institutional and legal framework for climate change, and social justice issues. From the review of various climatic stresses affecting Namibia, drought was referred to consistently and was therefore used in the article to elucidate Namibia's lived realities and experiences of vulnerabilities.

Findings

Namibia's projected climate risks and global emissions context

Namibia experiences high temperatures, with average annual temperatures ranging between 14.3°C and 24.2°C (World Bank, 2021). Temperature trends show that since the 1960s, Namibia has experienced increases in mean, maximum, and minimum temperatures, with overall warming in the country exceeding the global average. Since the Paris Agreement was adopted in 2015 and came into force in 2016, world leaders have emphasised the need to limit global warming to 1.5°C by the end of this century (United Nations, 2015). This legally binding international treaty aims to keep the global average temperature increase below 2°C above pre-industrial levels, with efforts being focused on limiting the rise to 1.5°C (United Nations, 2015). Staying within the 1.5°C threshold is crucial, as exceeding it could lead to much more severe climate change impacts. For countries like Namibia, projections indicate that if global temperatures rise by 1.5°C or 2°C, the country

will experience further increases in maximum temperatures, while annual precipitation will decrease (Thomson, 2021). The current projection trajectory indicates that Namibia will continue to experience high temperatures and increasing aridity. Projections suggest that Namibia will become hotter and drier, with increased variability in rainfall. For example, precipitation rates are expected to decrease by up to 19% by the 2080s (World Bank, 2021). Extreme climate-related events and hazards such as droughts and floods are expected to become more prevalent and intense in the coming years (for example, see Global Facility for Disaster Reduction and Recovery (2020)). These thus characterise the country as a climate risk.

According to the Global Climate Risk Index, which assesses the relative and absolute impacts of extreme weather events based on fatalities and economic losses, Namibia ranks 113 out of 180 countries, with an index score of 98.17 for 2019, placing it among the countries most vulnerable to extreme weather events (Eckstein et al., 2021). Another important measure to assesses countries' vulnerability to climate disruptions and their readiness to leverage private and public investments for adaptation actions is the University of Notre Dame Global Adaptation Initiative (ND-GAIN) (Chen et al., 2023). This index assesses countries' exposure, sensitivity, and ability to adapt to the negative impacts of climate change, focusing on food, water, health, the ecosystem, human habitat, and infrastructure. ND-GAIN also includes the Readiness Index, which measures countries' ability to leverage investments and convert them to adaptation actions using three components, namely economic, governance and social readiness. According to ND-GAIN, Namibia has vulnerability and readiness indices of 0.464 and 0.380, respectively (Chen et al., 2023), suggesting that the country faces significant risks and has a moderate capacity to adapt, while facing considerable challenges in governance, economic capacity, and social systems that hinder its ability to respond effectively to climate change. With climate change impacts on the sectors important for the economy, it is estimated that the country's GDP could decrease by 6.5% (World Bank, 2021).

While Namibia is one of the world's most vulnerable countries, its contribution to global GHG emissions is minimal, standing at only 0.00026% (Ministry of Environment, Forestry and Tourism [MEFT], 2023). This positions the country as one of the world's lowest emitters; in fact, it is a net carbon sink, meaning that the country absorbs more GHGs than it emits (Republic of Namibia, 2020; Sherbourne, 2022).

Namibia is among the bottom 100 countries in the world. The bottom 100 countries only contribute 2.9% of the global GHG emissions. In contrast, the top three emitters globally are China, the United States of America, India, contributing 42.6% of the total emissions (Friedrich et al., 2023). Others in the top ten are European Union, Russia, Japan, Brazil, Indonesia, Iran, and Canada, in that order. Comparing countries' responsibilities for climate change based solely on their respective emissions is just one approach. For a more nuanced understanding, it is also important to consider climate equity, particularly in relation to population differences and their contributions to total emissions. From this perspective, examining emissions relative to population size, or per capita emissions, is considered to provide another useful perspective. In that light, the United States, Russia and South Korea have the highest emissions per capital at 17.6 tonnes of carbon dioxide equivalent (tC02e) per person, 13.3 tC02e per person and 12.6 tC02e per person, respectively (Vigna & Friedrich, 2023). While India ranks among the top three emitters its per capita emissions is only 2.5 tC02e per person. On per capita basis, Namibia emits 5.2 tonnes of CO2 equivalents (tCO2e) per person annually, ranking 82nd out of 191 countries (Boyle, 2024). From the foregoing, it is evident that Namibia is highly vulnerable to climate change, with bleak projections for the future, despite being one of the countries least responsible for global GHG emissions.

Namibia's exposure and sensitivity to climate change

Namibia has high levels of exposure and sensitivity to climate change. With 92% of its land classified as very arid, arid, or semi-arid, the country ranks as the second-most-arid country/region in the world, following the Sahara Desert (Mapani et al., 2023; Bailey et al., 2021; World Bank, 2021). Namibia generally experiences a hot and dry climate. The average annual temperatures range from 14.3°C to 24.2°C, with the coastal areas having cooler temperatures, while the northern regions can exceed 22°C (World Bank, 2021). The annual rainfall averages a mere 278 mm, with variations between different areas in the country ranging from 650 mm in the northeast to less than 50 mm in the southwest and along the coast (Spear et al., 2018; World Bank, 2021). The country is exposed to significant climatic variability, where frequent and severe droughts have become a salient characteristic of the new normal and the defining feature projected for the future. Over the past three decades, the country has experienced severe drought events, with three recorded in the 1990s, two in the 2000s, and three in the 2010s (Liu & Zhou, 2021;

Thomson, 2021). The 2018/19 drought was regarded as the worst in 90 years (Nakanyete et al., 2020). The most recent drought was declared in 2024. Its impacts are unprecedented, especially on the country's food security, so much so that the government has decided to cull more than 700 wild animals to support the drought relief programme (Republic of Namibia, 2024).

Every successive drought lays bare Namibia's sensitivity to climate change. The face of drought sensitivity is often represented by the climate-sensitive sectors that a country depends on. For Namibia, the face of drought sensitivity is farming, and it is particularly so for rainfed agriculture. Approximately 70% of Namibia's population rely directly or indirectly on farming and agriculture for their livelihoods (Republic of Namibia, 2023b). These sectors employ about one-third of the Namibian workforce, making them crucial actors for the country's Gross National Product (GDP). Focussing on the 2018/19 drought and the latest 2024 drought elucidates Namibia's sensitivity. During the 2018/19 drought year, the cumulative seasonal rainfall volumes were 60 to 70 percent below average rainfall (Food and Agriculture Organization [FAO], 2019). These extreme rainfall deficits led to agricultural production reaching its lowest point in 2019, resulting in the need for emergency food relief which cost the government about N$ 131 million in addition to N$ 129 million mobilized as donations from development partners ("Govt spends N$131m on drought relief", 2019). In the 2000s, for example, the 2003/2004 drought was estimated to have cost the government N$275 million for the provision of emergency relief (Reid et al., 2007).

Rangeland conditions were severely affected, resulting in significant livestock deaths. It was estimated that over 60 000 livestock perished in the drought year of 2019 (FAO, 2019). Similarly, there were alarmingly low yields of crop production. Namibia's primary staple crops are maize and pearl millet, which saw decreases of 26% and 89%, respectively, during the 2018/19 drought year. For the 2024 drought, the Namibia Meteorological Services reported that rainfall for the entire 2024 season was below normal rainfall. Specifically, certain regions, including //Karas, Hardap, western Erongo, and western Kunene, received less than 25 mm of rain, while other normally wetter regions like Zambezi only saw around 125 mm in January, a period typically expected to be the peak of the rainy season (Namibia Economist, 2024; Xinhua, 2024). The onset of the 2023/2024 rainfall season showed some hopeful prospects. However, as the season progressed, dry spells with high temperatures were experienced,

affecting crop development and thereby causing total crop wilting (Ministry of Agriculture, Water and Land Reform [MAWLR], 2024). As a result, the crop-growing regions experienced poor to no harvests. Nationally, the aggregate cereal production (maize, millet, sorghum, and wheat) was 53% lower than it had been in the previous season (MAWLR, 2024).

One of the key indicators of drought's severe impact on crop failures, and thus livelihoods, is the state of food security in the country. The national Crop Prospects, Food Security and Drought Situation Report (MAWLR, 2024) revealed that household food security has generally weakened in many parts of the country, since agricultural production for 2022/2023 had also been reduced. By the 2023/2024 season, many households had depleted their previous season's food stock, and the majority are now dependent on the market and drought relief. The Integrated Food Security Phase Classification Situation Report (Integrated Food Security Phase Classification, 2024) revealed that in the first half of 2024, 1.2 million people were experiencing acute food insecurity and urgently needed assistance to reduce food shortages and protect their livelihoods. It was projected that this situation would worsen in the second half of 2024, with 1.4 million people, almost 50% of the Namibian population, expected to experience high levels of acute food insecurity. Among those most affected by acute food insecurity are the vulnerable groups, including marginalised communities, children under the age of five, pregnant and breastfeeding women, pensioners, the unemployed, and those without national documents for them to benefit from social safety nets. Acute food insecurity is defined as "any manifestation of food insecurity found in a specified area at a specific point in time of a severity that threatens lives, livelihoods, or both, regardless of the causes, context, or duration" (Integrated Food Security Phase Classification, 2024, p. 9). Acute food insecurity classification indicates a crisis level of food insecurity, where urgent humanitarian assistance is required to address acute malnutrition and prevent further deterioration of food security. The already existing economic decline, poverty, inequalities, unemployment, and price shocks have led to a deterioration in food security, with climate change-induced droughts exacerbating the situation.

In addition to agriculture and the state of food security, a country's sensitivity to climate change or drought is also reflected in its water supply. As a result of the 2024 drought, many areas in Namibia are facing serious water shortages due to insufficient water inflow into dams and reservoirs. In addition, underground

water aquifers have not been sufficiently recharged (Petersen, 2024). For example, in the central regions of the country, water levels in dams and boreholes are in a precarious state. It is documented elsewhere that even without significant climate change, Namibia is predicted to face water scarcity – generally, the country is water-deficient (Republic of Namibia, 2011, 2021), with climate change expected to exacerbate the situation.

The high exposure and sensitivity of Namibia to climate events, particularly droughts, are evident in the frequency with which the President has declared a state of emergency, as he or she is empowered to do by Article 26 of the Namibian Constitution when a situation threatens the lives of the nation (Namibian Constitution, 1990). The President has declared a state of emergency four times over the last decade in response to severe drought conditions (2013, 2016, 2019 and 2024) (Matthys, 2024).

Linkages between climate change and adverse socioeconomic conditions

Namibia's sensitivity to climate change is caused not only by its reliance on climate-sensitive sectors, but also by the broader socioeconomic and developmental context of the country, which faces high levels of unemployment (33.40%) (Namibia Statistics Agency, 2019), poverty (17.2%), and inequality (GINI index: 57.2) (Namibia Statistics Agency, 2018). Additionally, 43% of the population is multidimensionally poor, and many livelihoods are vulnerable. There are also significant numbers of female-headed households (46%) and child-headed households, both of which are more likely to experience multidimensional poverty (Namibia Statistics Agency, 2021). Female- and child-headed households, the unemployed, and the poor are more likely to bear the brunt of the impacts of climate change due to several factors, including high dependency on climate-sensitive sectors, and limited economic resources and general adaptive capacity to cope with climate change. As Porter et al. (2020) argue, the distribution of effects and impacts of climate change are burdening those who are already disadvantaged. On a more macro level, frequent and severe droughts force the country to divert resources originally intended to address the developmental challenges the country is facing towards emergency drought relief. It is reported that Namibia needs about 1.3 billion to fully implement the 2024 drought relief programme ("Drought to cost Govt over N$1 billion", 2024a). In contrast, in 2019, the government spent 131 million on the drought relief programme ("Govt spends N$131m on drought relief", 2019)). This significant increase can be

attributed to the population's inability to recover from previous droughts, thus highlighting the compounding effects of consecutive climate events and the escalating costs of emergency relief. Generally, the consecutive droughts over the past decade have prevented Namibia's population from recovering and rebuilding, thereby leading to a cycle of dependency on drought relief. We argue that this is a chronic vulnerability, and that it is evident in the continued supply of drought relief over the years. It is as if the country is on a "life drip", in a state of perpetual emergency, which is indicative of the reality of climate exposure and sensitivity in Namibia. The resource demands and diversion towards drought relief programmes impede focus on long-term development goals. Thus, frequent and severe droughts not only raise immediate humanitarian needs (an additional strain) but also strain the Namibian economy and disrupt planned development initiatives. The country thus faces a triple challenge: managing immediate climate impacts; addressing economic consequences; and striving for long-term development. This is the multifaceted nature of Namibia's sensitivity to climate change.

Namibia's adaptive capacity

Climate stresses, in Namibia's case droughts, increase dependency on international aid. During drought events, the government appeals to development partners and international development organisations for assistance to mitigate the drought impacts and support the affected communities. With the latest declaration of a state of emergency, of the N$1.3 billion needed for drought relief to mitigate hunger and food scarcity across all fourteen regions of the country, the government has only made N$820 million available through the National Emergency Disaster Fund. This leaves a deficit of N$482 million, for which the country has requested development partners for support ("Drought to cost Govt over N$1 billion", 2024). Dependency on international aid to mitigate the impacts of droughts and climate change broadly speaks to the third element of vulnerability (the other two being exposure and sensitivity) – namely adaptive capacity: how effectively Namibia can adapt to and cope with climate change.

According to the IPCC, adaptation to climate change occurs within a dynamic context of social, economic, financial, technological, biophysical, and political factors that vary over time, location, and sector, thus influencing countries' capacity to adapt to the respective changes they experience. Existing literature identifies the primary determinants of countries' adaptive capacity as economic wealth, technological advancement,

availability of information, knowledge and skills, infrastructure, institutional frameworks, and equity (IPCC, 2001). The economic condition of countries and social/population groups within countries plays a crucial role in determining adaptive capacity. Compared to poorer nations, wealthy nations are better equipped to respond to and manage the risks of climate change and to bear the costs of adaptation. For example, when a flood or any climate hazard occurs in any of the wealthy nations, they do not rely on international aid to respond to and cope with the disaster. However, the situation is different for developing nations. This serves as a rough indicator of the differentiated abilities to cope with climate-related events. It is therefore crucial not only to highlight the inequalities in the distribution of risks arising from climate change (that is, highlighting vulnerabilities), but also to emphasise the social positioning of these risks, including the different levels of capacities and abilities to respond to such risks.

It has been well documented that while there are differentiations, many communities in Namibia have limited adaptive capacity due to factors such as marginalisation, underdevelopment, poverty, inequality, ineffective policies, and rapid population growth (Republic of Namibia, 2020). The Fourth National Communication to the United Nations Framework Convention on Climate Change measured adaptive capacity at the constituency level using an adaptive capacity index. This index was conceptualised using multiple deprivations, defined as "a measure of the level of unmet needs in terms of material, education, employment, health, housing, and services in each constituency" (Republic of Namibia, 2020, p. 8). A higher adaptive capacity index value indicates greater deprivation, which implies lower adaptive capacity. Conversely, a lower adaptive capacity index value indicates less deprivation, thus signifying higher adaptive capacity (ibid.). The assessment identified health deprivation, material deprivation, and service deprivation as the key drivers of diminished adaptive capacity in Namibia. Areas in northern Namibia were found to have very low adaptive capacity due to higher levels of these deprivations. This is a reflection that vulnerability is differentiated and is determined by the prevailing context.

In its position paper to COP 28, Namibia highlighted that countries' adaptive capacities to climate change "vary in terms of recovery from the losses and damages associated with the impacts of climate change" (Republic of Namibia, 2023a, p. 2). Wealthy nations' adaptive capacities are conditioned by strong economies, advanced technologies, and well-

developed infrastructure, which enable them to manage such crises internally, thereby minimising the need for external assistance (also see above). Additionally, adaptive strategies for managing climate change directly or indirectly involve technology such as early warning systems, that most developing countries grapple with.

As an arid country with low economic growth and a high dependence on natural resource-based industries, Namibia has limited capacity to adapt to climate change impacts (Republic of Namibia, 2011). Economically, Namibia faces limitations and developmental challenges, and despite its ranking as an upper-middle-income country, there are high levels of inequalities. As presented above, the pre-existing development challenges of high levels of poverty, unemployment and multiple deprivations constrain the country's ability to independently finance adaptation measures, with the result that adaptive capacity in the form of climate financing is an issue. In Namibia's First Adaptation Communication to the UNFCCC, it was indicated that Namibia needed about USD 1.72 billion over the period 2021–2023 for its adaptation actions (Republic of Namibia, 2021). As indicated in the Nationally Determined Contributions (NDCs), Namibia's adaptation policies and strategies cannot be efficiently enforced without external assistance (MEFT, 2023). Namibia requires significant investment to enhance its technological resilience, as the country still grapples, for example, with early warning systems, which are key for preparedness and better, timely responses. This is linked to the dissemination of information, knowledge, and skills, which while growing, remains differentiated. A recent study on the gendered impacts of drought on women in Omusati and Kunene regions found that early warning system communications do not come straight to the regions, and that the sharing of information is not coordinated with the stakeholders on the ground (Olwage & Nghitevelekwa, 2023). Infrastructure development, especially in rural areas, remains inadequate, thereby impacting climate response capabilities. Namibia's position paper at COP 28 highlights the challenges the country faces in coping with climate change impacts, thus emphasising that developing nations, including Namibia, face significant difficulties due to their having limited financial resources, technological advancement, and human capacity (Republic of Namibia, 2023a).

Institutional and legal framework for climate change

On a very positive note, Namibia has established legal and institutional frameworks for climate change, and the

country actively participates in international climate change negotiations of the UNFCCC COPs. The institutional frameworks include the multi-sectoral climate change committee, now referred to as the National Committee on Rio Conventions, and a Climate Change Unit within the Department of Environmental Affairs in the MEFT. The country has also developed responsive national policies and strategies, including the National Climate Change Policy and its ambitious NDCs. Namibia has also developed capacities over the years for climate change action programming. Nevertheless, equity issues do persist, as vulnerable communities and social/population groups, particularly those reliant on subsistence farming, face disproportionate impacts from climate change. From the above, it is clear that adaptive capacity to climate change in Namibia, and/or positioning Namibia in relation to other countries, is differentiated—definitely low in comparison to other countries, low in some sectors and better in others, and lower for some social/population groups than for others (see also Angula & Kaundjua (2016)).

Social justice issues

Global inequalities: Distributional effects of climate change

The justice concerns that are entangled with climate change vulnerability revolve around the disparities between countries such as Namibia and other developing nations which contribute the least to global GHG emissions, yet suffer the most from its impacts, underscoring the inequality in the distribution of climate risks and vulnerabilities. As presented above in the section on Namibia's climate risks and global emission context, the country's contribution to GHG emissions is minimal. However, the country faces the daily challenges of climate change, evident in its vulnerability to consecutive droughts that threaten food and water security, amongst others. This highlights the injustice in terms of the country's responsibility for climate change vis-à-vis its vulnerability. Climate change itself stems from a "Western" mode of production that is based on extractivism, characterised by high levels of resource extractions and significant GHG emissions, and is associated with the prioritisation of economic growth over environmental sustainability. Additionally, high consumption levels in the Global North (and generally, in other industrialised nations) are the other driving force behind extractivism. Collectively, these have led to global environmental degradation. As captured early in the 1990s by Ulrich Beck, modernity has produced so much wealth, but that wealth is accompanied by risks (Beck, 1992). The injustice here is

reflected in capability (or lack thereof) to respond, which speaks directly to adaptive capacity. Despite being highly vulnerable, yet one of the countries least responsible for causing climate change, Namibia has less ability to address its impacts. The injustice here lies in the mismatch between responsibility/capability and vulnerability. All these raise significant issues of fairness and equity in the global response to climate change.

Gender and intersectional inequalities

The disparities in climate change impacts exist not only between countries, but also within countries—and not only geographically, but also between different social groups. Specific social and population groups within countries, such as women, the elderly, and children, are more vulnerable to climate change (Angula & Menjono, 2014). A key element of this vulnerability is the sensitivity to climate change and its impacts, which, as shown above, is complex and multifaceted. For example, female- and child-headed households are particularly sensitive to climate change due to their economic marginalisation, limited access to resources and multiple deprivations across a broad spectrum. Other structural challenges that increase women's vulnerability include their overdependence on climate-sensitive sectors, limited voice in decision-making processes, unequal access to information and knowledge, and social exclusion, as well as pervasive gender inequalities (also see Angula & Menjono (2014)). These signal a significant need for fairness and equity in climate action and the inclusion representation, and participation of women in climate-related decision making at local, national and international level. At the international level, as evidenced by the recently concluded COP29, delegates registration data showed that 40% of parties' delegations were women. However, women's representation in top executive positions remains notably limited—for instance, only 10% of the 78 government leaders who spoke during the opening of COP29 were women (UN Women, 2024a). In addition to participation and representation, questions of what has been said about gender during the COP were asked, with organisations advocating for gender equality arguing that gender equality has been pushed to the backburner, despite the COP's outcomes being crucial for women and girls. By the end of the COP, some progress has been recorded for example recognizing women as an important beneficiary group of climate finance and the renewal of parties' commitments to gender-responsive climate policy and action (UN Women, 2024b). The argument here is that there

is need to move beyond mere numbers (participation and representation) and focus on ensuring that the decisions made at COPs are gender-sensitive and responsive. Gender mainstreaming in climate action should be the norm, as should improved access to climate information and knowledge, increased awareness of and sensitivity to existing social exclusion and gender inequalities, and deeper understanding of how these intersect with climate change impacts.

Climate financing

Climate financing is one of the key points included in Namibia's position to the UNFCCC COPs (for example, see Republic of Namibia (2023a)). According to the Paris Agreement, developed countries are required to provide financial resources to assist developing countries in implementing mitigation and adaptation measures (United Nations, 2015). In line with this, developed countries committed to mobilising USD 100 billion per year by 2020 to address the needs of developing countries. This commitment was not honoured, as by 2020 only USD 20 billion had been mobilised through the Green Climate Fund (Republic of Namibia, 2023a). It has been argued that the climate finance architecture is highly fragmented, thus creating challenges in coordinating and monitoring aid flows, and that developed countries have consistently fallen short of their commitments (Salazar, 2019). A 2014 report revealed that Namibia was among the countries that received very small volumes of climate finance, with funding totalling less than USD 5 million (Nakhooda & Norman, 2014). In Namibia's NDCs, it is indicated that the country needs over USD 18 billion for implementation, including of its mitigation and adaptation actions, from 2015 to 2030 (The Commonwealth, 2023). The challenges that exist in this regard are not only about access to climate finance but also capacity to develop proposals for mobilising climate financing (ibid.). Through climate change negotiations, developing countries also emphasise the need to separate climate finance from developmental finance and uphold the UNFCCC polluter-pays principle. This principle asserts that countries responsible for more emissions should bear the costs of climate mitigation and adaptation efforts to support vulnerable nations. The current state of climate finance challenges the financing of adaptation to climate change and hinders the ability of developing countries to meet their NDC targets, including those for mitigation, set for 2030.

Many developing countries are already living with climate change, and people who are directly affected by its very real and increasing effects have

begun to face the urgent new reality of adaptation (Schlosberg, 2012, p. 445), and climate finance is seen as key to this. In this regard, Namibia's call for climate finance is not only about increasing the scalability and ensuring the long-term commitment of climate finance targets, but also about reassessing the allocation between adaptation and mitigation. Specifically, Namibia advocates for increased grant-based support for adaptation (Republic of Namibia, 2023a). While the country is committed to contributing to the global efforts to mitigate GHG emissions (under the principle of common but differentiated responsibilities) and remains a net carbon sink, its primary climate challenge and needs lie in adaptation. This situation highlights a significant justice issue of (mis)recognition of the fact that adaptation is beyond being merely important; it has become a "life-support" for the survival and well-being of the population where the underlying condition of the maldistribution of climate finance may fail to adequately address the distinctive needs of countries like Namibia. Maldistribution as a result of misrecognition deprives vulnerable nations of the resources needed to survive the impacts of climate change. The inadequacy of climate financing, the fragmentation of its flows, its non-separation from general development finance, and the increasing preference for the financing of mitigation over adaptation (in other words, misrecognition and maldistribution) present serious justice challenges for developing countries like Namibia. In adopting a new climate finance goal during COP29 for example, it is described as the 'insurance policy for humanity' but the caveat to that is as expressed in the discussions, like any insurance policy – it only works – if the premiums are paid in full, and on time (UNFCCC, 2024). This speaks to countries contributions towards climate financing. Therefore, just and fair practices in terms of climate financing are those that consider these elements and ensure that finance benefits the most vulnerable nations and populations most vulnerable to climate change. Notwithstanding the need for adaptation financing, especially for countries like Namibia, a critical justice perspective on climate finance—often overlooked—raises the question of whether climate finance is perpetuating Western economic models and, in so doing, contributing to ongoing climate change. Without structural changes to address the root causes of climate change, including strong enforcement of emission reductions and transformative shifts in wealthier nations, climate finance risks being only a temporary solution. To be truly effective, climate finance must be in parallel with systemic reforms (in particular, in terms of mitigation reforms discussed below) that tackle the very root causes of climate change.

Mitigation and emission reductions

Mitigation is another climate justice concern. Under the Paris Agreement, countries have committed to keeping the global temperature increase well below 1.5 degrees Celsius above pre-industrial levels by mid-century (United Nation Climate Change, n.d.). However, assessments have revealed that unless more robust and rapid reductions in GHG emissions occur now, the Paris Agreement targets will not be achievable (IPCC, 2001). The global temperature is likely to surpass the 1.5-degree threshold by 2030, much sooner than initially anticipated. Much sooner than predicted, the world has already been recorded to have breached the 1.5 degrees Celsius target in 2024 (Poynting, 2024). For countries like Namibia, it has been documented that "even a 1.5°C increase in global temperature will have severe local impacts, ushering in intensified and longer droughts and many more heatwaves" (New & Bosworth, 2018). Without robust action and commitment to urgently reduce the emissions, the critical question arises: Where is the fairness for countries like Namibia and others that will face the brunt of further global temperature increase as the earth exceeds the critical temperature threshold? To ensure justice, countries, especially developed ones, need to be more ambitious in their NDCs and adopt stringent deadlines for achieving net-zero emissions (Republic of Namibia, 2023a). Developed countries, in particular, must take the lead in mitigating GHG emissions in line with their historical responsibilities.

Adaptation, mitigation and the right to development

Adaptation is a primary justice concern. The Paris Agreement recognises adaptation as an important pillar of the long-term global response to climate change. In relation to this, Namibia emphasises the need for countries to establish a global goal for adaptation that enhances adaptive capacity, strengthens resilience, and reduces vulnerability to climate change. Additionally, Namibia advocates for climate finance to be evenly distributed between adaptation and mitigation efforts (see above). For a just transition, it is acknowledged that climate action may have both positive and negative economic impacts on different economies. To address these impacts, affected economies should pursue economic diversification. Namibia calls for support for developing countries to conduct comprehensive studies to fully understand the consequences, both positive and negative, of global climate response measures (Republic of Namibia, 2023a). Furthermore, Namibia urges the eradication of unilateral measures implemented by developed countries that negatively

affect imports from developing countries, particularly African nations with limited means of implementation. The call for economic diversification is closely tied to the right to development for nations like Namibia. Under the principle of common but differentiated responsibilities, developing countries argue that it is only fair for them to explore their natural resources to further their development. For Namibia, this specifically refers to the discourse and plans of oil and gas exploration, especially since the country is a net carbon sink. While pursuing resource exploration, Namibia is also committed to advancing green industrialisation. Although these may be viewed as contradictory trajectories, the former is pursued from a climate justice angle.

Conclusions

Based on the preceding discussion, it can be concluded that Namibia's vulnerability to climate change is a multifaceted issue that is intertwined with justice concerns. Characterised by a semi-arid climate, Namibia is among the most affected by climate change, despite contributing only minimally to global GHG emissions. This disparity underscores significant issues of fairness and equity in the global climate response. The country's high exposure to climatic variations, the sensitivity of its ecosystems and economy, and limited adaptive capacity highlight the urgent need for targeted support and justice-oriented climate policies. The conceptual framework of climate vulnerability, comprising exposure, sensitivity, and adaptive capacity, reveals that Namibia is particularly susceptible to climate impacts, with frequent droughts posing severe threats to agriculture, water supply, and food security. Rural populations, marginalised groups, and women are those most disproportionately affected. Namibia's position in global climate negotiations, as articulated in its position to COP 28, calls for increased and more equitably distributed climate finance, which is critical for adaptation. The country advocates for a balanced allocation of climate finance, with a strong emphasis on grant-based support for adaptation to enhance resilience and reduce vulnerability. However, climate finance alone will not solve the bigger problem as there is a need for structural changes to address the root causes of climate change—structural changes that are embedded in enforcement of emissions reductions and wider economic transformation. More so, mitigation efforts must be ambitious, with developed countries leading the charge in line with their historical responsibilities. The global commitment to keeping temperature increases well below 1.5 degrees Celsius requires rapid and substantial reductions in GHG emissions. For this to happen, the mode of production must change. Unless this happens,

all adaptive measures may not really make a big difference. For Namibia and similar countries, even a small increase in global temperatures can lead to drastic local impacts, including intensified droughts and heat waves. Adaptation is crucial for Namibia's survival and well-being, and it requires a global goal that strengthens adaptive capacity and resilience. In conclusion, therefore, Namibia's climate vulnerability highlights the critical need for a transformative, just, and equitable global climate response.

References

Angula, M.N., & Kaundjua, M.B. (2016). The changing climate and human vulnerability in north-central Namibia: Original research. *Jamba: Journal of Disaster Risk Studies*, *8*(2), 1–7. https://doi.org/10.4102/jamba.v8i2.200

Angula, M.N., & Menjono, E. (2014). Gender, culture and climate change in rural Namibia. *Journal for Studies in Humanities and Social Sciences*, *3*(1 & 2), 225–238.

Bailey, M., Heinrich, D., & Kruczkiewicz, A. (2021). *Climate profiles of countries in southern Africa: Namibia*. Red Cross Red Crescent Climate Centre. https://www.climatecentre.org/wp-content/uploads/Climate-Profiles-of-Countries-in-Southern-Africa-Namibia.pdf

Beck, U. (1992, July). *Risk society: Towards a new modernity*. Sage.

Brooks, N. (2003, January). *Vulnerability, risk and adaptation: A conceptual framework* [Working Paper 38]. Tyndall Centre for Climate Change Research. https://www.researchgate.net/publication/200032746_Vulnerability_Risk_and_Adaptation_A_Conceptual_Framework

Chen, C., Noble, I., Hellman, J., Coffee, J., Murillo, M., & Chawla, N. (2023, January 30). *University of Notre Dame global adaptation initiative: Country index technical report*. University of Notre Dame. https://gain.nd.edu/assets/522870/nd_gain_countryindextechreport_2023_01.pdf

The Commonwealth. (2023, May 16). *Case Study: Building capacity for sustainable access to climate finance – A case of Namibia's readiness for Green Climate Fund*. https://thecommonwealth.org/case-study/case-study-building-capacity-sustainable-access-climate-finance-case-namibias-readiness

"Drought to cost Govt over N$1 billion". (2024, July 16). *New Era*. https://neweralive.na/drought-to-cost-govt-over-n1-billion/

Eckstein, D., Künzel, V., & Schäfer, L. (2021). *Global climate risk index 2021: Who suffers most from extreme weather events? Weather-related*

loss events in 2019 and 2000-2019. Germanwatch e.V. https://reliefweb.int/report/world/global-climate-risk-index-2021

FAO. (2019, October 9). *GIEWS – Global information and early warning system: Country briefs Namibia*. https://www.fao.org/giews/countrybrief/country.jsp?code=NAM

Fraser, N. (2003). Social justice in the age of identity politics: Redistribution, recognition and participation. In A. Honneth, & N. Fraser, *Redistribution or recognition: A Political-philosophical exchange*. Verso.

Ge, M., Friedrich, J., & Vigna, L. (2020, February 6). *4 charts explain greenhouse gas emissions by countries and sectors*. World Resources Institute. https://www.wri.org/insights/4-charts-explain-greenhouse-gas-emissions-countries-and-sectors

Global Facility for Disaster Reduction and Recovery. (2020). ThinkHazard—Namibia. https://thinkhazard.org/en/report/172-namibia/

"Govt spends N$131m on drought relief". (2019, October 4). *New Era*. https://reliefweb.int/report/namibia/govt-spends-n131m-drought-relief

Hipondoka, M., & Hamunyela, E. (2024). *Risks Profile of Natural Hazards and Selected Diseases in Namibia*. The Risk Profiling Project. https://repository.unam.edu.na/items/1d4d460e-33ac-44bc-8e9d-88a7a7ee0207

Integrated Food Security Phase Classification. (2024, September). *Namibia: IPC acute food insecurity analysis July 2024 — June 2025*. https://www.ipcinfo.org/fileadmin/user_upload/ipcinfo/docs/IPC_Namibia_Acute_Food_Insecurity_Jul2024_Jun2025_report%20(1).pdf

IPCC. (2001). *Climate change 2001: The scientific basis*. Cambridge University Press. https://www.ipcc.ch/site/assets/uploads/2018/03/WGI_TAR_full_report.pdf

Liu, X., & Zhou, J. (2021). Assessment of the continuous extreme drought events in Namibia during the last decade. *Water*, *13*(20), 2492. https://doi.org/10.3390/w13202942

Mapani, B.S., Shikangalah, R.N., & Mwetulundila, A.L. (2023, January). A review on water security and management under climate change conditions, Windhoek, Namibia. *Journal of African Earth Sciences*, *197*, 104749. https://doi.org/10.1016/j.jafrearsci.2022.104749

Matthys, D. (2024, May 27). Namibia declares state of emergency over drought. *The Namibian*. https://www.namibian.com.na/namibia-declares-state-of-emergency-over-drought/

MAWLR. (2024). *Crop Prospects, Food Security and Drought Situation Report.* MAWLR.

Nakanyete, N.F., Shikangalah, R., & Vatuva, A. (2020, March). Drought as a disaster in the Namibian context. *International Journal of Science and Research (IJSR)*, *9*(3), 377–386. http://dx.doi.org/10.21275/SR20223012241

Nakhooda, S., & Norman, M. (2014, December). *Climate finance: Is it making a difference? A review of the effectiveness of multilateral climate funds*. Overseas Development Institute. https://weadapt.org/wp-content/uploads/2023/05/odi_is_climate_finance_making_a_difference.pdf

Namibia Economist. (2024, January 11). *Meteorological services expect below average rainfall across most regions*. https://economist.com.na/85208/agriculture/meteorological-services-expect-below-average-rainfall-across-most-regions/

Namibia Statistics Agency. (2018). *Namibia household income and expenditure survey: 2015/2016 report*. Republic of Namibia. https://cms.my.na/assets/documents/NHIES_2015-16.pdf

Namibia Statistics Agency. (2019). *The Namibia labour force survey 2018 report*. Republic of Namibia.

Namibia Statistics Agency. (2021). *Namibia multidimensional poverty index report 2021*. Republic of Namibia. https://www.npc.gov.na/wp-content/uploads/2022/09/Namibia_Multidimensional_Poverty_Index_MPI_Report_2021.pdf

Namibian Constitution. (1990). Government Gazette 2.

New, M., & Bosworth, B. (2018, October 9). *What global warming of 1.5°C and higher means for Botswana and Namibia*. Climate and Development Knowledge Network. https://cdkn.org/story/opinion-what-global-warming-of-1-5-%25e2%2584%2583-and-higher-means-for-botswana-and-namibia

Olwage, E., & Nghitevelekwa, R. (2023). *Living with drought and climate change in Namibia*. GIZ Namibia.

Petersen, S. (2024, April 23). Ministry wants drought declared national emergency. *The Namibian*. https://www.namibian.com.na/ministry-wants-drought-declared-national-emergency/

Porter, L., Rickards, L., Verlie, B., Bosomworth, K., Moloney, S., Lay, B., Latham, B., Anguelovski, I., & Pellow, D. (2020, April 30). Climate Justice in a Climate Changed World. *Planning Theory & Practice*, *21*(2), 293–321. https://doi.org/10.1080/14649357.2020.1748959

Poynting, M.. (2024, November 7). *This year set to be first to breach 1.5C global warming limit*. BBC.

https://www.bbc.com/news/articles/c1dpnxnvv2go

Reid, H., Sahlén, L., MacGregor, J., & Stage, J. (2007). *The economic impact of climate change in Namibia: How climate change will affect the contribution of Namibia's natural resources to its economy* [Discussion Paper 07-02]. International Institute for Environment and Development.

Republic of Namibia. (2011). *National policy on climate change for Namibia - 2011*. Ministry of Environment and Tourism. https://www.meft.gov.na/files/files/National%20Policy%20on%20Climate%20Change%20for%20Namibia%202011(1).pdf

Republic of Namibia. (2020, March). *Fourth national communication to the United Nations Framework Convention on Climate Change*. Ministry of Environment and Tourism. https://www4.unfccc.int/sites/SubmissionsStaging/NationalReports/Documents/5823401_Namibia-NC4-1-Namibia%20-%20NC4%20-%20Final%20signed.pdf

Republic of Namibia. (2021). *First adaptation communication: Namibia's climate change adaptation communication to the UNFCCC*. MEFT. https://unfccc.int/sites/default/files/resource/namibia-adaptation-communication-to-the-unfccc.pdf

Republic of Namibia. (2023a). *Namibia's climate change position paper to the COP 28*. MEFT. https://cop.nipdb.com/wp-content/uploads/2023/11/Namibia_COP_28_Position-_15_11_2023.pdf

Republic of Namibia. (2023b). *Namibia's Nationally Determined Contribution (second update)*. MEFT. https://unfccc.int/sites/default/files/NDC/2024-01/FINAL%20UPDATED%20NAMIBIA%20NDC%202023.pdf

Republic of Namibia. (2024, August 26). *Update on the culling of wild-animals as a result of drought and fatal report involving elephant*. MEFT. https://www.meft.gov.na/files/files/Culling%20of%20Wild-animals%20as%20a%20Result%20of%20Drought.pdf

Salazar, V.A. (2019, July). *Addressing issues in climate adaptation finance through the lens of climate justice: The case of the Green Climate Fund (GCF)* [Research Paper for the Doctoral Program in Asia-Pacific Studies, National Chengchi University]. https://www.academia.edu/39815224/Addressing_issues_in_climate_adaptation_finance_through_the_lens_of_climate_justice_The_case_of_the_Green_Climate_Fund_GCF

Schlosberg, D. (2012, December 21). Climate justice and capabilities: A framework for adaptation policy. *Ethics & International Affairs*, *26*(4), 445–461. Cambridge University Press. https://doi.org/10.1017/S0892679412000615

Sherbourne, R. (2022). *Namibia's green transition: A summary of the issues* [Special Briefing Report]. Democracy Report (IPPR). https://ippr.org.na/wp-content/uploads/2022/12/Namibias-Green-Transition-web.pdf

Spear, D., Zaroug, M., Daron, J., Ziervogel, G., Angula, M., Haimbili, E., Hegga, S., Baudoin, M.-A., New, M., Kunamwene, I., Togarepi, C., & Davies, J. (2018). *Vulnerability and responses to climate change in drylands: the case of Namibia*. International Development Research Centre (IDRC). http://hdl.handle.net/10625/58630

Sultana, F. (2022). Critical climate justice. *The Geographical Journal*, *188*(1), 118–124. https://doi.org/10.1111/geoj.12417

Terry, G. (2009). No climate justice without gender justice: An overview of the issues. *Gender & Development*, *17*(1), 5–18. https://doi.org/10.1080/13552070802696839

Thomson, G. (2021). *Climate change in Namibia Part 2: Current and projected changes*. Conservation Namibia. https://conservationnamibia.com/blog/b2021-climate-change-pt2.php

UNFCCC. (2024, November 24). *This new finance goal is an insurance policy for humanity*. https://unfccc.int/cop29United Nations. (2015). *Paris Agreement*. https://unfccc.int/sites/default/files/english_paris_agreement.pdf

United Nations Climate Change. (n.d.). *The Paris Agreement. What is the Paris Agreement?*. https://unfccc.int/process-and-meetings/the-paris-agreement

Friedrich, J., Ge, M., Pickens, A., & Vigna, L. (2023, February 3). *The Top 10 GHG Emitters Contribute Over Two-Thirds of Global Emissions*. https://www.wri.org/insights/interactive-chart-shows-changes-worlds-top-10-emitters

UN Women. (2024a, November 18). *COP29: What is at stake for gender equality as the second week of negotiations starts*. UN Women – Headquarters. https://www.unwomen.org/en/news-stories/news/2024/11/cop29-what-is-at-stake-for-gender-equality-as-the-second-week-of-negotiation-starts

UN Women. (2024b, November 26). *COP29 decisions deliver gains for gender equality in climate action, but more remains to be done*. UN Women. https://www.unwomen.

org/en/news-stories/news/2024/11/cop29-decisions-deliver-gains-for-gender-equality-in-climate-action-but-more-remains-to-be-done

UNFCCC. (2024, November 24). *This new finance goal is an insurance policy for humanity*. https://unfccc.int/cop29

Vigna, L., & Friedrich, J. (2023, August 5). *9 Charts Explain Per Capita Greenhouse Gas Emissions by Country*. https://www.wri.org/insights/charts-explain-per-capita-greenhouse-gas-emissions

World Bank. (2021). Climate Change Knowledge Portal: Namibia. https://climateknowledgeportal.worldbank.org/

Xinhua. (2024, January 14). *Namibia faces below-normal rainfall for early 2024*. News Ghana. https://newsghana.com.gh/namibia-faces-below-normal-rainfall-for-early-2024/

The Impacts of Climate Change on the Livelihoods of Rural Women: A Case Study from Onalusheshete District, Namibia

Emma N. Nangolo

Abstract:

Many rural women depend on natural resources for their livelihoods, which climate change disrupts, affecting food security, water availability, and income opportunities. This paper presents findings from a phenomenological study in Onalusheshete District, Oshikoto Region, focusing on how climate change affects these women. Utilising primary data from survey research and focus group discussions, the study explored rural women's experiences with changing environmental conditions. Employing the Climate Vulnerability and Capacity Analysis (CVCA) framework, the research identified perceptions and impacts on their livelihoods. The findings underscore significant disruptions induced by climate change, including alterations in physical geography, loss of biodiversity, decreased water availability, reduced agricultural yield, heightened food insecurity, and migration for greener pastures. The paper concludes with recommendations for empowering rural women to respond and adapt to climate change, emphasising the importance of gender-sensitive approaches in addressing the complex challenges faced by rural communities.

Keywords: Climate change; impacts; livelihoods; rural women; gender; Namibia

Introduction

Rural women are primarily responsible for agricultural activities such as crop cultivation, which contribute significantly to rural livelihoods. This reliance on natural resources makes them vulnerable to climate change, which disrupts ecosystems, affects water availability, and intensifies extreme weather events. The natural resource base is increasingly vulnerable to the impacts of climate change. According to Maunganidze (2022), communities that are dependent on local resources face heightened risks from climate variability, including altered rainfall patterns, reduced agricultural productivity, and environmental degradation. Rural women also manage home resources, including food, water, and energy, differently to men, as they bear a disproportionate burden

from climate change. For example, drought, floods, irregular rainfall and increased temperatures compel them to labour harder to safeguard household resources (CARE International, 2019). Fluctuations in rainfall directly impact women's ability to ensure food security and sustain household livelihoods. As noted by Angula (2010), Cassidy (2022) and Maunganidze (2022), women often shoulder the emotional and physical burden of coping with climatic impacts, while managing household needs and securing food supplies.

Gender inequalities heighten women's vulnerability to climate change, perpetuating poverty and marginalisation. Women constitute over 70% of the world's poor (UN Women, 2022), due to disparities in access to resources, education, and economic opportunities (CARE International, 2019; Cassidy, 2022). Women are often overlooked in resource conflicts and face barriers in decision-making, credit access, land ownership, and income generation. Despite evidence linking gender dynamics to climate change impacts, gender issues have historically received limited attention in climate policy, negatively affecting sustainable development efforts.

Climate change adaptation is crucial for vulnerable areas and communities. Literature (Awala et al., 2019; Angula & Menjono, 2014; Cassidy, 2022; Sibanda, 2022) indicates that impacts and adaptation strategies are gendered, affecting men and women differently. Adaptation depends on access to natural, social, physical, political, and financial resources. In Namibia, rural women have limited access to these resources and lack empowerment to mitigate climate change impacts (Mendelsohn et al., 2000). Factors like personal wealth, technology, information access, and social status are crucial for adaptation, but many rural women still face significant barriers to these resources (Sibanda, 2022).

Namibia is semi-arid, characterised by low and erratic rainfall (250 mm annually), extreme heat, and a high evapotranspiration rate (Mendelsohn et al., 2000). Most rain falls from November to April, primarily in the northern regions where crop cultivation occurs (Awala et al., 2019). Climate change affects rainfall patterns, seasonality, and precipitation levels, impacting water resources, agriculture, ecosystems, and socioeconomic conditions. With 50.5% of its population in rural areas and heavily reliant on agriculture, Namibia is highly vulnerable to climate change. Women represent over 60% of this rural population (Namibia Statistics Agency, 2024). The country's susceptibility to drought makes it one of the most vulnerable to climate impacts in sub-Saharan Africa.

Namibia's rural communities, being reliant on subsistence and dryland farming, are particularly vulnerable to climate change and face risks in food security, water access, and agricultural productivity. Women in these areas are crucial to agricultural production and household management, yet are often overlooked in climate change discussions and policy formulation. This study addresses this gap by examining the impacts of climate change on rural women's livelihoods in Onalusheshete District, Oshikoto Region. It explores how environmental changes affect their economic activities, social roles, and well-being, using phenomenological methods to capture their lived experiences and strategies.

Gender, rural livelihoods and climate change

Gender, rural livelihoods, and climate change are interconnected, significantly impacting rural communities. Gender roles are shaped by cultural norms and societal expectations, and create inequalities between men and women. According to Cassidy (2022), gender relations refer to the power dynamics that are socially formed within a community between men and women. The manner in which men and women engage with the environment is influenced by these gender relations, which in turn affects how they are respectively affected by climate change. This includes the roles they assume and the division of labour based on gender norms. Their coping and adaptive capacities to respond to impacts of climate change and related challenges are also different.

In Namibia's diverse society, roles and responsibilities for men and women vary by race or tribe (UNDP, 2012). Gender behaviours, household duties, and decision-making power are strongly influenced by descent patterns. However, studies reveal that decision-making authority is predominantly held by men, reflecting a patriarchal structure common across ethnic groups (Gender and Development Network, 2018; Namupala et al., 2021; Von Wietersheim, 2021). Men typically perform primary roles of governance, household decision-making, and community leadership, while women often have limited influence. Despite this inequality, urban women tend to be better educated, and with that, more empowered than their rural counterparts.

The relationship between gender and rural livelihoods underscores the multifaceted challenges faced by individuals and communities, especially amid climate change. Gender roles and norms profoundly influence how men and women interact with natural resources, engage in agriculture, and adapt to socioeconomic changes. Literature shows that gender influences

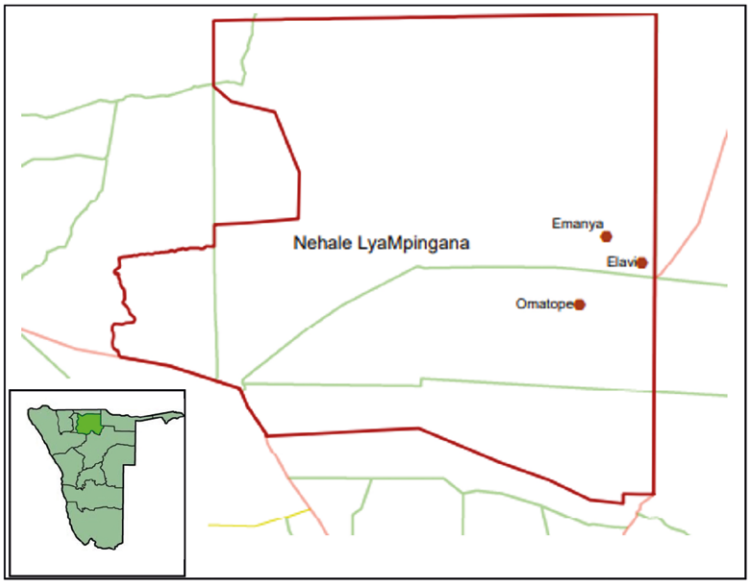
vulnerability to climate change and its effects on livelihoods (Angula, 2010; Angula & Menjono, 2012; Mutenje et al., 2019; Meinzen-Dick et al., 2011; Mavisakalyan & Tarverdi, 2019). Men and women experience and respond to climate change differently, due to the inequality between their respective roles. Addressing gender dynamics is crucial for effective climate change adaptation and mitigation strategies. This paper explores the complex interplay between gender, livelihoods, and climate change, aiming to inform more inclusive policies. It underscores the need for gender-sensitive approaches in adaptation strategies, promoting women's leadership in environmental management, and fostering equitable access to resources and opportunities.

Research Methodology

Research location

This study was conducted in three neighbouring villages in Namibia's Oshikoto Region, namely Omatope, Elavi, and Emanya, which all fall under the Nehale LyaMpingana Constituency of the Onalusheshete District, and the Ondonga Traditional Authority, as indicated in Figure 1 below. Onalusheshete District, like the rest of the constituency, is remote and predominantly rural. According to the village headmasters, the total numbers of houses in the selected villages, at the time of this research, were: Omatope (56), Elavi (113), and Emanya (107).

Figure 1 *Location of the research site (study villages) in Onalusheshete District*



Data collection

CVCA employs both quantitative and qualitative methodologies for data collection. Quantitative methods include surveys, household assessments, and statistical analyses of climate data and demographic trends, which quantify vulnerability indicators like exposure to hazards, economic losses, and food insecurity. Qualitative methods include focus group discussions, participatory mapping, key informant interviews, survey research respondents, and storytelling sessions, offering insights into social, cultural, and gender dimensions of vulnerability. These methods reveal local knowledge, perceptions, and adaptive strategies, enriching understanding of climate change impacts. Participatory approaches are crucial; engaging local communities and stakeholders to ensure assessments reflect diverse perspectives and local realities. This engagement enhances data accuracy and relevance, empowers communities, and supports effective adaptation and resilience-building (Blom, 2016).

The study, conducted between August and November 2023, utilised a mixed-methods approach to gather primary data at village levels. A phenomenological approach was used to collect both quantitative and qualitative data to deconstruct the participants lived experiences and perceptions of climate change and its impacts on their livelihoods. Phenomenology, as described by Englander (2012), focuses on understanding human experiences, making it ideal for exploring how individuals subjectively experience climate change. The study combined survey research and focus group discussions with rural women, with village headmasters' consent obtained for research access. Data collection and analysis were guided by the CVCA framework, supplemented by a literature review.

Survey research

Survey research, a method of data collection that involves systematically gathering information from a sample of individuals or entities through the use of standardised questions or instruments, was employed.

The responses of 197 women, representing 70% of total households in each of the three selected villages, were gathered with the aim of acquiring comprehensive and in-depth information on their perceptions and the impacts of climate change on their lives and livelihood patterns. Participating households were chosen using a systematic random selection method, as espoused by Blom (2016).

The main instrument used in the survey research was a pretested structured questionnaire with

carefully crafted questions designed to gather specific information. This questionnaire included questions about the sociodemographic profiles of respondents, their understanding and perceptions concerning the causes and effects of climate change, and the impacts of climate change on livelihoods. The questionnaire was targeted at female household heads, and wives or female companions in cases of male-headed households. It was originally written in English and then translated into Oshiwambo, the most commonly spoken language in Onalusheshete District. This process facilitated systematic collection of both quantitative and qualitative data, to comprehensively grasp how rural women perceive and are impacted by climate change on individual and household levels.

Focus group discussions

Focus group discussions (FGDs) provided a platform for participants to share their observations, experiences, perspectives, and insights in a more open-ended and interactive setting. The main aim of the FGDs was to corroborate the information obtained from survey research interviews with village members. To ensure that the perspectives were as representative as possible of the women from those villages, the FGDs targeted women who live in those villages on a fulltime basis, and whose livelihoods are thus directly impacted by climate change.

By adopting a phenomenological approach and utilising a combination of quantitative and qualitative methods, the study aimed to grasp the rural women's way of life, and to provide a comprehensive understanding of how climate change impacts the livelihoods of rural women. This methodology allowed for the exploration of both objective themes and subjective experiences, contributing to a richer and more nuanced understanding of the research topic.

The Climate Vulnerability and Capacity Analysis Framework

The CVCA framework assesses the impacts of climate change on vulnerable communities and their capacity to adapt (CARE International, 2019). It evaluates vulnerability through stakeholder perceptions, current conditions, dangers, and trends, emphasising multi-stakeholder analysis and dialogue. The framework highlights gender as a key factor in vulnerability, recognising that climate impacts vary by gender due to social norms and inequalities. Integrating gender analysis is crucial for a thorough assessment, involving gender-sensitive data collection, impact analysis, and equitable adaptation strategies. The framework includes components for information gathering,

analysis, and addressing of cross-cutting issues like gender equality, ecosystems, and governance.

In the CVCA framework, cross-cutting issues are key themes that impact vulnerability and adaptation across sectors. Gender equality is central, as it is recognised that gender norms and roles shape how women and men experience and respond to climate change. Social inclusion addresses the compounded vulnerabilities faced by marginalised groups, including indigenous peoples, ethnic minorities, and LGBTQ+ communities, due to socioeconomic inequalities and discrimination. Effective governance and institutional frameworks are essential for climate adaptation and resilience. CVCA also considers how poverty exacerbates vulnerability by limiting resources and adaptive capacities. Additionally, technology and innovation play a crucial role in building resilience, with CVCA examining how advancements like climate-resilient infrastructure and early warning systems support adaptation efforts.

Results and Discussion

This section presents the study's findings and discussions, divided in two main sections. The first section describes socioeconomic and demographic characteristics of the respondents in the study area. The second presents a critical assessment of the rural women's perceptions of climate change and its impacts on their livelihoods.

Socioeconomic and demographic characteristics of the respondents

All 197 participants in the survey research interviews were rural women. The age distributions across the sampled villages show that respondents between 41 and 50 years old were the largest demographic component in all three villages (Omatope: 51%; Elavi: 40%; Emanya: 44%), followed by those between 51 and 60 years old (Omatope: 30%; Elavi: 26%; Emanya: 28%). Respondents aged 21 to 30 were the fewest in number (Omatope: 4%; Elavi: 6%; Emanya: 2%). This could be linked to urbanisation trends that contribute to an increase in elderly female-headed households. Some respondents were over 60 (Omatope: 3%; Elavi: 18%; Emanya: 12%). The respondents' marital status followed a similar pattern in all three villages, with the largest group being single (Omatope: 56%; Elavi: 43%; Emanya: 58%), followed by those who were married (Omatope: 36%; Elavi: 38%; Emanya: 32%), widowed (Omatope: 6%; Elavi: 13%; Emanya: 10%) and finally, divorced (Omatope: 2%; Elavi: 6%; Emanya: 0%).

The education level of the women in all three villages was quite low, with the largest group having completed only primary school (Omatope: 58%;

Elavi: 40%; Emanya: 63%). Many had no formal schooling (Omatope: 28%; Elavi: 32%; Emanya: 21%), while a few had completed secondary education (Omatope: 9%; Elavi: 19%; Emanya: 9%), and only a small proportion had completed tertiary education (Omatope: 5%; Elavi: 9%; Emanya: 7%). It may be inferred that the lack of education is a serious impediment to improved life circumstances and a better standard of living. In terms of income, nearly half (46%) of respondents from Omatope village reported earning less than N$1 000 per month. The majority of respondents in Elavi and Emanya were earning more than N$1 000 per month, but still less than N$2 500. The highest monthly income recorded in Omatope was more than N$10 000 per month, whereas in Elavi and Emanya, 2% and 1% of respondents received monthly income in excess of N$15 000, respectively. Table 1 provides a comprehensive overview of the income earned by women in the study area. In all three villages, the individuals identified with high income are retired civil servants who were also actively involved in various community activities. Clearly, women in all three villages have extremely low monetary incomes, corresponding to their low levels of education.

Table 1 *Overview of the monthly income earned by women in the study area*

Monthly income (N$)	**Omatope (N = 39)**	**Elavi (N = 79)**	**Emanya (N = 75)**
	(%)	**(%)**	**(%)**
Less than 1 000	46	18	19
1 001–2 500	30	36	38
2 501–5 000	16	29	30
5 001–10 000	5	9	8
10 001–15 000	3	6	4
More than 15 000	0	2	1
Total	100	100	100

The study area is mainly occupied by subsistence farmers who earn their livelihoods mainly from crop production and livestock farming (Omatope: 89%; Elavi: 65%; Emanya: 71%). It is thus not surprising that only few respondents were formally employed (Omatope: 0%; Elavi: 3%; Emanya: 2%). Land tenure in the study area is communal. According to Mendelsohn et al. (2000), under the communal land tenure system, communities are expected to share natural resources such as rangeland and water for both household and livestock consumption. However, each household is allocated its own piece of land for crop cultivation. Agriculture is rated as the primary

occupation for most women in all three villages. They play crucial roles in food production, contributing significantly to the livelihoods of their families and communities. This affirms the work of Angula (2010), who pointed out that livelihoods in rural Namibia are often closely tied to the natural resources of the area. Crops such as maize, millet, sorghum, and vegetables are grown for subsistence use and small-scale trading.

In Omatope (11%), Elavi (32%), and Emanya (27%), women engage in various trade activities, primarily selling surplus agricultural produce to contribute to their households' income. Small businesses such as shops and transport services play key roles in local commerce. In addition to the seasonal selling of agricultural surplus to nearby towns such as Tsumeb and Omuthiya, common businesses include convenience stores, locally known as "cuca shops", vetkoek ("fat cake") frying, and second-hand clothing sales. These activities boost the local economy, provide employment, and support families by funding essentials like food, medicine, and education. Women's financial contributions reflect their commitment to family welfare and community economic advancement.

