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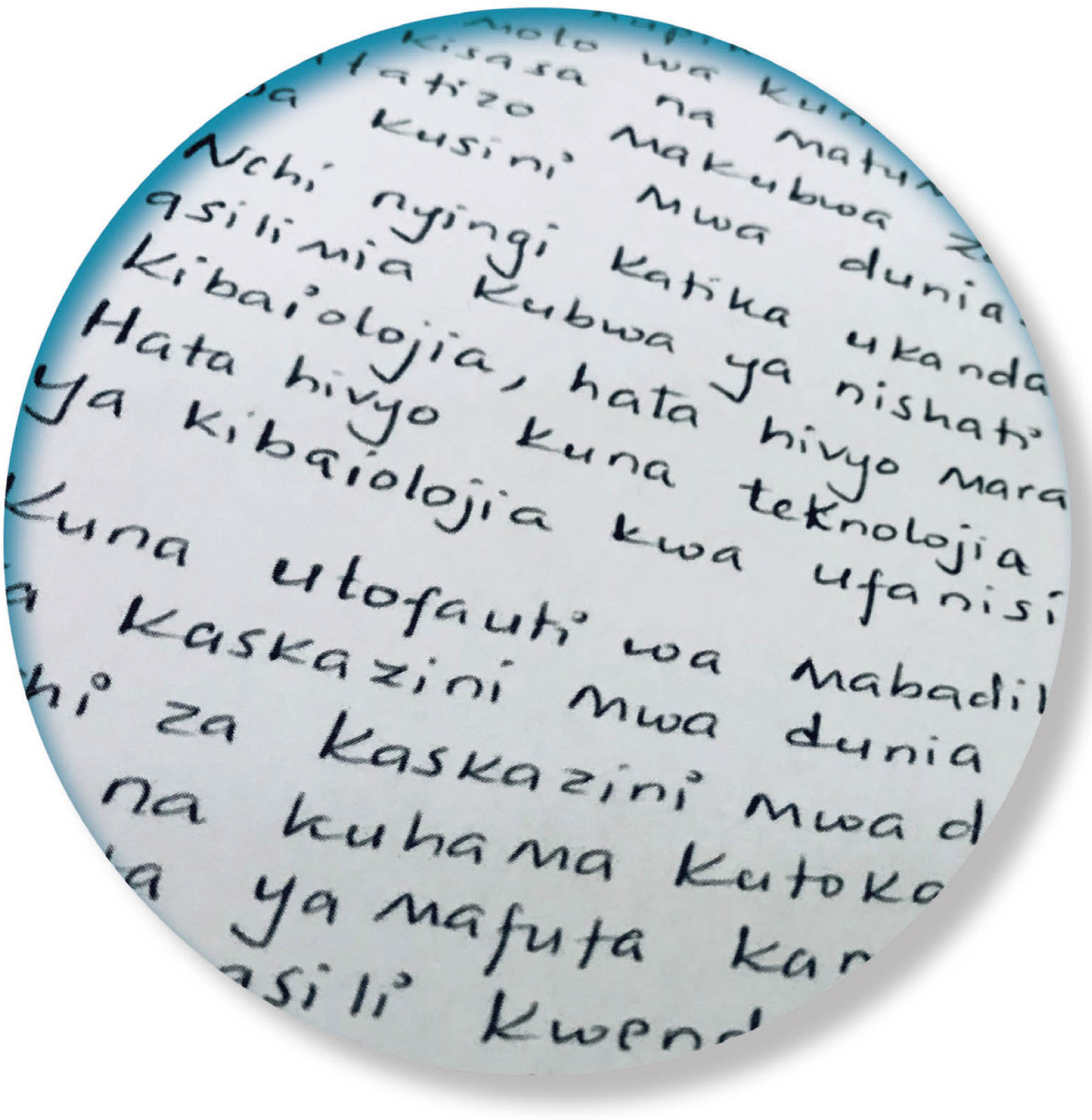
Andreas J. Obrecht (Ed.)

Knowledge and Development V

Energy Transition and the Global South: Contributions to the Austrian Development Research Award 2023



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Energy Transition and the Global South: Contributions to the Austrian Development Research Award 2023

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Editorial notes: The volumes of *Knowledge and Development* I to IV were published in German and English, as both languages are authorized for submission for the Austrian Development Research Award. As the texts selected for this book were all submitted in English, volume V is published entirely in English, contrary to previous practice.

Like the four previous volumes, this book publishes the best texts from the Young Talent Austrian Development Research Award. In 2023 the theme of the award was "Energy Transition and the Global South." The cover shows the Swahili translation of the call for submissions – translated by Leah Mwaisango, to whom we wish to express our sincere thanks.

Swahili is the most widespread lingua franca in sub-Saharan Africa; it is the national language of Kenya and Tanzania, but is also spoken in Rwanda, Burundi, the Democratic Republic of Congo, and large parts of the East African country of Uganda, which is the setting of two articles in this book. The number of Swahili speakers is estimated at up to 100 million.

The excerpt from the call for submissions translated into Swahili reads:

Thirteen percent of the population worldwide (940 million people) have no access to electricity. And 40% or three billion people worldwide cook with the simplest technologies such as open fires. Lack of access to modern energy services and inefficient use of energy are the biggest energy problems in the Global South.

Accordingly, the average per capita consumption of energy varies worldwide between poor and rich countries by a factor of 10, and even by a factor of 100 in the case of electricity consumption. A person from the USA not only consumes twice as much energy on average as a person from the EU but also 10 times as much as an average person from India.

Many countries in the Global South actually have high percentages of renewable energy in their respective energy balances, especially bioenergy. However, this is often not used in a sustainable way – e.g., open fires with high emissions and low efficiency. However, there are technologies that could use bioenergy much more efficiently.

"Energy transition" in the Global South differs fundamentally from that in industrialized countries. The discourse on "energy transition" in the Global North primarily refers to a shift away from burning fossil fuels such as coal, oil, and natural gas towards renewable energy such as solar, hydropower, geothermal, wind, and modern bioenergy. In the Global South, however, it is often less about a shift from fossil fuels to renewable energy sources but rather about the development of energy supply structures in the first place.

Social, cultural, political, economic, ecological, and technological aspects of the broad theme of "Energy Transition and the Global South" will be presented in the junior researchers' texts in a theoretical way and/or on the basis of specific studies and examples, and also analyzed with regard to options for action.

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I Introduction

Andreas J. Obrecht

Development Research as a Peace Project

At the beginning of May 2024, I am in the Algerian city of Oran, or rather in an austere suburb called Ain El Turk. From the balcony of my slightly shabby apartment right on the beach, I have a magnificent view of the calm Mediterranean Sea in the morning. The whitecaps of the waves lap leisurely at the golden yellow beach; far out, there is a container ship on its way towards the Strait of Gibraltar. As enchanting as the sight of the sea swaying in the early summer sun may be, there is hardly any romantic elation. The apparent idyll cannot be separated in my mind from the thousands of people who drowned in this sea on their journey to the coasts of Europe – a sea of death and the dead.

In the north, there is the promise of Europe to which people set off again and again – fleeing persecution, poverty, and the consequences of climate change, and in search of a better economic life that can also support those who are staying at home. In the south, there are mountains and salt lakes, rocks and screes that end up in the vast Saharan sand desert. Following the secession of South Sudan from North Sudan, Algeria is the largest country on the African continent in terms of area. Many of the people who are sent on the risky journey from the Maghreb coast to the European mainland by unscrupulous traffickers previously crossed the vast desert – with enormous exertions and the use of great resources. The narrative of Europe – the continent of milk and honey – has, shockingly, lost none of its appeal to date. The more difficult the situation in the migrants' countries of origin, the more they cling to this narrative – despite all the deaths in the sea.

From the port city of Oran, I travel to Saida on the next day – a city in the interior of the country, which is reached after a two-hour drive. The University of Saida is one of the new members of the Austrian-African university network Africa-UniNet,[1] which has invited me as well as representatives of sub-Saharan universities that are active in the network to an international meeting lasting several days. Africa-UniNet, financed by the Austrian Federal Ministry of Education, Science and Research (BMBWF), is a great initiative that was launched around five years ago by the then minister of science, Univ.-Prof. Dr. Heinz Faßmann. Seventy-two higher education institutions now take part in the network, 26 from Austria and 46 from a total of 19 African countries. The network sees itself as a communication platform for transnational research between Austrian higher education institutions and universities and scientific institutions on the African continent, and as a

1 www.africa-uninet.at

funding instrument for excellent research on the thematic guidelines of the United Nations Sustainable Development Goals (SDGs).

Up to six higher education institutions can take part in the current 80 or so research projects: at least one of them must be from Austria. The activities also promote cooperation between African universities in particular and thus contribute to a lively scientific exchange across many borders – the "North-South-South cooperations" go beyond national, linguistic, social, and cultural borders, are implemented in different jurisdictions, and orient their scientific questions and problem-solving approaches towards the necessities of a common sustainable future that relies more on cooperation than on competition. This not only brings the Austrian scientific landscape closer to that of our neighboring continent, but the continent's scientific areas – which are often still separated from each other due to the borders drawn by colonialism – also communicate with each other and work together more closely. This is also shown by the regional distribution of African member institutions from the following countries: Algeria, Burkina Faso, Burundi, DR Congo, Egypt, Ethiopia, Gabon, Ghana, Kenya, Lesotho, Morocco, Mozambique, Namibia, Nigeria, São Tomé and Príncipe, South Africa, Tanzania, Uganda. The broad regional distribution also accounts for the great diversity of topics and research approaches. More than 100 scientific disciplines have been represented in the project work to date.

Research in diverse knowledge areas works when those involved, regardless of discipline, are willing to learn from each other, to reject hegemonic knowledge, and to practice epistemological and cultural openness as the basis for joint scientific thinking and action. It is a great challenge and opportunity not just to demand respect, mutual understanding, and trust, but also to establish them in concrete scientific relationships. Every emphatic understanding of other worlds of knowledge and lifeworlds enlarges the space in which peaceful cooperation can take place, not only in science but in all sectors: cultural, social, economic, and sociopolitical.

"Science and Research for Development" was established at the OeAD in 2009 – with the takeover of the "Commission for Development Research" (KEF), which until then had been established at the Austrian Academy of Sciences (ÖAW), and the acquisition of the "Austrian Partnership Program in Higher Education and Research for Development" (APPEAR)[2] in a Europe-wide call for proposals. Prior to this, the OeAD had gained decades of experience in implementing various scholarship programs supporting students from developing countries. Austrian universities have always had scientific cooperations with institutional partners in countries of the Global South, although these were mostly based on the personal commitment of individual researchers. KEF and APPEAR were the first systematic funding channels for development research projects that are committed to a common basic understanding.

Development research is not understood as a discipline, but as an interdisciplinary and in some cases transdisciplinary field of research that draws on a wide

2 APPEAR is the higher education cooperation program of the Austrian Development Cooperation (ADC). It is financed by the ADC and implemented by the OeAD. www.appear.at

variety of academic subjects but has an overarching normative goal – improving the living conditions of people in poor countries and marginalized regions. The SDGs proclaimed by the international community in 2015 have also given this understanding a boost. Solution-oriented research must focus on promoting a prosperous future for all people – especially also in economically difficult regions – and contribute to the gradual implementation of the SDGs. Moreover, two central analytical orientations have emerged in the debate on this relatively young interdisciplinary field of research, both of which are of central importance for understanding global and local problems and their possible solutions – research *for* development and research *on* development. Both approaches complement each other in the analysis and are also reflected in this publication.

One of the prerequisites for the establishment of Africa-UniNet is the aforementioned APPEAR program, which promotes development research in the ADC's priority countries[3] at the following three levels: research, teaching, and management of higher education institutions. An important overarching goal is institutional capacity development and a contribution to poverty reduction in the respective countries. The projects in this program are also based on cooperation between at least one Austrian higher education institution and universities or scientific institutions in the partner countries. Forty-five multi-year higher education cooperation projects have been successfully completed to date. Twenty-two projects are currently implemented. Moreover, more than 180 scholarship holders successfully completed their academic education at Austrian universities with a master's or PhD degree in the APPEAR program, which has been running since 2010 – most of them within the framework of the project activities. Although only four partner countries in sub-Saharan Africa are currently taking part in APPEAR, the African APPEAR alumni played a significant part in the development of the Austrian-African university network Africa-UniNet and also in the preparation of scientific cooperations. Alumni are ambassadors of an Austrian research and academic tradition that is open-minded and sensitive to specific cultural contexts, who contribute expertise and are not afraid to embrace new experiences and creative, innovative methodological and analytical approaches.

It is not only the situation of ongoing migration across the Mediterranean that has worsened massively in the last few years but also the political, economic, and social conditions in many countries for which development research is particularly relevant. Following the Russian invasion of the Crimean Peninsula, the war in Syria, the isolationist US foreign policy under the Trump administration, Brexit, etc., the COVID-19 pandemic, which began in 2020, also plunged the high-tech world into unprecedented apathy for almost two years. The political, social and economic consequences of global lockdowns were enormous and still have an impact today. The pandemic had finally been overcome to some extent – but in February 2022 the world was once again holding its breath: many people, including those with geopolitical knowledge, had considered Russia's attack on Ukraine,

3 Albania, Armenia, Ethiopia, Bhutan, Burkina Faso, Georgia, Moldova, Mozambique, Palestinian territories, Uganda

which violated international law, to be impossible until the very end, so the horror at this breach of taboo in the middle of Europe was all the greater. It was a conventional war of aggression waged with utmost severity, aimed at the territorial conquest of a neighboring country, the legitimacy of which was recognized by the aggressor thirty years ago as binding under international law. The Russian invasion of Ukraine has subsequently exacerbated the geopolitical and economic situation worldwide. Besides food shortages, interrupted supply chains, and costly armaments worldwide, there was a steady rise in inflation not only in the OECD countries, but also in "poor" countries in particular – especially due to the increase in energy costs, which were partly due to a reduction in Russian oil and gas supplies.

The tendency to use violence and military intervention as a means of enforcing political interests has increased in many countries and regions of the world in the last few years. In the wake of the Russian war of aggression, for example, international legal frameworks, international law and humanitarian conventions have been increasingly violated, or at least disregarded, by political actors to violently enforce unilateral interests. We encounter examples of "brutalization" in many different contexts, including in those countries in which our institutional partners carry out development research projects. The past year[4] was characterized by major challenges in this regard, which can be briefly outlined by the political developments: In 2023, the repeatedly announced summer offensive by the Ukrainian armed forces began too late, namely at a time when the Russian defense lines of the occupied Ukrainian territories had already been massively expanded. The offensive, which cost a great number of lives on both sides, only led to marginal recaptures of territory – often just a few kilometers. Commentators spoke of a positional war – just like it often was the case in the First World War. In early fall, the offensive came to a complete standstill, and with it the hope of a turning point in the war died. What is more, the lack of success of the Ukrainian offensive increasingly called into question Western involvement (especially military aid) – a political reaction that was exacerbated by the rise of right-wing movements in Europe and the preelection campaign in the USA. The first half of 2024 was characterized by new arms supplies but also a long delay in the release of US military aid. By the time this book went to press, the military situation in Ukraine had deteriorated further and discussions about intensifying military aid were continuing. Meanwhile, strategic targets in Russia itself are attacked with "Western weapons," which could lead to further escalation. This situation inevitably leads to constant uncertainty in the post-Soviet APPEAR countries of Moldova and Georgia, which contain Russian-controlled territories that could play a central strategic part in any further attempt by the Russian Federation to "reconquer" post-Soviet territories.

In the post-Soviet APPEAR country of Armenia, the government of the self-proclaimed Republic of Artsakh in Nagorno-Karabakh was forced to surrender in a lightning operation by the Azerbaijani armed forces in September 2023. This resulted in the flight and expulsion – which Azerbaijan denies – of more than 100,000 Armenians. The reconquest of the South Caucasus region of

4 The editorial deadline for this book was July 1, 2024.

Nagorno-Karabakh by Azerbaijan led to a wave of internal refugees that was difficult for the poor country of Armenia to cope with, but also fundamentally called into question Russia's role as Armenia's "protecting power." Russia has moved strategically closer to Azerbaijan as a result of the war in Ukraine. The APPEAR Armenia projects are – according to reports – not affected by these latest developments, although uncertainty and mistrust towards the aggressive neighbor characterize the basic political mood.

At least 1,140 people were murdered in the Hamas terrorist attack on Israel on 7 October 2023. Military posts near the border were overwhelmed, horrific massacres were carried out in settlements, small towns, and at a music festival in southern Israel, and more than 200 hostages were taken and abducted to Gaza. The Israeli army then bombed and invaded Gaza with the declared aim of destroying Hamas militarily, of destroying the terrorist organization's military infrastructure and extensive tunnel system, and freeing the Israeli hostages. At the time of going to press, the Gaza war was still raging, with enormous losses among the Palestinian civilian population – so far more than 37,000[5] people have lost their lives. The APPEAR project in Gaza had to be suspended after the bombing of our institutional partner, the Islamic University, in the second week of the war. Despite voices of concern, especially from the United Nations and the US administration, that the scale of Israel's military response is inappropriate and that there is far too little humanitarian aid available for the suffering civilian population in Gaza, and despite clear condemnations by the International Criminal Court, the campaign continues. At the time this book went to press, neither a ceasefire nor a medium-term peace plan was in sight and the majority of hostages – if still alive at all – were still in the hands of Hamas.

In Ethiopia, too, there were new acts of war in the last year that had nothing directly to do with the largely settled conflict in Tigray. The region affected was Amhara, where Bahir Dar University is located – a long-standing institutional partner of Austrian development research. Fighting groups from different ethnic groups rebelled against the government of the province, which they reject as a puppet government appointed by the central government in Addis Ababa. In the hot phase of the conflict, more than 100 fighters and civilians were killed every day. Bahir Dar University was closed and mobility was generally extremely restricted. The conflict has now lost some of its intensity and it is to be hoped that this development will continue.

In West Africa and the Sahel, the security situation has also tended to deteriorate. The forced withdrawal of French troops from Niger has boosted the narrative that a "local dictator" is in any case better than a "neo-colonial or post-colonial puppet government." The entire region also suffers from the destabilizing influence of Islamist groups such as Boko Haram. In a number of West African countries, such as Mali, Russian mercenary troops are taking advantage of the power vacuum.

5 https://www.ochaopt.org/ (July 1, 2024) OCHA – United Nations Office for the Coordination of Humanitarian Affairs

In Burkina Faso, where both APPEAR and Africa UniNet projects are carried out, the situation is considered insecure, especially in the north of the country.

Not only the new wars and violent conflicts but also their socioeconomic consequences destabilize regions and countries in which Austrian scientists conduct development research together with local institutional partners. These are sometimes difficult, sometimes even dangerous research situations. As a funding institution, we closely monitor and analyze the political situation in the countries, have a close exchange of information with colleagues on-site and coordinate with the project managers in each case. Applied development research has always been a very challenging, transdisciplinary field of science, and has become even more so in the uncertain and often violent present.

Violent conflicts always exacerbate poverty. Global achievements in reducing absolute poverty have already been partially undone by the COVID-19 pandemic and conflicts have exacerbated this trend in the last two years. High inflation and a significant rise in food prices are direct and indirect consequences of war in many countries. It seems as if the world has entered a revisionist era in which violence is once again legitimate to enforce political and territorial interests.[6] The Russian Federation's war of aggression on Ukrainian territory in the middle of Europe, which violates international law and is imperialist and conventionally waged, represents a breach of taboo in this respect. Besides economic and political upheaval, it has led to a massive, new arms race worldwide, tying up important resources for sectors that promote and sustain life. Against this backdrop, development research – i.e., the creative search for joint solutions for the gradual implementation of the SDGs – once again presents itself as a peace project. Scientific cooperation in the sense of sustainable development research is more important than ever.

So, while global armament has begun again and Europe is filling its armories – to support Ukraine but also to show its willingness to defend itself – the security policy debate is essentially reduced to military and strategic considerations. However, it is vital to remember that security and peace are not only achieved through military deterrence but above all through cooperation and collaboration – wherever this is institutionally possible. This applies also to transnational institutions and transnational science. The European programs promote openness to the world – from Erasmus experiences abroad for young people, and cooperation in teaching and research, to major transnational science initiatives to, for example, combat climate change. Conflicts can only be resolved by means of cooperation. The geopolitical situation will only ease if more space is given to unprejudiced communication and an appreciative interest. This starts on a small scale – thinking together, experimenting, observing, recognizing, sharing what we have recognized

6 The "United Kingdom Peace Index" of the think tank "Institute for Economics & Peace," which was published in mid-June 2024, shows that violent conflicts are taking place in 92 countries—more than at any time since the Second World War. Austria is in 3rd place on the peace scale—out of a total of 163 countries. The situation has deteriorated in 79 countries in 2023—more than in any other year since the index was introduced in 2008. One direct consequence of this is that 108 countries have increased their military spending https://www.economicsandpeace.org/global-peace-index (28 June 2024).

and putting it into practice so that people's living conditions improve, so that the stressed planet can recover, and an unlimited future becomes possible. This is what the peace project of development research is all about, which is incompatible with ethnocentrism, nationalism, and hegemonic politics. The knowledge generated by development research contributes to a sustainably organized world that sees itself as the sum of interdependent and interacting parts that cannot be reduced to themselves.

The normative aspect of conducting science for the social, cultural, economic, political, etc. improvement of human living conditions in the context of the United Nations SDGs is inherent in development research. A third focus of "Science and Research for Development Cooperation" at the OeAD is the "Cooperation Development Research" (KoEF) program,[7] which is also funded by the BMBWF. Within this framework, projects can be carried out with scientific institutions in those countries[8] that are less covered or not covered at all by other Austrian programs. KoEF projects are currently carried out in the following countries: Egypt, Ethiopia, Bhutan, Burkina Faso, Democratic Republic of Congo, El Salvador, Kenya, Kyrgyzstan, Malawi, Mongolia, Nepal, Nigeria, Pakistan, Papua New Guinea, Philippines, Rwanda, Zambia, Solomon Islands, Tanzania, Tunisia, Uganda, Vietnam, Zimbabwe.

The systematic promotion of development research with the instruments described here is of recent origin. To support the establishment of this field of research, the Austrian Development Research Award was awarded for the first time in 2013 on the initiative of the then minister of science, Univ.-Prof. Dr. Karl-Heinz Töchterle. The prize is awarded every two years by the BMBWF in cooperation with the OeAD and honors both established and young scientists for excellent scientific achievements in development research.

In 2023 the main prize was awarded to two outstanding personalities who are an integral part of development research in Austria: Univ.-Prof. Dr. Walter Sauer and Dr. Karin Fischer. Walter Sauer is nationally and internationally renowned for his work on and analysis of Austrian colonial history, in particular museum collections, and as an expert in restitution and repatriation. He is also vividly remembered for his great commitment to the abolition of apartheid policies in the Republic of South Africa. The SADOCC (Southern Africa Documentation and Cooperation Centre), which he founded, also makes a special contribution to the dissemination of knowledge.

Karin Fischer, in turn, made a decisive contribution to establishing the International Development degree program at the University of Vienna. She has also established an internationally renowned research focus on global supply chains at the Johannes Kepler University Linz. In her diverse publications, conference contributions and presentations, she deals with topics such as working conditions, social change, globalization, raw materials, goods and value chains, etc.

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7 https://oead.at/en/cooperations/international-he-cooperations/cooperation-development-research

8 DAC list of recipient countries of the OECD's Official Development Assistance (ODA)

Clemens Bohl was awarded the junior researcher's prize in 2023. The jury's statement reads: "In his contribution Clemens Bohl pursues a very good and expandable approach and presents a socio-politically highly relevant topic in a solid way and also from a local perspective in order not to lose sight of post-colonial North-South relations. He succeeds in providing a differentiated comparison of the activists' and the majority population in Uganda's frames in relation to climate (in)justice in a good and reflective style of writing." Like the four previous volumes, this book also publishes the best texts of young academics submitted for the Austrian Development Research Award. Moreover, the publisher has asked the two main prize winners to present a central topic of their research work in a separate contribution. In a speech he gave to the German History Society in Sheffield on 8 September 2022, Walter Sauer dispels the myth that Austria was not a colonizing country. In his contribution "Habsburg's Colonial Empire and Austrian Identity," he explores the many traces of colonialism in the Austro-Hungarian Empire. Karin Fischer opens the debate, which continues in varied ways, in the junior researchers' texts. With a view to the Global South, she analyses the increasing adoption of the term "climate colonialism" in an academic context and beyond. Further, she characterizes the climate crisis as a global crisis of distribution and justice in her contribution: "Climate Colonialism – a Travel Guide through Origins, Theory, and Case Studies."

As always, the junior researcher's prize has a special theme. In 2023 it was "Energy Transition and the Global South." The five contributions by young academics in the third part of this book cover a broad thematic and geographical range. The text by the prize winner Clemens Bohl – "Climate (In)Justice as a Global Challenge: A Framing Analysis of the Climate Justice Movement in Uganda" – is based on qualitative interviews with Ugandan climate activists and quantitative data. The actors' interpretative framework of the causes and consequences of man-made climate change, which relate to both local and global contexts, is shown. The results of the qualitative content analysis of the interviews are mirrored by quantitative data from Afrobarometer surveys – thus creating a picture of complex and politically highly topical social developments that also revolve around normative questions of justice and responsibility.

The political dimension of Nisasia Ekafitrina's contribution is integrated into the analysis of macroeconomic relations between Indonesia and the European Union. Her article "Palm Oil and the EU's Renewable Energy Directive (RED) II: A Green Trade War?" describes the potential impact of the EU's "green policy" on trade relations with Indonesia. Biofuel from palm oil is to be successively reduced from a European perspective. Online interviews with Indonesian government representatives, palm oil industry associations, NGOs, smallholder initiatives, and field research in Jakarta provided the data for this study. The analysis shows the influence of the "green economy" and sustainability narratives on Indonesian national policy as well as the economic and political dominance of the EU, which, despite the initiation of proceedings by Indonesia at the World Trade Organization (WTO), need not expect any "retaliation" from Indonesia.

The third junior researcher's text deals with another raw material that is of central importance for the energy transition envisaged in Europe: the mining of lith-

ium is directly linked to increased electromobility. Felix Malte Dorn analyzes the growth of lithium mining as an example of the continuation of the "imperial way of life." Resistance to mining projects is spreading in many places. Using two case studies, the article "Inequalities in Resource-Based Global Production Networks: Resistance to Lithium Mining in Argentina (Jujuy) and Portugal (Região Norte)" analyzes the effects of hegemonic development discourses along global production networks and makes global and intrasocietal inequality structures visible.

In May 2024, the temperature climbed to up to 50 degrees Celsius in parts of India. The heatwave in 2022, which forms the basis of Ambika Sairam's study, caused the hottest May in 122 years in Hyderabad – with temperatures rising to up to 45 degrees Celsius. The article "Come Hail or Heatwave: Utilizing Just Energy Transition to Address Occupational Heat Stress among Female Construction Workers in Hyderabad, India" examines the living and working conditions of female outdoor construction workers and the social and health consequences of the ever-increasing heatwaves. Additional company benefits and other measures described in the article to cope with the enormous heat stress could alleviate the unacceptable and unhealthy working situation of women – but are far from being implemented.

The final junior researcher's text in this book takes us back to the East African country of Uganda. Max Reisinger examines a simple but efficient technology for the disinfection of water using solar energy – which also has the potential to reduce CO_2 emissions. In his article "Safe Water and Saved CO_2: CO_2 Reductions and SDG Impacts of Solar Water Disinfection (SODIS) with WADI – Project Evaluation of 'Clean Air and Safe Drinking Water for Soroti' (Uganda)," the emission reductions compared to the boiling of drinking water are examined against the background of a baseline study. Moreover, the individual and social changes resulting from the implementation of this system are discussed: The results show not only an improvement in the health of the villagers but also time savings, increased autonomy, a stronger sense of community and gradual regeneration of surrounding ecosystems.

As different as the contributions presented here may be, they are all linked by a central theme: Whether it is Ugandan climate activists, palm oil farmers in Indonesia, opponents of lithium mining in Argentina, Indian women workers in enormous heat, or villagers in Uganda who benefit from simple emission-reducing solar technology, climate change and the resulting energy transition always have – besides technological and economic aspects – a central social dimension that must be negotiated in a sociopolitical way and also be critically accompanied by social science. Development research also makes an important contribution to these diverse transformation processes – not least as a peace project.

On this note, the editor wishes to thank the BMBWF for supporting development research in Austria and for making the Austrian Development Research Award – and thus also the publication of this book – possible. Thanks also go to the OeAD, which provides a suitable institutional framework for the professional implementation of the programs, and thanks also go to those who took part in the Austrian Development Research Award and made their scientific expertise and

competent contributions available for this publication. The editor also wishes to express special thanks to Dr. Rainer Einzenberger, who was responsible for the organization of the Austrian Development Research Award.

II Contributions by the Winners of the Austrian Development Research Award 2023

Walter Sauer

Habsburg's Colonial Empire and Austrian Identity[1]

Ladies and Gentlemen,

Permit me to start by drawing your attention to a press statement issued by the Austrian Ministry of Culture in January 2022 which includes the following: "Although Austria is not regarded historically as a colonial power, current research has revealed the multiple involvement of the Habsburg monarchy in colonial affairs."

This sentence is remarkable as it deviates from the longstanding position maintained by government, media, and most civil society that former Austria, meaning the Habsburg Empire, was not or only marginally involved in European expansion overseas. This is a sort of a national consensus, supported by mainstream historiography and also internationally accepted. Research and political debates around colonial legacies of the past, etc., focus on Britain, France, contemporary Germany, and others, but not on Austria, Switzerland, or Scandinavia – countries with a seemingly noncolonial past.

But even if apparently obvious, this perception – which I will name the denialist discourse – leaves some questions unanswered. One of them relates to the paradox: "Austria had no colonies, but it has extensive colonial collections." This has become an unexpected challenge since President Macron's announcement to return art works in French museums acquired in colonial contexts to their countries of origin. It has generated political pressure all over Europe and in Austria as well; some – like Achille Mbembe during a recent visit to Vienna – even speak of a moral obligation. Does it mean that the Republic of Austria too has to return certain objects or even whole collections?

In order to respond sensibly to possible claims for the restitution of cultural objects or human remains, we have to understand better how these collections were assembled and whether and how there was a colonial context on which restitution claims can legitimately be based. This is the context not only for the statement of the Ministry of Culture mentioned above but also for the establishment of an international advisory group to make recommendations for a restitution policy as well as for intensified colonial provenance research in Austrian federal museums.

For all these efforts, it is paying off today that a few historians, partly from outside traditional academia, already started to reassess Austria-Hungary's colonial entanglements twenty years ago – an undertaking which was initially confronted

1 Speech given to the United Kingdom German History Society in Sheffield on September 8, 2022.

with little interest. What did this reassessment actually entail? We were obviously not aiming at creating "alternative facts." But our intentions were

- to contribute to a systematic understanding of colonialism as a system which encompassed countries playing different roles – some more militarily aggressive, some more behind-the-scenes, but hardly any country developing and acting outside the system;
- to reinterpret modern Austrian history in the light of contemporary interpretations of colonialism, and on the basis of all available sources (many of which were neglected in the denialist discourse);
- to deal with certain ideological interpretations of Austrian history which – as I will try to show in a moment – are linked more to identity politics than to realities. These interpretations generally aim to position Austria on a global scale in a specific way, and vis-à-vis Germany in particular.

I

Very early, the Habsburg Empire got involved in transatlantic trade – remember the close family connections between Vienna and Madrid – and it established colonial outposts in East Africa, India, and China since the early eighteenth century. This was done relatively late, as before the ruling elite had been occupied by protracted wars against the Ottoman Empire in the Balkans. Although trade relations with the Indian Ocean region were profitable, the colonies could not be sustained for long. In the nineteenth century, we see phases of bigger or lesser colonial interests, and a notable absence during the Scramble for Africa. Here lies, indeed, an important difference to West European powers.

But does that mean that the Habsburg Empire – around 1900 the second biggest state in Europe in terms of geographical extension, and the third biggest in terms of population – was disconnected from the colonial system? I don't think so. There is a popular misconception which simplifies colonialism to a system of state sovereignty over territories with clear-cut starting and independence dates. But in a wider perspective, colonialism was also a process which implied decades, even centuries, of economic, cultural, and political penetration long before these regions became colonies in a constitutional sense. Looking only at "formal empire," Gallagher and Robinson reminded us already in the 1950s, "is rather like judging the size and character of icebergs solely from the parts above the water-line" – and this is now commonly accepted in the historiography of European expansion.

If we only look at the tip of the iceberg, Habsburg Austria seems largely off the hook. It did not conduct genocide somewhere in Africa, nor was there an Austrian Savorgnan de Brazza, Cecil Rhodes, or Leopold II. On the other hand, there had been numerous, unsuccessful attempts by Austrian stakeholders to acquire colonies since the 1850s, escalating shortly before the opening of the Suez Canal and again around 1900. Furthermore, we notice an economic upswing, massive investments into the navy, participation in the multilateral intervention against the so-called Boxer Rebellion in China, and reinforcements of colonial propaganda that might perhaps have enabled Austria to reach its colonials goals. Had the course of events

not been interrupted by World War I, Austria might thus be understood as a colonial power in the making, which – fortunately from today's perspective – came too late to complete this process.

Looking at the iceberg below the waterline, the picture becomes, in any case, more complex and ambiguous. Unequal trade relations were shaped to the unilateral benefit of Austria or Austria-Hungary. The monarchy participated in all multilateral state meetings on colonial affairs, including the notorious Congo Conference in Berlin, whose decisions were ratified in Vienna. Furthermore, particularly since the 1850s, numerous individuals – adventurers, missionaries, tourists, scientists, as well as emigrants – travelled through regions in Africa and Asia which were still politically independent and thus partly "unknown" to Europeans. Remember the Catholic missionaries in Southern Sudan, or people like Emil Holub, Oscar Baumann, or Samuel Teleki and Ludwig von Höhnel who were among the first or even the first Europeans in what is today Zambia, Rwanda/Burundi, or Northern Kenya. Others could be named as well. Whether on purpose or as a by-product only, they collected evidence on landscape formations, climate conditions, settlement and transport structures, the economic potential, and, not least, political, social, and cultural conditions; and most of them returned with collections of cultural objects, natural specimen, and sometimes human remains, too. They all were part of the general colonial destabilization of the Global South.

Some perceived themselves as forerunners of a specific Austrian(-Hungarian) colonialism, while others found employment in the service of other European powers and so contributed to territorial expansion: of Britain (in South Sudan and East Africa), Portugal (in Angola), Belgium (in the Congo), and, in particular, Germany (in East Africa and the Pacific). By publishing voluminous travelogues, many of them popularized the image of the heroic white explorer in far-off lands, and entrenched derogative, even racist perceptions of local situations.

The conventional discourse insisting on Austria-Hungary's nonrelevance to colonial affairs – which I call the denialist discourse – understands such activities as essentially nonpolitical and devoted to academic research. The classical evidence for that approach is to be found in a speech delivered by the then president of the Geographical Society in Vienna, Emil Tietze, at the funeral of Emil Holub, a popular "explorer" of Southern Africa, in 1902:

> *When travellers from other countries, other nations set out for foreign lands, it is not always, but very often for specific goals, the achievement of which directly or indirectly benefits their homeland, be it in political, colonial or commercial terms. Under normal circumstances, the Austrian traveller has no other driving force than the love for science itself and the desire to expand knowledge of other countries through his findings or his collections.*

We observe two interesting points here: (1) the attribution of a special quality, if not superiority to Austrians – an ideological element to which I will return later, and (2) the separation of commercial or strategic interests on the one hand (which

he terms colonial) and science on the other, which he perceives as a universal good as it advances Europe's understanding of the world. This conviction serves as a cornerstone of the denialist discourse in our country. Because Austrians devoted their efforts overseas to research, they by definition cannot be regarded as colonial.