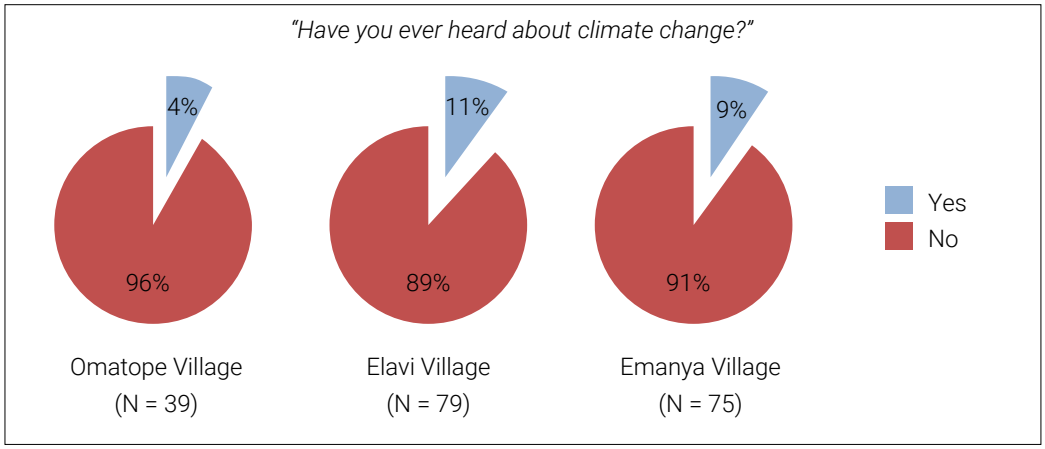
A few women in the study area are employed in government roles such as teachers and healthcare providers (Omatope: 0%; Elavi: 3%; Emanya: 2%). Their work supports their livelihoods and enhances local education and healthcare services, playing a key role in community development and well-being.

It is crucial to emphasise that in rural areas, livelihoods frequently intersect and complement each other, as households strategically diversify their income sources to manage risks and leverage seasonal opportunities. This diversification strategy involves engaging in multiple economic activities that are interconnected and mutually supportive within the local community. By diversifying income streams, rural families not only safeguard themselves against potential economic downturns or crop failures but also maximise their earnings during peak seasons. This approach underscores the adaptive resilience of rural livelihoods, ensuring sustainability and relative prosperity amid varying environmental and economic conditions.

Rural women's perception of climate change

Perception studies are qualitative in character (Blom, 2016). In interviews, survey research respondents were asked if they had ever heard about climate change. Figure 2 displays the distribution of their responses.

Figure 2 *Rural women's perception of climate change*



In all three villages, over 90% of survey research respondents had limited understanding of climate change and its driving forces. Those who reported being aware of climate change were mostly retired civil servants, individuals with higher educational backgrounds, and those who frequently travel to towns. Their wider access to information and varied experiences beyond their village settings clearly enhanced their perceptions regarding climate change. Those who remained more isolated or had limited access to external sources of information were less informed about climate change. This pattern suggests that awareness of climate change is associated with better access to information and more opportunities for exposure. This finding supports Sibanda (2022), who noted that personal wealth, technology, information access, and social status are essential for adaptation; and that many rural women continue to face significant barriers to these resources.

Nevertheless, despite the majority of respondents having limited understanding of climate change, they still held strong negative views of the challenges it presents to their livelihoods. At Omatope and Emanya, they blamed their lack of knowledge about climate change on the remoteness of their villages, claiming that information is difficult to access. As one survey research respondent from Emanya put it: "Living in a remote village like ours poses unique challenges when it comes to accessing information" (SR EM24). During the period of fieldwork for this study, all three villages had limited access to climate change information. The lack of electricity in the area prevented

residents from watching television, while the absence of newspapers and the sporadic nature of radio reception further constrained their access to information. This overall scarcity of information can be attributed to the area having inadequate infrastructure, educational opportunities and modern communication channels, all of which are critical for effective information dissemination of climate change knowledge. As pointed out above, while the general lack of information was widespread, certain individuals had advantages due to their educational background and access to external sources, which influenced their awareness and opinions about the challenges climate change poses to their livelihoods.

Respondents' conventional knowledge and observation of weather and climatic trends have aided them in forming opinions and impressions about what is going on around them. They described noticeable changes in the physical geography of their villages, including the disappearance of certain fauna and flora, the loss of biodiversity essential for sustaining local livelihoods, shifts in temperature and rainfall patterns, and recurring droughts. Their attempts to describe climate change included the following responses:

> *"Climate change is lack of rainfall." (SR EL14)*

> *"Climate change is frequent droughts and dying of livestock." (SR EL61)*

> *"Climate change is depletion of boreholes water sources." (SR O38)*

> *"Climate change is temperatures and droughts." (SR EM34)*

> *"Climate change is disappearance of wild fruits." (SR EM50)*

These responses demonstrate that, despite having never heard of the notion of climate change, many rural women were aware of the significant changes occurring in their surroundings.

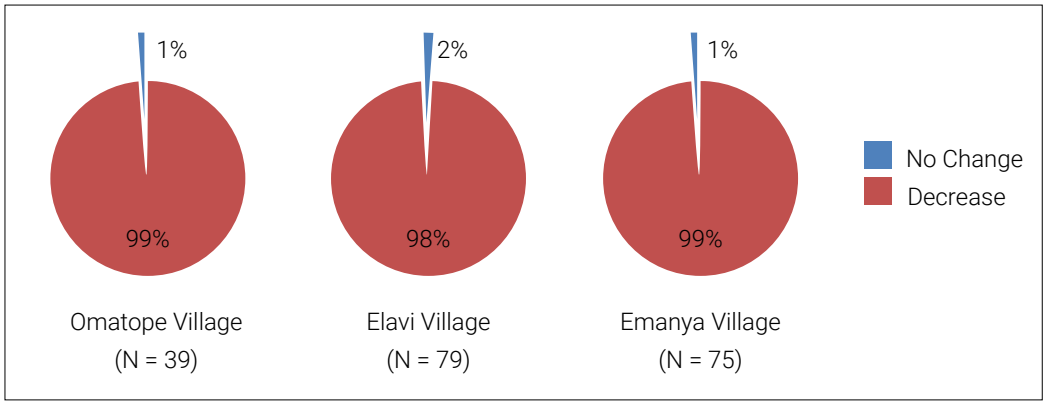
During the FGDs, some youths from Omatope and Elavi mentioned learning about climate change in school, while most adult and elderly women were unaware of it. However, all participants agreed that their villages were experiencing changing physical and climate conditions. The elderly attributed these changes to religious beliefs: "God is punishing us for our sins, such as crime, rape, and immorality:

> *"He is closing the tap of heaven because He wants us to repent and obey His commandments." (FGD O05).*

Changes in rainfall patterns

Survey respondents and FGDs across all three villages noted significant changes in rainfall patterns in recent years. Two main changes were emphasised: a substantial decrease in rainfall, and increased unpredictability in rainfall patterns. This unpredictability has altered seasons and fieldwork timing, making agricultural production a high-risk undertaking that is difficult to plan. Participants were asked to describe rainfall patterns as increasing, decreasing, or unchanged. Figure 3 below shows the distribution of replies.

Figure 3 *Perceived changes in rainfall patterns*



Some of the narratives describing the impacts of changes in rainfall are captured below. The overall impression among the participants in both the interviews and FGDs was that the decline in rainfall levels observed over time has had a negative impact on their livelihoods.

> *"A decrease in rainfall has led to water scarcity in our village. Our boreholes do not hold water for a long time anymore. In the past, the boreholes never dried up. This situation has affected various aspects of our lives. Now we sometimes have to walk long distances to collect water from the government water pump which has salty water meant for livestock. We now have no other alternatives but to also drink and cook with salty water. To make matters worse, for using the government water pump, we are required to give money to the designated person as a contribution towards the pump's maintenance." (SR EM11)*

> *"Due to a decrease in rainfall, our fields can no longer produce enough crops. It has been three consecutive years of crop failure now. Crop failures and reduced*

agricultural output have an impact on household income and food security. We used to sell some of the agricultural output, but now we cannot. What is harvested is not even enough to last the family until the next harvest season. From the selling, one could get money to buy school uniforms for the children and other household needs. This year we relied on my pension to buy food and other household items." (SR EL40)

"Since our area does not receive enough rainfall anymore, our community borehole dried up two years ago. It was where we fetched water for drinking, cooking, washing and for our home garden. We now have to travel for up to 5km to get water. We utilise donkeys to transport the water containers for us. Children are incredibly helpful; they ensure that the donkeys get home. However, when the children are in school and there is no water at home, I must go fetch it myself." (SR O13)

"Our climate has become unfriendly for crop farming, mainly because of high temperatures, low rainfall and its irregular, unreliable nature. Now, each year is a year of hunger." (SR EL34)

"In previous years, we began working the field in late November, and by Christmas, the fields and surrounding areas were lush and green, and pans would be filled with rainwater. But now, even January is dry, and we can only begin fieldwork in February. By then, the children are back in school without helping with field cultivation. In the end, I must work the field alone, sometimes in extremely hot temperatures, which affects my health. My husband avoids fieldwork. He leaves in the morning and returns around lunch time." (FGD EL07)

"… even when it finally rains in February, crops may not receive enough water due to low rainfall or uneven distribution." (FGD EL08)

"Nothing is predictable anymore. For example, one does not any longer know when winter or summer is to begin or to end. In the same way, it is now difficult to predict when the rainy season will come, if it is coming at all. " SR O25)

"Maize and beans are also staple crops in our area, but they are also being impacted by climate change. Maize requires a steady water supply throughout its growing season, however due to rainfall and temperature fluctuations, productivity has decreased significantly. Beans have a relatively short growing season, but when the rain comes late or withdraws early, the output is affected." (SR O34)

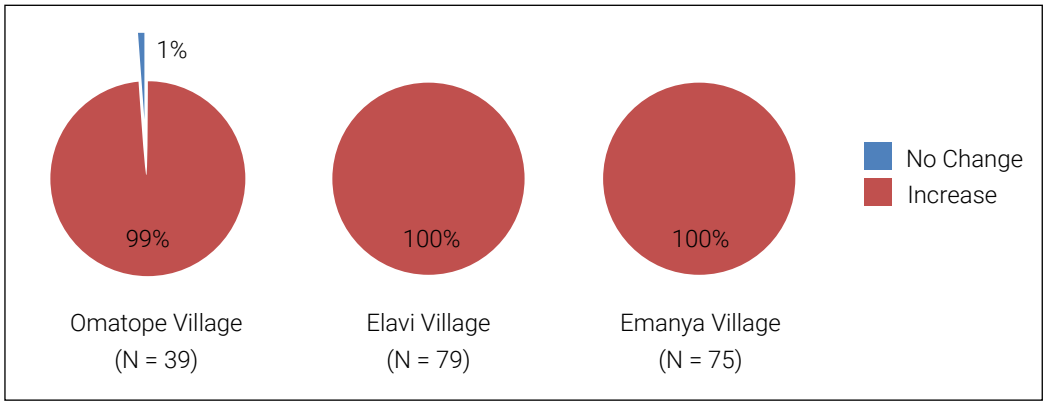
As may be gathered from the accounts above, changes in rainfall

patterns and water availability caused by climate change have increased the burden on rural women. As can be seen under the socioeconomic profile of the respondents, the majority of rural women in the study area rely predominantly on agriculture for their sustenance and income. Dependence on rainfed agriculture renders rural communities particularly vulnerable to decreased and erratic rainfall (Angula, 2010).

Changes in temperature patterns

Survey research respondents in all three villages revealed that rural women have observed an increase in temperatures in recent years. This insight was also confirmed in the FGDs. Respondents in the interviews were requested to select one of three options regarding temperature trends in their villages: increasing, decreasing, or not changing. Figure 4 shows the distribution of responses.

Figure 4 *Perceived changes in temperature patterns*



The findings reflect a uniform perception of rising temperatures across all three villages. Although Omatope showed a slight discrepancy, with 1% of respondents reporting no change in temperature, this minor deviation is considered insignificant compared to the overall consensus. The overwhelming agreement across the majority of respondents underscores a strong awareness of how local weather patterns are changing.

Below are some narratives from the interviews and FGDs. Respondents described how temperature shifts directly impact their agricultural activities, household chores, and livelihoods. Women linked rising temperatures to several challenges: disrupted agricultural calendars, recurring droughts, food insecurity, altered crop cycles, lower yields, changing precipitation patterns, increased pests, higher livestock

mortality, reduced income, deepening poverty, and migration. These factors significantly affect women's livelihoods, highlighting how temperature changes intensify existing socio-economic vulnerabilities.

> *"There is no doubt; high temperatures have reduced our crop yields. They have also affected our livestock health. The result is decreased agricultural productivity." (SR EL06)*

> *"I am responsible for my daughter's tuition fees at NUST. I am not employed; I just rely on my cattle. My plan was to sell one cow each year and use the proceeds for my kid's tuition fees. But now I am in a predicament because the cattle are dying every year due to drought. Last year I lost six heads to drought. I don't know if I will still be able to see my daughter through." (SR EL09)*

> *"High temperatures provoke droughts. And so in times of drought, livestock productivity suffers due to a lack of feed, milk production falls, health deteriorates, and growth rates slow. Our livestock have been dying over the past year. The land is dry, there is no fodder, and there is seemingly nothing we can do. The government does not help us. In fact, we only see them when they come here to campaign for elections." (SR O09)*

> *"As the temperature rises in our surroundings, the length of the growing season has been getting shorter. This is not good for our agricultural activities because we are not getting enough time to work the fields for a plentiful harvest." (SR O22)*

> *"High temperatures cause rapid evaporation, which means that just a small portion of the little rainfall will recharge our groundwater. This is one of the reasons why our boreholes are drying." (SR EM72)*

> *"With the warmer temperatures, our mahangu fields constantly face threats from various insect pests. Some of the pests, such as brown locusts, were seen in this area for the first time in 2022, and if left unchecked, they can devour large areas of mahangu fields and cause significant damage to crops. Some other insects have multiplied and have been causing extensive damage by feeding on the leaves and stems of mahangu, causing stunted growth." (SR EM43)*

Impacts of climate change on crop production

Through various narratives and anecdotes, women in the research area expressed the same sentiment that the impacts of climate change have a detrimental influence on crop productivity, posing challenges to food security and, by extension, to their livelihoods.

> *"All households in this village cultivate crops, and mahangu is the most common, cultivated largely for grain production for household consumption and trading." (SR EL56)*

> *"In recent years, we have seen the length of the growing season shorten as the onset of rainfall is delayed. Our agricultural production is climate-dependent, and we cannot begin field preparations until it has rained." (SR EM55)*

> *"Due to the poor and unpredictable nature of rainfall these years, there is a risk of crop failure each year. Because of this, our family has become vulnerable to poverty and hunger." (SR O18)*

Dryland crop production depends entirely on prevailing weather conditions, which are influenced by global and regional climatic systems. As in the rest of Namibia's north-central regions, mahangu is the staple food of residents of Onalusheshete District. The crop is grown under marginal soil and rainfed conditions during the summer months of November to April, without irrigation inputs (Ausiku et al., 2020). Generally, mahangu is considered to be stress-tolerant, and has a broad adaptability and high nutritional qualities compared to other cereals (Awala et al., 2019).

In the FGDs, participants explained that climate change significantly challenges the local Kantana pearl millet (mahangu) varieties, which are vital for food security and livelihoods. These varieties struggle with growth, development, yields, and quality due to sudden temperature spikes and altered rainfall patterns (Ausiku et al., 2020). Kantana mahangu has adapted to specific temperature and rainfall ranges, and deviations stress the plants, leading to reduced yields (SR EM11). Prolonged droughts have resulted in crop failure, while heavy rainfall events have led to waterlogging and soil erosion, affecting the health and productivity of mahangu fields. Women in the FGDs agreed that cultivation of all types of crops has become a trial-and-error process due to unpredictable rainfall, making planning nearly impossible. One participant in the FGDs expressed this sentiment by saying:

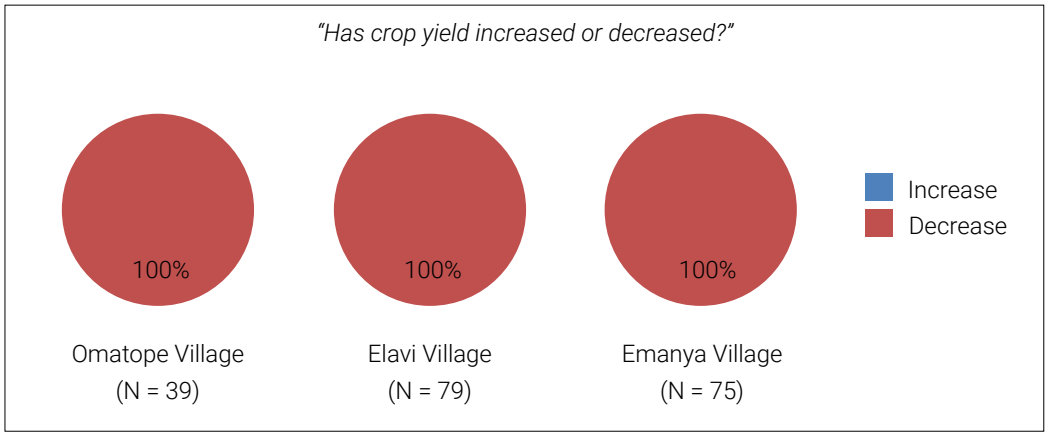
> *"Nowadays, crop production is similar to gambling. Sometimes, if you don't plant with the early rains, you might not harvest. On the other hand, early planting can result in wilted crops when the rain stops abruptly, and then those who planted late will have a good harvest. You see, it is like gambling." (FGD EL68)*

Both interviews and the FGDs revealed a dramatic increase in pest incidence across all three villages in the study. Participants noted that climate change has altered pest and disease distribution, exacerbating threats to Kantana mahangu. Warmer temperatures and changes in humidity levels can favour the proliferation of pests and pathogens, increasing the risk of infestations and disease outbreaks on crops (Ausiku et al., 2020). This can result in significant yield losses and undermine the resilience of local mahangu farming. Some participants in Omatope and Elavi FGDs indicated that unchecked pests could destroy entire fields, leaving households with no harvest.

Another aspect of climate change that directly affects crop production is the alteration and shortening of growing seasons. Increased temperatures and late rainfall result in a shorter growing season, giving crops less time to mature and develop, resulting in reduced yields.

Respondents in the interviews were asked to choose one of three possibilities regarding how crop yields are affected by climate change: increased, decreased, or unchanged. Figure 5 displays the distribution of responses.

Figure 5 *Perceived impact of climate change on crop production*



Participants from all three villages indicated that climate change has caused a decrease in crop production. This unanimous observation underscores a broad perception of negative impacts on agricultural productivity resulting from changing climate conditions (UN Women, 2022). The

consistent trend across the villages also reveals that climate change adversely affects rural women's ability to grow crops effectively. This perspective underscores the significant consequences of climate change for local agriculture, highlighting concerns about food security and the sustainability of farming practices in the face of ongoing climate change.

Impacts of climate change on the livelihoods of rural women

Rural women in the study area have a distinct view on the impacts of climate change on their livelihoods, influenced by their daily interaction with the environment and household responsibilities. Table 2 summarises the observed changes related to climate change and the corresponding impacts on rural livelihoods and on the rural women themselves.

Table 2 *Observed changes and their perceived impacts*

Observed changes	Direct impacts on livelihoods	Direct impacts on rural women
Late arrival and early withdrawal of rainfall	• Reduced agricultural crop yield • Limited pasture growth • Reduced water availability	• Women are left to care for their homes as males migrate for better grazing or employment possibilities. • Women bear the responsibility of walking long distances to collect water for domestic purposes. • Water scarcity limits the development of small-scale projects.
Higher temperatures	• Damages crops and reduces their yields and quality • Exacerbates water scarcity • Reduces livestock feed intake, affects reproduction rates, and compromises the quality of animal products like milk and meat • Contributes to forest fires, destroying timber resources, habitats, and biodiversity • Leads to drought conditions	• Higher temperatures affect rural women's income generating activities and cause food insecurity. • Higher temperatures increase women's workloads due to their roles as primary caregivers and house keepers. • Women find themselves fighting over natural resources, such as water. • They affect women's physical health and concentration, as women work mostly outdoors in the heat. For example, heat can cause fatigue and a slow work pace. • They causes income instability.

Increased incidence of drought	• Loss of land productivity, reduced crop yields and failures • Causes a shortage of water and forage for livestock, decreases their productivity, and increases their mortality rates • Reduced availability of clean water for drinking, sanitation and irrigation • Pests outbreaks • Threatens food security •	• It affects rural women's incomes and food security, as well as availability and affordability of food for the community. • It causes the loss of income for pastoralist households. • It increases competition for water resources among households. • It leads to decreased incomes. • It leads to poor hygiene and sanitation practices. • Women are left alone to care for their families as male migrate in search of food, water, and livelihood opportunities. • It increases stress level in women due to food insecurity of the family. • It causes worries and anxieties about where the next meal might come from. • It limits the development of small-scale projects.

In the FGDs, women reported increased agricultural and household labour due to frequent changes in climatic conditions and extreme weather. For instance, they sometimes need to scatter seeds multiple times because they fail to sprout after initial rain suddenly stops. Occasionally, they scatter seeds in intense heat despite the skies being cloudy. One respondent added:

> *"Scattering the seeds, again and again over the same ploughed area is wasteful. Every now and then the seeds run out, and we have to travel 130km to Omuthiya to purchase more. The one-way cost of transportation to Omuthiya is N$180." (FGD EM38)*

Undoubtedly, water is essential for maintaining sustainable livelihoods. Both the interviews and FGDs revealed that a number of water sources, mostly hand-dug boreholes, that once supplied people and animals with water have dried up. Consequently, in drought years or in years with relatively poor rainfall, women and children trek long distances to fetch water for household needs, whilst men and boys move with the livestock to areas with better grazing.

As already mentioned, many rural women in the study area rely on natural resources for their livelihoods, including income generation. They generate revenue from activities such as collecting wild spinach and

thatching grass, harvesting wild fruits, and engaging in small-scale agriculture. Interviewees clarified that these revenue-generating endeavours have been weakened by the effects of climate change, leaving the women with reduced autonomy and exacerbated financial hardship.

Discussions in FGDs across all three villages underscored that climate change worsens food insecurity. However, their concerns extend beyond physical hunger to deep anxieties about the uncertainty of having enough food for themselves and their families. These concerns are rooted in the unpredictability of agricultural yields, which can fluctuate due to factors such as erratic weather patterns and pests. These concerns are intensified by gendered roles, as women often handle food production, manage household resources, and address family and community needs. Women, juggling multiple responsibilities, face added challenges from climate change that impact agricultural output and food stability. Poor harvests force them to stretch limited resources, intensifying their anxiety about meeting basic household needs. The lack of reliable income further worsens their food insecurity, as it limits their ability to purchase food or invest in alternative livelihood strategies during lean periods. This persistent uncertainty not only affects their physical health but also undermines their emotional well-being and sense of security within their households and communities.

Participants in FGDs further observed that as climate change worsens environmental conditions in the study area, many males feel compelled to leave the villages in order to find employment in urban areas or to relocate the cattle to better pastures. This migration frequently leads to the prolonged absence of males from their families in the village. Consequently, women are often left behind to shoulder the responsibilities of household management and caretaking on their own. This includes not only domestic chores but also critical decision-making regarding agricultural activities, water management, and family welfare. Male family members migrate not only to secure better economic opportunities but also to mitigate the impact of deteriorating environmental conditions on livestock and livelihoods. hoods. However, it also underscores the gendered impacts of climate change, as women become increasingly responsible for maintaining household stability amidst changing socio-environmental dynamics. In certain cases, males, in particular, who relocate to cities, cease visiting their families in the village and form new relationships with women in urban areas. This shift in family dynamics can strain familial ties and alter traditional roles within

the household. While less frequently than males, young women also move to cities, particularly during times of poor harvests. Their decision to move is often driven by the search for employment opportunities, better living conditions, or educational pursuits. However, the realities of urban life can be harsh, and some of these women return to their villages with harrowing tales of mistreatment and exploitation experienced in urban environments. These accounts highlight the vulnerabilities faced by rural migrants, particularly women, who confront various challenges such as unsafe working conditions, the lack of social support networks, and discriminatory practices.

Conclusion

During the fieldwork period, it became evident that women in all three villages faced constraints in accessing information about climate change. This lack of access to climate change-related information in these villages is connected to larger issues, including inadequate infrastructure, limited educational opportunities, and insufficient modern communication technologies. Despite having limited formal understanding of climate change, respondents drew on their traditional knowledge and observations of weather and climatic trends to form perceptions about their environment. They highlighted notable changes in village geography, the decline of biodiversity, shifts in temperature and rainfall patterns, and frequent droughts.

The scarcity of rainfall poses a critical threat to the livelihoods of rural women, impacting various aspects of their daily lives and economic activities. Insufficient rainfall reduces water availability for drinking, cooking, sanitation and household gardens, forcing women to travel long distances to fetch water, often carrying heavy containers back home or leading donkeys. This additional workload can result in physical strain and limit the time available for other activities, and even for resting. In agriculture, inadequate rainfall diminishes crop yields, jeopardising food security and income generation for rural women who depend heavily on farming for sustenance and profit from selling agricultural surplus.

Temperature shifts have been identified as tangible realities affecting agricultural activities, household tasks, and overall livelihoods among rural women. These shifts contribute to various challenges, including fluctuations in seasonal patterns, disruptions of agricultural calendars, recurring droughts, food insecurity, changes in crop cycles, reduced yields, increased incidence of pest outbreaks, higher livestock mortality

rates, reduction in income, intensified poverty, and rural-to-urban migration. These challenges collectively undermine the livelihoods of rural women.

Women are disproportionately affected by climate change-induced food insecurity, a multifaceted issue that encompasses more than just physical hunger. Due to their traditional gender roles, women bear the primary responsibility for food provision within their households. This role places them at the forefront of coping with the uncertainty of securing enough food for themselves and their families amidst changing environmental conditions. Their worries are compounded by the unpredictability of agricultural yields, which are increasingly influenced by erratic weather patterns, prolonged droughts, and the spread of pests.

As climate change worsens environmental conditions, many men feel compelled to migrate to urban areas for employment or relocate cattle to better pastures, resulting in extended absences from their families. The migration patterns reflect the complex socioeconomic pressures faced by rural women amidst environmental challenges. The departure of male family members affects household dynamics and places additional responsibilities on the women who are left behind. It also underscores the vulnerabilities faced by rural women who migrate, often in search of economic opportunities, but who are exposed to risks such as exploitation and abuse. Issues such as labour exploitation, gender-based violence, and inadequate living conditions underscore the urgent need for policies and interventions that safeguard the rights and well-being of rural-to-urban migrants.

Recommendations

Addressing the impacts of climate change on the livelihoods of rural women requires gender-sensitive policies and interventions that empower rural women to enhance their resilience and promote sustainable practices. Initiatives should focus on improving access to resources, education, information, technology, and healthcare, while also promoting their leadership in formulating and executing strategies for enhancing resilience to climate change. Furthermore, they should encourage the adoption of climate-resilient farming practices such as diversified cropping systems and water-efficient irrigation techniques. The component of training and support for women farmers to implement these practices effectively cannot be overemphasized. Empowering rural women as agents of change is not only crucial for mitigating the immediate impacts of climate change, but also for fostering

resilient communities and sustainable development that benefits all. By recognising and addressing the specific challenges faced by rural women, we can create more equitable and inclusive pathways towards a climate-resilient future.

Appendix: *Profiles of survey research respondents quoted directly in the report*

Code	Age	Marital status	Education level	Employment/profession
Survey Research from Omatope Village				
SR O09	47	Single	Secondary	Farmer
SR O13	48	Married	Secondary	Kindergarten teacher
SR O18	49	Single	No formal education	Farmer
SR O22	48	Single	Primary	Farmer
SR O25	50	Married	Secondary	Farmer
SR O34	44	Divorced	Primary	Farmer
SR O38	46	Single	No formal education	Farmer
Survey Research from Elavi Village				
SR EL06	42	Married	Primary	Farmer
SR EL09	49	Married	Secondary	Farmer
SR EL14	60	Widow	Primary	Farmer
SR EL34	42	Single	Tertiary	Nurse
SR EL61	41	Married	Secondary	Kindergarten teacher
SR EL40	66	Single	Primary	Farmer
SR EL56	44	Single	Secondary	Trader
Survey Research from Emanya Village				
SR EM11	54	Single	Secondary	Farmer
SR EM24	52	Single	Primary	Farmer
SR EM34	49	Married	No formal education	Trader
SR EM43	53	Widowed	No formal education	Farmer
SR EM50	29	Single	Secondary	Farmer
SR EM55	42	Single	No formal education	Farmer
SR EM72	42	Single	Tertiary	Teacher

References

Angula, M. (2010). *Gender and climate change: Namibia case study*. Heinrich Böll Stiftung. https://www.boell.de/sites/default/files/assets/boell.de/images/download_de/ecology/Namibia.pdf

Angula, M. N., & Menjono, E. (2014). Gender, culture and climate change in rural Namibia. *Journal for Studies in Humanities and Social Sciences, 3*(1&2), 225–238.

Ausiku, A. P., Annandale, J. G., Steyn, J. M., & Sanewe, A. J. (2020, February). Improving pearl millet (*Pennisetum glaucum*) productivity through adaptive management of water and nitrogen. *Water, 12*(2), 422.

Awala, S. K., Hove, K., Wanga, M. A., Valombola, J. S., & Mwandemele, O. D. (2019). Rainfall trend and variability in semi-arid northern Namibia: Implications for smallholder agricultural production. *Welwitschia International Journal of Agricultural Sciences*, *1*, 1–25.

Blom, A. G. (2016). Survey field work. In C. Wolf, D. Joye, T.W. Smith, & C. Fu (Eds.), *The Sage handbook of survey methodology*. SAGE.

CARE International. (2019, July). *Climate vulnerability and capacity analysis handbook: Informing community-based adaptation, resilience and gender equality* (Version 2.0). https://careclimatechange.org/wp-content/uploads/2016/06/CARE-CVCA-Handbook-EN-v0.8-web.pdf

Cassidy, L. (2022). Gender and power dynamics. In: T. Madzivhandila, S. Hachigonta, J. Francis, J. Kamuzhanje, O. D. Kolawole, & S. DeWolf (Eds.), *Development practice in eastern and southern Africa*. Springer, Cham. https://doi.org/10.1007/978-3-030-91131-7_15

Englander, M. (2012). The interview: Data collection in descriptive phenomenological human scientific research. *Journal of Phenomenological Psychology, 43*(1), 13–35.

Gender and Development Network. (2018, March). *Submission to the Independent Expert on foreign debt and human rights on the links and the impact of economic reforms and austerity measures on women's human rights.* https://static1.squarespace.com/static/536c4ee8e4b0b60bc6ca7c74/t/5ac4d94470a6adfc8c898db6/1522850118055/Submission+to+IE+on+austerity+Gender+%26+Development+Network.pdf

Maunganidze, L. (2022). Exhuming lived experiential past in rural development research and practice. In T. Madzivhandila, S. Hachigonta, J. Francis, J. Kamuzhanje, O. D. Kolawole, & S. DeWolf (Eds.), *Development practice in eastern and southern Africa*. Springer, Cham.

https://doi.org/10.1007/978-3-030-91131-7_15

Mavisakalyan, A., & Tarverdi, Y. (2019). Gender and climate change: Do female parliamentarians make a difference? *European Journal of Political Economy, 56*(C), 151–164. Elsevier.

Meinzen-Dick, R., Behrman, J., Menon, P., & Quisumbing, A. (2011. February 10–12). *Gender: A key dimension linking agricultural programs to improved nutrition and health* [2020 Conference Brief 9]. Leveraging agriculture for improving nutrition & health. New Delhi, India. International Food Policy Research Institute.

Mendelsohn, J., El Obeid, S., & Roberts, C. (2000*). A profile of north-central Namibia*. Gamsberg Macmillan. https://www.raison.com.na/sites/default/files/Profile%20of%20north-central%20Namibia.pdf

Mutenje, M. J., Farnworth, C. R., Stirling, C., Thierfelder, C., Mupagwa, W., & Nyagumbo, I. (2019, September). A cost-benefit analysis of climate-smart agriculture options in southern Africa: Balancing gender and technology. *Ecological Economics*, *163*(C), 126–137. https://doi.org/10.1016/j.ecolecon.2019.05.013

Namibia Statistics Agency. (2024). *2023 Population & housing census*: *Preliminary report*. https://nsa.org.na/wp-content/uploads/2024/07/Preliminary-Report-2023-Population-and-Housing-Census_compressed.pdf

Namupala, N., Nangolo, E., and Edwards-Jauch, L. (2021). Women's access to urban land and housing: Implications for human rights and gender justice in Namibia. *Namibian Journal of Social Justice, 1*, 131–146.

Sibanda, S. (2022). Farming systems: A research practitioner's viewpoint. In T. Madzivhandila, S. Hachigonta, J. Francis, J. Kamuzhanje, O. D. Kolawole, & S. DeWolf (Eds.), *Development practice in eastern and southern Africa*. Springer, Cham. https://doi.org/10.1007/978-3-030-91131-7_15

UN Women. (2022). UN Women strategic plan 2022-2025. https://www.unwomen.org/en/un-women-strategic-plan-2022-2025

Von Wietersheim, E. (2021). This land is my land!: Motions and emotions around land reform in Namibia (2nd ed.). Friedrich Ebert Stiftung.

Preserving Heritage: The Importance of Seed Banking in Namibia

Nafimane Hamukoshi

Introduction

In Namibia, the practice of seed banking has become increasingly significant in recent years, particularly among rural women in the northern regions. Seed banking, the practice of preserving the seeds of various plant species, plays a vital role in safeguarding genetic diversity, ensuring food security, and countering the adverse effects of climate change. This case study explores the key issues surrounding seed banking in Namibia, specifically the role it plays in promoting sustainable agriculture, preserving indigenous seeds, and protecting local agricultural knowledge. Amidst the rise of genetically modified organisms (GMOs) and climate change's devastating impact on food production, the growing concerns among rural women about the long-term impacts

Photos contributed by Maano Nangolo

of GMO seeds have led to a collective effort to preserve Namibia's traditional agricultural practices. This article will highlight the challenges faced by these women, the actions they have taken to safeguard indigenous seeds, and the outcomes of their efforts.

Background

The practice of seed banking is not new in Namibia. Historically, the people of Namibia, particularly in rural areas, have relied on traditional agricultural knowledge to sustain their livelihoods. Communities have passed down seeds from one generation to the next, ensuring the preservation of valuable indigenous crops. Among the most commonly used seeds in Namibia's northern villages are varieties of millet, known as omahangu in Oshiwambo, and other indigenous plant varieties like "ombuto yandjipiti and ombuto yiitoka yokalye" (Civic+264, n.d.).

These seeds are passed from mothers to daughters as part of a rich cultural heritage in communities in regions including Ohangwena, Oshana, and Omusati. It is the adult and elderly women, typically aged 40 and above, who are the custodians of this knowledge. Their role in preserving these seeds is crucial, not only for the food security of their families but also for the cultural continuity of their communities. In addition to their familial roles, many of these women are subsistence farmers, relying on their crops to feed their families and sustain their livelihoods (Civic+264, n.d.).

Challenges

The introduction of genetically modified seeds has raised serious concerns among these women. Although GMOs promise faster-growing crops, they are seen as a threat to the genetic diversity of indigenous plants, potentially eroding the region's agricultural heritage. For these women, the need to preserve indigenous seeds is not just a matter of food security but also of cultural preservation. The cultural and emotional connection they have to their seeds is strong, as they see these plants as part of their identity and heritage (Shiva, 2016).

Despite their best efforts, the women of Namibia's rural regions face several challenges in preserving their indigenous seeds. One of the most pressing issues is climate change. Over the years, Namibia has been subjected to prolonged droughts, unpredictable rainfall patterns, and shifting weather conditions, all of which have made seed storage and crop cultivation increasingly difficult. Droughts lead to poor harvests, and in some cases, crops do not even reach maturity. As a result, the indigenous seeds that these women rely on for food security have become increasingly scarce (GRAIN, 2015).

The challenges of seed banking are further compounded by pests such as maize bugs, and the constant threat of birds consuming the stored seeds. Traditional methods of seed storage, such as using ashes to ward off birds and storing seeds in eshisha or okaanda containers, have been used for generations. While these methods have proven effective to some extent, they cannot fully protect the seeds against the devastating effects of natural disasters or the encroachment of GMOs (Civic+264, n.d.).

The spread of genetically modified seeds is a direct challenge to the preservation of indigenous seed varieties. GMO seeds are often promoted by agricultural corporations and governments as a solution to food insecurity, offering higher yields, faster growth, and increased drought resilience. For many rural women in Namibia, however, the adoption of GMOs represents a departure from traditional agricultural practices and a loss of cultural identity. There is a growing sense of urgency to protect and preserve indigenous seeds before they are replaced by GMO varieties (Shiva, 2016).

Actions

In response to these challenges, rural women in Namibia have come together to take action. Driven by a strong sense of community and a desire to protect their agricultural heritage, these women have established informal seed banks to preserve and store indigenous seeds. These seed banks are not just places to keep seeds but are symbols of resistance to the forces of globalisation and genetic modification.

The women involved in these seed banks have also been vocal in their opposition to the widespread use of GMOs. They have sought the support of local organisations, government bodies, and international agencies to raise awareness about the dangers of genetically modified seeds. Some have taken part in workshops and training sessions to learn more about sustainable agriculture, organic farming, and seed-saving techniques. Through these efforts, they aim to protect their communities from the negative impacts of GMOs and ensure that their food systems remain intact (GRAIN, 2015).

The government of Namibia has also recognised the importance of preserving indigenous seeds. Efforts have been made to promote seed banks and support rural communities in their quest to protect their genetic heritage. Additionally, environmental and agricultural NGOs have been working alongside these women to provide training and resources that will help them maintain sustainable agricultural practices in the face of

climate change and other challenges. For instance, the Agricultural Bank of Namibia, in collaboration with the KfW Development Bank, has launched programs to support farmers and micro, small, and medium enterprises in the agriculture sector, aiming to enhance financial inclusion and support sustainable agricultural practices (German Embassy Windhoek, 2023).

Results

The efforts of these rural women to preserve indigenous seeds have led to some positive outcomes. Through their seed banking initiatives, they have successfully preserved a wide range of indigenous plant species that are now threatened with extinction due to climate change and the spread of GMOs. These seed banks have not only ensured food security for their families but have also helped to strengthen community ties, as the women collaborate and share knowledge about seed-saving and sustainable farming practices.

The opposition to GMOs has sparked important discussions about the need for a balanced approach to agriculture in Namibia. While genetically modified seeds may offer a short-term response to food insecurity, many rural women believe that preserving indigenous crops offers a more sustainable and culturally appropriate solution. The preservation of indigenous seeds also aligns with the country's broader goals of sustainable development and the protection of cultural heritage (Civic+264, n.d.).

While the challenges remain, the seed banking initiatives have demonstrated the resilience of Namibia's rural women. They have shown that, even in the face of climate change, natural disasters, and the proliferation of GMOs, traditional agricultural practices and community-based seed preservation initiatives can still thrive. Their work not only protects seeds but also safeguards cultural identity (GRAIN, 2015).

Conclusion

Seed banking plays an essential role in preserving genetic diversity, ensuring food security, and combatting the effects of climate change in Namibia. Through the efforts of rural women in the northern regions, traditional seed-saving practices are being kept alive, ensuring that future generations will have access to the rich agricultural heritage of their ancestors. Despite the challenges posed by GMOs, climate change, and natural disasters, these women have shown resilience and determination in their fight to preserve the seeds that have nourished their communities for generations. The seed banking movement in Namibia is a testament to the power of grassroots activism, cultural preservation, and sustainable agriculture.

References

Civic+264. (n.d.). Namibian Rural Women Assembly (NRWA). https://www.civic264.org.na/agriculture/namibian-rural-women-assembly-nrwa

German Embassy Windhoek. (2023*). Agricultural Bank of Namibia collaborates with KfW Development Bank to promote sustainable farming*. https://windhuk.diplo.de/na-en/-/2636160

GRAIN. (2015). The real seeds producers: Small-scale farmers save, use, share and enhance the seed diversity of the crops that feed Africa. https://grain.org/en/article/entries/5157-the-real-seed-producers

Shiva, V. (2016). *Seed laws that criminalise farmers: Resistance and fightback*. https://grain.org/en/article/entries/5062-seed-laws-that-criminalise-farmers-resistance-and-fightback

Assessing Namibia's Climate-related Laws and Policies: Applying the Human Rights Integration Framework for Climate Policy Evaluation

Oliver C. Ruppel & Atieh Khatibi

Abstract:

Namibia is most vulnerable to climate change and therefore faces significant threats to human rights, particularly among its most vulnerable communities. The adverse impacts of climate change exacerbate socioeconomic inequalities, leading to violations of rights related to access to water, food, land, and health care services. While Namibia established legal and political frameworks to address climate change within both international and national contexts, ongoing challenges persist. Accordingly, there is an increasing need to assess Namibia's climate-related laws and policies to ensure that they effectively protect human rights and address the needs of the most vulnerable communities. This paper introduces the Human Rights Integration Framework for Climate Policy Evaluation (HRIFCPE) as a novel tool for systematically assessing the integration of human rights in climate policies. Applying HRIFCPE to Namibia's policies reveals both progress and significant gaps, especially in protecting the rights of the elderly, children, and persons with disabilities. The study concludes that although Namibia has made strides in integrating human rights into climate policies, further improvements are necessary to ensure comprehensive protection for all vulnerable communities. The HRIFCPE framework not only provides valuable insights for Namibia but also offers a model for other countries seeking to enhance the human rights dimensions of their climate policies.

Keywords: Namibia, climate change, human rights, law and policy assessment, vulnerable population

Introduction

This paper explores the critical intersection of climate change and human rights, focusing on the human rights integration assessment of Namibia's climate-related laws and policies to protect the rights of its most vulnerable populations. The reports in the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment

Report (IPCC, 2014a) brought to light a stark reality: climate change is not just an environmental issue but also a profound human rights crisis. From extreme weather events to water and food insecurity, the cascading effects of a warming planet are threatening the very essence of human well-being, particularly for those who are already marginalised politically, socially, and economically (IPCC, 2014b). By progressively highlighting the connection between climate change and human rights, some vulnerable states, including small island nations, began advocating for the inclusion of human rights provisions in climate change agreements. A significant milestone in this effort was the 2007 Malé Declaration, which spurred actions by the United Nations Human Rights Council (UNHRC, hereinafter HRC) and ultimately led to the incorporation of human rights language in the Paris Agreement (Atapattu & Schapper, 2019). Reports by the Office of the High Commissioner for Human Rights (OHCHR) and other bodies have highlighted climate change's disproportionate impacts on poorer and more vulnerable communities, emphasising the necessity for inclusive, rights-based approaches to both mitigation and adaptation plans (OHCHR, 2009).

The human rights-based approach (HRBA) focuses on participation, accountability, non-discrimination, and the empowerment of vulnerable communities, offering a framework for integrating human rights into climate action (OHCHR, 2015). By applying an HRBA, states can better align climate laws and policies with human rights standards (Fırat, 2023).

Home to several deserts, Namibia is one country that is most vulnerable to climate change. Its arid environment exacerbates the impact of intensified droughts, floods, and rising temperatures. The nation's limited resources and capacity, combined with pervasive challenges such as poverty, disease, and high unemployment, further hinder its ability to effectively respond to these climate-related threats. Despite these challenges, Namibia, as a party to the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, has developed a range of legal and political instruments for combating climate change to meet international obligations (Mapaure, 2022). Many vulnerable countries have prioritised economic concerns in their climate laws and policies, often overlooking the social impacts of climate change on their populations, including human rights considerations. However, there is a growing global trend toward integrating human rights into climate law and policies (Knox, 2016).

This paper aims to evaluate the integration of human rights considerations within Namibia's climate-related laws and policies. The goal is to identify gaps and opportunities for developing more human rights-inclusive climate policies, ensuring that they effectively address and protect the rights of all affected communities. To facilitate the assessment in this paper, we introduce the Human Rights Integration Framework for Climate Policy Evaluation (HRIFCPE), a novel method for systematically assessing the integration of human rights into climate policies, with its foundation in an HRBA. This framework provides a tool for evaluating the extent to which human rights considerations are included in Namibia's climate-related law and policy framework. In this regard, the paper first outlines the HRBA and its application in international human rights mechanisms and climate change regimes. It then offers a brief overview of the status of climate change in Namibia and its implications for human rights. Following this, the paper introduces Namibia's existing climate-related laws and policies, providing the foundation for applying the HRIFCPE. The next section deals with the formulation of the HRIFCPE, illustrating how it can be used to assess the integration of human rights into climate law and policies. Using the HRIFCPE framework, the final section evaluates to what extent Namibia's climate-related laws and policies respect and integrate human rights.

By assessing how well current legislation and policies protect and promote human rights, this paper seeks to highlight the existing gaps and recommend some entry points to ensure the inclusion of human rights considerations in climate change interventions. This assessment is vital for reviewing legislation and policymaking in the future, and could enable Namibia to meet its international obligations and more effectively safeguard the rights of its population, particularly those most affected by climate change, such as women, children and impoverished rural communities. By integrating human rights standards, Namibia can develop more inclusive, equitable, and effective climate strategies that address both environmental and socioeconomic challenges, ensuring social justice1 for all its inhabitants.

1 Social justice in this paper refers to the equitable inclusion and protection of vulnerable communities in the climate change decision-making process and climate-related laws and policies to ensure that their human rights are respected. It emphasises addressing socioeconomic injustices exacerbated by climate change, such as unequal access to food, water, job opportunities, and health services, particularly for marginalised groups like women, children, persons with disabilities, and the elderly.

A Human Rights-based Approach to Climate Change in International Human Rights Mechanisms and Climate Regime

Following numerous efforts to acknowledge human rights in the context of climate change, the 2005 petition by Inuit Communities before the Inter-American Commission of Human Rights highlighted the accountability of major state emitters for their impacts on human rights (Jodoin et al., 2020). The Malé Declaration on the Human Dimensions of Global Climate Change, adopted by the Small Island Developing States group in 2007, formally introduced the link between climate change and human rights. This important milestone document urged the HRC to prioritise this emerging issue (Malé Declaration, 2007).

The HRC has played a crucial role in promoting an HRBA to climate change and advocating for inclusive and equitable policies that respect human rights. The HRC has issued various resolutions emphasising that climate policies must consider the rights of the most vulnerable communities (OHCHR, 2015). In response to the Malé Declaration, the HRC adopted its first resolution (7/23) on climate change and human rights in 2008, noting that climate change "poses an immediate and far-reaching threat to people and communities around the world" and proposing an HRBA as one of the solutions for addressing its impacts (United Nations Human Rights Council, 2008a). The resolution also mandated the OHCHR to research the impacts of climate change on vulnerable groups, including women, indigenous people, children and youths, persons with disabilities, cross-border displaced persons, and the elderly (United Nations Human Rights Council, 2008b).

The OHCHR has therefore significantly impacted global discussion on incorporating human rights into climate policies through an HRBA. The OHCHR's reports and analytical studies highlight the link between climate change and the full enjoyment of human rights, advocating for an HRBA in policymaking in an accountable, transparent, and equitable manner (OHCHR, 2021a).

In addition to international human rights mechanisms, human rights have become more prominent in the climate change regime, beginning with the 2010 Cancun Agreement, which incorporated references to the rights of indigenous people and local communities in safeguards for REDD+ (Reducing Emissions from Deforestation and Forest Degradation) (UNFCCC, 2011). The preamble to the 2015 Paris Agreement further recognised the need to respect and

promote different human rights in climate action, including the rights of indigenous people, local communities, migrants, children, persons with disabilities, and vulnerable groups; and the rights to health and development, gender equality, women's empowerment, and intergenerational equity (UNFCCC, 2015).

Additionally, two notable initiatives highlight the integration of human rights in climate governance: the Local Communities and Indigenous Peoples Platform, established under the Paris Agreement to enhance climate efforts and participation of these groups in the UNFCCC process; and the Gender Action Plan, adopted by UNFCCC parties in 2017, which aims to advance gender-responsive climate strategies and integrate gender considerations into climate policy (Jodoin et al., 2021).

Generally, an HRBA is established based on international human rights obligations and principles such as participation, equality and non-discrimination, accountability, and transparency (Gasparri et al., 2021). This approach promotes more sustainable outcomes by empowering right-holders to participate in policymaking and holding duty-bearers accountable (OHCHR, 2010). It is possible to identify both opportunities and gaps for improving human rights protection at the national level by applying an HRBA to assess the legal framework (Vu, 2022). Incorporating an HRBA into all climate actions ensures that the rights of vulnerable groups are prioritised and that their involvement in decision-making is guaranteed, while also serving as a foundation to assess the extent to which climate laws and policies protect human rights (Orellana, 2012).

An Overview of Climate Change and Human Rights in Namibia

Climate change is not an abstract, distant phenomenon but a pressing and immediate threat in Namibia that profoundly impacts the environment and the fundamental rights of its people. Despite contributing only 0.00026% by weight of global greenhouse gas emissions (Government of the Republic of Namibia [GRN], 2023, pp. 8, 12), Namibia's arid climate and the poverty and income disparities that characterise its socioeconomic conditions make it highly vulnerable to climate change. Projected increases in temperature and rainfall variability threaten the agriculture sector and pose significant risks to human rights (Mendelsohn, 2006). Below are brief descriptions of how climate change impacts various sectors and related human rights in Namibia.

Agriculture and the right to food

Rising temperatures and changes in rainfall negatively affect agriculture, including crop production, livestock rearing, and fisheries, threatening food security and the right to adequate food, particularly for marginalised communities such as rural indigenous populations (World Bank Group, 2021; Mapaure, 2022). For instance, cereal crop yields are projected to decrease by 20% in the northeastern region and by 50% in the northcentral region (Reid et al., 2007). Additionally, the livestock carrying capacity is predicted to decline by 10% in the northeastern region, 15% to 30% in the northcentral region, and 35% in the central region (Turpie et al., 2010). Food insecurity now affects 22% of the population, highlighting the urgent need for targeted interventions (Amnesty International, 2024); 38% of the population, approximately 1.15 million people in Namibia, were expected to experience high levels of food insecurity between April and June 2024, primarily attributable to changing rainfall patterns and long-term droughts (Integrated Food Security Phase Classification [IPC], 2024. Most households, particularly in the northern crop-growing regions suffering from poor harvests, are heavily reliant on food and social aid, which is often hamstrung by inadequate distribution (IPC, 2024).

Food insecurity undermines the right to food, particularly for vulnerable groups who are disproportionately affected by social injustices. Given the results of the IPC report, many social injustice factors exacerbate this issue, including unfavourable economic and market conditions, higher rates of unemployment, and limited agricultural opportunities for marginalised communities. Additionally, increasing migration across borders further intensifies food insecurity challenges in Namibia (IPC, 2024).

Water resources and the right to water

It is projected that southern Africa will experience a 10% to 20% decrease in rainfall by 2050, leading to significant water scarcity in Namibia (Reid et al., 2007). Changes in rainfall may reduce runoff and drainage in perennial rivers by 20% to 30% in northern Namibia, a region that suffers the lowest water access rates. The reduced runoff not only threatens access to water for rural communities that rely on natural resources but also jeopardises government irrigation projects aimed at increasing food production, and thereby impedes the protection of the right to food and water for these communities (GRN, 2020). In addition, the drought period

has adversely affected vegetation and limited access to water for households and their livestock. According to the projection of IPC, the water scarcity situation was expected to deteriorate further by October 2024 (IPC, 2024). Water scarcity thus threatens water supply, sanitation, hygiene, and the right to water, particularly for vulnerable groups, including indigenous communities living near wetlands such as the Kavango River. These communities' livelihoods are highly dependent on agricultural production and livestock rearing (Mapaure, 2022), emphasising the need for comprehensive and sustainable humanitarian aid. This situation exacerbates existing inequalities and social injustices, further impacting their livelihoods.

Human health and the right to health

The health of the Namibian people is at risk due to extreme weather events, rising temperatures, and prolonged droughts which could lead to water and food insecurity, heat stress, and changes in disease transmission patterns (World Bank Group, 2021). Increased temperatures are raising the incidence of heat-related illnesses such as heat stress and vector-borne diseases such as malaria, affecting 60% of Namibia's population in malaria-prone areas (Mapaure, 2022).

In addition, the occurrence of floods in Namibia increases the risks of virus transmission, spreading various illnesses through contaminated water resources (Keja-Kaereho & Tjizu, 2019). Extreme weather events, such as floods in the northern floodplain region of Namibia, exacerbate existing social injustices in the health sector, particularly access to health services. These areas are already vulnerable due to underlying challenges, including poverty, the HIV/AIDS pandemic, tuberculosis, malaria, and malnutrition (World Bank Group, 2021). Vulnerable communities such as women, children, and elderly people, particularly in the rural areas of north and central Namibia, are particularly vulnerable to the health impacts of climate change because they require greater access to health care services, which may be inoperative or inaccessible during natural disasters (Wilhelm, 2012).

Progress has recently been made towards malaria eradication through the publication of three national documents, namely National Malaria Case Management Guidelines, Surveillance Guidelines for Malaria Elimination, and National Malaria Elimination Strategic Plan 2023 – 2027 (World Health Organization [WHO], 2024). However, climate change could undermine these efforts and exacerbate droughts, affecting food and water access, nutritional status, and mental

health (Jacobson et al., 2019). These health risks disproportionately affect vulnerable populations, including children, women, and the elderly (Mapaure, 2022).

Access to natural resources and women's rights

Future projections of climate change impacts on biodiversity indicate a significant reduction in vegetation cover in the central areas of Namibia by 2050. It is estimated that the loss of plant species will range from 40% to 50% by 2050, increasing to between 50% and 60% by the 2080s (Midgley et al., 2005).

Additionally, these projections suggest a notable expansion in arid vegetation, with an estimated increase of 20% by 2050 and up to 43% by 2080 (Mapaure, 2022). Rural women in Namibia, who are largely unemployed and reliant on natural resources, face heightened vulnerability to climate change due to existing social and economic inequalities. The loss of biodiversity, shifting vegetation cover to arid and semi-arid shrublands, and the depletion of natural resources such as fuel wood during floods, disproportionately affect women who are traditionally responsible for cooking and heating in households, increasing their contribution to unpaid labour and exacerbating their vulnerability (Angula & Menjono, 2014).

Moreover, limited access to education, technical skills, and decision-making opportunities, combined with restrictive cultural norms, intensifies this vulnerability. Ensuring women's participation in climate change policymaking is crucial for creating equitable, gender-responsive actions that address these specific vulnerabilities and promote women's empowerment (Van Wyk, 2015).

Selected Namibian Climate-related Laws and Policies

The Namibian approach to addressing climate change is multifaceted, and includes a range of legal frameworks at the constitutional, international and national levels that aim to promote sustainable development and environmental stewardship. The country's commitment lies in its progressive Constitution, which mandates the protection and sustainable use of natural resources and acknowledges the link between a healthy environment and the well-being of citizens (Ruppel, 2022). This paper only focuses on four international and national instruments within the context of climate change, which are explained in the next section. However, it also outlines the constitutional framework along with the international and national legal and political instruments described below.

The constitutional framework

Namibia's 1990 Constitution does not explicitly refer to climate change, but Article 144 highlights the importance of international law in formulating domestic climate policies, reflecting Namibia's commitment to international agreements. As a member of inter alia the United Nations, the African Union, and the Southern African Development Community (SADC), Namibia is bound by multiple treaties, including the UNFCCC and Paris agreement ratification in 2016. While Namibia's environmental legislation does not (yet) specifically address climate change in a separate piece of legislation, related principles are included, such as those in the Environmental Management Act (7 of 2007) and Article 95(l) of the Constitution, which mandate policies for protecting renewable energy resources, and ecosystem and biodiversity conservation, respectively, establishing the foundation for the country's climate action (Ruppel, 2022).

International legal and political framework

International climate change law is established by multilateral, regional, and unilateral agreements, along with general principles of law, customary international law, and key declarations. States are obligated to prevent transboundary harm and mitigate greenhouse gas emissions, with significant treaties such as the 1992 UNFCCC, the 1997 Kyoto Protocol, and the 2015 Paris Agreement requiring actions to combat climate change, especially (but by no means exclusively) on the part of developed countries. In its preamble, the Paris Agreement also mandates states to protect human rights and submit nationally determined contributions (NDCs) to achieve global temperature goals.

Namibia has signed and ratified the UNFCCC, the Kyoto Protocol, and the Paris Agreement, submitting inter alia four national communications; Namibia's nationally determined contribution 2023: Second update (UNDC-2) (dated 2023, submitted in 2024); three biennial update reports; three national greenhouse gas inventory reports (Ruppel, 2022); and the Republic of Namibia: First Adaptation Communication (FAC) in 2021 (UNFCCC, n.d.-a, n.d.-b, n.d.-c, n.d.-d; GRN, 2021a). The 2021 FAC emphasises climate adaptation as a top priority for Namibia, involving various stakeholders, including women, youths, and marginalised communities, and highlights the need for financial support, capacity development, and technology transfer to implement its adaptation measures (GRN, 2021a).

Among Namibia's international climate policies mentioned above, the second NDC update (UNDC-2, submitted in 2024) and the 2021 FAC were selected for assessment in this paper for the following reasons:

- The NDCs outline key actions for reducing emissions and adapting to climate change. It is crucial to incorporate human rights considerations into the development and evaluation of both NDCs and adaptation plans to ensure that these efforts are equitable and inclusive, and address the needs and rights of all communities affected by climate change.
- The guidelines for developing National Adaptation Plans (NAPs) adopted in 2011 at COP17 in Durban recommend ensuring human rights, non-discrimination, and active participation, particularly for vulnerable groups (Lottje et al., 2017).

National legal and political framework

The Namibian approach to climate policy is multidisciplinary, encompassing a range of legislation and national policies, strategies, and action plans. Despite the absence of a specific legal or policy framework solely dedicated to climate change, significant progress has been made in integrating climate change considerations into broader national legislation and policy-making initiatives. Key legislation includes the Environmental Management Act (7 of 2007), which promotes the sustainable management of natural resources, and the Forest Act (12 of 2001), which focuses on environmental conservation. The Disaster Risk Management Act (10 of 2012) also plays a crucial role in preventing and mitigating disasters related to climate change (GRN, 2015).

Despite the absence of explicit climate change laws, Namibia's existing legislation incorporates principles of sustainable resource management and environmental protection which influence climate-related decision-making (Ruppel, 2022). Namibia established the Namibian Climate Change Committee in 2001 to provide consultation and make recommendations to the government in the context of climate change, including fulfilling the country's commitments to the UNFCCC. The Climate Change Committee is chaired by the Ministry of Environment, Forestry and Tourism (MEFT), with the Climate Change Unit operating under the Department of Environmental Affairs within the MEFT. The MEFT serves as the national focal point for the UNFCCC, coordinating and implementing climate change activities and preparing

national compliance reports (GRN, 2021b; 2023).

In 2011, the Cabinet approved the National Policy on Climate Change for Namibia – 2010 (NPCC); this was followed by the National Climate Change Strategy & Action Plan 2013 – 2020 (NCCSAP), which guides the country's climate mitigation and adaptation efforts (GRN, 2014). Additional significant policies include (but are not limited to) the 1998 National Disaster Plan, the White Paper on Energy Policy (1998), the National Disaster Risk Management Plan 2011, the National Renewable Energy Policy (2017), and the Fifth National Development Plan (NDP5) 2017/18 – 2021/2022 (Climate Change Laws of the World, n.d.). These initiatives demonstrate Namibia's integrated approach to addressing climate change within its broader development agenda.

The NPCC and the NCCSAP have been selected for this paper for the following reasons:

- The NPCC has been selected due to its focus on developing and implementing adaptation strategies to reduce the vulnerability of Namibians and various sectors to climate change impacts.
- The NCCSAP has been selected because it includes guiding principles for responses to climate change, outlines priority action areas for adaptation and mitigation, and identifies various funding mechanisms (Ruppel, 2022).

HRIFCPE formulation and application for Namibia's climate-related policies

In this paper, we introduce and apply the HRIFCPE, our own methodological approach designed to assess the incorporation of human rights within Namibia's climate policies. The first step in developing the HRIFCPE involved deriving a set of ten criteria from related OHCHR reports, covering various human rights categories: the right to food; the rights of people in vulnerable situations; the rights of the elderly; the rights of persons with disabilities; the rights of women; the rights of children; and the right to physical and mental health. The OHCHR reports used to define criteria are referenced at the top of each table in the following section. After defining the assessment criteria, each policy is evaluated based on the specified criteria, focusing on whether the policy document explicitly addressed or acknowledged the need to meet these criteria. The following sections detail the application of the HRIFCPE in assessing selected climate policies in Namibia.

Human rights assessment criteria

The OHCHR has published several analytical reports on the human rights implications of climate change for vulnerable populations. We utilised OHCHR reports as they are specifically designed to incorporate HRBA standards and principles, providing a solid foundation for applying HRIFCPE methodology. To build the assessment criteria for evaluating Namibia's climate policies in the next section, we selected the specified OHCHR analytical studies. Through an in-depth analysis of these reports, ten relevant HRBA criteria, along with brief descriptions for each, are identified and presented in Tables 1–7. Such a comprehensive review ensures that Namibia's climate policy assessment is grounded in a robust human rights framework.

Right to food assessment criteria

The assessment criteria for this right, presented in Table 1, were derived from Measures for minimizing the adverse impact of climate change on the full realization of the right to food (OHCHR, 2024).

Table 1 *Right to food assessment criteria*

No.	Assessment criteria	Description (based on the report text)
1	Women's empowerment and inclusion	Empowerment and inclusion of women and girls in the agriculture sector
2	Equal land and resource rights	Promotion of equal land and resource rights, access, ownership, and distribution, especially among women and rural communities
3	Right to social security	Ensuring the right to social security for all workers affected by climate change, particularly for those who lose their livelihoods due to climate impacts on food production
4	Equitable access to adequate food	Equitable access to adequate food and nutrition for all, including vulnerable populations
5	Financial support for vulnerable communities	Aligning finance, economic and trade policies, and business activities to ensure the right to food, and affordability of food, especially for vulnerable communities
6	Transforming food systems to protect the right to food	Creation of policy space and flexibility to support small-scale producers while safeguarding the right to food within existing trade rules, such as subsidies
7	Application to indigenous people	Application to indigenous peoples, peasants, small-scale farmers, and rural communities

8	Land tenure rights for women	Land tenure rights, particularly for vulnerable groups, women and girls
9	Transition to people-centred, sustainable food systems	Promotion of transition to people-centred, sustainable food systems based on natural processes such as agroecology, regenerative agriculture, soil rehabilitation, ecosystem-based fisheries, circular bioeconomics, and aquaculture management
10	Protection of food-related rights and knowledge	Protection of food-related rights and knowledge, including safeguarding the rights to seeds, plant varieties, and traditional knowledge essential for sustainable food systems

Human rights of vulnerable people assessment criteria

The assessment criteria for the human rights of vulnerable people were derived from Impacts of climate change on the human rights of people in vulnerable situations: Report of the Secretary-General (OHCHR, 2022), and are presented in Table 2.

Table 2 *Human rights of vulnerable people assessment criteria*

No.	Assessment criteria	Description (based on the report text)
1	Inclusive climate action	Including vulnerable communities in climate action to ensure their participation, access to information, and access to justice
2	Urgent climate finance	Increasing climate finance, with 50% dedicated to adaptation for vulnerable populations
3	Climate grants for vulnerable communities	Ensuring that international climate financing, especially to vulnerable countries, increasingly are grants, not loans
4	Access to information	Providing accessible and understandable climate information to all, including early warnings, in multiple languages and formats
5	Participation in decision-making	Ensuring that people in vulnerable situations have meaningful opportunities to participate in climate policy planning and action
6	Access to justice	Promotion of access to justice in environmental matters, including access to court facilities, interpreters, and culturally appropriate services for vulnerable people
7	Addressing root causes of inequity and discrimination	Tackling the root causes of social injustice and inequality such as poverty, historical and structural inequity, and discrimination, through rights-based climate action
8	Rights-based adaptation measures	Development of rights-based climate adaptation measures with inputs from those most affected by climate change

9	Protection of traditional lands and resources	Recognition and protection of the rights of people in vulnerable situations to their traditional lands, resources, territories, and knowledge
10	Fair energy transition	Ensuring that the energy transition includes a fair transition for workers and communities affected by climate change, benefiting all, especially vulnerable groups

Rights of older persons assessment criteria

The assessment criteria for the rights of older persons were derived from Analytical study on the promotion and protection of the rights of older persons in the context of climate change (OHCHR, 2021b), and are presented in Table 3.

Table 3 *Rights of older person assessment criteria*

No.	Assessment criteria	Description (based on the report text)
1	Inclusion of the elderly in policymaking and planning	Inclusion of the elderly in policymaking and planning to create sustainable infrastructure, local spaces, and communities that account for their needs and rights
2	Access to high-quality health care and social services	Ensuring access to high-quality health care and social services for the elderly and building social protection systems that consider the effects of climate change and enhance resilience
3	Participation in sustainable livelihoods	Supporting the elderly in participating in sustainable livelihoods through job training, skills-building programmes, and access to relevant credit and resources
4	Preservation of cultural heritage	Taking firm action with community elders to preserve cultural heritage and traditional and indigenous knowledge that is threatened by climate change
5	Investment in climate communication and education	Investing in communication and education about climate change specifically for the elderly, and ensuring accessibility for those with disabilities
6	Inclusion in national and international climate actions	Supporting diversity by including the elderly in national delegations to climate meetings and in environmental volunteering and climate action efforts
7	Support for later-in-life learning opportunities	Providing good-quality later-in-life learning opportunities to enhance the confidence, voice, and negotiation skills of the elderly in the context of climate action
8	Facilitation of intergenerational climate discussions	Making intergenerational discussions about climate change and the environment easier, by involving the elderly in these conversations

9	Fair allocation of benefits from traditional knowledge	Ensuring that the benefits of using traditional knowledge in climate solutions are allocated fairly to communities and the elderly, with prior permission from indigenous peoples
10	Promotion of rights for the elderly	Protecting the elderly's rights that are affected by climate change, including the rights to life, health, food, water, sanitation, housing, decent work, culture, and development

Rights of persons with disabilities assessment criteria

The assessment criteria for the rights of persons with disabilities were derived from Analytical study on the promotion and the protection of the rights of persons with disabilities in the context of climate change (OHCHR, 2020), and are presented in Table 4.

Table 4 *Rights of persons with disabilities assessment criteria*

No.	Assessment criteria	Description (based on the report text)
1	Disability-inclusive, rights-based approach to climate action	Recognising persons with disabilities as agents of change and ensuring their meaningful, informed, and effective participation in decision-making on climate change at all levels
2	Full implementation of commitments to rights-based climate action concerning the rights of disabled persons	Obligation on states to implement commitments under international conventions, such as the Paris Agreement, the Sustainable Development Goals, and the Convention on the Rights of Persons with Disabilities, to address the root causes of the disproportionate impacts of climate change on persons with disabilities
3	Accountability and accessibility	Ensuring that duty bearers are accountable to persons with disabilities at all stages of climate action and that all communications, information, and venues are accessible
4	Strengthening capacity-building for persons with disabilities	Providing inclusive and accessible education and awareness-raising on climate change to strengthen capacity-building for persons with disabilities and their organisations
5	Monitoring and data collection	Monitoring the impacts of climate change on the rights of persons with disabilities and collecting disaggregated data by disability to inform climate policymaking
6	Protecting the right to social protection for persons with disabilities	Implementing the principle of universal design in social protection, housing, and infrastructure to build more robust systems and empower persons with disabilities

7	Climate financing for persons with disabilities	Recognising the needs of disabled persons by encouraging international climate financing mechanisms to incorporate a disability-inclusive approach and strengthening international cooperation and partnerships
8	Disability-inclusive efforts under the UN Framework	Ensuring that efforts under the UNFCCC are disability-inclusive and rights-based, ensuring accessibility in negotiations, and collecting data on how persons with disabilities are affected by climate change
9	Empowerment through universal design	Developing and implementing policies and programmes using universal design principles to ensure that climate action fosters the dignity of persons with disabilities and addresses existing social inequities
10	Promotion of inclusive disaster risk reduction	Including persons with disabilities in disaster risk reduction plans and policies to ensure their effective participation in mitigating the negative impacts of climate change

Rights of women assessment criteria

The assessment criteria for the rights of women were derived from Analytical study on gender-responsive climate action for the full and effective enjoyment of the rights of women (OHCHR, 2019), and are presented in Table 5.

Table 5 *The rights of women assessment criteria*

No.	Assessment criteria	Description (based on the report text)
1	Gender-responsive climate policies	Ensuring that states implement gender-responsive climate policies that empower women, protect their rights, and address the gendered impacts of climate change
2	Women's participation in decision-making and leadership	Ensuring that women participate in decision-making processes at all levels
3	Protection against gender-based violence	Taking measures to address and prevent sexual and gender-based violence in the context of climate change, and ensuring women's meaningful and effective participation in related policies and plans
4	Gender-inclusive climate action	Ensuring that climate action is inclusive, considering the multi-dimensional and intersectional experiences of women, i.a. by including rights to land, resources, services and income, and by addressing climate-induced displacement and migration
5	Gender mainstreaming	Pursuing the inclusion of gender mainstreaming and targeted gender strategies in legislation, policymaking, programming, and other activities related to climate action
6	Gender-responsive stakeholder consultation	Developing guidance for gender-responsive stakeholder consultation, ensuring the active participation of local women's organisations and providing increased funding to support grassroots women's organisations working on climate responses

7	Gender and human rights impact assessments	Implementing ex-ante and ex-post gender and human rights impact assessments in climate action projects, with regular reporting and the collection of gender-disaggregated data
8	Promotion of equal rights and opportunities in agriculture	Promotion of equal rights and opportunities for women in agriculture, strengthening women's land rights, ensuring access to finance and technology, and improving working conditions
9	Gender budgeting and financial audits	Mandating gender budgeting and gender financial audits to ensure that climate funds benefit the most affected countries and people, and systematically integrating women's human rights and gender equality into governance structures
10	Capacity-building for women	Supporting capacity-building for women from diverse backgrounds to maximise their voice, confidence, and negotiation skills in climate action processes

Rights of children assessment criteria

The assessment criteria for the rights of children were derived from Analytical study on the relationship between climate change and the full and effective enjoyment of the rights of the child (OHCHR, 2017), and are presented in Table 6.

Table 6 *Rights of children assessment criteria*

No.	Assessment criteria	Description (based on the report text)
1	Integration of children's rights in climate policy	Ensuring that children's rights considerations are integrated into climate, disaster risk reduction, and development activities
2	Enhancing children's resilience to climate change and reducing inequalities	Implementing the Sustainable Development Goals related to child poverty, malnutrition, education, child mortality, health, and water and sanitation to enhance children's resilience to climate change and reduce inequalities
3	Enhancing adaptation capacities of children	Ensuring that climate adaptation policies improve disaster risk preparedness and enhance the adaptation capacities of all children, considering the needs and vulnerabilities of those most at risk
4	Participation in climate policymaking	Facilitating the active participation of children in climate-related decision-making processes at all levels, and recognising their unique perspectives and potential as agents of change

5	Access to education	Obliging states to guarantee continuous access to quality education, including during and after climate-related disasters, and ensuring that educational facilities are resilient to climate impacts
6	Right to health for children	Obliging states to strengthen health systems to address the specific vulnerabilities of children to climate-related health risks, and ensuring access to preventive and curative health services
7	Right to water and sanitation for children	Ensuring that children have access to clean water and adequate sanitation, especially in areas affected by climate change
8	Right to food security and nutrition	Addressing the impact of climate change on food security by ensuring that children have access to adequate and nutritious food
9	Access to remedies for climate harm	Guaranteeing children's access to remedies for harms caused by climate change
10	Resource mobilisation	Mobilising adequate resources for child rights-based climate action

Right to physical and mental health assessment criteria

The assessment criteria for the right to physical and mental health were derived from Analytical study on the relationship between climate change and the right of everyone to the enjoyment of the highest attainable standard of physical and mental health (OHCHR, 2016), and are presented in Table 7.

Table 7 *Right to physical and mental health assessment criteria*

No.	Assessment criteria	Description (based on the report text)
1	Integration of health and human rights policies	Integration of health and human rights considerations in climate policies to ensure comprehensive protection and promotion of the right to health
2	Models to track health threats relating to climate change	Developing and utilising models to track health threats posed by climate change, including by collecting data, monitoring health impacts, and predicting future risks to implement efficient and timely responses
3	Development of resilient health systems	Development by states of sustainable and resilient health systems capable of adapting and responding to climate-related stresses

4	Equity and non-discrimination regarding the right to health	Prioritising equity and non-discrimination in climate policies, and ensuring that health facilities, goods, and services are accessible to all, particularly the most vulnerable populations
5	Public health strategy	Implementing transparent and socially inclusive public health strategies that focus on climate adaptation and mitigation
6	Emergency responses for the right to health protection	Ensuring comprehensive emergency responses for protecting the right to health in climate crises, and covering of a broad range of areas by emergency assistance, including mental health and social protection measures
7	Protection against sexual harm	Including measures in emergency and climate policies to protect against sexual harm
8	Access to reproductive health services	Ensuring that reproductive health services are accessible and available, particularly during climate-related emergencies
9	Universal health coverage and social protection floors	Promotion by states of universal health coverage and establishment of social protection floors as part of their climate adaptation strategies
10	Early warning systems and public accessibility	Establishment of early warning systems for climate effects and natural disasters to ensure effective rights-based climate action

Assessment of human rights integration in Namibia's climate-related policies

Namibia has made considerable efforts to integrate human rights in national and international climate change policies, in alignment with its commitments under international agreements such as the UNFCCC and its subsidiary Paris Agreement. A comprehensive evaluation can highlight the extent to which these frameworks incorporate human rights. Following the extraction of assessment criteria in the previous section, Table 8 identifies the criteria specifically mentioned or indirectly referenced by indicating the need for integration into each human rights category within climate policy. Figure 1 visually illustrates the extent of integration of human rights assessment criteria in each climate policy, and within each human rights category.

Table 8 *Integration of human rights assessment criteria in Namibia's climate change policies*

Human rights assessment criteria	***Namibia's Nationally Determined Contribution 2023: Second Update (UNDC-2)***	***Republic of Namibia: First Adaptation Communication (FAC)***	***National Policy on Climate Change for Namibia – 2010 (NPCC)***	***National Climate Change Strategy & Action Plan 2013 – 2020 (NCCSAP)***
Right to food				
Women's empowerment and inclusion	✓	✓	✓	-
Equal land and resource rights	✓	-	-	-
Right to social security	-	-	-	-
Equitable access to adequate food	✓	-	-	✓
Financial support for vulnerable communities	✓	-	-	-
Transforming food systems to protect the right to food	✓	-	✓	✓
Application to indigenous people	-	✓	✓	-
Land tenure rights for women	-	-	✓	-
Transition to people-centred and sustainable food systems	✓	✓	✓	✓
Protection of food-related rights and knowledge	✓	-	✓	-
Human rights of people in vulnerable situations				
Inclusive climate action	✓	✓	✓	-
Urgent climate finance	✓	✓	✓	✓
Climate grants for vulnerable communities	✓	-	-	-
Access to information	✓	✓	✓	✓

Human rights assessment criteria	***Namibia's Nationally Determined Contribution 2023: Second Update (UNDC-2)***	***Republic of Namibia: First Adaptation Communication (FAC)***	***National Policy on Climate Change for Namibia – 2010 (NPCC)***	***National Climate Change Strategy & Action Plan 2013 – 2020 (NCCSAP)***
Participation in decision-making	✓	✓	✓	-
Access to justice	-	-	-	-
Addressing root causes of inequity and discrimination	-	-	✓	-
Rights-based adaptation measures	✓	-	✓	-
Protection of traditional lands and resources	-	✓	✓	-
Fair energy transition	✓	✓	✓	✓
Rights of the elderly				
Inclusion of the elderly in policymaking and planning	-	-	✓	-
Access to high-quality health care and social services	-	-	-	-
Participation in sustainable livelihoods	✓	-	-	-
Preservation of cultural heritage	-	-	-	-
Investment in climate communication and education	-	-	-	-
Inclusion in national and international climate actions	-	-	✓	-
Support for later-in-life learning opportunities	-	-	-	-
Facilitation of intergenerational climate discussions	✓	-	✓	-

Human rights assessment criteria	***Namibia's Nationally Determined Contribution 2023: Second Update (UNDC-2)***	***Republic of Namibia: First Adaptation Communication (FAC)***	***National Policy on Climate Change for Namibia – 2010 (NPCC)***	***National Climate Change Strategy & Action Plan 2013 – 2020 (NCCSAP)***
Fair allocation of benefits from traditional knowledge	✓	-	✓	-
Promotion of rights for the elderly	-	-	✓	-
Rights of persons with disabilities				
Disability-inclusive, rights-based approach to climate action	✓	-	✓	-
Full implementation of commitments to rights-based climate action concerning the rights of disabled persons	✓	-	-	-
Accountability and accessibility	-	-	-	-
Strengthening capacity-building for persons with disabilities	-	-	-	-
Monitoring and data collection	-	-	-	-
Protecting the right to social protection for persons with disabilities	-	-	-	-
Climate financing for persons with disabilities	-	-	-	-
Disability-inclusive efforts under the UN Framework	✓	-	-	-
Empowerment through universal design	✓	-	-	-
Promotion of inclusive disaster risk reduction	✓		-	-

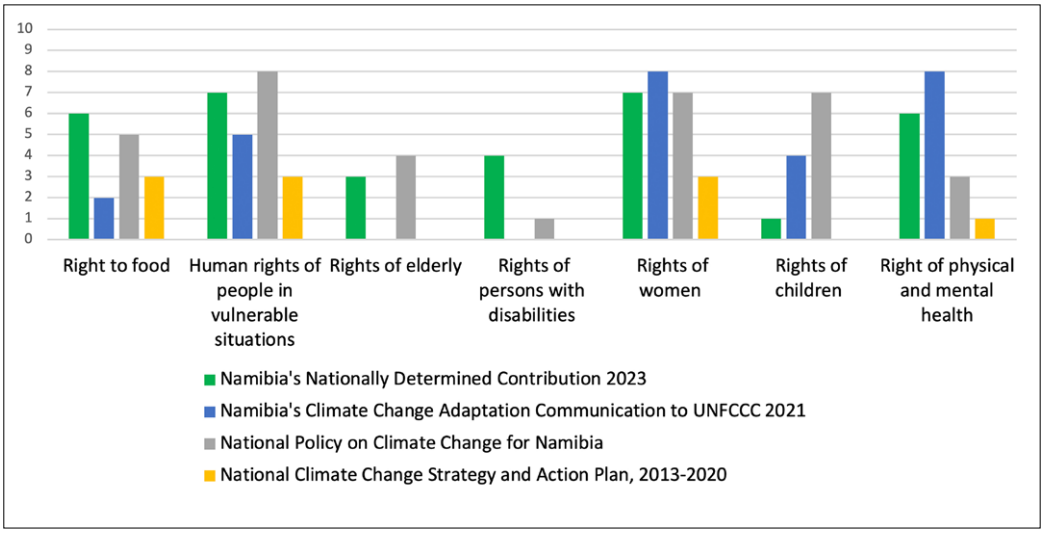
Human rights assessment criteria	***Namibia's Nationally Determined Contribution 2023: Second Update (UNDC-2)***	***Republic of Namibia: First Adaptation Communication (FAC)***	***National Policy on Climate Change for Namibia – 2010 (NPCC)***	***National Climate Change Strategy & Action Plan 2013 – 2020 (NCCSAP)***
Rights of women				
Gender-responsive climate policies	✓	✓	✓	✓
Women's participation in decision-making and leadership	✓	✓	✓	-
Protection against gender-based violence	-	-	-	-
Gender-inclusive climate action	✓	✓	✓	✓
Gender mainstreaming	✓	✓	✓	✓
Gender-responsive stakeholder consultation	✓	✓	✓	-
Gender and human rights impact assessments	-	✓	-	-
Promotion of equal rights and opportunities in agriculture	✓	✓	✓	-
Gender budgeting and financial audits	-	-	-	-
Capacity-building for women	✓	✓	✓	-
Rights of children				
Integration of children's rights in climate policy	-	-	✓	-
Enhancing children's resilience to climate change and reducing inequalities	-	✓	✓	-
Enhancing adaptation capacities of children	-	-	✓	-
Participation in climate policymaking	-	✓	✓	-

Human rights assessment criteria	***Namibia's Nationally Determined Contribution 2023: Second Update (UNDC-2)***	***Republic of Namibia: First Adaptation Communication (FAC)***	***National Policy on Climate Change for Namibia – 2010 (NPCC)***	***National Climate Change Strategy & Action Plan 2013 – 2020 (NCCSAP)***
Access to education	-	✓	✓	-
Right to health	✓	✓	✓	-
Right to water and sanitation	-	-	-	-
Right to food security and nutrition	-	-	✓	-
Access to remedies for climate harm	-	-	-	-
Resource mobilisation	-	-	✓	-
Right to physical and mental health				
Integration of health and human rights policies	✓	✓	✓	✓
Models to track health threats relating to climate change	✓	✓	-	-
Development of resilient health systems	✓	✓	✓	-
Equity and non-discrimination regarding the right to health	-	✓	-	-
Public health strategy	✓	✓	✓	-
Emergency responses for the right to health protection	-	✓	-	-
Protection against sexual harm	-	-	-	-
Provision of access to reproductive health services	-	-	-	-
Promotion of universal health coverage and social protection floors	✓	✓	-	-
Early warning systems and public accessibility	✓	✓	✓	-

The human rights variation can be observed in the comparative analysis of climate policy documents, demonstrating significant efforts made in some areas, particularly in newer international policy documents, as well as notable gaps in other areas. However, the document variation underscores the need for continuous evaluation and updating of policies to ensure comprehensive human rights integration in areas where further integration is needed.

Across UNDC-2, FAC, NPCC, and NCCSAP, there is a consistent emphasis on the human rights of people in vulnerable situations and women, reflecting Namibia's commitment to gender inclusion and stakeholder participation. However, there are also significant gaps in addressing the rights of children, the elderly, and persons with disabilities. For a better analysis of Figure 1, in the following sections, the human rights integration is categorised into three levels: highest, moderate, and lowest scores.

Figure 1 *Human rights integration in Namibia's climate policies*



Highest score for human rights integration

Namibia's climate policies reflect a deep commitment to integrating women's rights, which aligns strongly with the principles of equality and non-discrimination of the HRBA enshrined in Article 10 of the Constitution. Article 10 guarantees that all persons are equal before the law and prohibits discrimination i.a. on the grounds of sex, race, or economic status. This article supports the advancement of gender equality as a fundamental

right that must be upheld in all areas, including environmental and climate-related policies (Ruppel, 2022).

As shown in Figure 1, Namibia's FAC regarding climate change incorporates the highest number of criteria related to women's rights. This reflects a strong commitment to integrating women's rights throughout the document, with particular emphasis on advancing gender equality and women's empowerment, especially within the gender sector. This policy also promotes the active participation of affected women in decision-making, ensuring that their perspectives on forest use are considered. Additionally, it explicitly incorporates gender considerations in climate-related agriculture initiatives, aiming to promote women's equal participation through gender-related goals or affirmative action (GRN, 2021a). Similarly, UNDC-2 and NPCC also underscore the importance of gender-responsive and gender-inclusive climate policies, particularly in promoting women's participation in decision-making, ensuring equal rights and opportunities, and advancing capacity-building targeting programmes for women to enhance their skills and knowledge related to climate change (GRN, 2011).

The NCCSAP generally mentioned gender-responsive climate policies, gender-inclusive climate action, and women's participation under the guiding principle, advocating for an inclusive decision-making process (GRN, 2014). This approach aligns with Namibia's broader efforts toward women's empowerment. It underscores a commitment to gender equality, as demonstrated by the establishment of the Ministry of Gender Equality and Child Welfare in 2000. This ministry (subsequently renamed the Ministry of Gender Equality, Poverty Eradication and Child Welfare) focuses on empowering women, men, and children, and ensuring the full participation and equality of women and men in all governance areas across the country (Ruppel, 2008).

Despite considerable political provisions outlined through a de jure analysis for integrating women's rights into different Namibian climate policies, prevailing cultural symbolism considering women as marginalised communities threaten social justice by restricting their participation in the decision-making process across different levels of governance. This social exclusion not only hinders Namibia's ability to achieve its international climate targets by limiting women's adaptive capacities but also impedes the realisation of social justice at the national level (Iipinge et al., 2000).

For example, women from the Herero, Himba, Oshiwambo, Kavango, and

Zambezi traditional communities are often discouraged from participating in decision-making processes. While gender-inclusive approaches are highlighted in climate policies, some climate-related programmes, like the Namibia Country Pilot Partnership Programme: Adapting to Climate Change through the Improvement of Traditional Crops & Livestock Farming that was piloted in Omusati Region in northern Namibia, have failed to fully integrate women's needs and rights in their design, implementation, and evaluation. This social exclusion risks diminishing women's motivation to take on leadership roles or participate in different climate-related actions (Angula & Menjono, 2014).

Despite the positive aspects expressed above, there remains a need for explicit measures to protect against gender-based violence and to ensure comprehensive gender and human rights impact assessments. Strengthening these aspects will enhance the inclusivity and effectiveness of Namibia's climate strategies, ensuring equity and addressing the specific challenges women face.

In addition to women's rights integration in Namibia's climate policies, the assessment of documents also reflects both significant achievements and notable gaps in the integration of human rights of people in vulnerable situations. UNDC-2, FAC and NPCC all highlight the need for the active participation of vulnerable communities in climate policy planning and implementation.

UNDC-2 and NPCC both underscore the urgent need for climate finance, particularly for adaptation measures (GRN, 2021a; GRN, 2023; GRN, 2011). UNDC-2, for example, highlights the fact that the Environmental Investment Fund is instrumental in accessing grants which are essential for advancing both adaptation and mitigation efforts. The references to the rights of vulnerable communities in these climate policies are compatible with Articles 10 and 95(l) of the Namibian Constitution. These articles reinforce the state policy principle of protecting all people, including vulnerable populations, from the adverse effects of climate change, and ensuring equality (Ruppel, 2022).

Furthermore, access to information is highlighted across the policies, with NPCC and FAC both emphasising the need to provide vulnerable communities with the necessary information to take appropriate action. However, many Namibian people are still struggling with access to information challenges and a lack of transparency in climate projects. For example, not infrequently, Namibian people are worried about the government signing legally binding agreements, for example, agreements

related to the EU-Namibia strategic partnership on sustainable raw materials value chains and renewable hydrogen, without conducting an environmental impact assessment or consulting with local communities. According to the Procurement Tracker Namibia report published by the Institute for Public Policy Research on 8 March 2002, the information on the expected benefits of the Hyphen Hydrogen Energy project is inexact and not transparent (Institute for Public Policy Research, 2022).

One of the key strengths of climate policies, particularly those that explicitly incorporate an HRBA, is their strong advocacy for rights-based adaptation measures. Both UNDC-2 and NPCC emphasise the importance of ensuring that climate actions respect and promote the human rights of vulnerable communities, thereby providing them with enhanced protection and support (GRN, 2023; GRN, 2011). Protection of traditional lands and resources, especially for indigenous communities, has been recognised in NPCC and FAC. However, UNDC-2 does not fully align with this focus, despite its being an offshoot of an important international climate policy. This is essential for preserving indigenous communities' traditions, lifestyles, livelihoods, and cultural heritages, which could be understood to resort under the right to culture guaranteed under the Bill of Rights (Chapter 3 of Namibia's Constitution) in Article 19 (Ruppel & Ruppel-Schlichting, 2017).

Despite the positive integration of the rights of vulnerable communities, a critical gap remains in terms of access to justice. Although including economic and social rights in the Bill of Rights could significantly enhance government accountability with respect to safeguarding Namibians' socioeconomic rights and ensuring access to justice, challenges in realising these rights and achieving justice persist (Horn, 2017). Communities frequently encounter significant barriers when seeking legal resources and remedies for climate-related harms. None of the documents, including UNDC-2, NPCC and FAC, adequately address the need for mechanisms to ensure that vulnerable populations have access to justice.

Moderate score for human rights integration

Namibia's climate policies show a moderate level of human rights integration, particularly concerning the right to food and the right to physical and mental health. UNDC-2 and NPCC show great commitment to integrating the right to food through a focus on women's empowerment and inclusion. For example, UNDC-2 emphasises gender-responsive climate adaptation

actions in the agriculture sector, such as developing climate-resilient livestock species and promoting conservation agriculture (GRN, 2023). Both UNDC-2 and NPCC underscore the importance of ensuring equitable access to adequate food, particularly for vulnerable populations. Furthermore, all four documents recognise the need to transform food systems towards sustainability, emphasising the protection of the right to food.

Despite these positive aspects, none of the policies explicitly address the right to social security in the context of food security, which leaves the affected population more vulnerable without adequate protection for their livelihoods. Although UNDC-2 recognises the gender-specific challenges in accessing resources that support equal land and resource rights, none of the policies provide specific measures to secure equal land and resource rights, particularly for women. Moreover, although UNDC-2 includes the importance of financial support for gender-responsive climate actions, it lacks detailed mechanisms for allocating such support to the most vulnerable communities.

In addition to the right to food, Namibia's climate policies, particularly UNDC-2 and FAC, show a high level of integration of the right to physical and mental health. These documents emphasise the importance of addressing health impacts related to climate change, reflecting a comprehensive approach to safeguarding both physical and mental well-being. The integration of health and human rights policies within all the documents is a positive step towards ensuring that health objectives are met within the broader climate actions. Also, advocacy for developing a resilient health system is another significant strength of these policies. UNDC-2, FAC, and NPCC all highlight the need for health systems that can adapt and effectively respond to climate-induced health threats. Additionally, the focus on early warning systems within these policies demonstrates the extent of efforts to enhance public health preparedness by decreasing the health risks associated with climate change.

However, some gaps regarding the right to health in the context of climate change require future consideration. Specifically, all the policies fail to address access to reproductive health services, which is a vital component of the right to health, particularly during climate-related emergencies. Additionally, the lack of provision for protecting against sexual harm in these policies is a significant oversight, as sexual violence can escalate during or after natural disasters, making women more vulnerable.

Lowest score for human rights integration

In contrast to the strong integration of human rights in Namibia's climate policies discussed above, the analysis reveals weaker integration in specific areas, particularly concerning the rights of the elderly, persons with disabilities, and children. The rights of the elderly are insufficiently addressed across Namibia's climate policies. As shown in Figure 1, NPCC scores the highest among the documents, with the explicit acknowledgement that the elderly should be included in climate change planning and policymaking and the recognition that they are a vulnerable group.

Furthermore, NPCC and UNDC-2 value traditional knowledge, ensuring that the benefits of the contributions of older community members are not lost, and recognising the crucial role they play. However, more explicit mechanisms are needed to secure their involvement in decision-making processes, which could strengthen their participation. For example, critical areas such as access to health care, participation in sustainable livelihoods, and support for later-in-life learning opportunities are not adequately addressed. There is also a lack of focus on the elderly's rights in the FAC and NCCSAP documents, resulting in the risk of further marginalisation.

The rights of persons with disabilities are similarly underrepresented in Namibia's climate policies. Only UNDC-2 includes some references to a disability-inclusive approach, particularly in designing climate adaptation measures. However, significant gaps remain, including the absence of specific measures for accountability, accessibility, capacity-building, monitoring, social protection, and climate financing for persons with disabilities. Although NPCC directly mentions people with disabilities as amongst vulnerable groups that need to be empowered to effectively adapt to climate change impacts, this policy, like UNDC-2, performs poorly in integrating the rights of people with disabilities, with little or no mention of specific rights-based approaches.

Furthermore, the integration of children's rights in Namibia's climate policies is notably weak, particularly in international climate policies, with the lowest scores observed in UNDC-2 and FAC. However, NPCC shows more promise by addressing children's resilience, participation in climate policy formulation, access to education, and the right to health. NPCC explicitly mentions the integration of child welfare in climate policy, which constitutes an attempt to include children as key stakeholders in climate adaptation and mitigation (GRN, 2011).

While Namibia has significant commitments to protect children's rights due to its being a state party to the most relevant international legal instruments, and is obliged to conform to related treaties under Article 144 of the Constitution, UNDC-2 and FAC lack specific frameworks and strategies to address the unique vulnerabilities and rights of children. Although there is an acknowledgement of the disproportionate impacts of climate change on children in UNDC-2, there are no targeted measures to enhance children's rights in the climate change decision-making process.

Conclusion

The HRIFCPE that has been introduced and applied in this paper has proven to be a valuable tool for assessing the integration of human rights within Namibia's climate laws and policies. The HRIFCPE can be applied across various geographical and socioeconomic contexts to evaluate and enhance climate policies. This framework ensures that human rights are effectively considered and integrated into climate policies, promoting a more equitable and inclusive approach to climate action. However, the method introduced in this paper is relatively new, and the assessment criteria outlined in the HRIFCPE can be expanded and adapted based on local contexts and specific human rights challenges. This approach underscores the importance of a bottom-up approach to policy development, allowing for more tailored and relevant integration of human rights into climate policies.

An assessment under this framework highlights both significant advances and notable gaps in integrating human rights into climate policies. The most prominent gaps are found in the areas concerning the rights of the elderly, persons with disabilities, and children. These categories were either inadequately addressed or not addressed at all across the examined policies, revealing critical areas for improvement.

While to a degree, NPCC is inclusive in integrating the rights of the elderly, the other policies in most instances fail to specifically address rights in fields such as policymaking, access to health care, and livelihood participation. The lack of inclusion of the elderly in national and international climate action across all policies risks marginalising them from important climate actions. There is a notable absence of focus on ensuring access to essential health care, social services, cultural preservation, and later-in-life learning opportunities for the elderly in all the policies. This gap means that older individuals might not fully benefit from or contribute to climate resilience efforts, limiting the effectiveness and inclusivity of climate policies.

Furthermore, the rights of persons with disabilities are insufficiently addressed across Namibia's climate laws and policies. While UNDP2 addresses a few related criteria, there are significant gaps in inclusion, social protection, accessibility, capacity building, and financial support. These gaps suggest that persons with disabilities may be disproportionately affected by climate change as they are not afforded adequate policy support. Addressing these criteria is crucial to ensure that Namibia's updated or newly developed climate policies are truly inclusive, and that neither persons with disabilities nor the elderly are left behind in the fight against climate change.

Conversely, the HRIFCPE shows that women's rights and the human rights of people in vulnerable situations are well-represented in all assessed climate policies. Women's empowerment and inclusion in decision-making, and gender-responsive climate actions are consistently highlighted across all the climate policies, particularly in UNDC-2 and FAC, which could be applied as guidance for other countries seeking to integrate women's rights in their NDCs or national adaptation plans. Still in this category, critical areas such as protection against gender-based violence and gender-specific budgeting are underrepresented, which could serve as entry points for future climate policy efforts.

In addition, the policies strongly emphasise the inclusion of vulnerable communities in climate action, with notable references to inclusive climate action, access to information, and participation in decision-making processes. However, in Namibia's climate policies, access to justice is insufficiently addressed. None of the assessed policies explicitly incorporate mechanisms to ensure that vulnerable populations can access the legal system to defend their rights against climate-related harm.

Ultimately, since the HRBA is not a very clear framework and lacks comprehensive guidelines for integrating human rights into climate policies, frameworks such as the HRIFCPE introduced in this paper can be indispensable. They can assist in ensuring that climate policies do not overlook the rights of those most affected, thereby safeguarding social justice. The identified gaps in Namibia's climate policies highlight critical entry points for future legislation. Addressing these gaps will ensure improved protection of human rights, particularly for neglected communities. Moreover, it can strengthen resilience to climate change, and promote social justice and sustainable development for present and future generations.

References

Amnesty International. (2024, April 23). *The state of the world's human rights: April 2024*. https://www.amnesty.org/en/documents/pol10/7200/2024/en/

Angula, M. N., & Menjono, E. (2014). Gender, culture, and climate change in Namibia. *Journal for Studies in Humanities and Social Sciences, 3*(1 & 2), 225-238.

Atapattu, S., & Schapper, A. (2019). Human rights and the environment: Key issues (1st ed.). Routledge. https://doi.org/10.4324/9781315193397

Climate Change Laws of the World. (n.d.). *Namibia*. Grantham Research Institute on Climate Change and the Environment. Retrieved June 14, 2024 from https://climate-laws.org/geographies/namibia

Fırat, E. (2023). Rights-based litigation in tackling climate change: Can the ECtHR be effective in protecting human rights in the context of climate change? *Law and Justice Review, (14)*26, 89–140. https://lawandjustice.taa.gov.tr/yuklenenler/dosyalar/dergiler/law/law-26/35f1df5d-7049-4674-a5e2-df7a80cc8dfa-5--laj-82-engin-firat.pdf

Gasparri, G., El Omrani, O., Hinton, R., Imbago, D., Lakhani, H., Mohan, A., Yeung, W., & Bustreo, F. (2021). Children, adolescents, and youth pioneering a human rights-based approach to climate change. *Health and Human Rights Journal, 23*(2), 95–108. https://pmc.ncbi.nlm.nih.gov/articles/PMC8694303/

GRN. (2011, October). *National policy on climate change for Namibia – 2010*. Ministry of Environment and Tourism. https://www.meft.gov.na/files/files/National%20Policy%20on%20Climate%20Change%20for%20Namibia%202011(1).pdf

GRN. (2014). *National climate change strategy & action plan 2013 – 2020*. Ministry of Environment and Tourism. https://www.meft.gov.na/files/files/National%20Climate%20Change%20Strategy%20and%20Action%20Plan%20brochure%202013%20-%202020.pdf

GRN. (2015, September). *Intended nationally determined contributions (INDC) of the Republic of Namibia to the United Nations Framework Convention on Climate Change.* https://www.meft.gov.na/files/files/Intended%20Nationally%20Determined%20Contributions%20(INDC)%20of%20Namibia%20to%20the%20UNFCCC%202015.pdf

GRN. (2020, March). *Fourth national communication to the United Nations Framework Convention on Climate Change*. Ministry of Environment and Tourism, Namibia. https://unfccc.int/sites/default/files/resource/Namibia%20-%20NC4%20-%20Final%20signed.pdf

GRN. (2021a). *Republic of Namibia: First adaptation communication*. MEFT. https://unfccc.int/sites/default/files/resource/namibia-adaptation-communication-to-the-unfccc.pdf

GRN. (2021b). *Namibia's updated nationally determined contribution 2021*. MEFT. https://unfccc.int/sites/default/files/NDC/2022-06/Namibia%27s%20Updated%20NDC_%20FINAL%2025%20July%202021.pdf

GRN. (2023). *Namibia's nationally determined contribution 2023: Second update*. MEFT. https://unfccc.int/sites/default/files/NDC/2024-01/FINAL%20UPDATED%20NAMIBIA%20NDC%202023.pdf

Horn, N. (2017). Transformative constitutionalism: A post-modern approach to constitutional adjudication in Namibia. In N. Horn & M. O. Hinz (Eds.), *Beyond a quarter century of constitutional democracy: Process and progress in Namibia* (pp. 241–264). Konrad Adenauer Stiftung. https://www.kas.de/documents/252038/253252/7_dokument_dok_pdf_48513_2.pdf/d857b710-88f7-83e5-faf4-444de2d0d2fe?version=1.0&t=1539656511881

Iipinge, E. M., Phiri, F. A., & Njabili, A. F. (2000). *The national gender study. Volume 1, main study*. University of Namibia.

Institute for Public Policy Research. (2022, April). H2: Transparency concerns dog 'largest tender in nation's history. *Procurement Tracker Namibia Issue No. 16, April 2022*. https://ippr.org.na/wp-content/uploads/2022/04/PTN16-web.pdf

IPC. (2024, July 8). *Namibia: Acute food insecurity analysis: April – September 2024.* IPC Global Support Unit. https://reliefweb.int/report/namibia/namibia-acute-food-insecurity-analysis-april-september-2024-published-8-july-2024

IPCC. (2014a, October). *Fifth assessment report*. https://www.ipcc.ch/assessment-report/ar5/

IPCC. (2014b). *Climate change 2014: Impacts, adaptation, and vulnerability. Part A: Global and sectoral aspects* (C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, M. Chatterjee, K. L. Ebi, Y. O. Estrada, R. C. Genova, B. Girma, E. S. Kissel, A. N. Levy, S. MacCracken, P. R. Mastrandrea, & L. L. White, Eds.). Cambridge University Press. https://www.ipcc.ch/report/ar5/wg2/

Jacobson, J. O., Smith, J. L., Cueto, C., Chisenga, M., Roberts, K., Hsiang, M., Gosling, R., Mumbengegwi, D., & Bennett, A. (2019, May 22). Assessing malaria risk at night-time venues in a low-transmission setting: A time-location sampling study in Zambezi, Namibia. *Malaria Journal*, *18*(179), 1–11. https://doi.org/10.1186/s12936-019-2807-x

Jodoin, S., Snow, S., & Corobow, A. (2020, March). Realizing the right to be cold? Framing processes and outcomes associated with the Inuit petition on human rights and global warming. *Law & Society Review*, *54*(1), 168–200. Cambridge University Press. https://doi.org/10.1111/lasr.12458

Jodoin, S., Savaresi, A., & Wewerinke-Singh, M. J. (2021, July). Rights-based approaches to climate decision-making. *Current Opinion in Environmental Sustainability*, *52*, 45–53. 10.1016/j.cosust.2021.06.004

Keja-Kaereho, C., & Tjizu, B. R. (2019, March). Climate change and global warming in Namibia: Environmental disasters vs. human life and the economy. *Management and Economics Research Journal*, *5*(S3), 1–11. https://www.researchgate.net/publication/332006884_Climate_Change_and_Global_Warming_in_Namibia_Environmental_Disasters_vs_Human_Life_and_the_Economy

Knox, J. H. (2016, February 1). *Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment.* United Nations Human Rights Council. https://digitallibrary.un.org/record/831230?ln=en&v=pdf

Lottje, C., Hirsch, T., & Minninger, S. (2017). *Poverty orientation and civil society participation in national adaptation plans (NAP)*. German Climate Finance. https://www.germanclimatefinance.de/2017/02/08/poverty-orientation-civil-society-participation-national-adaptation-plans-nap/

Malé Declaration on the Human Dimension of Global Climate Change. (2007). https://www.ciel.org/Publications/Male_Declaration_Nov07.pdf

Mapaure, I. (2022). Review of the climate change situation in Namibia: Projected trends, vulnerability, and impacts. In O. C. Ruppel & K. Ruppel-Schlichting (Eds.), *Environmental Law and Policy in Namibia 43* (4th ed., pp. 533–560). Nomos. https://doi.org/10.5771/9783748933564

Mendelsohn, J. (2006). *Farming systems in Namibia*. RAISON (Research & Information Services of Namibia). https://www.raison.com.na/sites/default/files/Farming%20systems%20in%20Namibia.pdf

Midgley, G., Hughes, G., Thuiller, W., Drew, G., & Foden, W. (2005). *Assessment of potential climate change impacts on Namibia's floristic diversity, ecosystem structure, and function*. South African National Biodiversity Institute, Climate Change Research Group.

https://www.sanbi.org/wp-content/uploads/2018/04/midgley-et-al-2005-namibian-ecological-impacts-climate-change-report-final-14-apr-05.pdf

OHCHR. (2009). *Report of the Special Rapporteur on the right to housing as a component of the right to an adequate standard of living and on the right to non-discrimination in this context* (A/64/255). United Nations. https://documents.un.org/doc/undoc/gen/n09/446/64/pdf/n0944664.pdf

OHCHR. (2010). *Applying a human rights-based approach to climate change negotiations, policies, and measures*. UNCC:Learn. https://www.uncclearn.org/resources/library/applying-a-human-rights-based-approach-to-climate-change-negotiations-policies-and-measures/

OHCHR. (2015). *Understanding human rights and climate change.* United Nations. https://www.ohchr.org/sites/default/files/Documents/Issues/ClimateChange/COP21.pdf

OHCHR. (2016). *Analytical study on the relationship between climate change and the human right of everyone to the enjoyment of the highest attainable standard of physical and mental health: Report of the Office of the United Nations High Commissioner for Human Rights* (A/HRC/32/23). United Nations. https://documents.un.org/doc/undoc/gen/g16/092/02/pdf/g1609202.pdf

OHCHR. (2017). *Analytical study on the relationship between climate change and the full and effective enjoyment of the rights of the child: Report of the Office of the United Nations High Commissioner for Human Rights* (A/HRC/35/13). https://documents.un.org/doc/undoc/gen/g17/110/91/pdf/g1711091.pdf

OHCHR. (2019). *Analytical study on gender-responsive climate action for the full and effective enjoyment of the rights of women: Report of the Office of the United Nations High Commissioner for Human Rights* (A/HRC/41/26). United Nations. https://documents.un.org/doc/undoc/gen/g19/120/13/pdf/g1912013.pdf

OHCHR. (2020). *Analytical study on the promotion and protection of the rights of persons with disabilities in the context of climate change: Report of the Office of the United Nations High Commissioner for Human Rights* (A/HRC/44/30). United Nations. https://www.ohchr.org/en/documents/thematic-reports/ahrc4430-analytical-study-promotion-and-protection-rights-persons-disabilities

OHCHR. (2021a, September 8). *Fact sheet no. 38: Frequently asked questions on human rights and climate change*. United Nations. https://www.ohchr.org/en/publications/fact-sheets/fact-sheet-no-38-frequently-asked-questions-human-rights-and-climate

OHCHR. (2021b). *Analytical study on the promotion and protection of the rights of older persons in the context of climate change: Report of the Office of the United Nations High Commissioner for Human Rights* (A/HRC/47/46). United Nations. https://digitallibrary.un.org/record/3927180?ln=en&v=pdf

OHCHR. (2022). *Impacts of climate change on the human rights of people in vulnerable situations: Report of the Secretary-General* (A/HRC/50/57). United Nations. https://www.ohchr.org/en/documents/thematic-reports/ahrc5057-impacts-climate-change-human-rights-people-vulnerable

OHCHR. (2024). *Measures for minimizing the adverse impact of climate change on the full realization of the right to food - Report of the United Nations High Commissioner for Human Rights* (A/HRC/55/37). United Nations. https://www.ohchr.org/en/documents/thematic-reports/ahrc5537-measures-minimizing-adverse-impact-climate-change-full

Orellana, M. A. (2012). A human rights-based approach to climate change. In J. Parra (Ed.), *The human rights-based approach: A field of action for human rights education* (pp. 39–56). Les Éditions du CIFEDHOP.

Reid, H., Sahlén, L., Stage, J., & MacGregor, J. (2007). *The economic impact of climate change in Namibia: How climate change will affect the contribution of Namibia's natural resources to its economy* [Environmental Economics Programme Discussion Paper 07-02]. International Institute for Environment and Development. https://www.researchgate.net/publication/237559917_The_economic_impact_of_climate_change_in_Namibia_How_climate_change_will_affect_the_contribution_of_Namibia's_natural_resources_to_its_economy

Ruppel, O. C. (Ed.). (2008). *Women and custom in Namibia: Cultural practice versus gender equality?* Konrad-Adenauer-Stiftung/Macmillan Education.

Ruppel, O. C. (2022). Climate change de facto and de jure: Legal and regulatory aspects relevant to Namibia. In O. C. Ruppel & K. Ruppel-Schlichting (Eds.), *Environmental law and policy in Namibia* (4th ed., pp. 561–602). Nomos. https://doi.org/10.5771/9783748933564

Ruppel, O. C., & Ruppel-Schlichting, K. (2017). Namibia's Constitution in the context of environmental protection and combatting climate change. In N. Horn & M. O. Hinz (Eds.), *Beyond a quarter century of constitutional*

democracy: Process and progress in Namibia (pp. 103–134). Konrad Adenauer Stiftung. https://www.kas.de/documents/252038/253252/7_dokument_dok_pdf_48513_2.pdf/d857b710-88f7-83e5-faf4-444de2d0d2fe?version=1.0&t=1539656511881

Turpie, J., Midgley, G., Brown, C., Barnes, J., Pallett, J., Desmet, P., & Tarr, P. (2010). *Climate change vulnerability and adaptation assessment for Namibia's biodiversity and protected area system*. Namibia Nature Foundation. https://www.meft.gov.na/files/files/Climate%20Change%20Vulnerability%20and%20Adaptation%20Assessment%20for%20Namibia's%20Biodiversity%20and%20Protected%20Area%20System%202010.pdf

UNFCCC. (2011). *Report of the Conference of the Parties on its sixteenth session, held in Cancun from 29 November to 10 December 2010: addendum: Part Two: Action taken by the Conference of the Parties at its sixteenth session*. United Nations. https://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf

UNFCCC. (2015). *Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015* ["Paris Agreement"] (UNFCCC/CP/2015/10/Add.1, pp. 1–32). United Nations. https://unfccc.int/sites/default/files/resource/docs/2015/cop21/eng/10a01.pdf

UNFCCC. (n.d.-a). *National Communication submissions from Non-Annex I Parties*. Retrieved [July 15, 2024], from https://unfccc.int/non-annex-I-NCs

UNFCCC. (n.d.-b). *Nationally determined contributions registry*. Retrieved [July15, 2024], from https://unfccc.int/NDCREG

UNFCCC. (n.d.-c). *Biennial update report submissions from Non-Annex I Parties*. Retrieved [July 15, 2024], from https://unfccc.int/BURs

UNFCCC. (n.d.-d). Annual climate reports submissions. Retrieved [July 15, 2024], from https://unfccc.int/ACR

United Nations Human Rights Council. (2008a). *Resolution 7/23 on climate change and human rights* (A/HRC/RES/7/23). https://ap.ohchr.org/documents/e/hrc/resolutions/a_hrc_res_7_23.pdf

United Nations Human Rights Council. (2008b). *Report of the Special Rapporteur on the right to food, Jean Ziegler: addendum* (A/HRC/7/5). https://digitallibrary.un.org/record/622147?v=pdf

Van Wyk, L.-A. (Ed.) . (2015). *Commemorating twenty years of tackling climate change in Namibia: 1995-2015*. Hanns Seidel Foundation Namibia. https://namibia.hss.de/fileadmin/user_upload/Projects_HSS/Namibia/Dokumente/bis_2016/20_YEARS_OF_TACKLING_CLIMATE_CHANGE_IN_NAMIBIA_1995_-_2015.pdf

Vu, B. (Ed.). (2022). *Handbook: Applying a human rights-based approach to development and humanitarian programming. People in need*. https://resources.peopleinneed.net/documents/1194-hrba-handbook---single-paged.pdf

Wilhelm, M. (2012, October). *Impact of climate change in Namibia: A case study of Omusati Region* [Master's mini-thesis, Polytechnic of Namibia]. Polytechnic of Namibia Library. https://ir.nust.na/server/api/core/bitstreams/00d6195c-a7af-4a86-926c-05b60193d932/content

World Health Organization (WHO). (2024, September 3). *Namibia celebrates progress towards eliminating malaria.* https://www.afro.who.int/countries/namibia/news/namibia-celebrates-progress-towards-eliminating-malaria

World Bank Group. (2021). *Climate risk country profile: Namibia*. World Bank. https://climateknowledgeportal.worldbank.org/sites/default/files/2021-08/15931-WB_Namibia%20Country%20Profile-WEB.pdf

Climate Change, Exploitative Paradigms and Neocolonial Energy Transitions in Africa

Bruno Venditto

Abstract

This article addresses how climate change and energy colonialism intersect in Africa. The continent is experiencing renewed interested from both Western and Asian countries that often replicates historical patterns of exploitation. As global temperatures rise due to human-induced climate change, the urgency for renewable energy sources has intensified. However, this transition is not merely a technological shift; it is deeply entwined with the legacy of colonialism, which continues to shape the dynamics of resource extraction and energy production in Africa. The modern energy transition, initially driven by the scarcity of resources, is now increasingly motivated by the need to address climate change. This shift represents a fundamental transformation in energy systems, encompassing production, distribution, and consumption. Yet, as Africa seeks to adopt renewable energy technologies, there is a risk that the new energy paradigm may perpetuate colonial-like exploitation, where foreign interests dominate local resources and decision-making processes. Through the use of secondary sources, this paper provides some theoretical insights and empirical evidence to counterbalance official narratives portraying the social benefits of decarbonisation and renewable energy initiatives, emphasising their potential to foster local economic development, create jobs, and enhance energy security. The article concludes that the energy policies of the wealthiest nations and large corporations do not aim to fundamentally alter the prevailing models of production and consumption, and that hence they do not really address climate change. Consequently, these policies are not sustainable for the territories involved, particularly in the Global South.

Keywords: Africa, climate change, green colonialism, energy transition

Introduction

The implications of climate change are extensive, impacting security, the environment, the economy, and social justice due to the interconnectedness of various societal sectors. Its effects are global, transcending national borders, necessitating immediate and coordinated action from the international community. The energy

transition emerges as a direct response to this crisis. The term "energy transition" was first introduced by U.S. President Carter in the late 1970s, emphasising the need for a shift towards conservation and renewable energy sources as fossil fuels became scarce.

Although initially driven by resource scarcity, the modern energy transition, emerging in the nineties, appears to be motivated primarily by the risk associated with the effects of climate change, signifying a systemic transformation in how we produce, distribute, and consume energy. This led to the signing of international agreements to reduce greenhouse gas emissions and move urgently towards the use of renewable energy.

The urgency of the issues raised by climate change demands that we rethink not only our energy systems, but also our consumption patterns. This shift is not just about adopting new technologies, but also about fostering a cultural transformation that prioritises sustainability and environmental responsibility. To effectively address climate change, we must challenge the existing paradigms of consumerism that typically prioritise short-term gains over long-term sustainability.

In this context, the energy transition must be viewed as an opportunity to redefine our relationship with energy, resources, and modes of production with a view to promoting a more equitable and sustainable future. This involves not only technological advancements but also a fundamental re-evaluation of societal values and behaviours related to energy consumption. By aligning our economic systems with ecological principles, we can create a more resilient society capable of reversing the damages inflicted on the environment which are leading to climate change.

Achieving net-zero emissions and mitigating the impacts of climate change will require coordinated global actions that extend beyond merely reducing fossil fuel use. It is crucial to incorporate improvements in energy efficiency across various sectors, promote behavioural change, and eventually shift the consumerism philosophy that underpins the capitalist mode of production which is ultimately the cause of the same climate change we are trying to address by using alternative sources of energy (Sánchez Contreras et al., 2023).

It is in this context that the actions undertaken on the African continent, and often promoted by the countries of the Global North, primarily the countries of the European Union, are inserted into the debate.

The thesis of this article is formulated around research questions that

ultimately aim to investigate the possible connection between the achievement of the goal of zero emissions and the forms of extractivism that, under the banner of energy transition, actually end up reproposing forms of colonialism, which perpetuate the dependence of the African continent on the countries of the Global North (Ederhardt, 2023), while not addressing the challenges of climate change.

The paper critically investigates the relationship between energy colonialism and climate change in Africa, emphasising how historical patterns of exploitation evocative of colonial practices have an impact on the continent's shift to renewable energy sources. It looks at how this change will affect the larger socioeconomic scene and asks whether the energy policies now in place actually help the affected regions, or if they are just a continuation of historical injustices.

The paper highlights important concerns regarding social justice in the form of ownership, control, and the fair distribution of benefits obtained from these resources as Africa looks to adopt renewable energy technologies to address climate change. The need for renewable energy sources in Africa has increased due to the necessity of tackling climate change. This shift is not just technological, but also intricately linked to colonial legacies that still have an impact on resource extraction and energy production. The resurgence of Western and Asian countries' interest in Africa's resources appears to be a reflection of past colonial exploitation.

This pattern highlights the risk that the new energy paradigm may perpetuate colonial-like exploitation, whereby foreign entities dominate local resources and decision-making processes. It also raises questions about whether the current energy transition will truly benefit African nations, or merely serve foreign interests. These dynamics jeopardise the possible advantages of renewable energy for local communities.

Linkages between Climate Change and the Energy Transition

Climate change stands as one of the most pressing challenges of the twenty-first century. It is primarily characterised by the rise in global temperatures. While it is commonly believed that global warming occurs naturally and gradually (Venditto et al., 2023), human activities are accelerating this warming at an unprecedented rate (NASA, n.d. a; National Research Council, 2020; Hausfather, 2017). Therefore, the United Nations Framework Convention on Climate Change (United Nations, n.d. a, p. 1, art. 2) defines climate change as the result of both direct and indirect

human actions that modify the global atmosphere alongside natural climate variations. This acceleration is largely attributed to increased emissions of CO2 and other greenhouse gases, which alter the atmosphere's radiative properties and contribute to global warming (NASA, n.d. b; Fecht, 2021). The combustion of coal, oil and gas by the energy sector is responsible for about three-quarters of greenhouse gas emissions globally (Client Earth, 2022; International Energy Agency, 2024).

The decade 2010–2020 marked the hottest period since records began in 1880, with the average global temperature in 2022 approximately 0.86°C above the 20th century average, making it one of the warmest years ever recorded, alongside unprecedented ocean temperatures (Bardan, 2023). Despite being a minor contributor to global warming, Africa is highly vulnerable to climate variability, experiencing more frequent and prolonged heat waves (Trisos et al., 2022). In fact, 2022 marked the 46th consecutive year of above-average temperatures in Africa (National Centers for Environmental Information, 2022), with rising temperatures threatening livelihoods and exacerbating existing challenges across the continent (Venditto et al., 2023).