From contemporary understandings of colonialism, it becomes, however, clear that science was extremely relevant to colonial expansion as a systemic contribution towards weakening, conquering, and dominating overseas societies and exploiting their resources. In a practical sense, knowledge of geography, geology, linguistics, sociology, and other disciplines was indispensable for the establishment and maintenance of colonial rule. And in a more long-term perspective, research findings from the colonies did contribute to the tremendous dynamics of Europe's development in the nineteenth and twentieth centuries: on the one hand, to the development of new technologies and products, and on the other to the information hegemony which Europe or what we call the Global North still enjoy today. Scientific work in colonialism was a one-sided process leading to a world system which is still characterized by the epistemological dominance of the North. In the words of Michael Adas: "Especially in the industrial era science and technology were sources of both Western dominance over African and Asian peoples, male and female, and of males over females in European and American societies."

To name but a few examples, we could refer

- to the circumnavigation of the globe by the Novara flotilla in the late 1850s, which was designed to underline Austria's reappearance on the international stage, to do market research abroad, and to carry out a wide range of scientific and collecting tasks, but also had the mandate to proclaim the Nicobar Islands an Austrian colony; or
- to Emil Holub, who in the 1870s investigated the social and political structures of local kingdoms in Botswana and Zambia with the long-term aim to establish Austrian settler communities in this region; or
- to geographer Oscar Baumann, who around 1890 laid the foundations for the Northern Railway Line (still existing today) in what was to become German East Africa; or
- to geologist Heinrich v. Foullon-Norbeeck, who participated in the Solomon Islands expedition in 1895/96, organized by the Austrian navy to prospect for nickel ore deposits in the Pacific (he fell victim to the resistance of the local population and has since been regarded a "martyr," not of colonialism but of science!).

If Austrian fieldworkers on the ground, as well as "armchair analysts" at home, were heavily involved in collecting, interpreting, and systematizing knowledge on the Global South, they did not work in isolation, and they were not apolitical, but served very practical colonial interests – be it in geography, natural sciences, linguistics, anthropological studies, or race research. That should not be denied. Lack of awareness of the mutual interdependence of colonialism and science is at best

naive and at worst justifying the misuse of science, the manipulation of information which we encounter all over in history as well as at present.

II

Interpretations to Austria's colonial past were frequently connected to identity politics. If we look at the discourse history on Austria and colonialism since the late nineteenth century, we see that denialist approaches alternated with affirmative ones depending on how Austria wanted to position itself in the international sphere, and that had to do with national interests and identities.

Let us briefly look back at the early 1900s. I have already quoted from Tietze's famous burial speech which perceived science and research as a specific Austrian "vocation" abroad – in contrast to allegedly interest-driven activities of researchers from other countries. A similar but religious version of this argument was submitted by the Grande Dame of the Catholic mission movement, Countess Maria Theresia Ledóchowska (1901):

> *It was said last night […] that if Austria had colonies in Africa, it would arouse greater enthusiasm for the missions among the Catholic people than many meetings, speeches and pamphlets are capable of. As far as I am concerned, I am of the opposite opinion and proud that Austria does not yet have any colonies in Africa, because this makes its missionary activity all the more ideal.*

We can understand both Tietze's and Ledóchowska's voices as justifications of the Habsburg Empire's factual failure to acquire colonies before the turn of the century. They were not anti-colonial as such but represented a resigned attitude which was depicted as conscious "renunciation" of colonial policies. A perceived weakness was converted into a perceived virtue – note the term "ideal" in Ledóchowska's speech! Implicitly, they created an ethical difference between the multicultural Austro-Hungarian Empire and West European nation states, including Germany.

To portray Austria as less aggressive and more philanthropic than others has a long history. I feel tempted to go back as far as the panegyrical poem from the mid-seventeenth century praising the Habsburg dynasty for forming marriage alliances instead of fighting wars: *Bella gerant alii / tu, felix Austria, nube. / Nam quae Mars aliis / dat tibi diva Venus*. As definitely relevant we also point to Franz Grillparzer's "Praise Song on Austria," included in his 1825 drama *King Ottokar's Fortune and End* – a key text of Austrian patriotism for many generations, rating Austrian character and mentality superior to the German. In distinguishing Austrianness from other European mentalities by attributing to it higher moral values, the denialist discourse uses a rhetoric figure which was already present in patriotic tradition and in context of the "Habsburg myth."

In early twentieth-century Habsburg Austria, however, references to soft power were obviously on the defensive. Aggressive and populist tendencies gained ground. Concerted cooperation between the government, the military, and industry was established, systematically aiming at expanding Austria-Hungary's spheres

of influence on the Balkans as well as overseas. Foreign policy became militarized and aggressive, as shown by the annexation of Bosnia-Herzegovina in 1908, and plans were developed to annex Serbia and secure a land corridor to Salonika which could have become a stepping stone for controlling oil reserves in Anatolia. Turning the denialist discourse into its opposite, radical positions spoke of the Habsburg Empire's "destiny" to acquire (not to renounce) colonies:

> *Austria-Hungary, too, can look back on respectable colonial achievements in its history, which give us the right and the duty to participate in modern colonial activities in overseas countries.*

And as long as the assumption prevailed that the Central Powers would emerge victorious from World War I, demands were made for Austria-Hungary to take over colonies of the Entente when eventually concluding a peace treaty.

Not surprisingly, these radical colonialist positions were of a philo-Germanic character (like official foreign policy), and they survived in the Republic of Austria, established in late 1918, in small German nationalist parties and associations. They were strongly connected to colonial revisionism, a movement to regain former German colonies which was quite influential in the Weimar Republic and under early National Socialist rule but was popular in Austria, too. During this time, we note a raising interest in Austrian colonial activities, both in the East India companies of the eighteenth century as well as in the later explorers, particular those in the service of Bismarck's Reich. These activities were interpreted as forerunners of German imperialism of later years. Introducing a special show of the Natural History Museum in Vienna on "Ostmark Germans as Researchers and Collectors in our Colonies. The Share of the Ostmark in the Exploration and Development of the German Colonial Territories", the new Director General Hans Kummerlöwe wrote, for example, in 1939, one year after the fascist Reich had occupied Austria: "The exhibition aims to provide evidence in a small space that the Ostmark has played a very significant role in German colonial work before and after the World War."

This development shows how quickly attitudes on colonialism could change depending on the political framework. While Habsburg loyalists had expressed reservation against colonial adventures, pro-German strands in public opinion tended towards the colonial as this opened an opportunity to participate in German successes overseas, whether real or fictional. The course of history, however, made it necessary to again change this approach: In 1945 Austria was liberated and regained its independence. The strong propagation of colonial revisionist ideas in the first years of Nazi rule now changed into the opposite. Just as the resurrected country presented itself as "Hitler's first victim" and proclaimed its "unburdenedness" by political terror, the Holocaust, and the war crimes of the Wehrmacht, so too with regard to colonial expansion. In 1947, the geographer Hugo Hassinger published his book *Austria's Share in the Exploration of the Earth*, which in passages is almost word-for-word identical to Emil Tietze's statement forty-five years earlier:

In any case, the researcher coming from Austria will be free from the suspicion of combining material interests with his science and of serving political aspirations to power, for even in the time when Austria was still a great power, its researchers have always preserved unselfishness and idealism, and they have done their research work out of an inner urge and not merely by commission.

It is ironic that, before 1945, Hassinger was a supporter of National Socialism and was involved in plans for increased economic utilization of the Balkans by the Third Reich – he was quite the opposite of the selfless researchers he fantasized about. Nevertheless, his denialist approach gained paradigmatic character and met with strong affirmative response, especially given the conservative intellectual climate of the 1950s and 1960s. Obviously, Tietze's and Hassinger's sublimation of colonial interest into academic idealism hit a nerve and proved to be a useful element of Austria's search for postwar identity. "Austria conquered the world through music," wrote the sociologist August M. Knoll in 1947, meaning by implication that this conquest was not done "through power politics." Evidently, the perception of Austria as a cultural and scientific great power served as a substitute for the loss of the political great power status after the breakup of the monarchy and provided orientation for a small state in an increasingly complicated world.

Changes in domestic as well as foreign policies during the 1970s – the era of social democratic government – produced a contrasting understanding of Austria's international role and added a new dimension to the discourse. Reinterpreting its status of permanent neutrality, self-chosen in 1955, led to initiatives within the United Nations, particularly with regard to negotiations on a New International Economic Order and to closer relations with the Non-Aligned Movement who even granted Austria observer status. Not at least for economic reasons, relations and cooperation with a number of Third World countries – former colonies – were established. In this context, it proved useful for foreign policy to insist that Austria had never in history been a colonizing power. The denialist discourse continued but with changed connotations: not regretting the loss of former power but serving as a door opener to the overseas world, and that quite successfully.

III

In concluding, let me make a final remark. To look into Austria's (Austria-Hungary's) colonial past is obviously not a theoretical exercise happening in empty space – and the same is true for other allegedly non-colonial countries in Europa like Switzerland and the Scandinavian countries, but also for Austria-Hungary's successor states like the Czech and Slovak Republics, and of course Hungary itself. As I have tried to demonstrate, approaches towards colonial legacies in Austria during the imperial as well as the republican regimes shifted between denial and appraisal, and these shifts reflected changes in identity and interests.

Similar processes can be recognized today: International trends like the overdue restitution of art works from colonial contexts require Austria – and other countries – to re-assess its position. The emergence of an internal Black Lives Matter movement exposes colonial mentalities and various forms of racism by the

majority population and institutions. By advancing alternative interpretations of history, historians contribute towards that development – not on the basis of ideological assumptions as in previous times but of serious historical analysis.

From a serious discussion of Austria's complex involvement in colonial activities and its participation in a European colonial system in the past, certain questions regarding the present arise:

- How does the country shape its policies on immigrants and refugees?
- How is a colonial mindset, resulting from history, tackled, including with regard to xenophobia and racism?
- To what extent does the colonial past contribute to the privileged position the country enjoys today within the Global North – and does it have a co-responsibility for growing social inequality and ecological unsustainability on a global scale?

The answers to such questions given by Austrian society – and indeed by European societies in general – will again impact on the construction of identity and self-understanding in one way or the other. This makes our topic so timely.

Karin Fischer

Climate Colonialism – a Travel Guide through Origins, Theory, and Case Studies

Introduction

The term "climate colonialism" has achieved some reach in recent years, both in scientific publications and in the wider public. The itinerary of the term is not easy to reconstruct. I think the journey started with activists in the Global South and has since been on a round trip between social movements, international advocacy NGOs, activist research, and academia.

Concepts travel between activism and the academy, disciplines and geographically dispersed academic communities, and time periods. For Mielke Bal, the travelling nature of words and concepts is an asset rather than a liability. "Nomadic" concepts, she says with reference to Isabelle Stengers, have the power of "propagation" (Bal 2002, 25, 32). And "climate colonialism" is indeed a provocative term that deserves propagation to draw attention to the unequal causes and impacts of the climate crisis.

Originating from an activist context, climate colonialism meanwhile entered scientific language. Many case studies use the term and pronounce on theoretical validity. If well thought through, concepts offer "miniature theories" (Bal 2002, 22) and help in the analysis of, in our case, structures of global inequalities. The meaning of climate colonialism, however, is far from clear-cut. Speaking generally, it connects the history of colonialism, dispossession, and racism with the unequal responsibility for global warming and the unequal distribution of its consequences. The term emphasizes that the Global North bears the primary responsibility for the current climate crisis while people in the Global South suffer the most severe consequences. In a second manner, the term is a symbol of the ongoing exploitation and the growing division and inequality between North and South introduced by climate impacts and prevailing solutions. Climate colonialism denominates the strategies of Northern countries and Northern-based corporations that damage the environment for their material benefit. This happens most prominently through the offshoring of carbon-intensive industry operations (*carbon colonialism*) and enhanced raw material extraction to enable the energy transition in the Global North (*green colonialism*). Finally, the term criticizes Northern-dominated international climate policy. Net-zero frameworks involve emission trading systems to reduce emissions via a carbon market and rely on speculative technofixes such as carbon capture and hydrogen technologies. The preferred measures and the pace

of implementation of international climate policy are interpreted as the result of a colonial continuity that marginalizes the needs of the majority world.

The broader and more frequent use of the term, first as words, then as a concept, suggests a clarification of its meaning. This is not a plea for theoretical purity or "proper usage," but different or indefinite meanings can obscure analytical insight. I refer again to the feminist cultural theorist Mielke Bal (2002, 17), who argues for a "productive dispersion of concepts." Concepts are important areas of debate and tools of intersubjectivity. As such, they facilitate discussion based on a shared understanding and promote consensus. Not that absolute consensus is possible or even desirable, according to Bal, but with an agreement of how a concept is best used – provisionally and tentatively – in a particular meaning, results can then be discussed. Such agreement also enables a more offensive use of concepts that are never merely descriptive, but also programmatic and normative (Bal 2002, 27–28).

In the second part of my article, I describe academic efforts to clarify the meaning of climate colonialism. Before that, I follow the traces that lead me to an early use of the term or its predecessor, environmental colonialism. In the third part, I make a foray through research areas and case studies in which the term is productively engaged. It goes without saying that my travel guide is incomplete. Due to language and other barriers, my exploratory journey neglects lesser known or accessible places. It needs to be continued by other travelers who have more insight and foresight than I do.

Tracing Climate Colonialism

The term environmental colonialism emerged in the late 1980s in the context of environmental justice movements in the US, which organized to expose the socially unequal distribution of environmental risks and hazards alongside race and ethnicity. Since the late 1970s, Black activists took action against the dumping of toxic waste in their community. The beginning of uranium mining, milling, and enrichment on Native American land led Churchill and LaDuke (1986) to speak of "radioactive colonialism": Over 60% of all known uranium deposits in the US were located on Native American land. Not much later, scholars employed the term environmental colonialism to mark it as a globalized phenomenon (e.g., Hofrichter 1993). Although the focus continued to be on local effects and local communities, researchers expanded the original idea: environmental injustice extends beyond national borders, thereby perpetuating old patterns of imperialism, colonialism, and racism. Today`s climate colonialism is heard here: "While peoples of color and the third world generally bore few of the fruits of development, they are now asked to be partners in solutions to an environmental crisis created by others" (Hamilton 1993, 69).

Ecofeminism should also be mentioned here. I was unable to track down the term in the publications of the 1980s and 1990s, but the link between colonialism and environmental destruction is the linchpin of ecofeminist argumentation. Colonialism initiated ecological degradation in the Global South and is now being per-

petuated and exacerbated by international organizations and powerful commercial interests in the First World that seek to exploit natural and genetic resources. This new colonialism drains resources away from those who most need them (see, for example, Shiva 1992).

It was also authors from India who, to my knowledge, were the first to make an explicit connection between the climate crisis and colonialism. In *Global Warming in an Unequal World – a Case of Environmental Colonialism*, Agarwal and Narain (1991, 1) criticized "climate ambitions" by Western-dominated international institutions and biased data that prioritizes nonfossil greenhouse gases and deforestation over fossil fuel pollution: "The idea that developing countries like India and China must share the blame for heating up the earth and destabilising its climate … is an excellent example of environmental colonialism." The cover of the booklet features a limousine marked as "developed country." The driver asks a peasant for a tree "to protect us from the greenhouse effect." The cartoon alludes to global afforestation and reforestation projects in the Global South to absorb CO_2.

In the booklet, Agarwal and Narain referred to a study from the California-based International Project for Sustainable Energy Paths. Its authors also used the term environmental colonialism, "in which the climate issue is inadvertently or deliberately used to reinforce traditional agendas" (Krause et al. 1989, 136). The study was financed by the Dutch Ministry of Environment and offered differentiated data on CO_2 emissions. In their policy recommendations, Krause et al. placed particular responsibility on the countries of the Global North.

Theorizing Climate Colonialism

Meanwhile, climate colonialism emerges frequently in social science and humanities scholarship, but also as a provocative term employed by activists, journalists, and policy experts. As databases (e.g., Google Scholar, ProQuest, Scopus) show, the number of scientific publications using the term has risen sharply since 2020. For example, between 2005 and 2010, Google Scholar recorded 19 publications that mentioned climate colonialism in the text, abstract, or title; this number rose to 427 from 2020 to mid-2024.

The term relates to "climate apartheid," a term that has its origins also in activist contexts, especially in South Africa and Palestine. "Climate apartheid" achieved greater reach through a special contribution by human rights activist and former Archbishop of Cape Town Desmond Tutu in the *Human Development Report 2007/2008*. Here he stated: "No community with a sense of justice, compassion or respect for basic human rights should accept the current pattern of adaptation. Leaving the world's poor to sink or swim with their own meager resources in the face of the threat posed by climate change is morally wrong. Unfortunately … this is precisely what is happening. We are drifting into a world of 'adaptation apartheid'" (Tutu 2007, 166). More than a decade later, Philip Alston, UN Special Rapporteur on extreme poverty and human rights, helped to popularize the term when he released his thematic report on climate change and poverty in 2019: "We risk a

'climate apartheid' scenario where the wealthy pay to escape over-heating, hunger and conflict while the rest of the world is left to suffer" (Alston, 2019).

Due to its prominent adoption in the UN system, the term denotes the unequal distribution of power and resources in the implementation of mitigation and adaptation measures. Apartheid sums up the social inequality dimension in the climate crisis – between low-income and higher social strata, marginalized and affluent people, wealthy suburbanites and inhabitants of redlined neighborhoods, those who dispose of spatial mobility and those who remain confined to unfavorable contexts. In its lineage to the South African apartheid regime, it highlights the racialized nature of climate impacts: "Climate apartheid emerges from complex exchanges between racism and environmental exploitation" (Tuana 2019, 6).

In addition to the social and racial dimension, "climate apartheid" offers a spatial component. In discussing the term, Elia emphasizes the important conceptual distinction in climate devastation between geographical scale(s) and shape: "Securing a partition at the porous and ever-shifting border between *there* and *here* is climate apartheid's work. It preserves, or tries to preserve, relative stability in some spaces by localizing damage to others" (Elia 2023, 575, italics in the original). Based off these elements, Rice et al. (2022, 627) offer a productive working definition of climate apartheid as "a system of discrimination, segregation, and violence based on various axes of oppression and privilege (race, class, gender, sexuality) that is produced by the material effects of climate change, but also many responses to the crisis."

Both terms are used interchangeably (see, for example, Krupar 2022; Long 2024). Nevertheless, climate colonialism differs from its conceptual sister through its historicity – but also through its greater openness and vagueness.

Despite the increasing adoption of climate colonialism in an academic context and beyond, few scholars have detailed systematic characteristics or definitions. Some authors, however, offer conceptual starting points. Bhambra and Newell (2022) start from the assumption that colonialism is often understood as deriving from the logic of a system defined separately from it, specifically, the logic of global capitalism. Accordingly, climate change tends to be presented as a consequence of capitalism's logic of expansion. But, so they say, there is little analysis of the systematic processes of colonialism involved in injustices produced by climate change. They argue instead that "capitalism is embedded within colonialism rather than vice versa. … In this way, we bring land, its dispossession, appropriation and its use centre stage in historical and future accounts of climate change" (Bhambra and Newell 2022, 4).

You don't have to agree with their definition of capitalism, but Bhambra and Newell make an important point here. First, they do not equate the beginning of human-caused global environmental change with the "Great Acceleration" since 1950 or the Industrial Revolution. It is neither the onset of the mass consumer society after World War II (Steffen et al. 2004) nor the beginning of the hydrocarbon era in the early 19th century (Abram et al. 2016) that kick-started climate change. In agreement with others (see, e.g., Haraway 2015; Baldwin and Erickson 2020), Bhambra and Newell date the drama back to European colonialism and the birth of the colonial modern world.

Secondly, by emphasizing dispossession, elimination, and extraction, they coincide with global historians who argue that capitalism has its roots in the spectacular expansion of commodity frontiers (Beckert and Bosma 2022). The plantation economy overseas did not only contribute to the growth of homeland economies; it bore essential features of a factory regime and can be seen as a colonial laboratory for industrial capitalism (see, for example, Mintz 1986). The exploitative, racial, political-ecological plantation complex marked the beginning of global capitalism and went viral in the aftermath of abolition when multinational corporations consolidated control over vast territories and populations, bureaucratizing coercion to maximize extraction (Manjapra 2018).

In this view, capitalism is a process rooted in a profound and ongoing restructuring of the global countryside and the commodification of nature. In other words, capitalism is a hungry and all-devouring machine: "Our daily lives are based on a continual and massive conversion of forests, flatlands, valleys, marshes and lakes into areas of commodity production" (Beckert and Bosma 2022; see also Beckert et al. 2021). The extraction and exchange of resources has been and continues to be associated with ecological degradation, racialized political ecologies, and resistance by local populations in rural peripheries.

After his journey through the *Empire of Cotton*, Beckert (2014) states that the global countryside should be at the center of our thinking about the origins of the modern world (and, we might add, the climate crisis). Invaded by new infrastructures, laws, and property rights, the global countryside was integrated into the circuits of metropolitan capital accumulation – with devastating consequences for those who lived from it. Bhambra and Newell (2022, 4) follow on from this: "While it is clear that the effects of climate change are mediated by global inequalities … , we would go further to argue that climate change has been brought about through the colonial processes implicated in the production and reproduction of those very inequalities: the colonial and racialized dispossessions that severed peoples' access to land and resources to sustain their livelihoods and set them to work in the plantations and factories that went on to drive extraction through industrial development."

Sultana (2022) starts with renaming the object of inquiry "climate coloniality." She builds her approach on big shoulders. The Peruvian sociologist Aníbal Quijano (2000) created the term "coloniality of power" to describe the power relationship between colonizers and the colonized, between centers and peripheries. This relationship begins with the colonial expansion of the European powers into the Americas, but outlasts this through the persistence of historical hierarchies on the socioeconomic, political and epistemic terrain. In contrast to colonialism, coloniality is therefore an ongoing power relationship. Like its originator, Sultana uses the term to refer to colonial histories and the reproduction of the coloniality of power, being, and knowledge and transfers it to the experience of climate injustice. DeBoom (2002) acknowledges that "coloniality foregrounds the *relationality* of climate change. Through this lens, climate change is not merely an outcome or a process. It is a relation of violence rooted in the failed attempt to separate the drive for endless extractive growth from the Earthly conditions of life" (DeBoom 2022, 2, italics in original).

A second point of reference for Sultana's theoretical endeavors is "racial capitalism." Robinson (1983) conceptualized capitalism as a racialized system of dispossession and exploitation. As such, "capitalism relies on racialized and gendered designations about the kinds of communities and peoples whose dispossession, exploitation, and obliteration is justifiable for the sake of 'progress' and industrial growth" (Manjapra 2018, 365). In this perspective, racialization was not concomitant of capitalist expansion and exploitation, but an integral part of it.

Sultana's main concern is to integrate both material, geopolitical, and epistemological violence into the concept of climate coloniality. Regarding the latter, she has Frantz Fanon at her side. Fanon (2021) emphasized the embodied experience of colonialism – i.e., the physical, affective, and epistemological wounds of coloniality. Sultana links Fanon's embodied experience of racialization and colonialism to the embodied emotional geographies of climate breakdown and the experiences of people on the climate frontlines (Sultana 2022, 4, 10). Echoing Fanon, Sultana calls for feeling, embodying, and experiencing "the heaviness of climate coloniality" as a necessary precondition for confronting it.

Places and Cases of Climate Colonialism

It is beyond the scope of this article to provide a comprehensive overview of the numerous studies that use the concept of climate colonialism/coloniality. Scholars from various disciplines – from interdisciplinary development studies and critical geography to ecological economics and transition research – use the term to examine various contemporary expressions and structural dynamics of the climate crisis. For analytical clarity, I propose the following thematic clustering for the use of climate colonialism/coloniality: i) geopolitical climate policy, ii) extractivism to enable digital and energy transition the Global North, and iii) the offshoring of energy-intensive and polluting industries. Scholarly work in these fields are only cited by way of example. Many, but not all, deal with alternatives in addition to analysis.

Scholars, activist researchers, and advocacy NGOs (with indigenous organizations at the forefront) accuse the international climate negotiations of replicating forms of climate colonialism (e.g., Martinez 2014; Cultural Survival Quarterly 2023). Climate colonialism crystallizes in the unequal patterns of representation and access to decision-making in UN climate negotiations and includes the poor involvement of scholars from the Global South in the reports of the Intergovernmental Panel on Climate Change (Chaplain 2024). The analysis of the controversial issue of "loss and damage" or the constant delay of the African Group's demands for recognition of the special needs and circumstances status in the UN system also belong here (Bhambra and Newell 2022; Squeff 2024). A point of critique after COP26 (and before) was the pledge by representatives of the Global North such as Norway to stop funding fossil fuel projects overseas – while they themselves continue to profit from oil and gas extraction and outsource climate mitigation to countries of the Global South (Benjaminsen and Svarstad 2021). Typically, this happens through forest-based conservation under the label REDD. In this context,

voices from the Global South demand to differentiate between survival emissions of poor countries and luxury emissions of the rich. The contested issues of ecological debt and climate reparations also belong here (Moe-Lobeda 2016; Hossen and Benson 2024).

A growing body of work addresses the racialized economies of resource extraction triggered by the decarbonization of production (including individual e-mobility) and digitalization in the Global North. The twin transition, as envisioned in the EU's Green Deal scenarios, generates significant additional demand for a variety of raw materials (e.g., lithium, copper, rare earths, biomass) and requires a lot of energy in the long term. In addition to an expansion of mining, a "green, digital and resilient" economy goes hand in hand with an immense demand for land (Matondi et al. 2011). Often referred to as "green" or "energy colonialism", the social and environmental costs of the carbon-reducing transformation and economic growth in the Global North are once again externalized to territories in the Global South and the people working and living in these "green sacrifice zones" (Zografos and Robbins 2020; Dorn in this book). The Global North's "decarbonization consensus" reproduces not only colonial material practices of externalization, but also a neocolonial ecological imaginary, using the idea of "empty spaces" suitable for vast oilseed plantations, windmill farms, or hydrogen plants (Bringel and Svampa 2023; *Hamouchene and Sandwell 2023*).

A related third research field of climate colonialism/coloniality is a more general analysis of globalized production. Despite discourses on reshoring or nearshoring, many everyday goods are manufactured in dispersed global production networks or food chains. Research shows that imports of goods and services into high-income countries – whether for further processing or for final consumption – cause high emissions and ecological damage in poorer economies. Command and control functions and advanced producer services, however, remain located at headquarters or locations in the Global North (Fischer et al. 2023). Workers and local communities in or near factories, mines, and plantations bear the social and ecological costs of global pollution chains; they suffer from health problems, water scarcity, and food insecurity (LeBaron and Lister 2022; Parsons 2023).

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Climate colonialism and climate apartheid can be understood as a warning, a provocation, and as emerging theoretical constructs. They highlight climate injustice as a result of historical and persistent power asymmetries between North and South, between the privileged and the marginalized. Both are therefore important concepts for countering the hegemonic discourse on climate change and its causes, consequences, and solutions.

In my opinion, climate apartheid is better suited to social and spatial studies of climate injustice and to looking at different scales. Climate colonialism, in turn, seems more appropriate for macrolevel studies; it proves its strength through its historicity. It makes clear that climate colonialism is, in a first step, a product of the plundering and transforming of the global countryside, and, in a second step,

the entrenchment of colonial relations and the institutions set up to oversee and maintain them. Forms of historical lock-in – in international systems of negotiation, knowledge production, globalized production networks and patterns of consumption – must be foregrounded in order to understand the current condition of climate coloniality. Sultana's approach and renaming are convincing: coloniality in Quijano's sense emphasizes an ongoing, unequal power relationship that unfolds on socioeconomic, political, and epistemic levels; with Fanon, the relationship of violence is added.

As climate change and global inequalities will undoubtedly intensify, publications on climate coloniality will also increase. May these studies contribute to counter dominant discourses and change climate policy.

References

Abram, N., McGregor, H., Tierney, J., Evans, M. N., McKay, N. P., Kaufman, D. S., the PAGES 2k Consortium (2016). Early onset of industrial-era warming across the oceans and continents. *Nature*, 536, 411–418. doi:10.1038/nature19082

Agarwal, A., Narain, S. (1991). *Global Warming in an Unequal World – a Case of Environmental Colonialism*. Centre for Science and Environment, New Delhi.

Alston, P. (2019, 25. Juni). *World faces "climate apartheid" risk, 120 more million in poverty*. https://news.un.org/en/story/2019/06/1041261 [abgerufen am 10.07.2024].

Bal, M. (2002). *Travelling Concepts in the Humanities*: *A Rough Guide*. Toronto: University of Toronto Press.

Baldwin, A., Erickson, B. (2020). Introduction. Whiteness, Coloniality, and the Anthropocene. *Society and Space*, 38(1), 3–11.

Beckert S., Bosma U., Schneider M., Vanhaute, E. (2021). Commodity frontiers and the transformation of the global countryside: a research agenda. *Journal of Global History*, *16*(3), 435–450. doi:10.1017/S1740022820000455

Beckert, S. (2014). *Empire of Cotton: A Global History*. New York: Alfred A. Knopf.

Beckert, S., Bosma, U. (2022). *Ever more land and labour*. https://aeon.co/essays/the-capitalist-transformations-of-the-countryside [abgerufen am 10.07.2024].

Benjaminsen, T. A., Svarstad, H. (2021). Climate Mitigation Choices: Reducing Deforestation in the Global South Versus Reducing Fossil Fuel Production at Home. *Political Ecology*. Cham: Palgrave Macmillan. doi:10.1007/978-3-030-56036-2_6

Bringel, B., Svampa, M. (2023). Del "Consenso de los Commodities" al "Consenso de la Descarbonización". *Nueva Sociedad 306*, 51–70. https://nuso.org/articulo/306-del-consenso-de-los-commodities-al-consenso-de-la-descarbonizacion/

Chaplain, J. (2024). Storytelling and worldmaking climate justice futures: Indigenous climate advocacy and transnational solidarity in UN climate conferences. *Quarterly Journal of Speech*, 1–26. doi:10.1080/00335630.2024.2315043

Churchill, W., LaDuke, W. (1986). Native America: the Political Economy of Radioactive Colonialism. *The Insurgent Sociologist*, 13(3), 51–78.

Cultural Survival Quarterly (2023). *We are the Voice of Nature. Indigenous Leaders Demand Urgent Action*. https://www.culturalsurvival.org/publications/cultural-survival-quarterly/47-1-we-are-voice-nature [abgerufen am 10.07.2024].

DeBoom, M. J. (2022). Climate coloniality as atmospheric violence: From necropolitics toward planetary mutuality. *Political Geography*, 99, 102786. doi:10.1016/j.polgeo.2022.102786

Elia, M. (2023). Climate Apartheid, Race, and the Future of Solidarity: Three Frameworks of Response (Anthropocene, Mestizaje, Cimarronaje). *Journal of Religious Ethics*, 51(4), 572–610. doi:10.1111/jore.12464

Fanon, F. (2021). *The Wretched of the Earth*. New York: Grove Press.

Fischer, K., Eder, J., Schaffartzik, A. (2023). Globalisierung: Globale Warenketten und Arbeitsteilung. In Görg., C., et al. (Hrsg.), *APCC Special Report. Strukturen für ein klimafreundliches Leben*. Berlin/Heidelberg: Springer Spektrum. https://link.springer.com/chapter/10.1007/978-3-662-66497-1_19

Hamilton, C. (1993). Environmental Consequences of Urban Growth and Blight. In Hofrichter, R. (Hrsg.), *Toxic Struggles: The Theory and Practice of Environmental Justice*. Philadelphia: New Society Publishers, 67–75.

Hamouchene, H., Sandwell, K. (Hrsg.) (2023). *Dismantling Green Colonialism: Energy and Climate Justice in the Arab Region*. Transnational Institute. London: Pluto Press.

Haraway, D. (2015). Anthropocene, Capitalocene, Plantationocene, Chthulucene: Making Kin. *Environmental Humanities*, 6(1), 159–165.

Hofrichter, R. (1993). *Toxic Struggles: The Theory and Practice of Environmental Justice*. Philadelphia, PA: New Society Publishers.

Hossen, M. A., Benson, D. (2024). *Donor climate coloniality, ecological debt and vulnerabilities in coastal Bangladesh: redesigning institutions for recognition justice*. doi:10.21203/rs.3.rs-4527929/v1

Krause, F., Bach, W., Koomey, J. (1989). *Energy Policy in the Greenhouse*, *International Project for Sustainable Energy Paths (IPSEP)*. El Cerrito, CA: o.V.

Krupar, S. (2022). Brownfields as climate colonialism. Land reuse and development divides. In Bobic, N., Haghighi, F. (Hrsg.), *The Routledge Handbook of Architecture, Urban Space and Politics, Volume I*. New York: Routledge, 446–462.

LeBaron, G., Lister, J. (2022). The hidden costs of global supply chain solutions. *Review of International Political Economy*, 29(3), 669–695. doi10.1080/09692290.2021.1956993

Long, Joshua (2024). Reckoning climate apartheid. *Political Geography*, 112, 103117. doi:10.1016/j.polgeo.2024.103117

Manjapra, K. (2018). Plantation Dispossessions: The Global Travel of Agricultural Racial Capitalism. In Beckert, S., Desan, D. (Hrsg.), *American Capitalism. New Histories*. New York: Columbia University Press, 946–951.

Matondi, P. B., Havnevik, K., Beyene, A. (Hrsg.) (2011). *Biofuels, land grabbing and food security in Africa*. London, New York: Zed Books.

Martinez, D. E. (2014). The Right to Be Free of Fear: Indigeneity and the United Nations. *Wicazo Sa Review*, 29(2), 63–87.
Mintz, S. (1986). *Sweetness and Power. The Place of Sugar in Modern History*. New York: Penguin.
Moe-Lobeda, C. D. (2016). Climate Change as Climate Debt: Forging a Just Future. *Journal of the Society of Christian Ethics*, 36(1), 27–49.
Parsons, L. (2023). *Carbon Colonialism: How Rich Countries Export Climate Breakdown*. Manchester: Manchester University Press.
Quijano, A. (2000). Coloniality of Power and Eurocentrism in Latin America. *International Sociology*, 15(2), 215–232. doi:10.1177/0268580900015002005
Rice, J., Long, J., Levenda, A. (2022). Against climate apartheid: Confronting the persistent legacies of expendability for climate justice. *Environment and Planning E*, 5(2), 625–645.
Robinson, C. J. (1983). *Black Marxism. The Making of the Black Radical Tradition*. London: Zed.
Shiva, V. (1992). Globalism, Biodiversity and the Third World. In Goldsmith, E. et al. (Hrsg.), *The Future of Progress. Reflections on Environment and Development*, 50–67. Bristol [u.a.]: ISEC.
Squeff, T. C. (2023). Rearranging the Geopolitics of Climate Change Due to Climate and Carbon Coloniality. In Talukdar, S., de Aquino, V.E. (Hrsg.), *Judicial Responses to Clim-ate Change in the Global South. Living Signs of Law*, vol. 2. Cham: Springer. doi:10.1007/978-3-031-46142-2_4
Steffen, W., Broadgate, W., Deutsch, L., Gaffney, O., Ludwig, C. (2015). The trajectory of the Anthropocene: The Great Acceleration. *The Anthropocene Review*, 2(1), 81–98. doi:10.1177/2053019614564785
Sultana, F. (2022). The unbearable heaviness of climate coloniality. *Political Geography*, 99. doi:10.1016/j.polgeo.2022.102638
Tuana, N. (2019). Climate Apartheid: The Forgetting of Race in the Anthropocene. *Critical Philosophy of Race*, 7(1), 1–31.
Tutu, D. (2007). We do not need climate change apartheid in adaptation. In UNDP (Hrsg.), *Human Development Report 2007/2008. Fighting climate change: Human solidarity in a divided world*. UNDP: New York; Palgrave MacMillan: Basingstoke, 166.
Zografos, C., Robbins, P. (2020). Green sacrifice zones, or why a Green New Deal cannot ignore the cost shifts of just transitions. *One Earth*, 3(5), 543–546. doi:10.1016/j.oneear.2020.10.012

III Energy Transition and the Global South: Contributions to the Young Talent Austrian Development Research Award 2023

Clemens Bohl

Climate (In)Justice as a Global Challenge: A Framing Analysis of the Climate Justice Movement in Uganda

Introduction

For almost five years now, the Fridays for Future (FFF) movement has been one of the most visible actors in climate politics. Their protests have catapulted the dramatic issue of climate change back onto the political agenda in many countries around the world, and triggered a social shift in the perception of an issue that has been recognized for decades. After the then 15-year-old Swede Greta Thunberg started her strike in front of the Swedish Parliament in August 2018 (taz August 27 2018), other activists in countries outside Europe were inspired by Greta's protest and took to the streets of their cities. Two of them are Hilda Flavia Nakabuye and Vanessa Nakate from Kampala, Uganda, who have been protesting since January 2019. While Hilda initially protested as an individual at Friday lectures at the university, Vanessa, who had just completed her bachelor's degree, was able to persuade her siblings, cousins, and sisters to join her in public protests.