Although the need to identify new forms of clean energy emerged as a tangible response to the looming 21st century climate crisis in the late 1970s, this need was already present, as indicated by US President Carter's Energy Nation address: "As we are now running out of gas and oil, we must prepare rapidly for a third shift toward rigorous conservation and renewed use of coal and permanent renewable energy sources such as solar power" (Carter, 1997, para. 10 and 13).

Carter's emphasis, however, was not on the effects on the climate of human actions, since the energy transition was motivated by the scarcity of a resource that led to the identification and use of alternative renewable/non-carbon resources such as photovoltaic energy or, as in the case of Germany, nuclear energy (Krause et al., 1980).

The Kyoto Protocol, adopted on 11 December 1997, was the first attempt to prevent dangerous anthropogenic interference with the climate system by proposing measures to reduce greenhouse gas concentrations in the atmosphere. It was, however, the 2015 Paris Agreement that sent a strong message to abandon fossil fuels and proceed rapidly towards their replacement with renewable and green energy sources.

In Paris, where COP 21 (the 21st session of the Conference of the Parties) was held, 196 nations agreed

to aim to limit global warming to well below 2°C by achieving carbon neutrality (net-zero carbon emissions) by 2050. Experts agree that achieving these goals is vital if global warming is to be kept to no more than 1.5°C above pre-industrial levels (United Nations, n.d. b). Several legislative proposals adopted by the European Union in 2021 aim to reduce greenhouse gas emissions by at least 50% by 2030 to reach the net-zero carbon emission target by 2050, as agreed in the Paris Agreement.

It is essential to increase the use of renewable energy to generate electricity and end dependence on fossil fuels which result in CO2 emissions; to implement policies that promote the use of solar, wind, hydroelectric and other renewable energy sources; and to invest in advanced energy storage technologies.

Hydrogen seems to be the perfect solution to respond to the need to use energy sources that do not emit CO2. It is practically not present in nature as a gas, but must be generated, usually through the electrolysis of water, and in this process, it is transformed into a gas that can be used for the exact same functions as any other combustible gas, such as natural gas, butane, propane, etc. In addition, it can be transported like fossil fuel gases. The even more important advantage is that when used, hydrogen does not produce CO2 or other air pollutants, but only water. As a result, when hydrogen is produced using renewable energy sources such as sunlight or wind, its total environmental impact, excluding all aspects of its distribution, is essentially zero (Cerqueda, 2022).

However, the prevailing renewable energy system follows the same capitalist market logic inherent in ecological destruction. This can be extrapolated from the words of the European Union (EU) Energy Commissioner, Kadri Simson: "A key element of this transition is establishing a competitive hydrogen market with dedicated infrastructure" (European Commission, 2021, para 3). The emphasis on creating competitive markets for renewable energy sources such as hydrogen reflects a broader trend within the renewable energy sector that prioritises profit and market dynamics over ecological sustainability. This capitalist approach can lead to the commodification of renewable resources, where the focus shifts from community benefit and environmental stewardship to maximising financial returns, and the drive for profit can overshadow the social and environmental goals that renewable energy projects are meant to achieve (Ćetković & Buzogány, 2021).

Africa and Energy Colonialism

Africa, thanks to its substantial natural resources and geographical proximity to Europe, seems to be the perfect place to engage in the production of renewable energy at competitive costs. At the same time, renewable energy projects could stimulate and support the economic development of producing countries, providing access to sustainable energy sources to over 640 million Africans who are currently deprived of it (African Development Bank, n.d. a).

The abundant solar irradiation and strong winds, as well as the hydroelectric potential, would in fact allow the production of clean and sustainable electricity, without relying on fossil fuels. Specifically, solar resources on the continent are evenly distributed, and solar irradiation is fairly evenly distributed among African countries; over 85% of African territory receives a GHI (global horizontal solar irradiation) equal to or greater than 2 000 kWh/m2/year. All this implies that theoretically, the solar energy potential obtainable in Africa is naturally high, and is estimated at 60 000 000 TWh (terawatt hours) per year, which represents almost 40% of the global total (Liu, 2015).

On the other hand, the wind potential is distributed a little less evenly than the solar one, as the wind speed is not always sufficient for traditional turbines. However, technological improvements with new generation turbines have expanded the possibilities of wind energy production and in as many as 27 countries, mainly in the Saharan and Sahelian zone and along the coast and in the mountainous areas of southern Africa, wind farms could now be installed. A recent World Bank study indicates that two-thirds of Africa's total wind potential is located in places with average wind speeds above 7.5 m/s (meters per second), and one-third in high-productivity locations with wind speeds above 8.5 m/s. This brings the total wind potential in Africa to almost 180 000 TWh/year, theoretically capable of supplying 250 times the electricity requirement of the entire continent. Despite this enormous potential, however, only 0.01% of this has thus far been accessed (Whittaker, 2020).

Hydroelectric energy holds potential for Africa, currently constituting around 16% of the electricity production on the continent. In some countries, such as the Democratic Republic of Congo, Ethiopia, Malawi, Mozambique, Uganda and Zambia, the share of hydroelectric energy in electricity production exceeds 90% (International Energy Agency, 2022a).

Unlike solar energy, and in part wind energy, the continent's hydrography

means that hydropower potential is unevenly distributed across the continent, with much of it located in West and Central Africa, and to a limited extent in East Africa and southern Africa. Africa's vast potential for clean, low-cost hydropower is yet to be exploited. Furthermore, the effects of climate change could compromise the reliability of hydropower systems, and therefore of energy production (International Energy Agency, 2020b)

Many African countries have recognised the relevance of renewable energy and its potential for delivering socioeconomic benefits, and have implemented supportive policies and regulatory frameworks to promote its development. There has been an upsurge in European interests in green hydrogen production in Africa. The use of solar or wind energy would allow for the goal of zero emissions by 2050 to be achieved (Cerqueda, 2022).

The challenge for Africa is the advanced technology and associated high costs required to build renewable energy plants and distribution systems. International partnerships and initiatives, such as the African Renewable Energy Initiative or the Scaling Solar programme, can provide financial and technical support for many of these projects by facilitating technology transfer, capacity-building and knowledge-sharing (African Development Bank, n.d. b; International Finance Corporation, n.d.). Renewable energy production offers a path to sustainable development, energy access, climate resilience and shared prosperity. This can only be achieved if renewable energy production does not become a form of colonialism. To avoid such an outcome, it will be necessary to depart from traditional development and industrialisation models associated with neoliberal capitalism, as these are based on the production and consumption of material wealth, which results in uneven development (Piketty, 2014; Zhu et al., 2023).

The roots of energy exploitation in Africa can be traced back to colonialism, where European powers extracted resources to fuel their industrial growth. The colonial era established a framework of extraction that prioritised the needs of the colonisers over the welfare of local populations. This historical context is crucial for understanding the current dynamics of energy transitions in Africa, (Frankema et al., 2015; Gareth, 2010).

The Berlin Conference (1884–1885) formalised the scramble for Africa (Michalopoulos & Papaioammou, 2016; Heldring, 2013) between the 19th century and the first half of the 20th century. During this period, the African territories that were considered freely

occupiable were divided on the basis of the balance of power existing between the European powers, and their spheres of influence on the continent. The United Kingdom, France, Portugal, Germany, Belgium and Italy were the main protagonists creating colonies and protectorates, governed by local puppet governments and supported by the European metropole, as they imposed their political and economic control in order to exploit the natural and human resources present on the continent.

It is emblematic that the Berlin Conference, at which no Africans were present, established what are still roughly the modern borders of African states – divisions that were often made following geographical coordinates, without any consideration of the characteristics of the resident populations. States, or ethnic groups that had a common historical, political, cultural heritage and that shared economic ties, were dismembered or, in some cases, disparate entities were forced to coexist, laying the foundations for future conflicts that arose once independence was achieved (Fischer, 2015).

The extractivist and exploitative nature of European colonial interests was often justified as a "civilizing mission". Chancellor Bismark opened the conference stating that: "The interest which the nations represented at this Conference take in the development of civilization in Africa, an interest continually demonstrated by bold enterprises of exploration on the part of each nation for one of these purposes, gives us a guarantee of the success of the work which we undertake to regulate and develop the commercial relations which our countrymen entertain with this continent and at the same time serve the cause of peace and humanity" (Filesi, 1985, p.16).

There is a tendency to underestimate the predatory nature of colonialism and give it a positive reading (Duignan & Gann, 1975). However, as a result of extractive colonialism, the economic system, the labour market and the structure of land ownership were profoundly modified on the basis of unequal exchange relations and a system of forced labour (Frankema, 2015). Combined with the disintegration and enslavement of the advanced societies that existed on the African continent, as underlined by Bairoch (1976, p.122), this reduced, "the possibilities of spontaneous industrialization ... practically to zero." As nations gained independence, the expectation was that they would reclaim control over their resources and develop energy systems that benefited their populations. However, the legacy of colonialism has proven resilient, manifesting in new forms of exploitation under the guise of renewable energy development.

The transition to renewable energy can lead to a new form of green colonialism since it is extractive in nature. We must be mindful of the fact that the production model based on extractivism is exploitative if it is not transformed. The chances are that the production of renewable energy will follow the colonial model and set off a new race to exploit and colonise new resources (Bruna, 2023).

Renewable Energy as a New Form of Colonialism

The production model rooted in natural resource extraction typically exhibits three key attributes (Acosta, 2013):

- a high level and intensity in the process of resource extraction;
- a low or minimal level of local processing of resources; and
- a significant quantity of extracted resources destined for export.

The appropriation of natural resources has been a fundamental aspect of the production process since the Industrial Revolution. This practice evolved into a systematic and organised form during colonial conquest. The extraction and export of raw materials, and the import of goods and manufactured goods created an unequal exchange of goods and services between the countries of the Global South and North; this development scholars have defined as 'dependency'. This unequal trading system persisted even after the colonies gained political independence (Archibong & Afolabi, 2023).

Extractive activities can be broadened to encompass renewable resource like solar and wind. It often prioritises the energy transition requirements of Global North nations, displaces local communities through land expropriation, and perpetuates existing energy-intensive global production and consumption patterns, along with maintaining the same political, economic, and social structures that perpetuate inequality (Hamouchene, 2022).

Due to their access to capital and technology, countries of the Global North, particularly the EU countries, can drive the development and diffusion of cost-effective solutions for the energy transition. The President of the European Commission in September 2022 announced the creation of the European Hydrogen Bank, which is intended to stimulate hydrogen production and achieve the objectives set in Paris, (Spinaci, 2024; European Commission 2020a). One of the bank's activities is to provide subsidies to renewable hydrogen producers within the EU, Norway and Iceland to achieve a reduction in supply costs and ensure that green hydrogen is

competitive with energy carbon-based fossil fuels. The dilemma is that these countries do not have raw materials to use to achieve the energy transition (European Commission, 2020b). A third of the mineral reserves needed for the energy transition, including platinum, coltan, cobalt, tantalum, lithium, copper, and rare earths, are present in Africa (Sartori et al., 2022).

Africa also has the large tracts of land needed to set up large photovoltaic, wind or green hydrogen plants (Nelson, 2020). To invest in and construct such plants, they need direct or indirect control over the raw materials (Zhang, et al. 2023). This raises the critical question of ownership over these resources. The exercise of this control can help to better understand the new phenomenon of green colonialism. It also raises questions about how local communities where such resources are located benefit from the energy produced.

In addition, there remain unanswered questions. These questions are around the ecological sustainability of the processes through which minerals needed for renewable energy are extracted, the working conditions and occupational health risks to workers employed in those extractive activities, and the competition between mainly transnational mining companies involved in such extraction and local communities over land and water resource. Therein lies the paradox of energy transition. To produce clean energy, it is very often necessary to use strategic resources of a mineral or natural nature. The construction, for example of electric batteries or green hydrogen, perpetuate negative social and environmental impacts by the extractive industry in the Global South (Allan et al. 2021).

There is also evidence that renewable energy production could lead to a net transfer of wealth from the poor to the rich through subsidies, discounted services and tax breaks offered by the host governments in the Global South. A case in point is the Ouarzazate's solar power plant in Morocco. It was built by expropriating 3 000 hectares of land from Amazigh agro-pastoralists, and came into operation in 2016. It has not brought any benefits to the displaced communities, and its annual deficit of around 80 million euros has been covered by the public coffers. In addition, the country has incurred a further 9 billion dollars in debt with the World Bank for its construction, for which the Moroccan government has provided guarantees. This potentially means more public debt for a country that is already burdened by debt. Finally, Ouarzazate is in a semi-arid region and the plant requires extensive use of water to cool the system and clean the solar panels, water that has been diverted from drinking and agricultural uses (Hamouchene, 2023).

Conclusions

The prevailing discourse around energy transition, entrenched, in the illusion of sustainability, tends to promote the idea that any shift towards renewable energy is inherently positive. However, this perspective overlooks the fact that the climate crisis is not solely a result of fossil fuel usage but rather stems from the unsustainable and destructive practices of capitalism that prioritise profit over ecological balance. The capitalist framework commodifies and privatises natural resources, perpetuating a cycle of exploitation that undermines the very goals of sustainability and social equity.

In many cases, renewable energy projects in developing regions are framed as opportunities for local development and climate resilience. However, they often serve the interests of western nations seeking to secure energy resources while maintaining their economic dominance. This neocolonial approach can lead to the appropriation of local resources, where the benefits of renewable energy production are siphoned off to serve the energy security needs of richer countries rather than addressing the local energy needs of the communities involved.

To genuinely address climate change and its impacts, a radical transformation of the global economic system is necessary. This transformation must prioritise social and ecological justice, dismantling the colonial relationships that continue to disenfranchise communities in the Global South. It is essential to ask critical questions about ownership, control, and the distribution of benefits from renewable energy projects. Without addressing these issues, the transition risks becoming a form of "green colonialism", where extraction and exploitation continue under the guise of environmental progress. A truly sustainable energy transition must go beyond simply replacing fossil fuels with renewable sources. It requires a comprehensive re-evaluation of production and consumption patterns, emphasising local needs and equitable resource management. Only by confronting the underlying structures of power and privilege can we hope to create an energy future that is just, equitable, and sustainable for all.

Consensus has been reached on the fact that the energy transition can be considered or interpreted as a new form of colonialism since, ultimately, it is based on access to and exploitation of the energy and mineral resources present in the countries of the Global South with little or no consideration for the needs or rights of local populations. The technologies and knowledge necessary for the energy transition are often developed and held by wealthier

nations or large corporations. This may limit the ability of developing countries to develop autonomous and sustainable energy solutions, thus maintaining a dependence on external suppliers.

Nations or companies leading the energy transition can exert significant economic and political influence over countries that supply resources or are recipients of energy technologies and infrastructure. This can lead to relationships of dependency and inequality, where richer countries or large corporations hold control over the energy sectors of less developed countries. While the energy transition aims to reduce greenhouse gas emissions and pollution, this can result in the production of toxic or hazardous waste, which is often disposed of in less developed countries or more vulnerable communities. This raises questions of environmental justice and fairness in the distribution of environmental burdens.

While the energy transition is critical to addressing climate change and reducing greenhouse gas emissions, it is important to recognise that it can carry colonial-like implications if it is not implemented with a fair and just perspective for all parties involved. It is necessary to adopt policies and practices that respect human rights, promote the participation of local communities, and contribute to reducing global inequalities.

The transition from an economy based on hydrocarbon energy to an economy based on renewable energy requires a transformation of production systems. It is not enough to replace energy sources; new technologies must be available that are compatible with renewable energy sources. Addressing green colonialism requires a commitment to decolonising environmentalism, which involves centring indigenous knowledge, perspectives and leadership in environmental decision-making. This includes recognising and respecting the land rights of local communities and supporting community-led conservation initiatives. Decolonising environmentalism also involves recognising the interconnectedness of social and environmental justice issues and working towards holistic solutions that prioritise equity and inclusion to achieve what we can call just sustainability; to coin a term, justainability. Green colonialism highlights the need for critical reflection on how environmental initiatives can perpetuate or challenge colonial legacies. By placing the principles of justice, equity and self-determination at the centre, it is possible to promote more inclusive and sustainable approaches to environmental management that respect the rights and dignity of all peoples and communities.

The shift from an economy based on hydrocarbon energy to an economy

based on renewable energy requires a paradigm change. It is not enough only to replace some energy sources with others; the new energy form also requires new production systems compatible with renewable energy sources, changing consumption patterns, and promoting circular economy models that encourage the sustainability of the planet's natural resources.

The paradox of the energy transition is embodied in the fact that energy transition requires new technologies that, though compatible with renewable energy sources, will continue to exacerbate the negative dynamics of social and environmental impact triggered by the extractive industry. In its effort to achieve decarbonisation objectives, the European Union is achieving carbon neutrality at the expense of the exploitation of natural resources in Africa. The spirit of the agreements between the EU and Africa exhibits goodwill on the part of the EU, but that alone is clearly insufficient. The energy transition may be motivated by good intentions, but the disconnection between social justice and sustainability can lead to socially unsustainable transitions, and it may once again become a trap for developing countries that will strengthen their economic dependence on natural resources: a sine die extension of energy neo-colonisation.

References

Acosta, A. (2013, August). Extractivism and neoextractism: Two sides of the same curse. In M. Lang, & D. Mokrani (Eds.), *Beyond development: Alternative visions from Latin America*. Transnational Institute / Rosa Luxemburg Foundation. https://www.tni.org/files/download/beyonddevelopment_complete.pdf

African Development Bank (n.d. a). *Light up and power Africa. A new deal on Energy for Africa*. https://www.afdb.org/en/the-high-5/light-up-and-power-africa-%E2%80%93-a-new-deal-on-energy-for-africa#:~:text=Universal%20Access%20to%20Electricity&text=Over%20640%20million%20Africans%20have,the%20lowest%20in%20the%20world.African

African Development Bank (n.d. b). Sustainable energy fund for Africa: Accelerating the energy transition in Africa. https://www.afdb.org/en/topics-and-sectors/initiatives-partnerships/sustainable-energy-fund-for-africa

Allan, J., Lakhal, H., & Lemaadel, M. (2021, November 10). *An unjust transition: Energy, colonialism and extractivism in occupied Western Sahara*. Transnational Institute. https://www.tni.org/en/article/an-unjust-transition

Archibong, E. I., & Afolabi, A. P. (2023). From colonial exploitation to renewable transition: A critical analysis of Africa's energy paradigm. *European Journal of Sustainable Development Research*, *7*(4), em0236. https://doi.org/10.29333/ejosdr/13635

Bairoch, P. (1975). *The economic development of the Third World since 1900*. Cynthia Postan, trans. University of California Press.

Bardan, R. (2023). *NASA says 2022 fifth warmest year on record, warming trend continues*. NASA. https://www.nasa.gov/news-release/nasa-says-2022-fifth-warmest-year-on-record-warming-trend-continues/

Bruna, N. (2023). *The rise of green extractivism: Extractivism, rural livelihoods and accumulation in a climate-smart world*. Routledge. https://www.routledge.com/The-Rise-of-Green-Extractivism-Extractivism-Rural-Livelihoods-and-Accumulation-in-a-Climate-Smart-World/Bruna/p/book/9781032398952?srsltid=AfmBOooNS5IWbJg7uKVqyV_Jq-JNxdK-qjpgkSEykovQejxn1gsseUdN_

Carter, J. (1997, April 18). *Address to the nation on energy*. The American Presidency Project. https://www.presidency.ucsb.edu/documents/address-the-nation-energy

Cerqueda, M. R. (2022). *¿Por qué hidrógeno y por qué ahora?* OBS Business School, Universitat de Barcelona. https://marketing.onlinebschool.es/Prensa/Informes/Informe%20OBS%20Mercado%20del%20Hidrogeno%202022.pdf

Ćetković, S., & Buzogány, A. (2021). *Varieties of capitalism and renewable energy development in the European Union: Towards a common but differentiated approach* [Conference Working Paper: "The 2020 Strategy Experience: Lessons for Regional Cooperation, EU Governance and Investment"]. DIW Berlin. https://www.diw.de/documents/dokumentenarchiv/17/diw_01.c.508438.de/cetkovic.pdf

Client Earth. (2022). *Fossil fuels and climate change: The facts*. https://www.clientearth.org/latest/news/fossil-fuels-and-climate-change-the-facts/

Duignan, P., & Gann, L. H. (1975). The economics of colonialism. *The Journal of African History*, *19*(2), 265–273. Cambridge University Press. https://www.jstor.org/stable/181602

Ederhardt, P. (2023). Germany's great hydrogen race: The corporate perpetuation of fossil fuels, energy colonialism and climate disaster. Corporate Europe Observatory. https://corporateeurope.org/en/GermanysGreatHydrogenRace

European Commission. (2020a). *A hydrogen strategy for a climate-neutral Europe*. https://energy.ec.europa.eu/system/files/2020-07/hydrogen_strategy_0.pdf

European Commission. (2020b). *Clean energy transition – technologies and innovations report*. https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52020SC0953

European Commission. (2021). *Commission proposes new EU framework to decarbonise gas markets, promote hydrogen and reduce methane emissions.* https://ec.europa.eu/commission/presscorner/detail/en/ip_21_6682

Falchetta, G. (2023, September 4). *Climate change will affect hydropower, African countries must be prepared*. The Conversation. https://theconversation.com/climate-change-will-affect-hydropower-african-countries-must-be-prepared-212659

Fecht, S. (2021). *How exactly does carbon dioxide cause global warming*? Columbia Climate School, State of the Planet. https://news.climate.columbia.edu/2021/02/25/carbon-dioxide-cause-global-warming/

Filesi, T. (1985). La partecipazione dell'Italia alla Conferenza di Berlino (1884-1885). *Africa*, *40*(1), 1–40. Centro Studi Paesi Extraeuropei. https://www.jstor.org/stable/40759786

Fischer, H. (2015). *130 years ago: Carving up Africa in Berlin*. DeutscheWelle. https://www.dw.com/en/130-years-ago-carving-up-africa-in-berlin/a-18278894

Frankema, E. (2015). *How Africa's colonial history affects its development.* World Economic Forum. https://www.weforum.org/agenda/2015/07/how-africas-colonial-history-affects-its-development/

Frankema, E., Williamson, J. G., & Woltjer, P. (2015, May). *An economic rationale for the African scramble: The commercial transition and the commodity price boom of 1845-1885* [Working Paper 21213]. National Bureau Of Economic Research. https://www.nber.org/system/files/working_papers/w21213/w21213.pdf

Gareth, A. (2010). African Economic Development and Colonial Legacies. *International Development Policy*, *1*, 11–32. Geneva Graduate Institute. https://doi.org/10.4000/poldev.78

Heldring, L. (2013, January 10). *Colonialism and development in Africa*. Vox EU. https://cepr.org/voxeu/columns/colonialism-and-development-africa

International Energy Agency. (2022a). *Africa energy outlook 2022*. IEA Publications. https://www.iea.org/reports/africa-energy-outlook-2022

International Energy Agency. (2020b). *Climate impacts on African hydropower*. IEA Publications. https://www.iea.org/reports/climate-impacts-on-african-hydropower

International Energy Agency. (2024, October). *Global energy and climate model*. IEA Publications. https://www.iea.org/reports/global-energy-and-climate-model

International Finance Corporation. (n.d.). *Scaling solar: The complete package*. World Bank Group. https://www.ifc.org/content/dam/ifc/doc/2023-delta/infra-factsheet-scaling-solar-2023.pdf

Hamouchene, H. (2022). *The Energy transition in North Africa: Neocolonialism again!* TNI. https://www.tni.org/en/article/the-energy-transition-in-north-africa

Hamouchene, H. (2023). *Dismantling green colonialism energy and climate justice in the Arab region*. Pluto Press. https://openresearchlibrary.org/content/00f17fce-1221-4a50-bc6e-643d19f790f7

Hausfather, Z. (2017). *Why scientists think 100% of global warming is due to humans.* Carbon Brief. https://www.carbonbrief.org/analysis-why-scientists-think-100-of-global-warming-is-due-to-humans/

Krause, F., Bossel, H., & Müller-Reißmann, K.-F. (1980). *Energie-Wende: Wachstum und wohlstand ohne Erdöl und Uran* ("*Energy transition: Growth and prosperity without oil and uranium*"). Frankfurt a.M.: S. Fischer [u.a].

Liu, Z. (2015). *Global energy interconnection*. Elsevier Science.

Michalopoulos, S., & Papaioammou, E. (2016). The scramble for Africa and its legacy. In M. Vernengo, E. P. Caldentey, & J. Ghosh (Eds.), *The new Palgrave dictionary of economics* (1–11). Palgrave Macmillan. https://link.springer.com/referenceworkentry/10.1057/978-1-349-95121-5_3041-1

NASA (n.d. a). Climate change. https://science.nasa.gov/climate-change/

NASA (n.d. b). Carbon dioxide. https://climate.nasa.gov/vital-signs/carbon-dioxide/?intent=121

National Centers for Environmental Information. (2022). *Annual 2022 global climate report*. https://www.ncei.noaa.gov/access/monitoring/monthly-report/global/202213

National Research Council. (2020). *Climate change: Evidence and causes: Update 2020*. The National Academies Press. https://doi.org/10.17226/25733

Nelson, A. J. (2020). *The renewable energy transition in Africa. Powering, access resilience and prosperity*. KfW Development Bank. https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2021/March/Renewable_Energy_Transition_Africa_2021.pdf

Piketty, T. (2014). About capital in the 21st Century. *American Economic Review*, *105*(5), 48–53. https://www.aboutthestories.com/s/Capital-In-The-21st-Century.pdf

Sánchez Contreras, J., Matarán Ruiz, A., Campos-Celador, A., & Fjellheim, E. M. (2023). Energy colonialism: A category to analyse the corporate energy transition in the Global South and North. *Land*, *12*, 1 241.

Sartori, N., Spinosa, L., & Burgo Rodriguez, S. (2022). *Terre rare e materiali critici al centro della transizione energetica*, ECCO Climate. https://eccoclimate.org/it/terre-rare-e-materiali-critici-al-centro-della-transizione-energetica/

Spinaci, S. (2024, October 20). European hydrogen bank - Q3 2023. European Parliament. https://www.europarl.europa.eu/legislative-train/spotlight-JD%2023-24/file-eu-hydrogen-bank#:~:text=For%20this%20aim%2C%20President%20von,the%20future%20market%20for%20hydrogen

Trisos, C. H., Adelekan, I. O., Totin, E., Ayanlade, A., Efitre, J., Gemeda, A., Kalaba, K., Lennard, C., Masao, C., Mgaya, Y., Ngaruiya, G., Olago, D., Simpson, N. P., & Zakieldeen, S. (2022, February 28). Climate change 2022: Impacts, adaptation and vulnerability [Contribution of Working Group II]. *IPCC sixth assessment report*. Cambridge University Press. https://www.ipcc.ch/report/ar6/wg2/

United Nations. (n.d. a). *Framework Convention on Climate Change*. https://unfccc.int/resource/docs/convkp/conveng.pdf

United Nations. (n.d. b) *The Paris Agreement: What is the Paris Agreement?* https://unfccc.int/process-and-meetings/the-paris-agreement

Venditto, B., Kamwanyah, J. N., & Nekare, C. (2023). Trapped in poverty and informality: The effects of climate change-induced migration on women in urban settlements in Windhoek. *Namibian Journal of Social Justice*, *3*, 136–167.

Whittaker, S. (2020, October 5). *Exploring Africa's untapped wind potential*. International Finance Corporation, World Bank Group. https://gwec.net/wp-content/uploads/2021/04/IFC-Africa-Wind-Technical-Potential-Oct-2020-1.pdf

World Wildlife Fund. (2020). *Rivers of the green heart of Africa: The Congo River, artery of the basin*. https://origin-congo.wwf-sites.org/congo_basin_at_a_glance/area/ecosystems/rivers/

Zhang, S. E., Bourdeau, J. E., Nwaila, G. T., & Ghorbani, Y. (2023). Emerging criticality: Unraveling shifting dynamics of the EU's critical raw materials and their implications on Canada and South Africa. *Resources Policy*, 86, 104247.

Zhu, M., Stern, S., Stiglitz, J. E., Liu, S., Zhang, Y., Li, J., Hepburn, C., Xie, C., Clark, A., & Peng, D. (2023). *Embracing the new paradigm of green development: China Carbon Neutrality Policy Framework research report*. The Grantham Foundation. https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2023/02/Embracing-the-New-Paradigm-of-Green-Development-in-China.pdf

Social Justice amidst Climate Change in Namibia's Community-based Natural Resources Management Programme

Selma Lendelvo and Sian Sullivan

Introduction

This case study outlines the intersections of social justice and climate change as they relate to the Community-based Natural Resources Management (CBNRM) programme in Namibia. In so doing, it outlines the challenges faced by diverse communities dwelling in Namibia's remaining communal lands in fully benefiting from natural resources in these areas. It also discusses the implications of these challenges for the well-being and development of these communities and offers recommendations to improve the efficacy of the CBNRM programme, focusing in particular on addressing existing barriers amidst the effects of climate change and the limitations imposed by inequalities in the sector. To provide some context for the severity of this issue, in May 2024 Namibia joined southern African countries such

Dug-out springs at Otjizeka / Xorib‖gams in Omatendeka Conservancy, Kunene Region
Source Sian Sullivan

as Malawi, Zambia and Zimbabwe in declaring a state of emergency due to drought considered to be associated with regional climate change (Angula, 2024).

The CBNRM programme in Namibia was established to empower rural community members living on communal land by granting them rights to manage and benefit from wildlife and other natural resources. Initiated through the Nature Conservation Amendment Act (5 of 1996), which provided a "conservancy amendment" to the Nature Conservation Ordinance 4 of 1975, the programme primarily targets Namibian communal lands, as defined under the Communal Land Reform Act (5 of 2002), where autocthonous, as opposed to settler, Namibians reside.

This law enables the formation of locally led institutions, known as conservancies, which are governed by elected community members. These conservancies are officially recognised and authorised by the Ministry of Environment, Forestry and Tourism (MEFT). The programme aims to promote sustainable resource management, enhance livelihoods, and support conservation efforts by ensuring that local communities directly benefit from their natural surroundings.

Background to CBNRM

Over the years, conservancies have become vital partners of the Namibian government in conservation efforts, significantly contributing to landscape protection, connectivity, and the promotion of ecosystems, key species, and genetic diversity. Bollig (2016) refers to Namibia's community conservation programme as the new commons, highlighting the devolution of rights over natural resources, especially for wildlife management. This programme empowers communities to make some decisions about utilisation, protection, investments, and the nature and distribution of benefits derived from their natural resources.

The CBNRM programme in communal areas has proven to be a crucial vehicle for enhancing economic development in rural Namibia through wildlife conservation and tourism, while promoting community participation (Bollig, 2016; Mosimane & Silva, 2014; Namibian Association of CBNRM Support Organisations (NACSO), 2021). This success can be attributed to the exponential growth of the programme since the 1996 amendment of the Nature Conservation Ordinance of 1975. The former Ministry of Environment and Tourism gazetted the first four conservancies in Namibia in 1998: Nyae Nyae Conservancy in Otjozondjupa Region; Salambala Conservancy in Zambezi

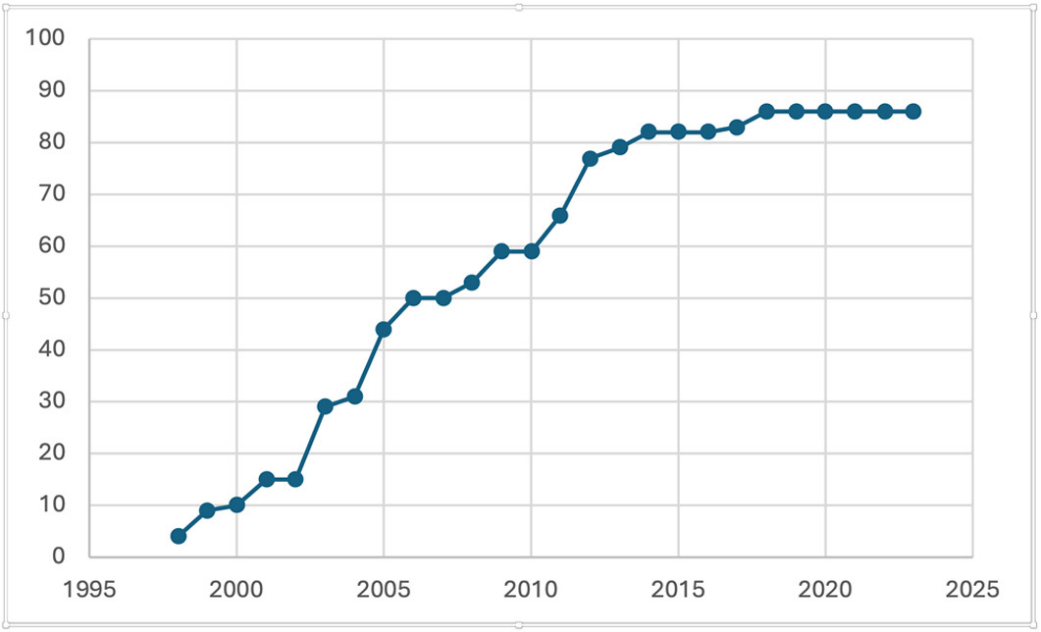
Region (then Caprivi Region); and Torra Conservancy and ǂKhoadi-ǁHôas Conservancy in Kunene Region. By 2022, there were 86 community-based conservation institutions, including 84 conservancies and two community conservation associations (see Figure 1). These institutions cover 58.7% of the communal areas in Namibia, or 20% of the country's total surface area (MEFT/NACSO, 2023).

Conservancies and conservation associations are community-led, with management committees elected in accordance with their constitutions and the standard operating procedures determined by the MEFT. In collaboration with NACSO, the MEFT has established a coordinated support system to strengthen these institutions' capacity to manage their natural resources with a view to sustainable development. Critical support areas provided by the government, NGOs, and other partners fall into three categories: institutional development; natural resources management; and business, enterprise and livelihoods development.

Governance structures of conservancies and associations have been strengthened over the years, demonstrated by the increasing number of conservancies complying with MEFT standard operating procedures. For example, more conservancies and associations are able to hold annual general meetings, a requirement for good governance that ensures the involvement of members in decision-making and amplifies their voices. Prudent financial management of the conservancies and associations is also evident, with an increasing number presenting annual financial reports. Additionally, the CBNRM programme continues to uphold gender equality within the management of natural resources. Over a third of the members of management committees are women (34%), and 19% of the conservancies and associations are led by female chairpersons (MEFT/NACSO, 2023).

Since the enactment of the Nature Conservation Amendment Act of 1996, significant progress has been made in developing various conservation initiatives and enterprises within conservancies aimed at community empowerment and development. Over 80% of these institutions have implemented effective community-level monitoring tools for natural resources. These include the Event Book system, game management and zonation plans, harvesting quotas, game guards, and annual game counts. Additionally, the Concession Policy, applied since 2007, allows conservancies to participate in tourism concessions within neighbouring protected areas, further integrating conservation and economic development.

Figure 1 *Trend in conservancy/association establishment in Namibia (1998–2022)*



Source: MEFT/NACSO (2023)

A major source of income for community members in these areas is employment from joint-venture tourism, conservancies/associations, conservation hunting, and member benefits. According to MEFT/NACSO (2023), in 2022, a total of N$75 million was paid to community members as salaries or allowances, and approximately 300 000 kg of game meat was distributed. The same report indicated that N$19 million was invested in the sector during 2022 in the form of cash benefits, community development and social projects.

In addition to these conservation efforts, several economic development initiatives have also been advanced. The MEFT and NACSO detailed this progress in their Annual Report for 2022, as illustrated below.

Summary of conservation and tourism developments directly benefitting local communities in conservancies/associations

Source: (MEFT/NACSO, 2023)

Challenges within the CBNRM Sector

Despite the positive intentions of the CBNRM programme, communities living in communal land areas (as defined by the Communal Land Reform Act of 2002) face several challenges that hinder their ability to benefit fully from wildlife, forestry and other natural resources. A significant challenge is low capacity amongst community members, many of whom have limited levels of education and lack opportunities for enhancing their skills and capacity, which prevents effective resource management and value addition. Several business interventions owned by the local communities struggle to sustain themselves because of this limited capacity, meaning that it is external private sector investors that tend to profit more from enterprises in communal areas (Schnegg & Kiaka, 2018; Kalvelage et al., 2020; Hewitson & Sullivan, 2021; Sullivan, 2023).

The challenge of low capacity-building is multifaceted and deeply rooted in historical, social, and economic contexts. Many community members have limited access to quality education, which hinders their ability to engage effectively in resource management activities. The lack of education translates into a deficiency in necessary skills for managing and

adding value to natural resources. This challenge is further compounded by the limited availability of training programmes aimed at enhancing the skills and building the capacity of these communities. Without targeted efforts to improve education and training, the full potential of these communities to manage and benefit from their natural resources remains untapped. In response to this concern, multiple training initiatives have been part of the CBNRM programme, facilitated by the government and associated NGOs. However, concern has been expressed that these trainings initiatives have not led to higher incomes. As a result, trained individuals have left conservancy committees and management positions for better job opportunities elsewhere. This makes the issue of capacity-building in communal conservancies and other related local institutions all the more complex.

In addition, access to financial resources is another major barrier. Without sufficient capital, communities cannot invest in the necessary infrastructure, technology, or training programmes, limiting their potential for economic development. Additionally, Namibia's arid climate exacerbates resource limitations, reducing the diversification of livelihoods that is primarily dependent on livestock and, to some extent, crop farming. "Human-wildlife conflict" is an additional factor impacting livelihoods in some contexts, and is also thought to be exacerbated by climate change (Lendelvo et al., 2021).

Land and resource ownership disparities constitute a significant social injustice faced by communities. Vast tracts of productive land and other valuable resources are state-owned, which limits direct and significant economic benefits accruing to rural communities. Moreover, over the years, communal conservancies in Namibia have been highly dependent on donor funding, with extensive technical support from the government and NGOs (Sullivan, 2002; Lendelvo et al., in press). While donor support has been beneficial, it has created a challenge for self-reliance among these communities. The COVID-19 pandemic highlighted this vulnerability, as the system nearly collapsed due to high dependence on external support (Lendelvo et al., 2020).

Infrastructural development is another significant challenge that affects the efficacy of the CBNRM programme. Many rural areas in Namibia suffer from inadequate infrastructure, including poor road networks, limited market access, and insufficient healthcare and educational facilities. These infrastructural deficiencies impede economic activities and limit access to essential

services, thereby restricting the overall development of these communities. Improving infrastructure is crucial for facilitating better market access, enhancing service delivery, and supporting economic activities that can drive community development.

The availability of capital is a critical issue for the success of the CBNRM programme. Many community members lack access to financial resources, which limits their ability to invest in necessary infrastructure, technology, and training programmes. This lack of capital prevents communities from fully realising the economic potential of their natural resources. Establishing financial mechanisms such as microfinance programmes, grants, and investment funds can provide communities with the capital they need to invest in sustainable development initiatives.

Trophy hunting is a traditional financial support mechanism for communal conservancies in Namibia. This industry, which involves hunting wildlife for trophies sold to tourists, has generated substantial revenue for communities. However, it is dominated by foreign businesspeople, with little capacity being transferred to native Namibians (Koot 2019; Kalvelage et al., 2023; Sullivan, 2023). This exclusivity limits the participation of local people in the lucrative trophy hunting business, perpetuating dependency on wealthier, resource-rich individuals. Facilitating the inclusion of native Namibians in the trophy hunting industry by providing training, financial support, and opportunities to enter and compete in this business may help reduce economic disparities and promote more equitable development, although significant concerns also exist regarding the impacts of such hunting on some CITES-listed species, as well as animal welfare more broadly and species social structures.

The lack of local participation in trophy hunting restricts economic opportunities for native Namibians and perpetuates reliance on external entities. Facilitating the inclusion of native Namibians in the trophy hunting industry by providing training, financial support, and opportunities to enter and compete in this business can help reduce economic disparities and promote more equitable development. At the same time, structural circumstances in which trophy hunting businesses tend to be based on or led from land acquired through settler colonialism is proving a significant barrier to such inclusion.

Climate Change and Environmental Constraints: Implications and Impact

Namibia's arid climate presents significant challenges for the CBNRM

programme. Water scarcity is the norm, and frequent droughts exacerbate resource limitations and reduce options for the diversification of livelihoods. Most communities primarily depend on livestock farming, with some engaging in crop farming. However, the limited availability of water and other natural resources coupled with limited capacities restricts the ability of these communities to diversify their livelihoods. Developing and promoting climate resilience strategies, including water conservation, drought-resistant crops, and sustainable land management practices, are essential for mitigating the impacts of climate change on these communities.

The dependence on narrow livelihood activities also increases the vulnerability of these communities to environmental and economic shocks. Most communities primarily rely on livestock farming, with some engaging in crop farming. However, the limited availability of water and other natural resources restricts their ability to diversify their livelihoods, making them more susceptible to the impacts of climate change and other environmental challenges. The development and promotion of climate resilience strategies, including water conservation, drought-resistant crops, and sustainable land management practices, are essential for mitigating these impacts and promoting sustainable development.

Inadequate infrastructure, education, and financial resources further compound the challenges faced by these communities. Poor infrastructure limits market access and restricts economic opportunities, while inadequate education and training prevent effective resource management and value addition. The lack of financial resources prevents communities from investing in essential infrastructure, technology, and training programmes, limiting their potential for economic development. Establishing financial mechanisms such as microfinance programmes, grants, and investment funds can provide communities with the capital they need to invest in sustainable development initiatives.

The high dependency on donor funding also renders communal conservancies vulnerable to external shocks. The COVID-19 pandemic highlighted this vulnerability, as the system nearly collapsed due to high dependence on external support. Promoting self-reliance by developing strategies to reduce dependency on donor funding is vital. This includes fostering local entrepreneurship, improving financial management skills, and creating sustainable income streams within the communities.

Conclusions

Rural communal communities in conservancies face significant challenges in fully benefiting from the CBNRM programme, which are rooted in historical, social, and economic contexts. The colonial legacy and historical injustices have left many native Namibians with limited access to productive land, valuable resources, and quality education, perpetuating cycles of poverty and underdevelopment. These historical factors have led to persistently low income levels among rural communities, hindering their ability to fully engage in and benefit from wildlife management and tourism-based economic activities. Poverty in rural Namibia, including within the CBNRM programme, is extreme and possibly worsening. The sustainability of the CBNRM programme is a major concern that needs urgent attention, especially given the widespread poverty and declining wildlife populations in rural areas. To achieve social justice and foster sustainable development amidst climate change impacts, Namibia must undertake significant reforms.

References

Angula, V. (2024, July 2). Southern Africa climate tipping points. *Evergreen News*. https://evergreennews.lymamedia.com/2024/07/02/southern-africa-climate-tipping-points/

Bollig, M. (2016). Towards an Arid Eden? Boundary making, governance and benefit sharing and the political ecology of the "new commons" of Kunene Region, Northern Namibia. *International Journal of the Commons*, *10*(2), 771–799. http://www.thecommonsjournal.org. DOI: 10.18352/ijc.702

Hewitson, L., & Sullivan, S. (2021). Producing elephant commodities for 'conservation hunting' in Namibian communal-area conservancies. *Journal of Political Ecology 28*, 1–24. https://doi.org/10.2458/jpe.2279

Kalvelage, L., Revilla Diez, J., & Bollig, M. (2020). How much remains? Local value capture from tourism in Zambezi, Namibia. *Tourism Geographies*, *24*(4–5), 759–80. https://doi.org/10.1080/14616688.2020.1786154

Kalvelage, L., Revilla Diez, J., & Bollig, M. (2023). Valuing nature in global production networks: Hunting tourism and the weight of history in Zambezi, Namibia. *Annals of the American Association of Geographers 113*(8), 1 818–1 834. https://doi.org/10.1080/24694452.2023.2200468

Koot, S. (2019). The limits of economic benefits: Adding social affordances to the analysis of trophy hunting of the Khwe and Ju|'hoansi in Namibian CBNRM. *Society and Natural Resources*, *32*(4), 417–433. https://doi.org/10.1080/08941920.2018.1550227

Lendelvo, S., Mechtilde, P., & Sullivan, S. (2020). A perfect storm? COVID-19 and community-based conservation in Namibia. *Namibian Journal of Environment*, *4*(B), 1–15. http://www.nje.org.na/index.php/nje/article/view/volume4-lendelvo

Lendelvo, S., Nghitevelekwa, R., & Pinto, M. (2021). Gendered climate change-induced human-wildlife conflicts (HWC) amidst COVID-19 in the Erongo Region, Namibia. In S. Böhm, & S. Sullivan (Eds.), *Negotiating climate change in crisis* (159–172). Open Book Publishers. www.openbookpublishers.com/books/10.11647/obp.0265/chapters/10.11647/obp.0265.12

MEFT/NACSO. (2023). *The state of community conservation in Namibia: Annual report 2022*. Namibian Association of CBNRM Support Organisations. https://www.nacso.org.na/sites/default/files/The%20State%20of%20Community%20Conservation%20Report%202020%20book.pdf

Mosimane, A. W., & Silva, J. A. (2014). Boundary-making in conservancies: The Namibian experience. In M. Ramutsindela (Ed.), *Cartographies of nature: How nature conservation animates borders* (83–111). Cambridge Scholars Publishing.

NACSO. (2021)

Schnegg, M. and Kiaka, R. D. (2018). Subsidized elephants: Community-based resource governance and environmental (in) justice in Namibia. *Geoforum*, *93*, 105–115. https://doi.org/10.1016/j.geoforum.2018.05.010

Sullivan, S. (2002). How sustainable is the communalising discourse of 'new' conservation? The masking of difference, inequality and aspiration in the fledgling 'conservancies' of Namibia. In D. Chatty, & M. Colchester (Eds.), *Conservation and mobile indigenous people: Displacement, forced settlement and sustainable development*. Berghahn Press.

Sullivan, S. (2023). "Hunting Africa": How international trophy hunting may constitute neocolonial green extractivism. *Journal of Political Ecology*, *30*. https://doi.org/10.2458/jpe.5489

Exploring Climate Justice through Environmental Adaptation: A Case Study of Namibia

Jasper D. Kassoma

Introduction

This article explores the concept of climate justice within the framework of Namibia's environmental adaptation. It focuses on Namibia's susceptibility to the climate crisis as a developing, semi-arid country. While environmental adaptation strategies are crucial for mitigating these challenges and safeguarding the livelihoods of affected communities, there are concerns regarding the equitable distribution of resources. The article identifies key challenges and gaps in achieving climate justice. It also assesses the effectiveness of ongoing adaptation efforts and evaluates how they address social justice and equity concerns, and the needs and priorities of Namibia's poor. Specifically, the study examines current adaptation initiatives as contextualised in the socioeconomic realities and vulnerabilities of poor communities in Namibia. The article further examines the adequacy of existing financing mechanisms in support of Namibia's environmental adaptation initiatives. Finally, the study recommends mechanisms to be applied to attain climate justice and environmental adaptation.

The relationship between climate justice and adaptation measures

Figures 1, 2 and 3 below1 illustrate Namibia's vegetation cover, and temperature and rainfall patterns, which are all directly affected by climate change.

Climate justice requires fairness in addressing both the causes and impacts of climate change (Mwenda & Bond, 2020). Countries in the Global North, which have historically contributed the most to climate change, have a responsibility to support the Global South in adopting sustainable, climate-resilient practices (Arcaya & Gribkoff, n.d.). In Namibia, as in many developing countries, the poorest and most vulnerable communities who are the least responsible for climate change suffer the most from its impacts (Newsham & Thomas, 2009).

1 Source (Figure 1, Figure 2 & Figure 3): Author

Figure 1 *Namibian vegetation map*

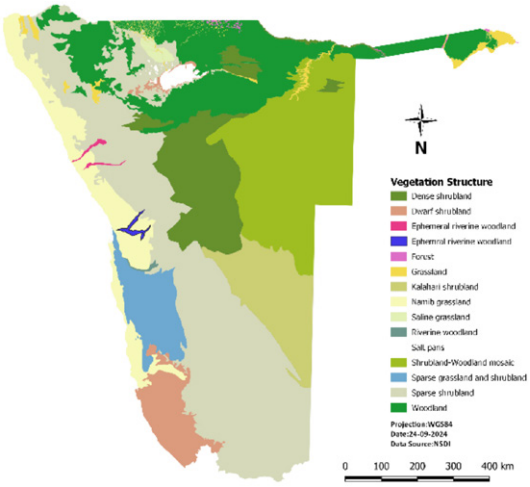


Figure 2 *Namibian temperature map*

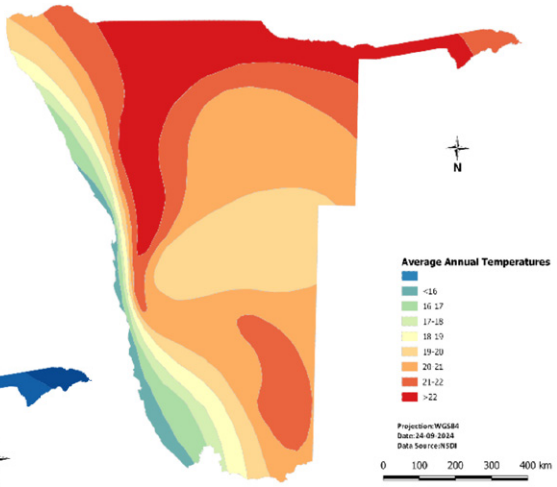
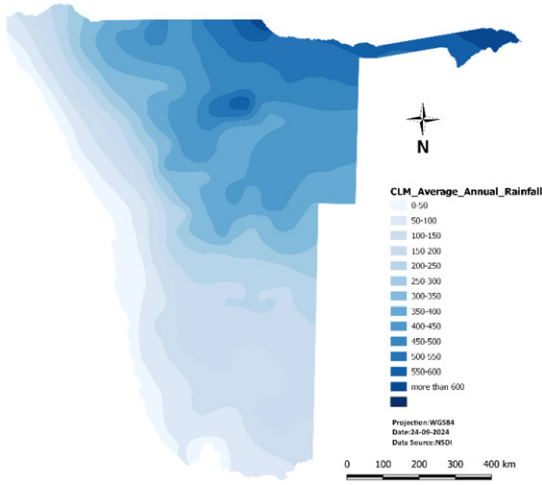


Figure 3 *Namibian rainfall map*



Adaptation

Climate adaptation is defined as any adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm, or exploits or harnesses beneficial opportunities (IPCC, 2007). The fundamental question is how the local community in Namibia can adapt to climate change, and how they will be able to survive the changing trend in the world in order to maintain their living standards and, crucially, to continue producing food.

The best available science informs Africa on her adaptation priorities (Ruppel et al., 2022). Consequently, the African Union member states have adopted the Great Green Wall in Africa initiative to adapt to climate variability and change, particularly in Africa's arid and semi-arid environments (Trautman et al., 2024; Ford et al., 2015).

Challenges to environmental adaptation in Namibia

Namibia's socioeconomic development depends on natural resources that are severely impacted by climate change (Hauptfleisch et al., 2024). The Ministry of Environment, Forestry and Tourism (MEFT, 2023) argues that constituencies in the southern part of the country are more resilient than those in the northern regions, where the poorer segments of the population reside, adding additional layers to unequal resource distribution. In addition to financial constraints, knowledge constraints and governance issues, these act as significant barriers to the implementation of Namibia's adaptation measures (Shackleton et al., 2015; Wisner, et al., 2015). It is anticipated that hydrocarbon oil extraction in and along water sources such as rivers and oceans will lead to water contamination (Bashir et al., 2020). This constitutes a threat to the water quality and safety of the Kavango River/Okavango Delta, which is the main source of water for irrigation, cleaning and cooking for local communities (Ruppel et al., 2022). Due to droughts, different communities continue to suffer shortages of drinking water, especially in Ohangwena, Oshikoto and Omusati regions (Wanke et al., 2014).

Relationship between climate change adaptation and mitigation

Mitigation refers to an anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gases (IPCC, 2007). Mitigation is rooted in just transition as a way of moving toward a low-carbon emissions dispensation, as outlined in the Harambee Prosperity Plan II and Namibia's long-term Vision 2030 (Republic of Namibia, 2016). Examples of this are sustainable energy and transport initiatives.

Namibia has embarked on mitigation measures such as establishing the Omburu and Kahn photovoltaic schemes, the Otjikoto Biomass Power Station, the Baynes Hydropower Project (MEFT, 2023; Kandjoze, 2014; Kruger, 2022) and green hydrogen projects in the southern part of the country (von Oertzen, 2021). Concerns have been raised about some of Namibia's mitigation efforts and adaptation measures, as some of these projects could cause further environmental damage (Davies et al., 2019). One example is the green hydrogen pilot projects that use underground water sources. This poses a serious threat to the area's biodiversity that depends on these water sources (von Oertzen, 2021). Similarly, riparian regions, especially, in farming communities in Erongo Region, are affected by reduced water supply (Mapani et al., 2023). Additionally, the project's envisioned scope may occupy a significant portion of the protected Namib Naukluft Park, potentially jeopardising the survival of its healthy ecosystem (Tilman & Kantel, 2024).

Some mitigation developments throughout the country undermine ecosystem services. As much as these projects may bring development, they also threaten livelihoods based on these ecosystems (Mungai et al., 2021). In addition, the ecosystem services provide for climate regulation, healthy food and water for both people and livestock, as well as their crops (Millennium Ecosystem Assessment, 2005). This also speaks to culture and the way of life: for instance, within the Topnaar community, the !nara plant is significant for their survival and identity, and if it were to be eliminated from the desert, the negative consequences for them would be significant (Magnúsdóttir, 2013).

Namibia's Adaptation Agenda

The National Climate Change Strategy & Action Plan (2013–2020) highlights that "development should be based on notions of human rights and equity" (Principle 5) and should "[address] the needs of the most vulnerable social groups and sectors" (Principle 6) (Ministry of Environment & Tourism, 2013). The country agenda identified food security and sustainability of resources, with a focus on agriculture, natural resources and biodiversity as being fundamental to livelihoods (Ministry of Environment & Tourism, 2013). The agenda refers to a need for sustainable water resources management, given the aridity of the country and poor water quality. It notes the need to improve policy response, monitoring and the conservation of water resources (Republic of Namibia, 2015). Another strategic area is human health: the health sector is to be strengthened to cope with the

prevention and treatment of those diseases expected to increase due to climate change (MEFT, 2023). To deal with extreme weather conditions, part of the adaptation agenda is to roll out infrastructure that stimulates economic growth and strengthens resilience to adverse climate events (Ministry of Environment & Tourism (MEFT), 2013). Such infrastructure includes decent housing; roads; water facilities; electricity transmission; communications systems; and sewage and drainage systems (Ministry of Environment Forestry and Tourism, 2023). The adaptation agenda considers equity, fairness and ambition, in line with Namibia's nationally determined contribution (NDC) to climate change (Mills-Novoa & Liverman, 2019).

Namibia's NDCs reporting emphasises that climate change has gender-differentiated impacts and adversely affects women, girls, and minority groups such as the disabled. Women's vulnerabilities to the climate crisis are linked to socially and culturally gendered roles and responsibilities (MEFT, 2023). Many women have limited voice and participation in decision making and lack access to resources, including technological resources, that could help to improve their adaptation capacity (Gicheru et al., 2024). Angula et al. (2021) found that women are not equal partners in resource management and are mainly engaged in activities that do not yield financial gains. Climate risks increase women's vulnerability to job losses as a result of limited employment choices at the local level, and their restricted mobility compared to men (Angula et al., 2021). Post-independence, the introduction of gender equality laws in the Republic of Namibia and the Sustainable Development Goals, particularly SDG 5 for gender equality, provided a platform for women to be involved in decision-making and access career choices and opportunities (Olsson, 2001, p. 14; Ananias et al., 2023). These measures are relevant to gender-responsive measures in Namibia as they enable women to adapt to the adverse impacts of climate change.

Adaptation funding in Namibia

Financing is a critical aspect of the adaptation strategy, but Namibia has struggled to secure the necessary funds to support its climate adaptation initiatives. The MEFT estimates the requirement of about United States Dollars (USD) 4 billion to implement Namibia's adaptation ambitions. Current spending falls short of this goal (Davies et al., 2019; Garrard et al., 2021; Wilhelm, 2012).

Namibia does not have adequate mechanisms to access climate finance (Mungai et al., 2021). Green Climate

Finance, a global financier, has pledged to provide support for low carbon emissions and climate resilient projects to address adaptation (Redman et al., 2012). To date, Namibia is accredited with the Environment Investment Fund as a direct access entity for micro-scale grants (Green Climate Fund, 2023). This hinders Namibia's access to more climate finance (Seo, 2019; Fonta et al., 2018). Institutional arrangements and human resource capacity limitations hinder African countries from accessing sufficient adaptation finance (Tirpak et al., 2014).

The MEFT has nominated the Namibia Nature Foundation, Bank Windhoek, the Development Bank of Namibia and the Agricultural Bank of Namibia as direct access entities for climate finance, in addition to the Environmental Investment Fund of Namibia. This would imply that communities are able to access finance in the form of grants and non-concessional loans for micro- and mega-projects focusing on adaptive low carbon emissions and for building climate resilience (Tirpak et al., 2014

Legal and policy frameworks for climate change adaptation

The protection of the environment and promotion of climate change adaptation in Namibia is supported by various laws, strategies and plans, in line with Namibia's NDCs, such as the Second National Biodiversity Strategy and Action Plan; the Revised National Strategy on Wildlife and Law Enforcement (2021–2025); the National Climate Change Strategy and Action Plan (2013–2020); Namibia's Aquaculture Strategic Plan; and the Forestry Strategic Plan (Ruppel et al., 2022). These collectively evince a focus on food security, sustainable agriculture, human health and wellbeing, and infrastructure (Millennium Ecosystem Assessment, 2005; Fonta et al., 2018).

Namibia's Environmental Investment Fund Act (13 of 2001) commits the government to supporting and making financial resources available for communities to build climate resilience capabilities.

The Environmental Management Act (7 of 2007) provides for the effective management of natural resources by communities (Ruppel et al., 2022). In line with this act, the MEFT commissioned environmental officers whose responsibility it is to ensure that communities are in compliance with the law (Smit, 2024).