By this time, pupils and students across Europe had already joined forces and formed local, regional, and national FFF branches to strike and protest together for the climate. Hilda and Flavia shared pictures of their strikes and protests online via Twitter. Initially, their activism attracted very little public attention. They also received little attention within the transnational FFF movement. This has changed over time. Their participation in international conferences, such as Hilda's at the C40 World Mayors Summit in Copenhagen in October 2019 and at the Conference of the Parties (COP25) in Madrid in December 2019, has helped. "I do not understand why the most affected countries are always underrepresented […]. Voices from the Global South deserve to be heard" (FFF International 2020), Hilda said in her speech at COP25. Hilda and Vanessa have since become sought-after speakers, interlocutors, and guests in various international forums and media.

Since 2019, several climate justice movements have emerged in Uganda: Fridays for Future Uganda (FFF Uganda), the Rise Up Movement (Rise Up) and Extinction Rebellion Uganda (XR Uganda). They are fighting the 1.5 degrees target agreed on

in the 2015 Paris Climate Agreement[1] and climate justice.[2] Many young people[3] have joined the movements or responded to calls to take part in mass protests. Despite the movements that have emerged and the protests that are taking place, many Ugandan activists feel that they are not being heard and that they are powerless.

> *As the people who are fighting and speaking up, we are discouraged, we feel hopeless, we feel like we're not being heard. But what gives us the hope, what gives us the courage to keep speaking up is seeing many people rising up every day, more young people rising up to join the fight, to speak up and we're even seeing the older generation rising up to speak up with us. This keeps us optimistic. (IntEvelynRU)*

Climate justice protests are a global phenomenon. The climate crisis[4] has become an existential issue for people in both the Global South[5] and the Global North. Responsibility for this crisis is unevenly distributed. While countries in the Global North have historically been responsible for the majority of CO_2 emissions, people

1 Article 2 of the Paris Agreement states: "Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change" (Horowitz 2016, 744).

2 Richard Brand and Thomas Hirsch (2012, 63, own translation) define "climate justice" as granting everyone on earth, regardless of nationality, age, gender, race, or religion, equal rights to use the atmosphere, while limiting the total amount of greenhouse gases in the atmosphere so that average global warming is limited to a maximum of 2 degrees Celsius and, if possible, does not exceed 1.5 degrees Celsius. Climate justice also means sharing responsibility for avoiding the damage caused by human-induced warming wherever possible, but compensating for it when it occurs. The principle of "common but differentiated responsibility" adopted in the UN Framework Convention on Climate Change applies to climate protection, adaptation, and compensation. It takes into account both the responsibility for causing the problem and the current (economic) capacity of countries.

3 The African Union (AU) defines young people as persons between the ages of 15 and 35 (African Youth Charter; AU 2006, 3).

4 The framing of the Fridays for Future Movement has led to a linguistic change that has become widely accepted in society, but also in the political arena. While the term *climate change* has been used in public discourse for decades and is still used to some extent, the term *climate crisis* is now increasingly gaining public acceptance. While the term climate crisis was initially used primarily in the context of the climate justice movement and established environmental movements, since 2020 it has been widely adopted by scientists, journalists (*The Guardian* October 16 2019), some politicians, and international organizations (UN 2020). For example, Ripple et al. (2020 [2019], 9) state in their article "World Scientists' Warning of a Climate Emergency" that "the climate crisis has arrived and is accelerating faster than most scientists expected […]. It is more severe than anticipated, threatening natural ecosystems and the fate of humanity." The word "change" has a neutral, sometimes even positive connotation, while the word "crisis" emphasizes the dramatic nature of climatic changes underway. The term *climate crisis* is therefore preferred in this paper. The term *climate change* will be used whenever the referenced sources explicitly refer to climate change.

5 The concept of the "Global South" (see Clarke 2018) has become established in academic discourse across disciplinary boundaries over the past 15 years (Haug 2021). At the same time, the terms Global North and Global South are increasingly used in public discourse, including by activists in Uganda. In the context of the climate justice debate, the focus is on global inequalities, colonial causalities, and dependencies (see Harlan et al. 2015, 127ff.). Against this background, it makes sense to use these terms, as the context described and a duality that exists in parts.

in the Global South are increasingly and directly suffering the consequences, some of which are already catastrophic. Activists in Uganda's climate justice movements are calling on policymakers at national and international levels to act in favor of a just and responsible climate policy.

The starting point for the work on the climate justice movement (CJM) in Uganda is the previous research on the FFF protests in Vienna, Austria (see Daniel et al. 2020; IE 2022). In examining the increasingly globally networked FFF movement, it has become clear that the media and academic focus is on the protests in Central Europe. In some cases, the fate of individual activists from countries particularly affected by the consequences of the climate crisis has attracted media attention (see, e.g., Hilda Flavia Nakabuye in *Le Point* May 31 2019; *Der Spiegel* June 7 2019; *Time* October 11 2019). While the media has already broadened its perspective, activists in Africa and other regions of the Global South receive little attention in the academic discourse (see publications on FFF in countries of the Global South: McLymont 2019; Nakabuye et al. 2020; Walker 2020; Barford et al. 2021; Mugeere et al. 2021; Prendergast et al. 2021; Zitterbarth 2021; Torvik 2022; Neas et al. 2022).

Due to the rapid growth of the FFF movement and the accompanying Friday protests in many European cities, the movement has increasingly become the subject of protest and movement research. In recent years, many qualitative and quantitative research projects have been initiated, resulting in a large number of publications (see, e.g., Wahlström et al. 2019; Sommer et al. 2019; De Moor et al. 2020; Bohl and Daniel 2020; Daniel and Deutschmann 2020; Daniel et al. 2020; Haunss and Sommer 2020; Bohl et al. 2021; De Moor et al. 2021; Buzogány and Scherhaufer 2022; Noth and Tonzer 2022; Zamponi et al. 2022; Svensson and Wahlström 2023). Anthony Mugeere, Anna Barford, and Paul Magimbi (2021, 360f.) criticize that "youth climate activism in Africa so far has received limited research" and argue that "supporting young people in relation to climate change will require more youth focused research." Sally Neas, Ann Ward, and Benjamin Bowman also criticize the lack of research "beyond white activism" (Neas et al. 2022: 7) and call for a stronger focus on climate activism in the Global South.

This article aims to contribute to protest and movement research by providing a complementary perspective on the global climate justice movement through the analysis of a case study from the Global South, thus filling an existing research gap (Mugeere et al. 2021; Neas et al. 2022). With regard to the transnational climate justice movement, more attention needs to be paid to the realities, positions, and demands of activists from the countries most affected by and with the lowest contribution to the climate crisis. On the one hand, the Republic of Uganda is very much affected by the impacts of the climate crisis but has contributed very little to it. At the same time, a politically engaged climate justice movement has emerged in Uganda with a strong media presence. The focus of this paper is therefore on the case study of the climate justice movement in Uganda since January 2019, which comprises a number of independent movements.[6]

6 Consequently, this article employs both the singular and the plural forms of the climate justice movement.

This article is a translated extract from the master's thesis.[7] It focuses on framing analysis in relation to the identification of causes for the climate crisis, the naming of culprits, the perspectives on solutions, the attribution of responsibility, and the motives for activist commitment. Framing analysis is an established analytical tool for analyzing the attitudes, perspectives, and demands of movement actors.[8] The condensed research question is therefore: How do Ugandan climate justice activists frame the climate crisis?

Theoretical Approach and Methodology

The primary assumption of the framing approach is that human behavior is influenced by collective patterns of interpretation, which are referred to as frames. The sociologists Friedhelm Neidhardt and Dieter Rucht (1993, 308) define frames as collective patterns of interpretation that bring together certain problem definitions, causal descriptions, claims, justifications, and value orientations in order to explain facts, substantiate criticism, and legitimize demands.

The framing of certain issues is therefore an expression of social opinion forming processes that contribute to public discourse. The formation of collective patterns of interpretation in relation to certain social, economic, or political issues rarely starts with society as a homogeneous whole. Rather, there are competing (civil-)social actors and partial publics that want to contribute to the formation of social and political opinion through a certain framing, e.g., in the form of problem definitions, which ideally leads to a change in the status quo. Therefore, the framing approach is highly relevant for the analysis of social movements, as they are a formative part of active civil society. Their actions are based on emphasizing what they see as a concrete grievance of the status quo. By defining the cause of the problem, identifying the culprits, and naming possible solutions and responsibilities for their implementation, social movements attempt to gain interpretive sovereignty in public discourse and thereby underscore their legitimacy vis-à-vis decision-makers (Bohl et al. 2021).

According to Benford and Snow (2000, 615), the core task of *framing* is the formulation of *collective action frames,* which they define as follows:

> *Collective action frames are constructed in part as movement adherents negotiate a shared understanding of some problematic condition or situation they define as in need of change, make attributions regarding who or what is to*

7 My master's thesis is entitled "The Climate Justice Movement in Uganda: An Analysis of the Actors, their Action Repertoires and their Framing of the Climate Crisis." It was submitted to the Department of Development Studies at the University of Vienna, Austria, in March 2023. The thesis can be accessed via the following DOI: 10.25365/thesis.73330.

8 In contrast to most publications on the climate protests in Europe, which carry out the framing analysis on the basis of quantitative surveys and short qualitative interviews of protest participants in the global climate strikes, the research interest of this article lies in the activists of the individual climate justice movements.

blame, articulate an alternative set of arrangements, and urge others to act in concert to affect change.

Social movements are thus a driving force in social negotiation processes. Framing serves to mobilize potential followers and supporters on the one hand, and to articulate demands to political decision-makers on the other. Social movements depend on successful agenda setting in order to realize their demands. The frames of collective action can in turn be broken down into individual subframes covering different levels of analysis. Snow and Benford (1988) distinguish between three framings: (1) diagnostic framing, (2) prognostic framing, and (3) motivational framing. The three framings are briefly outlined below.

Diagnostic framing stands for the identification of a problem and includes the naming of the causes and the culprits in the same way (Kern 2008, 143; Benford and Snow 2000, 616). The identification of "whom or what to blame" (Benford and Snow 2000, 616) depends strongly on the situatedness of the movement actors and can also vary within a movement. Social movements use the diagnostic frame to draw attention to what they see as existing grievances. The identification of problems is often also the basis for legitimizing the emergence of a social movement.

Prognostic framing builds on diagnostic framing and represents the formulation of proposed solutions to the identified problem ("what is to be done" [Benford and Snow 2000, 616]), including the attribution of responsibility for solving the problem (Benford and Snow 2000, 616). According to Kern (2008, 144), the formulating of solutions to problems is fundamental for social movements because it contributes to the credibility of the movement. Credibility is closely linked to a movement's legitimacy. The development of solutions to problems is usually accompanied by processes of negotiation within the movement (ibid.).

Snow and Benford define *motivational framing* as the third core function of framing and describe it as a "call to arms" (Benford and Snow 2000, 616). This is necessary because it cannot be assumed that a consensus on the cause of the problem and its solution is sufficient to trigger a mobilization for collective protest action. Therefore, a justification for action in the form of a motivational framing is required (Snow and Benford 1988, 201f.).[9] Kern (2008, 145) specifies the justification for action and speaks of necessary selective incentives such as recognition, solidarity, or moral appeals with which potential protest participants must be addressed for the purpose of mobilization. Opp (1998, 92) defines selective incentives as benefits and costs that occur when one engages or does not engage. Both Kern and Opp do not interpret motivational framing exclusively as a one-way *call to protest* emanating from a movement, but rather speak of *selective incentives* in general. Selective incentives can take many forms.

Master frames are superordinate frames that can be linked across a movement, serving the same function as movement-specific *collective action frames*, namely the punctuation, attribution and articulation of social grievances (Snow and

9 Motivational framing is a complex analytical approach. As part of the framing analysis, I look exclusively at the activists' motives for action within the climate justice movement.

Benford 1992, 138). The main difference is that the frames are broad and open-ended, allowing them to be identified and applied to different conflict issues by other social actors. These could be other movements, civil society organizations, academic actors, international organizations, companies, political parties, governments, and other decision-makers.

The framing analysis in this paper is based on six guided expert interviews with activists. Two further interviews with external persons (a Swedish diplomat, and a journalist from *Nile Post*) from the environment of the climate justice movements in Uganda complement the interviews with the activists with an external perspective. The Qualitative Content Analysis according to Mayring (2015) serves as the basis for the analysis of the data.[10]

The Climate Justice Movement in Uganda and its Activists

The field of actors working on the environment, climate, and climate justice in Uganda is extensive. A distinction can be made between institutionalized and non-institutionalized actors. FFF Uganda, Rise Up, and XR Uganda can be described as noninstitutionalized actors. They are part of a transnational climate justice movement coalition. Nevertheless, the noninstitutionalized character does not necessarily imply the absence of organizational structures. This is indeed the case, facilitating the movements' internal and external coordination. Despite their independent status, FFF Uganda and Rise Up exhibit blurred boundaries and occasionally encounter misclassification in media reporting.

The climate justice movement in Uganda is not a unified entity. At the national level, there are alliances between the movements (FFF Uganda, Rise Up, and XR Uganda), which cooperate on certain issues and protest actions. They are also involved in alliances and coalitions at the transnational level, some of which overlap. The degree of integration varies. The transnational coalitions, such as #StopEACOP, are primarily composed of individual movements, with civil society organizations, such as nongovernmental organizations (NGOs), belonging to them in a secondary capacity.

The movement is a constantly exposed actor to public discourse and a changing context (EACOP, Bugoma Forest, COPs, elections). As a result, the movement is forced to constantly adjust its thematic prioritization and arguments to remain relevant. The climate justice movement's actions are not limited to local contexts; they also explicitly target decision-makers in the Global North. In addition to street protests and social media activism, direct action is another fundamental pillar of the climate justice movement in Uganda.

According to observers, and activists' own observations, the average age is between 17 and 28 years (IntExNilePost), which corresponds to the definition of young people by the African Union (see footnote number three). It should be noted that a school strike in the form of (unauthorized) absenteeism from school

10 A detailed description of the methodological approach can be found in my master's thesis.

does not take place in Uganda (IntExNilePost). One reason for this is that parents have to pay high school fees, which means that absenteeism is out of question for pupils and parents for socioeconomic reasons (*Zeit Campus* November 5 2022). Another reason is the fear of the consequences of not attending school or university (IntEvelynRU). Consequently, activists in Uganda have found alternative ways to express their protest in public. For instance, students engage in on strike actions before or after classes, displaying self-written posters and cardboard signs. Photographs or short videos of these are taken, uploaded, and shared or retweeted on social media with slogans, demands, hashtags, and links from political and economic decision-makers as well as fellow activists (ibid.).

The interviewed activists are briefly introduced below.[11] For this research, they have shared their personal stories and perspectives on the climate crisis. The interviews provide the basis for the following framing analysis.

Fridays for Future (FFF) Uganda

Kabila (24) is an environmental and climate activist from Gulu, Uganda. He is responsible for the coordination of FFF activities in Northern Uganda. Kabila holds a bachelor's degree in food and agriculture. He is currently working as a scholarship holder for the NGO Teach for Uganda. He has been a climate activist since 2020. (IntKabilaFFF)

Junior (25) is a climate, nature, and environmental activist from Kampala, Uganda. He is currently studying environmental science at Kyambogo University. Junior and his family are farmers. He joined FFF Uganda in 2022 as part of the #StopEACOP campaign. He first got involved with an environmental youth organization as a campus coordinator at his university. In this capacity, he assisted in the organization of one of the first global climate strikes in Uganda. He was also involved in the organization of the so-called SDG runs.[12] He sees himself as an independent activist who pursues an inclusive approach. (IntJuniorFFF)

Rise Up

Evelyn (31) is a climate justice activist from Kampala, Uganda. She is a close friend of Vanessa Nakate. She holds a bachelor of science in land economics from Makerere University and works for the Ministry of Lands, Housing and Urban Development as a valuation surveyor. She has been involved with Rise Up since 2019 and is now the national coordinator for Rise Up in Uganda. Evelyn initiated the +1TreeProject. (IntEvelynRU)

11 For a detailed actor analysis of the climate justice movements, please see the master's thesis. It should be noted that the activists' affiliations and activities may have changed since the interviews were conducted in 2022.

12 The SDG run is an annual event that showcases Uganda's dedication to achieving the 17 United Nations Sustainable Development Goals (SDGs).

Aidah (24) is a gender and climate justice activist from Kampala, Uganda. In addition to her voluntary work, she works as an application consultant. Before Aidah came to climate activism in 2021, she was already involved in gender issues and recognized the negative effects of climate change on them. She therefore looks at climate change from an intersectional perspective. Aidah is part of Rise Up but is also involved in FFF MAPA.[13] (IntAidahRU)

Ezra (mid-20s) is a climate activist from Kampala, Uganda. He identifies himself as a member of Rise Up and FFF. He is currently studying law at Uganda Christian University and has a degree in climate studies from Makerere University in Kampala. Ezra first became aware of Rise Up late through a friend, joined the group in 2022, and has been involved with the movement as a legal advisor ever since. Previously, he was socially involved in an NGO that primarily works with marginalized groups (especially women) in rural areas in Uganda. In his role as legal adviser, he explains to other activists their rights, draws up necessary documents, and is available on call. Ezra also has his own project for clean water. (IntEzraRU)

Extinction Rebellion (XR) Uganda

Annette (45) is the founder of XR Uganda. She describes herself as an advocate for the environment and sees her role in the movement as an "invisible hand" (IntAnnetteXR). She is a mother and works as a software analyst. Annette has been involved in various environmental and climate justice movements for six years to raise awareness of the climate crisis. In her role as "invisible hand," she supports local XR groups on the African continent and serves as an interface between African activists and XR in Europe. Annette is responsible for the overall communication of the movement in Uganda and translates for activists in French-speaking countries such as Congo. She deliberately refrains from using the term activist for herself, as it is too political in the Ugandan context. Annette is on the board of the Association for the Conservation of Bugoma Forest. (IntAnnetteXR)

The Climate Justice Movement and the Climate Crisis: A Framing Analysis

While FFF activists in Europe worry about their future and that of their potential children in the face of the climate crisis, the climate crisis in Uganda is already showing its far-reaching effects today (cf. Afrobarometer 2022a). Vanessa sums it up in her book *A Bigger Picture*:

> *People in Uganda, in Africa, and across what's called the Global South are losing their homes, their harvests, their incomes, even their lives, and any hopes of a livable future right now. (Nakate 2021, 2)*

13 FFF MAPA is a subgroup of FFF International, representing the Most Affected People and Areas.

It is scientifically proven and generally recognized who is historically responsible for the highest CO_2 emissions, what effect CO_2 in the atmosphere has on the climate, and what consequences this has for people in particularly vulnerable regions of the world (see Oreskes 2004; Anderegg et al. 2010; Verheggen et al. 2014; Ripple et al. 2020 [2019]; IPCC 2022). The Paris Agreement of 2015 has already given a binding basis for how this crisis can be countered and its escalating consequences averted, or how compensation and adaptation to climate change can be implemented (cf. Horowitz 2016). A fundamental problem is that the responsible actors (primarily nation states) are not fulfilling their contractual obligations or are moving too slowly in implementing them. Activists take up this lack of action and formulate demands directed at various recipients.[14]

It is striking that all the activists are very keen to report on the impacts of the climate crisis in Uganda. This became clear in the interviews. Perceptively, they describe the disastrous consequences of the climate crisis. For the activists, the climate crisis is an emotionally charged issue. Evelyn, for example, finds the effects of the crisis "painful" and "heartbreaking" (IntEvelynRU). Although Annette feels hopeless, she does not think that her efforts are in vain (IntAnnetteXR). Aidah believes that change is possible. The activities of the climate movements give her hope and support her as she deals with her feelings of climate anxiety (IntAidahRU).

The framing analysis is used to frame the climate crisis from the perspective of Ugandan activists.[15] It is structured based on diagnostic, prognostic, and motivational framing. The large number of longer quotations is intended to make the voices of the activists audible.

Diagnostic Framing: Identifying Causes and Naming Culprits

In the following, the problem as defined by the activists is analyzed as part of the diagnostic framing. The activists were asked what they thought had caused the climate crisis[16] and who was responsible for it.

14 The responses in the interviews show differences in the framing of the different activists. It becomes clear which people have been activists for longer, have more experience in dealing with interviews, and who is closely involved in the transnational climate justice movement. These factors seem to influence the framing of some people.

15 The qualitative data from the interviews (activists' positions) are complemented and contrasted with quantitative data (positions of the Ugandan population). The inclusion of the quantitative data makes it possible to categorize the positions of the climate justice movement in the Ugandan context.

16 Activists do not always use the terms *climate change* and *climate crisis* consistently. Even when some activists talk about climate change, it is framed as a *crisis*.

Identifying Causes

The qualitative content analysis of the interview transcripts shows that the activists formulate the causes of the climate crisis generally and globally, while at the same time making a strong reference to the local context in Uganda, which is characterized by current events. Three overarching areas can be identified in the identification of causes: (1) *human activities*, (2) *lack of awareness,* and (3) *weak law enforcement*.

The interviewees identify *human activities* and the associated increase in global CO_2 emissions as the main cause of climate change. They support the theory of anthropogenic climate change, which a great number of scientists consider to be highly plausible (IntJuniorFFF; IntKabilaFFF; IntAnnetteXR; IntEvelynRU). The activists base their arguments on scientific findings, such as the United Nations' IPCC reports (IPCC 2022): "I didn't want to distance myself from the IPCC report, it's undoubtedly believed that it's human beings responsible for this, that is happening, […] it's human activities," stresses Junior (IntJuniorFFF). The knowledge of the generally recognized causes of the climate crisis is the result of an intensive study of its impact on Uganda. Individual activists were initially unable to identify what they were observing in Uganda and what they themselves were affected by as a climate crisis. Evelyn, for example, began researching the phenomenon she had observed and developed a deeper understanding of the causes of the climate crisis.

> *I started doing research on what global warming was. And this is something that it affected me so much when I started reading about it, because it was making sense with what I'm seeing in my day to day life, it was making sense with what I've been seeing while growing up. […] I think what caused climate change is the increase in CO_2 emissions. (IntEvelynRU)*

In relation to human activities, activists cite the *extraction of fossil fuels* as the cause and driver of the climate crisis. In this context, the EACOP project[17] in Uganda (and Tanzania), which increases CO_2 emissions and at the same time represents a dramatic intervention in the environment, its flora and fauna, and the habitat of the people living along the pipeline, was mentioned (see IntKabilaFFF; IntJuniorFFF; IntEzraRU). EACOP thus symbolizes the general extraction of fossil fuels and the associated increase in CO_2 emissions worldwide.

Deforestation is also identified by activists as a key cause of the climate crisis (in Uganda). Exploitation and environmental degradation are the result of a *lack of awareness* in society. In addition to deforestation to utilize land for industrial agriculture (IntJuniorFFF), cutting down trees for firewood also plays an important role (IntEzraRU). According to Ezra, however, people are not aware of the impact of deforestation on the climate: "They [the people] need to be aware that if I touch a tree, because they don't have an option, they cut trees to cook, to be alive" (IntEzraRU). A Swedish diplomat from Uganda, who was interviewed as an expert, also

17 EACOP stands for East African Crude Oil Pipeline.

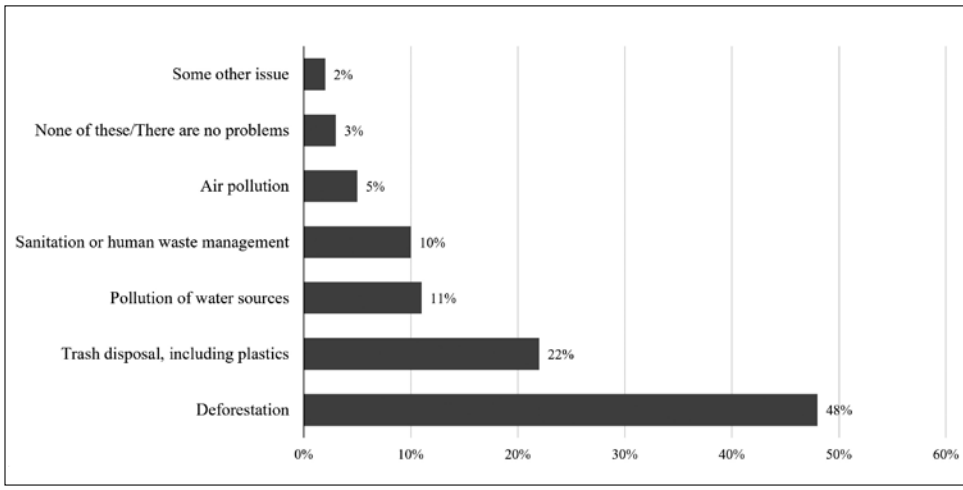

Figure 1. Most important environmental issue in the community, Uganda, 2022 (Source: Afrobarometer 2022b, 5)

believes that deforestation by the rural population is due to the fact that people are primarily concerned with their own survival (see the famine in Karamoja) and, therefore, the long-term survival of the planet is irrelevant to them (and due to their unawareness) (IntExSWE).[18] Activists are addressing this lack of awareness through educational and reforestation measures.

The perceived lack of awareness among the Ugandan population contradicts the results of the latest Afrobarometer survey (see fig. 1) and is an expression of a possible discrepancy between awareness and action (see "survival over climate").[19] The Afrobarometer survey (2022b) asked the Ugandan population to identify the most pressing environmental issue that Uganda endures.[20] Of those surveyed, 48% consider deforestation to be the most important environmental issue, followed by trash disposal (22%), pollution of water sources (11%), and sanitation or human waste management (10%).

Identifying the cause of *weak enforcement* of national laws goes hand in hand with identifying and criticizing the *draining of wetlands.*[21] This is first and foremost an intervention in the environment which, due to climate change, is having a crisis-like effect on the people who live there.

18 The "survival over climate" aspect could be interpreted as a separate frame. However, the focus of this article is on the framing of activists who do not represent this potential frame (on the side of marginalized parts of the population).

19 The extent to which awareness of the problem differs between urban and rural populations is not clear from the survey results (see fig. 1).

20 The questions and possible answers in the survey cannot be transferred one-to-one to the questions asked of activists about the causes and culprits of the climate crisis.

21 Drainage of wetlands was not a response option in the Afrobarometer survey (2022a).

You find rich people building in swampy areas, building flats, malls, you know, constructing in swampy areas, which would be drainage areas for water. And these [NEMA] are the people allow those people to build. (IntEzraRU)

The destruction of wetlands is linked to weak law enforcement, which also raises suspicions of corruption. The National Environment Management Authority (NEMA) grants construction permits for wetlands to wealthy people (IntEzraRU). The representative of the Swedish embassy confirms the problem of wetland destruction but sees the main cause in population growth and the resulting demand for construction land (IntExSWE). The analysis of the causes shows that it is inextricably linked to the attribution of blame and the naming of those responsible. This issue will be discussed in greater detail below.

Naming Culprits

The following section examines the identified culprits of the climate crisis, as presented by the activists. Based on the empirical material, four frames can be identified: (1) the *Global North*, (2) the *Ugandan government*, (3) the *fossil fuel industry* and (4) *humanity per se*.

In principle, the activists agree that the main responsibility for causing the climate crisis lies with the countries in the *Global North.* However, not all activists formulate this with the same clarity. Junior from FFF Uganda, for instance, attributes the elevated CO_2 emissions to "other countries from other continents that are leading too much of the vulnerability effects, facing right now currently in our communities. We are suffering because of that" (IntJuniorFFF). This assertion is made in the context of the perceived suffering of Ugandan communities due to the climate crisis. The activists express a sense of abandonment by the people of Europe (IntEzraRU). Aidah and Evelyn from Rise Up are more specific in their attribution of responsibility for the climate crisis. They identify the "rich nations or countries in the Global North" (IntEvelynRU) or "the biggest polluters in the Global North" (IntAidahRU) as the culprits in the crisis.

Despite the assertion of the activists that the climate crisis is partly caused in the Ugandan context, this is not expressed in their communication on a global level (particularly on Twitter). The argument that the Global North is responsible for the climate crisis is consistently accompanied by an emphasis on the *non-responsibility of Africa* and the people of Uganda: "historically, just Africa alone as a continent [is] responsible for just about 3% [3.91%] of global emissions. Then when you divide that percentage among all 54 countries, that means just my country Uganda has a very little contribution to that percentage" (IntAidahRU), explains Aidah. Furthermore, the activists emphasize the suffering associated with the climate crisis for the people: "So, in Uganda, for us, we are already suffering some of the worst impacts of the climate crisis. And yet, we are least responsible for causing this climate crisis. […] we don't have enough resources to cope. So, to us the climate crisis is a death sentence to some communities" (IntEvelynRU). The

emphasis on non-responsibility and the resulting injustice regarding the suffering caused by the climate crisis for the people of Uganda is indicative of the explicit justice component that characterizes the climate justice movement in Uganda.

Against the backdrop of the responsibility for the climate crisis, which is primarily located in the countries of the Global North, Rise Up and FFF MAPA[22] activist Hamira Kobusingye links the EACOP project to environmentalism and neocolonialism.[23]

> *This is also an act of environmental colonialism and neo-colonialism. We all know that when these fossil project happen, it's the Global North that earns from them than us here the Global South. We all know that we have seen that Total, between Total and CNOOC. The 70% ownership of a project that is not on French land, that is not on Chinese land, but it's on an African land. It's African people that are being exploited. In Africa people that are being displaced. African people are losing their lives. It's their living and livelihood. It's the African people that are losing their homes, it's African people that are losing their cultures, and it's African that will still bear the aftermath and the wrath of the aftermath of the oil projects.[24] (BUNDjugend/Locals United 2022)*

Additionally, Annette from Extinction Rebellion recognizes a correlation between the climate crisis in Uganda and colonialism. She states, "We do not blame in my movement. I totally avoid it because it's too late for us now to blame. Because if we go back to the history, as our culture is no longer the way it used to be. If we had retained our culture with less, without colonialism, maybe." She attributes the advent of environmentally destructive capitalism to colonialism, stating, "We wouldn't be having some of this capitalism, the economic activities that have led to the local former traditional human species to go destroy the environment" (IntAnnetteXR). In contrast to Hamira, Annette discusses historical colonialism and its impact on the lives of people in Uganda today. She clarifies that she does not want to explicitly blame anyone for the climate crisis. Nevertheless, she also clearly ascribes responsibility to the Global North.

In addition to the Global North, the *fossil fuel industry,* which is often closely linked to the Global North, is also identified as a cause of the climate crisis. "CO_2 emissions have come about the biggest percentage been caused by the fossil fuel industry," diagnoses Evelyn (IntEvelynRU). Specific actors are also highlighted, such as "Total and Shell, which are breeding these oils, but also using coal, and other forms of fossil fuels" (IntKabilaFFF). The example of Hamira's quote and the statements of the activists demonstrate that the criticism of the fossil fuel industry is, to some extent, embedded in the Ugandan context.

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22 The abbreviation MAPA stands for Most Affected People and Areas. Further information on FFF MAPA can be found in Appendix 1.1 of the master's thesis.

23 China, as a neocolonial economic power, is understood in the same way as France as part of the Global North.

24 Given that an interview with Hamira could not be conducted, an external interview was deemed appropriate for inclusion in the framing analysis, as it helps to portray the climate justice movement in Uganda.

In the framework of contextualizing the effects of the climate crisis on Uganda, the *Ugandan government* is also criticized and held responsible. "The activists in Uganda are people that are against the government," Aidah clarifies (IntAidahRU). The government is just as responsible for the weak law enforcement in relation to the clearing of forests and the draining of wetlands as it is for authorizing the extraction of fossil fuels by foreign companies. Kabila argues that the EACOP project will have a significant impact on Ugandan society. He further asserts that the government is the primary driving force behind the project and outlines a clear assignment of responsibility: "My greatest demand lies back here in Uganda, and it is to the President of the Republic of Uganda, this is His Excellency Yoweri Kaguta Museveni, but also to the Minister of Energy and Mineral Development, that's Hon. Ruth Nankabirwa Ssentamu" (IntKabilaFFF). Despite the attribution of responsibility and confrontation with the government at the national level, at the international level, activists and the Ugandan government are making some of the same demands of the Global North.

In addition to the framing of specific names of culprits, another framing must also be considered. There are activists who take the view that *humanity per se* is to blame for the climate crisis. They see humanity in general as being responsible and speak of "the people. It's us. It's all of us" (IntJuniorFFF). Kabila also says: "Yes, the people are responsible for the climate crisis; it is we the same human beings" (IntKabilaFFF). Nevertheless, these activists relativize their general attribution of blame and see the greater responsibility as lying with "a few individuals, who in most cases, tend to be more powerful than majority of the people" (IntKabilaFFF).

The analysis of the diagnostic framing reveals a clear identification of causes and naming of culprits. For the identification of causes, the activists base their statements on scientific evidence and speak of the anthropogenic climate crisis. They also cite a lack of awareness of the problem among the population and weak law enforcement to protect the environment and the climate. In addition to the global level, the activists always refer to the national context. The activists identify the Global North and the fossil fuel industry as the main causes of the climate crisis. They emphasize the non-responsibility of the African continent and its (neo) colonial exploitation by the Global North using the example of EACOP. In this context, the Ugandan government is harshly criticized for supporting this project. Humanity per se is also named as a culprit, even if this framing is less strongly articulated. Some activists refrain from making a specific attribution of responsibility and instead present their argument in a more generalized manner.

Prognostic Framing: Demands for Solutions and Attribution of Responsibility

In addition to identifying the causes and naming the culprits, it is also vital for social movements to formulate demands for solutions and attribute the associated responsibility in order to mobilize potential supporters and achieve change with regard to the defined problem. In the interest of ascertaining the demands of the

climate justice movements for solutions to the climate crisis, and the associated responsibility, activists were asked to provide responses.[25]

The demands of the climate justice movements for solutions are closely linked to the identification of causes and the situatedness of the activists.

> *Every activist has a story. And every story has a solution it gives, so I believe that my voice has a solution that it gives to people. And that so is the same for the rest of the activists. (IntEvelynRU)*

A content analysis of the empirical material revealed the following key demands: (1) *climate finance*, (2) *reparation payments*, (3) *stopping fossil fuels*, (4) *sustainable policies*, and (5) *active action*. The demand for climate justice is overarching and is therefore presented separately as a master frame. The analysis of the prognostic framing is based on the addressees that the activists identify for the solution to the climate crisis and the associated demands. In some instances, a single demand is directed at multiple addressees.[26] While the activists from Rise Up primarily address the Global North, the focus of the activists from FFF Uganda and XR Uganda is on the national context and the population. The subchapter is therefore organized as follows: (1) *general demands*, (2) *Global North*, (3) *Ugandan government*, and (4) *Ugandan population*. From the perspective of the activists, some of the actors are the same in terms of identifying the culprits and attributing responsibility for resolving the problem caused.[27]

General Demands

Of the three climate justice movements in Uganda that were analyzed, two of them are integrated into transnational movements.[28] Extinction Rebellion Global (XR Global 2022) formulates three central demands: (1) *tell the truth*, (2) *act now*, and (3) *go beyond politics*.[29] The first demand implies a call for governments to declare an environmental and climate emergency and to work together with other institutions (e.g., the media) to communicate it. The second demand is focused on the necessity for action to halt the extinction of species and reduce greenhouse gas emissions to net zero by 2025. The third demand is that governments should set up so-called citizens' assemblies for climate and environmental justice, whose decisions should guide their actions (XR Global 2022).

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25 As the requirements are intricately linked to the attribution of responsibility in accordance with the polluter pays principle (see BpB 2016), the two aspects are analyzed together and presented jointly.

26 In these cases, the corresponding receivable is assigned to the main addressee.

27 The fossil fuel industry is identified as a part of the Global North in terms of their responsibility for a solution to the climate crisis. In contrast, the focus shifts from humanity per se as the culprit to the Ugandan population as responsible for the solution.

28 Unlike XR and FFF, Rise Up is a movement that does not have officially communicated universal demands. At the same time, some Rise Up activists also identify with FFF MAPA.

29 The specific wording of the requirements differs in detail across the various languages available.

Fridays for Future (FFF) International also formulates standardized demands to which the FFF movements in the individual countries refer. The three main demands of FFF International (2022) are: (1) *keep the global temperature rise below 1.5°C compared to preindustrial levels*, (2) *ensure climate justice and equity*, and (3) *listen to the best united science currently available*.[30] Despite the fact that the demands of the activists from FFF Uganda and Rise Up are essentially the same as those of FFF International, the demands of the Ugandan activists extend beyond the generally formulated demands. The demands of the Ugandan activists are more concrete and embedded in the local context. The demands and attributions of responsibility of the activists are analyzed below.

Global North

Climate movement activists in Europe primarily address their own governments with demands (see Daniel et al. 2020, and Bohl et al. 2021 for Austria), whereas the activists of Rise Up primarily focus on the countries of the Global North.

> *The people responsible for this crisis, other countries in the Global North, the rich nations are responsible for solving this crisis. And this is why we have been like trying to amplify this message and calling them out to take action to take responsibility for the crisis they caused. (IntEvelynRU)*

The activists suggest that the Global North is not only responsible for causing the climate crisis, but also for combating it. In the view of the activists, the Global North not only bears responsibility for reducing greenhouse gases, but also for the people who suffer most from the effects of the crisis. The activists add the social dimension to the climate crisis.

The activists are calling for the provision of *climate finance* (IntEzraRU; IntAidahRU; IntEvelynRU). The United Nations Framework Convention on Climate Change (UNFCCC 2023a) defines "climate finance" as "local, national or transnational financing-drawn from public, private and alternative sources of financing-that seeks to support mitigation and adaptation actions that will address climate change."[31] Activists argue that the fulfilment of the demand for climate financing was promised many years ago, but this has not yet materialized. The funds could assist "vulnerable communities like mine, in adaptation and mitiga-

30 The demands were formulated in the Lausanne Climate Declaration (FFF International 2019).

31 Climate finance is understood to encompass the following: "The Convention, the Kyoto Protocol and the Paris Agreement call for financial assistance from Parties with more financial resources to those that are less endowed and more vulnerable. This recognizes that the contribution of countries to climate change and their capacity to prevent it and cope with its consequences vary enormously. Climate finance is needed for mitigation, because large-scale investments are required to significantly reduce emissions. Climate finance is equally important for adaptation, as significant financial resources are needed to adapt to the adverse effects and reduce the impacts of a changing climate" (UNFCCC 2023a).

tion to the climate crisis" (IntEvelynRU), thereby positively impacting the lives of people in Uganda, according to Evelyn. From the activists' perspective, there is also a need for financial compensation for the loss and damage caused directly or indirectly by the climate crisis in Uganda. In Uganda, this includes extreme weather events such as droughts or floods. Aidah also posits that climate financing should be utilized to facilitate "a just transition to renewable energy for Africa", "so that we don't have to go through the same […] process of bad pollution, experiencing all the bad things that come with it" (IntAidahRU). This position is clear in its assertion that, despite the historically low level of CO_2 emissions, the activists of Rise Up do not believe that Uganda should have the right to cause more CO_2 emissions for a certain period in order to enable economic development. This stance differs from the arguments of some African states at international negotiations such as the Conferences of the Parties (COPs) (see *Reuters* October 4 2022).

In addition to the provision of climate finance by states with greater financial resources for states with fewer financial resources and particularly high vulnerability to climate change (UNFCCC 2023a), as stipulated in the Kyoto Protocol[32] and the Paris Climate Agreement (Horowitz 2016), the activists of Rise Up are demanding so-called *reparation payments* from the states responsible for the climate crisis:

> *We are demanding for a separate fund from the rich countries for loss and damage, to provide a loss and damage facility. This loss and damage facility is here to provide reparations for a crisis that they cause, this is like our compensation for a crisis that the rich countries have caused. So, they have the biggest part here or they have the biggest role here to play to stop the climate crisis. (IntEvelynRU)*

The activists' demand extends beyond the climate finance for mitigating and adapting to climate change set out in the Paris Agreement. It expresses the injustice implicit in the climate crisis, which is a central concern for the activists of the climate justice movements in Uganda. These activists articulate this concern weekly with protest actions on Twitter. Posters with slogans such as "Show Us the Money"[33] or "We Cannot Adapt to Loss and Damage"[34] can be seen in the published images.

Another demand to the actors in the Global North is to *stop fossil fuels*. "The Global North should stop funding new fossil fuel projects," demands Aidah (IntAidahRU), citing the EACOP project as an example. This project is partially financed by Total, a French company, among others. Aidah believes that the Global North is in a position to refrain from promoting such large-scale fossil fuel projects. Nevertheless, she maintains that a cessation of the extraction and utilization

32 The Kyoto Protocol is the predecessor agreement to the Paris Climate Agreement (see UNFCCC 2023b).

33 See Vanessa's tweet from November 8 2021: https://twitter.com/vanessa_vash/status/1457700317852807176 [March 9 2023].

34 See Evelyn's tweet from 18 October 2022: https://twitter.com/eve_chantel/status/1582341867101777920 [18 January 2023].

of fossil fuels is not a desired outcome, despite the occurrence of global protests (IntAidahRU).

While the activists clearly attribute responsibility to the Global North, the results of the Afrobarometer survey (2022a, 9f.) show that only 2% of respondents believe that "rich or developed countries" are responsible for combating climate change and mitigating its effects (see fig. 2). Additionally, 11% of respondents believe that "developed countries" are already doing enough to stop climate change, a sentiment that is more prevalent than with the Ugandan citizens (9%), business and industry (5%), and the Ugandan government (4%) (ibid., 10; see fig. 3). At the same time, 65% of respondents indicate that the "developed countries" need to do much more (see fig. 3). The results of the Afrobarometer survey present a contrasting picture of the attribution of responsibility for combating the climate crisis compared to the views of the activists. It is not clear from the survey how the interviewees came to the conclusion that the "rich and developed countries" bear so little responsibility for tackling the climate crisis. It can be assumed that, although the term "climate change" is known, there is no extensive knowledge of the connections between the causes and culprits responsible for the climate crisis. In this respect, the cultivation[35] of public discourse by the media may have led to the Global North being seen as progressive, green, and sustainable, which is then interpreted as a comparatively greater effort in the fight against the climate crisis. The Afrobarometer survey (2022a) does not address the dimension of social justice as a sub-aspect of the climate crisis, namely climate justice.

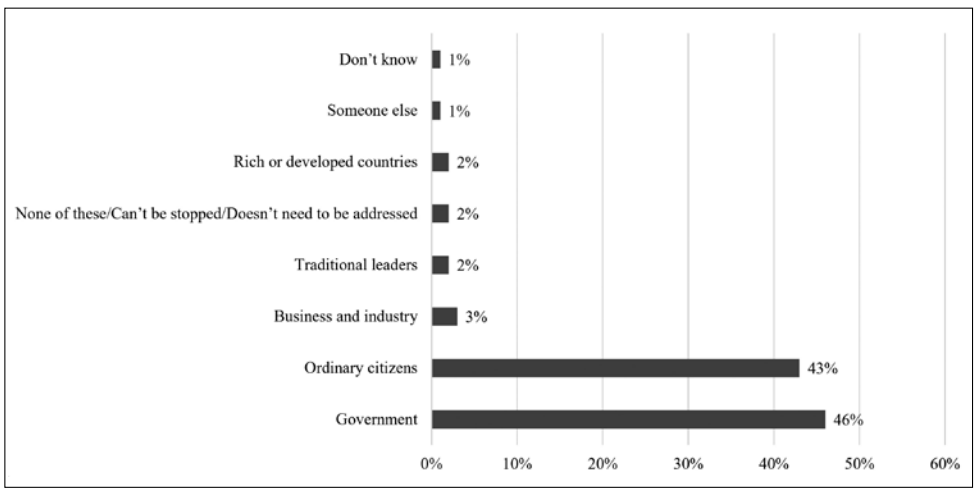

Figure 2. Who has primary responsibility for limiting climate change? Uganda, 2022 (Source: Afrobarometer 2022a, 10)

35 The cultivation hypothesis is a theory that proposes that the content of television programs has a long-lasting influence on the recipient's world view (Wulff and Lehmann 2008, 274).

The divergence between the perspectives of activists and the socioeconomic and demographic average of society suggests a lack of social representation within the movement. It can be posited that the climate justice movement is predominantly comprised of students and former students (IntEzraRU), which results in a high level of education within the movement. Moreover, Ugandan activists are closely integrated into a transnational advocacy network (see Keck and Sikkink 1999), consume international media, follow international climate policy, and are sometimes actively represented in the international climate discourse. These factors have an impact on the differentiation of activist views.

Ugandan Government

In contrast to the marginal attribution of responsibility to industrialized countries, the Ugandan population believe that their own government bears the main responsibility (46%) for tackling the climate crisis (Afrobarometer 2022a, 9f.; see fig. 2). At the same time, 79% of respondents believe that the government must make significantly greater efforts to solve the crisis (see fig. 3).[36] A mere 4% of respondents indicate that the government is already doing enough (ibid., 10). Furthermore, the more people are affected by poverty, the more critical they are of the government's actions in combating the climate crisis (ibid., 11). A significant proportion of the surveyed population (83%) indicate that the government should implement more

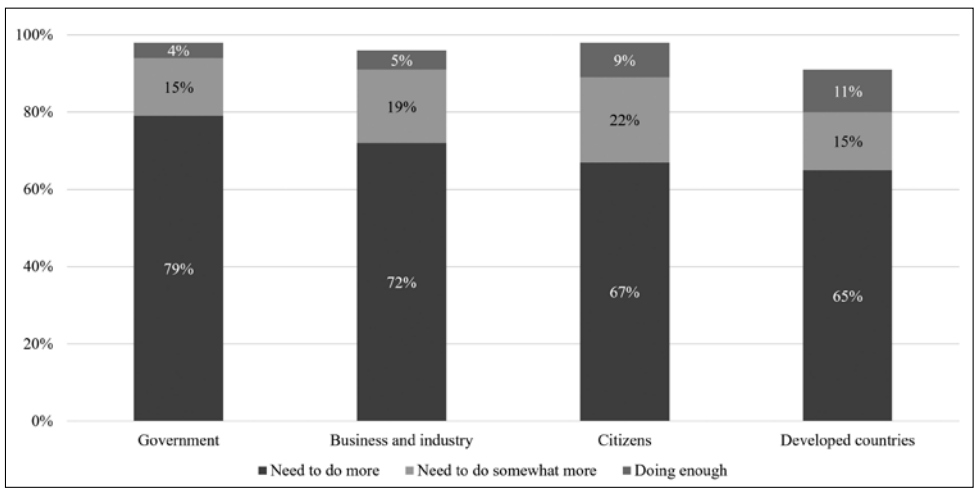

Figure 3. Are stakeholders doing enough to limit climate change? Uganda, 2022 (Source: Afrobarometer 2022a, 10)

36 Despite the prevalence of unemployment in Uganda, a significant proportion of the population (80%) is aware of climate change and believes that the government should take more action to combat it. This is true even if the necessary measures are expensive, burden the economy, or result in job losses (Afrobarometer 2022a, 2, 12). No information is available regarding the conception of the measures.

stringent regulations governing the extraction of natural resources to mitigate the associated environmental impacts (Afrobarometer 2022b, 2).

Although the activists also perceive the Ugandan government as a responsibility bearer, the primary accountability for addressing the climate crisis is attributed to the "rich and developed countries" of the Global North. Nevertheless, the activists also propose specific solutions for mitigating the effects of climate change and direct these proposals to the Ugandan government.

I am a Ugandan; I am calling up on my country. (IntJuniorFFF)

At the national level, FFF activist Junior is advocating for a responsive government (IntJuniorFFF) that employs *sustainable policies* to protect biodiversity and natural resources in the context of the climate crisis. The demand for a change of course in policy, in which the government should put its "people above profits" (IntAidahRU), is closely aligned with the demand to *stop fossil fuels*. "Our greatest demand is to stop EACOP", states Kabila (IntKabilaFFF). He goes on to assert that the consequences of EACOP would be catastrophic not only for Uganda but also for the entire world. With regard to other African countries such as Nigeria, which is also particularly vulnerable, Evelyn demands that these countries must not allow the exploitation of fossil fuels either (IntEvelynRU). Despite the progress of the large-scale project, the activists are optimistic that their protest against EACOP can be successful: "It's an achievement to me, because one night there have been threatening words violence, or words by the leaders, because they are profit-minded instead of being community oriented and mindful of people in the society. So, I still believe that for EACOP will stop. And I believe that very soon, it will be my biggest achievement" (IntKabilaFFF).

On the other hand, not all activists articulate clear demands to the Ugandan government. However, in the context of the general and standardized demands formulated by XR Global, it is not possible to formulate demands to the national government with regard to the local context, according to Annette. She states, "you can't tell the truth [Annette laughs]; you cannot instruct your governmental authorities here. They [the activists] don't have that right and capacity to take action" (IntAnnetteXR).[37] Notwithstanding Annette's view that XR Global's demands are too general and not applicable to the local context, XR Uganda is attempting to implement them (ibid.).

Despite the considerable distance between activists and the government at the national level, there appears to be a consensus on the identification of the main culprits and the demands to be made of these actors. In the run-up to COP27, the *Nile Post* reported "Minister for Water and Environment Beatrice […] Anywar

37 For this reason, XR Uganda's protest is conducted in a "passive form." "We have to do it passively because of the political situation. We do not want to violate the rules, as we do not have enough legal capacity to support groups, even from the global movement," Annette states (IntAnnetteXR). Annette's statements express a frustration with XR Global that is rooted in hierarchical structures and a lack of inclusion and consideration of activists from Africa.

also urged the developed countries which are emitting the most to compensate the least developed countries like Uganda for their contribution" (*Nile Post* November 8 2022).

Ugandan Population

Although the responsibility for addressing the climate crisis is clearly attributed to actors in the Global North, the activists also emphasize the responsibility for tackling the crisis that lies with all of the humanity. Nevertheless, the focus of the attribution of responsibility in the activists' statements is on the Ugandan population. Junior from FFF Uganda avoids apportioning blame to actors outside the national level: "I don't want to blame. I want to put ourselves at the center. We are causing this," and adds, "so, it's us responsible because it's us being affected. And we aren't going to wait for the neighbor to come and help us" (IntJuniorFFF). A significant proportion of the Ugandan people (43%) also believes that the general population is responsible for mitigating climate change (Afrobarometer 2022a, 10; see fig. 2). Furthermore, 78% of those surveyed are convinced that citizens can contribute to averting climate change (ibid., 9). This high level of conviction that each individual can contribute to overcoming the climate crisis is the evidence of a high level of reflection on one's own actions. However, this result also demonstrates a perspective on the climate crisis that is limited to the local context and fails to consider the global dimension of the climate crisis. In light of this, it becomes evident that there is a pressing need to raise awareness of the climate crisis and its interrelationships. This is a mission that the activists have taken upon themselves. Annette is convinced that tackling the climate crisis must begin directly with local people, stating, "this has to start from the family level" (IntAnnetteXR).

The activists are fulfilling their self-attributed co-responsibility for addressing the climate crisis. This is evidenced by their *active action*, which constitutes an integral aspect of the activism of the climate justice movements in Uganda.[38] Evelyn states: "I think, from Africa or Rise Up movement, we are actually taking like physical action, like […] tangible action, we are trying like to show the leaders that we are already taking action; we are creating solutions, and we need you to support us" (IntEvelynRU). In their actions, the activists are concerned with setting a good example. According to Evelyn, this is where activism in Africa differs from activism in Europe:

> *I realized that in Europe, in Fridays for Future Europe, they don't actually do projects like Africans do, like tree planting, installation of solar, reaching out to women and girls […] African activists, I think, putting so much energy into their activism, the activism is totally different. I have seen it. They're putting so much energy, they're putting so much passion into this and I have seen that*

38 Further information on the activists' action repertoires can be found in Chapter 5 of the master's thesis.

most of them are not about to give up. They are getting stronger and stronger every day. I've seen the consistency of the activists that we work with, protesting every week, every week. Some of them are protesting everyday. (IntEvelynRU)

For some activists, the urgency of addressing the climate crisis is so great that it impinges on their ability to engage in paid work. Ezra states, "but all these people are educated, some resigned from their jobs and made climate change their work" (IntEzraRU).

The analysis of the prognostic framing reveals that the activists perceive the primary responsibility for overcoming the climate crisis to lie with the Global North. In this way, the activists diverge fundamentally from the majority of the Ugandan population, who place the primary responsibility on their own government. In addition to calling for a halt to fossil fuel projects, the activists expect that the Global North will provide financial compensation for the suffering caused by the climate crisis in Uganda. Their demands extend beyond the climate financing stipulated in the Paris Agreement. Nevertheless, the activists also attribute responsibility to the Ugandan government. Furthermore, the activists are calling for the enactment of sustainable legislation, despite Uganda's minimal historical CO_2 emissions. Additionally, they recognize the necessity for active action and thus assume responsibility themselves.

Motivational Framing: Motives for Activist Commitment

The significance of the activism described above is contingent upon the diverse motives driving such action. In the context of Uganda, motives driving activist action can be categorized into two distinct dimensions: On the one hand, there is the push dimension, which reflects the personal concerns of the activists. On the other hand, there is the pull dimension, which expresses the incentives to participate in a movement.[39] Furthermore, against the background of the local context, various factors that make the commitment of activists a challenge can be observed.

The following motives can be identified: (1) *impact on Uganda*, (2) *giving a voice* to marginalized people, (3) *injustice*, (4) *role models*, (5) *climate justice movement as a platform*, and (6) *access to public discourse*.

Push Dimension

The effects of the climate change are being felt particularly strongly in Uganda. Many of the activists, their families, or acquaintances are personally affected by the

39 The terms were selected in order to specify the different motives for activist behavior. This is intended to enable a structured presentation of motivational framing. It should be noted that this is not a theoretical approach.

climate crisis. All activists cite the increase in extreme weather events and the fact that the *impact on Uganda* is the key motive for their activist commitment.

What inspired me to engage in this climate activism was the current conditions in which our country was facing, that's in regard to we had a number of climate crises happening in our country. This encouraged me to work towards promoting climate action. Be an advocate for change towards promoting climate justice. (IntKabilaFFF)

This is in line with the view of the activists that there is a lack of awareness of the climate crisis, its causes and consequences in Uganda. As one activist states, "that's what issue we need: Awareness" (IntEzraRU). The activists are convinced that their knowledge of the climate crisis goes hand in hand with a responsibility towards other people (IntKabilaFFF; IntEvelynRU; INtAnnetteXR). This reflects a high degree of introspection regarding their privileged position in comparison to other Ugandans. Evelyn states, "I didn't understand what climate change is. And I couldn't do anything about it. But after reading and understanding, I started doing something about it" (IntEvelynRU).

The activists' actions aim to *give a voice* to those most affected by the climate crisis who lack a voice their own, and to advocate for the less privileged (IntAnnetteXR; IntKabilaFFF; IntAidahRU). Kabila elucidates his motivation as follows:

> *I believe it's really very important for me to be an activist and in particular, a climate activist, because climate activism plays a key role in our society, one voice to many voiceless people in our society. Especially people from those mostly affected areas. Their voices have been marginalized and their voices are not heard and I believe some opportune that under some circumstances may theirs has been heard. (IntKabilaFFF)*

Prior to her involvement with the climate justice movement Rise Up, the activist Aidah had already been engaged in advocacy for the rights of girls and women (IntAidahRU). Consequently, she has a particular interest in the marginalized position of girls and women in the context of the climate crisis.:

> *It's important to me because there are very many underrepresented women. And yet we are one section, or the biggest section of society that suffered the most from the brunt of the climate crisis. So, for me it is important, because they need to be represented, their voices need to be heard. Yeah, it's important. That's why it's important for me to be an activist. (IntAidahRU)*

While Kabila and Aidah's primary objective is to represent the interests of marginalized groups, Evelyn's argument is based on a justice perspective. For her, the ***injustice*** associated with the climate crisis is the driving force behind her actions:

> *It's important for me to create awareness and tell the world and tell the people in my country that this situation that we are going through we don't deserve to go through it. It's not right. We have a right to a clean environment, have a*

right to normal temperatures. So, this is where I started speaking up against it. And since then, I have been protesting and I cannot, I just cannot stay comfortable and silent. And yet people are dying every day. (IntEvelynRU)

Pull Dimension

The actions of activists such as Vanessa and Hilda serve as a significant motivating factor for many other activists. These individuals serve as *role models* (e.g., IntJuniorFFF; IntEvelynRU; IntEzraRU). Ezra asserts that "we need to help Vanessa" (IntEzraRU). Vanessa and Hilda's courage in taking to the streets and protesting for climate justice has inspired numerous other activists, as Jonah from the *Nile Post* newspaper notes:

They've given young people role models. They've given opportunities to young people, for young people, you know, sometimes our education, like I say, sometimes people after university, they don't know what to do. We have high unemployment rate; someone comes out of university. They sit at home; they don't know what to do. They can't get into the job market. So, things like this have got more and more young people evolved. And they work with either Vanessa or Hilda in the Fridays for Future. They've got more opportunities from her. (IntExNilePost)

The climate justice movements in Uganda employ a range of incentives to mobilize potential supporters. The *climate justice movement as a platform* is particularly attractive to potential activists. This is especially true for FFF Uganda and Rise Up. The appeal of this movement lies in the opportunity to be part of something larger than oneself. Rise Up's self-image, as conveyed on a roll-up banner, is as follows:

We are a climate movement focusing on connecting with youth activists from the Global South with an emphasis on amplifying the voices of African activists through providing Platforms both locally and internationally to develop their skills through innovative, creative and effective communication strategies and campaigns in the fight for Climate Justice. [40]

The movements provide a platform on which activists can network with like-minded people at a local and international level. This is particularly relevant against the backdrop of a sometimes-low level of social acceptance for activism (IntEzraRU; IntKabilaFFF). The activists receive soft skills through training and expand their knowledge of climate issues. While existing friendships and acquaintances

40 Cf. https://twitter.com/Riseupmovt/status/1613428968782454786, January 12 2023 [January 13 2023].

are often leveraged to mobilize individuals for the movement (IntEzraRU), new friendships are also formed within the movement (IntJuniorFFF). Engaging with the climate justice movement presents a valuable opportunity for young adults to experiment with new ideas and receive guidance in realizing their own projects. The high profile of activists such as Vanessa Nakate and Hilda Nakabuye (IntEzraRU) plays a significant role in this regard. They serve as a gateway for other activists (ibid.). Vanessa is "widely known and she can deliver. If had something, I tell her I have this project, she can help us reach [out to] some offices" (IntEzraRU), says Ezra. Projects are funded by individuals and not by the movements as actors (ibid.). For individual activists, belonging to the movement and the movement's reputation are important factors in gaining the trust of funders and donors (ibid.).

Through movements such as FFF Uganda or Rise Up, which attract global media and political attention on a global scale, activists gain *access to public discourse*.

> *One thing I've seen about them, […] when they call Vanessa for an interview, she would say, maybe I wanted to come but let's have a friend who can give you a better interview. So, this is one thing I've seen about most of them, that they give opportunities to other young people to shine and to share their ideas. And yes to me this is a success. (IntExNilePost)*

Activists are recognized in the media, giving them the opportunity to articulate their concerns. This is particularly important given the feeling expressed by individual activists that their voices are not being heard (IntKabilaFFF; IntAnnetteXR). Some activists are able to attend international conferences such as the COP (IntEzraRU). This would not be possible without being part of a movement that has good contacts with international organizations, NGOs, and the transnational climate justice movement.

Aggravating Factors

In the Ugandan context, activists face a number of challenges. Socialization in a patriarchal society has a considerable influence on their commitment, affecting not only female activists but also male-identified activists. Due to the influence of patriarchal structures, it is often unattainable to challenge one's own parents and other authority figures, as Ezra explains: "A parent is a parent, and a child is a child, you can't disagree or be an outbreak, you can't advise someone who broad you to world" (IntEzraRU). Consequently, the activists are often left to their own devices and seek social connections with people with whom they can share their concern for the climate. Such individuals may find support in the respective movements (IntEzraRU). However, there are also activists who, despite initial skepticism, receive support from their parents and their social environment, as evidenced by Evelyn's experience:

The support has grown with time, my parents have become so supportive, my siblings have become so supportive. I have some siblings who have actually joined the fight for climate justice, I have some cousins that have joined the fight, some friends that have joined the fight. So, with time, the support has grown over time because people are informing themselves. (IntEvelynRU)

In some instances, activists encounter a lack of understanding, which is frequently based on religious grounds (IntEzraRU). The belief of numerous people in God-sent climate change is a widespread social phenomenon (IntEzraRU; IntKabilaFFF). Even if the activists do not themselves believe in climate change deliberately brought about by God, they have been and still continue to be repeatedly confronted with this. Two opposing logics can be identified: firstly, the logic that climate change is anthropogenic (man-made) and can therefore be stopped by humans; secondly, the logic that climate change is divinely ordained (Godsent) and therefore cannot and should not be interfered with by humans. Ezra describes this confrontation as follows:

I come from a Christian family. Some people, you know, they have a Christian perspective on climate change. It's really something big for some people, they think that's what's planned. Things are turning dirty because that's how God wants it to be. So, when someone says that the Bible says this, scientists are saying this, you sit down and ask yourself. […] these people do not support the fight against climate change in Uganda. (IntEzraRU)

This religious-based view of the climate crisis can result in individuals becoming estranged from their families and communities. For instance, Ezra was unable to obtain a letter of reference from his church to finance his participation in COP27. He was told by church representatives that one should not interfere with God's actions (IntEzraRU). Nevertheless, Ezra is not deterred from his activism by such experiences; he finds like-minded individuals in the climate justice movement with whom he can collaborate in combating the climate crisis.

Kabila also encountered a lack of understanding in his social environment, as evidenced by the following quote:

I remember one time when I discussed this issue of climate activism and climate chance with my teacher, I remember him telling me that climate change things brought by God, and we have no control over it. So, I'm wasting my time. But that did not demotivate me. But it further gave me the mindset to continue working hard to continue fighting for climate justice and climate action. (IntKabilaFFF)

Kabila is encouraged by the growing awareness of the climate crisis, as evidenced by the increasing frequency of extreme weather events and the impact of FFF Uganda and other movement actors' awareness-raising campaigns. However, despite this growing understanding, there has been little change in people's perceptions and attitudes (IntKabilaFFF).

The analysis of the motivational framing has demonstrated that the motives for activists' commitment are multifaceted. Individuals such as Vanessa and Hilda, who act as role models, play a pivotal role. The activists are unified by their motivation to advocate for marginalized groups and to challenge the injustices associated with the climate crisis. They are not deterred by their social environment, social norms, or religiously motivated convictions. Participation in the climate justice movement is crucial for activists. Such participation provides them with the courage and reassurance that they are not alone in their efforts to combat the climate crisis.

Master Frame Climate Justice: Creating Connectivity

Master frames are overarching frames that provide a framework for central topics and thus become connectable for other civil society actors beyond the followers.

In the climate justice movement in Uganda, *climate justice* can be identified as a master frame. This frame expands the discourse on the climate crisis to include the issue of justice in the context of global inequality and implies the moral responsibility of the culprits towards the people who are already suffering directly from the consequences of the climate crisis. The frame has been articulated by civil society actors, including environmental, human rights, church, and development organizations, for over 15 years (see Della Porta and Parks 2013; Brand and Hirsch 2008, 3). Since the COP15 in Copenhagen in 2009, the climate movement has shifted its focus from climate change to climate justice (Della Porta and Parks 2013, 45). The transnational climate justice movement has led to a new interest in the climate justice frame since 2018/2019, with increasing establishment in public and political discourse due to its high level of connectivity. While activists in Europe are advocating for climate justice from a position of solidarity, Ugandan activists are personally affected by the climate crisis and place this concern at the center of their activism.

> *Climate justice is affecting every system in life. It's a social justice issue. It's a racial justice issue. It's an education issue. It's a gender equality issue, and environmental issue. It's affecting everything. So, for me, to achieve climate justice, we need to achieve all these other justices, we need to look at everyone and not only solve it from a small perspective. (IntEvelynRU)*

The concept of climate justice is a central tenet of the activism of FFF Uganda, Rise Up, and XR Uganda. The demand for climate justice is a fundamental aspect of their activities, informing the identification of causes, naming of culprits, demands for solutions, attribution of responsibility, and the motives for activist commitment. The activists demand climate justice and express this in their protest actions. The demands for solutions are the basis for achieving climate justice. The success of the climate justice framing is contingent upon the transnationally coordinated protest movement of actors in both the Global North and the Global South.

Movements in the Global North and Global South are working together. In cases a campaign we are working together, we speak up together to show solidarity, and also to show the policymakers that we are one and we have the same ways, we are speaking up against the same thing. So, these are things that keep me optimistic, and I know that we will achieve climate justice one day. (IntEvelynRU)

By participating in the transnational climate justice movement, Ugandan climate justice activists have succeeded in amplifying their voices on an international scale. Prominent activists such as Vanessa and Hilda have given the Global South a face. In this manner, the activists have succeeded in transforming themselves from passive objects, whose voices are determined by others, into active subjects. They articulate the interests of those affected by the climate crisis, formulate demands and appeal to the moral conscience of political and economic decision-makers at the international level.

Conclusion

Since the beginning of 2019, a climate justice movement has emerged in Uganda. The framing analysis of Fridays for Future (FFF) Uganda, Rise Up, and Extinction Rebellion (XR) Uganda has demonstrated how the activists of the climate justice movement in Uganda frame the climate crisis. The activists assume that climate change is man-made and that CO_2 emissions, primarily from the burning of fossil fuels, have contributed to this. The activists identify the countries of the Global North as the main cause of the climate crisis and emphasize the non-responsibility of the African continent. Within the national context, the activists complain about a lack of awareness of the problem within society. Concurrently, the Ugandan government is accused of prioritizing profits (e.g., the EACOP project) over the well-being of its population, thereby encouraging neocolonial exploitation by the Global North.

From the perspective of activists, the *polluter pays principle* is applicable. This principle suggests that states that have historically been responsible for the climate crisis should bear the responsibility for solving the climate crisis. The activists are not only calling for a halt to the financing and implementation of fossil fuel projects such as EACOP, but also for *climate finance* in accordance with the Paris Climate Agreement for countries that have been particularly hit hard by the catastrophic effects of the climate crisis and have contributed the least to this crisis. The requested funds are to be used to finance *mitigation and adaptation* measures and to compensate for *loss and damage*. Furthermore, some activists are advocating for so-called *reparations* as compensation for the people affected by the climate crisis in countries of the Global South. For activists, climate finance is therefore an integral part of measures to achieve climate justice. The activists also believe that the responsibility for tackling the climate crisis lies with humanity per se and, in the Ugandan context, explicitly with the country's own population. The assumption of responsibility on the part of the activists is expressed in a broad repertoire of actions, which is presented in detail in the master's thesis. In Uganda, active action is a central pillar of the activism of the movements analyzed. This means that the

activism of the climate justice movement in Uganda goes beyond the realization of protest actions in public spaces and on social media. The activists perceive themselves as having a moral obligation to serve as role models and contribute to combat the climate crisis in Uganda through a range of projects. These include tree planting campaigns and educational work in schools and village communities, as well as litter cleanup events and the provision of schools with climate friendly stoves and solar panels.

The motivation for activism can be identified in motives of personal concern and moral obligation. The activists observe how the environment and people in Uganda are suffering from the climate crisis. This state of injustice and the desire to give marginalized people a voice is guiding motives for activist commitment. The activists are aware of their privilege of having access to education and knowledge about the context of the climate crisis. The FFF Uganda and Rise Up movements provide activists with platforms that give them access to public discourse. Furthermore, the movements serve as a community of like-minded individuals for the activists, which is of particular importance in light of state repression and a lack of understanding for their activism in certain segments of society.

The statements of some activists indicate that there is a significant degree of mutual influence within the transnational movement coalition, which has an impact on the framing of the climate crisis. This reciprocal influence can be observed, among other things, in the fact that they increasingly point out global connections that go beyond addressing the national context. This is particularly evident in the case of individuals who have been active in activism for some time. The use of certain buzzwords, such as "Global North," "climate crisis" and "neocolonialism," also plays a role here, expressing a critique of global injustice from a postcolonial perspective.

The activists of FFF Uganda and Rise Up have succeeded in broadening the public discourse with new perspectives and pointing out the materiality of the climate crisis through their tireless commitment, diverse activities, and presence at international conferences and in the media. Their activism contributes to more representation of people from the Global South in the transnational climate movement coalition.

The climate crisis is a crisis of justice and therefore a global challenge. Activists from countries of the Global South, such as Uganda, have been able to exert pressure on the agendas of political decision-makers, both inside and outside Uganda. The climate crisis has reached a new level of urgency for the international community. The climate justice activists from Uganda give a face and a voice to the people who are suffering the most from the effects of the climate crisis. It remains to be seen to what extent the climate justice movement in Uganda, as part of a transnational movement coalition, will be able to sustain the pressure on international decision-makers and demand the implementation of the climate finance pledged in the Paris Climate Agreement, thus coming a step closer to the goal of climate justice.

References

African Union. (2006). *African Youth Charter*. https://au.int/sites/default/files/treaties/7789-treaty-0033_-_african_youth_charter_e.pdf [abgerufen am 10.02.2023].

Afrobarometer (Makanga Ronald Kakumba). (2022a). *Climate change worsens life in Uganda; citizens want collective action to mitigate it*. https://www.afrobarometer.org/wp-content/uploads/2022/09/AD547-Ugandans-want-action-on-climate-change-Afrobarometer-dispatch_4sept22.pdf [abgerufen am 24.01.2023].

Afrobarometer (Makanga Ronald Kakumba). (2022b). *Damage control: Ugandans want government action on environmental problems affecting their communities*. https://www.afrobarometer.org/wp-content/uploads/2022/11/AD577-Ugandans-want-government-action-on-environmental-threats-Afrobarometer-25nov22.pdf [abgerufen am 24.01.2023].

Anderegg, W. R. L. (2010). Expert credibility in climate change. *Environmental Science*, 107(27), 12107-12109.

Barford, A., Olwell, R. H., Mugeere, A., Nyiraneza, M., Magimbi, P., Mankhwazi, C., Isiko, B. (2021). *Living in the climate crisis: young people in Uganda*. https://www.repository.cam.ac.uk/handle/1810/330714 [abgerufen am 17.08.2022].

Benford, R. D., Snow, D. A. (2000). Framing Processes and Social Movements: An Overview and Assessment. *Annual Review of Sociology*, 26(1), 611–639.

Bohl, C., Daniel, A. (2020). Klimaproteste in Wien. Motive und Emotionen der Fridays for Future. *Kurswechsel*, (1), 64–73.

Bohl, C., Braunhuber, B., Daniel, A., Glässer, D., Ilchmann, O., Lange, L., Wingender, A. (2021). The Climate Crisis and the Fridays for Future Movement: Causes, Responsibilities and Solutions through the Lens of Framing Theory. *ie.WorkingPaper*, (10).