Local level actions towards adaptation

Some adaptation measures target land utilisation to address degradation. Special public participation events accommodate the participation of

vulnerable social groups such as youth, women, and other marginalised groups. Through these programmes, women are given title deeds and rights to participate equally in decision-making (Angula et al., 2021). There is also an annual youth-led Local Conference of Youth. In addition, youth participation in the Conference of Parties (COP) introduced them to the global systems, processes and institutions for adaptation and sustainable development (Marquardt et al., 2024).

In parallel with these developments, climate justice further requires that policymakers consider those that are least responsible for climate change, yet bear the brunt of its impacts (Ritchie, 2024). For instance, in Omusati Region, deforestation, land degradation, and water scarcity severely affect local livelihoods (Nikodemus & Hajek, 2022). In response, local leaders in bodies such as the Ongandjera Traditional Authority have introduced regulations to curb deforestation and promote sustainable resource management (Odendaal, 2011). These measures align with the principles of climate justice and seek to protect the environment and ensure that the most vulnerable communities are not disproportionately affected by the impacts of climate change. In 2017, the Ongandjera Traditional Authority put an end to tree-felling without permits in Onamatanga, Okahao, Okotjatu and Iitapa (Doderer et al., 2022). Students at the University of Namibia's Ogongo Campus have also taken part in awareness raising through a climate change awareness-raising outreach project. They engage with traditional leaders and school learners on climate-friendly farming methods and dry season food production (Kandongo et al., 2013)

The Ministry of Agriculture, Water and Land Reform has promoted the use of climate-resilient crops, such as omahangu (pearl millet) varieties that can thrive in dry condition (Shikangalah, 2020). This includes the use of Kangara and Okashana 2 as drought tolerant seeds that grow rapidly even with diminished rainfall (Shindume, 2017). Similarly, Namibian local businesses have recognised an opportunity to invest in corrugated iron sheeting for building material as individuals are now moving away from timber products due to restrictions imposed by the Environmental Management Act (7 of 2007) (Remmert & Ndhlovu, 2018; Itewa, 2002; Ruppel et al., 2022).

Conclusions

This article has scrutinised the concept of climate justice within the framework of environmental adaptation by placing emphasis on Namibia's vulnerability as a developing, semi-arid nation. This vulnerability

underscores the critical importance of adaptation strategies in mitigating climate challenges and protecting the livelihoods of affected communities.

It forcefully argues for the equitable distribution of resources, especially among women and vulnerable groups. There remain financial constraints, knowledge gaps and governance issues that impede the realisation of Namibia's adaptation goals. Locally-led actions in land use and participation initiatives are also vital for addressing degradation and promoting sustainable management. Efforts to involve vulnerable social groups such as women, youths and the disabled in decision-making processes are essential for achieving climate justice and adapting to climate change.

Legal and policy frameworks such as the Environmental Management Act (7 of 2007) and the Environmental Investment Fund Act (13 of 2001) play a crucial role in supporting climate resilience.

There is a need to balance mitigation and adaptation. While mitigation projects such as renewable energy initiatives are necessary for reducing carbon emissions, they must be carefully managed to avoid further environmental damage and ensure that they do not undermine adaptation measures.

Information platforms could serve as mechanisms to assess information, identify the challenges and opportunities associated with addressing environmental adaptation efforts, and gain access to climate finance. This should go hand-in-hand with awareness creation. There is a pressing need to make it easier for climate-related information to be translated into laymen's terms to facilitate timely action.

References

Ananias, J., Bromfield, N., Chikadzi, V., Leonard, E., Mogotsi, I., & Theron, V.R. (2023). Towards Achieving the United Nations Sustainable Development Goal 5: Gender equality in Namibia in the past, present , and future. In D. Androff, & J. Damanik, *The Routledge international handbook of social development, social work, and the Sustainable Development Goals*. Taylor & Francis. https://books.google.com.na/books?id=uATmEAAAQBAJ&dq=Gender+policy+in+Namibia&lr=&source=gbs_navlinks_s

Angula, M. (2010). *Gender and climate change: Namibia case study*. Heinrich Böll Stiftung Southern Africa. https://www.researchgate.net/publication/265179480

Angula, M. N., Mogotsi, I., Lendelvo, S., Aribeb, K. M., Iteta, A.-M., & Thorn, J. P. (2021). Strengthening

Gender Responsiveness of the Green Climate Fund Ecosystem-Based Adaptation Programme in Namibia. *Sustainability 2021*, *13*. doi:https://doi.org/10.3390/su131810162

Arcaya, M., & Gribkoff, E. (n.d.). *Climate Justice.* MIT Climate Portal. https://climate.mit.edu/explainers/climate-justice

Bashir, I., Lone, F., Bhat, R. A., Mir, S. A., Dar, Z. A., & Ahmad, S. (2020, January 27). Concerns and threats of contamination on aquatic ecosystems. In K.R. Hakeem, R.A. Bhat, & H. Qadri (Eds.), *Bioremediation and biotechnology: Sustainable approaches to pollution degradation*, 1–26. https://link.springer.com/chapter/10.1007/978-3-030-35691-0_1

Davies, J. E., Spear, D., Ziervogel, G., Hegga, S., Angula, M. N., & Togarepi, I. K. (2019). Avenues of understanding: mapping the intersecting barriers to adaptation in Namibia. *Climate and Development 12*(3), 1–12. https://doi.org/10.1080/17565529.2019.1613952

Doderer, C. C., Kamwi, J. M., & Ruppel, O. C. (2022). Chapter 17: Forestry related law and policy. In O. C. Ruppel, & K. Ruppel-Schlichting (Eds.), *Environmental law and policy in Namibia*, *43*, 435–452. Nomos/Hanns Seidel Foundation. doi:https://doi.org/10.5771/9783748933564

Fonta, W. M., Ayuk, E. T., & Huysen, T. v.H. (2018, April 2). Africa and the Green Climate Fund: Current challenges and future opportunities. *Climate Policy 18*(9), 1 210–1 225. doi:https://doi.org/10.1080/14693062.2018.1459447

Ford, J. D., Lea Berrang-Ford, A. B., Mckay, C., Inwin, M., & Pearce, T. (2015). The status of climate change adaptation in Africa and Asia. *Regional Environmental Change*, *15*(5), 801–814. http://dx.doi.org/10.1007/s10113-014-0648-2

Garrard, S., Heyns, P., Pfaffenthaler, M., & Schneider, G. (2021). Environment awareness for sustainable development: A resource book for Namibia (2nd edition). Hanns Seidel Foundation. https://www.namibianuranium.org/wp-content/uploads/2023/10/2020Environmental-Awareness-For-Sustainable-Development-A-Resource-Book-For-Namibia-LowRes.pdf

Gicheru, M. N., Mwenda, M. J., & Omwami, D. O. (2024). Gender and climate change : The role of women in climate change processes. *Asian Journal of Geographical Research*, *7*(1), 13–23. doi:10.9734/AJGR/2024/v7i1210

Green Climate Fund. (2023, March 24). *Support for accreditation of direct access entities in Namibia*.

Hauptfleisch, M., Blaum, N., Liehr, S., Hering, R., Kraus, R., Tausend-

fruend, M., … Uiseb, A. K. (2024, January 6). Trends and barriers to wildlife-based options for sustainable management of savanna resources: The Namibian case. Sustainability of southern African Ecosystems under Global Change, Ecological Studies, 248, 499–525. Springer. https://doi.org/10.1007/978-3-031-10948-5_18

IPCC. (2007). *Climate Change 2007: Synthesis Report* [Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change]. R.K. Pachauri, & A. Reisinger (Eds.). Intergovernmental Panel on Climate Change. https://www.ipcc.ch/site/assets/uploads/2018/02/ar4_syr_full_report.pdf#:~:text=The%20IPCC%E2%80%99s%20periodic%20assessments%20of%20the%20causes,%20impacts%20and

IPCC. (2018). Summary for Policymakers. In V. Masson-Delmotte, P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P. R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, & T. Waterfield (Eds.), *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways,in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.* Cambridge University Press. https://www.ipcc.ch/site/assets/uploads/sites/2/2022/06/SPM_version_report_LR.pdf

Itewa, M. (2002). *Housing the low-income population in Namibia: Increasing affordability by adopting appropriate building standards and materials*. Ministry of Regional and Local Government Housing . https://www.lth.se/fileadmin/hdm/alumni/papers/hd2002/hd2002-16.pdf

Kandjoze, O. (2014). *The official inauguration of the Omburu Solar Concentrated Power.* Ministry of Mines and Energy. https://mme.gov.na/files/publications/cb9_Introductory%20Speech%20Minister%20at%20Omburu%20Solar%20Power%20Plant.pdf#:~:text=The%20InnoSun%20MD%20has%20just%20confirmed%20to%20us%20that%20only

Kandongo, H., Mudamburi, B., Akundabweni, L., & Hatutale, K. H. (2022, February). Effect of deficit irrigation and irrigarion types on yield and gross margin of onion in a semi-arid sub-Saharean Africa Namibia, Omusati Region. *International Journal of Scientific and Engineering Research and Development*, *5*(2), 16–23. https://www.researchgate.net/profile/Kudakwashe-Hove/publication/339697153_Effect_of_Deficit_Irrigation_and_Irrigarion_Types_on_Yield_and_Gross_Margin_of_Onion_in_a_Semi-Arid_Sub-Saharean_

Africa_Namibia_Omusati_Region/links/5e5ff9c3299bf1bdb8541420/Effect

Kruger, W. (2022, October). A quiet transition: The role of Namibia's state-owned power utility in the renewable energy auction program. *Utilities Policy*, *78*(C). Elsevier. doi:doi.org/10.1016/j.jup.2022.101392

Magnúsdóttir, K. (2013). *Guests in their homeland: The situation of the Topnaar community, the traditional but not legal residents in the Namib Naukluft Park*. Namibia Digital Repository. https://namibiadigitalrepository.com/items/show/290

Mapani, B. S., Shikangalah, R. N., & Mwetulundila, A. L. (2023, January). A review on water security and management under climate change conditions, Windhoek, Namibia. *Journal of African Earth Sciences*, *197*(11). Elsevier. doi:https://doi.org/10.1016/j.jafrearsci.2022.104749

Marquardt, J., Lövbrand, E., & Buhre, F. (2024, May 1). The politics of youth representation at climate change conferences: Who speaks, who is spoken of, and who listens? *Global Environmental Politics*, 19–45. doi:https://doi.org/10.1162/glep_a_00736

MEFT. (2023). *Namibia's nationally determined contribution: 2023 - Second update.* https://unfccc.int/sites/default/files/NDC/2024-01/FINAL%20UPDATED%20NAMIBIA%20NDC%202023.pdf#:~:text=Climate%20change%20effects%20in%20Namibia%20are%20underpinned%20by

Millennium Ecosystem Assessment. (2005). *Ecosystems and Human Well-being: Synthesis.* Island Press. https://www.millenniumassessment.org/documents/document.356.aspx.pdf

Mills-Novoa, M., & Liverman, D. M. (2019, May 29). Nationally determined contributions: Material climate commitments and discursive positioning in the NDCs. *Wires Climate Change 10*(5). https://doi.org/10.1002/wcc.589

Ministry of Environment and Tourism. (2013). *National Climate Change Strategy & Action Plan (2013 – 2020).* https://www.meft.gov.na/files/files/National%20Climate%20Change%20Strategy%20&%20Action%20Plan%202013%20-%202020.pdf

Mungai, E. M., Ndiritu, W. S., & da Silva, I. (2021). Unlocking climate finance potential for climate adaptation: Case of climate smart agricultural financing in sub Saharan Africa. In W.L. Filho, N. Oguge, D. Ayal, L. Adeleke, & I. da Silva (Eds.), *African Handbook of Climate Change Adaptation* (2 063–2 083). Springer. https://link.springer.com/referenceworkentry/10.1007/978-3-030-45106-6_172#DOI

Mwenda, M., & Bond, P. (2020). African climate justice: Articulations

and activism. In B. Tokar, & B. T. Gilbertson (Eds.), *Climate justice and community renewal.* Routledge. https://www.taylorfrancis.com/chapters/edit/10.4324/9780429277146-8/african-climate-justice-mithika-mwenda-patrick-bond

Newsham, A., & Thomas, D. (2009). *Agricultural adaptation, local knowledge and livelihoods diversification in north-central Namibia*. Tyndall Centre for Climate Change Research. https://www.researchgate.net/profile/Andrew-Newsham/publication/265191757_Agricultural_adaptation_local_knowledge_and_livelihoods_diversification_in_North-Central_Namibia/links/5486f9fc0cf289302e2eaf72/Agricultural-adaptation-local-knowledge-and-livelihoo

Nikodemus, A., & Hajek, M. (2022). Implementing local climate change adaptation actions : The role of various policy instruments in mopane (*Colophospermum mopane*) woodlands, northern Namibia. *Forests 2022*, *13*(10). Faculty of Forestry and Wood Sciences, Czech University of Life Sciences. doi:https://doi.org/10.3390/f13101682

Odendaal, W. (2011). Land grabbing in Namibia: A case study from the Omusati Region, northern Namibia. *International Conference on global land grabbing.* https://www.oicrf.org/documents/40950/43224/Land+grabbing+in+Namibia+a+-case+study+from+the+Omusati+Region+northern+Namibia.pdf/ab81e657-cf16-760c-3d57-2182bb5297ae?t=1510224777027

Olsson, L. (2001). Gender mainstreaming in practice: The United Nations transitional assistance group in Namibia. In L. Olsson, & T.L. Tryggestad (Eds.), *Women and International Peacekeeping*. Routledge. https://www.taylorfrancis.com/chapters/edit/10.4324/9781315039091-8/gender-mainstreaming-practice-united-nations-transitional-assistance-group-namibia-louise-olsson

Redman, J., Reddy, T., & Mwenda, O.R. (2012, March 1). Sources of finance in the International climate change regime. *Climate Finance Africa 1.* https://coilink.org/20.500.12592/k6w9wd

Remmert, D., & Ndhlovu, P. (2018). *Housing in Namibia: Rights, challenges and opportunities.* Institute for Public Policy Research. https://www.researchgate.net/publication/340512251_Housing_in_Namibia_Rights_Challenges_and_Opportunities

Republic of Namibia. (2015). *Third national communication to the United Nations framework convention on climate change.* https://unfccc.int/sites/default/files/resource/namnc3.pdf

Republic of Namibia. (2016). *Harambee Prosperity Plan 2016/17-2019/20.* http://www.ag.gov.na/publications/Harambee%20Prosperity%20Plan.pdf#:~:text=The%20HARAMBEE%20PROSPERITY%20PLAN%20[HPP]%20is%20a%20targeted%20Action%20Plan

Ritchie, H. (2024). *Who has contributed most to global CO2 emissions?* Our World in Data. //ourworldindata.org/contributed-most-global-co2

Ruppel, O.C., Ruppel-Schlichting, K., Hinz, M. et al. (2022). Environmental law and policy in Namibia. In O. C. Ruppel, & K. Ruppel-Schlichting (Eds.), *Law and constitution in Africa 43* (4th edition). Nomos Verlagsgesellschaft mbH & Co. KG. https://www.thinkglobalnetwork.org/images/publications/ELPN_4_.pdf

Schusser, C. (2013, November). Who determines biodiversity? An analysis of actors' power and interests in community forestry in Namibia. *Forest policy and economics*, *36*, 42–51. doi:https://doi.org/10.1016/j.forpol.2012.06.005

Seo, S.N. (2019). The Green Climate Fund: History, institution, pledges, investment criteria. In S.N. Seo, *The history of global allocations of the Green Climate Fund*, 35–65. https://doi.org/10.1007/978-3-030-18274-8_2

Shackleton, S., Ziervogel, G., Sallu, S., Gill, T., & Tschakert, P. (2015). Why is socially-just climate change adaptatiion in sub-Saharan Africa so challenging? A review of barriers identified from empirical cases. *Wiley Interdisciplinary Reviews: Climate* Change, *6*(3), 321–344. https://wires.onlinelibrary.wiley.com/doi/abs/10.1002/wcc.335

Shikangalah, R. N. (2020, June 30). The 2019 drought in Namibia: An overview. *Journal of Namibia Studies: History Politics Culture*, *27*, 37–58. https://namibian-studies.com/index.php/JNS/article/view/198

Shindume, F. N. (2017). *Genetic and biochemical characterization of pearl millet mutant lines using simple sequence repeat markers in Namibia* [Masters thesis, University of Namibia]. https://repository.unam.edu.na/server/api/core/bitstreams/05c361f2-42b5-4e2e-8be7-a67ccd73cdfc/content

Smit, E. (2024, June 24). Shifeta appoints 75 environmental officers. *Namibian Sun*. https://www.namibiansun.com/environment/shifeta-appoints-75-environmental-officers2024-06-24#:~:text=Seventy-five%20officials%20from%20the%20environment%20ministry%20have

Tilman, A., & Kantel, A. (2024). *Green hydrogen in Namibia: Opportunities and risks. German Institute of Development and Sustainability* [IDOS Discussion Paper No. 6/2024]. German Institute

of Development and Sustainability. https://hdl.handle.net/10419/300228

Tirpak, D., Brown, L., & Athena, A. R.-B. (2014). *Monitoring climate finance in developing countries: Challenges and next steps* [Working Paper]. World Resource Institute. https://www.issuelab.org/resources/18288/18288.pdf

Trautman, S., Chevallier, R., & Gosling, A. (2024). *The African Union Great Green Wall Initiative strategy (2024-2034): A new continental roadmap for restoration, sustainable land management and climate resilient livelihoods.* Accelerating Impacts of CGIAR Climate Research for Africa (AICCRA). https://cgspace.cgiar.org/items/40863a71-e2db-4862-99f9-e7db4907f756

Wanke, H., Nakwafila, A., Hamutoko, J., Lohe, C., Neumbo, F., Petrus, I., David, A., Masule, N., & Quinger, N. M. (2014). Hand dug wells in Namibia: An underestimated water source or a threat to human health? *Physics and Chemistry of the Earth, Parts A/B/C 76–78*, 104–113. https://www.sciencedirect.com/science/article/abs/pii/S1474706515000054

Whitley, S., Granoff, I., Chiofalo, E., & Pickard, A. H. (2014). *Private climate finance: Mapping incentives and investment in sub-Saharan Africa* [Shaping Policy for Development Working Paper No. 412]. https://odi.cdn.ngo/media/documents/9351.pdf

Wilhelm, M. (2012). *Impact of climate change in Namibia: A case study of Omusati Region* [Masters thesis, Namibia University of Science and Technology]. http://hdl.handle.net/10628/381

Wisner, B., Pelling, M., Mascarenhas, A., Holloway, A., Ndong, B., Fave, P., Ribot, J., & Simon, D. (2015, January 1). Small cities and towns in Africa: Insights into adaptation challenges and potentials. In S. Pauleit, G. Jorgensen, S. Kabisch, P. Gasparini, S. Fohlmeister, I. Simonis, K. Yeshitela, A. Coly, S. Lindley, & W.J. Kombe (Eds.), *Urban vulnerability and climate change in Africa: A multidisplinary approach*, 153–196. Springer. http://dx.doi.org/10.1007/978-3-319-03982-4_5

von Oertzen, D. (2021). *Issues, challenges and opportunities to develop green hydrogen in Namibia*. Konrad-Adenauer-Stiftung. https://www.kas.de/en/web/namibia/single-title/-/content/issues-challenges-and-opportunities-to-develop-green-hydrogen-in-namibia-1

Climate Change Funding to Namibia

Bernadette Shalumbu-Shivute

Introduction

The United Nations Framework Convention on Climate Change (UNFCCC) (known as the Paris Agreement) includes the goal of limiting global warming to below 2°C (and ideally below 1.5°C) above pre-industrial levels. Current promises of emissions reductions by nations fall short of what is needed to meet this target. Instead, global average temperatures could exceed the 1.5°C warming mark by as early as the next decade, and the 2°C threshold in the decade thereafter (CDKN Global, 2018). For vulnerable countries like Namibia, these seemingly small increments in global temperature can lead to distinct local climatic effects, which can interact with, and exacerbate, existing vulnerabilities. Many communities in Namibia have little capacity to adapt to the impacts of the projected changes at warming of 1.5°C and above, and government-led adaptation often tends to focus on immediate development needs. With its dry and hot climate, Namibia is already vulnerable to climate variability, and without adaptation, climate change will heighten this vulnerability. As global temperature increases by 1.5°C and more, climate models project that Namibia will experience climate extremes with increasing frequency and intensity (CDKN Global, 2018).

Background

The Ministry of Environment, Forestry and Tourism (MEFT) is the focal point of the UNFCCC in Namibia. The ultimate objective of the Convention is to stabilise greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system" (United Nations, n.d. a). The Namibian government ratified the UNFCCC in May 1995. The objective of the UNFCCC is to stabilise concentrations of greenhouse gas emissions in the atmosphere at a level that would prevent man-made interference with the climate system. As an active Party, Namibia is "resolutely committed to the Paris Agreement, and to taking practical and ambitious action to reduce emissions and ensure a climate-resilient economy" (Republic of Namibia, 2021).

Facilitation of Climate Change Action

Below are the steps that UNFCC mandates to enable action on global climate change goals:

a) Common but differentiated responsibilities

Common but differentiated responsibilities place the onus on developed countries to lead the way in climate change financing due to the fact that they are greatest sources of most past and current greenhouse gas emissions. Industrialised countries are expected to make the greatest cuts to their emissions. They should also contribute most to climate change funding. Put simply, the requirement of common but differentiated responsibilities is based on the polluter-pays principle. The Annex I countries of the UNFCCC belong to the wealthier Organisation for Economic Cooperation and Development (OECD) group (United Nations, n.d. b).

Under the UNFCCC, these wealthier countries agree to support climate change activities in developing countries by providing financial support for action on climate change above and beyond any financial assistance they already provide to these countries. A system of grants and loans set up through the Convention is managed by the Global Environment Facility (GEF), the Green Climate Fund (GCF), and the Adaptation Fund (AF) (Green Climate Fund, n.d.). Industrialised countries also agree to share technology with less advanced nations through the Climate Centre and Technology Network which was purposefully established by the UNFCCC to transfer environmentally sound technologies for low-carbon and climate-resilient development at the request of developing countries (UN Climate Technology Centre & Network, n.d.).

b) Keeping tabs and monitoring progress and commitments

Industrialised countries (Annex I Parties) must report regularly on their climate change policies and measures, including issues governed by the Kyoto Protocol (for countries that have ratified it). They must also submit an annual inventory of their greenhouse gas emissions, including data for their base year (1990) and all subsequent years (United Nations, n.d. b)

Developing countries (non-Annex I Parties) report in more general terms on their actions both to address climate change and to adapt to its impacts – but less regularly than Annex I Parties do, and their reporting is contingent on their acquiring funding for the preparation of the reports, particularly in the case of the Least Developed Countries (United Nations, n.d. b).

c) Charting the beginnings of a path to strike a delicate balance

Economic development is particularly vital to the world's poorer countries. Such progress is difficult to achieve even without the complications added by climate change. The Convention takes this into consideration by accepting that the share of greenhouse gas emissions produced by developing nations will grow in the coming years. Nonetheless, in the interests of fulfilling its ultimate goal, it seeks to help such countries limit emissions in ways that will not hinder their economic progress. One such win-win solution was to emerge later when the Kyoto Protocol to the Convention was formulated (United Nations, n.d. b).

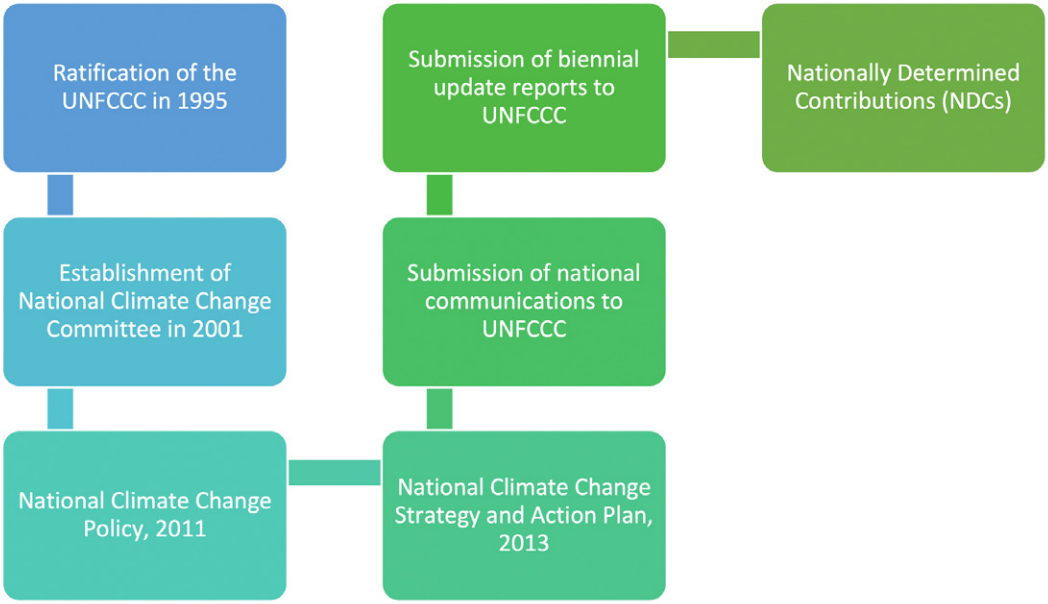
Nationally Determined Contributions

The Paris Agreement requests each country to outline and communicate their post-2020 climate actions, known as their Nationally Determined Contributions (NDCs). NDCs are at the heart of the Paris Agreement and the achievement of these long-term goals. Each climate plan reflects the country's ambitions with respect to reducing emissions, considering its domestic circumstances and capabilities. It is estimated that the total cost of implementing Namibia's NDC will amount to USD 15 billion (Republic of Namibia, 2023), with USD 1.5 billion expected from public resources as unconditional funding (Republic of Namibia, 2024).

The Convention acknowledges the vulnerability of all countries to the effects of climate change and calls for special efforts to ameliorate its consequences, especially in developing countries that lack the resources to do so on their own. In the early years of the Convention, adaptation received less attention than mitigation, as Parties wanted more certainty regarding the impacts of and vulnerability to climate change. When the Intergovernmental Panel on Climate Change released its Third Assessment Report, adaptation gained traction, and Parties agreed on a process to address adverse effects and to establish funding arrangements for such adaptation (DLA Piper, 2023).

Below is a summary of Namibia's efforts as a member of the UNFCCC (Republic of Namibia, 2024):

Namibia's Climate Change Commitments and Efforts



Source: Republic of Namibia (2024)

Namibia's Climate Finance Landscape

Brown and Amutenya (2021) estimate that Namibia's climate finance flows since the initial NDC, for the period 2015–2020, amount to NAD 9.8 billion, or approximately NAD 1.63 billion per year. Most of this funding (63%, or NAD 6.2 billion) came from OECD donors, including bilateral development agencies, climate funds, and multilateral development banks, while 35% was contributed through Namibia's national development budget, primarily through the Ministry of Agriculture, Water and Land Reform, in addition to other ministries.

Only 2% came from the private sector, although this figure is likely to be an underestimate, since data on private sector contributions to climate change mitigation initiatives are sparse. Private sector commercial investments are primarily in the renewable energy sector. They estimate that the funding gap in climate finance amounts to NAD 6.4 billion per year (Brown & Amutenya, 2021).

For domestic public finance, integrating climate change into the national planning and budgeting process and introducing climate budget tagging would enable Namibia to use

the national budget more strategically to simultaneously advance both development and climate change goals.

The strategic role of national development finance institutions such as the Development Bank of Namibia, Agribank, and the Environmental Investment Fund is critical, as these institutions can bring together multiple funders with different objectives to create blended finance structures that will enable investment in climate adaptation and mitigation, while also advancing key development objectives. They could also provide support for project preparation for the private sector (Brown & Amutenya, 2021). In recognition of having diverse development finance institutions accredited to the GCF, readiness funding support for accreditation of direct access entities in Namibia (NAM-RS006) valued at USD 326.542 million was approved by the GCF in March 2023. This readiness project will strengthen capacities of nominated entities, namely Agribank (the Agricultural Bank of Namibia), Bank Windhoek, the Development Bank of Namibia, and the Namibia Nature Foundation, and accelerate their accreditation process (Green Climate Fund, (n.d.))

Objective 5 of the National Policy on Climate Change for Namibia – 2011 (Republic of Namibia, 2011) aims to provide secure and adequate funding resources for effective adaptation and mitigation investments in climate change. As a signatory to the UNFCCC, Namibia continues to work closely through the MEFT with various multilateral and development partners to secure climate financing to enable the implementation of the climate change agenda in the country.

The table below summarises the climate financing secured from the three largest climate funds to date:

Table 1 *Climate funding sources for Namibia to date*

Financing mechanism	No. of projects	Value (USD millions)
Global Environmental Facility	8	29.3
Green Climate Fund	10	125.1
Adaptation Fund	2	National project: 5 Transboundary project: 11
Total funding		170.4

Sources: GCF (n.d.); GEF (2024); *AF (n.d.)*

To date, the three largest climate funds have contributed approximately USD 170.4 million (approximately NAD 3 billion) towards Namibia's climate ambitions. The MEFT has estimated the total cost of implementing the country's NDC at USD 15 billion, with USD 1.5 billion expected to come from public resources as unconditional funding. These figures clearly illustrate the significant funding gaps that are still required to realise the country's climate ambitions (Republic of Namibia, 2023).

Challenges

According to the United Nations (n.d. b), key challenges related to accessing climate financing are:

Processes involved with accreditation

The big three climate funds (GEF, GCF and AF) only work through accredited entities, and attaining accreditation is not an easy process for institutions to undertake. Even once accreditation has been attained, the success of funding applications is not guaranteed. It is recommended that to scale up international finance, the number of national institutions accredited to the GCF be increased, and that a national development bank which can access funding on a larger scale for strategic projects such as renewable energy, water infrastructure and technology be accredited (United Nations, n.d. b).

Development status of the country

Namibia's classification as an upper middle-income country disproportionately affects the county's access to some of the development partners, who only provide funding support to countries classified as least developed, or those that fall within a particular vulnerability index or GDP bracket. As a result, the funding opportunities that Namibia has access to are mostly limited to the GEF, GCF and AF (United Nations, n.d. b).

Grant funding and blended financing

As Namibia is a developing country, its NDC has prioritised access to grant funding as a condition for the attainment of the country's climate goals. However, accessing of grant funding is becoming more challenging for Namibia. The GCF has recommended that Namibia consider the blended finance approach, especially for those projects which promise economic returns. However, with the application of the "common but differentiated responsibilities" (CBDR) principle, Namibia should be able to access grants, which are more favourable, as they require no repayment, securities, guarantees or repayment schedules.

Project approval and implementation time lags

The bureaucratic processes from project origination to approval, contracting/awarding and eventual disbursement of funds ultimately delay project implementation and response to the real needs on the ground. In some cases, there are such time lags between funding request submissions and final approvals, so that by the time project funds are transferred, the situation on the ground has changed.

Budget tagging

For domestic public finance, integrating climate change into the national planning and budgeting process and introducing climate budget tagging would enable Namibia to use the national budget more strategically to simultaneously advance both development and climate change goals (Brown & Amutenya, 2021).

References

Adaptation Fund. (n.d.) *Resilience building as climate change adaptation in drought-struck South-western African communities (Angola, Namibia)*. https://www.adaptation-fund.org/project/angola-and-namibia-resilience-building-as-climate-change-adaptation-in-drought-struck-south-western-african-communities/

Brown, L., & Amutenya, T. (2021). *Namibia's landscape of climate finance 2015–2020*. Ministry of Environment and Tourism. https://www.meft.gov.na/files/downloads/Namibia's%20Landscape%20of%20Climate%20Finance_Jan_06.pdf

CDKN Global. (2018). *What global warming of 1.5 ℃ and higher means for Botswana and Namibia*. https://cdkn.org/story/opinion-what-global-warming-of-1-5-%25e2%2584%2583-and-higher-means-for-botswana-and-namibia

DLA Piper. (2023). *What are Nationally Determined Contributions (NDCs), and why do they matter?*. https://www.dlapiper.com/en/insights/topics/cop-conference-of-the-parties/what-are-nationally-determined-contributions#_ftn1

Global Environment Facility (GEF) (2024) *Namibia: Country-at-a-glance*. https://www.thegef.org/projects-operations/country-profiles/namibia

Green Climate Fund. (n.d.) *Republic of Namibia*. https://www.greenclimate.fund/countries/namibia

Republic of Namibia (2011, October). *National Policy on Climate Change for Namibia – 2011*. Ministry of Environment and Tourism https://www.meft.gov.na/files/files/National%20Policy%20on%20Climate%20Change%20for%20Namibia%202011(1).pdf.

Republic of Namibia. (2021). *Namibia's updated Nationally Determined Contribution – 2021*. https://unfccc.int/sites/default/files/NDC/2022-06/Namibia%27s%20Updated%20NDC_%20FINAL%2025%20July%202021.pdf

Republic of Namibia. (2023). *Namibia's Nationally Determined Contribution: Second update*. https://unfccc.int/sites/default/files/NDC/2024-01/FINAL%20UPDATED%20NAMIBIA%20NDC%202023.pdf

UN Climate Technology Centre & Network. (n.d.). *Connecting countries to climate solutions*. https://www.ctc-n.org/

United Nations. (n.d. a). *UN climate change conferences*. https://www.un.org/en/climatechange/un-climate-conferences

United Nations. (n.d. b). *What is the United Nations Framework Convention on Climate Change?* https://unfccc.int/process-and-meetings/what-is-the-united-nations-framework-convention-on-climate-change

Green Jobs: Pioneering Sustainable Growth and Environmental Stewardship

Iyaloo Shikongo

Introduction

"The future will either be green or not at all." This has become a widely known quote, notably repeated by the Australian environmentalist and politician Bob Brown, while addressing the Senate. Green jobs are crucial for addressing climate change, as they provide a sustainable route for both economic development and environmental conservation.

According to the United Nations Environment Programme, green jobs encompass any work that aids in preserving and improving environmental quality. This includes positions in agriculture, industry, services, or administration that aim to lower energy use, reduce pollution, safeguard ecosystems, and support communities in adapting to climate change (Worldwatch Institute, 2008). In Namibia, the importance of green jobs is heightened by the country's distinct environmental challenges and opportunities. These jobs not only mitigate environmental impacts, but also encourage sustainable practices that are vital for the nation's future.

Economic Benefits

Endowed with abundant natural resources, Namibia is poised to be a leader in Africa's shift towards a green economy, effectively balancing economic growth with environmental sustainability. The economic benefits of green jobs in Namibia are considerable. The country's rich renewable energy sources, particularly solar and wind, create a robust foundation for job creation in the green sector. Namibia's strategic advantages position it perfectly for sustainable development, receiving about 10 hours of strong sunlight daily for 300 days a year. This gives Namibia significant solar energy potential, further supported by a Memorandum of Intent with Botswana and the United States to tap into this renewable resource (World Economic Forum, 2021). It is evident that with its unique positioning and forward-thinking initiatives, Namibia could become a beacon of sustainable growth and environmental stewardship in Africa.

Environmental Impact and Social Benefits

Green jobs are essential in the battle against climate change, playing a crucial role in reducing carbon footprints and fostering sustainable practices. Namibia's dedication to renewable energy, exemplified by initiatives like the Green Hydrogen Namibia Programme, underscores this commitment (World Economic Forum, 2021). By investing in green technologies and sustainable practices, Namibia can substantially lower its greenhouse gas emissions, making a significant contribution to global climate goals. This dedication to renewable energy is not just an environmental imperative but a national duty, ensuring that Namibia remains at the forefront of the fight against climate change.

Beyond environmental impacts, green jobs offer profound social and community benefits. They can vastly improve public health by reducing pollution and fostering cleaner environments. Moreover, green jobs have the potential to address social inequalities by providing much-needed employment opportunities in underserved communities, offering a vital solution to the country's youth unemployment crisis. This is not just about jobs; it's about creating meaningful, dignified work that uplifts entire communities.

Additionally, Namibia's communal conservancies, managed by local communities, stand as a beacon of success in wildlife conservation. These conservancies, which form part of the protected areas network, protect wildlife beyond formally designated national parks, contribute significantly to anti-poaching efforts, and generate income through ecotourism and the sustainable use of natural resources. This model not only promotes biodiversity but also enhances local livelihoods, proving that economic prosperity and environmental stewardship can indeed go hand in hand (World Wildlife Fund, n.d.). Moreover, Namibia has a unique opportunity to lead by example, demonstrating how green jobs can drive both environmental sustainability and social equity. By embracing this path, Namibia can inspire other nations to follow suit, proving that a greener future is not only possible but also essential for a prosperous and just world.

Challenges and Solutions

Transitioning to a green economy presents several challenges. Namibia needs to develop new skills and training programmes to support the green job market, which is a significant hurdle. However, these challenges are surmountable. Proactive government policies, robust educational programmes, and incentives for

businesses to adopt green practices can greatly ease this transition. The Environmental Investment Fund of Namibia is pivotal in providing the necessary technical coordination and stakeholder engagement for green initiatives ("Creating Jobs through Green Economy", 2013). Overcoming these challenges requires a collective effort and a shift in mindset. The government must prioritise green education and training, ensuring that the workforce is equipped with the skills needed for the green economy. This is not just about economic development but about securing a sustainable future for Namibia. Businesses, too, must be encouraged and incentivised to adopt green practices. These changes can drive economic growth while safeguarding the environment, proving that far from being mutually exclusive, economic progress and environmental sustainability are mutually reinforcing.

Namibia stands at a crossroads, with the opportunity to turn these challenges into stepping stones for a greener future. By investing in the necessary infrastructure, and advocating and fostering a culture of sustainability, Namibia can lead the way in creating a resilient, green economy. This is a call to action for all stakeholders to embrace this vision and work together towards a sustainable and prosperous future.

Future Outlook

The future of green jobs in Namibia is promising. With continued investment in renewable energy and sustainable practices, the country is well-positioned to achieve its climate goals and foster economic growth ("Creating Jobs through Green Economy", 2013).

Conclusion

Namibia's green transition holds immense promise. By embracing green jobs, conserving biodiversity, and adopting practices associated with a circular economy, Namibia can lead the way towards a sustainable future where economic development and environmental protection go hand in hand. Let us go green, and stay clean.

References

European Parliament. (2023, May 24). Circular economy: definition, importance and benefits. http://www.europarl.europa.eu/topics/en/article/20151201STO05603/circular-economy-definition-importance-and-benefits#:~:text=What%20is%20the%20circular%20economy,products%20as%20long%20as%20possible.

"Creating Jobs through Green Economy". (2013, April 19). Namibia Economist. https://economist.com.na/4597/environment/creating-jobs-through-green-economy/

Stanef-Puica, M., Badea, L., Serban-Oprescu, G., Șerban-Oprescu, A.-T., Frâncu, L.-G., & Cretu, A. (2022). Green jobs—A literature review. International Journal of Environmental Research and Public Health, 19(13), 7998. https://doi.org/10.3390/ijerph19137998

World Economic Forum. (2021, October 3). Namibia is poised to become the renewable energy hub of Africa. https://www.weforum.org/agenda/2021/10/namibia-is-positioned-to-become-the-renewable-energy-hub-of-africa/

World Wildlife Fund. (n.d.). Conserving wildlife and enabling communities in Namibia. https://www.worldwildlife.org/projects/conserving-wildlife-and-enabling-communities-in-namibia

Worldwatch Institute. (2008). Green jobs: Towards decent work in a sustainable, low-carbon world. United Nations Environment Programme. https://www.unep.org/resources/report/green-jobs-towards-sustainable-work-low-carbon-world

the fish that sees its water is getting shallow cannot be stranded: a curatorial essay

Nashilongweshipwe Mushaandja

the fish that sees its water is getting shallow cannot be stranded is an exhibition project that was curated at The Project Room in June 2023, and the Franco-Namibian Cultural Centre in August 2024. The show is a project of the Owela Live Arts Collective Trust. This exhibition's point of departure is an observation of the recurrence of fish in contemporary Namibian art.

By simply attending a local exhibition or working through a collection of Namibian art, one is likely to find representations of or engagements with fish or other water resources. A curatorial intervention of this nature therefore reflects on the ways in which fisheries and water cultures have been historically expressed in Namibian art. The title, the fish that sees its water is getting shallow cannot be stranded, is a popular African proverb which metaphorically and literally speaks to experiences of survival, livelihoods and mobility. It emphasises both the fish and water as relational, marked by movement.

The shows at both venues presented a discursive and historical outlook on how artists in Namibia's post-coloniality are thinking with and through images of fish, water and other natural environments. The project is a collection of prints, photography, mixed-media works, installations, sculpture, performances, documentation of previous artwork and literature relating to the political and socioeconomic uses of oceans, rivers, reservoirs, springs, lakes and groundwater.

One of the themes in this show is the climate crisis and natural disasters such as the regular floods in northern Namibia, as seen in Shomwatala Shivute's Efundja (Figure 1). Here, we are invited to think of Namibia as a site of regular floods and droughts, two extremes that are caused by changing climatic conditions. Littering comes to mind as one of the contributing factors to the climate crisis. Julia Hango's installation titled Alien Invasion is a pile of trash that was collected in preparation for this exhibition by an artist who lives both at the coast and inland.

Samuel Mbingilo's popular print Rain Callers (Figure 2) can be found in various public and private art

collections in Namibia. Mbingilo's print, depicting supernatural figures (half-human, half-fish) in ritual, drumming and dancing, reminds us of the ancient African mythologies and spiritualities relating to rain-making practices, including the metaphysical resources of water. Kay Cowley's serpentine wall hanging sculpture, Mermaid Mother and Child, is one of these water figures. This celebration of rain and water is echoed in a choreographic and sonic intervention titled Water (Figure 3) by Gift Uzera, Muningandu Hoveka, Joanne Sitler and Diolini at the 2019 Owela Festival.

Water also evokes the spectre of migrants who die trying to cross the Mediterranean sea, and ingrained memories of the historically enslaved Africans crossing the Atlantic. Jo Rogge's mixed-media work Mare Nostrum II offers an emotive and sensitive portrayal of this painful reality. For many Africans, and Black people in particular, the ocean and water in general are charged with memories and lived experiences of pain, trauma and loss.

Kay Cowley's prints and storyboard document her 1999/2000 installation In search of the Moneyfish (Figure 4), "an allegorical journey undertaken by SilverMoonBeam fish, and a cast of fish characters". This is a story that uses the world of fish as metaphor to speak to a people's wishes and dreams, deferred by the bureaucratisation of public resources. This story also speaks plangently to the title of this exhibition, evoking the survival and resilience of the living, despite the odds. It is interesting to look at Cowley's older works in relation to her latest charcoal texture rubbings of a fossilised dolomite stone on pastel. What is interesting is the notable continuity of dealing with fish and the ocean in her artistic collaborations across time.

Shomwatala Shivute's photographs moMeya (Figure 5) and Olutenda (Figure 6) both show scenic views of a ship at Lüderitz port and the railway, hinting towards the extractive nature of racial capitalism and its continuities in the post-coloniality of Namibia. These photographs evoke Namibia's baggage – the plundering of natural resources through political schemes such as Fishrot and the baggage of history. If we think of Lüderitz as a historic site of forced labour, concentration camps and the genocide of indigenous people, have we ever asked what the water at Shark Island remembers? Two bodies of work that attend to this question are the photographic and performance works by Veronique Kuchekena-Chirau and Tuli Mekondjo. Kuchekena-Chirau's series titled Daughter of Molly (Figure 7) draws on her autobiography and Nama material culture in relation to Lüderitz's spatial memory of colonial

violence. Reflecting on the same geography, Tuli Mekondjo's Oudjuu wo makipa etu (Figure 8) looks at traumatic histories, matrilineal relations and colonial labour. Tuli Mekondjo, Cowley, Shivute and Kuchekena-Chirau's focus on Lüderitz all invite us to take seriously national questions of the redistribution of land, restorative justice, and healing.

Sea water holds healing qualities for various Namibian and African cultures, and we see this potential in Julia Hango's new series of mixed media works (Figures 9, 10 and 11). This series emphasises fluidity and movement as central to our environmental awareness. In Hango's ecofeminist imagination, the ocean is treated as a site of human origins as much as it is a source of medicine. In Hango's new collection of photographs, fish and water are interfaced with her naked body located between the city and the desert ecosystems. The ocean's healing qualities are also raised in Joseph Madisia's FishRot Aquarium Cleansing, not only recognising the ocean's ability to cleanse itself, but also reminding us of the corruption and exploitation of natural resources by Namibia's political elites.

There is also a question of food security echoed in the additional images and objects collected from different Namibian artists. These include Ishmael Shivute's outdoor metal sculpture and Hercules Viljoen's acrylic painting on eucalyptus wood. Fish as a traditional and religious symbol is also depicted regularly in Elia Shiwohamba and Peter Mwahalukange's prints sold at local markets in Windhoek and Swakopmund.

Figure 1 *Efundja (2021), Shomwatala Shivute*

Figure 2 *Rain Callers (1998) by Samuel Mbingilo. Photograph complements of StartArt Gallery.*

Figure 3 *Water (2019), Gift Uzera, Muningandu Hoveka, Joanne Sitler and Diolini*

Photograph courtesy of Owela Live Arts Trust

Figure 4 *Photographic documentation and storyboard of the In search of the Moneyfish (1999/2000) installation, Kay Cowley*

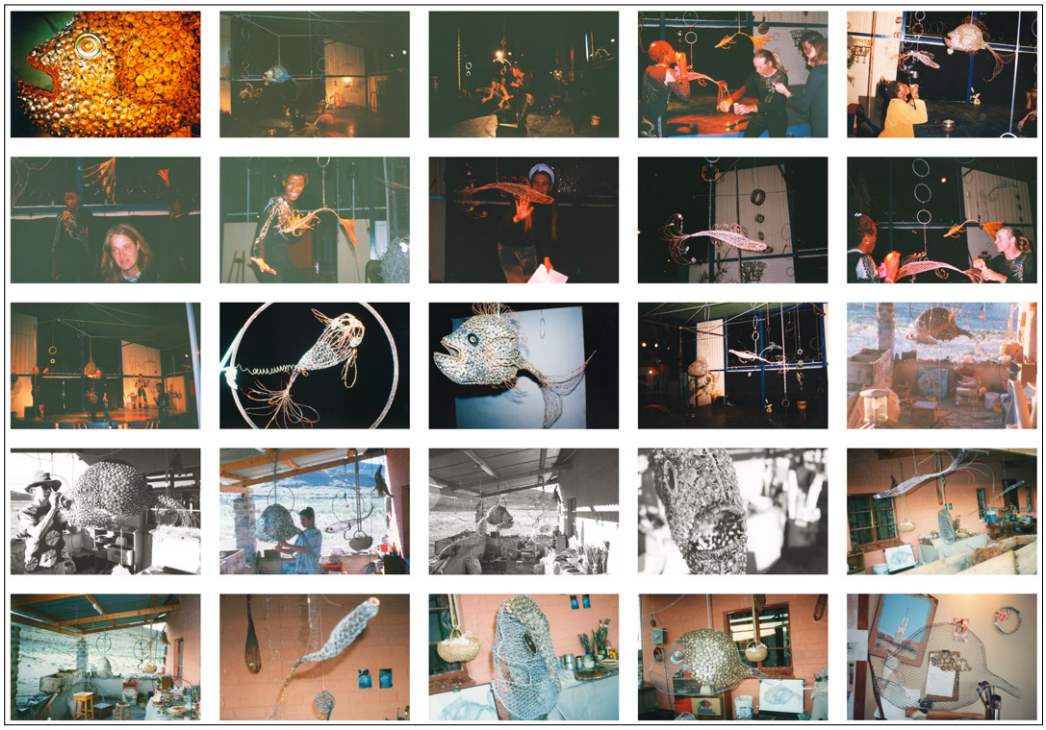
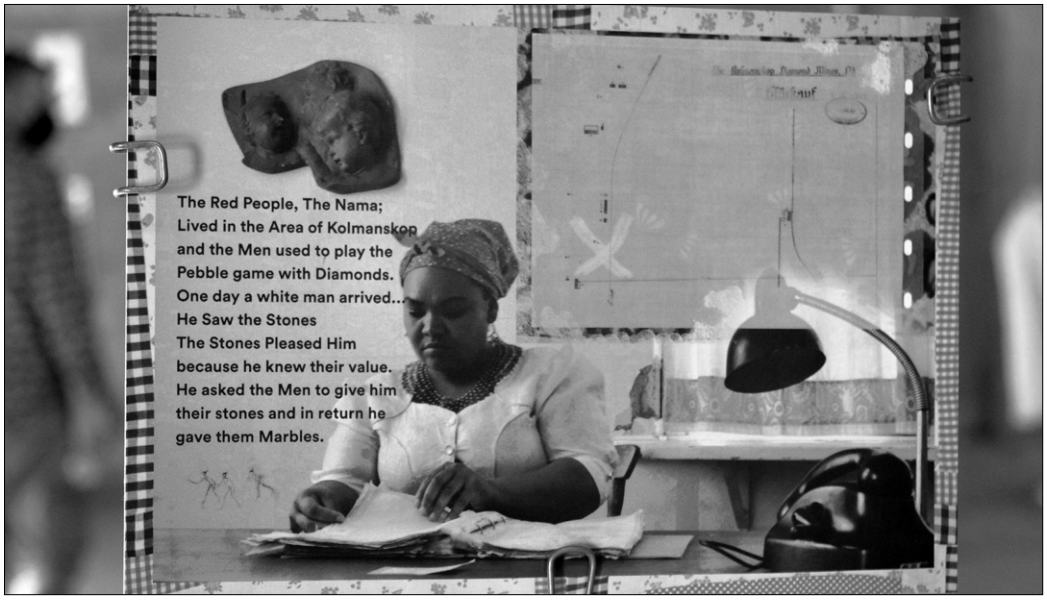


Figure 5 *moMeya (2021), Shomwatala Shivute*

Figure 6 *Olutenda (2021), Shomwatala Shivute*

Figure 7 *Photographic documentation of the exhibition My Body is an Archive (2019), Owela Festival*



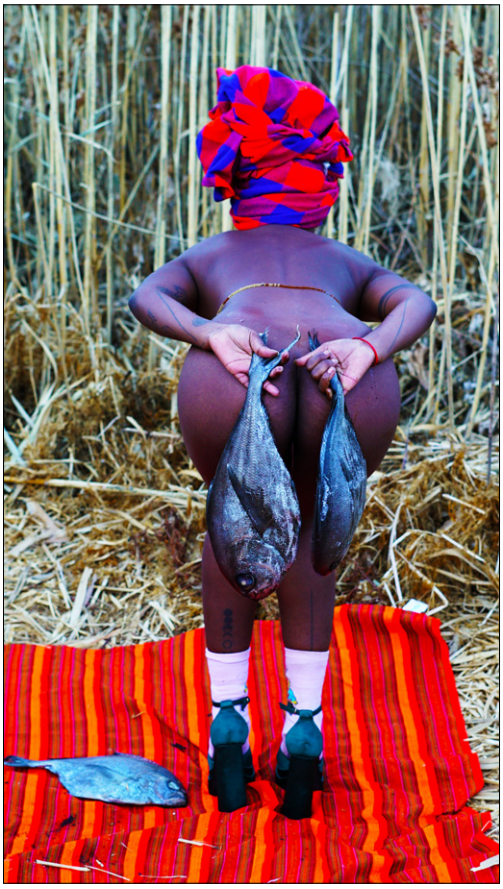
Photograph Courtesy of Owela Live Arts Trust

Figure 8 *Oudjuu wo makipa etu (2022), Tuli Mekondjo*

Figure 9 *A Fish Odyssey with the 3 Angels- The Private becomes Political (2024), JuliArt (Julia Hango) and Lila Swanepoel.*

Figure 10 *A Fish Odyssey with the 3 Angels- The Private becomes Political (2024), JuliArt (Julia Hango) and Lila Swanepoel.*

Figure 11 *A Fish Odyssey with the 3 Angels- The Private becomes Political (2024), JuliArt (Julia Hango) and Lila Swanepoel.*



Environmental Threats Posed by the Proposed In-situ Leach Mining of Uranium to Underground Potable Water Aquifers in the Stampriet Artesian Basin

Roy McG. Miller

Introduction

Uranium, apparently in commercial quantities, has been discovered by Headspring Investments, a subsidiary of Uranium One, the international exploration, mining and processing arm of the Russian state-owned company Rosatom, in the main underground artesian potable water aquifer of the Stampriet Artesian Basin (SAB) in the Leonardville area. Because of the high water table, this can only be mined by the in-situ leach (ISL) mining method. In conjunction with high water usage by irrigation operations, this method has the potential to cause extreme contamination of the potable water by the highly toxic solutions associated with mining operations. There are no mining activities at present, but an application for an environmental clearance certificate to carry out ISL test mining has been submitted by Headspring Investments to the Ministry of Environment, Forestry and Tourism (MEFT). This would allow for contamination of the aquifer to begin, and must be prevented before test mining, let alone large-scale mining, even starts. Descriptions of ISL mining and its associated problems are reported in many publications of the International Atomic Energy Agency, the Canadian Nuclear Safety Commission, CSIRO Australia, the Nuclear Energy Agency, the USA Environmental Protection Agency, the USA Nuclear Regulatory Commission, Radiation Safety, the World Health Organization, World Nuclear Association, and many others. The Stampriet Aquifer Uranium Mining Association (SAUMA) has been opposing the proposed mining since August 2021.

Background

The Stampriet Transboundary Aquifer System covers 86 647 km2. The Namibian sector, the SAB, constitutes 73% thereof, covering 63 252 km2 in the dune-covered, waterless Kalahari of southeastern Namibia. For more than a century, this has been a farming area relying entirely on the underground aquifer water for its livelihood.

Contamination of the aquifer by any mining activity would be a major disaster for all surface life that depends on the water.

Mineral exploration for base and rare metals began in 2011 in the Leonardville area. Environmental impact assessments (EIAs) for this activity were poor, particularly with regard to revealing the critical importance of the groundwater, but environmental clearance certificates were nevertheless issued and have been renewed ever since. Exploration licences were endorsed to include uranium in 2017. By late 2021, 602 exploration and hydrogeological boreholes had been drilled. SAUMA reached out repeatedly to the Ministry of Agriculture, Water and Land Reform (MAWLR), the MEFT, and the ministries of Mines and Energy, and Health and Social Services to discuss the dangers that ISL mining poses for the potable water aquifers in the basin. Only the MAWLR listened, cancelled two drilling permits in the basin, and refused an application for additional drilling. Exploration drilling has ceased for the moment. Presently, 40 Exclusive Prospecting Licences (EPLs) for uranium cover 2.66 million hectares (40% of the SAB). Eventually, after more than 30 PowerPoint presentations by SAUMA to the public, scientific organisations and farmers' unions over a period of almost three years, and support from newspaper reports and press releases on the topic, Cabinet committees were tasked with preparing reports (as yet unpublished) on the proposed ISL mining and making recommendations to Cabinet. The EIA that accompanied the application for an environmental clearance certificate to erect and run the test mining pilot plant was so atrocious that the MEFT has required a more comprehensive EIA to be submitted.

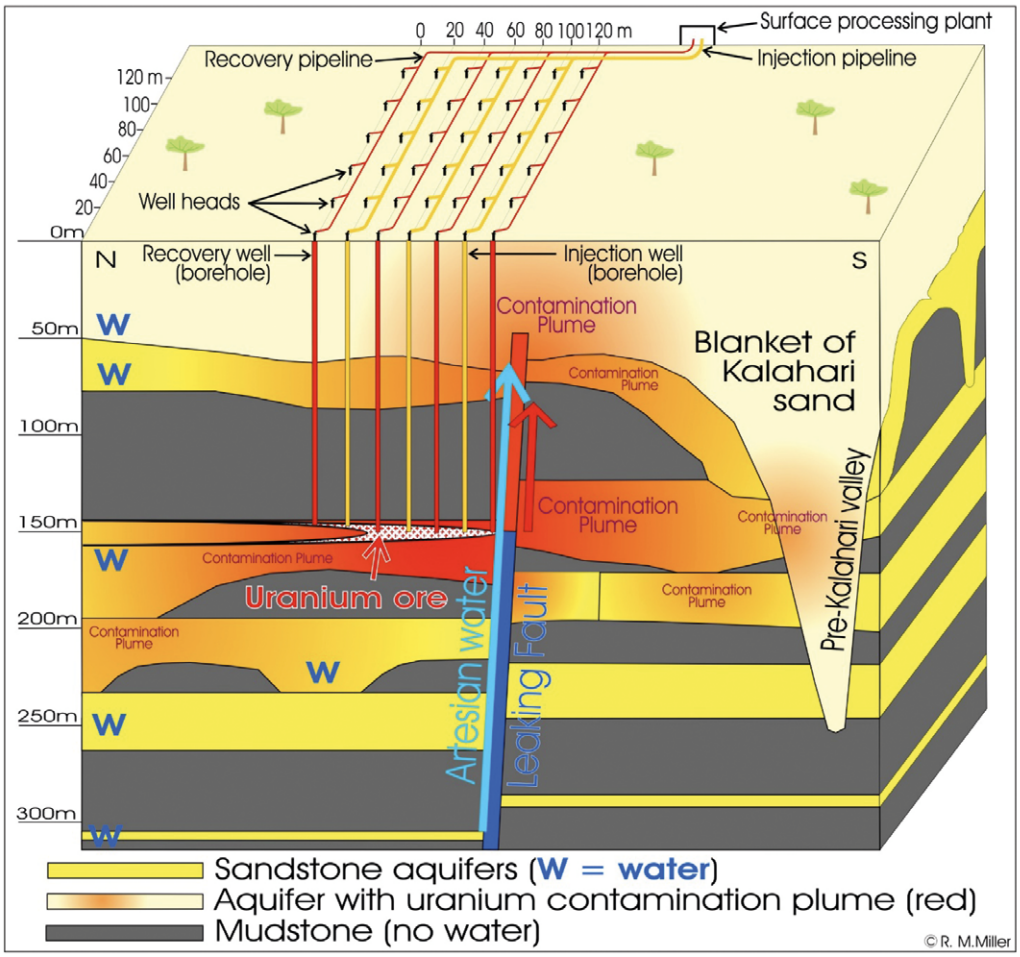
The Challenges

To understand the dangers that the proposed ISL mining poses for the underground potable water aquifers in the SAB, one needs first to understand the geology, the aquifer sandstones that are the source of the underground water, the water quality, water usage, water legislation, how ISL mining works, its magnitude, and its inherent problems.

Geology of the SAB and aquifer sandstones

The underground geology below the unconsolidated Kalahari sands consists of alternating layers of porous aquifer sandstone and impervious mudstone. Five layers of porous aquifer sandstone extend throughout the Stampriet Transboundary Aquifer System (Miller, 2008; UNESCO, 2016) and are also pumped for potable water. The lower four aquifers are under high artesian water pressure and the water flows freely

Figure 1 *Schematic diagram of an in-situ leach uranium mining operation*



Source: Author

Schematic diagram of an in situ leach uranium mining operation showing the underground lithology with water-bearing sandstone layers (yellow) in the Stampriet Artesian Basin, a fault displacement thereof (potential zone of leakage), a typical sandstone-hosted uranium orebody, a wellfield with wells (boreholes) for injection of acidic leach solutions (orange) and recovery of the uranium-rich mine solution (red), the corresponding well heads and pipelines to and from the surface processing plant, and the potential locations of the spread of contamination haloes of dissolved uranium in the water-bearing sandstones and Kalahari sands.

out of most of the deep boreholes in the upper reaches of the Auob, Nossob and Olifants river valleys. The upper three artesian sandstone layers, collectively called the Auob Formation, form the thickest aquifer and contain by far the largest quantities of groundwater. The Kalahari sands are themselves an aquifer.

In places, the underground aquifers are in contact with each other. Numerous long linear fractures of highly permeable broken rock (termed faults) cut vertically right through the rock succession. Two fault directions are present, north-south trending and up to 200 km long in the western part of the basin, and northeast trending further east.

The uranium orebodies occur at the top of the Auob Formation artesian sandstone aquifer.

Groundwater quality

With the exception of water in uranium orebodies, the water in the Auob Formation is good quality potable water throughout the basin. NamWater supplies this water to all the towns. All irrigation water is pumped from the Auob Formation. The yield of the deep Nossob Formation is limited. Its quality deteriorates southwards. Many farm boreholes tap only the variable quality water in the uppermost sandstone aquifer (the fifth of the aquifer sandstones) and the Kalahari sands.

Groundwater outside uranium orebodies throughout the world contains only minute amounts of uranium that are well below the World Health Organization (WHO) safe guideline for potable water of 30 micrograms of uranium per litre. Such is the case in the SAB. It is only in the uranium orebodies that the dissolved uranium and radionuclides exceed WHO safe guidelines. However, only a few analyses of uranium and radionuclides in SAB water have been carried out, but more are planned.

Water usage

There are approximately 7 000 boreholes in the SAB, a few extending to below the base of the Nossob Formation. The earliest artesian borehole was drilled in 1912 just north of Stampriet and yielded 110 cubic metres (m3) of water per hour (UNESCO, 2016) (1 m3 = 1 000 litres). Farm boreholes tap all aquifers, but irrigation (88% of total abstraction) and town supply (7%) are sourced from the Auob Formation. Irrigation projects pump between 20 and 107 m3 of water an hour all year round. The annual volume abstracted by irrigation is about 6 million m3. A few large, year-round irrigation operations pump at a continuous rate of 50 m3/hr and more. Such high abstraction has resulted in a fall in the Auob Formation water table of 20 m. However, recharge along the northern and western margins of the

basin restores the water table during exceptionally good rainy seasons that occur every 10 to 20 years (Kirchner et al., 2002).

When an individual borehole is pumped at a rate greater than the rate at which water can flow into the borehole, a cone of depression of the water table around the borehole develops. A porous sandstone cannot deliver the continuous yields that the large irrigation projects are pumped at. Such yields are only possible from boreholes drilled into the long faults with highly permeable broken rock. Groundwater flow modelling shows that such pumping draws water mainly from the fault for a distance of up to 40 km away, creating not a cone of depression, but a valley of depression of the water table along the fault.

Water legislation

The legislated boundary of the SAB is defined in Ordinance 35 of 1955 and was incorporated in the Water Act (54 of 1956), which declared the SAB as a Water Control Area. Key aspects of this act are incorporated in the Water Resources Management Act (11 of 2013) which was promulgated in August 2023. In terms of the latter, all artesian areas are defined as Water Protection Areas in which no borehole may be drilled without a drilling permit from MAWLR. In order to prevent leakage and help maintain the artesian water pressure, drilling permits are issued with strict instructions of where and how casing is to be cemented in place before drilling proceeds into the artesian aquifer.

The Water Resources Management Act specifically states that a person, organisation, institution, entity or authority may not cause a water resource to be polluted, and defines "pollute" as "directly or indirectly to alter the physical, thermal, chemical, biological, or radioactive, properties of the water so as to render it less fit for any beneficial use for which it is or may reasonably be used …" If mining or even test mining were permitted, this would be in contravention of the safety measures built into the Act.

How ISL mining works; its magnitude

Because of the high artesian water table of the Auob Formation, conventional open pit and underground mining cannot be undertaken. Such mines would flood immediately. Only ISL mining is feasible. This involves injecting a leach solution consisting of water containing a little sulphuric acid and oxidizing chemicals via injection boreholes into the uranium orebody in the underground aquifer. Migration of the leach solution through the orebody takes one to two months to dissolve the uranium and moves at a rate of about 0.5 m to 1 m/day. The resulting pregnant

mine solution is then pumped to the surface via production or recovery boreholes to a processing plant. Other radioactive elements and heavy metals in the orebody are also dissolved by the leach solution. Recovery boreholes pump a little more solution out than is pumped in to ensure flow of the solution is always directed towards the recovery boreholes. Once recovery of uranium is complete in the surface processing plant, this slight excess of solution is bled off to evaporation ponds. This bleed solution still contains small amounts of uranium as well as the dissolved radionuclides and heavy metals which settle out during evaporation. The remaining water is recharged with a little acid and oxidant and reinjected. Such recycling can be repeated up to about 100 times.

The mine solution is highly toxic and contains concentrations of dissolved uranium up to 3 000 times the WHO safe guideline for potable water of 30 micrograms uranium per litre of water. The dissolved uranium, radionuclides and heavy metals in the mine solution pose a huge risk to the aquifer.

Large ISL mines generally have thousands of injection and recovery boreholes spaced, on average, 20–30 m apart. Mining can last decades because orebodies are divided into smaller mine units that are mined sequentially. Mining of each unit lasts between one-and-a-half and five years. The Lost Creek Mine in the USA, for example, has 19 mine units covering about 1 700 ha (half the area of an average farm in the SAB) and will end up with about 26 000 boreholes.

All ISL mines are surrounded by monitoring boreholes in order to detect escape of the mine solution out of the mine area or into overlying and underlying aquifers (called an excursion). Water in the monitoring boreholes is analysed approximately every two weeks for uranium and radionuclide content. Various procedures are undertaken if such an escape is detected.

Inherent problems associated with ISL mining

Problems occur both on the surface and underground. The latter are of the greatest concern because they cannot be seen, are in the aquifer, and are in water under high artesian pressure. Typical surface problems are broken and leaking pipelines that lead from every borehole to the surface plant; spills of uranium-bearing solutions and reaction chemicals; radioactive radon gas in the plant; leaking evaporation ponds; wind blowing away dried precipitate powder in the dry evaporation ponds; handling of drums of the final yellow cake product; and accidental exposure of personnel to high-grade solutions or yellow cake.

The underground problems cannot be seen and are not always immediately apparent. These include broken casing or improper cementing of casing (i.e. boreholes failing pressure integrity tests); broken pumps or other hardware that require replacement; broken or blocked filter screens; loss of injection or recovery pressure; pressure build-up in boreholes; and escape of toxic mine solution (excursions) from mine areas, contaminating lateral and overlying aquifers. Pumping also has to stop or be reversed when parts are replaced or screens need unblocking during routine workovers (approximately every 2–3 weeks).

Add to these problems the underground geology. Faults are a major problem. The artesian pressure can force water and toxic mine solution up the broken rock of faults into overlying aquifers. Cross-contamination from one aquifer to another can take place where aquifers are in contact with each other. Rusted casing in old boreholes and incorrectly sealed boreholes are always a source of cross-contamination.

Irrigation projects are scattered across the northern and western parts of the basin, precisely where the uranium exploration licences are located. These pump between 20 and 107 m3 of water an hour all year round. The high pumping rate of the larger irrigation projects induces a flow of water through the underground aquifer of 22 m/day and more, and from as far away as 40 km. This is far greater than the rate of flow of 0.5–1 m/day of the leach solution flowing from injection to recovery boreholes. Such continuously high induced flow rates are bound to draw toxic mine solution out of the mine area into the rest of the aquifer for many kilometres. The danger for the escape of mine solution becomes even greater during mine stoppages for repairs and regular workovers.

Accidents and violations of ISL mining regulations are by no means uncommon. The World Information Service on Energy – Uranium Project's Issues at operating uranium mines and mills – USA has extracted lists of over 750 licence violations and reportable events from the United States Nuclear Regulatory Commission's ADAMS (Agencywide Documents Access and Management System) database. These occurred between 1996 and 2023 on US ISL mines belonging to Strata Energy, Peninsular Energy, Ur Energy, Cameco, Uranium One, and Uranerz Energy. Fines were imposed in some cases.

The violations and events included: over 300 spills of injection and production fluids; over 150 excursions (underground leakages of mine solution out of the mine area); spills of chemicals or brines; over 70 boreholes

('wells' in US terminology) that failed pressure integrity tests (i.e. were leaking); over 80 cases of monitoring boreholes missing scheduled testing; over 20 cases of leaking evaporation and waste water ponds, as well as damaged yellow cake drums and exposure of personnel to yellow cake; incorrect rate of filling of yellow cake into drums; incorrect operation pressures and bleed rates (removal of excess solution after processing); problems with shipping papers; missing radiation work permits; incorrect calculation of radioactivity and exposure dose rate; failure to remove topsoil and protect topsoil, missed daily inspections; failure to carry out monthly gamma rays surveys of buildings; problematic Environmental, Safety and Health reports; storage facilities for radioactive material not properly secured; inadequate material release surveys; and illegal modification of licence boundaries, amongst others.

Actions

SAUMA must continue to create awareness of the dangers that the proposed ISL mining of uranium in the aquifers of the SAB poses to the potable water, the livelihoods and the economy of the SAB. The revised EIA for pilot plant test mining will have to be critically evaluated by geologists, hydrogeologists, environmentalists, the Namibia Agricultural Union, the authorities, and farmers, once it is available.

Outcomes/Conclusions

At a UNESCO-sponsored meeting held on 17 June 2024 with various presentations on this subject, Minister Schlettwein concluded his speech with the comment, "At the end of the day we cannot survive without water and food, but we can live without coal or uranium."

Such ISL mining of uranium in underground potable water aquifers would not be allowed in Australia (personal communication: Dr. Ian Lambert, author of Australia's In-situ Recovery Uranium Mining Best Practice Guide, Commonwealth of Australia, 2010). Common sense dictates that this should also be Namibia's stance.

References

Commonwealth of Australia. (2010). *Australia's in-situ recovery uranium mining best practice guide*. https://www.nrc.gov/docs/ML1024/ML102440222.pdf

Kirchner, J., Tredoux, G., Wierenga, A., & Christelis, G. (2002). *Applying environmental isotopes to a hydrogeological model of the Stampriet Artesian Basin. Report on Regional Model Project RAF/8/029 submitted to the IAEA*. Department of Water Affairs, Ministry of Agriculture, Water and Rural Development.

Miller, R. McG. (2008). *The geology of Namibia*. Ministry of Mines and Energy, Geological Survey of Namibia.

UNESCO. (2016). *Stampriet transboundary aquifer system assessment: Governance of groundwater resources in transboundary aquifers (GGRETA), phase 1: Technical report*. UNESCO International Hydrogeological Programme. https://unesdoc.unesco.org/ark:/48223/pf0000245265

Water Resources Management Act (11 of 2013) (Namibia). https://www.lac.org.na/laws/annoSTAT/Water%20Resources%20Management%20Act%2011%20of%202013.pdf

Derisking of Dependency? A Political-economic Analysis of the Hyphen Hydrogen Project in Namibia

Fabio Banet & Armin Hoepfner

Abstract:

In this article, we examine the financing architecture and the conception of the Hyphen Hydrogen Project (HHP) and look at its consequences for Namibia's position in global capitalism. Based on guided expert interviews and a document analysis, we analyse the interests and resources within the project of the Namibian state, as well as those of foreign actors such as Germany. Based on our analysis, we present three plausible scenarios arising from the HHP and Namibia's hydrogen ambitions, of which we consider green extractivism to be the most plausible. The findings of our article indicate that Namibia's dependence on the capitalist centre tends to deepen, despite the presentation of the HHP as an egalitarian partnership.

Keywords: dependency, development, derisking, extractivism, global capitalism, hydrogen

Introduction

The "sustainable" transformation of industrial capitalism, as well as Western countries turning away from Russian gas and oil, opens new potential for some African countries to establish themselves as suppliers of green hydrogen, which is considered to be the energy source of the future (Van de Graaf, 2022). It has the potential to decarbonise those industrial processes that cannot be electrified and is therefore a key pillar for the green energy transition and a global net zero carbon emission (IEA, 2021). Namibia stands out, as its geographical conditions offer optimal circumstances for hydrogen production. Namibia is therefore trying to utilise these advantages in the hope of economic development, job creation and a general socioeconomic upturn (Ministry of Mines and Energy, 2022). However, realising this renewed development promise requires substantial investments in production capacities. In this paper, we examine the Hyphen Hydrogen Project (HHP) in Namibia, a planned green hydrogen production plant with German government participation.

We explore how the conception of the HHP can change Namibia's position in global capitalism and lead to new socioeconomic structures within the country. We will do so by using the theoretical framework of international financial subordination (Alami et al., 2023). After introducing our methodology, we will analyse the HHP, focussing on the conditions for the profitable production of green hydrogen determined by external factors and negotiated terms, as well as on the Namibian state, its agency, and its limitations. To conclude our findings, we will outline three possible scenarios regarding the HHP and Namibia's hydrogen ambitions. Like other studies, we expect a scenario of green extractivism to be the more likely outcome than failure or derisking developmentalism (Gabor & Sylla, 2023).

Germany and Namibia are linked by a colonial past that led to the genocide of the Hereros and Namas between 1904 and 1908 and still characterises class relations in Namibia today (Schaller, 2004; Melber, 2018). If trade relations between the two countries are now to be revitalised, one must pay close attention to which actors, interests, and strategies are involved, and to the related consequences for the people of Namibia and its ecological environment. The concept of social justice, understood as a holistic perspective of social, environmental and historical factors, is therefore the guideline of our analysis.

This article contributes to the increasing interest in the field of critical social science regarding the implications of global green hydrogen ambitions. Only recently, different papers have examined the potential consequences and warned about new manifestations of neocolonialism and extractivism (Müller et al., 2022; Müller, 2024; Kalt & Tunn, 2022; Kalt et al., 2023) and have looked at the implications of the European Green Deal for the African continent (Claar, 2021). Other authors focused on the financial conditions under which renewable energy and hydrogen projects take place (Haag et al., 2024; Gabor, 2021). Finally, research has also been conducted on the HHP and Namibia's hydrogen ambitions (Gabor & Sylla, 2023).

An aim of this paper is to contribute to what is a critical debate by examining this important pilot project. Taking a political-economic approach, we attempt to scrutinise the theoretical framework of international financial subordination (IFS) by establishing two dimensions that are fruitful for analysing the HHP and the Namibian context.

HHP and Namibia's Hydrogen Strategy

The Namibian government sees the HHP as the starting point of a comprehensive green hydrogen strategy with the ambitious goal of green industrialisation of the country (Ministry of Mines and Energy, 2022). The Namibian hydrogen strategy thus explicitly distinguishes itself from extractivist economic models that are based solely on the exploitation of domestic resources and their largely unprocessed export abroad. Like many countries in the Global South, Namibia has also experienced such extractivist practices by international corporations, for example in the mining sector, and in the exploitation of the rich fish stocks off Namibia's coast of Namibia (interview 1 (i1)).

The hydrogen strategy is presented as a promising solution for poverty, development, energy security, and ecological problems. However, in the past, such strategies posed the risk of ushering in new forms of green extractivism, defined as "a variation of extractivism, in which resource appropriation and extraction is materialized through climate change policy guidelines and legitimized by green discourses" (Bruna, 2021, p. 163).

The HHP is seen as a pilot project for Namibia's hydrogen strategy, which includes the establishment of an export infrastructure and Hyphen Hydrogen Energy Ltd (Hyphen, for short), and facilities that will be used for further projects. Hyphen is a joint venture between the German company Enertrag and the offshore investment company Nicholas Holdings Limited. For the hydrogen to be classified as green, it must be produced using renewable sources of energy. For this purpose, Hyphen plans to build a wind and solar farm with a capacity of 7GW, with 3GW for the hydrogen electrolysis plants. By the end of 2030, a total of 350 000 tonnes of green hydrogen will be produced, to be converted into 2 million tonnes of ammonia for export in Lüderitz (Hyphen, 2024a).

Following the selection of Hyphen as the preferred supplier in November 2021, the Concession Agreement (former: Feasibility and Implementation Agreement) was negotiated with the Namibian Government, setting out the key terms and conditions of the project (Hyphen, 2024b). The project is currently in the final assessment phase regarding its feasibility and environmental compatibility before the final decision is made regarding the USD 10 billion investment. However, at the end of 2024, the schedule for the HHP was postponed by over a year without any further details being communicated. Nonetheless, the HHP is of enormous importance for Namibia due to its size.

Derisking

In recent decades, the concept of derisking has established itself as a central instrument in development cooperation. The core idea of derisking is publicly financed risk minimisation for private investors. The aim is to create lucrative assets for private capital, for example by removing regulatory hurdles and offering return guarantees. The intention is that private capital will finance the development of strategic sectors and infrastructure without creating public debt (World Bank Group, 2017). Due to the lack of resources and government capacity to realise such megaprojects with public funding in Namibia, the HHP will be implemented using the financing strategy of derisking. It structures the involved actors, their interests, and their strategies, and hence influences the outcomes of the HHP. Derisking is seen as an enabler of the HHP, but it also shapes its outcomes in a field of tension between the private profits of multinational corporations and Global North countries, on the one hand, and Namibia's revenue based on its sun and wind resources, on the other. We are therefore interested in what conclusions can be drawn from an analysis of the project design. Accordingly, this article aims to answer the following question:

How does the derisking of the Hyphen Hydrogen Project affect Namibia's dependency in the Global North-Global South relationship?

Methodology

In approaching this case-study, we used a mixed methodology where document analysis was intertwined with five guided interviews with relevant experts from the fields of politics, the business world, and civil society, all of whom were directly or indirectly involved in the HHP. The interviews were conducted between December 2023 and April 2024. The interview guidelines were tailored to the respondents' expertise and focussed on determining the financing conditions of the HHP, as well as the potential and risks arising from an emerging hydrogen economy in Namibia.

Our analysis is also based on secondary data taken from policy papers of international energy organisations, partnership agreements between Namibia and Germany, and government documents relating to Namibia's hydrogen economy. Data from these current developments are embedded in longer-term socioeconomic developments, which we drew from available statistics from the Namibian government and international organisations.

The risk of Namibia renewing its dependency due to the way in which

the hydrogen strategy has been planned was clearly expressed by Namibian experts in the interviews. Following the abductive research tradition (Timmermans & Tavory, 2012), we took this hypothesis as the starting point and centre of our study, which follows a deductive and abductive category system. The interviews were coded using MAXQDA software and analysed using thematic qualitative data analysis, as per Kaiser (2021).

Theoretical Framework

IFS (Alami et al., 2023) is used as a theoretical framework to provide a multilayered understanding of the financial conditions and mechanisms of the periphery countries in the context of global capitalism. In our research and in this article, we mainly focus on the two dimensions of production and state within IFS.

The production dimension centres on the question of whether and how a completely new hydrogen industry can be established in Namibia under the conditions of global capitalism. In addition, the social consequences of the HHP will be assessed and an outlook on the relations of production in Namibia will be provided. The conceptualisation of this dimension is based on Marx's understanding of three different capital cycles (money capital, production capital, commodity capital), which interact dialectically (Marx, 1998; Alami et al., 2023, p. 1 372). Capital is therefore not in a fixed relation but is constantly changing its form. Money (G) becomes means of production (P), and eventually commodities (W), before this cycle restarts (Pechmann, 2016).

Applied to the HHP and Namibia's hydrogen ambitions, the capital cycle as a whole can be understood as follows: First, it requires the investment of monetary capital, which is used to finance labour and production facilities (primarily electrolysers, wind and solar power plants, and desalination plants); this production capital produces green hydrogen; this, in turn, is sold as a commodity, and thus realises surplus value and satisfies the profit expectations of money capital. However, as soon as profitability is considered unlikely, derisking by state actors is required to ensure that private capital is acquired for investment. In our theoretical approach to Marx's capital cycles, we understand derisking as a necessary state intervention to ensure the continuous circulation and transformation of capital within its accumulation.

The state dimension summarises how peripheral states act within IFS, which structural constraints of global capitalism they are subject to, and what scope for action can be opened up and negotiated. Following Simon

Clarke (1991), we define the role of the capitalist state in terms of three functions: 1) realising the international division of labour (in accordance with global class relations); 2) negotiating and pacifying social antagonisms; and 3) establishing and securing the national accumulation regime (Alami et al., 2023, p. 1 375; Clarke, 1991, p. 188). This is intended to counteract the misunderstanding that a (capitalistically organised) developmental state could evade capitalist logic, and particularly IFS, with suitable policies, possibly aimed at regulation and protectionism.

Findings

Production: Ideal conditions for a Namibian hydrogen hub?

In the circumstances of a peripheral region of global capitalism, high capital costs are a major obstacle to the profitable production of green hydrogen. Due to legal uncertainties and a lack of basic infrastructure and qualified labour, as well as racially connotated assumptions, these investment conditions are considered unfavourable in comparison to the Global North:

> *As I said at the beginning, the central problem … that investors will face is the cost of finance, i.e. credit financing. [Note: Namibia] … has no equity of this magnitude, but … the banking world has to get involved … and the banking world looks at Africa and then says … "Interest rates are twice as high"* (i3)

High capital costs reduce the profitability of the project, as lenders' interest must be earned in the accumulation process before profits can be realised. This tends to discourage investment, which, among other things, has led to a lack of industrialisation in many sub-Saharan countries (Döver & Kappel, 2015). Under the given financing conditions, only extractivist practices geared towards the export of unprocessed raw materials remained profitable (Brand & Dietz, 2022, p. 251).

The limited state capacity resulting from the low level of industrialisation is made even more difficult by the challenge of the inevitable foreign currency debt. This means that states are heavily dependent on the key interest rates of the dollar or the euro, as these determine the price of their debt (Koch, 2024, p. 250). Like many countries in the Global South, Namibia's national debt has increased sharply because of the COVID-19 pandemic. Between 2018 and 2021, the debt ratio in relation to gross domestic product rose from 49% to 70% (Statista, 2024). The high cost of the debt burden is limiting the scope of action for many countries in the Global South. In 2020, for example, 62 countries spent more

money on repaying external public debt than on healthcare (Munvar, 2021, p. 2). The risk of a debt crisis has been latent since the pandemic and has led to an increased need for foreign exchange earnings (Gabor & Sylla, 2023, p. 6).

Derisking is seen as the answer to these uncertain investment conditions and a lack of state financing capacity. The aim is to encourage private capital to invest in global infrastructure projects and enable the circulation of monetary capital by providing state security and producing profitable assets (Gabor, 2021). The targeted private capital is heavily concentrated in the hands of institutional asset managers, which are disproportionately located in the US financial centres. Private asset managers such as Blackrock manage trillions of dollars and seek profitable investments worldwide. Derisking measures are intended to create investment opportunities for this transnational financial capital (Banse & Shah, 2021, p. 313).

Due to the Namibian state's limited fiscal scope of action, it is not able to implement the same cost-intensive derisking measures as the countries of the Global North. Namibia's primary derisking tool is the USD 1 billion "Namibia One" fund, which was set up with the help of loans from international development banks. These funds are intended to secure the development, construction and operation of hydrogen projects on the supply side (Ministry of Mines and Energy, 2022, p. 17; Gabor & Sylla, 2023, p. 8). In addition, the Namibian government is taking regulatory and legal measures to support the hydrogen strategy by avoiding bureaucratic obstacles and thus additional costs. In May 2023, the Namibian government made a commitment to Hyphen in the Concession Agreement (former: Feasibility and Implementation Agreement) to create the "legal, fiscal and regulatory framework for project implementation" (Hyphen, 2024b, p. 1).

The transition from money capital to production capital will take place after the final investment decision, which is due at the end of 2024, when the construction of the production facilities is to begin. The production of green hydrogen requires technology and capital-intensive facilities. These include renewable energy plants, desalination plants for water treatment, electrolysis plants and a storage and transport structure for hydrogen and its derivative, ammonia. The capital composition of the HHP is therefore heavily weighted towards constant capital, i.e. production resources. The complex plants require significant labour solely for their construction. Hyphen expects to need 15 000 workers in the first five years. After that, only

3 000 permanent jobs, mainly highly skilled, will be created (Hyphen, 2024a).

In addition to the equipment, the successful production of green hydrogen requires large quantities of renewable electricity and fresh water. Hyphen is planning to build 7 GW of production capacity to cover its electricity needs, which corresponds to 10 times Namibia's current electricity production (i5). However, only a few details were communicated about the electricity required to desalinate the seawater, which poses an unresolved challenge to the success of the production process:

> *But all the other projects never got off the ground because of water. … And that is [unclear] fact: No water. … Nothing is possible. … Uh, … like, I mean, if you [unclear] desalination plant, everybody says, oh, no, they'll build desalination plants. Um, … do you know, uh, you know, it takes a 3.5kW of electricity to generate just one litre of water. … Yeah. … Uh, if you're going to be producing 300 000 tonnes of their stuff, you know. … Yeah. Uh, that's 3.5 million, kilowatts. It's a three gigawatt of electricity just to have the water, just to have the water. And you haven't actually done any processing of that water. You haven't started up your hydrogen plant as well (i2).*

Once the hydrogen has been produced, its conversion into a commodity form through sale on a market represents the final hurdle in the movement of capital. There is currently no global market for green hydrogen (i2). Therefore, a considerable price and quantity risk exists, as companies cannot make any reliable forecasts about how much hydrogen (derivatives) they can sell, and at what price (i2). This uncertainty has a negative, inhibitory impact on the planning certainty of green hydrogen projects. The H2Global Foundation's derisking instrument is the central measure to counter the price and quantity risk described above. As an intermediary trading platform, the Hydrogen Intermediary Company GmbH (HINTCO) is intended to facilitate the development of a green hydrogen market by countering demand uncertainties. This is done by means of a so-called double auction process, in which HINTCO concludes long-term supply contracts on the supply side with companies that can offer a tendered supply quantity of green hydrogen at the most favourable price. On the demand side, they sell the purchased hydrogen to the highest bidder, with supply contracts that are shorter-term. This measure takes an expected increase in willingness to pay as a result of rising emission costs for fossil alternatives into account (i2). It is expected that initially, supply and

demand prices will not meet, which is why these contracts allowing for differences are concluded (Bollerhey et al., 2023). This price gap is closed with funds from a public sponsor; in the case of H2Global, this is financed by the German Federal Ministry of Economics and Climate Protection (BMWK). The BMWK had already approved 900 million euros by the end of 2021, and a further 3.5 billion euros have already been pledged. Other countries in the Global North, such as Canada, want to participate in financing the instrument.

State: A national development promise in harmony with global economic trends?

Building a new mode of accumulation

The Namibia Green Hydrogen and Derivatives Strategy, which the Namibian government published in 2022, was the result of several years of effort to develop a new economic development strategy. The strategy was developed under the leadership of the consulting firm McKinsey with the participation of the Namibian agency Monasa Advisory & Associates, funded by the German Federal Ministry of Education and Research (BMBF) (Mckinsey secures consultancy, 2022). A 2020 World Bank study had already emphasised Namibia's potential for the competitive production of green hydrogen (IPPR, 2021, p. 3), and further studies followed (Gabor & Sylla, 2023, p. 16). Namibia's geographical and climatic conditions are considered ideal locational advantages: The combination of sun and wind in Namibia is one of the most favourable in the world. For example, photovoltaic systems in Namibia can generate 2 950 full-load hours of green electricity compared to 900 in Germany (i3). In addition, photovoltaic and wind power plants require large, empty spaces. Namibia fulfils this requirement due to its low population density. However, other harsh site conditions make investments in Namibia more difficult. There is limited project-specific infrastructure required for the various phases of the HHP. For example, the construction of a project of this scale requires a stable electricity grid, distribution within the country requires transmission lines, and specialised port infrastructure is needed for exports (i2). As stated by Tom Alweendo, the Namibian Minister of Mines and Energy, this form of infrastructure is only available to a limited extent in Namibia, and in the main still needs to be financed and built (Ndjavera, 2023). Other requirements such as the availability of well-trained, preferably specialised workers are also only partially met.

Through the Namibia Green Hydrogen and Derivatives Strategy,

Namibia is also part of globally coordinated efforts and plans to establish an international hydrogen market at various levels. With the REPowerEU Plan, the European Union (EU) once again increased the targeted import quantity of hydrogen to 10 million tonnes by 2030 and emphasised its central role for the decarbonisation of sectors that are difficult to electrify (European Commission, 2024). In this context, the EU concluded agreements with Namibia and other African countries to expand capacities for renewable energies and green hydrogen. Germany is playing a pioneering role in this transformation; as early as 2019, the Federal Government adopted a National Hydrogen Strategy, which, in its 2023 update, assumes an import requirement of between 50% and 70% for 2030 (BMWK, 2024, p. 9). This was followed in July 2024 by a hydrogen import strategy, which again emphasises that "a large part of Germany's hydrogen demand [...] must be covered by imports from abroad in the medium and long term" and is intended to provide "orientation and clarity" about German import requirements (ibid., p. 2). In this scenario, the HHP plays a pioneering role in Germany's post-fossil energy supply. The German government has classified the project as a strategic foreign project (Enertrag, 2024).

The international plans to establish green hydrogen as the central energy source of the future are thus closely aligned in terms of both temporality and content with Namibia's decision to position itself at the "next frontier of the energy transition" (Van de Graaf, 2022, p. 21; Gabor & Sylla, 2023, p. 15).

With its Namibia Green Hydrogen and Derivatives Strategy, Namibia is not only formulating a claim to establish a new and sustainable accumulation regime that will enable broad and sustainable industrialisation, but is also positioning itself as an energy exporter in the context of a reorganisation of the international division of labour. It should be noted that these two objectives are, at least in part, in conflict with one another. In their hydrogen strategies, the countries of the Global North, and Germany in particular, only set out specific targets for the import of the energy source and its derivatives. The production of goods such as fertilisers or steel using green hydrogen should continue to take place in the developed economies in order to maintain the accumulation regimes. This objective can also be clearly seen in the design of the derisking instruments (see the section on production). Namibia's hope of shifting green hydrogen-based value chains into its national economy is therefore only partially supported by development funds from the Global North. This leaves Namibia with a vague prospect that its successful establishment as a

hydrogen producer will result in cost advantages, and thus in a relocation of further manufacturing processes. However, these cost advantages must be substantial to compete with massively funded derisking efforts such as HINTCO from Germany for the limited quantities of hydrogen available.

Pacification of social antagonisms

The Namibian government hopes that the national hydrogen strategy will lead to a broad socioeconomic upturn. By 2030, its development is expected to contribute over USD 6 billion to the GDP (gross domestic product) (Statista (2024, p. 3) gives Namibia's 2022 GDP as USD 13 billion) and thus create 280 000 new jobs (GH2Namibia, 2022, p. 32). With an unemployment rate of over 33%, the prospect of new jobs has been particularly well received by the population (Namibia Statistics Agency, 2019). At the same time, publicly communicated job figures are the central issue in every election campaign, which is why such announcements are increasingly viewed with scepticism (i5; i1).

With regard to the HHP, the Namibian government has endeavoured to shape the terms of investment in line with its own development goals in the negotiations with Hyphen. Ambitious targets were agreed: 90% of the jobs are to be filled by Namibians, creating 15 000 full-time positions during the construction phase and 3 000 during operation. So far, the only concrete step towards this goal is a BMBF funding programme to support the education and training of 200 Namibian students. However, the total funding amount of 40 million euros appears to be negligible given the scope of the HHP (BMBF, 2022). It has also been agreed that 30% of the goods and services used will be sourced from Namibian companies, although the specific implementation and scope of this agreement are unclear (Ministry of Mines and Energy Namibia, 2022, p. 16). In addition, Hyphen pays around €16 million per year to Namibia for the project area during operation (ibid.), which cannot be compared with the income of €500 for the one-off issuing of a mining licence (GH2Namibia, 2023, p. 3). The mere fact that Namibia was able to negotiate these contractual conditions shows a change in the mode of cooperation compared to previous fossil fuel projects. The change can also be observed in the communication of Hyphen, which describes its plans more transparently and openly than fossil fuel companies such as the Canadian ReconAfrica (i1). Civil society is invited to consultations on environmental impact assessments and the company makes documents on the project process available to the public

on its website (i1; i3).

However, there are doubts as to whether all the agreements can be implemented and, above all, monitored. This is because the Namibian state sometimes lacks effective resources and practices to effectively control international companies, as one interviewee noted:

> Our government doesn't have the capacity, or our government is not interested in scrutinising … what the mining company is doing here. ... They don't go around and check what they are doing. Even if the community is complaining like, this company is poisoning us. No – no government official will go there and have a look and see if these companies are doing things according to the plan that was set up. Or according to the contract that was signed with government. … Our government doesn't do that. They just let these companies come here and run wild. You know, those are – those are nice words that they are using in the Hyphen contract. We will do this. We'll do that. But who's going to make sure that they stick to that. Nobody will be. So we're not expecting anything. It's just a contract. It doesn't mean anything in Namibia (i1).

Nevertheless, the Namibian government seems determined to utilise the potential of the hydrogen economy for Namibia. Namibia has secured the option to acquire a 24% stake in the HHP to benefit directly from the hoped-for economic success. As this participation exceeds Namibia's financial scope, the European Investment Bank and a semi-governmental Dutch financing company have promised Namibia a loan on favourable terms (i3). Although the final decision on Namibia's participation in the HHP is still pending, there are already critical voices. They warn that if the HHP fails, Namibia could face national bankruptcy due to the debt burden of a single project (Wagner, 2023, p. 108). As a result, this possible participation would entail considerable disciplinary measures for Namibia, as it would no longer be practically possible to independently cancel the project.

> *And, um, the other thing that really worried me was that … the government is also agreed to … taking up 25% shares … in the Hyphen Project. … If you – if you calculate that money, it's like … half our – … half our national budget … that we are required, … you know, to provide for the Hyphen Project … And if something went wrong with that project, … that – that's us left with – with some debt to pay. We don't have money as usual. We always depending on – on investors, … uh, foreign investors (i1).*

Summary: Risks of Namibia's Dependency Development through the HHP

Table 1 *Summary of the results*

Dimension	Category	Results
Production	Money capital	• Framework conditions: high capital costs, neo-colonial accumulation patterns, foreign currency debt • Derisking to attract private capital for infrastructure investments • Profitability of investments in H2 must be guaranteed
	Production capital	• Capital- and technology-intensive production facilities are required • Qualified labour for operating the plants will probably come from abroad • Water and energy requirements for desalination is still an unresolved problem
	Commodity capital	• Uncertain acceptance of green hydrogen, sales depend on implementation of decarbonisation plans in industrialised countries • Demand-side derisking instrument HINTCO equalises purchase and sales price
State	International division of labour	• Namibia's hydrogen strategy is part of the development of a global green hydrogen industry: • Germany as a pioneer in green hydrogen and most important partner for Namibia (import: 3 million tonnes from 2030) • In the context of the REPowerEU Plan, the EU is also planning to establish hydrogen as the central energy source of the future (import: 10 million tonnes from 2030) • Namibia is positioning itself as a producer of green hydrogen and is (primarily) supported in this role by countries of the Global North
	Accumulation	• Favourable site conditions and foreseeable increase in international demand for green hydrogen justify decision for new accumulation model • Namibia's economic policy efforts are mainly focussed on building up a hydrogen industry • Hope for broad industrialisation through competitive relocation of value creation to Namibia in the context of hydrogen production
	Social peace	• Towards the Namibian population: • Renewing the promise of development

Source: Author

Conclusions

Scenario 1: Derisking developmentalism

According to Gabor and Sylla, the scenario communicated by Namibia and Germany can be described as derisking developmentalism. The Namibian state develops a hydrogen strategy under the conditions of IFS and creates attractive investment conditions with the financial support of industrialised countries. This lays the foundation for private capital to significantly finance and build up Namibia's economic development vision due to the profitability of the assets created (Gabor & Sylla, 2023, p. 3f.). Namibia's goal within the framework of the National Hydrogen Strategy is to implement the development promise, which includes broad industrialisation, the creation of good, sustainable jobs and a general socioeconomic upswing, and an increase in the financial leeway of the Namibian state (GH2Namibia, 2023). In view of our analysis, this scenario is primarily supported by the agreements made with Hyphen regarding the employment rate of Namibian workers, the proportionate use of Namibian primary products, the lease payments for the area, and the possibility of a 24% stake in HHP, which would allow the Namibian state to participate continuously in the economic success of the HHP. In addition to the agreements with Hyphen, the aspirations and practices of the German government in its partnership with Namibia also speak in favour of this scenario: Germany not only financed Namibia's development of the national hydrogen strategy, but also awards scholarships to young Namibians who are undergoing professional training in areas relevant to the hydrogen economy. In addition, various pilot projects are being subsidised to test further possible uses for green hydrogen. However, development funds outside of the HHP are low in relation to the required investments. Namibia hopes to realise the promise of development and industrialisation through competitive advantages that arise from the HHP, and to make investments of private capital in subsequent business areas profitable and therefore attractive. In that respect, derisking developmentalism can be understood as a congruent development strategy by the state. However, the inherent logic of derisking prevents sufficient control of the means of production such as the technology for hydrogen production, as well as an increase in local value addition.

Scenario 2: Failure

The second scenario is the failure of the HHP due to the analysed challenges surrounding the project. Various factors have the potential to make the

investment riskier and considerably more expensive than anticipated: The chronic water shortage necessitates the construction of huge desalination plants at a considerable energy cost to provide the considerable amount of water required; such construction is therefore essential for the functioning of the production capital cycle. In comparison to Namibia's current economic activities, the scope of the HHP is almost beyond comprehension. Not only does the investment volume of USD 10 billion almost equal Namibia's GDP, but the planned power generation capacity (5–6 GW) also exceeds the capacity currently installed in the country (610 MW) by a factor of 10 (Gerrard & Hauser, 2021, p. 10). Equally relevant are the overall lack of infrastructure which is required both for the actual operation of the HHP and for its construction, and the insufficiency of the supply of skilled labour for the hydrogen industry in Namibia. There are also political risk factors: general elections were due in November 2024 and the SWAPO government was in danger of losing a significant percentage of votes, which could at least jeopardise the smooth continuation of the HHP. Although a complete abandonment of the HHP seems rather unlikely, even if former opposition parties were to participate in the next Namibian government, there is a possibility that the momentum of implementation could decrease. This is in line with the observations made by one interviewee after the death of Hage Geingob (i5). The extent of the German government's commitment also depends largely on the appointment of a politician from the Green Party to the Ministry of Economic Affairs, which is unlikely in the next legislative period given the current state of the German government.

In addition to the risks specific to the HHP, the general uncertainties regarding the profitability of green hydrogen are a major factor in HHP's and Namibia's hydrogen strategy. When developing a market that does not yet exist, there is generally a price and quantity risk. The main reason for this is the considerable cost disadvantage of green hydrogen compared to grey hydrogen, as green hydrogen is currently around two to three times more expensive to produce. This is compounded by higher transport costs, as fossil hydrogen is generally produced directly at the point of use (Alagu et al., 2024, p. 19).

> Perhaps we need to … consider where this demand [for green hydrogen] comes from? It's not … an economic need in the sense that it's not economically viable. It's a need because we have to do it because we're in a climate crisis. And if it were an economic need in the sense of "this is a great market and … a gap in the

market or something", it's not a gap in the market. We have to switch because otherwise we'll run into a climate catastrophe. That's where the demand comes from … and as long as nobody has priced in the climate consequences // … So … it's just going to be expensive (i2).

The development of a market for green hydrogen can therefore be understood as a political project which must be implemented in line with the inherent capitalist compulsion to accumulate capital. Accordingly, the success of this political project depends on the chosen instruments convincing private investors of the profitability of their investments and thus also of the political project in terms of their scope and reliability. Whether the promise regarding the sustainability and profitability of green hydrogen will convince private capital can at least be doubted. There are still no customers for 88% of the planned hydrogen projects within Europe, which is an unusually high figure (Energy voice, 2024). Interviewed observers also shared the assessment that there is a massive gap between the forecast demand and the actual willingness to invest (i2). Although demand-sided derisking instruments such as HINTCO provide a flexible and market-oriented response to price and quantity uncertainty, which could in principle also close larger gaps between supply and demand prices, it appears that the market is still in a state of flux. Also, the reduction of grey hydrogen's competitiveness by pricing its climate-damaging emissions has been contested by right wing parties in the Global North. The fossil fuel backlash is fuelled by the fear of the social consequences of making fossil fuels more expensive and the doubt that a political response to their socioeconomic consequences can be found to preserve social peace (Patterson, 2023; Gourinchas et al., 2024). Overall, private capital does not seem convinced that the green transition will be implemented with the necessary determination and rigour to ensure the profitability of green hydrogen investments.

Scenario 3: Green extractivism

However, a complete failure of the HHP does not appear to be conceivable, which is why the scenario of green extractivism can be considered the most likely outcome. The HHP is the main pilot project for green hydrogen for Germany, which is also reflected in its classification as a "foreign project in the strategic interest of the Federal Republic of Germany", which enables "more support than usual through our foreign trade promotion instruments" (Enertrag, 2024). The priority of the project for the German import strategy can also be seen in the visit of the German Minister of Economic Affairs and the

appointment of a special representative for German-Namibian climate and energy cooperation (Hoffmann, 2023). In addition, the derisking instrument HINTCO is already equipped with considerable financial resources. The importance of green hydrogen as an alternative and a green energy carrier is of central importance for the German accumulation model, which is clearly demonstrated by the cooperation with the HHP. Despite the fossil fuel backlash described above and the most recent European elections, the HHP and the green transition do not appear to be substantially jeopardised in the European context either. In her political guidelines, Ursula von der Leyen commits to the "Green Deal" adopted in the last legislative period, which, however, is to be increasingly geared towards improving the competitiveness of European industries with the help of a "Clean Deal" (Von der Leyen, 2024, p. 9f.). The HHP could benefit from this, as hydrogen projects are explicitly mentioned in the context of a planned fund for competitiveness (ibid., p. 25), in contrast to climate protection projects, which do not contribute to the competitiveness of the European market. In view of the economic downturn within the EU and in Germany in particular, the "Clean Deal" may indicate how climate protection will be organised in the coming years: A consolidation of ambitions combined with an increased focus on those fields that promise to secure the competitiveness of one's own accumulation model. In combination with a persistently strong ideology and policy of austerity, this could also change the structure of HHP cooperation. With a change of government in Germany, the partnership may be focused solely on the central goal of hydrogen exports, or Namibia may be asked to make a larger financial contribution, further constraining Namibia's already limited ability to advocate for its own development goals.

To understand the significance of the green extractivism scenario for Namibia's dependency relationship in Global North-Global South relations, it helps to look at the definition of dependency of a co-founder of dependency theory, Theotônio dos Santos (1970, p. 231): "A situation in which the economy of certain countries is conditioned by the development and expansion of another".

This understanding of dependency can largely be applied to Namibia's position within the green extractivism scenario. Since green hydrogen is not a competitive and profitable product and private capital will only invest if the Global North finances extensive derisking instruments, Namibia is directly dependent on the success of the political project of green transformation.

However, there are many indications that this project cannot be realised to the same extent and that green hydrogen will only play a smaller role in the future than planned. This will inevitably reduce the scope for Namibia's development ambitions, meaning that Namibia will at best be able to establish itself as an exporter of green hydrogen. This puts Namibia in a twofold dependency. On the one hand, industrial production in Germany is a prerequisite for the continued existence of demand for green hydrogen. The quantity of this demand is not within Namibia's sphere of influence and can be jeopardised by various scenarios, such as a relocation of capital and subsequent deindustrialisation of Germany (Hüther, 2023). On the other hand, Namibia is becoming dependent on the world market prices of green hydrogen. These are linked to global demand and thus tend to be linked to the needs of the Global North in general, as well as geopolitical events. As a result, instead of greater independence, Namibia's integration into the international division of labour will increase and Namibia will likely be subject to increasingly strong restrictions by capital and the countries of the Global North.

References

Alagu, A. R., Boumrifak, C., & González, L. (2024). *Green-H2 Namibia: Green Hydrogen Production in Namibia*. DECHEMA. https://dechema.de/green_hydrogen_namibia_report/_/H2-Report_GreeN-H2_digital.pdf

Alami, I., Alves, C., Bonizzi, B., Kaltenbrunner, A., Koddenbrock, K., Kvangraven, I., & Powell, J. (2023). International financial subordination: A critical research agenda. *Review of International Political* Economy *30*(4), 1 360–1 386. doi.org/10.1080/09692290.2022.2098359

Banse, F., & Shah, A. (2021). Die Geopolitik von Finanzialisierung und Entwicklungspolitik. Interview mit Ilias Alami. *PERIPHERIE: Politik • Ökonomie • Kultur, Nr. 162+163*, *41*(2), 298–317. https://doi.org/10.3224/peripherie.v41i2-3.07

BMBF. (2022). *Grüner Wasserstoff aus Afrika: Namibia wird Forschungspartner*. https://www.bmbf.de/bmbf/shareddocs/kurzmeldungen/de/2022/10/gruener-wasserstoff-aus-namibia.html

BMWK. (2024). *Importstrategie für Wasserstoff und Wasserstoffderivate*. https://www.bmwk.de/Redaktion/DE/Publikationen/Energie/importstrategie-wasserstoff.pdf?__blob=publicationFile&v=18

Bollerhey, T., Exenberger, M., Geyer, F., & Westphal, K. (2023, February). *H2Global - idea, instrument and intentions*. H2Global Foundation. https://files.h2-global.de/H2Global-Stiftung-Policy-Brief-01_2022-EN.pdf

Brand, U., & Dietz, K. (2022, November 23). (Neo-)Extraktivismus. In D. Gottschlich, S. Hackfort, T. Schmitt & U. v. Winterfeld (Eds.), *Handbuch Politische Ökologie: Theorien, Konflikte, Begriffe, Methoden* (pp. 245–253). transcript Verlag. https://doi.org/10.1515/9783839456279-021

Bruna, N. (2021). *Extractivism, rural livelihoods and accumulation in a "climate-smart" world: The rise of green extractivism* [PhD dissertation, Erasmus University, Rotterdam]. https://repub.eur.nl/pub/137082/natacha-bruna-thesis-final.pdf

Claar, S. (2021, February 25). Kein Ende des grünen Kolonialismus. *PROKLA 51*(202), 141–148. https://doi.org/10.32387/prokla.v51i202.1931

Clarke, S. (1991). State, class struggle, and the reproduction of capital. In S. Clarke (Ed.), *The state debate* [Capital and Class series], (183–203). Palgrave Macmillan. https://doi.org/10.1007/978-1-349-21464-8_6

Dos Santos, T. (1970). The structure of dependence. *American Economic Review 60*(2), 231–236.

Döver, M., & Kappel, R. (2015). *Hürden für die Industrialisierung in Afrika.* German Institute of Global and Area Studies (GIGA Focus Afrika 7). https://www.giga-hamburg.de/de/publikationen/giga-focus/huerden-fuer-die-industrialisierung-in-afrika

Energy voice. (2024). *Why almost nobody is buying hydrogen, dashing green power hopes*. https://www.energyvoice.com/renewables-energy-transition/hydrogen/558045/why-almost-nobody-is-buying-hydrogen-dashing-green-power-hopes/

Enertrag. (2024, March 20). *Hyphen Wasserstoff-Projekt in Namibia auf dem Weg zum strategischen Auslandsprojekt der Bundesrepublik Deutschland*. https://www.pv-magazine.de/unternehmensmeldungen/hyphen-wasserstoff-projekt-in-namibia-auf-dem-weg-zum-strategischen-auslandsprojekt-der-bundesrepublik-deutschland/

European Commission. (n.d.). *Hydrogen*. https://energy.ec.europa.eu/topics/energy-systems-integration/hydrogen_en#eu-hydrogen-strategy

Gabor, D. (2021). Wall-Street-Konsens. *PERIPHERIE 4*(2), 318–323. https://doi.org/10.3224/peripherie.v41i2-3.08

Gabor, D., & Sylla, N. (2023). Derisking developmentalism: A tale of green hydrogen. *Development and Change 54*(5), 1–28. https://doi.org/10.1111/dech.12779

Gerrard, A., & Hauser, J. (2021). *Namibia: Eigenversorgung und Inselnetze mit Speicher: Zielmarktanalyse 2021 mit Profilen der*

Marktakteuren. Southern African – German Chamber of Commerce and Industry. https://www.german-energy-solutions.de/GES/Redaktion/DE/Publikationen/Marktanalysen/2021/zma-namibia-2021.pdf?__blob=publicationFile&v=1

GH2Namibia. (2022). *Traction: Namibia's green hydrogen overview*. https://gh2namibia.com/wp-content/uploads/2022/09/Traction-Namibias-Green-Hydrogen-Overview.pdf

GH2Namibia. (2023, June). *Competing for H2 capital*. https://gh2namibia.com/wp-content/uploads/2023/07/Competing-for-H2-Capital.pdf

Gourinchas, P.-O., Schwerhoff, G., & Spilimbergo, A. (2024). *Energy transition: The race between technology and political backlash* [Working Paper 24-4]. Peterson Institute for International Economics. https://dx.doi.org/10.2139/ssrn.4768020

Haag, S., Apfel, D., & Herbes, C. (2024, September). Do development finance projects facilitate domestic renewable energy transitions? The role of small economic actors in Senegal. *Energy Research & Social Science 115*, 103598. https://doi.org/10.1016/j.erss.2024.103598

Hoffmann, H. (2023, July 9). Hier soll grüner Wasserstoff in gigantischem Ausmaß produziert werden. *Spiegel Ausland*. https://www.spiegel.de/ausland/luederitz-namibia-hier-soll-gruener-wasserstoff-in-gigantischem-ausmass-produziert-werden-a-a160205b-2215-4c98-8300-969eba4d3a5e

Hüther, M. (2023). *Deindustrialisierung: Schreckgespenst oder notwendiger Schritt im Strukturwandel der deutschen Wirtschaft?* Leibniz-Institut für Wirtschaftsforschung an der Universität München (ifo Schnelldienst, 76).

Hyphen. (2024a). *The Hyphen project*. https://hyphenafrica.com/the-hyphen-project/

Hyphen. (2024b). *Concession Agreement*. https://hyphenafrica.com/wp-content/uploads/2024/09/Hyphen-Hydrogen-Energy-Concession-Agreement-2024-01.pdf

International Energy Agency. (2021). *Net zero by 2050: A roadmap for the global energy sector*. https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf

IPPR. (2021). *Green hydrogen and Namibia: Has the future arrived?* Namibia Quarterly Economic Review October–December 2021. https://ippr.org.na/wp-content/uploads/2022/01/Namibia-QER-2021-Q4-final-1.pdf

Kaiser, R. (2021). *Elemente der Politik: Qualitative Experteninterviews: Konzeptionelle Grundlagen und*

praktische Durchführung. Springer Fachmedien Wiesbaden. https://doi.org/10.1007/978-3-658-30255-9

Kalt, T., Simon, J., Tunn, J., & Hennig, J. (2023). Between green extractivism and energy justice: Competing strategies in South Africa's hydrogen transition in the context of climate crisis. *Review of African Political Economy 50*(177–178), 302–321. https://doi.org/10.1080/03056244.2023.2260206

Kalt, T., & Tunn, J. (2022). Shipping the sunshine? A critical research agenda on the global hydrogen transition. *GAIA - Ecological Perspectives for Science and Society 31*(2), 72–76. http://dx.doi.org/10.14512/gaia.31.2.2

Koch, E. (2024). *Internationale Wirtschaftsbeziehungen II: Das Weltfinanzsystem - Wahrungsordnungen, globale Finanzmärkte und Finanzkrisen*. Springer Gabler.

Marx, K. ((1887) 1998). *Kapital: Volume 3*. Dietz Verlag (Marx-Engels-Werke, 25).

Mckinsey secures N$36.4m green hydrogen consultancy. (2022, September 29). *The Brief*. https://thebrief.com.na/2022/09/mckinsey-secures-n-36-4m-paycheck-for-green-hydrogen-consultancy-work/

Melber, H. (2018). *The political economy of Namibia* [Unicef Escaro Country Paper]. Rift Valley Institute. DOI:10.13140/RG.2.2.12865.86884

Ministry of Mines and Energy. (2022). *Namibia green hydrogen and derivatives strategy*. Government of the Republic of Namibia. https://gh2namibia.com/wp-content/uploads/2022/11/Namibia-GH2-Strategy-Rev2.pdf

Müller, F. (2024). Energy colonialism. *Journal of Political Ecology 31*(1), 701–717. https://doi.org/10.2458/jpe.5659

Müller, F., Tunn, J., & Kalt, T. (2022). Hydrogen justice. *Environmental Research Letters 17*(11). https://doi.org/10.1088/1748-9326/ac991a

Munvar, D. (2021). *A debt pandemic: Dynamics and implications of the debt crisis of 2020*. european network on debt and development. https://www.eurodad.org/2020_debt_crisis

Namibia Statistics Agency. (2019). *The Namibia Labour Force Survey 2018 Report*.

Ndjavera, M. (2023, November 29). Alweendo: Oil to flow by 2030. *New Era*. https://neweralive.na/alweendo-oil-to-flow-by-2030

Patterson, J. J. (2023). Backlash to Climate Policy. *Global Environmental Politics 23*(1), 68–90. https://doi.org/10.1162/glep_a_00684

Pechmann, A. (2016). Die drei Kreisläufe des Kapitals und ihre realen Unterschiede. *Z. - Zeitschrift für marxistische Erneuerung 105*.

https://www.zeitschrift-marxistische-erneuerung.de/de/article/3004.die-drei-kreislaeufe-des-kapitals-und-ihre-realen-unterschiede.html

Schaller, D. J. (2004). «Ich glaube, dass die Nation als solche vernichtet werden muss»: Kolonialkrieg und Völkermord in «Deutsch-Südwestafrika» 1904–1907. *Journal of Genocide Research 6*(3), 395–430. https://doi.org/10.1080/1462352042000265864

Statista. (2024). *Namibia: Staatsverschuldung von 1993 bis 2022 und Prognosen bis 2029 in Relation zum Bruttoinlandsprodukt*. https://de.statista.com/statistik/daten/studie/952507/umfrage/staatsverschuldung-von-namibia-in-relation-zum-bruttoinlandsprodukt-bip/

Timmermans, S., & Tavory, I. (2012, September 10). Theory construction in qualitative research: From grounded theory to abductive analysis. *Sociological Theory 30*(3), 167–186. https://doi.org/10.1177/0735275112457914

Van de Graaf, T. (2022, December). Hydrogen's decade. *Finance and Development Magazine: The scramble for energy 59*(4), 21–23. International Monetary Fund.

Von der Leyen, U. (2024, July 18). *Europa hat die Wahl: Politische Leitlinien für die nächste Europäische Kommission 2024–2029*. https://commission.europa.eu/document/download/e6cd4328-673c-4e7a-8683-f63ffb2cf648_de?filename=Political%20Guidelines%202024-2029_DE.pdf

Wagner, N. (2023, October). Wasserstoff aus Afrika: Hoffnung für wen? *Blätter - Zeitschrift für deutsche und internationale Politik – Oktober 2023*. https://www.blaetter.de/ausgabe/2023/oktober

World Bank Group. (2017, September 19). *Maximizing finance for development: Leveraging the private sector for growth and sustainable development* [Discussion document prepared for the October 14, 2017 Development Committee meeting]. https://www.devcommittee.org/content/dam/sites/devcommittee/doc/documents/mgr/DC2017-0009_Maximizing_8-19.pdf

List of Interviews

i1: Namibian activist, online, 07.02.2024

i2: Energy consultancy, online, 26.02.2024

i3: German government expert 1, online, 27.02.2024

i4: German government expert 2, online, 05.04.2024

i5: Namibian journalist, online, 08.04.2024

Development for Whom? A Case Study of the Hyphen Hydrogen Project in Namibia.

Maximilian Rischer

Abstract:

This paper examines the potential socioeconomic and environmental implications of Namibia's emerging green hydrogen economy, focusing on the Hyphen Hydrogen Energy project. Based on 18 months of research, including document reviews and over 60 interviews, it assesses anticipated benefits, risks, and stakeholders involved. Despite Namibia's renewable energy potential, findings indicate that primary gains may favour international corporations, with limited benefits to Namibian society. Opportunities for local job creation, value chains, and resolving Namibia's energy issues appear limited, while unique biodiversity is put at risk. The project's financing structure and lack of transparency raise concerns that it may perpetuate social inequalities, with Global North entities exploiting Namibia's natural resources for the sake of a "green" energy carrier. The study calls for stronger accountability and transparent planning processes to align Namibia's green hydrogen economy with the needs of its people, emphasising the role of civil society in advocating for equitable outcomes.

Shacks in Lüderitz. Source: Author

Keywords: green hydrogen; Hyphen; uneven development; Namibia; justice

Green hydrogen? We are still waiting.
Lüderitz resident in his early 20s

Introduction

Namibia stands at the crossroads of a global green hydrogen revolution that presents both remarkable opportunities and significant challenges. Within this context, stakeholders often adopt contrasting positions. On one hand, industrial and government representatives highlight Namibia's vast renewable resources as key enablers of economic and social upliftment, with the potential to address pressing national issues such as unemployment, poverty, inequality, and public debt (Amelang, 2023; Republic of Namibia, 2022a). In contrast, growing concerns about transparency, inclusivity, and uncertainties are being raised, particularly by non-profit organizations and civil society groups. For example, the Institute for Public Policy Research (IPPR, 2022) and various interviews conducted for this study highlight these issues, as reflected by the statement above. Activists and residents question whether the benefits of this emerging hydrogen economy will be equitably shared, or if the gains will disproportionately favour foreign entities, as has occurred in Namibia in the past.

This case study examines the socioeconomic and environmental implications of the Hyphen Green Hydrogen project, planned for the Tsau ||Khaeb National Park (TKNP) in southern Namibia, near Lüderitz Bay. Additionally, the paper shall present actionable entry points for various stakeholders, encouraging civil society, decision makers, industry leaders, and government entities to engage in critical reflection and active dialogue on green hydrogen. This engagement is vital both in Namibia and in Germany, a country heavily involved in promoting and funding Namibia's hydrogen initiatives.