Brand, R., Hirsch, T. (2008). Klimagerechtigkeit als neues Leitbild. In Brot für die Welt, Diakonie Katastrophenhilfe, Evangelischer Entwicklungsdienst, Welt-Sichten (Hrsg.), *Dossier 10-2008*. https://www.brot-fuer-die-welt.de/fileadmin/mediapool/2_Downloads/Fachinformationen/Sonstiges/ws-Dossier_10-2008_Wege_aus_der_Krise.pdf [abgerufen am 14.01.2023].

Brand, R., Hirsch, T. (2012). Was heißt Klimagerechtigkeit? Vom Prinzip zur politischen Praxis. In Kirchlicher Herausgeberkreis Jahrbuch Gerechtigkeit (Hrsg.), *Jahrbuch Gerechtigkeit V: Menschen, Klima, Zukunft? Wege zu einer gerechten Welt*. Glashütten: C & P, 62–71.

Bundeszentrale für politische Bildung. (2016). *Verursacherprinzip*. https://www.bpb.de/kurz-knapp/lexika/lexikon-der-wirtschaft/21050/verursacherprinzip [abgerufen am 10.03.2023].

BUNDjugend, Locals United. (2022). *Talks of Resistance: Environmental Colonisation*. In @bundjugend, @localsunited.de (Hrsg.), https://www.instagram.com/p/CheaU2ljpjk [abgerufen am 21.08.2022].

Buzogány, A., Scherhaufer, P. (2022). Framing different energy futures? Comparing Fridays for Future and Extinction Rebellion in Germany. *Futures*, 137, 1–10.

Clarke, M. (2018). *Global South: what does it mean and why use the term?* https://onlineacademiccommunity.uvic.ca/globalsouthpolitics/2018/08/08/global-south-what-does-it-mean-and-why-use-the-term/ [abgerufen am 08.08.2018].

Daniel, A., Deutschmann, A. (2020). Umweltbewegung revisited? Fridays for Future in Wien: Profil und Einstellungen einer neuen Protestbewegung. *ie.WorkingPaper*, (9).

Daniel, A., Deutschmann, A., Buzogány, A., Scherhaufer, P. (2020). Die Klimakrise deuten und Veränderungen einfordern. *SWS-Rundschau*, 60(4), 365–384.

De Moor, J., Uba, K., Wahlström, M., Wennerhag, M., De Vydt, M. (2020). *Protest for a future II: Composition, mobilization and motives of the participants in Fridays For Future climate protests on 20–27 September, 2019, in 19 cities around the world*. https://osf.io/asruw/ [abgerufen am 30.01.2023].

De Moor, J., De Vydt, M., Uba, K., Wahlström, M. (2021). New kids on the block: Taking stock of the recent cycle of climate activism. *Social Movement Studies*, 20(5), 619–625.

Della Porta, D., Parks, L. (2013). Framing-Prozesse in der Klimabewegung: Vom Klimawandel zur Klimagerechtigkeit. In Dietz, M., Garrelts, H. (Hrsg.), *Die internationale Klimabewegung*. Wiesbaden: Springer VS, 39–56.

Extinction Rebellion Global. (2022). *About Us*. https://rebellion.global/about-us/ [abgerufen am 07.12.2022].

Fridays For Future. (2019). *Lausanne Climate Declaration*. Fridays for Future. Lausanne.

Fridays For Future. (2020). *COP25 Speech | Hilda Flavia Nakabuye*. https://www.youtube.com/watch?v=wgpYF9iV0tg [abgerufen am 24.01.2023].

Fridays For Future. (2022). *Our Demands*. https://fridaysforfuture.org/what-we-do/our-demands [abgerufen am 09.01.2023].

Harlan, S. L., Pellow, D. N., Roberts, J. T., Bell, S. E.; Holt, W. G., Nagel, J. (2015). Climate Justice and Inequality. In Dunlap, R. E., Brulle, R. J. (Hrsg.), *Climate Change and Society: Sociological Perspectives*. Oxford: Oxford University Press, 127–163.

Haug, S. (2021). A Thirdspace approach to the 'Global South': insights from the margins of a popular category. *Third World Quarterly*, 42(9), 2018–2038.

Haunss, S., Sommer, M. (Hrsg.). (2020). *Fridays for Future – Die Jugend gegen den Klimawandel*. Bielefeld. Transkript.

Horowitz, C. A. (2016). Paris Agreement. *International Legal Materials*, 55(4), 740–755.

Institut für Internationale Entwicklung. (2022). *Forschungswerkstatt Umweltproteste. Fridays for Future & Umweltaktivismus in Wien*. https://ie.univie.ac.at/forschung/forschungswerkstatt-umweltproteste [abgerufen am 29.11.2022].

Intergovernmental Panel on Climate Change. (2022). *Reports*. https://www.ipcc.ch/reports [abgerufen am 17.01.2023].

Keck, M. E., Sikkink, K. (1999). Transnational advocacy networks in international and regional politics. *International Social Science Journal*, 51(1), 89–101.

Kern, T. (2008). *Soziale Bewegungen: Ursachen, Wirkungen, Mechanismen*. Wiesbaden: VS Verlag für Sozialwissenschaften.

Mayring, P. (2015). *Qualitative Inhaltsanalyse: Grundlagen und Techniken*. Weinheim: Beltz.

McLymont, R. (2019). Hardly Missing in Action. *Network Journal*, 27(1), 4.

Mugeere, A., Barford, A., Magimbi, P. (2021). Climate Change and Young People in Uganda: A Literature Review. *The Journal of Environment & Development*, 30(4), 344–368.

Nakabuye, H. F. (2019, 11. Oktober). *You Will Soon Feel the Same Heat We Feel Every Day*. https://time.com/5698417/hilda-nakabuye-uganda-climate [abgerufen am 29.11.2022].

Nakabuye, H. F., Nirere, S., Titilope Oladosu, A. (2020). The Fridays For Future Movement in Uganda and Nigeria. In Henry, C., Rockström J., Stern. N. (Hrsg.), *Standing up for a Sustainable World*. Cheltenham: Edward Elgar, 212–218.

Nakate, V. (2021). *A Bigger Picture: My fight to bring a new African voice to the climate crisis*. London: One Boat.

Nakate, V. (2022, 05. November). *Freitags keine Demo*. https://www.zeit.de/2022/45/klima-aktivismus-uganda-fridays-for-future [abgerufen am 28.11.2022].

Neas, S., Ward, A., Bowman, B. (2022). Young people's climate activism: A review of the literature. *Frontiers in Political Science*, 4.

Neidhardt, F., Rucht, D. (1993). Auf dem Weg in die „Bewegungsgesellschaft"? Über die Stabilisierbarkeit sozialer Bewegungen. *Soziale Welt*, 44(3), 305–326.

Noth, F., Tonzer, L. (2022). Understanding climate activism: Who participates in climate marches such as "Fridays for Future" and what can we learn from it? *Energy Research & Social Science*, 84, 1–7.

Opp, K.-D. (1998). Die Perspektive der Ressourcenmobilisierung und der Theorie kollektiven Handelns. In Hellmann, K.-U., Koopmans, R. (Hrsg.), *Paradigmen der Bewegungsforschung: Entstehung und Entwicklung von neuen sozialen Bewegungen und Rechtsextremismus*. Opladen: Westdeutscher Verlag, 90–108.

Oreskes, N. (2004). The Scientific Consensus on Climate Change. *Science*, 306(5702), 1686.

Prendergast, K., Hayward, B., Aoyagi, M., Burningham, K, Hasan, M. M., Jackson, T., Jha, V., Kuroki, L., Loukianov, A., Mattar, H., Schudel, I., Venn, S., Yoshida, A. (2021). Youth Attitudes and Participation in Climate Protest: An International Cities Comparison Frontiers in Political Science Special Issue: Youth Activism in Environmental Politics. *Frontiers in Political Science*, 3. doi:10.3389/fpos.2021.696105

Quecke, F., Duhm, L. (2019, 07. Juni). *„Mein Professor hat mir neulich gesagt, dass es den Klimawandel nicht gibt"*. https://www.spiegel.de/lebenundlernen/schule/fridays-for-future-wie-kinder-in-syrien-und-china-den-klimawandel-bekaempfen-a-1269860.html [abgerufen am 29.11.2022].

Roelf, W. (2022, 04. Oktober). *African countries to push for more fossil fuel projects at COP27*. https://www.reuters.com/world/africa/african-countries-push-common-energy-position-cop27-2022-10-04 [abgerufen am 09.03.2023].

Ripple, W. J., Wolf, C., Newsome, T. M., Barnard, P., Moomaw, W. R. (2020). World Scientists' Warning of a Climate Emergency. *BioScience*, 70(1), 8–12.

Sauphie, E. (2019, 31. Mai). *Nakabuye Hilda Flavia, cette jeune activiste climatique qui interpelle Museveni*. https://www.lepoint.fr/afrique/nakabuye-hilda-flavia-cette-jeune-activiste-climatique-ougandaise-qui-interpelle-museveni-31-05-2019-316213_3826.php [abgerufen am 29.11.2022].

Snow, D. A., Benford, R. D. (1988). Ideology, Frame Resonance and Participant Mobilization. *International Social Movement Research*, 1, 197–217.

Snow, D. A., Benford, R. D. (1992). Master Frames and Cycles of Protest. In Morris, A. D., Mueller, C. M. (Hrsg.), *Frontiers in Social Movement Theory*. New Haven: Yale University Press, 133–155.

Sommer, M., Rucht, D., Haunss, S., Zajak, S. (2019). Fridays for Future. Profil, Entstehung und Perspektiven der Protestbewegung in Deutschland. *ibp working paper*, (2).

Svensson, A., Wahlström, M. (2023). Climate change or what? Prognostic framing by Fridays for Future protesters. *Social Movement Studies*, 22(1), 1–22.

Torvik, K. E. (2022). *Fridays For Future: Using Social Media in the Mobilization of a Global Social Movement.* Masterarbeit, Oslo Metropolitan University. https://oda.oslomet.no/oda-xmlui/handle/11250/3012262

United Nations. (2020). *The Climate Crisis – A Race We Can Win*. https://www.un.org/en/un75/climate-crisis-race-we-can-win [abgerufen am 19.12.2022].

United Nations Framework Convention on Climate Change. (2023a). *Introduction to Climate Finance*. https://unfccc.int/topics/introduction-to-climate-finance [abgerufen am 19.01.2023].

United Nations Framework Convention on Climate Change. (2023b). *What is the Kyoto Protocol?* https://unfccc.int/kyoto_protocol [abgerufen am 10.03.2023].

Verheggen, B., Strengers, B., Cook, J., Van Dorland, R., Vringer, K., Peters, J., Visser, H., Meyer, L. (2014). Scientists' Views about Attribution of Global Warming. *Environmental Science & Technology*, 48, 8963–8971.

Wahlström, M., Kocyba, P., De Vydt, M., De Moor, J. (2019). *Protest for a future: Composition, mobilization and motives of the participants in Fridays For Future climate protests on 15 March, 2019 in 13 European cities*. https://osf.io/xcnzh [abgerufen am 30.01.2023].

Walker, C. (2020). Uneven solidarity: the school strikes for climate in global and intergenerational perspective. *Sustainable Earth*, 3(5), 1–13.

Wolff, R. (2018, 27. August). *15-jährige Aktivistin aus Schweden: Greta schwänzt die Schule – fürs Klima*. https://taz.de/15-jaehrige-Aktivistin-aus-Schweden/!5528023 [abgerufen am 19.11.2022].

Wulff, H. J., Lehmann, I. (2008). Kultivierungshypothese (Cultivation Hypothesis). In Sander, U., Gross, F. v., Hugger, K.-U. (Hrsg.), *Handbuch Medienpädagogik*. Wiesbaden: VS Verlag für Sozialwissenschaften, 274–277.

Zamponi, L., Baukloh, A., Bertuzzi, N., Chironi, D., Della Porta, D., Portos, M. (2022). (Water) bottles and (street) barricades: the politicisation of lifestyle-centred action in youth climate strike participation. *Journal of Youth Studies*, 25(6), 854–875.

Zeldin-O'Neill, S. (2019, 16. Oktober). *'It's a crisis, not a change': the six Guardian language changes on climate matters.* https://www.theguardian.com/environment/2019/oct/16/guardian-language-changes-climate-environment [abgerufen am 19.12.2022].

Zitterbarth, S. (2021). *Fridays for Future in Latin America: An analysis of collective action frame adaptation by the Peruvian climate movement Viernes por el Futuro Perú.* Masterarbeit, Freie Universität Berlin. https://refubium.fu-berlin.de/handle/fub188/34436

Nisasia Ekafitrina

Palm Oil and the EU's Renewable Energy Directive II: A Green Trade War?

Analyzing the Impact on EU-Indonesia's Bilateral Relations and the Future of the Palm Oil Sector in Indonesia

Introduction

The palm oil sector has been at the center of serious debates in the past two decades. While the palm oil firms and producing country governments generally glorify the crop's ability to support economic development and poverty reduction, the consumer countries are becoming more concerned with its social and environmental impacts. The issue of deforestation and social problems related to poor working conditions is alarming (Pacheco et al. 2017; Pye and Bhattacharya 2012; Pichler 2013; Brad 2019). The debate recently escalated following the European Union's (EU) measures to achieve its climate ambitions. The bloc launched a set of regulations under the Renewable Energy Directive II (RED II) that aims to phase out the use of palm oil as biofuel by 2030 (Mayr, Hollaus, and Madner 2020; Gerasimchuk and Koh 2013).

This topic is particularly delicate for Indonesia, which supplies more than 50% of palm oil around the world. The country is conscious of the role of the EU as one of the important markets for palm oil biofuel. A particularly controversial measure introduced by the EU's directive is the "freeze and phaseout" of certain biofuels in the transport sector with a high indirect land use change (ILUC) risk (Mukherjee 2013). In this regard, palm oil falls under the ILUC criteria and becomes the only agricultural commodity that faces the phaseout risk (Mayr, Hollaus, and Madner 2020). Indonesia and other palm oil producers consider the regulation a discriminatory and protectionist measure intended to support the locally produced vegetable oil in the bloc. Therefore, these groups of countries have initiated proceedings against the EU through the World Trade Organization (WTO) to find a middle ground for palm oil development (ibid.).

These tensions have raised the issue of how power dynamics between the EU and Indonesia play out around palm oil and how this affects the future of palm oil in Indonesia. In this regard, the proponents of palm oil development maintain that the passing of this bill at the EU level highlights the power asymmetry within the palm oil production network. Meanwhile, the opponents highlighted that RED II might be an effective measure to systematically reduce deforestation, as the EU is well known for influencing sustainability policies around the palm oil industry

(Amzul 2010; Drajat 2013; Carlson et al. 2018). These dynamics around palm oil are intriguing because the EU and Indonesia are currently in the process of ratifying a trade agreement called the Indonesia-EU Comprehensive Economic Partnership Agreement (IEU CEPA) (European Commission 2021; Ministry of Foreign Affairs of the Republic of Indonesia 2020).

The overarching theme guiding this thesis is how different actors are involved in the palm oil production network, how the state plays its role, and how power dynamics are formed in the context of policymaking related to the sector. This research seeks to contribute to a better understanding of the role of different actors in palm oil production networks, how they are directly and indirectly related to palm oil production, and how they are influenced by and influence policy changes. In this regard, it is important to understand the motivation of the European Commission behind the launch of RED II and its impact on a key palm-oil-producing country, Indonesia. This research is therefore developed to answer the main question: To what extent does Indonesia-EU's dispute on palm oil related to RED II lead to a green trade war?

The following sub-questions are formulated to systematically investigate the abovementioned issue:

What are the motivations behind the establishment of RED II?
What are the impacts of the implementation of RED II on Indonesian palm oil production and the Indonesian national policy?
To what extent do the RED II and WTO litigation influence Indonesia-EU trade relations in terms of CEPA free-trade negotiations?
How did global and local actors, particularly the European Commission, the Indonesian government, NGOs, and smallholders, react to the establishment of RED I?

The global production network (GPN) approach will be the main theoretical framework in this research. It helps to critically analyze governance structures and interactions between production processes and regulations between different actors. Through the GPN approach, various parties in the palm oil GPN can be identified by their interests. This framework allows the analysis of state regulation and its effects in shaping the strategies and activities of both direct and indirect actors in the production network. Due to the lack of further theorization of states in the GPN approach (Smith 2015; Grumiller 2019; Marslev et al. 2022), the strategic-relational approach to the state will also be utilized (Jessop 2008).

This approach understands states not only as a policy-setting body but also as a social relation which reacts to the changing balance in the political forces. It means the states are not a neutral political terrain. They favor some forces, some interests, some identities, and some projects more than others (Jessop 2007). This approach enables a closer look at the power relations that are not only induced by states but also by interactions between state institutions and actors in the production network. The concepts are necessary to understand the dynamics of the palm oil GPN by bringing state institutions back on the agenda. While the GPN approach

serves as a framework to understand the vertical and horizontal dimensions of globalization, the strategic-relational approach will provide an understanding of "the social basis and hegemonic struggles within and beyond the state over the forging of accumulation strategies" (Smith 2015). In the context of palm oil and the potential green trade war between Indonesia and the EU, GPN theories are required to understand the interests and strategies set by governments, smallholders, local and global firms, NGOs, certification providers, and international trade organizations in shaping the palm oil production network.

The strategic-relational approach will bring more "attention to the configuration of social forces" underpinning Indonesia's and/or the EU's support for "particular policy directions and their effect on capital accumulation" that leads to the palm oil dispute at the WTO (ibid.). This thesis largely uses qualitative research methods and a combination of an extensive literature review and interviews with actors in the EU and Indonesia. Primary data were gathered through online and in-person interviews conducted during fieldwork in Jakarta, Indonesia. The interviews involved 24 semi-structured interviews with government representatives, academics, palm oil business associations, NGOs, and smallholder associations. The research is also supplemented with document analyses, involving government websites, media, and NGO reports. Additionally, the mapping of actors' interests will be conducted to capture the strategic positions of actors in influencing policies around the palm oil sector. Interviews with different actors allow a deeper understanding of interactions between global/EU and local actors in shaping policies in production countries in the Global South and their implications for sector development.

This article is organized as follows: In the first three sections, the author will render an introduction, an explanation of the theoretical framework that guides the analysis process, and the methods used to gather and interpret data. The fourth and fifth sections will give some background information on the global and Indonesian palm oil sectors to help readers understand the context. The sixth section will specifically discuss the significance of RED II in the Indonesian palm oil sector and its impact on Indonesian revenue and national biofuel policies. The section will further analyze the possibilities of a green trade war triggered by the implementation of RED II based on the mapping of actors' interests in the production network. The final section will conclude the analysis and present the main findings of the whole research.

Theoretical Framework

The GPN and strategic-relational approaches provide a comprehensive framework for understanding the complexities of the global palm oil industry and the interplay between state and non-state actors. By adopting the GPN lens, this research moves beyond the traditional focus on lead firm-supplier relationships and incorporates a wide range of actors involved in the production network, including government agencies, supranational organizations, trade unions, employer associa-

tions, NGOs, and consumer groups. This perspective allows for a more nuanced analysis of power dynamics and the role of institutions in shaping the industry.

The original GPN framework (currently known as the GPN 1.0) offered useful devices for mapping the configuration of GPNs (Coe and Yeung, 2019). It underpinned the complex firm networks and territorial institutions and focused on how these are structured both organizationally and geographically (ibid.). Both the GPN and the GVC frameworks started to mature in the 2010s. However, growing attention has arisen from the lack of theorization about institutions and state roles on both lines. State action and inaction are rarely placed in the foreground and receive less theoretical consideration in the GPN and the GVC research narratives (Neilson, Prichard, Yeung 2014).

The GPN focuses more on "actors" and all their "organizational relationships" in "multiple locations" (Yeung and Coe 2014.). It enables an explicit discussion of their functions in the network. However, this contribution still cannot fully explain why the state acts in the way it acts, and it lacks a theoretical basis to understand the dynamics between state and non-state actors within the network. Notwithstanding its thorough explanation of the actors' constellation in the production system, this framework is still missing a specific tool to look at power relations between players in the network. Therefore, this thesis incorporates the concept of the strategic-relational approach to further analyze the power dynamics and the interplay between state and non-state actors.

The strategic-relational approach to the state complements the GPN framework by highlighting the state's agency and its influence on economic processes within and across borders. It emphasizes that the state is not a passive entity but an active participant in the global economy, shaping conditions for firms, regions, and national engagements. The state's roles go beyond facilitation and regulation; it can also act as a producer and buyer, adopting various combinations of these roles to accumulate and capture value. The strategic-relational approach recognizes that the state is embedded in societal relations and is subject to strategic interactions and contestations.

The state can, directly and indirectly, influence the economic processes that include value creation, enhancement, and capture occurring within and across the borders of its territory (Yeung and Coe, 2015). Therefore, it is vital to first understand what a state is and how it functions. Following Smith (2015), the state is conceptualized through the concept of the strategic-relational approach advanced by Poulantzas (1978) and Jessop (1990). The approach offers a profound conceptual basis to explain the dialectical relationship between the state and society (Marslev, Staritz, and Raj-Reihelt 2022). This approach is understandable through its two basic configurations. First, the state is considered relational because it is shaped by and emerges from societal fractions such as capital and labor. Second, the state responds strategically and does not behave objectively or neutrally (Jessop 2008). In this respect, the state itself is highly politicized. It might privilege some actors and interests and open a critical arena for struggle (Marslev, Staritz, and Raj-Reichelt 2022).

In this research, the GPN and strategic-relational approaches will be implemented to analyze the impact of RED II on EU-Indonesia trade relations and the

future of the Indonesian palm oil sector. The GPN lens allows for a comprehensive understanding of the actors involved in the palm oil production network and their interactions, going beyond the traditional focus on lead firms. By considering power dynamics and the interplay between state and non-state actors, the analysis will shed light on how policies are shaped and how they affect trade relations.

The implementation of the conceptual framework will involve analyzing the power exerted by different actors in the palm oil production network, including direct actors (such as palm oil firms) and indirect actors (such as government agencies, supranational organizations, and civil society groups). The state actors, with their regulatory authority, play a crucial role in shaping policies and inducing power dynamics among all players in the industry. This analysis will examine the impact of RED II on trade relations, export revenues, national policies, and ongoing free-trade negotiations between Indonesia and the EU. It will also consider the influence of lobbying efforts from social and environmental civil society organizations in the EU and palm oil business groups in the Indonesian political arena.

Overall, the combination of the GPN and strategic-relational approaches provides a robust analytical framework to understand the power dynamics, interactions, and implications of policies in the palm oil industry. By considering the roles of state and non-state actors within the production network, this research aims to contribute to a better understanding of how different actors shape and are influenced by policy changes in the sector. Ultimately, it seeks to shed light on the potential for a green trade war between Indonesia and the EU and its impact on the palm oil industry.

Methods

The data collection for this research involved a combination of expert interviews and document analysis. The purpose of using multiple methods, known as triangulation, was to strengthen the research design and reduce potential deficiencies of a single-method approach. Expert interviews were conducted to gather qualitative data and gain insights from individuals with expertise in the palm oil industry and EU-Indonesia trade relations. The interviews were semi-structured and involved experts from government agencies, research institutes, NGOs, and industry associations. The snowball method was used to expand the sample size by obtaining recommendations for additional interviewees from the initial participants.

The interviews involved 24 parties from different institutions to better understand the dynamics behind Indonesian palm oil as biofuel in the European arena. The interviews for this study were primarily conducted in Jakarta, Indonesia, during a field visit supported by the Kurzwissenschaftliche Arbeit Stipendium (KWA – short-term grants abroad) from the University of Vienna. Qualitative interviews were needed to capture the reality observed by the experts and how they interpreted this observation based on their expertise. The goal was to elicit descriptive data on a social phenomenon related to its contextual embeddedness (Dannecker and Vossemer 2014). This process was essential for this research to understand the

issue. The expert interview in the form of semi-structured questions was employed to gain access to the knowledge production according to the practical work done by the interview partners (ibid). Despite different views on the definition of the term "expert" in qualitative research put forward by Dannecker and Vossemer (2014), in this project, an expert is defined as a specialist in the field who has academically or professionally produced knowledge related to the palm oil issue in Indonesia. Experts were chosen carefully to consider the social implication of the ascription of this expert status.

The sampling method for the conduction of the interviews was a combination of purposive sampling and the snowball method. While purposive sampling allows confident strategic choices of where, how, and with whom the interviews are conducted (Aurini 2016), the snowball method enables wider reach to potential interview partners through the recommendations obtained from interviewees (Dannecker and Englert 2014). Experts chosen as interview partners were government representatives, researchers, smallholders, labor union representatives, and NGO representatives directly working with the Indonesian and EU palm oil industries. The interviews serve as the primary basis of the analysis. In addition to expert interviews, document analysis was conducted to supplement the empirical data. This method involved the systematic evaluation of printed and electronic documents, such as government websites, press releases, and trade documents. Document analysis is an efficient and cost-effective way to collect data, especially considering the limitations posed by the COVID-19 pandemic, which hindered fieldwork. The period of document analysis covered 2018 to 2022, focusing on key developments and debates related to the palm oil industry.

The data analysis followed an iterative process using qualitative content analysis techniques. The data from interviews and documents were coded and organized in a spreadsheet to facilitate data retrieval and analysis. The coding process involved open coding, where descriptive labels were assigned to passages and themes identified in the data. The coded data were then analyzed for patterns and repetitions before interpretations were made. The analysis aimed to identify the motivations behind the establishment of RED II, assess the impact of RED II on trade relations and the palm oil industry, map the interests of different stakeholders, examine government strategies in the palm oil sector, and explore the possibility of a trade war between Indonesia and the EU.

It is important to acknowledge the limitations of this research. The short research stay in Indonesia and the reliance on video interviews limited the ability to conduct extensive fieldwork and engage with actors outside of Jakarta. The ongoing nature of WTO proceedings and the CEPA negotiation meant that the analysis of these events is incomplete. Difficulties in contacting decision-makers and obtaining first-hand data posed challenges in accessing comprehensive information. The author's background as an Indonesian researcher may have introduced biases, and the availability of written data on certain topics, such as the CEPA negotiation process, was limited.

Despite these limitations, this research aims to provide valuable insights into the dynamics of the palm oil industry and EU-Indonesia trade relations. The

combination of expert interviews and document analysis allows for a comprehensive analysis of the topic, considering different perspectives and data sources. By acknowledging the limitations and biases, the findings of this research contribute to a better understanding of the complexities and power dynamics within the palm oil industry and shed light on the potential implications of RED II and trade relations between Indonesia and the EU.

Global Palm Oil Sector

Palm oil is a type of vegetable oil derived from palm trees, primarily grown in tropical countries such as Indonesia and Malaysia. The history of palm oil can be traced back to West Africa, where it was used as a local food source for Europeans travelling to the region in the 15th century. However, it was only in the 1800s that palm oil started gaining attention for its commercial potential. The development of palm oil plantations in Congo and the introduction of palm oil to Southeast Asia in the mid-1800s played a significant role in the global palm oil industry's expansion.

Palm oil production involves harvesting the fruit bunches of palm trees, which are then processed to obtain crude palm oil (CPO) and palm kernel oil (PKO). These oils are used in various applications, including food, industrial products, and biofuels. Indonesia and Malaysia are the largest producers of palm oil, accounting for about 84% of global production. Other countries like Colombia, Brazil, Thailand, and Ecuador also contribute to palm oil production but to a lesser extent.

The rapid expansion of the palm oil industry has brought economic benefits to producing countries, contributing to job creation and economic growth. However, it has also raised environmental and social concerns. Palm oil plantations have led to deforestation, loss of biodiversity, and increased carbon emissions, especially when primary forests and peatlands are cleared for cultivation. The industry has also been associated with human rights abuses, land grabbing, and conflicts over land ownership.

To address these sustainability challenges, various certification schemes have been introduced. The Roundtable on Sustainable Palm Oil (RSPO) is one such initiative that aims to promote sustainable practices in the palm oil sector. Other certification schemes include the International Sustainability and Carbon Certification (ISCC) standard and the Indonesian Sustainable Palm Oil (ISPO) certification. These certifications provide guidelines and criteria for sustainable palm oil production, although they have faced criticism for their effectiveness and implementation.

The global demand for palm oil continues to rise due to its unique properties, versatility, and competitive advantage over other vegetable oils. However, the industry's expansion must be balanced with environmental and social considerations to ensure a more sustainable and responsible palm oil production. The production of palm oil starts from the harvest of the fruit. A fully grown palm oil tree bears fresh fruit bunches (FFBs) that will be harvested after three years. The oil comes from the extraction of FFBs, which results in two main products: CPO

and PKO (Fang 2013). The refinery of CPO will be processed into edible oil (cooking oil, cream, and margarine), oleochemicals (used in detergent and lubricants), biodiesel, and lauric acid (used in cosmetics and soaps). PKO, which results from deshelling, refining, and crushing the kernels, is generally used in making food products such as non-dairy creams. The process of deshelling per se will also produce a by-product of palm kernel expellers (PKEs) used to make animal feeds. On the other hand, the shells taken away from the kernels will be sold as an additional biofuel raw material (ibid.).

Hence, the palm oil production network comprises a wide range of stakeholders that include producers of various scopes (large and small), processors, traders, consumer good manufacturers (CGMs), and retailers who are scattered globally (Canossa et al. 2020). It is important to note that only a few companies run the refining, processing, and trading stages. Processors and traders are primarily located in the Global North and are the ones who supply the product to diversified end users.

About 84% of palm oil is produced in Indonesia and Malaysia (see figure 1), with nearly four million and around 700,000 people employed in the countries respectively (Pacheco et al. 2018). This means that other producing countries such as Columbia, Brazil, Thailand, and Ecuador can only partially fill the gap. This lucrative business could attract countries in Africa and Latin America to contribute to global supply. However, high labor costs (e.g., in Brazil), uncertain social and political situations, and the lack of price incentives are blocking the potential of these new producing countries (ibid.).

The Indonesian domestic market, India, China, and the EU dominate global palm oil consumption (figure 2). While palm oil is predominantly used for cook-

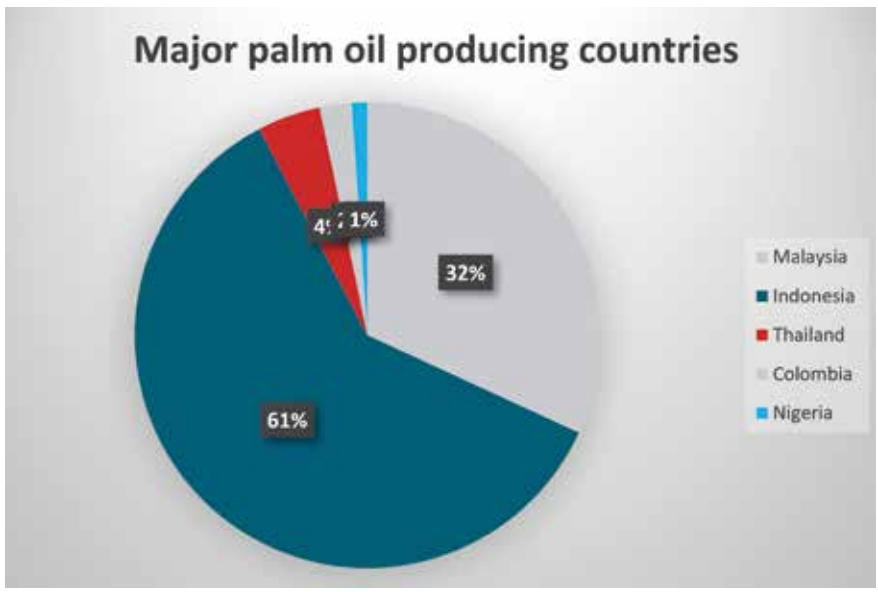

Figure 1. Major Palm-Oil-Producing Countries
Source: "Palm oil: Too much of a good thing?" 2018. Deutsche Welle.

ing oil and food ingredients in India and China, it is used more for manufacturing products and as biofuel raw material in the EU. Demand for palm oil for food is mainly driven by urbanization and the dietary shift toward processed foods. At the same time, renewable energy policies specifically prompt the need for non-food purposes (Canossa et al. 2020). It is important to note here that India, China, and the Netherlands are not only importers of CPO but also the hub of palm oil distribution worldwide. Most of these importing countries also act as exporters of palm oil derivatives and help the spread of palm oil in their respective regions. More than half of palm oil used for cooking oil (UCO) and for biodiesel in Europe in 2019 was imported from China (34%) and only about 20% came from Malaysia and Indonesia (Euractive 2020).

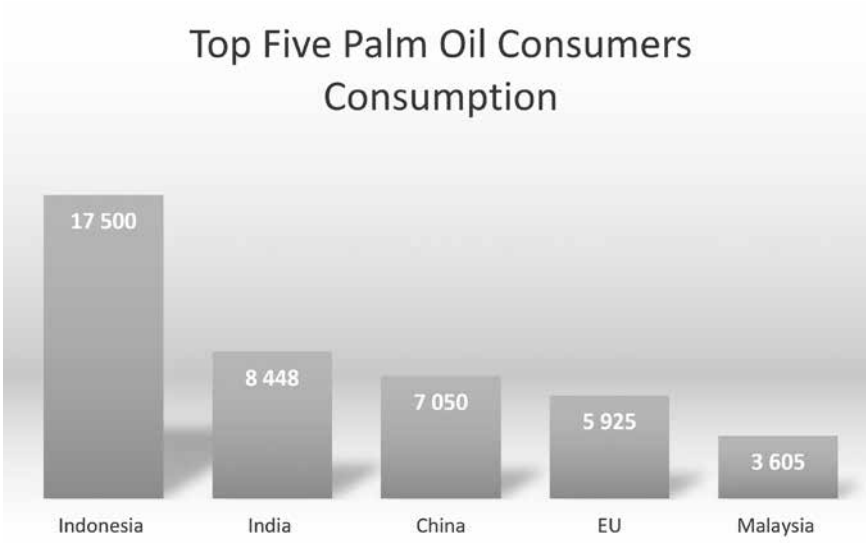

Figure 2. Top Five Palm Oil Consumer's Consumption (in 1000 MT)
Source: Index Mundi. 2022. "Palm Oil Domestic Consumption by Country."

Indonesian Palm Oil Sector

Palm oil has played a significant role in Indonesia's economic development, making it the largest palm oil producer in the world. The country accounts for 84% of the global palm oil supply and relies on the industry for economic growth and employment. The expansion of palm oil plantations began in the late 1970s under President Suharto, with increased access for foreign investors and attractive incentives. Indonesia's palm oil production has seen remarkable growth, reaching 44.5 million tons in 2021.

The Indonesian palm oil production network consists of primary and secondary players. Primary players include farmers, business associations, manufacturers, financial institutions, and state actors, while secondary players include certifica-

tion providers, NGOs, social movements, and international consumers. The production network has an hourglass shape, with upstream activities such as planting, harvesting, milling, and refining taking place in Indonesia, while downstream activities occur in importing countries like India, China, and the EU.

The palm oil industry in Indonesia is dominated by large conglomerates, with more than 30 major groups controlling over 60% of plantations and subsidiary palm oil companies. The industry includes private companies, smallholders, and state-owned companies, with private enterprises accounting for the majority of production. Malaysian and Singaporean companies also play significant roles, with Malaysian companies operating in Indonesian plantations and Singapore providing financial investment.

The palm oil sector in Indonesia faces social and environmental issues, including deforestation, biodiversity loss, land conflicts, and CO_2 emissions. NGOs and certification providers play a role in addressing these issues and shaping industry dynamics. Land conflicts are rooted in historical land ownership laws, and unregistered lands and the lack of reliable data hinder sustainability efforts and certification. Discrepancies between forest zone boundaries and regional spatial planning contribute to the complexity of the industry. The licensing system for palm oil plantations also faces challenges, including overlapping permits and a lack of accountability.

Overall, the Indonesian palm oil sector has experienced significant growth and economic benefits but faces ongoing challenges related to sustainability, social conflicts, and environmental impact. Efforts are being made to address these issues and promote sustainable practices in the industry.