Data Collection and Structure of this Paper

The analysis presented here is the result of extensive archival research of reports, documents, and scientific papers from industry, government, and academic sources, complemented by a three-month field study in Namibia. During that time, over 60 interviews—both semi-structured and field-based—were conducted with individuals of diverse ages, genders, occupations, residencies, and countries of origin. Moreover, participation in several conferences and symposia on green hydrogen developments provided firsthand insight into developments in towns like Lüderitz.

The following sections will briefly outline the political and legislative

background that shapes the hydrogen economy both globally and in Namibia, followed by an update on the current status of the Hyphen Green Hydrogen project. The main focus of this paper is to explore who stands to benefit from the hydrogen-related developments in Namibia, examining this question from various perspectives. The paper concludes by outlining opportunities that may present themselves with the new economy, as well as actionable steps that industry leaders, policymakers, and civil society can take to help realise these opportunities.

Political and Legislative Pressures Influencing the Hydrogen Economy in Namibia

In many countries of the Global North, green hydrogen is seen as a clean, sustainable, and affordable energy source for combatting climate change, particularly by replacing fossil fuels in sectors that are hard to decarbonise, in other words, where electrification is not feasible, such as some industrial activities, the mobility sector, aviation, and maritime shipping. Given that Germany creates a significant portion of its GDP from these sectors, the use of green hydrogen is highly attractive (United Nations Environment Programme, 2021; Merten & Scholz, 2023). Additionally, the Russian-Ukraine war has added greater urgency to the energy transition, resulting in efforts to replace reliance on cheap Russian oil and gas. Limited domestic production capacity has moved Germany towards prioritising imports, including from Namibia, a country considered ideal for green hydrogen production due to its abundant sun, wind and seawater renewable resources (Federal Ministry for Economic Affairs and Climate Action, 2024).

Namibia is facing substantial socioeconomic inequalities, with high unemployment and significant government debt (Bank of Namibia, 2022; Benonia, 2020; Melber, 2022). Additionally, a considerable portion of its electricity is imported, while half of the population lacks access to it (Brandt, 2022; Elston, 2022). Given the high electricity demands of hydrogen production, there is potential to reduce electricity imports if production facilities are oversized or configured to primarily feed electricity into the local grid. Regarding economic benefits, a key challenge lies in structuring projects to maximise Namibia's financial gains while ensuring that they remain attractive to developers. Given the described factors and the country's economic situation, the Namibian government has high hopes for the hydrogen economy to create numerous jobs, establish parts of the value chain domestically, boost national GDP, and address existing energy challenges (Republic of Namibia, 2022b).

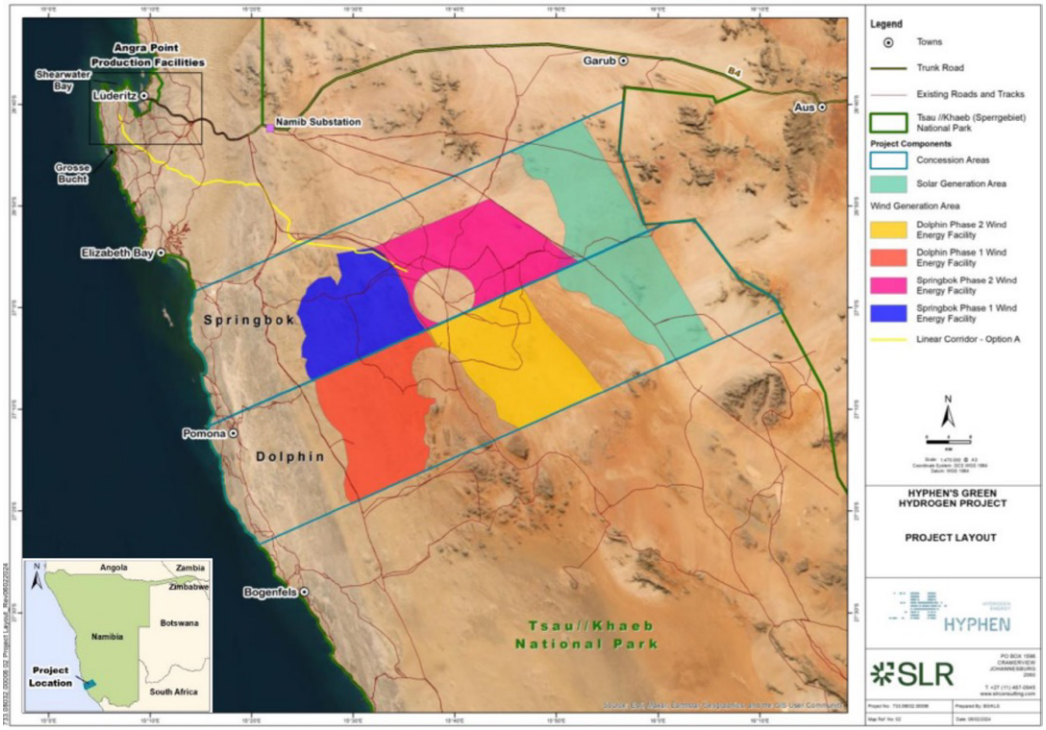
Green Hydrogen and the Current State of the Hyphen Project

Hydrogen is utilised in various forms today, playing a vital role across several industrial sectors. It is a key feedstock for the synthesis of ammonia, which is essential for chemical production and fertilisers, and is widely used in the petrochemical industry for fuel refining. Currently, the majority of hydrogen is derived from fossil fuels, particularly natural gas. However, hydrogen can also be produced through electrolysis, a process in which electricity is passed through water (mixed with a conductive substance) to separate water into hydrogen and oxygen. When the electricity used for electrolysis is sourced from renewable energy, the resulting hydrogen is commonly referred to as "green" hydrogen. As of 2019, the share of green hydrogen of the total global hydrogen production volume was less than 0.1% (International Energy Agency, 2019).

Green hydrogen production requires significant quantities of water. In arid regions like Namibia, where fresh water scarcity is a concern, seawater can be desalinated to serve as a feedstock. However, desalination is energy-intensive and generates brine—a concentrated salt solution—as a by-product, which may also contain hazardous chemicals. This brine is commonly discharged into surface ocean waters, although more costly alternatives exist for extracting minerals from brine (Collins, 2021; Schmidt & Frank, 2023).

As described above, Namibia has a significant interest in producing hydrogen. In this context, in 2021, the company Hyphen Hydrogen Energy was awarded the contract for the development of a large-scale hydrogen production facility to be located in the TKNP in southern Namibia, with an estimated investment volume of over USD 10 billion. The project is expected to create 18 000 jobs, with 90% of these positions to be filled by Namibians, with production originally planned to commence in 2027. According to Hyphen's plans as of October 2024, the projected start of production has been revised to 2029 (Hyphen Hydrogen Energy 2024). The investment, jointly raised by Hyphen (76%) and the Namibian government (24%), covers the development of wind and solar power plants, electrolysis facilities (to produce hydrogen), pipelines, a seawater desalination plant, and infrastructure such as roads and transmission lines (Hyphen, 2023b; Republic of Namibia, 2022a). Notably, this project is globally one of the first of its kind and scope. By 2031, it is expected to produce more than 350 000 tonnes of hydrogen annually. The entire concession area covers about 4 000 square kilometres within the park. Figure 1 provides an overview of the preliminary layout of the project.

Figure 1 *Preliminary layout of the Hyphen facilities within the TKNP*



Source: SLR Consulting (2024)

The designated renewable energy capacity includes 4 GW of wind power and 3 GW of solar power, which corresponds to around 600 wind turbines, and extensive fenced photovoltaic areas. According to preliminary plans from Hyphen, seawater will be pumped through pipelines from the Lüderitz Peninsula. Following desalination, it will be further transported to the electrolysis sites. The produced hydrogen will then be piped back to the peninsula where it will be synthesized into ammonia for international export by ship. Ammonia is widely regarded as the preferred hydrogen carrier for long-distance transport via ship, including by the German government (Federal Ministry for Economic Affairs and Climate Action, 2024). In addition to the infrastructure directly required for producing green hydrogen and ammonia, Hyphen has proposed supplying excess electricity to the country and providing potable water from desalinated seawater to Lüderitz and the settlement of Aus (Hyphen Hydrogen Energy, 2023c).

The project is currently in its "feasibility phase", which could extend until mid-2025. During this phase, Hyphen is tasked with assessing the technical, financial, environmental, social, and commercial viability of the project, while the government develops the fiscal and regulatory framework. Currently, Hyphen has installed sensors and meteorological masts to gather wind data in designated areas within the National Park. On the regulatory side, the Namibian government is expected to develop the Synthetic Fuels Act, which will provide the framework for regulating this new economic sector (Hyphen Hydrogen Energy, 2023b).

Mechanisms to Address Environmental and Socioeconomic Risks

The development of green hydrogen production facilities in Namibia in the TKNP comes with several environmental and socioeconomic risks. The Namibian Chamber of Environment (2024) has suggested labelling the hydrogen produced there as "red hydrogen" due to the potential threat of species listed on the IUCN (International Union for Conservation of Nature) Red List becoming extinct or endangered. Additionally, risks to marine biodiversity—including impacts from a new port, increased vessel traffic, brine discharge from desalination, and possible ammonia leaks—could negatively affect the fishing industry (also see "Benefits and Costs: Development for Whom?" section a) "Risk of job exclusion for locals" below).

Mechanisms do exist to partly manage these risks. As regulated in the Environmental Management Act (7 of 2007) (2012), an environmental clearance certificate is required for the construction of energy generation facilities; this certificate may also mandate an environmental impact assessment (EIA), a well-recognised tool for mitigating environmental and social risks on a project basis. It assesses the direct impacts, both positive and negative, of a specific project and proposes mitigation measures. An EIA also provides opportunities for stakeholders to raise concerns, for example during public consultation meetings. Stakeholders may register as Interested and Affected Parties to stay informed on EIA progress (Dalal-Clayton & Sadler, 1999).

For the Hyphen project, as of July 2024, an EIA was conducted only for the construction and placement of sensors and meteorological masts to collect data on wind characteristics in some areas of the TKNP (Blood & Moodaley, 2022). The formal EIA process for the entire Hyphen project has not yet commenced, with little information being shared with the public. SLR Consulting, an international sustainability consultancy,

is responsible for managing and coordinating the entire EIA process.

In May 2024, Green Hydrogen Commissioner James Mynupe announced that a Strategic Environmental and Social Assessment (SESA) would be conducted for the entire Southern Corridor Development Initiative, an area of about 14 000 km2 in southern Namibia that covers large parts of the TKNP where hydrogen developments shall take place (Ndjavera, 2024). This decision was announced shortly after the release of the report by the Namibian Chamber of Environment.

A Strategic Environmental Assessment (SEA) and Strategic Environmental and Social Assessment (SESA) assess broader, cumulative impacts of regional plans, outlines alternative project sites, and encourages public engagement. The duration of a SEA can vary significantly depending on complexity and data availability, sometimes taking only a few months (Dalal-Clayton & Sadler, 1999). However, given the absence of a prior SEA for the TKNP and other parts of southern Namibia, the process may extend significantly beyond the original timeline of the Hyphen project, similar to the 20-month SEA conducted for uranium mining in the Namib Desert from 2009 to 2011 (Republic of Namibia, 2011).

Benefits and Costs: Development for Whom?

a) Risk of job exclusion for locals

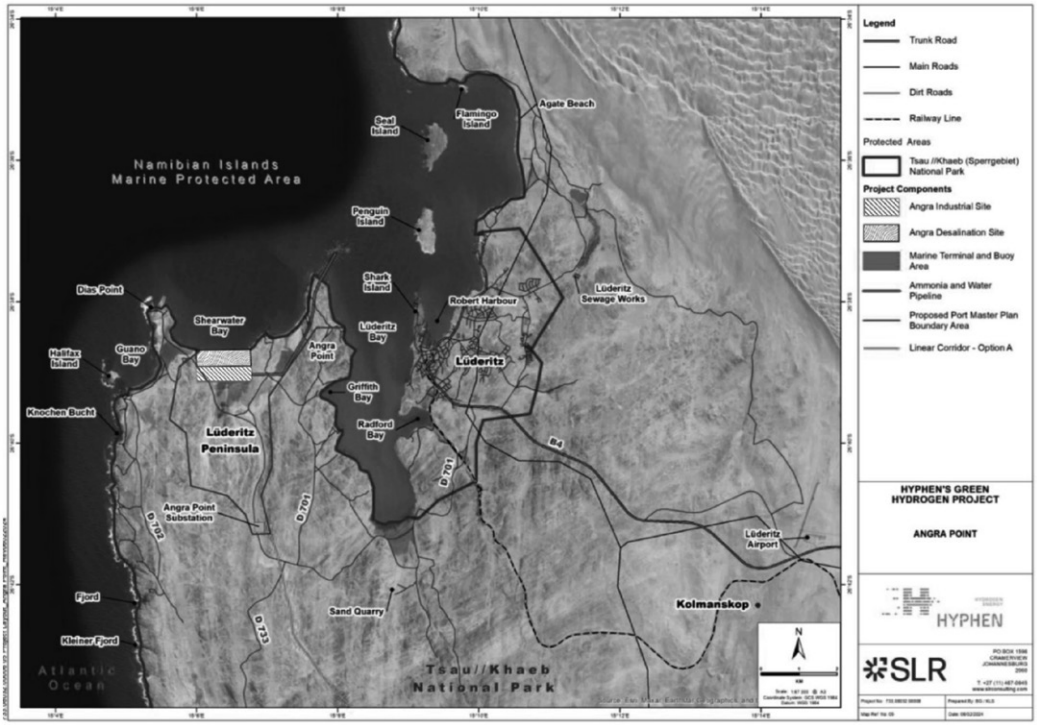
There is a significant risk that many job opportunities may be inaccessible to residents of Lüderitz and Namibia due to a lack of specialised skills within the country. Both residents and experts have expressed concerns that the necessary workforce does not currently exist in Namibia and would need to be imported, potentially leading to an influx of foreign workers in Lüderitz. This possibility was also mildly acknowledged by Hyphen's Head of Environment, Social, and Governance (Beukes, 2023).

One reason for the lack of the necessary skills is the limited availability of hydrogen-specific curricula from Namibia's higher education providers. Additionally, a gap exists between vocational education and training centres and universities, preventing many individuals from accessing university programmes due to missing qualifications and a lack of basic education (International PtX Hub, 2023). The high costs associated with tertiary education prevent many young people in Lüderitz and surrounding areas from pursuing higher studies, as highlighted by residents of Lüderitz and the settlement of Aus.

To address these gaps, Namibia has introduced skills development initiatives, including the Green Hydrogen Research Institute at the University of Namibia, partnerships with international institutions, and Youth for Green Hydrogen scholarships. Activists have raised concerns that these scholarships are unlikely to reach the underprivileged, marginalised, or uneducated populace, but will benefit those with existing status, wealth, or higher education.

Not only do the inhabitants of Lüderitz risk exclusion from emerging job opportunities, but they also face potential losses from the Hyphen project, particularly in the fishing industry. The discharge of brine into the ocean, potential ammonia leaks into the ocean, and increased large vessel traffic due to the construction of the new harbour on the Lüderitz peninsula, could have a significant negative impact on the marine environment and therefore threaten local fishing industries. This is particularly concerning given that the nearby nutrient-rich Benguela current supports the livelihoods of most Lüderitz residents. Figure 2 provides an overview of the planned facilities, offering a sense of the scale of the new harbour

Figure 2 *Planned new port location*



Source: own; adopted from SLR Consulting, 2024

zone where new entities will develop and where access will be restricted. Notably, this area is one of the few freely accessible coastal spaces along the entire southern coastline of Namibia.

Further in-depth research is necessary to understand the environmental and socioeconomic risks posed for the marine environment, but it is evident that these developments will inevitably have some kind of negative impact.

b) Electricity and water challenges

While acknowledging Hyphen's proposals to provide surplus electricity to Namibia and water to Lüderitz and the settlement of Aus, which are not mandated by the Namibian government, these suggestions do not effectively address the significant energy challenges and water shortages faced by Namibia. Electricity access would remain limited for most parts of Namibia, especially in rural areas, where 80% of the people without access to electricity reside (Brandt, 2022). The Hyphen plant could become an "energy island", as major investments and reforms would be necessary to allow the electricity it generates to reach remote areas and a wider population. An interviewee pointed out that in a best-case scenario, electricity could be provided to Lüderitz and Aus, but not to other areas in the country where it is also needed. It is also noteworthy that the planned renewable energy capacity of the Hyphen project could be approximately four times Namibia's entire electricity consumption of 2021 (GIZ, 2022; International Energy Agency, n.d.; author's calculations). Given the relatively small energy consumption of Lüderitz and Aus compared to national levels, the Hyphen project would not significantly improve access to electricity or reduce dependence on fossil fuel-based electricity imports from abroad.

Furthermore, as one of the driest countries in the sub-Saharan region, Namibia has faced several severe droughts in recent years (Liu & Zhou, 2021; Matthys, 2024). The water demand of Hyphen's planned electrolyser capacity to produce hydrogen could account for nearly 5% of all water consumed in Namibia in 2021 (Namwater, 2023; Schmidt & Frank, 2023; own calculations). Although the project uses seawater that will be desalinated and does not rely on Namibia's already limited groundwater resources, it will not help alleviate the country's problems associated with water scarcity and severe droughts.

c) Primary beneficiaries of the Hyphen project are abroad

The development of Namibia's hydrogen economy is predominantly driven by foreign companies that

control its entire supply chain, primarily originating from the Global North. Key beneficiaries include ENERTRAG, a German energy company and a member of the Hyphen consortium, which is probably involved in the planning and realisation of wind, solar, and electrolysis facilities. The second consortium member, and thus a main beneficiary, Nicholas Holdings, is an international investment firm registered in the British Virgin Islands, a known tax haven (GSL Law & Consulting, 2023). Generally, Hyphen outsources many critical advisory and planning tasks—from legal assistance and public relations, to environmental assessments and technical planning—to international companies from Austria, Germany, the USA, the UK, and South Africa (Hyphen Hydrogen Energy, 2023d, 2023e). According to the websites of these firms, most do not have local offices in Namibia.

Hyphen's "Socio-Economic Development Framework'" sets an objective to source 30% of its goods and services in Namibia (Hyphen Hydrogen Energy, 2023c). While Hyphen may undertake actions to reach this goal, implementing these measures could require a substantial amount of time, due to the significant lack of local expertise in Namibia. Consequently, foreign industries could dominate, for instance in wind blade production, where Hyphen has mooted the involvement of German or Danish companies (Hyphen Hydrogen Energy, 2021). Müller et al. (2022) and a social scientist specialising in green hydrogen whom I interviewed suggest that such developments could lead in Namibia to the establishment of an "enclave economy". This would result in the green hydrogen sector being disconnected from the domestic economy, reducing the likelihood of local economic spillovers.

The hydrogen that will be produced by the project is not intended for the Namibian market. If the current non-binding agreements between Hyphen and prospective clients are realised, all hydrogen produced in the project's first phase will be sold to countries in the Global North (Hyphen Hydrogen Energy, 2023a). Although Namibia's Green Hydrogen Council suggests potential domestic uses for hydrogen, such as in agriculture or mining (Republic of Namibia, 2022a), significant limitations restrict these prospects. These include inadequate infrastructure, scarce raw materials, and a lack of expertise. These factors also discourage industries from relocating to Namibia to produce hydrogen derivatives such as methanol, steel, and ammonia. As a result, Namibia's deeper integration into the hydrogen value chain will remain limited, with the country largely confined to exporting hydrogen rather than utilising it domestically (Eicke & De Blasio, 2022).

d) Financial risks associated with the project are significant

There are strong indications that the potential financial returns for the Namibian state are disproportionate to the financial risks it faces. In exchange for providing the land, the Namibian state is set to receive rent, royalties, taxes, and some revenue from hydrogen sales due to its project shares. Discussions are ongoing between Hyphen and the Namibian government about establishing a special economic zone in the Lüderitz region with reduced taxes on exported resources, as noted by a local politician from Lüderitz. Given this context, the 40-year concessional period granted to Hyphen to produce hydrogen, and own calculations of the potential financial reward, it is likely that Hyphen's profit will be significantly higher than Namibia's. This disparity is noteworthy, as Namibia is providing the land, and the natural resources – water, wind, and sun – necessary for green hydrogen production.

Namibia's 24% share of the overall project investment poses significant risks, potentially creating financial dependencies on other countries. From the overall investment of over USD 10 billion (Martin, 2023), the Namibian government would thus need to raise at least US$ 2.4 Bn, equivalent to NAD 44 billion (NAD 44 000 000 000). Due to limited capital available in the country, this share will likely be financed with foreign money, possibly through a loan by the European Investment Bank (2022) and by issuing green bonds (Gabor & Sylla, 2023). To incur new debt through foreign loans and bonds of such magnitude would double Namibia's overall foreign debt, presenting significant risks. These risks are particularly concerning if the hydrogen produced in Namibia is not as cost-competitive as hydrogen produced elsewhere, or if the expected demand for Namibian hydrogen falls short of expectations. In these scenarios, financial dependencies could arise as creditors would probably claim repayment, regardless of the project's success. Considering the nascent state of the global hydrogen economy, with the Hyphen project being among the first of its scale and with very limited prior experience to draw upon, concerns about the project's potential for limited success are well-founded. Additionally, the substantial financial commitment required from the Namibian government could divert necessary investments away from other critical sectors, such as healthcare and education, as noted by a social scientist interviewed during my research.

There are examples in other countries where similar financing models for pioneering energy projects have resulted in significant financial losses, borne primarily by the broader

public. One such example is a renewable energy project in Morocco, that employs Concentrated Solar Power (CSP) technology. The project has been financed with loans from international development banks and private investors, and is secured through guarantees by the Moroccan state. Since its inauguration in 2016, the project has incurred heavy annual losses, which are primarily borne by the Moroccan state and, ultimately, its citizens (Hamouchene, 2022).

In addition, global production capacity for essential components, such as electrolysers and wind turbines, must significantly increase to avoid long project delays (Martin, 2023). There is uncertainty about which companies and countries in the "great hydrogen race" (Eberhardt, 2023, p. 1) will gain access to these capacities first. A potential bottleneck for Namibia may be exemplified by the hydrogen production project of Cleanergy Solutions Namibia in Erongo Region, which is planned to start production by the end of 2024. One of its lead engineers reported a 1.5-year waiting time for the necessary electrolysers. For context, Cleanergy's electrolysis capacity will be 5 MW, roughly 0.2% of Hyphen's planned capacity.

Hyphen has indicated that it is working on how philanthropic investments through the project may benefit local communities in Namibia (Hyphen Hydrogen Energy, 2023c). At the time of writing this paper, no details have been made public.

e) Green hydrogen from Namibia: A case of neocolonialism?

The growing green hydrogen industry in Namibia raises concerns about neocolonialism, as historical patterns of exploitation might be repeated. In the past, this pattern was evident with natural resources such as diamonds and fish, particularly in Lüderitz. Today, it could be the wind, sun, and water that are harnessed to produce hydrogen. While this new industry has the potential to foster economic prosperity, it also brings with it significant risks, uncertainties, and concerns amongst residents, as described in the following section.

Under German colonial rule, Namibia was "developed" in accordance with colonial interests, prioritising the exploitation of resources such as diamonds, while only minimal compensation was provided to local workers. This systematic exploitation was also marked by acts of violence, forced expropriation, and ultimately, brutal atrocities, including genocide perpetrated against the Nama and Ovaherero peoples (Press, 2021).

While such coercive and violent measures are not being employed today, and land is not forcibly taken, some parallels between historical and modern practices persist. In both past and present contexts, the Nama people have had limited participation in decision-making and have received inadequate compensation for the use of their resources. While historically, these communities lost land with little restitution, today, they express concerns about being excluded from the hydrogen economy's development, including the Hyphen project, given the project's location. There is also concern that economic benefits may primarily flow to a private, partly German-owned company, backed by the German government, raising questions about fair compensation. As outlined earlier in this paper, there is concern that much of the economic value will not remain in Namibia, whereas potential financial risks could disproportionately impact Namibian society.

Such a scenario could widen the gap between Namibia and wealthier nations like Germany, which aim to benefit from an affordable and "sustainable" energy source, in this case, green hydrogen, for industrial decarbonisation, helping them to maintain global economic leadership.

Further research is needed to determine whether the production and export of hydrogen from Namibia to Europe could be considered a form of neocolonialism. However, there remains a striking resemblance to the conditions associated with practices of that time.

f) Lüderitz could face multiple socioeconomic challenges

The development of large-scale hydrogen production facilities in TKNP is expected to bring significant socioeconomic challenges to Lüderitz. The Hyphen project alone may draw 15 000 construction workers, effectively doubling the town's population. Additionally, workers from other sectors—such as construction for the new port, hospitality, and other tertiary industries—will likely move to Lüderitz. This influx will strain Lüderitz's already limited municipal systems for freshwater, electricity, and waste and wastewater management, which may struggle to meet the growing demand.

The development, which is anticipated to occur over a short period, may entail further consequences. Property prices in Lüderitz have already increased and are expected to rise drastically, as highlighted by local politicians, residents from Lüderitz, and a political analyst. Additionally, the demand for housing and services will increase administrative

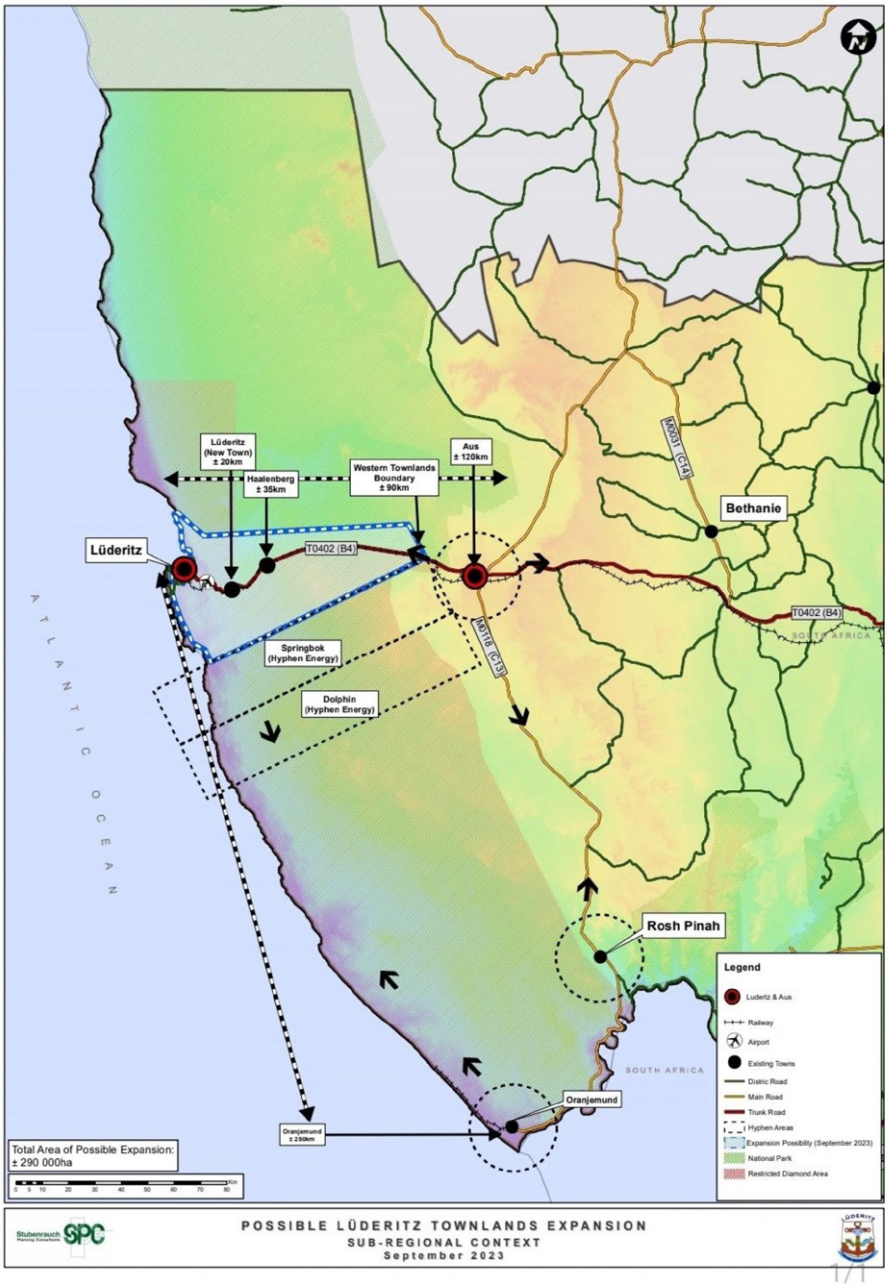
requirements in Lüderitz. This includes approving certain town developments, housing construction, and business establishments. Graham Hopwood, who spoke at the Regional Anti-Corruption Conference held in Lüderitz in May 2024, raised concerns that this could invite corrupt activities by companies to bypass bureaucratic processes. Some residents have noted that recent migrants to Lüderitz, primarily from other parts of Namibia, have had easier access to housing and property than long-term residents.

The Hyphen project may be the first of several potential hydrogen production projects in the TKNP (Hyphen Hydrogen Energy, 2022). Such further development would entail the construction of thousands of wind turbines, thousands of square kilometres of solar power facilities, the destruction of the entire TKNP, and an influx of many more people to Lüderitz. Furthermore, recent offshore oil discoveries near Lüderitz could also attract many people, necessitating additional services and infrastructure. The oil discoveries are substantial, potentially placing Namibia among the top 15 oil-rich countries in the world (Mining & Energy, 2024).

Residents also fear increased criminality and drug abuse with the anticipated influx of people. Individuals may arrive for job opportunities that may not materialise due to an oversupply of labour or insufficient specialised skills. They may remain in the town without employment, which could exacerbate pre-existing social problems.

To address these challenges, the Lüderitz town council has formed a planning group consisting of 40 members, focusing on expanding the town boundaries into so-called nodes. Despite not representing organic urban growth, nodes could have positive attributes regarding quality of life, as they may offer various opportunities for shops, housing, mobility, and entertainment in centralised areas outside the main town (Maher et al., 2018). The area inside the blue-white line in Figure 3 illustrates where such nodes could evolve, and how the town of Lüderitz could develop. This visualisation suggests that both the town and its surroundings could undergo significant changes, with the emergence of new urban centres at these nodes.

Figure 3 *Possible expansion of Lüderitz and context*



Source: Stubenrauch Planning Consultants (2023)

g) Challenges evolve through legislative deficiencies

Potential challenges in managing environmental and socio-economic risks stem from insufficient regulatory oversight and legislation in Namibia. As outlined earlier, environmental assessments offer mechanisms for managing such risks by assessing their severity and proposing mitigation strategies. However, limitations and loopholes can emerge in their application. Public engagement within SESA and EIA frameworks does not necessarily require the incorporation of concerns raised during consultation. Additionally, they may serve only as support for decision-making, and other factors, such as economic considerations, may outweigh environmental and social concerns (Kørnøv & Thissen, 2000). In Namibia, the Environmental Management Act does not explicitly refer to such an assessment, leading to ambiguity regarding the Act's implementation and stakeholder engagement.

Due to the described limitations, the effectiveness of the forthcoming SESA process will heavily depend on the commitment of the Namibian government and the involved companies to thoroughly assess the overall environmental and social impact. Hyphen's engagement with local communities has been limited, and the dissemination of information has fallen short of expectations. Although Hyphen operates within legal boundaries, this approach raises concerns about their genuine interest in thoroughly assessing impacts.

Additionally, a study by the German Federal Institute for Geosciences and Natural Resources and a Namibian consultancy identified a significant lack of coordination among Namibian ministries in performing their oversight duties. It noted that regulatory compliance monitoring would be a "rare occurrence", even within the Ministry of Environment, Forestry and Tourism with an officially designated Environmental Commissioner (Guillaneau, 2024). Historical instances such as hazardous manganese leaching during its transportation to Lüderitz reported by some locals, and unauthorised water drilling tests conducted by the Canadian company ReconAfrica in the Okavango River Delta in 2021 (Barbee & Neme, 2021; The Namibian, 2021) further illustrate these deficiencies and raise concerns about the potential for recurrence with Hyphen. Furthermore, the appeal process regarding the issuance of environmental clearance certificates is poorly regulated. This could cause potential delays due to unresolved issues.

The emerging hydrogen economy in Namibia requires various legislative changes. According to the Namibian Minister of Justice, at least nine different

laws will need to be amended (Kharas Media House, 2023). As reported by an expert during a community meeting in Lüderitz and as described in the Windhoek Observer (2022), Hyphen and other international companies seek to modify the Environmental Management Act to facilitate resource exploitation and maximise their financial benefits. Such influence could negatively impact both the environment and Namibian society, as their primary objective is financial gain.

Other prospective projects in the area, alongside the influence of Hyphen, are significant because the large-scale developments planned for the TKNP directly contradict the park's objectives: to "secure and increase landscape connectivity" and "protect and maintain biodiversity" (Republic of Namibia, 2020, p. 27). Additionally, "no new infrastructure is foreseen (…) except improvements to access control facilities, viewpoints and picnic sites" (ibid., p. 151). Consequently, amendments to the plan are inevitable, which poses a risk of the park's complete dissolution and the potential loss of its unique flora and fauna.

Global Marginalisation through Green Hydrogen: Namibia is not Alone

Concerns about the marginalisation of communities affected by green hydrogen projects are not unique to Namibia. Internationally, hydrogen production has faced criticism, with numerous examples of marginalised communities fearing adverse impacts from energy development, including green hydrogen. In some instances, civil society has successfully mounted opposition, advocating for more inclusive and just project developments. One relevant example is located just 20 kilometres from the Namibian border, in South Africa's Richtersveld Local Municipality, where the Northern Cape Green Hydrogen Hub is planned to be developed. This project, which includes large-scale wind and solar power installations, electrolysis facilities, and a deep-sea port, far exceeds the dimensions of Namibia's Hyphen project. The development of the Boegoebaai deep-sea harbour, in particular, has raised concerns among local communities and groups, such as the South African United Fishing Front and the indigenous Khoi and San peoples, who fear that they may be marginalised by these industrial advancements (Chief !Khaesen Maart, 2022; Lekalakala & Kalt, 2022). This situation closely mirrors that of Lüderitz in Namibia, where local fishermen fear the impact of green industrialisation on their livelihoods.

A similar scenario is unfolding in the Magallanes region of southern Chile, a remote area renowned for its unique flora and fauna. The region is seen as an

ideal location for producing electricity and hydrogen for international export, due to its extreme winds. However, the scale of the proposed wind and hydrogen production projects—comparable to Hyphen—has created fears of irreversible damage to unique ecosystems, including threats to migratory birds and cetaceans. Moreover, profound sociocultural changes are expected with this type of development, such as the shift from traditional sheep farming to renewable energy production for export. So-called "sacrifice zones" are areas where a high concentration of industrial activity is justified by a broader cause, in the case of southern Chile, "to decarbonise the entire world", as stated by the former Chilean energy minister. There is growing concern that such "sacrifice zones" could also emerge in the Magellanes region, as they have done in other areas of Chile. However, the true consequences of this approach are that profits and private interests take precedence over the well-being of local communities, their health, and the environment. This can lead to potentially catastrophic impacts on both the physical and mental health of the affected communities (Boyd, 2023; Opazo, 2023).

Opportunities and Entry Points

The aforementioned critique should not detract from opportunities associated with Namibia's abundant wind, solar, and ocean water resources. These resources hold the potential to foster socioeconomic prosperity in the form of job creation and GDP growth. While national parks may not be ideal locations, ample land is available for large-scale energy facilities. Moreover, if the demand for green hydrogen aligns with expectations, and the cost of hydrogen production is competitive, Namibia could generate substantial financial returns. Effective, timely legislation and inclusive governance can empower citizens to benefit directly from these revenue streams. In this regard, it may be important to prioritise national interests over international agendas and the objectives of major investors, as articulated by the Namibian energy expert Detlof von Oertzen (2024). This approach could enable Namibia to position itself as a key player in the international energy market without compromising the needs of its citizens.

Project developers, policymakers, and civil society can each take steps to advance these goals. Van Wyk (2024) suggests that developers engage communities early in the process, using clear and transparent communication in local languages to foster trust and awareness of both opportunities and risks. This approach aligns with governance principles such as transparency, accountability, the

provision of reliable data, and rigorous monitoring (Cremonese et al., 2023).

During the Regional Anti-Corruption Conference held in Lüderitz in May 2024, the IPPR suggested a more decentralised approach of revenue sharing between the central government and the hydrogen-producing regions. This approach could strengthen governance within local and regional institutions, address the actual needs of local populations, and lay the foundation for more inclusive and successful project implementation.

An alternative approach to enhance inclusiveness is to apply the Free, Prior, and Informed Consent (FPIC) principle in the development of infrastructure projects, such as hydrogen production facilities. Key FPIC components are:

- **Free**: Consent is given voluntarily, without coercion, intimidation, or manipulation.
- **Prior**: Consent is sought well in advance of the commencement of activities, allowing sufficient time for consultation and decision-making processes.
- **Informed**: All information related to the nature, scope, duration, and impacts of the project is provided to the affected communities in a way that is accessible and understandable.
- **Consent**: Affected communities have the right to give or withhold consent, and this decision must be respected by all parties involved.

These principles are incorporated in various internationally recognised agreements. Amongst the legally binding ones is Convention no. 169 of the International Labour Organization, 1989 (explained in International Labour Organization (2013)), which specifically addresses the rights of indigenous and tribal peoples. Article 6 mandates consultations with indigenous peoples through appropriate procedures, while Article 15 requires FPIC for any exploration or exploitation of resources on indigenous lands. However, Namibia has not ratified this convention. The Namibian government could be encouraged to become a signatory to it, and to incorporate appropriate participation and consultation processes in binding national law.

Lüderitz's urban development challenges and Namibia's skills shortage present opportunities for a holistic approach to workforce development across various sectors like energy, hospitality, and construction, while recognising that such capacity-building will take time.

Public participation remains crucial. The announcement of the Strategic Environmental Assessment for the Southern Corridor Development Initiative underscores the importance of an informed, knowledgeable, and critical society, and of engaging with politicians, attending public meetings, and raising concerns directly, to demonstrate public interest and help hold authorities accountable (see also section "Mechanisms to Address Environmental and Socioeconomic Risks" earlier in this article). It is also essential for individuals to understand their rights; consulting organisations such as the Legal Assistance Centre and the IPPR can provide insights into legislation, including the Environmental Management Act (7 of 2007), the Public Procurement Act (15 of 2015), and the Access to Information Act (8 of 2022). Concerns, including concerning corruption, can be reported through the IPPR's whistleblower portal or directly to the Anti-Corruption Commission of Namibia. Furthermore, building alliances within Namibia and internationally strengthens advocacy efforts. Collaborating with local organisations can significantly enhance public influence, particularly with upcoming legislation, such as the Synthetic Fuels Act and proposed amendments to the Environmental Management Act, which will be critical in shaping Namibia's socioenvironmental landscape. Finally, given Germany's involvement in the Hyphen project, German civil society could advocate for positive project impacts.

Conclusion and Recommendations

The findings of this paper suggest that the tangible benefits of large-scale hydrogen production projects, such as the Hyphen project, for Namibia and its population are likely to be limited. This conclusion is based on 18 months of extensive research, including a comprehensive review of reports, documents and scientific publications, and over 60 interviews. While Namibia has significant potential for energy production from wind and solar resources, with ample areas suited for electricity generation and hydrogen production facilities, the current situation strongly indicates that the primary beneficiaries will be foreign stakeholders.

As such, there are significant indications that the Hyphen project does not address Namibia's most pressing challenges. These include limited access to electricity, unemployment, and water scarcity. Furthermore, the financial risks associated with the project could place a substantial burden on the Namibian state and its citizens, while the financial gains may disproportionately favour the involved companies. The

situation may be exacerbated by non-transparent processes, a significant lack of information sharing, and Hyphen's potential influence on legislative changes. Employment opportunities for Namibians might be restricted to simple tasks, with many positions likely to be occupied by better-trained foreign workers. Additionally, Namibia currently seems to lack the capacity to develop industries connected to hydrogen production, such as fertiliser production or steel manufacturing based on green hydrogen.

Due to an enormous influx of people, the town of Lüderitz will face considerable challenges in developing infrastructure and providing essential services such as waste and sewage management, electricity, and housing. These pressures may also increase the risk of corruption. There is concern that historical injustices in Namibia could be repeated, benefiting actors from the Global North while offering minimal value and posing risks to local communities. Moreover, projects in the TKNP pose a substantial threat to unique flora and fauna. Combined with plans to build a new port in Lüderitz, both terrestrial and marine biodiversity could be severely affected, potentially also leading to negative socioeconomic impacts for the residents of Lüderitz.

All these factors strongly suggest that the broader value of projects like Hyphen for Namibia and its citizens remains very limited, potentially exacerbating social inequalities both within the country and in relation to other nations. The development associated with Namibia's green hydrogen economy does not appear to be primarily designed to serve the interests of Namibian society. Instead, it is driven by foreign companies and supported by national governments. For Germany, this pursuit responds to climate change legislation requiring the decarbonisation of its industries and geopolitical circumstances necessitating the reduction of dependence on Russian fossil fuels.

The Namibian government and the companies conducting social and environmental risk assessments must be held accountable. This accountability may entail transparent, holistic planning processes that prioritise Namibian societal needs—whether in the workforce and urban development in Lüderitz, protection of natural environments, or adherence to standards of ethical conduct such as the FPIC principles. In this regard, civil society and individuals must be well-informed, critical, and collaborative, working with various organisations to demand the fulfilment of rights and promises made by Hyphen and the Namibian and German governments.

Forming local and global alliances is essential for addressing the complex

challenges posed by emerging energy projects. Joining forces with individuals, groups, and NGOs can significantly amplify efforts to promote social justice.

References

Amelang, S. (2023). *Namibia launches 10 billion dollar-hydrogen project with German participation.* Clean Energy Wire. https://www.cleanenergywire.org/news/namibia-launches-10-billion-dollar-hydrogen-project-german-participation

Bank of Namibia. (2022). *Bank of Namibia Annual Report 2022*. https://www.bon.com.na/CMSTemplates/Bon/Files/bon.com.na/aa/aafa13ca-ecf5-4c5d-b584-49ad6f727715.pdf

Barbee, J., & Neme, L. (2021, December 13). *Oil company accused of drilling in African wildlife reserve, offering jobs for silence*. National Geographic. https://www.nationalgeographic.com/animals/article/oil-company-reconafrica-accused-of-drilling-in-african-wildlife-reserve

Benonia, R. (2020). *The root causes of unemployment and possible policy interventions.* Republic of Namibia. https://www.npc.gov.na/wp-content/uploads/2023/06/The-Root-Causes-of-Unemployment-and-Posssible-Policy-Interventions-2020.pdf

Beukes, J. (2023, July 24). Hyphen promises thousands of jobs for Namibians. *The Namibian Sun*. https://flippers.my.na/main/flipper_img/1720#mybook/2

Blood, J., & Moodaley, D. (2022). *Proposed meteorological mast and remote sensing campaign in the Tsau ||Khaeb National Park: Final EIA scoping report (including Impact Assessment) and Environmental Management Plan* (p. 161). SLR Consulting. http://the-eis.com/elibrary/sites/default/files/downloads/literature/87_EIA_Proposed%20Meteorological%20Mast%20and%20Remote%20Sensing%20Campaign_Hyphen%20Hydrogen%20Energy%20Facility_TsauKhaeb%20National%20Park.pdf

Boyd, D.R. (2023). *Statement at the conclusion of country visit to Chile.* https://www.ohchr.org/sites/default/files/documents/issues/environment/srenvironment/eom-statement-Chile-12-May-2023-EN.pdf

Brandt, E. (2022, November 25). Universal access to electricity remains a daunting task…as 70% to 80% of rural households still in the dark. *New Era*. https://neweralive.na/posts/universal-access-to-electricity-remains-a-daunting-task

Chief !Khaesen Maart. (2022, August 26). Indigenous fisherfolk aren't fossil fools: Our life-giving ocean is under threat. *Daily Maverick*.

https://www.dailymaverick.co.za/opinionista/2022-08-26-indigenous-fisherfolk-arent-fossil-fools-our-life-giving-ocean-is-under-threat/

Collins, L. (2021, September 20). *'Vast majority' of green hydrogen projects may require water desalination, potentially driving up costs*. Recharge. https://www.rechargenews.com/energy-transition/vast-majority-of-green-hydrogen-projects-may-require-water-desalination-potentially-driving-up-costs/2-1-1070183

Cremonese, L., Mbungu, G.K., & Quitzow, R. (2023). The sustainability of green hydrogen: An uncertain proposition. *International Journal of Hydrogen Energy*, *48*(51), 19 422–19 436. https://doi.org/10.1016/j.ijhydene.2023.01.350

Dalal-Clayton, B., & Sadler, B. (1999). Strategic Environmental Assessment: A rapidly evolving approach. *Environmental Planning Issues 18*. https://www.iied.org/sites/default/files/pdfs/migrate/7790IIED.pdf

Eberhardt, P. (2023). *Germany's great hydrogen race. The corporate perpetuation of fossil fuels, energy colonialism and climate disaster.* Corporate Europe Observatory. https://www.corporateeurope.org/sites/default/files/2023-03/Germany%E2%80%99s-GreatHydrogenRace_CEO.2023.pdf

Eicke, L., & De Blasio, N. (2022). Green hydrogen value chains in the industrial sector—Geopolitical and market implications. *Energy Research & Social Science 93*, 102847. https://doi.org/10.1016/j.erss.2022.102847

Elston, L. (2022, June 24). Namibia stakes its future on the green hydrogen market. *Energy Monitor*. https://www.energymonitor.ai/tech/hydrogen/namibia-stakes-its-future-on-the-green-hydrogen-market

Environmental Management Act 7 of 2007. (2012). Government notice 28/2012. https://www.lac.org.na/laws/annoSTAT/Environmental%20Management%20Act%207%20of%202007.pdf

European Investment Bank. (2022). *EIB to support green energy in Namibia*. https://www.eib.org/en/press/speeches/cop27-namibia-mou-hoyer

Federal Ministry for Economic Affairs and Climate Action. (2023, July 27). *Fortschreibung der Nationalen Wasserstoffstrategie*. https://www.bmwk.de/Redaktion/DE/Wasserstoff/Downloads/Fortschreibung.html

Federal Ministry for Economic Affairs and Climate Action. (2024). *Import strategy for hydrogen and hydrogen derivatives*. https://www.bmwk.de/Redaktion/EN/Publikationen/Energie/importstrategy-hydrogen.html

Gabor, D., & Sylla, N.S. (2023). Derisking developmentalism: A tale of green hydrogen. *Development and Change 54*(5). https://doi.org/10.1111/dech.12779

GIZ. (2022). *Sector brief Namibia: Renewable energies*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. https://www.giz.de/en/downloads/giz2022-en-sector-brief-namibia-renewable-energy.pdf

GSL Law & Consulting. (2023). British Virgin Islands tax system: taxation of BVI companies and individuals. Tax treaties of the BVI. https://gsl.org/en/taxes/tax-zones/british-virgin-islands/

Guillaneau, J.-C. (2024). *D9.3 – Namibia case study. WP9—Task 9.4* EU-Africa Partnership on Raw Material Value Chains. https://africamaval.eu/wp-content/uploads/2024/05/CS_NAMIBIA_FINAL_withAPPENCIDES.pdf

Hamouchene, H. (2022, October 14). *The energy transition in North Africa: Neocolonialism again!* Transnational Institute. https://longreads.tni.org/the-energy-transition-in-north-africa-neocolonialism-again

Hyphen Hydrogen Energy. (2021, December 13). *Southern Corridor Development Initiative* (Namibian Green Hydrogen Roadshow Discussion Document).

Hyphen Hydrogen Energy. (2022, May 24). *Hyphen: First gigawatt-scale green ammonia project in Namibia*. (Conference Paper, World Economic Forum, Davos, Switzerland). https://hyphenafrica.com/wp-content/uploads/2022/05/Hyphen-World-Economic-Forum-Presentation-24-May-2022.pdf

Hyphen Hydrogen Energy. (2023a, February 2). *Hyphen Hydrogen Energy announces ammonia offtake MoUs with Approtium and Industrial Group*. https://hyphenafrica.com/news/hyphen-hydrogen-energy-announces-ammonia-offtake-mous-with-approtium-and-industrial-group/

Hyphen Hydrogen Energy. (2023b, May 25). *Feasibility and implementation agreement*. https://hyphenafrica.com/wp-content/uploads/2023/05/Hyphen-Hydrogen-Energy-FIA-Infographic-03.pdf

Hyphen Hydrogen Energy. (2023c). *Socio-economic development (SED) framework*. https://hyphenafrica.com/wp-content/uploads/2023/07/Hyphen-Hydrogen-Energy-SED-Framework_FINAL_July-2023-1.pdf

Hyphen Hydrogen Energy. (2023d, August 14). *Hyphen announces engineering partnership with ILF for ground-breaking green hydrogen project*. https://hyphenafrica.com/press/hyphen-announces-engineering-partnership-with-ilf-for-ground-breaking-green-hydrogen-project/

Hyphen Hydrogen Energy. (2023e). *Team & experts*. https://hyphenafrica.com/team-experts/

Hyphen Hydrogen Energy (2024, October 24). *Hyphen Green Hydrogen Project SCDI, Namibia: Hyphen Project Overview Ammonia Webinar.* Ammonia Energy Association. https://ammoniaenergy.org/wp-content/uploads/2024/10/Project-Features-speaker-slides-Oct-2024.pdf

Institute for Public Policy Research (2022, April). Transparency concerns dog 'largest tender in nation's history'. *Procurement Tracker Namibia*, *16*. https://ippr.org.na/wp-content/uploads/2022/04/PTN16-web.pdf

International Energy Agency. (n.d.). Energy system of Namibia. https://www.iea.org/countries/namibia

International Energy Agency. (2019, June). *The future of hydrogen: Seizing today's opportunities*. https://www.iea.org/reports/the-future-of-hydrogen

International Labour Organization. (2013). *Understanding the Indigenous and Tribal People Convention, 1989 (No. 169): Handbook for ILO tripartite constituents.* https://www.ilo.org/sites/default/files/wcmsp5/groups/public/%40ed_norm/%40normes/documents/publication/wcms_205225.pdf

International PtX Hub. (2023). *Enhancing employability: Skills needs and gap analysis in Namibia's PtX sector and recommendations for a skills development programme*. https://ptx-hub.org/wp-content/uploads/2023/08/International-PtX-Hub_202308_Namibia-PtX-skills-needs-assessment.pdf

Kharas Media House (Producer). (2023, July 24). *Launch of the Socio-Economic Development Framework* [Video recording]. https://www.facebook.com/watch/?v=1421324692053332

Kørnøv, L., & Thissen, W.A.H. (2000). Rationality in decision- and policy-making: Implications for strategic environmental assessment. *Impact assessment and project appraisal*, *18*(3), 191–200. https://doi.org/10.3152/147154600781767402

Lekalakala, M., & Kalt, T. (2022, December 9). Green hydrogen: Neocolonialism, greenwashing or just transition? *Daily Maverick*. https://www.dailymaverick.co.za/article/2022-12-09-green-hydrogen-neocolonialism-greenwashing-or-just-transition/

Liu, X., & Zhou, J. (2021, October 19). Assessment of the continuous extreme drought events in Namibia during the last decade. *Water*, *13*(20), 2942. https://doi.org/10.3390/w13202942

Maher, C., Preston, J., & McCaroll, D. (2018, August 6). *The Notion of Nodes*. Hames Sharley. https://www.hamessharley.com.au/knowledge/the-notion-of-nodes

Martin, P. (2023, December 1). *INTERVIEW | 'Only five to ten Neom-sized hydrogen projects will be built this decade—Here's why one will be in Namibia*'. Hydrogen Insight. https://www.hydrogeninsight.com/production/interview-only-five-to-ten-neom-sized-hydrogen-projects-will-be-built-this-decade-heres-why-one-will-be-in-namibia/2-1-1562338

Matthys, D. (2024, May 27). Namibia declares state of emergency over drought. *The Namibian*. https://www.namibian.com.na/namibia-declares-state-of-emergency-over-drought/

Melber, H. (2022). The struggle continues: Namibia's enduring land question. In F. Mazwi, G.T. Mudimu, & K. Hewliker (Eds.), *Capital penetration and the peasantry in southern and eastern Africa: Neoliberal restructuring* (79–99). Springer International Publishing. https://doi.org/10.1007/978-3-030-89824-3_4

Merten, F., & Scholz, A. (2023, June). Meta-analysis of the costs of and demand for hydrogen in the transformation to a carbon-neutral economy. Wuppertal Institute. https://epub.wupperinst.org/frontdoor/deliver/index/docId/8417/file/8417_Hydrogen.pdf

Mining & Energy. (2024, April 3). *Discoveries could propel Namibia to top 15 oil-rich countries in the world*. https://miningandenergy.com.na/discoveries-could-propel-namibia-to-top-15-oil-rich-countries-in-the-world/

Müller, F., Tunn, J., & Kalt, T. (2022). Hydrogen justice. *Environmental Research Letters*, *17*(11), 115006. https://doi.org/10.1088/1748-9326/ac991a

Namibian Chamber of Environment. (2024, May). *When green hydrogen turns to red. Threating a global biodiversity hotspot* (Position Paper). https://n-c-e.org/wp-content/uploads/Green-hydrogen-Tsau-Khaeb-National-Park-NCE-Position-Paper.pdf

Namibian Presidency. (2024, April 7). *Hyphen Angra Point industrial chemical facility site in Lüderitz.* [Video recording]. https://www.facebook.com/watch/?v=1799971500530653

Namwater. (2023). *Integrated annual report 2021/22: Resilience in the time of the Covid-19 pandemic*. Namibia Water Corporation Ltd. https://www.namwater.com.na/images/docs/NAMWATER_2021_IAR_Web_Final.pdf

Ndjavera, M. (2024, May 24). Mnyupe pours cold water over environmental fears. *New Era*. https://neweralive.na/posts/mnyupe-pours-cold-water-over-environmental-fears

Opazo, A. (2023, December 22). *Hidrógeno Verde: Agrupaciones ambientalistas piden a Boric no convertir Magallanes en una zona de sacrificio.* Elciudadano.com. https://www.elciudadano.com/chile/hidrogeno-verde-agrupaciones-ambientalistas-piden-a-boric-no-convertir-magallanes-en-una-zona-de-sacrificio/12/21/

Press, S. (2021). *Blood and diamonds: Germany's imperial ambitions in Africa*. Harvard University Press. https://www.jstor.org/stable/j.ctv1grbbs6

Republic of Namibia. (2011). *Strategic environmental assessment for the central Namib uranium rush.* Ministry of Mines and Energy. https://irp.cdn-website.com/2eb50196/files/uploaded/Uranium_SEA_mrgd.pdf

Republic of Namibia. (2020). *Management plan Tsau ǁKhaeb (Sperrgebiet) National Park 2020/2021–2029/2030*. Ministry of Environment, Forestry and Tourism. https://www.meft.gov.na/files/downloads/bfd_Management%20Plan%202%20-%20Tsau%20Khaeb%20(Sperrgebiet)%20National%20Park.pdf

Republic of Namibia. (2022a). *Traction: Namibia's green hydrogen-overview*. Namibian Green Hydrogen Council. https://gh2namibia.com/wp-content/uploads/2022/09/Traction-Namibias-Green-Hydrogen-Overview.pdf

Republic of Namibia. (2022b, November). *Namibia. Green hydrogen and derivatives strategy*. https://gh2namibia.com/wp-content/uploads/2022/11/Namibia-GH2-Strategy-Rev2.pdf

Schmidt, R., & Frank, D. (2023, September). *Feasibility study for green hydrogen in Namibia: Report on desalination, brine treatment options, disposal options and its potential impacts on maritime life.* Dechema. https://dechema.de/en/-p-20396563-EGOTEC-6a2733adaceba13dc7403e5f2764fb7b/_/report%20seawater%20brine%20treatment%20and%20disposal%20in%20Namibia.pdf

SLR Consulting. (2024, February 7). Hyphen Hydrogen Energy – Proposed Green Hydrogen Production and Supply Project, Southern Namibia. Local and International NGO Meeting: Biodiversity. https://cdn.sanity.io/files/b0ecix6u/production/a3077d98339006956c6e1b0b85b772706962a4d6.pdf

Stubenrauch Planning Consultants. (2023). *Possible Lüderitz townlands expansion.* [Map]. Lüderitz Town Council. https://www.linkedin.com/posts/phillippus-albertus-balhao-532a0a249_laesderitz-namibia-southerncorridordevelopmentinitiative-activity-7193158592122830848-5vff?utm_source=share&utm_medium=member_desktop

The Namibian. (2021, December 13). *ReconAfrica's water drilling illegal – Schlettwein*. https://namibian.com.na/reconafricas-water-drilling-illegal-schlettwein/

United Nations Environment Programme. (2021, September 16). *Ministers, mayors, CEOs announce huge push on clean and efficient energy*. http://www.unep.org/news-and-stories/press-release/ministers-mayors-ceos-announce-huge-push-clean-and-efficient-energy

Van Wyk, C. (2024). Fostering local community participation and consultation in the green hydrogen projects. In G. Hopwood & F. Links (Eds.), *Green hydrogen monitor: Reviewing Namibia's green hydrogen developments*, 13–16. IPPR. https://ippr.org.na/wp-content/uploads/2024/06/Green-Hydrogen-Monitor-web.pdf

Von Oertzen, D.D. (2024, March 20). *Grüner Wasserstoff in Namibia Entwicklungsperspektiven zwischen Hype und Hoffnung*. Forum Deutschsprachiger Namibier – Regionalgruppe Europa, Online. https://www.forum-deutsch-namibier.org/gruener-wasserstoff-in-namibia-entwicklungsperspektiven-zwischen-hype-und-hoffnung-vortrag-von-dr-detlof-von-oertzen-2024035159/

Windhoek Observer. (2022, October 24). *Green Hydrogen investor wants concessions from Govt*. https://www.observer24.com.na/green-hydrogen-investor-wants-concessions-from-govt/

Who Owns Namibia's Wealth and Natural Resources? A Response to Geingob

John B. Nakuta

In March 2022, late President Hage Geingob was quoted as having said that the oil reserves discovered off the coast of Namibia do not belong to Namibians because the majority shareholders of oil rights are foreigners. According to the lead story of 9 March 2022 of The Namibian (The oil is not ours, 2022), Geingob reportedly said:

> *Legally it [the oil] is not ours. Legally it is owned by the investors, with 90%, but we are going to get it through taxes and royalties until we nationalise and become socialists, and we do not want that.*

The Director General of the National Planning Commission, Obeth Kandjoze, publicly supported this statement on various occasions. The Geingob statement, by extension, arguably applies equally to all Namibia's natural resources, such as diamonds, uranium, oil, natural gas, lead, copper, zinc, fauna, flora, and marine resources. This, minimally, begs several questions: What is meant by 'natural resources'? Who legitimately owns the natural resources of a country? And what duties arise from natural resource ownership?

The Geingob-statement, unsurprisingly, caused much consternation in certain quarters. The sole object of this typology is to respond to and debunk the Geingob statement.

The United Nations (UN) defines natural resources as natural assets (raw materials) occurring in nature that can be used for economic production or consumption. The natural resources of the earth, according to Principle 2 of the Declaration of the UN Conference on the Human Environment, "must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate" (United Nations, 1972, p. 4).

International law serves as a guide to the question of ownership of natural resources. In this regard, the UN General Assembly Resolution 1803 (XVII) (Permanent Sovereignty over Natural Resources) is particularly instructive. This Resolution establishes the principle of Permanent Sovereignty over Natural Resources (PSNR). It unequivocally attributes "the right of peoples and nations to permanent sovereignty over their natural wealth

and resources" (United Nations, 1962). Importantly, such sovereignty "must be exercised in the interest of their national development and of the well-being of the people of the State concerned" (ibid.). In fact, the International Court of Justice (ICJ) in Armed Activities on the Territory of the Congo (Democratic Republic of the Congo v. Uganda) unequivocally declared that principle of permanent sovereignty over natural resources is part of customary international law (International Court of Justice, 2022).

Generally, the sovereign State or "the people" are regarded as the owners of natural resources. For instance, the International Covenant on Civil and Political Rights (United Nations, 1966a) and the International Covenant on Economic, Social, and Cultural Rights (United Nations, 1966b) vest the right to PSNR in "all peoples". Articles 1(2) of both these instruments specifically endow the people with ownership rights over natural resources as a derivative of the right to self-determination.

The issue of wealth and natural resources is codified in Article 21 of the African Charter on Human and Peoples' Rights. Paragraph 1 of Article 21 in clear terms provides that: "All peoples shall freely dispose of their wealth and natural resources. This right shall be exercised in the exclusive interest of the people. In no case shall a people be deprived of it" (Organization of African Unity, 1981, p. 7).

On the other hand, the law of the sea conventions and international environmental treaties such as the 1992 conventions relating to biodiversity and climate change vest the right to PSNR in States.

The Namibian Constitution also embraces the PSNR principle. Article 100 of the Constitution vests the right to PSNR in the Namibian State. It unambiguously proclaims:

> *Land, water and natural resources below and above the surface of the land and in the continental shelf and within the territorial waters and the exclusive economic zone of Namibia shall belong to the State if they are not otherwise lawfully owned.*

By way of giving content to Article 100, the Namibian legislative framework vests the Government, as the representative of the State, with the right to freely determine and control the prospecting, exploration, development, exploitation, use and marketing of natural resources. Such legislative instruments include the Petroleum (Exploration and Production) Act (2 of 1991), the Petroleum (Taxation) Act (3 of 1991), and the Minerals (Prospecting and Mining) Act (33 of 1992). These instruments implicitly affirm that the Namibian State legally

owns the natural resources as a trustee of the people.

A number of ancillary duties arise from the principle of PSNR. Nico Schrijver (1997) lists a few. Two of his examples are relevant in this context, and relate to:

- the duty to exercise PSNR-related rights in the interest of national development and to ensure that the entire population benefits from the exploitation of resources and the resulting national development; and
- the duty to have due care for the environment; this means first of all, the duty to exercise PSNR in such a way as to prevent significant harm to the environment.

The above brings into sharp focus concerns regarding the transparency and accountability gap, and allegations of corruption and unethical practices in Namibia's mining sector, as raised by the Institute for Public Policy Research. The same applies to the alleged unilateral alienation of communal wealth and natural resources in favour of foreign mining companies by some unscrupulous traditional authorities. In the same vein, concerns about environmental degradation caused by foreign mining companies should not be treated lightly. All these, if proven true, amount to violations of the State's obligation to protect the human rights of both present and future generations under international human rights law.

The notion that multinational corporations have proprietary rights over natural resources is incompatible with the PSNR-principle. It is important to stress that the Namibian Constitution is the supreme law of the land. What matters most is what the Constitution provides on a certain matter and not the views and whims of the political and ruling elite. This principle is underpinned by the rule of law and the principle of legality – the bedrock and foundation of our legal order.

With that said, it is safe to assert that Geingob's statement regarding the foreign ownership of Namibia's natural resources has no basis under either international or domestic law. The Namibian State is accountable for the management and equal distribution of the natural wealth and resources of the country for the larger public good. This obligation cannot be abdicated to benefit sovereign powers, including multinational corporations. Such an attitude and mindset in managing the country's wealth and natural resources only serves to perpetuate the induced inequality, poverty, and unemployment legacies of Namibia's colonial and apartheid history.

References

International Court of Justice. (2022, February 9). *Press release: Armed activities on the territory of the Congo (Democratic Republic of the Congo v. Uganda)*. https://www.icj-cij.org/sites/default/files/case-related/116/116-20220209-PRE-01-00-EN.pdf

Legally, the oil is not ours – Geingob. (2022, March 9). *The Namibian*. https://www.namibian.com.na/legally-the-oil-is-not-ours-geingob-2/

Organization of African Unity. (1981, June). *African charter on human and peoples' rights*. https://au.int/sites/default/files/treaties/36390-treaty-0011_-_african_charter_on_human_and_peoples_rights_e.pdf

Schriver, N. (1997). *Sovereignty over natural resources: Balancing rights and duties*. Cambridge University Press. https://doi.org/10.1017/CBO9780511560118

United Nations. (1962, December14). *General Assembly resolution 1803 (XVII) of 14 December 1962, "Permanent sovereignty over natural resources"*. https://www.ohchr.org/en/instruments-mechanisms/instruments/general-assembly-resolution-1803-xvii-14-december-1962-permanent

United Nations. (1966a, December 16). *International covenant on civil and political rights*. https://www.ohchr.org/en/instruments-mechanisms/instruments/international-covenant-civil-and-political-rights

United Nations. (1966b, December 16). *International covenant on economic, social, and cultural rights*. https://www.ohchr.org/en/instruments-mechanisms/instruments/international-covenant-economic-social-and-cultural-rights

United Nations. (1972). *Report of the United Nations conference on the human environment, Stockholm, 5-16 June 1972*. https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/ConferencesMeetings/Documents/A%20CONF.48%20 14%20Rev.1.pdf

Namibia's Sacrificial Zone: A Case Study of Arsenic Poisoning in Tsumeb

Samuel Schlaefli[1] (assisted by Ester Mbathera)[2]

This article has been translated and adapted rom an article published in (in different versions) in Switzeralnd, Canada and a daily newspaper in Namibia. Due to the significance of this topic, we included it in this journal.

Background

Tsumeb was founded in 1905 by the German colonial power, which ruled Namibia from 1884 to 1915 as the colony German South-West Africa. Germany wanted not only the land of the indigenous population, but also the mineral resources of Namibia. The area surrounding Tsumeb was particularly rich in metal ores. Street names such as Copper Street, Silver Street, Zinc Street and Germanium Street still bear testament to the metals mined there until the late 20th century. There is a mining museum, and the city hosts an annual Copper Festival. A hill separates the 40 000-plus inhabitants of the city from the area of the former mine, where today ore is no longer mined, but copper continues to be smelted. Five-hundred metres lie between the slightly elevated arsenic landfill and the nearest school, and about 700 metres separate the smelter from the central Minen Hotel, whose entrance wall proudly displays a hammer and a pick – the international symbols of mining.

Dundee Precious Metals (DPM) smelted highly arsenic-laden copper ore in Namibia for 14 years on behalf of the Geneva-based metal trading company IXM. In September 2024, the smelter was sold to the Chinese company Sinomine Resource Group; DPM left behind approximately 300 000 tonnes of highly toxic arsenic trioxide, deposited above a groundwater source that is of national importance.

From 2008, the provenance and composition of the copper ore processed in Tsumeb changed. It no longer came from the local mine or another southern African country, but from Europe. In that year, DPM opened the Chelopech copper and gold

1 Samuel Schlaefli is a freelance environmental and science journalist based in Switzerland. The investigation into copper smelting in Tsumeb was developed in cooperation with the Swiss Coalition for Corporate Justice , which funded the research.

2 Ester Mbathera is a reporter based in Namibia. She assisted with the investigation on the ground

mine in Bulgaria. The initial plan was that the copper in the ore mined there was to be extracted with cyanide, or that the ore was to be smelted on site. However, the Bulgarian government refused to issue the required permits, citing environmental and health risks. The Chelopech ore contains around 5.5% arsenic, far above the typical concentration of less than 1% . The smelting of such ores is prohibited in many countries. There are only four smelters worldwide that accept such "complex ores" (sometimes also referred to as "dirty ores") for smelting. Tsumeb is one of them.

DPM first sent copper ore from Bulgaria to Namibia in 2008 for testing. In 2010, the Canadian group bought the smelter. To ensure full capacity utilisation, additional ore from Peru – also high in arsenic – was introduced. From that point on, DPM transported the pulverised, anthracite-coloured ore from its mine in Chelopech about 13 000 kilometres by truck, ship and railway to Tsumeb to smelt it there at over 1 200 degrees Celsius and separate it from the arsenic and other toxins. When the Ministry of Environment and Tourism intervened in 2012 and forced DPM to reduce the production capacity of the smelter, a large-scale investigation co-funded by the UN Environment Program was undertaken, but the relevantreport was never published. However, it was obtained from a former DPM employee who had scanned it. The report concluded as early as 2012 that the smelter was ill-equipped to process such arsenic-

This is the smelter in which highly arsenic copper was processed by DPM until 2024.

Source Author

rich ore from Chelopech. As a result, gaseous arsenic evaporated through the production process passed into the environment, seriously endangering the employees there.

Even though the management knew early on about the workers' exposure, they insisted that the plant remain operational. The report's authors also pointed out that "the government has insufficiently trained and experienced inspectors to monitor the industry." At that time, they already recommended a broad-based clinical examination of the "high risk communities", including long-term monitoring of cancer cases, including death certificates. This was later also demanded by a doctor who wishes to remain anonymous. He claims that he advised DPM on health issues for a long time, and criticises the company for its unprofessional monitoring of arsenic exposure among workers.

Setting: Scenes from a post-apocalyptic movie

Travel enthusiasts primarily associate Namibia with vast, unpopulated swathes of savannah, animals in the wild, and luxurious lodges in national parks and protected areas. In Tsumeb, a small town in northern Namibia just 100 kilometres from the world-famous Etosha National Park, none of this can be found. Here, the landscape is characterised by fields of jet-black slag, high in toxic waste, and bright green sewage basins. They are the legacy of decades of mining and a huge copper smelter built in the 1960s that is still in operation today, mainly processing copper ore from Europe and South America. At the beginning of August 2024, through the mediation of a former employee, I gained access to an area of about nine square kilometres which is fenced off with barbed wire. This was surprising, as visit requests from journalists, scientists and NGOs are normally rejected by DPM.

We drove slowly in a DPM minibus, first towards the smelter and then to the waste dumps. In opaque, grey-filtered light, we passed post-apocalyptic scenes – rusty steel ribs, industrial buildings, pipelines, smoking chimneys and gigantic excavators. Everything was covered with dust. The few workers we saw, wearing protective suits, gloves, helmets and gas masks, were hosing down unpaved pathways. Working here requires protection against the hazards of toxic dust and vapours. We drove past tonnes of rusty steel pipes, discarded machines, and caldrons that had been abandoned for years, awaiting decontamination that would allow for their removal and disposal.

The bus continued past fields in a southerly direction towards the Hazardous Waste Disposal Facility, which is in fact a landfill with two

huge piles of white powder – arsenic trioxide, a stable form of the element arsenic. It is so toxic that a mere tenth of a gram, if swallowed, can be fatal. This deadly material is packed in sugar bags and transported in mine vehicles from the smelter to the landfill, where it is dumped in piles that are levelled by a bulldozer. A former senior employee of the smelter estimated that about 300 000 tonnes of this known carcinogen are stored in the landfill – enough to kill the world's entire human population multiple times over.

Research Results

Data were collected through observation during site visits and face-to-face interviews conducted with numerous Tsumeb residents between July and August 2024. In addition, 25 interviews were conducted with current and former employees of the smelter; further interviews were conducted with activists, researchers and two former directors of the smelter; and 30 samples of water, soil, plants and hair were collected on site and analysed by the Soil Science Group at the University of Bern in Switzerland. The data generated were supplemented by secondary data from research reports.

An estimated 300,000 tonnes of toxic waster are stored in Tsumeb.
Source Author

The laboratory tests confirmed the findings of previous studies, namely that the soil near the smelter is massively contaminated with arsenic and other heavy metals. According to Adrien Mestrot, Associate Professor for Soil Science at the University of Bern, "These values are extremely high, with up to two percent arsenic in the soil, which is comparable to other soils contaminated by smelting". The leaves and grasses that were analysed also had very high arsenic values: "We didn't test the fruits of these plants, but these levels suggest that edible parts could also be significantly contaminated," said Mestrot.

Arsenic accumulates in hair. Analysing hair is therefore a reliable means of measuring long-term exposure. In our samples, employees of the smelter and residents who live to the west of the smelter showed the highest arsenic concentration values. The latter area is particularly affected by emissions and dust from the smelter due to prevailing winds.

The highest measured values were found in people who suffer from symptoms associated with arsenic exposure. According to previous studies, arsenic concentrations in hair of more than 1 mg/kg indicate excessive exposure. All samples from Tsumeb exceeded this value, and in eight out of 12 samples, did so by at least three times. One smelter employee exceeded this value by a factor of 20. The arsenic content in the samples from Tsumeb was up to 100 times higher than samples collected in the Namibian capital, Windhoek, and in Switzerland. "The values are frightening, and show that the population of Tsumeb is massively exposed to arsenic," said Mestrot. "It is essential that further tests be conducted to understand the true extent of the health effects of the smelter."

The research revealed that the Geneva-based metal trading group IXM had copper ore with extremely high arsenic content processed in Namibia for years, and that its business partner DPM has taken advantage of Namibia's weak regulatory environment to dispose of highly toxic and carcinogenic arsenic trioxide in Africa. Risks to which the population of Tsumeb, particularly employees of the smelter, were knowingly exposed were accepted in the interests of the copper trade's profit. The management of DPM in Canada were informed early on that employees were sometimes exposed to very high arsenic concentrations. Despite being warned, and with full knowledge of the cancer risks involved, the management took no action.

Impacts on the environment and human health

Copper smelting produces two particularly toxic waste products:

arsenic trioxide, and sulphur dioxide. The latter, a gas, was eleased into the environment in large quantities by the smelter until the end of 2016. The air often smelt of rotten eggs and garlic, and Tsumeb residents recall that it irritated their mucous membranes. On certain evenings when low clouds trapped the gas as if under a lid, the plants in the gardens and the corn in the fields were burned the next morning. Former employees confirmed that farmers were compensated several times after such losses; some say they were "bought".

The other waste product, arsenic trioxide, may lack the pungent odour of sulphur dioxide, but is far more dangerous. According to the World Health Organization (WHO), it is incontrovertibly carcinogenic. When ingested, it disrupts biochemical processes in the body, such as the repair of the DNA, energy metabolism in cells, and transport processes between receptors. Studies have shown a link between long-term arsenic exposure and increased infant mortality, impaired cognitive development, renal failure, and various types of cancer in adolescents. The symptoms of such exposure are diverse and difficult to trace back to the original source. The first signs are often skin problems, especially skin discolouration and hardening, or respiratory problems, usually in the form of bronchitis.

In 2011, a year after DPM took over the smelter, the complaints of workers began to pile up. Newspaper reports from this time show DPM workers with rashes all over their bodies, burst and bloody blisters, and blinded eyes. The management at the time denied any connection between these conditions and the smelter, claiming they were symptoms of HIV/AIDS. The situation escalated to such an extent that Namibia's Ministry of Environment and Tourism intervened in 2012, forcing DPM to temporarily halve the smelter's capacity, thereby reducing the volume of arsenic trioxide produced.

Workers' testimonies

I meet Walter Haihambo on the terrace of a Tsumeb hotel, where tourists, mining industry consultants and NGO employees mingle. He speaks Oshiwambo, and a colleague translates for us. In 2011, Haihambo worked for half a year in the DPM smelting plant, at the hose filters where the arsenic vapours from the smelting furnace are cooled and crystallised into powder. He and his colleagues packed the arsenic trioxide into bags for transport to the landfill. Soon after starting at the smelter, Haihambo developed rashes all over his body, including his face. The company's doctor examined him and took a urine sample, but Haihambo never saw the results. Initially, he was transferred for a month. When he returned to his original workplace, the

rashes began again. After half a year he was fired, because, Haimbo said, "it was said that I was not fit enough to continue working in the smelter."

He rolls up his jeans and shows us his legs. They are scarred from the ankles to the thighs. The rash made blisters and burned so badly that he scratched permanent scars on his legs. "Sometimes it still burns today," he says. Haihambo has joined forces with other injured ex-DPM workers and is demanding financial compensation from the Canadian group for damage to his health and the lifelong medical care he will require. To date, DPM has not responded to the demand.

Arsenic trioxide irritates the skin due to its toxicity and low pH, which can lead to a violent rash. This "arsenic rash", as Walter Haihambo describes it, occurs particularly frequently in Tsumeb, as reports by occupational physicians from South Africa indicate. If you talk to former and current DPM employees, practically everyone knows someone who has already been afflicted with pustules.

In Tsumeb's Nomtsoub suburb, many streets are unpaved and riddled with potholes. In the evenings, the residents sit outside their simple brick houses with corrugated iron roofs or gather around braais frying meat on skewers. Teenagers drink in shebeens (informal pubs), while amapiano (a southern African house music genre) booms from loudspeakers. It's here in Nomtsoub that we meet Nikasius Hangula. He also belongs to the group of men who are demanding compensation from DPM. Under a glaring light bulb in a modest living room, he tells the story of how the smelter has affected him.

Hangula was hired by the mine in 1973 as a 19-year-old, repairing the railway tracks that transported ores and metals to the coast. After the mine was closed, he moved to the smelter till his retirement in 2014. His stories of the early years sound nostalgic, but the closer they come to the present, the more sinister they become. "It was only with DPM and the copper ore from Bulgaria that the problems in the smelter began," he says. Long-time colleagues suddenly complained about unbearable itching and skin rashes that turned into blisters that left open wounds. "We didn't know such things before."

Nikasius Hangula's arm trembles uncontrollably during the conversation – a problem with his nerves, possibly Parkinson's, he doesn't know exactly. He appears weak and frail, and tells of regular abdominal pain and a damaged kidney. Most of the colleagues with whom he worked in the smelter are sick today. "When we confronted

our superiors at DPM with the skin rashes, they simply claimed we were not wearing our protective clothing properly." Since then, Hangula has become something of an unofficial chronicler of the resistance against DPM. Employees have repeatedly denounced the working conditions in the smelter. They could not count on the union because they aligned with the government and DPM management. Their only support came from local and, occasionally, international NGOs. Many workers were fired because of their resistance. There were also some who resigned of their own accord, who suddenly became silent and moved away. "DPM put employees under pressure and silenced them," says Hangula.

Headquarters in Canada knew

An internal company report from 2013 revealed that in particular employees in the "arsenic plant" were exposed to high arsenic concentrations. In this separate manufacturing building, which was only closed in 2017, DPM processed the arsenic trioxide produced in the smelting process so that it could be resold to manufacturers of pesticides and wood preservatives, mainly in Malaysia. According to the report, arsenic concentrations in the air at the facility were up to 15 times above Namibia's legal limit. Urine samples from workers showed levels up to eight times the Namibian legal limit. If DPM were to have been assessed against international standards, the results would have been even more damning.

These levels remained consistently high in subsequent years, with some measurements surpassing earlier records, according to a former DPM employee with access to health data, who does not want to be named. According to him, "The management in Canada was informed early on about the severe exposure levels of the workers. Yet, the directive was clear: keep the plant running." He says that David Rae, the Chief Operating Officer at the time and current CEO of DPM in Toronto, was informed, as was Nikolay Hristov, the current Vice President of sustainability. The numerous warnings from Tsumeb were deliberately ignored in Canada: "DPM has benefitted from the weak regulation and the lack of control by Namibian authorities," says the former employee. "The health of the workers was not a consideration." We have confronted the DPM headquarters in Canada with these allegations, but despite repeated follow-ups, we have never received a response. No one knows how the 30 employees who worked in arsenic production are doing today, and whether they are still alive. Although a list of their names exists, no effort has been made to locate them. "The perfidious thing is that arsenic-related cancer often only

surfaces many years after exposure," says the former employee. "And DPM knows that."

IXM – a heavyweight in the global metal trade

From the outset, DPM's central partner was the multinational group Louis Dreyfus Company (LDC), whose operational headquarters are in Geneva. In 2017, LDC sold its metal division for US$466 million to the Chinese company Natural Resources Investment Fund. The company was renamed IXM in 2018.

IXM is a world-leading metals trading group that emerged in 2017 from the sale of the metals division of LDC. It has over 450 employees worldwide with its headquarters located in Geneva. Today, IXM is the third largest group in the industry, right behind Glencore and Trafigura. Nevertheless, very few people have ever heard of the company. In 2023, IXM sourced copper, zinc, lead, nickel, aluminium, cobalt and niobium from over 40 countries across six continents. In 2022, the group generated a turnover of around 21.5 billion Swiss francs. The Chief Executive Officer of IXM, Kenny Ives, previously worked at Glencore for over 25 years, where he last headed the nickel division.

Since DPM took over the smelter in Tsumeb in 2010, LDC (and later IXM) have had exclusive purchase rights for the copper processed there. In 2010, LDC opened its own warehouse for the copper ore imported from Bulgaria in the port of Walvis Bay on the Namibian coast. From there, the high-arsenic ore was transported by rail inland to Tsumeb. IXM had exclusive rights, valid until 2026, to buy copper concentrate from the Bulgarian Chelopech mine, to have it processed in the Tsumeb smelter in Namibia, and to buy all refined blister copper from the smelter. This exclusive agreement benefited IXM, as they were able to have the problematic copper ore with its high arsenic content processed in Tsumeb by DPM, while at the same time DPM also benefitted by having a predictable throughput for the smelter. Because the ore from the Bulgarian Chelopech gold and copper mines and from copper mines in South America was so toxic – or "complex", as it is termed in DPM's annual report – DPM was able to charge a high price for processing. On 30th August 2024, DPM sold the smelter for US$20 million to the Chinese Sinomine Resource Group Co. Ltd. This also ended all purchase contracts with IXM.

The headquarters of IXM, which is part of the Chinese CMOC Group, are located in Geneva, with a branch in Zug and offices on several continents. DPM acted as a sort of service provider for IXM. The Swiss-based group buys copper ore from Chelopech and other

mines, organises and finances the transport to Tsumeb, and then has the exclusive rights to accept the processed blister copper with a purity of around 98 percent. Copper is a lucrative core business for IXM. The metal is in demand because it is one of the most important for key technologies such as photovoltaics and energy production from wind. In recent years, prices for copper have mostly pointed in one direction: upwards. According to information supplied by IXM, its revenue is more than US$20 billion per year through the sale of metals. The Group's website lists a number of sustainability awards it has received, including "The Copper Mark", which is intended to guarantee the responsible production of copper, nickel, zinc and molybdenum and "contribute to a positive legacy and a sustainable society".

Relations between LDC (later IXM) and DPM have been close since the takeover of the smelter. Swiss-based employees regularly visited the smelter, as confirmed by several former DPM employees. In addition, IXM commissioned consultants from Bureau Veritas, stationed in Tsumeb, to ensure that DPM produced the agreed quantities of copper. According to a former DPM employee with insight into the coordination between DPM and IXM, the headquarters in Geneva was informed practically daily about the operations of the smelter. Despite this, IXM did not intervene to protect workers and the population of Tsumeb from the toxic emissions of the smelter. We also confronted IXM with the statements of former DPM employees and asked several times why the management had not intervened when it saw reports detailing the high arsenic levels. These queries were unsuccessful; IXM merely referred us to DPM.

Chemical exposure

Most of Tsumeb's shops line up along the central President Street, with bulky pick-ups parked in front of fast food restaurants. Women sell nuts and vegetables from the surrounding area on cloths spread out along the pavement. Groups of young men stand around, chatting and drinking beer.

In one of the shops, we meet a young shop owner (who wants to remain anonymous). Her arms, neck and face are covered with red pustules, resembling a rash of measles. She has been living in Tsumeb since 1991, and says her skin problems started in 2009. Since then, she has frequently suffered from stomach cramps and nausea at night and in the morning, enduring severe headaches that are often so intense that they make her vomit during the day. She digs out two boxes of different brands of painkiller. "I wouldn't manage without them," she says.

Her neighbour is also sick. As soon as she spends some days at the coast, she feels better again. "But Tsumeb is my home, I don't want to leave." Her small shop is located at the northern end of the city and only a few hundred metres from the arsenic landfill.

A young man dressed in smart attire and sporting a freshly shaved haircut overhears our conversation and says, "Look at my cheeks." They are rough and a little red. He is very worried about his appearance. "I think these chemicals are responsible," he says, and points in the direction of the smelter.

In the centre of Tsumeb there is a surprisingly high number of pharmacies. As we learned, they don't lack customers, and provide insights into the health problems of the community. The pharmacist at Tsumeb Pharmacy, Buys Steenkamp, reports no out-of-the-ordinary symptoms among his clients. "Nothing unusual – dry skin, as is common here during the winter months," he says. However, the pharmacist at Etosha Pharmacy, Annemarie Erasmus, says it is striking how many medications for respiratory diseases she sells, especially nasal sprays and cortisol. The supplier confirmed to her that nowhere else in the country are such large quantities of these medications sold. A third pharmacist wanted to remain anonymous because she doesn't want to get into trouble. "We are all suffering from the smelter here," she says. She describes how often she wakes at night because of the smoke and the gases from the smelter, struggling to breathe. When she came to Tsumeb six years ago, she was shocked at how many people sought help from the pharmacy for allergies and skin problems. She tells of frequent skin fungus infections in children. But very few residents are willing to complain or oppose DPM. "Most people are grateful when we give them an ointment. They don't want to cause trouble – above all, they want jobs."

DPM is by far Tsumeb's most important employer, until August 2024 providing jobs for 650 workers at the smelter, alongside hundreds of "contractors", who handle cleaning, maintenance and transport. DPM pays by far the best wages in the region, making the jobs highly sought after. A woman who had worked as a receptionist in the smelter since 2016 says she earned N$12 000 per month , double the average pay in other Namibian companies. DPM consciously cultivates its image and does not tire of emphasising how important the smelter is for the local economy. On huge billboards at the entrance to the city, the company boasts of "respect" and "inclusion", as well as of their being "stewards of the environment". DPM sponsored the shade roof in front of the post office

building, DPM organises the annual golf tournament, DPM is the main sponsor of the annual copper festival in Tsumeb, DPM donates laptops for schools and renovates football fields, and together with the community is building an open-air gym with the slogan "Healthy body, healthy mind, healthy life", as proclaimed on an information board.

Political connections

Relations between the company and the government are close, with politicians frequently visiting the smelter. Zebra Kasete, CEO of the smelter until the end of August 2024, grew up in Namibia, studied metallurgy, worked for Rio Tinto, and managed a diamond mine in Zimbabwe. He is also vice-president of the Chamber of Mines in Namibia and maintains excellent relations with the ruling SWAPO Party. President Hage Geingob, who passed away in February 2024, personally visited the smelter in 2016 to open the new sulphur dioxide plant. DPM is largely tax-exempt, as the smelter is a designated export processing zone. All the copper produced in Tsumeb, so-called blister copper with a copper content of 98.5 percent, is immediately exported. Virtually nothing remains in Namibia, except the toxic waste.

For many, it came as a surprise when, in March 2024, DPM announced that it wanted to sell the smelter to the Chinese group Sinomine Resource Group for US$49 million, mainly because the company had invested more than US$515 million in the smelter since 2010. By the end of August, the deal had been sealed, but Sinomine paid only US$20 million. Many found it strange that the Canadian company should be in such a hurry to get rid of the smelter and disappear from Namibia.

Trust lost

In August 2023, significant public resistance against DPM emerged for the first time. According to the organisers of a demonstration, over 700 people took to the streets, mainly from Nomtsoub. The straw that broke the camel's back was widespread unemployment and an incident involving a truck from the smelter, which was illegally cleaned in a public garage in the town. Fears arose that the truck had carried arsenic-loaded material and that arsenic could have entered the community's wastewater system. Concerns about water quality have been a persistent issue in Tsumeb. In a petition handed over to DPM during the demonstration, the organisers demanded an investigation into the incident and requested free medical examinations for all Tsumeb residents "to assess our health status, as we are daily exposed to arsenic and other toxic substances." The petition also declared: "The Tsumeb community has lost faith and trust in the corrupt

management of Dundee Precious Metals, which has no compassion for the residents." On 11 August 2023, the demonstrators marched towards the main entrance of the smelter and demanded the immediate resignation of CEO Zebra Kasete and other senior managers.

The demonstration was organised by the Tsumeb Community Concern Representatives. I meet the founder, Lisken Claasen, and several comrades one evening in the dimly lit room of a kindergarten on the outskirts of Nomtsoub. A thick folder with material collected on DPM and the smelter lies on the table. Claasen coughs and clears her throat constantly. "We are seriously worried about our health here," she says, "our men become impotent, many suffer from diabetes or high blood pressure, we see miscarriages and children with disabilities. DPM always says 'safety first', but we don't see them being genuinely concerned about the health of workers or the residents of Tsumeb."

Mujiwa Diamantina, a co-founder of Tsumeb Community Concern Representatives, says: "We have been there, we have seen the arsenic landfill for ourselves. When there is a strong wind, you can see the powder spreading into the surroundings." She continues that the soils in Tsumeb are obviously contaminated with arsenic trioxide. She is worried because many grow vegetables and fruits in Tsumeb and the arsenic and other heavy metals from the slag dumps may have entered the food chain. "We feel powerless," says Diamantina. "We don't trust the information from DPM, but we don't have the money to commission experts from abroad with independent tests." The government was aware of the situation for a long time, but would not do anything, she says, and the same applies to the municipal administration.

Permission for research into health risks refused

DPM and the Namibian government have long been aware of the risks to which the people of Tsumeb are exposed. In 2011, in cooperation with the German Federal Institute for Geosciences and Raw Materials, researchers at the University of Namibia in Windhoek tested 148 people from Tsumeb for arsenic and other heavy metals in their blood and urine. One in six persons had arsenic values above the WHO safe limit; in one case, the safe limit was exceeded by a factor of nine. Similarly, lead levels were above WHO limits in one-fifth of the participants. Residents of the industrial area adjacent to the smelter directly to the south, and in the suburb of Nomtsoub, were particularly affected. The scientists attributed the high values to the inhalation of contaminated dust, contact with contaminated soil, and the

consumption of products from their own gardens. However, the results were never published in a scientific journal. "We didn't have permission for it," says a researcher involved, who wants to remain anonymous. The research had been funded by the government, which had the final say. "They argued that the results could deter foreign investors in the mining sector."

In 2014, the same research group analysed 43 samples of tomatoes, carrots, corn and pumpkins from Tsumeb for heavy metals and arsenic. All samples showed significant accumulations of lead, cadmium and arsenic. "These elements can seriously affect human health if contaminated fruit and vegetables are consumed regularly or in large quantities," the study says, recommending that the vegetables should not be eaten. The researchers proposed creating zones around the smelter where agricultural activity would be restricted or banned entirely. In particular, growing leafy and root vegetables, which are prone to accumulating heavy metals, should be prohibited throughout the city and on agricultural land up to 10 kilometres west of the smelter. The researchers also recommended measures for the remediation of polluted soils, including the removal of the contaminated upper soil layers. None of these measures have been implemented by DPM or the government.

According to a researcher involved in the study, "At that time, we would also have liked to analyse hair and fingernail samples to better understand how many people in Tsumeb have high arsenic and lead values." Unlike in urine samples, in hair cumulative arsenic ingestion can still be detected long after exposure. But the Ministry of Health and Social Services would not approve these tests, or even studies on the impact of arsenic and lead exposure on children. "Tsumeb has essentially become off-limits for Namibian researchers," the researcher says. "It is simply too sensitive for the government." We have confronted the Ministry with these statements, as well as with the results of our own analysis. Despite repeated follow-ups, we have never received an answer.

Lack of transparency

DPM rebutted the research findings with its own measurements. According to the company, air quality in Tsumeb is continuously monitored using six measuring stations, while water quality is regularly checked at 31 groundwater boreholes in and around the smelter area. However, the environmental data are neither publicly available nor independently reviewed. DPM argues that all pollution, as well as the high arsenic and heavy metal levels in the soils, predates its acquisition of the smelter in 2010. It is not disputed that decades of mining and copper

smelting had already contaminated the soils with heavy metals before DPM's arrival. However, a 2020 study by Australian researchers measuring lead isotopes in dust samples found that residents continued to be exposed to dust from the slag fields and tailings heaps, and that the current operation of the smelter contributes to the exposure. Their modelling also shows that the absorption of dust through the mouth and food is the most important route for the absorption of arsenic, followed by inhalation. Especially the volatile dust which reaches the vicinity of Tsumeb from the landfills and the arsenic landfill is of concern, as it is very fine and has a high content of toxic elements. The researchers concluded that this dust exposure significantly increases the risk of cancer for the town's residents.

"The smelter in Tsumeb is dirty and dusty compared to similar operations," says Mark Patrick Taylor, a global expert with over 40 years of experience in mining-related environmental impacts and the lead author of the Australian study. When he took samples on site in 2018, he observed the lack of effective measures to contain the dust development – the main source of exposure for the population. "There is no doubt that the smelter is a source of environmental pollution and the harmful exposure of the people in Tsumeb." This is especially true for young children: "Studies in Australia have shown that the unintentional intake of lead in children is often much higher than in mothers, because they put everything in their mouths and are particularly exposed to toxic substances through the mother's clothes and breasts. There is no reason to believe that this would be different with arsenic."

According to Taylor, DPM's hasty exit from Tsumeb would be difficult to achieve in Europe, the USA or Canada, as stricter environmental regulations would require site remediation before the sale, or require that millions of dollars be deposited in a public fund for a future cleanup. None of this is planned in the case of Tsumeb, even if the smelter violates the right of future generations to an intact environment. The hasty departure is thought to be a ploy to evade responsibility and liability for the environmental damage and negative health impacts the company has caused in Tsumeb.

Ninety-two percent of deaths due to pollution are recorded in low- or middle-income countries, many of them in Africa. The Namibian Constitution states that the government "should take measures against the deposition or recycling of foreign nuclear and toxic waste on Namibian territory". Furthermore, the Constitution stipulates those conventions, such as the Basel Convention on the Control

of the Transboundary Shipments and Disposal of Hazardous Wastes, which has been ratified by 191 countries, including Namibia, Canada and Switzerland, is applied as part of Namibian legislation. This convention aims to prevent wealthy countries from disposing of toxic waste in poorer countries. Arsenic is explicitly mentioned in the Convention.

Attempts to take legal action against DPM have so far failed. The Namibian Legal Assistance Centre, which represents injured parties on a pro-bono basis, began investigations, but discontinued the case due to insufficient data. In 2019, the English law firm Leigh Day interviewed a dozen workers and wanted to sue DPM for damages. Because the company is registered in Canada, but Leigh Day is based in England, however, the firm wanted to sue the European Bank for Reconstruction and Development, which is based in London, as being liable for the health damage in Tsumeb, as the bank had co-financed the expansion of DPM's mine in Bulgaria from January 2017 to July 2024 with US$40 million. The plaintiffs argued that the bank knew or should have known about the risk of arsenic poisoning of the workers in Tsumeb. However, it soon became clear that the bank enjoys far-reaching immunity and cannot easily be prosecuted before a national or international court.

At the end of August 2024, Namibia's National Competition Commission gave the green light for the sale of the smelter after five months of deliberation – without any requirements regarding the safe storage of the arsenic waste, even though this is exactly what had been demanded by NGOs, researchers and the population in Tsumeb. "Why did DPM choose Namibia of all places to deposit this waste?" asks Richard Naobeb, a member of Tsumeb Community Concern Representatives, the citizens' movement that organised the demonstration against DPM. "And now they simply sell the smelter to a Chinese company and run away – without having to take any responsibility!" He wonders if there is a plan for the closure of the arsenic landfill and whether a fund has been set up for the remediation of the land. He doesn't know, because he never received an answer from DPM. "You have to remove this arsenic landfill!" says Naobeb. "This is not just about us, but also about the future of our children."

Arsenic waste threatens groundwater

Some in Tsumeb say the Hazardous Waste Disposal Facility is a ticking time bomb. It was built in 2012 on an aquifer of national importance, the Tsumeb Karst Aquifer, which is connected to other aquifers in the region. The landfill is located in a

porous dolomite zone, known for its geological faults and for the formation of sinkholes. According to experts, the landfill should never have been built at this location. Arsenic trioxide is water-soluble, meaning that heavy rains could leach it into the ground. If the landfill's liner fails, there is the possibility that arsenic will diffuse into the soil over a large area and get into the groundwater – a catastrophic scenario. Tsumeb relies entirely on groundwater for its drinking water supply. Additionally, more than 80 farms to the north depend on groundwater for growing vegetables, maize, wheat, cotton, and lemons.

No remediation plans

In 2016, DPM commissioned an environmental impact study from the international firm SLR Consulting, for a planned expansion of the smelter, which would increase its capacity from 240 000 to 370 000 tonnes of copper ore annually. The experts from SLR came to the conclusion that negative effects of the smelter on groundwater quality are already measurable and likely to intensify. Borehole samples from the site revealed levels of arsenic, molybdenum, and sulfate exceeding Namibia's drinking water standards. So far, the contamination has not yet penetrated into the areas in which the drinking water for the population is received, as also shown by analyses by the University of Bern of drinking water samples from Tsumeb. The SLR simulations indicate that the groundwater's heavy metal contamination will slowly spread northwards into agricultural areas. At the time, the experts recommended a large-scale remediation operation of the existing landfills. To this day, no such plans for Tsumeb have been announced.

The scale of environmental remediation required in Tsumeb to be in accordance with international standards can be compared to current efforts in Yellowknife, the capital of Canada's Northwest Territories. There, US$4.4 billion will be invested to safely store arsenic waste from the Giant Mine. For years, 237 000 tonnes of arsenic oxide were stored in 15 sealed chambers 76 metres below the earth's surface. To prevent leaching and contamination of the groundwater and to secure the landfill in the long term, the chambers are now being permanently frozen – an exceptionally complex undertaking expected to last until 2038. Canadian taxpayers are footing the bill after the responsible company, Royal Oak Mines Inc., declared bankruptcy in 1999.

For Tsumeb, however, there are no such plans. Although Dundee Sustainable Technologies, a subsidiary of DPM, on its website heaps praise on a "cost-effective" and "environmentally friendly" technology for the storage of

arsenic trioxide through vitrification, this option has not been implemented. Vitrification involves turning arsenic trioxide into a glass-like substance to prevent leaching. DPM claims to have conducted a pilot project in Tsumeb. During a visit to the smelter in early August, CEO Zebra Kasete showed a small piece of glass that is supposed to contain arsenic trioxide. However, he could not provide cost estimates for vitrifying the 300 000 tonnes of arsenic trioxide stored on-site, nor did there seem to be any concrete plans for its implementation. DPM does not have to worry about that anymore. The Chinese buyer Sinomine Resource Group took over the smelter in September with all responsibilities and liabilities. Was that the reason for the low selling price of $20 million?

Even during our tour of the smelter area at the beginning of August, there was no indication that the hazardous waste disposal site in Tsumeb would soon be closed. A landfill section that had already reached its maximum capacity had been covered with plastic sheeting; another was open and continues to be filled, with a group of men, dressed in white full-body suits and gas masks on their faces, shovelling white-grey powder onto a pile; a third site is already being prepared. This powder is probably arsenic trioxide residues from the basin, which was formerly used to collect contaminated water. Kasete confirms plans to enlarge the landfill, and says: "We assume that we still have capacity for another two to three years."

At the end of the tour through the dusty smelter area full of industrial waste, Kasete shows a small recycling station where plastic, paper and glass from the smelter offices are separated. Two employees, their faces also hidden behind gas masks, sort boxes with little enthusiasm. "This is our small contribution to saving the world. Everyone has to make a contribution," says the CEO. He proudly says that an employee of the Ministry of the Environment and Tourism inaugurated the station and praised the project as a model for the whole of Namibia. With regard to the renaturation of the area widely communicated by DPM, Kasete refers to a phyto-remediation project. DPM claims to have planted 15 000 tamarisk trees around the smelter, a resilient species that can also cope with dry and saline soils. They are known for extracting heavy metals from the ground and storing them in the wood. Once they are large enough, they should be burned in the smelter's furnace. "We want to leave a positive legacy and leave the place cleaner than we found it," says Kasete. Dioni Davindschima, who is responsible for the project at DPM, shows us the tamarisks. They are only chest-high, and grow in a pitch-black, sandy soil that should actually

be reddish. They look stunted and weak. We ask Davindschima if all the originally planted trees had survived. "No, about 40 percent have died," she says. "Probably because of the soil."

Assessment of the Coalition for Corporate Responsibility

If DPM were based in a European Union country, it could not simply leave Namibia without taking responsibility for the affected workers and residents, and the waste they have left behind. The new Corporate Sustainability Due Diligence Directive, adopted by the European Union in mid-2024, obliges corporations to comply with human rights and environmental regulations in their business operations. If a group violates these rules, it will be held liable for the damage caused. Switzerland, however, is not a member of the European Union, and still has no corporate responsibility law, and IXM, based in Geneva, therefore does not have to fear any consequences for the environmental pollution in Tsumeb, although the group profited from it for years. Also in Canada, there is still no comprehensive corporate responsibility law, but a legislative proposal that would address the issue is pending in parliament. Due to a different legal system in Canada, there have also been several legal proceedings against corporations in the past which were terminated by settlements being agreed upon.

Whether IXM will ever have to care about human rights and environmental requirements remains uncertain. Switzerland will soon be the only country in Europe without legally enforceable corporate responsibility. The Tsumeb case thus shows once again why a comprehensive corporate responsibility law is also needed in Switzerland to oblige corporations like IXM to comply with human rights and environmental standards, and to make it possible to hold them responsible for the damage caused in the event of violations.

Mining and Community Struggles for Economic Justice: A Case Study of Uis

Herbert Jauch & Lucy Edwards-Jauch

Introduction

This case study focuses on tin and lithium mining around Uis in Namibia's Erongo Region. It illustrates the struggles of many marginalised communities to hold big mining corporations and government departments accountable. The community contends that certain mining activities are illegal because permissions were granted without the prescribed procedures being followed. In many cases, mining destroys the environment and cause losses in income and livelihoods, as well as displacement, without any tangible benefits accruing to the affected communities. The extraction of these minerals follows the same colonial extractivist patterns of environmental destruction, economic dislocation, cultural erasure and negative health impacts. The promised benefits to the community do not materialise, and no-one is able to hold the transgressors accountable. This case study exposes corporate impunity for various human rights and social justice

Mining left the community in Uis in poverty. Houses cracked and the roofs had to be re-einforced with wire. Source: Author

violations. The case study also focuses on community efforts to assert and defend their internationally recognised right to free, prior and informed consent and for the simple application and enforcement of Namibian laws.

Background

Mining remains one of the most untransformed sectors of the Namibian economy, for it is still premised on the colonial model of the extraction and export of minerals. Almost 90% of Namibian mines are foreign-owned (Republic of Namibia, 2021). There is a new scramble for Africa's mineral wealth as part of the global competition for control over critical strategic minerals for industrial, military and renewable energy applications (Republic of Namibia, 2023).

Namibia has historical stockpiles of lithium that can be extracted from tin and tantalum that have been mined in the past. Tin pegmatites are concentrated in three northeast-trending belts around Uis. The brownfield open-cast tin mine in Uis operated between 1924 and 1990, but was closed due to low commodity prices. Since then, companies have resumed tin mining operations, and have also started reclaiming lithium minerals from stockpiled tailings (Republic of Namibia, 2023).

Challenges

A Chinese mining company, Tangshan Xinfeng Mining Co., has been mining lithium since 2022. Uis community members are convinced that it is doing so illegally. According to the community's research, Xinfeng only has licenses to mine semi-precious stones and not the lithium or the rare earth elements that they are currently mining (Rengura, 2023). Xinfeng has 10 mining claims for semi-precious stones. This places them in direct competition with community-based small-scale artisanal miners, who have mining claims in the area and have been mining there for decades. In some cases, the claims were issued for areas in which community members already hold valid artisanal mining licenses. It is also alleged that the company has been granted permission to mine on mining claims that belong to other companies. This is against the law.

Long Fire Investment (Pty) Ltd, a partner of Xinfeng Investments, is formally owned by an individual Namibian citizen. Long Fire was registered on 24 June 2022 and received an environmental clearance certificate (ECC) to mine lithium on 16 September 2022. The ECC is valid for three years. According to the community's research, Long Fire has 10 mining claims, only for semi-precious stones. Long Fire's ECC was granted for the Okombahe Reserve and not for

Uis. The ECC does not align with the mining claims issued in the company's name and the place where the mining is supposed to occur. The community contends that the company is allowed to mine without the requisite mining plan or blasting ticket. Despite community allegations of malfeasance, the Minister of Mines and Energy defended Long Fire's mining and insisted that the relevant licenses had been awarded procedurally and in compliance with Namibia's Minerals (Prospecting and Mining) Act (33 of 1992) ("'Alweendo 'satisfied'", 2023).

Information, Consultations and Consent?

Local communities were not informed about the mining activities prior to their commencement. They only noticed a large number of trucks transporting rocks from the area. They also claim that no consultations or environmental impact assessments were conducted prior to the commencement of Xinfeng's mining operations. They suspect that there has been collusion between Xinfeng and officials of relevant ministries and the Dâure Daman Traditional Authority (TA).

The local Tsiseb Conservancy has some management authority over the local land but was also not consulted or informed about Xinfeng's lithium mining license, despite the fact that the granting of an ECC requires the consent of the conservancy. Likewise, the Communal Land Board was not involved in the granting of the license. The license was approved with the consent of the TA, the Ministry of Mines and Energy (MME) and the Ministry of Environment, Forestry and Tourism, bypassing community structures.

The community has challenged the Minister of Mines and Energy to present Xinfeng and Long Fire's exclusive prospecting licences for inspection. They also want to see their ECCs, export permits, stakeholder consultation reports and letters of consent from the conservancy and the TA. They further want to know whether the 75 000 tons of lithium which the Minister of Mines and Energy allowed Xinfeng to export have been tested and, if so, they want to scrutinise the report that contains test results. They suspect that minerals other than lithium are also being extracted without being declared.

Destruction of Livelihoods

Displacement of small miners

The majority of the black inhabitants of the area were already dispossessed of their ancestral lands during the colonial occupation and genocide. They find it entirely unacceptable that indigenous small-scale miners are chased out of

the areas that they traditionally mined to the benefit of foreign transnational mining companies. The small-scale miners traditionally engaged in non-mechanised artisanal mining for small amounts of tin, lithium and semi-precious stones. Their survivalist enterprises do not receive the same degree of government support as those of the transnational corporations. The new holders of exclusive prospecting licenses are people from outside the area. The indigenous small-scale miners now have to seek permission to mine from outsiders, who sometimes acquired mining rights under dubious circumstances in areas where small-scale miners traditionally operated. This has dire consequences for their livelihoods. Community members who are small-scale famers lost most of their livestock during successive and protracted droughts. Small-scale mining provided an alternative source of income. Neither the company nor the MME informed the community of these impacts before the onset of these mining operations.

Loss of grazing and community tourism

The mining companies have fenced off grazing areas, depriving local farmers of access to grazing for their livestock. No compensation or benefits have been offered to local communities. Some farms do not have water, while the mines are supplied with water for their operations. The community believe that agriculture is more sustainable than mining, and they want their livelihoods to be protected.

Environmental damage caused by mining has led to income losses in the community tourism sector. Xinfeng mines lithium in a sensitive wildlife breeding area. Since the mining operations started, various species of wildlife, including rhinoceros, zebra, springbok, lion and cheetah, have disappeared. In addition to tourism, trophy hunting was an important source of income for Tsiseb Conservancy. The Chinese nationals employed at the mining company claim that the chiefs granted them permission to hunt the wildlife.

Access to water

The mining operations require large quantities of water, which exacerbates water scarcity in the area. The community is dismayed that mining companies use water from the pipes meant as drinking water for the community without prior consultation or consent. These problems were reported to the TA, but nothing was done. Water tariffs have since gone up and have become unaffordable for many. The council then cut the water supply to households that were unable to pay.

Health and environmental damage

Lithium mining may cause lung cancer, but no information was provided to the community about the potential risks. The blasting operations at mines (especially the tin mines) have caused cracks in several of the houses, but the community does not receive compensation for the damage blasting causes to their homes. They have to use whatever materials they can to prevent their roofs from being blown off during blasting. The dust created by blasting sometimes covers the entire area, and some people have developed lung problems. Workers complained that the mine does not follow dust protocols, putting their health at risk. When they leave work, the mine workers are completely covered in dust. They experience tough working conditions and receive salaries of only about NAD 4 000 per month.

Companies responsible for past mining operations have not rehabilitated the areas they mined. They have left behind large unfenced craters which have caused the death of children and animals that have fallen into the pits.

Community Benefits?

The Uis Tin Mine only provided a school garden at a local primary school. In addition, food parcels are sometimes provided by wealthy local individuals who were awarded tenders by the mining companies. The mining company refused to take any responsibility and did not provide any services or infrastructure for the increased population that resulted from mining. The community does not want charity, but rather expects to benefit from their own local resources. However, benefits like roads, hostels and schools that were promised by companies that previously mined in the area never materialised.

Employment at the mines bypassed the locals with the justification that the higher levels of education and skills required were not available locally. The community requested local jobs for local people, and following protests, a training facility was established where some local people were employed. There are, however, reports of discrimination. Community members see that Namibian workers employed at Long Fire Investment and Xinfeng Investments are subjected to inhuman working conditions compared to the comfortable conditions their Chinese counterparts enjoy ("Xinfeng workers live in apartheid conditions", 2023).

The high levels of poverty combined with an influx of predominately male labour into the area create other social problems, like transactional sex. The community has also seen increased levels of teenage pregnancy.

Governance Failures, Bribery and Suspected Corruption

The local community believes that there is a syndicate at the MME that colludes with foreign mining investors and solicits bribes in return for exploration and mining licenses. It is believed that these officials may have access to geological data, and trade that information.

There is insufficient oversight, monitoring and enforcement of the law by the relevant government ministries. There may also be gross incompetence and/or collusion with mining companies. The community finds it difficult otherwise to understand why Namibian laws are not respected. Article 31 of the Environmental Management Act (7 of 2007) explicitly states that a person may not take on mining activities without an ECC. Despite this provision, companies without ECCs are allowed to go ahead with mining. In terms of article 44 of the same Act, the Minister or Environmental Commissioner may consult interested and affected persons. Because of the discretionary way in which the law is phrased, companies and the traditional authorities by-pass communities that are most adversely affected by the mining operations. The Minerals (Prospecting and Mining) Act (33 of 1992) prohibits a person from carrying out prospecting and mining activities in, on or under land unless they have the relevant prospecting license, a mining claim, or a mineral license. It also prohibits the transfer of mining claims and licenses to any other persons. The community alleges that this is happening in Uis in contravention of the Act. They further allege that mining companies bribe the TA to get letters of support, and that the TA therefore fails in its duty to protect the interests of the community.

Community Demands and Actions

Community action has increased over the past years. The community have held various meetings on the impact of mining in their area and appointed a committee to conduct research and site visits, and to send a letter to the Dâure Daman TA to urge them to stop illegal mining in the area.

On 20 February 2023, the community sent a letter to the Minister of Urban and Rural Development in which they expressed their lack of confidence in their traditional leader, Chief Seibeb. The letter was acknowledged by the Minister, who promised to give a substantial reply once his office received feedback from the Dâure Daman TA. A report from the Ministry was initially expected in September 2023, but instead the Ministry requested the community to present their petition against Chief Seibeb in line with the legal requirements and

to forward it to the regional governor first. This was done in October 2024 (J. Areseb, personal communication, 7 November 2024).

On 3 March 2023, another petition was sent to the Minister of Mines and Energy and the Minister of Environment, Forestry and Tourism, as well as the Dâures Constituency Councillor in which the demands of the youth, farmers, small-scale miners and the community of Uis were set out. The petition called for the immediate cessation of illegal mining. The petition was handed over during a community demonstration that was part of the community protest campaign. The petition expressed the community's disappointment that Xinfeng was allowed to mine despite violating various provisions of the Environmental Management Act (No 7 of 2007). It listed various transgressions by the company, including operating without a valid ECC and without consultations with interested and affected parties; illegal hunting of wildlife; the dubious acquisition of an exclusive prospecting license; and the role of the TA in making decisions regarding environmental management. The petition also took issue with the conduct of government officials for their lack of application and enforcement of laws. The community demanded compensation for their loss of income as a result of Xinfeng's mining operations

In April 2023 the community requested the Anti-Corruption Commission to investigate the traditional authority and to conduct lifestyle audits on its individual members. No feedback was received from the Commission, and the community will follow up (J. Areseb, personal communication, 7 November 2024).

The community is concerned about the lack of transparency and wants the right to peruse the ECC and the export permits, as well as consent letters from the conservancy and the TA. In their discussions with the Minister of Mines and Energy on 12 April 2023, the Minister dismissed their concerns. In a subsequent letter, the Minister stated that "we are satisfied that the Long Fire mining claims were awarded and registered procedurally and in compliance with the Act" (Alweendo, 2023). The requested documents were, however, not made public to confirm the veracity of the Minister's claims.

In May 2023, the Parliamentary Standing Committee visited the Dâures Constituency and held meetings with the community, but no report or feedback has been provided to date.

Results

The community feels abandoned by the government structures and agencies which are supposed to protect

them. Thus far, the community has not received any reports from the agencies they have appealed to, and no one has been held accountable. The community argues that the Ministry of Mines and Energy defended the company instead of enforcing compliance with Namibian laws. Until late 2024, they had not received feedback on their request to review the relevant mining licenses. Their request for investigation by the Anti-Corruption Commission was ignored for months, before in December 2024, the Commission finally confirmed that a case of bribery against Xinfeng was "under active investigation". Several high-ranking government officials, as well as the former Technical Advisor to the Minister of Mines and Energy, are implicated (Matthys 2024).

The community's request to have the traditional chief replaced has not yet been granted. The Ministry of Environment, Forestry and Tourism has not responded to their request to peruse the ECC and related documentation. The Parliamentary Standing Committee that investigated the matters reported by the community has not shared its report with the community, and the investigation has therefore not led to any changes in the status quo. The only benefit the community has received so far through their collective actions is the establishment of a training centre and the employment of a few community members.

In November 2024, the community's struggles finally received some attention. The mining commissioner paid an unannounced visit to the Xinfeng mining site on 16 November and caught the company ferrying stockpiles of ore. It is suspected that thousands of tonnes of illegally mined lithium ore have been shipped out of the country. Former employees estimated that 15 000 metric tonnes were illegally mined and exported from the Ringman area. When the operations were finally shut down, the retrenched workers did not receive the final payments due on their contracts, any severance packages, or exit medical check-ups (de Klerk 2024a).

In December 2024, following ongoing pressure from community activists such as Jimmy //Areseb and reports in the local media, the Ministry of Mines and Energy finally launched an investigation and a criminal case against Xinfeng for conducting illegal mining activities. Despite being told to stop all operations on 16 November, the company continued ferrying ore from the mine and only ceased operations on 10 December 2024, confirming the community's concerns about the government's ability to effectively enforce mining regulations (de Klerk 2024b). Instead, //Areseb and other

community members were arrested for allegedly violating public order laws during a protest at the traditional authority's offices (Angula 2025).

This case study illustrates that the relevant government structures are unresponsive to the community's concerns and treat the destruction of their natural environment and livelihoods without any sense of urgency. It also speaks volumes about the failures of Namibia's systems of accountability that were set up to safeguard public interests and to ensure accountability.

References

"Alweendo 'satisfied' with Daures Lithium Miner". (2023, May 2). *New Era Live*. https://neweralive.na/alweendo-satisfied-with-daures-lithium-miner/#:~:text=Alweendo%20%E2%80%98satisfied%E2%80%99%20with%20Daures%20lithium%20miner

Angula, V. (2025, January 7) Arrest of activist spotlights alleged illegal lithium mining in central Namibia. *Voice of America*,. https://www.voanews.com/a/arrest-of-activist-throws-spotlight-on-alleged-illegal-lithium-mining-in-central-namibia/7927638.html

De Klerk, E. (2024a, December 4). Xinfeng caught pants down…forced to shut operations. *New Era Live*. https://neweralive.na/xinfeng-caught-pants-down-forced-to-shut-operations/

De Klerk, E. (2024b, December 19). Probe into Xingeng's 'illegal' mining begins …company told to cease operations. *New Era Live*. https://neweralive.na/probe-into-xinfengs-illegal-mining-begins-company-told-to-cease-operations/

Matthys, D. (2024, December 16). Prosecutor general sends N$50-million bribery case involving Xinfeng Investments back for further investigation. *The Namibian*. https://www.namibian.com.na/prosecutor-general-sends-n50-million-bribery-case-involving-xinfeng-investments-back-for-further-investigation/

"Xinfeng workers live in apartheid conditions". (2023, May 22). *New Era Live.* https://neweralive.na/xinfeng-workers-live-in-apartheid-conditions/

Rengura, R. (2023). *Uis community alleges that Xinfeng and others mines, contravenes their mining license*. NBC. https://nbcnews.na/node/100378

Republic of Namibia. (2021). *The impact of mining sector on the Namibian economy. "Assessing socio-economic and environmental effects"*. National Planning Commission. https://www.npc.gov.na/wp-content/uploads/2022/02/The-Impact-of-Mining-sector-to-the-Namibia-economy-FINAL.pdf

Republic of Namibia. (2023). Overview of Critical Mineral deposits in Namibia.