The Role of Palm Oil in Economic Development and the Rise of Indonesia as the Largest Palm Oil Producer

Palm oil became a dominant crop in Indonesia by the end of the twentieth century and plays a pivotal role in the country's economy (Watts and Irawan 2018; Obidzinski 2013). Eighty-four percent of the global palm oil supply comes from Indonesia and Malaysia, where 7.8 million people rely on the industry for their living throughout the value chains (Our World in Data, 2018; PASPI, 2018). CPO and PKO are Indonesia's second-biggest export earners after coal, contributing USD 16.53 billion in 2018 – 9.2% of its total exports and 1.6% of the GDP (FERN 2019; Reily and Ekarina, 2018; PASPI, 2018 in Purnomo et al. 2020). In 2011, oil palm plantations covered 7.8 million hectares (ha) in Indonesia, of which 6.1 million ha were productive plantations under harvest (Obidzinski 2013). The state plans to expand its oil palm plantation portfolio by another four million ha (Obidzinski 2013).

The history of the palm oil industry in the region can be traced back to the colonial era when the policy landscape of the palm oil industry started to take shape (Jiwan 2018; Brad 2013). The doctrinal legacy that the state has ultimate power over land rights has been the key historical factor that promotes crop expan-

sion (ibid.). The massive plantation of palm oil and the sustained effort on palm oil promotion only began under Suharto's presidency in the late 1970s (Budidarsono, Susanti, and Zoomers 2013). Due to a decrease in prices of rubber, the Indonesian primary commodity at that time, palm oil was perceived as an alternative for the state's revenue booster. During this time, state-owned plantation companies (PTPN) managed most of the palm oil business (Giacomin 2018). Further, production in Indonesia lagged until the late 1980s due to post-independence political uncertainties.

Following Indonesia's commitment to structural reforms and liberalization in 1998 stipulated by the International Monetary Fund (IMF) (Varkkey, Tyson, and Choiruzzad 2018), the government led by President Suharto created more access to foreign investors, offering attractive incentives for investing in the palm oil sector. As a result, the industry also experienced great strides (Brad 2013; Corley and Tinker 2016). Indonesia's palm oil harvested area increased dramatically from around 70,000 ha in the 1960s to 2.01 million ha by 1998 (Varkkey, Tyson, and Choiruzzad 2018). From 2008 onwards, Indonesia managed to replace Malaysia's position as the largest palm oil producer and cemented its position as the largest vegetable oil producer (Bakhtiar et al., 2019).

The Indonesian production in the past 30 years is remarkable. The liberalization has proven to stimulate more palm oil production, and it has increased production from 5.8 million tons in 1998 to 44.5 million tons in 2021 (Index Mundi 2021). Palm oil has become a strategic commodity and the most significant contributor to Indonesia's foreign exchange (Bakhtiar et al., 2019). The Indonesian Statistical Agency (2016) recorded that from the 32 million tons of palm oil produced in 2016, Indonesia managed to export 24.3 million tons with an economic value of USD 16.2 billion (BPS 2016). On the employment side, the Coordinating Ministry for Economic Affairs maintains that the palm oil industry can provide 17 million direct and indirect jobs for the entire nation (Bakhtiar et al., 2019). Worldgrowth (2011) recorded that the industry has also provided six million employments for the poor population and contributed to the development of the rural economy. Some 3.6 million workers are estimated to be employed in the palm-oil-based biofuel industry alone (Obidzinski et al., 2012).

Motivation Behind the Establishment of RED II

The establishment of RED II in the EU was driven by various motivations. The EU's commitment to climate policies, particularly after ratifying the Kyoto Protocol, led to the development of a legal framework, including the Biofuel Directive, to promote greener transportation and demonstrate climate ambition. The initial Renewable Energy Directive (RED I), adopted in 2009, aimed to reduce greenhouse gas emissions and promote economic growth through innovation and sustainable energy. However, the emphasis on biofuels under RED I led to concerns about unintended environmental impacts and increased greenhouse gas emissions due to land expansions for biofuel production.

These concerns, along with pressure from the European Parliament and civil society organizations (CSOs), led to the proposal and recasting of RED II in 2018. RED II introduced improvements by incorporating sustainability criteria, such as the ILUC approach, to limit high-ILUC-risk biofuels. It also ended the mandate for food-based biofuels but allowed member states to count them towards renewable energy targets. The directive aimed to reduce greenhouse gas emissions and promote regional development, employment, and technological innovation in the renewable energy sector.

Controversially, the ILUC-delegated act introduced a "freeze and phase-out" of certain biofuels considered high ILUC risks, with palm oil having the highest impact. RED II's establishment cannot be separated from the EU's political landscape and its commitment to climate politics. The EU's appointment of Ursula von der Leyen and the introduction of the European Green Deal demonstrated the importance of climate politics in the administration. CSOs played a significant role in shaping RED II through petitions and advocating for addressing unintended negative impacts.

The directive's motivation aligns with the EU's commitment to environmental policies and its aim to reduce greenhouse gas emissions while promoting economic benefits, employment, and regional development. However, there are concerns that RED II may have protectionist intentions, favoring European regional vegetable oil businesses over imported palm oil. These concerns arise from the EU's emphasis on environmental and social issues, powerful farmers' lobbies in some member states, and a preference for regional products. This has led to accusations of protectionism by Indonesia regarding the EU's sustainability criteria and their impact on the downstream industry. Overall, the motivation behind RED II reflects the EU's commitment to climate change mitigation, the influence of CSOs, and the complexities of balancing environmental objectives with economic considerations and regional interests.

The Impacts of RED II and ILUC-Delegated Act

RED II and its ILUC-delegated act have had both direct and indirect impacts on the Indonesian palm oil sector. While the direct impact can be seen in terms of export and revenue, the indirect impacts are evident in Indonesian policies related to palm oil management.

The economic modelling suggests that a total ban from the EU would have a relatively small impact on Indonesia's palm oil industry. This is because the market for palm oil has shifted to China and India, the largest importers. The EU's position as the third-largest import destination for palm oil contributes to the insignificant export shock. Additionally, despite RED II, palm oil continues to be used as a biofuel feedstock, with an increasing share in biodiesel production in the EU.

Indirectly, RED II has influenced Indonesian policies. The government has increased its domestic biofuel consumption target, known as the B30 mandate, to absorb excess palm oil supply and reduce the fuel import bill. Strengthening the

palm oil downstream industry is another strategy to enhance goods within Indonesia. The government has also implemented the National Action Plan for Sustainable Palm Oil (NAP SPO) to improve sustainability governance and address issues related to legality, traceability, and deforestation prevention. The plan includes the mandatory certification system, known as the ISPO, to ensure compliance with higher agricultural standards. However, international recognition and acceptance of the ISPO remain a challenge.

The establishment of RED II has also fostered dialogue and collaboration among palm-oil-producing countries through the Council of Palm Oil Producing Countries (CPOPC) to improve the quality, quantity, and sustainability of palm oil production. Overall, RED II and ILUC-delegated acts have had mixed impacts on the Indonesian palm oil sector, affecting exports to the EU but also driving domestic policies to enhance sustainability and the downstream industry.

The Litigation in the WTO and Its Relation to the Current Negotiation of the IEU CEPA

The litigation in the WTO and its relation to the ongoing negotiation of the IEU CEPA have significant implications for the Indonesian palm oil sector and trade relations between Indonesia and the EU.

In the WTO litigation, Indonesia filed a complaint, along with Malaysia, against the EU for what they perceive as discriminatory treatment against palm oil. The main argument is that RED II is inconsistent with several articles under WTO regulations. Indonesia aims to challenge RED II's measures through the dispute settlement process. While legal analyses suggest that the measures may not be justified under WTO regulations, the case is still ongoing.

Indonesia has been actively engaged in discussions and consultations with the EU to address its concerns regarding palm oil. The Indonesian government has threatened to review the IEU CEPA to ensure the proper position of palm oil in the European market. The CEPA negotiations have progressed, with discussions on trade and sustainable development (TSD) being a critical issue. Indonesia seeks to include economic dimensions of the palm oil industry in the TSD chapter, while the EU focuses on environmental and social aspects.

The ongoing WTO litigation and the palm oil issue have put pressure on the CEPA negotiations, with concerns raised by CSOs regarding human rights and social and environmental impacts. CSOs have called for a moratorium on the CEPA negotiations to allow public engagement and ensure a deal that benefits people and the planet. The Indonesian government has referred to the success of the European Free Trade Agreement (EFTA) ratification and the Swiss referendum on palm oil as examples that could influence the EU's perception of palm oil.

The outcome of WTO litigation and the CEPA negotiations will have significant implications for the Indonesian palm oil sector and trade relations between Indonesia and the EU. It remains to be seen how the disputes will be resolved and how the negotiations will shape the future of the palm oil trade between the two parties.

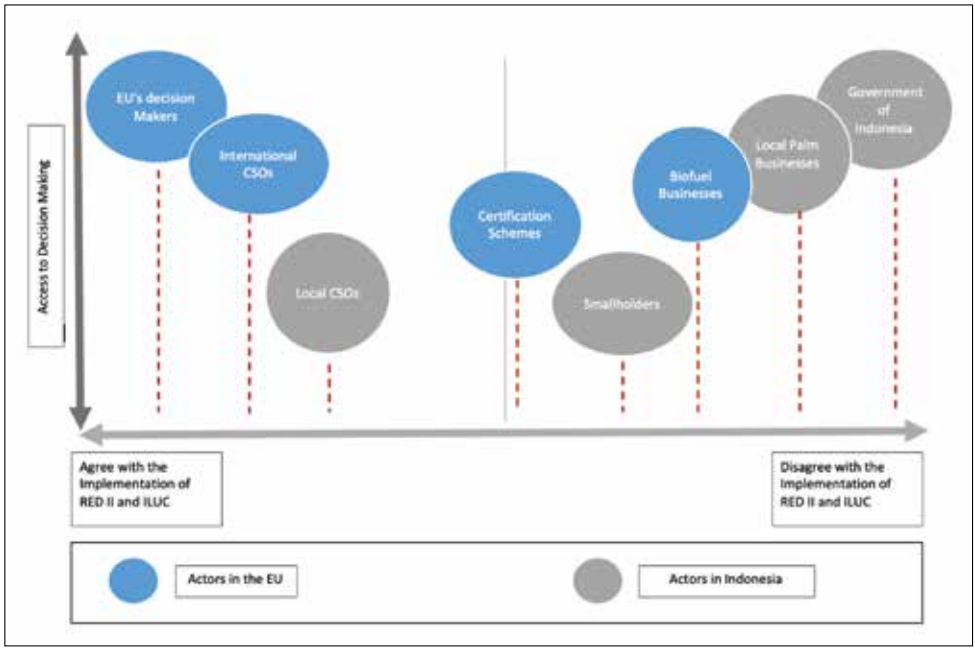

Figure 3. Mapping the Interests of Actors in the Network, created by the author.

The map encompassing the interests of different actors involved in the Indonesian palm oil sector in figure 3 visualizes the level of agreement toward the implementation of the directive and the level of access to decision-making for each actor. The analysis reveals that the interests of the Government of Indonesia are closely aligned with palm oil businesses, indicating a strong association between them. Smallholders, on the other hand, are not prioritized by the government, as indicated by the lack of emphasis on income security and sustainability measures for smallholders. The EU's interest shows a slightly more favorable path for the inclusion of smallholders, as RED II explicitly mentions the acceptance of palm oil import sourced from smallholders with land ownership of less than 2 ha. The EU's regulation is primarily driven by fact-based environmental arguments.

In the Indonesian context, the government's interest in palm oil is motivated by various factors, including poverty alleviation, sustainable economic activities, renewable energy development, tax revenue, employment, and income generation. The palm oil sector is highly politicized, with the current administration strongly defending Indonesian agribusiness and accusing critics of double standards. The Indonesian Coordinating Minister of Maritime Affairs, Luhut Binsar Panjaitan, is closely linked to the palm oil sector, further strengthening the perception that the administration favors the interests of palm oil businesses. The sector is also marred by corruption and a centralized market controlled by a few companies.

The government of Indonesia publicly criticizes the EU's sustainability concerns as a threat to the state's sovereignty, portraying it as an attempt to extend

Western values and impose unequal treatment. The administration asserts that palm oil plays a vital role in poverty eradication and accuses the EU of ignoring this aspect. Additionally, the EU's ILUC criteria are seen as favoring rapeseed oil and as a potential threat to Indonesian sovereignty. The government emphasizes economic growth and development, often overlooking the environmental impact and forest clearing associated with palm oil expansion.

Smallholders are instrumentalized by the government to defend the palm oil sector, portraying them as the most economically vulnerable group affected by the campaign against palm oil. However, the economic impact of RED II on smallholders is relatively minor, as reflected in stable prices for FFBs. Smallholder associations prioritize access to certification mechanisms and legal recognition of their land ownership. They aim to strengthen collective actions and organizations to improve bargaining positions and gain access to information, training, and sustainable practices.

Indonesian palm oil business associations, such as the Association of National Palm Oil Businesses (GAPKI), perceive RED II as discriminatory, and advocate for equal treatment of all vegetable oils. They support the recognition of the ISPO certification and emphasize the economic impact and food security concerns of excluding palm oil. Biofuel businesses in the EU, including the European Palm Oil Association (EPOA) and the European Biofuel Board (EBB), have varying positions. The EPOA highlights the sustainability efforts made by businesses and the potential disruption to the vegetable oil market. The EBB supports the classification of high- and low-ILUC-risk biofuels, emphasizing the need for good agricultural practices and sustainable raw materials.

International CSOs play a significant role in shaping European environmental policies. They advocate for zero deforestation and urge palm-oil-producing countries to stop expanding plantations into primary forests and peatlands. European CSOs are involved in lobbying and research to support their positions. Certification schemes, such as ISCC, argue against excluding palm oil from the biofuel market, citing limited palm oil use for biofuels and the potential for uncertified vegetable oils to replace it.

EU policymakers maintain that RED II does not discriminate against any particular vegetable oil and treats all feedstock equally. They recognize the importance of smallholders in the palm oil industry and have set specific regulations to secure their access to the market. The EU plans to reassess data and methodology for determining high-ILUC-risk crops, taking into account efforts by Indonesia to improve palm oil sustainability. The reassessment aims to increase the EU's renewable energy target and accelerate the transition to greener energy. Overall, the mapping of interests reveals complex dynamics and differing perspectives between actors in Indonesia and the EU regarding RED II and palm oil production.

Current Development and the Risk of a Green Trade War

The concept of a green trade war has emerged as environmental concerns increasingly intersect with international trade conflicts. This term refers to disputes and retaliatory measures related to renewable energy technologies and environmental issues in trade relationships. The so-called trade war between Indonesia and the EU over palm oil biofuel is one such example. However, before categorizing it as a trade war, it is important to consider certain indicators. A trade war involves the use of tools such as tariffs, quotas, or import bans to impose trade barriers, and it often includes a series of retaliatory measures. Following the adoption of RED II in 2018, the Indonesian government threatened to retaliate by raising import tariffs on EU dairy products and issued other threats. However, these threats have not been put into action. The Indonesian government is unlikely to engage in a full-fledged trade war due to the potential negative impact on its economy. Instead, Indonesia has only threatened to implement tariffs on smaller imports that would have a limited impact on the EU.

The EU has challenged Indonesia's export restrictions on raw materials for stainless steel at the WTO by requesting the establishment of a panel. This has further strained the trade relationship between the two parties. However, the prospects of an actual retaliation by Indonesia seem minor, as the EU has less at stake in the trade relationship. Indonesia heavily relies on exports to the EU, while the EU has numerous other trading partners. Escalating the dispute could put Indonesia in a disadvantageous position economically.

Despite the disagreements over palm oil and nickel, it is unlikely that the trade dispute will significantly affect other areas of the Indonesia-EU bilateral relationship. Both parties continue to collaborate in various sectors such as tourism, national defense and security, and education. The trade conflict is limited to specific issues and does not undermine broader cooperation between Indonesia and the EU.

Conclusion

This research has shed light on the impacts of RED II on the bilateral relations of the two trading partners, Indonesia and the EU. The overarching topic guiding this thesis was how different actors are involved in the palm oil production network, how the state plays its role, and how power dynamics are formed in the context of policymaking related to the sector. The starting point was to combine the concept of power in the GPN with the strategic-relational approach to the state. This research sought to answer the main question: To what extent does Indonesia-EU's dispute on palm oil related to RED II lead to a green trade war? The theoretical framework was applied to an environmentally motivated regulation established in the EU and how it interacts and creates dynamics in the palm oil sector. Mapping the palm oil sector and the policy landscape of the Indonesian industry became the basis for finding relevant actors involved in the Indonesian palm oil industry.

With insights from expert interviews and document analysis, the author managed to discuss the likelihood of a trade war caused by the straining tensions between Indonesia and the EU.

Through the GPN's concept of power and strategic-relational perspective, analysis shows that the strained relationship between Indonesia and the EU is a contingent product of a changing balance of political forces and interests located within and beyond these states. This finding can be further elaborated on in five points. First, the implementation of RED II was motivated by the European Commission's intention to correct its biofuel market and to respond to the growing criticism levelled by CSOs and the European Parliament. In the beginning, the EU encouraged the use of biofuel to gradually reduce fossil consumption through the launch of RED I. However, this directive has also led to the growing import of vegetable oil sourced from global producers including palm oil. Dissatisfied with this development, many CSOs decided to launch campaigns against palm oil biofuel and influence the European Parliament to push the European Commission to react.

With this pressure from civil society organizations and the European Parliament, the European Commission agreed to establish a recast of the regulation to correct the mistake. This event marks the birth of RED II and the ILUC-delegated act. In this context, the European Commission agrees to cap their import and to slowly phase out the use of oil derived from unsustainable production while encouraging the use of regional vegetable oil in the bloc. The government and the Indonesian palm oil businesses find themselves disadvantaged by the implementation of this regulation. To address this effect, the Indonesian government, supported by the Indonesian palm oil businesses, has reacted by filing litigation at the WTO.

Second, the implementation of RED II has impacted several aspects of the palm oil sector in Indonesia, both directly and indirectly. The direct impact is visible in the number of Indonesian palm oil exports to the EU. Indeed, the implementation of RED II has caused some declining effects in the Indonesian direct export to the EU. However, the revenue from palm oil export does not seem to be affected. In this context, it is also important to note that the EU remains an indirect palm oil consumer through the import of palm oil derivatives from China and India (Euractive 2020). This finding raised another question: if the palm oil global export does not seem to be affected, then why does the government of Indonesia insist on pursuing litigation at the WTO? The answer lies in the EU's power to significantly influence the sustainability narrative.

Despite the EU's position as only the third-largest palm oil export destination, the Indonesian government is aware of the EU's power in influencing the global perception of palm oil. The genuine concern of the Indonesian government is that campaigns and environmental regulations created by the EU will influence India and China (as the largest importers) to follow suit and curb market access for palm oil. This concern has indirectly impacted the Indonesian policy landscape. In addressing further damage to the palm oil reputation, the government seeks to focus more on improving the acceptance of the Indonesian palm oil certification scheme and revamping its sustainability management through the issuance of sev-

eral national policies. On the other hand, many Indonesian civil society organizations are more concerned about the ineffectiveness of these new national policies and therefore push for more action from the EU to further encourage sustainability management in Indonesia.

Third, the litigation process at the WTO on the palm oil issue hampers the free-trade negotiation between the two trading parties. Currently, both the litigation and the IEU CEPA are still in progress. This poses several challenges in predicting the exact implications of RED II on the bilateral relations between the EU and Indonesia. Whether RED II exercised discrimination toward palm oil is still to be decided by the WTO dispute settlement body. Indeed, WTO litigation seems to cause some obstruction in the CEPA negotiations and strained diplomatic relations between Indonesia and the EU. The negotiations on CEPA reached a standstill after eleven rounds of meetings. With the limited power that Indonesia has in influencing the European regulation, the country is left with less flexibility. So far, there is no significant progress reported by both trading partners on how to consolidate the text, especially concerning the TSD article.

Fourth, the two contrasting views between the EU and Indonesia are the result of different societal power structures occurring in each state. This event should be perceived as a dynamic instead of a linear process. Both states are highly influenced not only by internal forces. While the landscape of the EU's law making is dominated by environmental lobbyists and CSOs, the Indonesian ones are closely related to the palm oil businesses. This is evident in the European Commission's mandate to IIASA in developing some criteria to justify the removal of palm oil as an eligible biofuel feedstock under RED II. The analysis shows that the EU aims to further develop its own vegetable oil market and secure employment in its own industry. On the Indonesian side, GAPKI has more power in influencing the regulation. GAPKI controls almost all national palm oil data and has representatives in the government. Despite the claims made by Indonesia that RED II can jeopardize the livelihood of smallholders in the country, their involvement in the production network is less of a concern. The main interest of the government of Indonesia is to secure a close link to the palm oil businesses. Hence, the measures taken by the government of Indonesia only reflect its interest in capital accumulation and investment possibilities.

Certification providers do not seem to have enough power to push sustainability as expected by the EU. The certification mechanism remains voluntary and costly for most palm oil farmers and producers in Indonesia. ISCC, as the most-used certification for palm oil as a biofuel, has limited access to the EU's policy-making. Despite its attempt to convince EU policymakers that sustainable palm oil is feasible, the EU does not show any leniency in its regulations. On the other hand, environmental CSOs have managed to table their interests and push forward with a more ambitious climate target. The plan to include soybean oil in the high-ILUC-risk criteria on the next recast of RED is evident in this case. Most of the problems also come from the Indonesian internal land registration issue. Since land ownership has to comply with a series of segmented authorities (national, regional, and local levels), the procedures become complicated and unsupervised. Many small-

holder groups are still facing difficulties in obtaining sustainable certification due to legality and financial issues. Even the exact number of palm oil smallholders in forest areas remains unclear. The GoI does not seem to be concerned with this issue as the demand for palm oil continues to rise. This is where the role of the CSO campaigns fill the gap.

Fifth, with regards to the green trade war narrative heralded by media on the palm oil litigation at the WTO, the prospects of an actual retaliation seem minor. The EU has less at stake compared to Indonesia. Considering the motivation, impact, current litigation processes, and interests of respective parties, the EU still has a stronger influence on the trade relation. The trade relations between Indonesia and the EU are not mutually dependent. Indonesia exports almost 10% of their goods to the EU, while the country itself only managed to secure its position as the 31st largest of the EU's trading partners. If the disagreement persists and the government of Indonesia were to intensify the dispute, Indonesia would find itself in a disadvantageous position. Despite the palm oil issue, both trading parties maintain their diplomatic relations and collaborate in other sectors, such as tourism, national defense and security, and education. The narrative of the trade war, which was initially declared by the President of Indonesia, Joko Widodo, has subsided over time along with the rise of the domestic vegetable oil crisis they faced in the middle of 2022.

Despite the greenwashing problems surrounding the EU's political arena, the European power in influencing the sustainability narratives remains strong. This has effectively pushed the Indonesian government to work on its sustainability management to correct palm oil's reputation. RED II has significantly impacted Indonesian national policy on palm oil. On that basis, future research should focus on the implementation of the national policy on sustainable palm oil and the dynamics of improving the acceptance of Indonesian palm oil standards in the global market. As Indonesia is currently focused on enhancing value addition in the palm oil production chain, future research could further examine the government's strategies for achieving its goals. It could also contribute to a deeper understanding of how national palm oil sustainability measures develop over time.

References

Allard, T., Nangoy, F. (2021). *EU's Borrell: Palm oil issue shouldn't hamper trade talks with Indonesia*. https://www.reuters.com/world/asia-pacific/eus-borrell-palm-oil-issue-shouldnt-hamper-trade-talks-with-indonesia-2021-06-03/ [abgerufen am 01.07.2024].

Arief, B. N. (2007). *Masalah penegakan hukum dan kebijakan hukum pidana dalam penanggulangan kejahatan*. Jakarta: Kencana Prenada Media Group.

Aurini, J. D., Heath, M., Howells, S. (2016). How to Design a Qualitative Project and CreateResearch Question: Selecting the Right Tools for the Job. In Aurini, J. D., Heath, M., Howells, S., *How to of Qualitative Research: Strategies for Executing High-Quality Projects*. London: Sage, 34–67.

Bair, J. (2005). Global Capitalism and Commodity Chains: Looking Back, Going Forward.*Competition & Change*, 9(2), 153–180. https://doi.org/10.1179/102452905X45382

Bazeley, P. (2013). *Qualitative Data Analysis. Practical Strategies*. Los Angeles: Sage.

Brad, A. (2019). *Der Palmölboom in Indonesien: Zur Politischen Ökonomie einer umkämpften Ressource*. Bielefeld: transcript Verlag. doi:10.1515/9783839447574

Budidarsono, S., Susanti, A., Zoomers, A. (2013). Oil palm plantations in Indonesia: the implications for migration, settlement/resettlement and local economic development. In InTech, *Biofuels-Economy, Environment and Sustainability*. doi:10.5772/53586

Carlson, K. M., Heilmayr, R., Gibbs, H. K., Noojipady, P., Burns, D. N., Morton, D. C., Walker, N. F., Paoli, G. D., Kremenk, C. (2018). Effect of oil palm sustainability certification on. *Proceedings of the National Academy of Sciences*, 115(1), 121–126. doi:10.1073/pnas.1704728114

Choiruzzad, S. A. B., Tyson, A., Varkkey, H. (2021). The ambiguities of Indonesian Sustainable Palm Oil certification: internal incoherence, governance rescaling and state transformation. *Asia Europe Journal*, 19, 189–208. Doi:10.1007/s10308-020-00593-0

CNN Indonesia. (2019, 29. Oktober). *Menlu janji perjuangkan kepentingan sawit Indonesia*. https://www.cnnindonesia.com/internasional/20191029161325-106-443835/menlu-janji-perjuangkan-kepentingan-sawit-indonesia

Coe, N. M., Yeung H. W. C. (2015). *Global Production Networks: Theorizing Economic Development in an Interconnected World*. Oxford: Oxford University Press.

Coe, N. M., Dicken, P., Hess, M. (2008). Global production networks: Realizing the potential. *Journal of Economic Geography*, (8)3, 271–295.

Coe, N. (2018). Global Production Networks. In Cook, G., Johns, J., McDonald, F., Beaverstock, J., Pandit, N. (Hrsg.), *The Routledge Companion to the Geography of International Business*. New York: Routledge, 147–160.

Corley, R. H. V., Tinker, P. B. (2015). *The Oil Palm* (5. Aufl.). doi:10.1002/9781118953297

Dannecker, P., Vossemer, C. (2014). Qualitative Interview in der Entwicklungsforschung. Typen und Herausforderungen. In Dannecker, P., Englert, B. (Hrsg.), *Qualitative Methoden in der Entwicklungsforschung.* Wien: Mandelbaum Verlag, 153–175.

Dannecker, P., Englert, B. (2014). *Qualitative Methoden in der Entwicklungsforschung*. Wien: Mandelbaum.

Disdier, A.-C., Marette, S., Millet, G. (2013). Are consumers concerned about palm oil? Evidence from a lab experiment. *Food Policy*, 43, 180–189. doi:10.1016/j.foodpol.2013.09.003

Drajat, B. (2013). *Upaya mengatasi black campaign kelapa sawit dan langkah strategis ke depan.* Lembaga Riset Perkebunan. Jawa Barat. https://pse.litbang.pertanian.go.id/ ind/pdffiles/Pros_2012_05B_MP_Bambang.pdf [abgerufen am 30.12.2020].

Efeca. (2016, March). *Comparison of the ISPO, MSPO and RSPO Standards*. https://www.sustainablepalmoil.org/wpcontent/uploads/sites/2/2015/09/Efeca_PO-Standards-Comparison.pdf [abgerufen am 10.10.2017].

Eureopean Commission. (201). *Proposal For A Directive Of The European Parliament And Of The Council On The Promotion Of The Use Of Energy From Renewable Sources*. https://eur-lex.europa.eu/resource.html?uri=cellar:3eb9ae57-faa6-11e6-8a35-01aa75ed71a10007.02/DOC_1&format=PDF [abgerufen am 11.07.2024].

European Commission. (2019). *Commission Delegated Regulation (EU): Supplementing Directive (EU) 2018/2001 as regards the determination of high indirect land-use change-risk feedstock for which a significant expansion of the production area into land with high carbon stock is observed and the certification of low indirect land-use change-risk biofuels, bioliquids and biomass fuels*. https://ec.europa.eu/energy/sites/ener/files/documents/2_en_act_part1_v3.pdf

European Commission. (2021, November). The texts proposed by the EU for the trade deal with Indonesia. *Foreign Policy*, 56–65.

European Parliament. (2009). *Directive 2009/28/EC of the European Parliament and of the Council of the European Union of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives. 2001/77/EC and 2003/30/EC*. https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32009L0028

Fargione, J., Hill, J., Tilman, D., Polasky, S., Hawthorne, P. (2008). Land clearing and the biofuel carbon debt. *Science*, 319(5867), 1235–1238.

Fern. (2022). *Using tariffs to incentivise sustainable palm oil*. https://www.fern.org/publications-insight/using-tariffs-to-incentivise-sustainablepalm-oil-2454/

Gerasimchuk, I., Koh, P. Y. (2013). *The EU Biofuel Policy and Palm Oil: Cutting Subsidiesor cutting rainforest?* https://www.iisd.org/gsi/sites/default/files/bf_eupalmoil.pdf

Gereffi, G., Humphrey, J., Sturgeon, T. (2005). The governance of global value chains. *Review of international political economy*, 12(1), 78–104.

Gereffi, G., Fernandez-Stark, K. (2016). *Global Value Chain Analysis: A Primer*. https://www.researchgate.net/publication/265892395_Global_Value_Chain_Analysis_A_Primer

Gereffi, G., Garcia-Johnson, R., Sasser, E. (2005). The NGO–industrial complex. *ForeignPolicy*, 125(26). doi:10.2307/3183327

Gibbon, P., Ponte, S. (2005). *Trading down: Africa, value chains, and the global economy*. Temple University Press.

Greenpeace. (2019). *Cutting Deforestation Out of the Palm Oil Supply Chain: Company Scorecard*. https://www.greenpeace.org/static/planet4-sweden-stateless/2019/01/019ca40a019ca40a-palm-oil-scorecard-final.pdf [abgerufen am 23.06.2021].

Greenpeace. (2020). *Destruction. Certified.* https://www.greenpeace.org/international/publication/46812/destructioncertified/ [abgerufen am 23.06.2021].

Grumiller, J. (2019). *A strategic-relational approach to analyzing industrial policy regimes within global production networks: the Ethiopian Leather and Leather*

Products Sector. https://ideas.repec.org/p/zbw/oefsew/60.html [abgerufen am 09.07.2024].

Hai, T. C. (2013). Malaysian corporations as strategic players in Southeast Asia's palm oilindustry. In Pye, O., Bhattacharya, J., (Hrsg.), *The palm oil controversy in Southeast Asia: a transnational perspective*. Singapore: ISEAS, 19–47.

Haraway, D. (1988). Situated Knowledge: The Science Question in Feminism and the Privilege of Partial Perspective. *Feminist Studies*, 14(3), 575–599.

Henderson, J., Dicken, P., Hess, M., Coe, N., Yeung, H. W. C. (2002). Global production networks and the analysis of economic development. *Review of International Political Economy*, 9(3), 436–464.

Hess, M. (2018). Global Production Networks. In Richardson, D., Castree, N., Goodchild, M., Kobayashi, A., Liu, W., Marston, R. A. (Hrsg.), *International Encyclopedia of Geography*. Chichester: Wiley Blackwell. doi:10.1002/9781118786352.wbieg0675.pub2

Horner, R. (2017). Beyond facilitator? State roles in global value chains and global production networks. *Geography Compass*, 11(2), 1–13.

Indonesia, Ministry of Foreign Affairs. (2019). *Indonesian Minister of Foreign Affairs Urges the European Union to Treat Palm Oil Issue Fairly*. https://kemlu.go.id/portal/en/read/1932/view/indonesian-minister-of-foreign-affairs-urges-the-european-union-to-treat-palm-oil-issue-fairly [abgerufen am 11.07.2024].

Ivancic, H., Koh, L. P. (2016). *Evolution of sustainable palm oil policy in Southeast*. doi:10.1080/23311843.2016.1195032

Jakarta Post. (2017). *Indonesia up in arms over EU's negative campaign against palmoil*. http://www.thejakartapost.com/news/2017/11/03/indonesiaup-in-arms-over-us-negative-campaign-against-palm-oil.html

Jakarta Post. (2017b). *Indonesia calls EU's ruling on palm oil 'discriminatory'*. http://www.thejakartapost.com/news/2017/04/10/indonesia-callseus-ruling-on-palm-oil-discriminatory.html

Jiwan, N. (2012). The Political Ecology of the Indonesian Palm Oil Industry. In Pye, O., Bhattacharya, J. (Hrsg.), *The Palm Oil Controversy in Southeast Asia: A Transnational Perspective*. Singapore: ISEAS Publishing, 48–75. doi:10.1355/9789814311458-007

Jessop, B. (2008). *State power: A strategic-relational approach*. Cambridge, Malden, MA: Polity.

Jessop, B. (2016). *The state: Past, present, future*. Malden, MA: Polity Press.

Jessop, B. (2004). Multilevel governance and multilevel meta governance. In Bache, I., Flinders, M. (Hrsg.), *Multi-level governance*. Oxford University Press Oxford, 49–74.

Ketiga, E. (PASPI). (2017). *Mitos vs fakta industri minyak sawit Indonesia dalam isu sosial, ekonomi dan lingkungan global*. Bogor: PASPI.

KPK. (2016). *Kajian sistem pengelolaan komoditas kelapa sawit*. https://auriga.or.id/cms/uploads/pdf/related2/4/4_kajian_sawit_kpk_2016_en.pdf

Kuckartz, U. (2012). *Qualitative Inhaltsanalyse. Methoden, Praxis, Computerunterstützung*. Basel: Beltz Juventa

Luttrell, C., Komarudin H., Zrust, M., Pacheco, P., Limberg, G., Nurfatriani, F., Wibowo, L. R., Hakim, I., Pirard, R. (2018). *Implementing sustainability commitments for palm oil in Indonesia: Governance arrangements of sustainability initiatives involving public and private actors*. doi:10.17528/cifor/006884

Marslev, K., Staritz, C., Raj-Reichert, G. (2022). *Rethinking Social Upgrading in Global Value Chains: Worker Power, State-Labour Relations and Intersectionality, Development and Change*. doi:10.1111/dech.12705

Marti, S. (2008). *Losing ground. The human rights impacts of oil palm plantation expansion in Indonesia. A report by Friends of the Earth, LifeMosaic and Sawit Watch*. https://www.foei.org/wp-content/uploads/2020/12/losingground.pdf

Mayr, S., Hollaus, B., Madner, V. (2020). Palm oil, the RED II and WTO law: EU sustainable biofuel policy tangled up in green? *Review of European, Comparative and International Environmental Law*. doi:10.1111/reel.12386

McCarthy, J. F. (2010). Processes of inclusion and adverse incorporation: Oil Palm and agrarian change in Sumatra, Indonesia. *The Journal of Peasant Studies*, 37(4), 821–50.

McInnes, A. (2017). A comparison of leading palm oil certification standards. https://www.forestpeoples.org/sites/default/files/documents/Palm%20Oil%20Certification%20Standards_lowres_spreads.pdf

Neilson, J., Pritchard, B., Yeung, H. W.-C. (Hrsg.). (2015). *Global Value Chains and Global. Production Networks. Changes in the International Political Economy*. London: Routledge. doi:10.4324/9781315725321

Neilson, J., Pritchard, B., Yeung, H. W.-C. (2014). Global value chains and global production networks in the changing international political economy. *Review of International Political Economy* (21)1, 1–8.

Obidzinski, K., Dermawan, A., Hadianto, A. (2014). Oil palm plantation investments in Indonesia's forest frontiers: limited economic multipliers and uncertain benefits for local Communities. *Environment, development and sustainability*, 16(6), 1177–1196.

Obidzinski, K., Andriani, R., Komarudin, H., Andrianto, A. (2012). Environmental and social impacts of oil palm plantations and their implications for biofuel production in Indonesia. *Ecology & Society*, 17(1), 25.

Oosterveer, P. J. M. (2020). Sustainability of palm oil and its acceptance in the EU. *Journal of Oil Palm Research*, 32, 365–376. doi:10.21894/jopr.2020.0039

Our World in Data. (2022). *Palm Oil*. https://ourworldindata.org/palm-oil [abgerufen am 11.07.2024].

Pacheco, P., Gnych, S., Dermawan, A., Komarudin, H., Okarda, B. (2017). *The Palm Oil Global Value Chain. Implication for economic growth and social and environmental sustainability*. doi:10.17528/cifor/006405

Pichler, M. (2010). Agrofuels in Indonesia: Structures, Conflicts, Consequences, and the Role of the EU. *ASEAS - Austrian Journal of South-East Asian Studies*, 3(2), 175–193.

Ponte, S., Gereffi, G., Raj-Reichert, G. (2019*). Introduction to the Handbook on Global Value Chains*. Cheltenham: Edward Elgar Publishing.

Poulantzas, N. (1978). The problem of the capitalist state. *New Left Review*, 58(1), 67–78.

Purnomo, H., Okarda, B., Dermawan, A. A., Made, A., Achdiawan, R., Kartodihardjo, H.,

Pacheco, P., Juniwaty, K. S. (2018). Reducing forest and land fires through good palm oil value chain governance. *Forest Policy and Economics*, 94, 94–106. doi:10.1016/j.forpol.2017.12.014

Purwanto, E., Santoso, H., Jelsma, I., Widayati, A., Nugroho, H. Y. S. H., Van Noordwijk, M. (2020). Agroforestry as Policy Option for Forest-Zone Oil Palm Production in Indonesia. *Land* 9(12), 531. doi:10.3390/land9120531

Rifin, A. (2010). Export Competitiveness of Indonesia's Palm Oil Product. *Trends in Agricultural Economics*, 3(1), 1–18. doi:10.3923/tae.2010.1.18 Roundtable on Sustainable Palm Oil. (2013). *Principles and Criteria for the Production of Sustainable Palm Oil.* https://rspo.org/explore?q=Principles+and+criteria [abgerufen am 19.12.2020].

Ruysschaert, D., Salles, D. (2014). Towards global voluntary standards: Questioning the effectiveness in attaining conservation goals: The case of the Roundtable on Sustainable Palm Oil (RSPO). *Ecological Economics*, 107, 438–446. doi:0.1016/j.ecolecon.2014.09.016

Schoneveld, G. C., Jelsma, I., Komarudin, H., Andrianto, A., Okarda, B., Ekowati, D. (2017). *Public and private sustainability standards in the oil palm sector: Compliance barriers Facing Indonesia's independent oil palm smallholders*. Doi:10.17528/cifor/006556

Statistik Indonesia. (2016). *Statistik Kelapa Sawit Indonesia 2016*. https://www.bps.go.id/id/publication/2017/11/10/5c499ba5089da29bba2a148e/statistik-kelapa-sawit-indonesia-2016.html

Teoh, C. H. (2010). *Key Sustainability Issues in the Palm Oil Sector. A Discussion Paper for Multi-Stakeholders Consultations (commissioned by the World Bank Group)*. https://www.academia.edu/2017559/Key_Sustainability_Issues_in_the_Palm_Oil_sector [abgerufen am 117.07.2024].

Tan, C. K. (2015). *Malaysia and Indonesia consider steps to lift the flagging palm oil market*. Nikkei Asian Review. https://asia.nikkei.com/Markets/Commodities/Malaysia-Indonesia-considersteps-to-lift-flagging-palm-oil-market

Tempo. (2022). *Kroni Dana Sawit. Edition: April 2022*. https://majalah.tempo.co

Tyson A, Meganingtyas, E. (2022). The status of palm oil under the European Union's renewable energy directive: sustainability or protectionism? *Bulletin of Indonesian Economic Studies*, 58(1), 31–54. doi:10.1080/00074918.2020.1862411

Varkkey, H., Tyson, A., Choiruzzad, S. A. B. (2018). Palm oil intensification and expansion in Indonesia and Malaysia: Environmental and socio-political factors influencing policy. *Forest Policy and Economics*, 92, 148–159.

Wurzel, R., Connelly, J. (Hrsg.). (2011). *The European Union as a Leader in International Climate Change Politics*. London: Routledge. doi:10.4324/9780203839959

Yasinta, T., Karuniasa, M. (2021). *10 years of EU fuel policy increased the EU's reliance on unsustainable biofuels*. https://www.transportenvironment.org/uploads/files/Biofuels-briefing-072021.pdf

Felix Malte Dorn

Inequalities in Resource-Based Global Production Networks: Resistance to Lithium Mining in Argentina (Jujuy) and Portugal (Região Norte)[1]

Introduction

Lithium, as a resource, has gained momentum in recent years. It is a key component in the manufacture of Li-ion batteries and the production of electric vehicles. As an integral part of all debates on the green economy, electromobility should provide a – still market-based and growth-centered – answer to the negative ecological effects of the capitalist economic system. The raw material is therefore discursively linked to the goal of sustainable technological innovations and a decarbonization of the global economy, making it an example of a strategic resource of the 21st century.

To benefit from the electric vehicle market, the European Union (EU) has a major interest in developing a European battery industry. Launched in 2017 and supported by the European Commission and the European Investment Bank, the European Battery Alliance (EBA) aims at establishing a domestic battery cell value chain. This aim is accompanied by the wish for resource self-sufficiency and a reduction in the import reliance rate. The EU is currently importing 86% of its lithium, with 66% coming solely from Chile (European Commission 2018). In the context of the EBA's strategic action plan, the European Raw Materials Alliance (ERMA, following the EU's 2008 Raw Materials Initiative) was implemented in September 2020. That same month, lithium was added to the 2020 List of Critical Raw Materials (European Commission 2020).

Under these circumstances, lithium has recently gained visibility. While the 'lithium-rush' has long reached South America (Dorn 2021b), the resource deposits in the north of Portugal and Spain are now of particular relevance for the EBA. In this paper, I compare lithium mining in Salinas Grandes (northwest Argentina) and Covas do Barroso (northern Portugal) using the global production network (GPN) approach. In what at first glance appear to be two very different contexts, various similarities can be identified. Among the national governments, the lithium deposits raise hopes for investments, export revenues, value added, and economic growth. In the areas of exploration/extraction, local communities reject any form of mining project. The exploration projects repeatedly lead to protests and conflict.

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This article assumes that capitalism leads to an inexorable expansion to, and valorization of, a capitalist outside (Dietz/Engels 2014; Luxemburg 2013) and to increasing levels of inequality (Piketty 2020). Building on these assumptions, I use the example of lithium mining in the two case studies to explore the hypotheses that (1) lithium mining, besides perpetuating unequal North-South relations, leads to new intrasocietal, socialecological inequalities and conflicts, and that (2) electromobility therefore constitutes the preservation of an unsustainable, imperial mode of living (IML). With the IML, Brand and Wissen (2017) draw attention to the externalizations of everyday practices. Everyday life in capitalist centers is essentially made possible through shaping social relations and natural relations elsewhere (ibid., 43). The IML is therefore based on, and reproduces, inequality, power, and domination.

Resource conflicts are of increasing interest in human-environment research. This article builds on a broad (but not exclusively) geographical debate on resistance to so-called mega development projects. Conflicts materialize in the context of large-scale oil and gas projects (Bebbington 2012; Perreault/Valdivia 2010), the expansion of industrialized (genetically modified) agriculture (Alonso-Fradejas 2015; Brad et al. 2015; Hafner 2018; Lapegna 2016), infrastructure projects such as the installation of hydroelectric power plants (Weißermel 2019), and mining projects (Svampa 2020). Building on this body of work, in this article I analyze the persistence of resource conflicts in the context of a global sustainability transition.

Using a political ecology perspective, I apply the GPN approach to the extractive sector. This analytical framework draws on methods of qualitative social research. I build on 10 months of ethnographic fieldwork carried out between February 2018 and August 2019 (northwest Argentina; 109 interviews) and a series of virtual interviews realized between September 2020 and December 2020 (Portugal; 11 interviews). Next to interviews with different stakeholders (company representatives, geologists, government authorities, NGOs, community representatives, activists, and the local population), documentary research (official reports, press and web site records, documentation from community organizations, social media) has been conducted since 2017.

In the following section, I introduce the theoretical and conceptual framework of resource-based GPNs. I present the institutional settings, actor constellations, and local perceptions of lithium extraction in Salinas Grandes (Argentina) and Covas do Barroso (Portugal). In section four, I discuss and compare national development narratives and local resistance movements in the two cases. I then contextualize the resistance of local populations beyond an established Global North-Global South dichotomy. In doing so, the IML concept proves to be fruitful.

Theoretical Considerations: Resource-Based Global Production Networks

The increasing globalization of nature reveals profound structural inequalities. While transnational corporations benefit from the extraction of raw materials and subsequent incorporation into industrial production chains, social-environmental

costs and risks are externalized and enhance asymmetric dependencies between commodity supplying and demanding countries. Even within national contexts, natural resource extraction leads to an unequal spatial and temporal distribution of benefits and risks (Göbel 2013, 136). Against this background, I consider the GPN approach particularly suited for analyzing and understanding configurations of the IML. At the same time, focusing on the supply side and the externalization of social-ecological production costs, I argue that on a metalevel the IML builds upon GPNs. As I will show subsequently, what Tsing (2019) terms the "alienation of nature," combined with control through power relations, is what enables the perpetuation of the IML.

The GPN approach is often attributed to the so-called Manchester School (Coe et al. 2008; Henderson et al. 2002). Based on a critique of the global value chain approach and the global commodity chain approach, Henderson et al. (2002) introduce a framework that shifts attention to the social circumstances of commodity production and consumption. The GPN approach aims at a better understanding of economic integration and regional development processes. To deal with the complexity of value creation processes, the GPN approach replaces the linear chain metaphor with the network concept. It focuses on the dynamic connections between different actors, groups of actors, and spatial scale levels. Next to economic actors, it explicitly includes noneconomic actors, such as local, regional, and national institutions, NGOs, (indigenous) communities, trade unions, and civil society organizations (Kister 2019).

The GPN approach develops a relational, process-oriented, and spatial view of production processes. The theoretical analytical framework is based on the three categories of value, power, and embeddedness. These provide the tools for decoding complex economic, institutional, and social local-global interactions, and for analyzing power relations and interactions between economic and noneconomic actors. GPNs aim at a horizontal, multilayered, and multi-dimensional analysis of the transnational organization of production in relation to development processes (Henderson et al. 2002, 442). Extraction processes are also largely organized transnationally, so that resource-based GPNs are structured by transnational elites, institutions, and ideologies. The GPN approach strives to dissociate itself from the often state-centric development understanding of its predecessors.

GPN analysis is based on an economic perspective regarding the organization and coordination of interfirm linkages embedded in specific networks and territories. At the same time, both environmental and social issues are largely ignored (Dorn/Huber 2020; Yeung 2021). In contrast, political ecology (PE) attends to local environmental change. This change occurs as a consequence of direct local actions and/or indirect actions at other spatial levels. Starting from ecological changes caused by economic, political, and social power and interest constellations, classical political ecology examines resource conflicts in rural areas of the Global South (Bryant 1992). Taking into account a specific understanding of nature, a PE analysis considers different spatial scales (i.e., multiscalarity), place-based and non-place-based actors, and their power relations. PE thus examines (unequal) development in terms of an unequal distribution of resources and environmental risks.

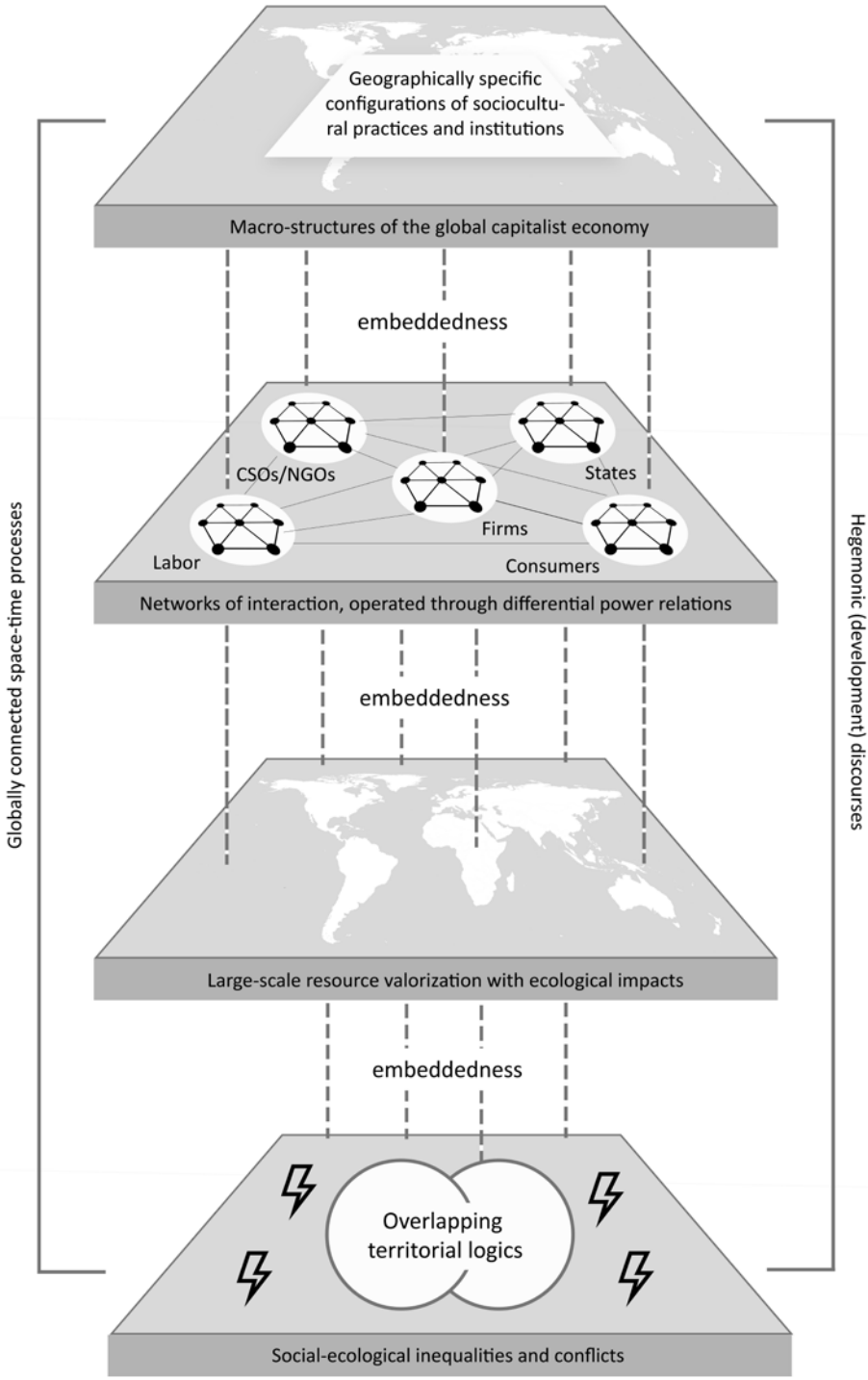

Figure 1. A Resource-Based GPN (Own illustration, adapted from Coe et al. 2008)

While the GPN approach offers much potential to trace and understand extractive contexts, identify impact chains, and critically examine international resource governance (Bebbington 2009; Bos/Forget 2021; Bridge 2008; Dorn/Huber 2020; Schmitt/Schulz 2016), PE has the potential to add further important perspectives to GPN analyses (Dorn/Huber 2020). First, it understands human-environment relations as being determined by discourses of knowledge and power. Second, PE research holds the imperative of including historical dimensions (e.g., coloniality for the Latin American context). Third, and most importantly, PE extends the GPN approach by an explicit conflict focus. Conflicts are a central topic of resource research, but they can rarely be explained on the basis of an unequal distribution of economic gains. Instead, conflicts related to resource extraction usually result from territorial identity issues, diverging human-environment relations, and the unequal distribution of environmental risks (Dorn 2021b).

The introduced framework may be too ambitious for a single research agenda. I therefore advocate examining partial aspects, while not losing sight of the holistic framework (see figure 1). Figure 1 visualizes the introduced framework of GPN in the context of the extractive sector. The model is divided into four levels: (1) macrostructures of the capitalist economy, (2) interaction networks in transnational space, (3) local/regional resource valorization, and (4) the microlevel. Resource valorization with ecological impacts (level 3) underlines the political-ecological perspective. The microlevel provides a detailed understanding of diverging perceptions, resulting conflicts, and social-ecological inequalities. The GPN is controlled through (unequal) power relations that permeate the different scales. The key issue is not to reduce the analysis of (unequal) development to a purely quantitative economic dimension. Instead, qualitative social research should be used to shed light on the social impacts of local environmental change and the (unequal) distribution of environmental risks, power asymmetries, and unequal access to natural resources. In Salinas Grandes and Covas do Barroso, there is so far no active lithium exploitation. Thus, no value is created and captured. In the following empirical analysis, I will therefore prioritize an analysis of GPN's analytical category power, understood as the assertion of one's own interests and the domination of discourses. The goal is to identify key positions within a GPN that unfold their power relationally and processually. Subjects are not endowed with a certain level of power per se; this is instead due to their network power, which unfolds in relationships and is subject to continuous shifts.

Lithium Mining in Argentina and Portugal: Actors, Power, and Structures of Inequality

Resource Federalism and Continued Resistance in Salinas Grandes (Argentina)

The actual discovery of lithium in Argentina dates back almost a century (Nacif 2019), but the discussion about the valorization of its lithium deposits has gained

momentum in the past two decades. Power relations in the context of lithium mining projects have to be considered in relation to different scales (global, national, regional, local) and levels (e.g., institutional, corporate, collective). On the institutional level, as of the 1990s, Argentina went through a series of legal and institutional reforms that – initiated and promoted by the World Bank (ibid.) – particularly affected the mining sector. The 1993 Mining Investment Law grants enormous tax benefits, 30 years of fiscal stability and royalties of maximum 3% to the operating companies (Law 24.196, 1993). Furthermore, article 124 of the 1994 constitutional reform transferred the ownership of natural resources from the Argentine state to the respective provinces. For Jujuy, Salta, and Catamarca,[2] three provinces with comparatively high poverty rates, the receipt of investments and the collection of royalties offer the opportunity to create jobs, improve their provincial budget, and strengthen their political independence vis-à-vis the national government.

Next to Catamarca's Fénix project (since 1997), the inauguration of Jujuy's Salar de Olaroz mine in 2014 made the country the fourth-largest lithium producer after Australia, Chile, and China, and the world's second-largest lithium carbonate exporter (USGS 2020). Depending on the calculation method, the number of lithium mining projects within the country (encompassing exploration, construction, and extraction) varies from 40 to more than 60 (Dorn/Ruiz Peyré 2020; Marchegiani et al. 2019). The number of licenses pertaining to lithium mining is significantly higher.

As mining commodities are a provincial matter, in the context of the Salinas Grandes case study it is necessary to further elaborate on the political implementation in Jujuy (a minor part of the salt pan is also located in Salta). Both under the government of Morales (in power since 2015, re-elected in June 2019) and his predecessors (Barrionuevo and Fellner), Jujuy aims at assuming national leadership in terms of expanding lithium added value. In this context, there are several political initiatives and projects worth mentioning (for a detailed overview, see Dorn 2021b): in 2011, for example, the government of Barrionuevo declared lithium a strategic resource and driver of the province's socioeconomic development. That same year, the government created the private law provincial company Jujuy Energy and Mining State Society (JEMSE).[3] The company's mission is to promote research, exploration and development in the mining and renewable energy sector. The self-declared goal of Morales' government is to change the provincial production and energy matrix. The announcement of South America's first Li-ion battery factory in Perico Industrial Park, the province's new slogan "*Jujuy Energía Viva*" ("Jujuy Living Energy"), the creation of Cauchari Solar Park (supposed to be the world's highest and South America's largest solar park), and the establishment of a series of autonomous solar villages exemplify the government's progressive development rhetoric. Olaroz Chico, a community located in close proximity to Jujuy's first lithium extraction project, was the first solar village inaugurated.

2 Jujuy, Salta, and Catamarca possess a large proportion of all Argentine lithium resources. The province of Jujuy alone accounts for 37% (Secretaría de Política Minera 2019).

3 I use approximate English translations for the names of companies and institutional bodies but maintain their Spanish/Portuguese acronyms, by which they are commonly known.

We can see that constraints of the international monetary system have strongly influenced the institutional setting. These economic imperatives are no longer questioned, but rather reproduced within the national and provincial government. Jujuy's government has a vested interest in the valorization of the lithium deposits. Locally, the perception of lithium mining is multifaceted. While the communities of the department of Susques (Salar de Olaroz-Cauchari) largely collaborate with the mining companies, the 33 indigenous communities of Salinas Grandes (25 in Jujuy, 8 in Salta) resist any form of exploration on their territory. The majority of the people are descendants of indigenous peoples. Their local economy is characterized mainly by transhumant grazing. This is complemented by artisanal salt extraction, the production of woven goods, subsistence agriculture, tourism, and temporary wage labor in mining.

In early 2010, the communities of the Salinas Grandes basin noticed unusual activities within the salt flat. Residents described the sudden circulation of off-road vehicles and machinery (interviews ARG40 and ARG52). Shortly afterwards, the lithium mining company South American Salars (Orocobre) approached the local (salt) Mining Cooperative Salinas Grandes to acquire its concessions. Despite poor infrastructure, a general lack of communication options, and high financial costs, as of May 2010 the communities came together in the Board of the Indigenous Peoples of the Salinas Grandes-Guayatayoc basin.

On the one hand, the communities tried to attract national attention with visible and symbolic protest actions, such as roadblocks. On the other hand, with the help of the lawyers Alicia Chalabe and Rodrigo Solá, legal steps were instigated to demand the right to prior consultation and to stop the projects. The communities were supported by regional, national, and international organizations, such as ENDEPA, FARN, and Amnesty International. After a visit to the region by the UN Special Rapporteur on the Rights of Indigenous Peoples, James Anaya, in 2011, and a hearing before Argentina's Supreme Court in 2012, there were rapprochements between the provincial government and the communities. However, in early 2019 the conflict escalated again. The provincial government had approved further exploration without the consent of local communities. These quickly came together and expelled the operating company.

How could such resistance materialize with the arrival of lithium mining? In the local communities, uncertainty prevails regarding the ecological impact of lithium mining. Along with the perceived curtailment of the communities' self-determination, this uncertainty has generated a highly politicized and hostile discourse – salt mining and tourism could never exist alongside invasive mega-mining projects. Lithium mining was also claimed to be an attack on all animals, on people, on water, on the Pachamama, and ultimately on life. Next to a historically conditioned social construction of territory, resulting in a consolidated local identity (see Dorn 2021a), the resistance to lithium mining has to be seen as a continuity of struggle against the government for property titles and the handover of common lands (*tierras comunitarias*). These common lands form the basis for the local pastoral system and continue to be used and managed collectively. Although the lands were never officially handed over to the communities, they were recognized through

Argentina's ratification of the ILO Convention 169 in 2000. This aspect is further framed by a far-reaching economic independence resulting from pastoralism, salt extraction, and work in tourism (tour guides, production of handicrafts and woven goods). Thus, occasional paid works complement forms of the subsistence economy (in order to buy fruits and vegetables, clothing, internet access, motorcycles, and cars). While only a few residents seek job opportunities in mining projects, local inhabitants basically consider themselves independent of the global labor market.

The Salinas Grandes communities' association is an example of collective power. By defending their territory and their way of life, the communities have managed to temporarily stop the valorization of their land, and thus their integration into a lithium GPN. However, the numerous lithium projects in the immediate vicinity indicate that the expansion of the IML can be prevented only partially.

Political Centralism and Environmental Movements in Covas do Barroso (Portugal)

The westernmost country on the European mainland is the continent's largest lithium producer; Portugal currently produces 11% of Europe's lithium. So far, Portugal's lithium is not battery grade, but destined for the glass and ceramics industry. With several pegmatite and spodumene lithium deposits (rock deposits), it has the most important lithium deposits in Europe (European Commission 2018; Viegas et al. 2012).

Similar to the case of Argentina, Portugal's institutional setting is strongly influenced by the international monetary system. After the 2008 economic crisis, Portugal struggled with a rising budget deficit and a growing public debt. In 2011, the country received emergency loans of EUR 78 billion from the EU and the International Monetary Fund (IMF). Next to a reform of the public administration, the structural reforms also included the privatization of companies, a health reform aimed at savings in health expenditure, a transformation of the economy towards exported growth, and measures to reduce "excessive licensing procedures, regulations and other administrative burdens for businesses," including permits for mining and geological exploration (European Commission 2014, 65).

According to the European Parliament (2019, 6), "the structural reforms introduced with the help of the EU and the IMF have improved productivity and competitiveness." Mining is also seen as a line of recovery. The Portuguese government established a lithium working group that indicated the potential of Portuguese lithium for the manufacture of batteries for electric vehicles (Grupo de Trabalho Lítio 2017). With Resolution 11/2018 of the Council of Ministers, the government approved new "strategic guidelines for the valorization of lithium minerals potential in Portugal." These include the promotion of public tenders for prospecting, research, and exploitation activities, and the evaluation of the opportunity to establish two technological units: one for industrial processing, and one for developing knowledge and technologies for the entire lithium value chain (Conselho de Ministros 2018).

The central government emphasizes the development opportunities associated with a potential lithium extraction. By aiming at a lithium and industry cluster (for example, by laying emphasis on the building of a lithium refinery), it internalizes and fuels development imaginaries such as the "white gold." Lithium mining should also generate new jobs for structurally weak regions. While the Portuguese government dreams of industrialization and economic growth (interviews PRT7 and PRT10), Portuguese social scientists describe the country's politicians as naïve and as puppets in the EU's plans. They stress that Portugal is powerless in face of the EU's development discourse because of the Troika's structural adjustment measures. They thus criticize lithium mining as a Trojan horse for mining (interviews PRT1 and PRT10).

Besides conducting several tenders, the Portuguese government has already signed two extraction contracts, one with Luso Recursos in Montalegre and one with Savannah Resources in Boticas. The latter operates the country's most advanced lithium exploration project, close to the village of Covas do Barroso. Through EIT InnoEnergy (responsible for the industrial development activities of the EBA), the British company receives direct support from the EU (Savannah Resources 2020). It is the country's only spodumene project and is considered to be particularly promising.

Covas do Barroso is located in the municipality of Boticas (Vila Real district, Norte region), an area that from 1936 to 1976 constituted the Trásos-Montes e Alto Douro Province. It is a historically marginalized region that is still seen as archaic, sparsely populated and isolated. Colloquially, people still use the term *Trás-os-Montes* ("Behind the Mountains," interview PRT1) to describe it. Abandoned gold and uranium mines left severe scenic damage in the past, while dams and reservoirs to produce energy for urban agglomerations were created against the will of the population (Faget 2019). The 2008 financial crisis only accelerated the process of rural exodus (interviews PRT10 and PRT11).

Besides the strong dichotomy between coastal urban centers and depopulated inland areas, the Norte region had the lowest GDP per capita in Portugal by 2016 (European Parliament 2019). In Covas do Barroso, local inhabitants mainly live from small-scale agriculture, livestock (cattle, sheep, and goats), forestry, beekeeping, and tourism. The agricultural system is traditionally organized and strongly based on communitarianism. Many people also come back a few years after they have migrated. They engage in organic farming, ecotourism, or other alternative forms of farming. Since 2018, the municipalities of Boticas and Montalegre have been considered Globally Important Agricultural Heritage Systems by the Food and Agriculture Organization of the UN.

This agricultural system is based on the communal use of lands. In Covas do Barroso, 202 inhabitants own 2,000 ha of common land (*baldios*). The lithium mining project is located on a large part of these lands, so that local residents now fear expropriation (interview PRT4; Georges 2020). The defense of the commons and fear of environmental pollution accompany the desire for self-determination. People usually refer to the government in Lisbon as "the empire." They see the benefits

of lithium mining mainly as being for the government, complain about the lack of transparency, and feel disregarded.

Particularly since 2018, numerous resistance movements emerged in different regions of Portugal. In Covas do Barroso, people came together in the local association: "United in defense of Covas do Barroso – No to mines, yes to life" (*Unidos em defesa de Covas do Barroso – Não às minas, sim à vida*). In addition, there are also movements in Montalegre, Braga, Argemela, Alto Minho, Beira Serra, Serra da Estrela, Soajo, and Lisbon, among others. The movements are primarily organized online. They reach their audiences via Instagram, Twitter, and Facebook, and organize walks for awareness and protest actions. Initially unrelated, they joined together for a number of actions. There were larger demonstrations in Serra da Estrela on August 24, 2019, and in Lisbon on September 21, 2019. In September 2019, several movements from Portugal and Spain joined forces to protest against a lithium mining project in Serra d'Arga; this indicated the emergence of a loose Iberian movement. On January 17 a coalition of movements published their concerns in a national manifesto (Manifesto Nacional 2020).

The environmental activism of civilians has surprised the Portuguese government (interviews PRT7 and PRT10). After the dictatorship, this activism was nonexistent for a long time (Figueiredo et al. 2001). Since then, democratic awareness, the demand for active participation, and activism have increased. In Covas do Barroso, the resistance against lithium mining questions the top-down policies of the EU and of the Portuguese government. People see the valorization of their land as being exclusively for the benefit of the large urban centers. They demand autonomy with regard to their lifestyle and territory. Economic self-sufficiency and independence enable this resistance. Through its location and actions – e.g., the National Assistant Secretary of State and Energy João Galamba was chased out of the village – the resistance of the photogenic and telegenic "Gallic village" quickly gained international attention (see, for example, Balch 2020; Faget 2019; Georges 2020; Vieira 2020). Throughout all movements, people trust in an established democracy. However, despite media coverage for Covas do Barroso, the resistance movements have not yet managed to stop the explorations.

Resistance to the Imperial Mode of Living

As is the case with global supply chains, GPNs are based on alienation (Tsing 2019). This becomes more evident when we take a closer look at the global relevance of a commodity that is insignificant to the communities under study here. Lithium plays a key role for a sustainability transition – particularly in terms of the manufacture of electric vehicles – in the urban centers of the Global North and China. The detachment of an element from its original environment and the change in meaning along a value chain – the alienation – make the resource economically relevant and allow for potentially unlimited accumulation. For the indigenous communities of Salinas Grandes and the community of Covas do Barroso, the raw material itself plays only a minor role. Rather, they feel a strong sense of spatial

identity regarding their respective territories. In both cases, there is no active mining project yet. Through the unfolding of a global discourse and test drilling, however, they are already integrated into GPNs. In Argentina's salt flats, the interest of transnational companies is triggered through comparative cost advantages. The extraction from brines is approximately half the cost compared to that from hard rock (European Commission 2018, 6). The Portuguese rock deposits do not have these economic advantages, but have to be considered as a strategic and geopolitical project in the context of the EBA. The increasing number of projects to secure national (in this case EU-wide) resource sovereignty is not unique to lithium. The production of shale oil and gas in the USA, for example, is also a strategic geopolitical decision (Svampa 2020). The disruption of global supply chains during the early months of the coronavirus pandemic has further increased the visibility of this issue. There are obvious differences between the two cases. One case refers to an indigenous community in the High Andes, the other one to a village within the EU. However, there are also significant similarities. Both Argentina and Portugal face situation-specific limitations in their national flexibility that shape the institutional (power) setting. Thus, in the first days of his presidency, Argentina's President Alberto Fernández announced that lithium would play a major role in repaying the national debt, along with the soy agribusiness and shale oil and gas exploitation in Vaca Muerta. Portugal, for its part, was forced into structural reforms and austerity policies by the Troika control body due to its debts on international financial markets (Piketty 2015). Everything was subordinated to the imposed target of 2% growth (European Commission 2014).

With regard to their ideas of progress and modernization, both Portugal's central government and Jujuy's provincial government are – through constraint and their own impetus – bound to a hegemonic discourse of growth and development. The governments' development discourses materialize in the projects, initiatives, and events described above, making use of both symbolic and material-physical dimensions. The imaginary of the "white gold" is reproduced at the respective institutional levels (see also Barandiarán 2019). In Jujuy, the links between lithium mining and renewable energy production, and between lithium mining and the supposed production of batteries, are repeatedly underlined in official government documents and speeches by the governor. In Portugal, ideas of future technologies and the prospect of a lithium refinery are marketing tools to make lithium mining more appealing to local groups. Both governments endorse lithium mining – for example, finalizing bids without consulting local inhabitants.[4] State and transnational companies therefore play – voluntarily or involuntarily – on the same team. This results in power asymmetries, to the detriment of local communities. In both cases the governments' development plans do not take local communities into account.

Considering the holistic resource-based GPN framework, it can be stated that the valorization of lithium takes place in the context of a sustainability transition at

4 According to the ILO 169 Convention, the state should actually act as a guarantor with regard to the implementation of indigenous law and free, prior and informed consent.

the global level. Figure 1 visualizes how the local level is ultimately embedded into macrostructures of the capitalist economy, namely, electromobility, green economy, and green growth. We can observe that, even in this early phase of the mining projects, inequalities within GPNs arise from unequal power relations. Considering the two countries' debts, these asymmetries arise on various levels. The mining projects are imposed as the materialization of hegemonic development projects.

National development narratives (e.g., neo-extractivism) foster the development and valorization of resources, and lead to the issue of mining licenses. At the local level, the PE perspective allows for grasping how overlapping territorial logics provoke conflicts, and that ecological implications result in winners and losers of environmental change. Even if no extraction has yet taken place, there are struggles around nature appropriation and processes of valuation. In the respective national context, local resistance is opposed to the government's development narrative. Both politically and in the urban context, we can observe a devaluation of local forms of production and regional economic models. In *Trás-os-Montes*, local groups are often referred to as "hillbillies." In Argentina, the use of the "desert metaphor" (Svampa 2020, 41) not only makes use of the imagery of a supposedly empty space, but also implies a continuity of the colonial struggle against indigenous peoples.[5] Local communities counteract the institutional-corporate power nexus through legal and public actions. They protest against the dispossession of land, water, landscape, and environment (Bebbington 2009; Harvey 2019), and demand democratic participation, respect for (indigenous) rights, and self-determination. The IML emphasizes the unsustainability of consumption patterns, which come at the expense of people and nature. In this context, electromobility serves to maintain consumption patterns and lifestyles that cannot be generalized (Brand/Wissen 2017). This not only shows how the consequences of everyday practices are spatially and temporally externalized, but also that the IML relates on, and is (re)constituted by GPNs. Trying to prevent the incorporation into the lithium GPN, the conflicts presented here have to be considered as social-ecological conflicts that question the IML.

Conclusion

The conflicts depicted are examples of new resource conflicts in the context of a global sustainability transition. At this point, electromobility can neither be judged as good nor as bad per se (see also Henderson 2020). Rather, innovations such as electromobility have to be evaluated in the framework of their social-ecological embeddedness. In this context, it becomes evident that the green economy does not reflect on the system-inherent logics of the capitalist mode of production. While it recognizes research on the planetary boundaries, it reduces interrelated multi-

5 In the 1870s, General Roca's Conquest of the Desert (*Conquista del Desierto*) aimed at extending Argentine power into Patagonia. Today, the conquest is also called a genocide of the indigenous population. More than 1,000 Mapuche were killed and many more were displaced.

ple crises to the variable of carbon dioxide emissions. Meanwhile, the modernization and growth paradigm leads to local resource conflicts, power asymmetries and social inequality. Still based on the growth imperative, the green economy has to be considered as a natural development within the framework conditions of capitalism: capitalism tends to produce ever greater inequality (Piketty 2020) and requires a capitalist outside that stabilizes the system by perpetuating primitive accumulation at the periphery (Harvey 2019).

In the two very similar case studies, the disregard and displacement of common land have to be understood as an expansion of the capitalist resource frontier. On the one hand, lithium mining further manifests existing North-South relations. On the other hand, new resource conflicts also emerge in the Global North. The latter have to be contextualized within pronounced asymmetries between the urban centers and the peripheries of the Global North, including the disproportionate use of natural resources since the beginning of industrialization. Increasing wealth inequality and the inexorable expansion of capitalism into rural areas, including the dispossession of commons, have led to new intrasocietal North-South relations. In the case of resource extraction, these inequalities have to be considered as social-ecological inequalities. I therefore call for identifying and analyzing these inequalities beyond the established North-South dichotomy. The described resistance movements subliminally question the endless commodification of nature and can be seen as individual elements of a larger social-ecological transformation.

In this article, I have shown the reciprocal relationship between resource-based GPNs and the IML, offering the potential for a holistic and critical cartography of social-ecological inequality and resource conflicts. This potential results from the interplay of a greater level of abstraction and the precise decoding of local-global processes, actors, and power relations. Linking these strands of literature with eco-Marxist perspectives (Altvater 2011) and the Capitalocene (Moore 2017; Reyes Núñez/Veiga 2021) holds potential for future research, providing further insights for contextualizing resource-based GPNs within the expansion of commodification and capital accumulation.

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References

Alonso-Fradejas, A. (2015). Anything but a story foretold: multiple politics of resistance to the agrarian extractivist project in Guatemala. *The Journal of Peasant Studies*, 42(3–4), 489–515. doi:10.1080/03066150.2015.1013468

Altvater, E. (2011). *Das Ende des Kapitalismus, wie wir ihn kennen. Eine radikale Kapitalismuskritik*. Münster: Westfälisches Dampfboot.

Balch, O. (2020). The curse of 'white oil': electric vehicles' dirty secret. *The Guardian*, 8.12.2020.

Barandiarán, J. (2019). Lithium and development imaginaries in Chile, Argentina and Bolivia. *World Development*, 113, 381–391. doi:10.1016/j.worlddev.2018.09.019

Bebbington, A. (2009). Latin America: Contesting extraction, producing geographies. *Singapore Journal of Tropical Geography*, 30, 7–12. doi:10.1111/j.1467-9493.2008.00349.x

Bebbington, D. H. (2012). Consultation, Compensation and Conflict: Natural Gas Extraction in Weenhayek Territory, Bolivia. *Journal of Latin American Geography*, 11(2), 49–71. doi:10.1353/lag.2012.0039

Bos, V., Forget, M. (2021). Global Production Networks and the lithium industry: A Bolivian perspective. *Geoforum*, 125, 168–180. doi:10.1016/j.geoforum.2021.06.001

Brad, A., Schaffartzik, A., Pichler, M., Plank, C. (2015). Contested territorialization and biophysical expansion of oil palm plantations in Indonesia. *Geoforum*, 64, 100–111. doi:10.1016/j.geoforum.2015.06.007

Brand, U., Wissen, M. (2017). *Imperiale Lebensweise – Zur Ausbeutung von Mensch und Natur im globalen Kapitalismus*. München: oekom. doi:10.3726/JP2017.21

Bridge, G. (2008). Global production networks and the extractive sector: governing resource based development. *Journal of Economic Geography*, 8, 389–419. doi:10.1093/jeg/lbn009

Bryant, R. L. (1992). Political ecology: An emerging research agenda in Third-World studies. *Political Geography* 11 (1), 12–36. doi:10.1016/0962-6298(92)90017-N

Coe, N. M., Dicken, P., Hess, M. (2008). Global production networks: realizing the potential. *Journal of Economic Geography*, 8, 271–295. doi:10.1093/jeg/lbn002

Conselho de Ministros. (31.01.2018). Resolução n.º 11/2018. *Diário da República*, 22/2018. Reyes Núñez, C., Veiga, J. G. (2021). Las corporaciones trasnacionales en el centro de la destrucción del ambiente en el siglo xxi. El caso de la industria petrolera. In Ornelas, R. (Hrsg.), *Estrategias para empeorarlo todo. Corporaciones, dislocación sistémica y destrucción del ambiente*. México D.F.: UNAM/ Instituto de Investigaciones Económicas, 315–358.

Dietz, K., Engels, B. (2014). Raum, Natur und Gesellschaft. In Oßenbrügge, J., Vogelpohl, A.(Hrsg.), *Theorien in der Raum- und Stadtforschung*. Münster: Westfälisches Dampfboot, 78–96.

Dorn, F. M. (2021a). Changing territorialities in the Argentine Andes: Lithium mining at Salar de Olaroz-Cauchari and Salinas Grandes. *DIE ERDE – Journal of the Geographical Society of Berlin*, 152(1), 1–17.

Dorn, F. M. (2021b): *Der Lithium-Rush. Sozial-ökologische Konflikte um einen strategischen Rohstoff in Argentinien*. München: oekom.

Dorn, F. M., Huber, C. (2020). Global production networks and natural resource extraction: adding a political ecology perspective. *Geographica Helvetica*, 75(2), 183–193. doi:10.5194/gh-75-183-2020

Dorn, F. M., Ruiz Peyré, F. (2020): Lithium as a Strategic Resource: Geopolitics, Industrialization and Mining in Argentina. *Journal of Latin American Geography*, 19(4), 68–90. doi:10.1353/lag.2020.0101

European Commission. (2014). *The Economic Adjustment Programme for Portugal. 2011–2014*. Brussels: European Commission.

European Commission. (2018). *Report on Raw Materials for Battery Applications*. Brussels:European Commission.

European Commission. (2020). *Critical Raw Materials Resilience: Charting a Path towards greater Security and Sustainability*. Brussels: European Commission.

European Parliament. (2019). *Economic, social and territorial situation of Portugal*. Brussels: European Parliament.

Faget, J. (2019). *Lithium: Der Streit um Portugals weißes Gold*. www.dw.com/de/lithium-der-streit-um-portugals-wei%C3%9Fes-gold/a-48569669 [abgerufen am 28.10.2021].

Figueiredo, E., Fidélis, T., Da Rosa Pires, A. (2001). Grassroots Environmental Action in Portugal (1974–1994). In Elder, K., Kousis, M. (Hrsg.), *Environmental Politics in Southern Europe. Actors, Institutions and Discourses in a Europeanizing Society*. Dordrecht: Springer Science+Business Media, 197–221. doi:10.1007/978-94-010-0896-9

Georges, N. (2020). *Portugal: Lithium, weißes Gold oder grünes Gift?* Strasbourg: Arte.

Göbel, B. (2013). La minería del litio en la Puna de Atacama: interdependencias transregionales y disputas locales. *Iberoamericana*, 13(49), 135–149.

Grupo de Trabalho Lítio. (2017). *Relatório do Grupo de Trabalho "Lítio"*. Lisbon. Hafner, R. (2018). *Environmental Justice and Soy Agribusiness*. London: Routledge. doi:10.4324/9781351201711

Harvey, D. (2019). *Spaces of Global Capitalism. A theory of uneven geographical development*. London: Verso.

Henderson, J. (2020). EVs Are Not the Answer: A Mobility Justice Critique of Electric Vehicle Transitions. *Annals of the American Association of Geographers*, 110(6), 1993–2010. doi:10.1080/24694452.2020.1744422

Henderson, J., Dicken, P., Hess, M., Coe, N. M., Yeung, H. W. (2002). Global production networks and the analysis of economic development. *Review of International Political Economy*, 9(3), 436–464. doi:10.1080/09692290210150842

Kister, J. (2019). *Von Wachstum und Werten: Globale Wertschöpfungsketten im Fairen Handel*. München: oekom.

Lapegna, P. (2016). *Soybeans and Power. Genetically Modified Crops, Environmental Politics, and Social Movements in Argentina*. New York: Oxford University Press. doi:10.1093/acprof:oso/9780190215132.001.0001

Luxemburg, R. (2013). *Die Akkumulation des Kapitals*. Berlin: Heptagon Verlag.

Manifesto Nacional. (2020). *National Manifest against Plans for Mineral Extraction in Portugal*. o.V.: Braga.

Marchegiani, P., Höglund Hellgren, J., Gómez, L. (2019). *Extracción de litio en Argentina: un estudio de caso sobre los impactos sociales y ambientales*. o.V.: Buenos Aires.

Moore, J. W. (2017). The Capitalocene, Part I: on the nature and origins of our ecological crisis. *The Journal of Peasant Studies*, 44(3), 594–630. https://doi.org/10.1080/03066150.2016.1235036

Nacif, F. (2019). *Litio en Argentina: de insumo crítico a commodity minero. Trayectoría socio-técnica de los yacimientos litíferos de la Puna (1930–2015)*. Bernal: Universidad Nacional de Quilmes.

Perreault, T., Valdivia, G. (2010). Hydrocarbons, popular protest and national imaginaries: Ecuador and Bolivia in comparative context. *Geoforum*, 41(5), 689–699. doi:10.1016/j.geoforum.2010.04.004

Piketty, T. (2015). *Die Schlacht um den Euro. Interventionen*. München: C.H. Beck. doi:10.17104/9783406675287

Piketty, T. (2020). *Kapital und Ideologie*. München: C.H. Beck. doi:10.17104/9783406745737

Savannah Resources. (2020). *Agreement with EIT InnoEnergy*. *Savannah Selected to Receive Support from the Business Investment Platform.* London.

Schmitt, T., Schulz, C. (2016). Sustainable Resource Governance in Global Production Networks – Challenges for Human Geography. *Erdkunde*, 70(4), 297–312. doi:10.3112/erdkunde.2016.04.01

Secretaría de Política Minera. (2019). *Argentina, visión del mercado del Litio. Estrategias de competitividad regional.* Buenos Aires/Salta.

Svampa, Maristella (2020). *Die Grenzen der Rohstoffausbeutung. Umweltkonflikte und ökoterritoriale Wende in Lateinamerika*. Bielefeld: Bielefeld University Press. doi:10.1515/9783839453780

Tsing, A. L. (2019). *Der Pilz am Ende der Welt. Über das Leben in den Ruinen des Kapitalismus.* Berlin: Matthes & Seitz.

United States Geological Survey. (2020). *Mineral Commodity Summaries: Lithium*. https://pubs.usgs.gov/periodicals/mcs2020/mcs2020-lithium.pdf [abgerufen am 11.07.2024].

Viegas, H., Martins, L., de Oliveira, D. (2012). Alguns aspectos da geoestratégia global do lítio. O caso de Portugal. *Geonovas - Associação Portuguesa de Geólogos*, (25), 19–25.

Vieira, A. (2020, 23.11.). Snapshots of Daily Life in a Remote Region of Portugal. *The New York Times*.

Weißermel, S. (2019). *Die Aushandlung von Enteignung. Der Kampf um Anerkennung und Öffentlichkeit im Rahmen des Staudammbaus Belo Monte, Brasilien*. Stuttgart: Franz Steiner Verlag.

Yeung, H. W.-C. (2021). The trouble with global production networks. *Environment and Planning A*, (53) 2, 428–438.

Ambika Sairam

"Come Hail or Heatwave": Utilizing Just Energy Transition to Address Occupational Heat Stress among Female Construction Workers in Hyderabad, India

Introduction

A typical workday for Sarita[1] starts at 9:00 a.m. at a construction site in Hyderabad, where she will be expected to lift heavy bags of sand, cement, bricks, and debris weighing up to 15 kg. Her work ends at 6:00 p.m., with only one day off per week. For a full day's work, she gets paid 350 rupees (ca. four EUR). While working, she must also look after her 10-month-old child, since there are no childcare facilities at work. She lays a hammock inside the construction site and puts her child to sleep. If she or the child gets hurt or falls ill, she needs to bear the medical expenses herself or will be sent away at a moment's notice.

Similar stories emerge among many women engaged as unskilled labor in the construction sector across India. They work without a contract, or any guarantee of fixed pay, healthcare, housing, and maternity benefits. Climate-change-induced temperature rise is now an additional stressor, making these women vulnerable to occupational heat stress.

The construction sector in India is a part of the informal economy consisting of 80% of the country´s population (ILO 2019). The most impacted groups by heat waves are the heavy manual labor workers such as in agriculture and construction (Parsons et al. 2021). It is the urban poor working as daily wage earners, such as construction workers, who are the worst off, since they are exposed for long hours to sun and air pollution, as well as with very limited access to health care provisions (Barthwal et al. 2022).

Workers across the world engaged in outdoor occupations like agriculture, construction, mining, and factory work face growing vulnerability due to climate-induced temperature rise (Nunfam et al. 2019). Research projects that climate risks are higher than earlier projections and the long-term impacts will be multiple times higher than currently known (IPCC 2023). These trends will lead to increased heat exposure for those working outdoors (Dash and Kjellstrom 2011),

1 Name changed to protect participant identity.

resulting in economic and social vulnerability at different scales, in addition to direct physical effects on health and wellbeing (ILO 2019).

Impacts on employment form a crucial aspect of the just energy transition debate. The energy policy discussions are mostly associated with direct, indirect, and induced jobs from the renewable energy sector (IRENA 2011). In this paper, I argue for the need to incorporate policies for the communities and workers most vulnerable to climate change impacts, the construction sector. I argue for a notion of climate jobs for construction workers which considers policy proposals of the heat action plan (HAP).

Heat leads to more deaths than any other natural disaster globally (Coates et al. 2014; Zografos, Anguelovski, and Grigorova 2016). However, despite recent policy and scholarly interest in heatwaves, little attention has been paid to understanding how particular groups of marginal communities, in this case informal women construction workers, are affected.

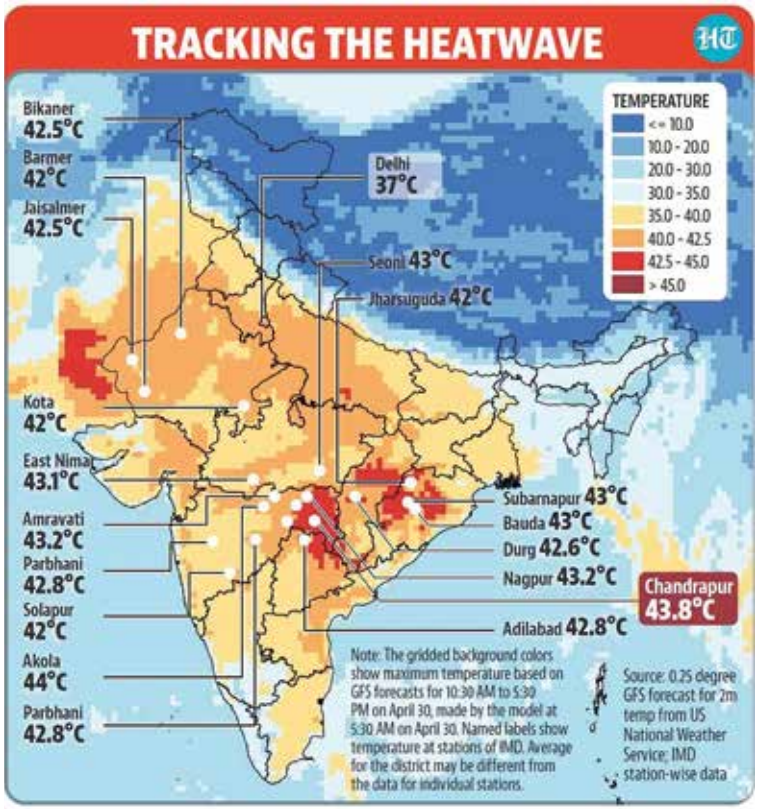
Workers in low- and middle-income countries like India are more vulnerable to heat stress due to amplification by other types of vulnerability across a wider range of individual and institutional scales. Factors such as low income, lack of workplace safety and benefits, lack of access to adequate energy sources to cool down, and the informality of the construction sector can potentially exacerbate heat stress conditions among workers (Kjellstrom et al. 2016). These factors are further exacerbated for women engaged in manual labor in the construction sector due to a lack of sanitation and childcare facilities and familial responsibilities (Venugopal et al. 2016)

Labor trends suggest that South Asia and Western Africa are the most likely to be affected by occupational heat stress, resulting in excess productivity losses of 5.3% and 4.8% respectively by 2030 (ILO 2019). Between 2003 and 2017, India witnessed the 11 warmest years on record, with an anomaly of 0.54 degrees Celsius above average (Golechha, Mavalankar, and Bhan 2021). Further, there has been an increase in surface area temperature all over the country during the last century (A. K. Srivastava, Kothawale, and Rajeevan 2017).

In line with the rise in average surface temperatures, heat waves and severe heat waves have been common across India. Data from 103 weather stations across the country shows that the number of heat wave days per year rose from 510 to 680, while severe heat wave days increased from 80 to 100 (Pai, Srivastava, and Nair 2017).

In 2022, the country experienced its warmest March in 122 years, with temperatures soaring above 30 degrees Celsius in parts of northwest India. In April and May, many parts of north and central India like Rajasthan, Madhya Pradesh, Gujarat, and Maharashtra experienced intense heat waves, with temperatures crossing 40 degrees Celsius (The Indian Express 2022). Figure1 illustrates the heatwave map of India in 2022.[2]

2 https://www.esa.int/ESA_Multimedia/Images/2022/04/Heatwave_across_India (February 29, 2024)



Due to poor safety regulations and high informality, extreme heat is expected to affect workers hardest (Dehury and Dehury 2017). Existing studies on occupational heat stress in India have been limited to a public health framework and less attention has been paid to exploring how developing coping capacities and energy transition can help in strengthening the adaptability of the workers. While covering energy transitions, questions of gender and social inequality stand fundamentally important, as these existing hierarchies in the social structure dictate one's access or lack of energy resources to tackle heat stress (Johnson et al. 2020).

The rollout of the heatwave action plans in India has been remarkable, covering 130 cities and towns (NRDC 2022), yet it is low in implementation and enforcement, being underfunded and without sufficient legal backing. This paper, through qualitative analysis, points out the major challenges and way forward for a just implementation.

This study set out to fill this gap by exploring coping capacity and its limiting factors of women working as undocumented construction laborers in Hyderabad, India. Specifically, it looks at the case of energy poverty of informal workers and how a clean energy transition can address the issue of climate equity among informal sectors.

Literature Review

Women in the construction sector are particularly vulnerable to Occupational Heat Stress (OHS) due to lower wages and more work, lack of social protection mechanisms, and domestic responsibilities (Panneer 2019). The Indian construction sector employs a significant proportion of women, nearly 30% (Patel and Pitroda 2016). While only a few of them hold technical and managerial positions, most women are integrated into the lower end of the workforce.

Most women working in the sector are unskilled and employed to do heavy manual labor such as carrying sandbags, bricks, cement, and stones and clearing rubble (ScD and Mori 2016). Further, there are hardly any opportunities for women to move up the workplace hierarchy, as they are seldom given training to improve their skills and usually end up assisting their male counterparts at work (Devi and Kiran 2013)

A survey conducted in the western state of Gujarat found that women in the construction sector earn only half of what their male colleagues are paid. The study also found a high level of occupational risks due to workplace accidents, resulting in temporary and permanent disabilities (Raval, Vankar, and SEWA 2000). They also face gender discrimination and sexual harassment from their workplace construction managers/site supervisors in addition to not having work benefits like health insurance and childcare (ScD and Mori, n.d.; Tiwary et al. 2012; Raval, Vankar, and SEWA 2000)

Only few studies have established the link between gender and climate-induced heat stress in workplaces (Venugopal et al. 2016; Sett and Sahu 2014). Venugopal et al. (2016) conducted the first study to assess how the lack of sanitation facilities in the workplace hinders women's ability to cope with heat stress, further causing illnesses. Further, Sett and Sahu (2014) study the effects of heat stress on women working in brick kilns and briefly highlight how heat stress can be a risk multiplier in the presence of conventional gender roles like childcare and domestic chores.

Although research points out coping mechanism among workers, such as drinking excess water to avoid heat stress (Dutta et al. 2015), studies focused on OHS in women have highlighted how the lack of sanitation facilities such as gender-segregated toilets deter them from drinking more water so as to avoid taking bathroom breaks (Venugopal et al. 2020; Krishnamurthy et al. 2017)

To tackle the problems arising from this, along with the informality of the sector, the government of India introduced the Building and Other Construction Workers (BoCW) (Regulation of Employment and Condition of Services) Act in 1996. Under this regulation, the state governments and union territories are required to set up a Construction Workers Welfare Board (CWWB) to implement the provisions of this act. These boards are responsible for registering workers and making them aware of workplace benefits such as maternity leave, accident cover, health insurance, pension, childcare facilities, and education of the children (Government of India, 1996). The act also mandates that construction sites meet minimum safety requirements laid out by the respective state governments (Roy and Naik 2017).

Although BOCW does not link climate-change-induced heat waves and worker safety, provisions as a part of the act may potentially build adaptive capacity among workers. Under the act, registered workers receive benefits such as fixed working hours, health insurance, accident coverage, maternity benefits, housing, and child-care facilities.

Even though these welfare measures exist on paper, their implementation has been slow. Although the act was introduced in 1996, many states across the country did not implement it until after the supreme court of India's intervention in 2006 (Roy and Naik 2017). Even after that, studies have found that not many workers know about the BOWC Act, which further prevents workers from claiming their entitled benefits (Naraparaju 2014; R. Srivastava and Sutradhar 2016).

Since 2013, Heatwave Action Plans (HAP) were developed for over 120 cities and towns across India, with an aim to generate public awareness and enable adaptive measures for vulnerable communities (NRDC 2022). However, a critical analysis shows that most HAPs have an oversimplified understanding, often missing the local context and unable to identify vulnerable groups. They are also underfunded, with weak legal foundations, and insufficiently transparent (Pillai and Dalal, 2023).

Coping and Adaptation to Heat Stress

Exploring social vulnerability in the Indian context and how it further limits coping capacity of households and individuals, Suresh Kumar Rathi et al. (2022) developed a heat vulnerability index among selected neighborhoods across four different cities. It was found that in these areas, there is a high vulnerability across the neighborhoods. The study concludes that vulnerability and adaptive capacity are not mutually exclusive. High vulnerability to heat waves exists due to lack of coping capacity, and that vulnerability and coping capacity are inversely proportional. Further, factors such as access to energy access and water are important factors to consider as ways to build resilience in a system to heat waves (Hatvani-Kovacs et al. 2016). Electricity consumption to tackle heat stress has also been acknowledged as one of the ways to adapt to changing climate (Patz et al. 2014).

The magnitude of vulnerability of individual workers to occupational heat stress also depends on social protection strategies in place, and adaptation at higher scales (Davies et al. 2009; Nunfam et al. 2019). It is necessary to explore localized social welfare measures to build adaptation and resilience in the system. These strategies entail the provision of fluids and cooling systems, education and outreach, moving work indoors, heat breaks, and shifting work timings (Dehury and Dehury 2017; Gao et al. 2018; Lundgren et al. 2013).

At the institutional level, strengthening workplace safety regulations and workers' rights through unions have the potential to increase the adaptive capacity of the workers. Communication, awareness and outreach, and training to build capacity among institutions to draw the link between climate change and outdoor work activity also have potential implications for adaptation at a larger scale (Nunfam et

al. 2019). Further, it is also advocated that workers should be compensated for the direct effects of heat stress such as workplace accidents and illnesses, which lead to income losses (Kjellstrom et al. 2016).

Conceptual Framework

In order to assess coping capacity related to heat stress, this research adopted a framework from the CLIMSAVE project organized around human, social, and financial capital without which effective coping would not be possible (Tinch et al. 2015). All three capitals have underlying proxy indicators as shown in table 1. The list of indicators should not be considered as comprehensive; they were selected to cover the essential elements of the research questions without making them overly complex. While the indicators cannot be directly quantified, they were used to guide the formulation of research questions.

Human capital	○ Literacy level ○ Skills ○ Housing ○ Family
Social capital	○ Formal and informal networks of support ○ Access to healthcare and social security ○ Land entitlements
Financial capital	○ Financial power to respond to heat stress through energy access ○ Access to financial resources when sick ○ Access to pension and paid days off

Table 1. Capital Stocks

Methods and Design

The region under study is Hyderabad, a city in the state of Telangana, located in the southcentral part of India. The city has witnessed rapid growth over the last three decades and is considered one of the fastest growing megacities in India, with a population of over eight million people (Hatab et al. 2022). This rapid growth has been aided by the construction of flyovers, corporate offices, ring roads, and skyscrapers, which led to the growth of the construction sector in the city. In Hyderabad, the construction sector is considered the largest employer, with more than two million people working within the sector (ActionAid India 2017). Despite this, the city faces significant noise, air, and water pollution as a result of unbalanced spatial development (Wakode et al. 2013).

The Hyderabad region has a dry and semiarid climate, with an average temperature of 26 degrees Celsius. Summers, between April and June, have temperatures

Figure 2. Locating Hyderabad in India (Source: Google Maps)

Figure 3. Study Sites across Hyderabad (Source: Google Maps)

hovering about 30 degrees. In May, the maximum temperature crosses 40 degrees and is the hottest month in Hyderabad (Srikanth and Swain 2022).

The incidence of heatwaves in the Telangana region have been steadily rising, and the region is termed as one of the heatwave-vulnerable regions in southcentral India (Satyanarayana and Rao 2020). Nearly 96% of those affected by heat stress in the region belong below poverty line, and the rest of the 4% were pink card holders, who are just above poverty line (Nadarajan et al. 2021).

Between 2006 and 2015, Hyderabad experienced 390 days with temperatures above 40 degrees (Suresh K. Rathi and Sodani 2021). In April 2022, Hyderabad experienced 10 heat wave days, as opposed to one heatwave day in 2021 (Chanchal and Chanchal 2022).

Hyderabad was chosen as the study location as the author is a native who speaks the local languages, Telugu and Hindi. Hence, interacting with workers was expected to be easier. Across the city, five areas were identified to conduct the study. The first site Lalapet is a sub locality of the Tarnaka area, located in western Hyderabad. The second study site is a construction site in Gundlapochampally, a suburb located in the northern part of Hyderabad, 30 km away from the city center. Once considered a village on the edge of the city, it is now a part of the largest growing residential areas. The third site was located in Uppal, a large neighborhood in the eastern part of the city. Narepally, another rapidly growing residential area, located 18 km away from the city center on the northeastern edge, was the fourth site of study. The final site was a private construction site in Yapral, a residential neighborhood in the northeastern part of the city.

Sampling

Snowball sampling is employed for finding subjects, where one participant nominates another, who in turn nominates the third and so on. The participants are selected like a rolling snowball (Cohen and Arieli 2011). This sampling technique is employed for hard-to-reach populations who are generally not open to researchers who do not have access to their social network (Dusek, Yurova, and Ruppel 2015). During the initial days of fieldwork, the members of the community were reluctant to speak, as they feared possible repercussions of going on record. Hence, snowball sampling was chosen as mutual contacts would already have established trust, which could be built upon. Through this sampling technique, 12 participants were selected.

Data collection

Data was collected using a qualitative, semi-structured interview approach, letting the participants guide the interview and elaborate on particular issues through open-ended questions (Alsaawi 2014). Based on archival research, data collection consisted of primary participants made up of women construction workers who

form a central part of this story. Secondary participants consisted of the various departmental stakeholders of the Telangana HAP. The field study was taken up in May 2022. The identity of the participants has been kept anonymous, as assured in the consent agreement. Hence, codes have been used to denote participant identity (see table 2).

	Primary Participants		
Interview Code	*Organisation/Group*	*Site/Jurisdiction*	*Role*
1	Construction worker	Lalapet	Registered worker engaged in construction sector since 10 years in the city
2–3	Construction workers	Gundlapochampally	Unregistered workers engaged in a private construction site in the city suburbs
4–5	Construction workers	Uppal	Unregistered workers in a small construction site
6–8	Construction workers	Narepally	Unregistered migrant workers engaged in a construction site in the city suburbs
9–12	Construction workers	Yapral	Unregistered migrant workers
	Secondary Participants		
13	Indian Meteorolocigal Department (IMD)	Hyderabad Metropolitan Area	High ranking official at the IMD, which is a key stakeholder in formulating HAP
14	Telangana Buildings and Other Construction Workers Welfare Board	Hyderabad Metropolitan Area	Official associated with the Telangana labour department, which is also an active decision maker in the HAPs
15	Private construction film	Yapral	Site supervisor at a private construction firm. While not an active stakeholder in HAPs, the official is responsible for enforcing safety regulations on site

Table 2. Participants

All the interviews were conducted in person. Interviews with primary participants lasted between 5 to 15 minutes and seeking more time with the participants was not possible as they were interviewed during their work hours, providing participants little time between tasks.

Data Analysis

The data analysis stage includes transcribing the information from spoken to written. This stage also includes thematic analysis, which is one of the most heavily relied upon analytical tools in social sciences. The thematic coding approach consists of five stages. They are getting familiar with data, generating initial codes, identifying themes, constructing thematic networks, and interpreting.

As the interviews were recorded in Telugu and Hindi, they were manually translated and transcribed to English. These transcripts were thematically coded in the NVivo software. Four codes were created, and the responses were coded under this. The coded results were used to build themes on coping capacity and heat stress. These themes are further discussed in the results section.

Results

This section discusses the findings of the interviews with primary and secondary participants in line with the conceptual framework. The first subsection sets the context for the construction sector in Hyderabad, exploring its dynamics. Then, I discuss the findings of the interview with the primary participants. The discussions are guided by the thematic codes generated as a part of data analysis. The last part of this section focuses on the adaptive capacity and the policies in place for it, as told by secondary participants.

Dynamics of the Construction Sector

The construction sector is said to be one of the largest sectors in Hyderabad, employing more than two million people from across the country. Due to rapid urbanization in the last three decades, the sector has been catering to the growing demand for flyovers, ring roads, IT offices, and so on. Workers from different parts of the country such as rural Telangana, Jharkhand, Bihar, and Odisha have been migrating to the city in search of work (ActionAid India 2017)

Workers either live in labor settlements in the low-income areas or close construction sites in huts and temporary houses made of corrugated iron sheets. In the low-income areas, every day from 8:00 a.m. workers assemble at the labor a*dda* in hopes of finding work for the day. An *adda* (or *naaka*, as called in other states) can be a meeting point, usually close to the main road, where most construction workers meet in hopes of finding work (see figure 4).

Figure 4. Workers Waiting at an adda *(Photo credits: Praveen Bushipaka)*

As observed in the first site, Lalapet, workers carrying crowbars, shovels, and tiffin boxes show up at the *adda*, waiting to be picked up by prospective contractors or *mestris* (masons) for the day's work. One of the common strategies, as told by those waiting, is to wait there from morning to midday in the hopes of getting work. If they don't succeed, they go back home and hope to find work the next day. These workers find a new site nearly every day and are only paid for the number of hours they put in. If they fail to find work, they lose their wage for the day.

On the other hand the out-of-state migrants are brought to the city by a *tekadar* (middleman) and are housed in huts and makeshift houses next to site, usually owned by a large firm. They live there until the project ends and move onto the next one.

A common pattern in both cases is the lack of any formal worker safeguards and benefits. This was validated by one of the stakeholders at a higher level, a site supervisor, who affirmed that, although some site safety provisions are in place to prevent serious accidents, there are no provisions such as health insurance, paid days off, or childcare facilities. The women were left to rely on informal networks of support for any workplace-related ill health, or child support.

Layers of Vulnerability

Of the 12 participants, seven belonged to the Telangana region. The rest were from Jharkhand and Bihar and had migrated to Hyderabad in search of work. They ranged from 18 through 40 years old and migrated to the city along with families,

who also worked on the site with them. The workers at the Yapral site mentioned that a *tekedar* brought them to the city and employed them at the site.

Only participant 8 studied up to class nine before dropping out to work. The other participants had no formal education. Lack of education was also pointed as one of the reasons why the women chose to work as labor in the construction sector.

Although the participants had no formal education, they were aware of climate change and its effects, owing to direct livelihood impacts. Those who worked as agriculture laborers previously had higher awareness due to change in temperature over years. Participants 3 and 5 observed how the gradual lack of rainfall had impacted agriculture, until they eventually gave up farming for the construction jobs. On the other end of the climate extreme, Participant 7 observed how floods forced her to leave hometown and look towards the city for livelihood:

> *Last year, back in the village, our house got drowned in the rain. Since we do not own any other land, we were forced to move to the city. Even before the flood, I was still staying at that place even though it rained heavily. But this constant rain and floods affected my son's health everely, so we decided to leave the village.*

Exposure through Working Conditions

The presence of fair working conditions goes a long way in strengthening the ability to cope with occupational heat stress (Chinnadurai et al. 2016). Some of the participants faced high heat stress exposure not just in current work but also through previous occupations.

As the construction industry is highly informal in India, there are many unregistered workers who receive wages lower than those stipulated by the government. Participants were asked questions about their work such as awareness of registration and unionization and if they were registered. The findings from this section would be useful to understand the financial capital of the workers.

In terms of the nature of work, a pattern can be drawn from the responses of the participants. The nature of work is highly volatile but generally switched between lifting bricks and sand, transporting heavy material from one place to another, and lifting whatever construction debris was left over. Some of the respondents further stated they are supposed to follow the supervisors' instructions. Participant 8 pointed out:

> *I do all sorts of odd jobs here. I throw away debris, do curing work, lift bricks, and do whatever the supervisor tells me. It's a lot of physical work and sometimes I must carry heavy material up to 3–4 floors. Additionally, I work as domestic help in the houses that have already been occupied.*

The work usually starts at 9:00 a.m. and ends at 6:00 p.m., with a one-hour lunch break at 1:00 p.m. Some interviewees mentioned that this is the only time when they get to take rest and cope with the heat. But the workers do not get any addi-

tional break time in cases of extreme heat waves. Participant 12 observed that sometimes they were made to work on Sundays as well. She noted:

> *They (*supervisors*) won't even let me rest in shade for some more time. He yells at us and reprimand if we take a break. Sometimes we even end up working on Sundays.*

As the rate of wage contributes financial capital to cope with occupational heat stress, the interviewer explores the wage rate of the participants. This was also an attempt to explore if the workers were being paid according to the wage rate laid down by the BOCW Act.

From the responses, it was clear only participant 1 was being paid 700 rupees (8.61 EUR) a day, which falls in line with the rates stipulated for unskilled workers by the BOCW Act 1996 (Government of India, 1996). The others were unregistered and were being paid less than the stipulated minimum wage. Hence, the wage rates for the rest hovered around 300–400 (up to five EUR) rupees a day. Two migrant workers stated that they did not know anything about their wage rate and that they depended on the middleman to pay them every week. Participant 12 states:

> *I don't really know the daily wage rate. The middleman who brought us here pays about 1000 rupees a week.*

Similarly, another worker from the same site, participant 10, speculated that the wage rate may be around 300 rupees a day and that she does not exactly know how much she is paid every day.

Coping and Adaptation at Work

As workplace facilities have the potential to reduce heat stress, exploring their presence and how they could contribute to coping was crucial. These facilities could entail short-term coping aids such as access to water and sanitation, shaded areas, and possible air conditioning for rest. Long-term coping mechanisms entail maternity care, childcare, heat breaks, and healthcare for employees.

In general, there are drinking water facilities at each site. The respondents working at the large construction sites (for instance, at Yapral and Gundlapochampally) said that the employers provide drinking water, which helps them cope immediately while working in the heat. But the smaller construction sites are far more informal, where the workers are expected to cope at their expense.

Even in terms of access to sanitation facilities like toilets, the workers at bigger construction sites seemed to be better off, as women workers had access to sanitation. In a smaller site in Narepally, participant 8 described:

> *No one gives us any water here. I must spend out of my pocket and buy. There are no toilet facilities here either. We relieve ourselves out in the bushes.*

All the participants mentioned that the most feasible and affordable coping strategy is staying hydrated to avoid heat stroke. But as noted, some of the sites lacked these means or they were not adequately provided. Further, there is no provision of heat breaks in construction sites, big and small.

Although heat breaks have been highlighted as an important strategy by the decision-making stakeholder from the meteorological department, a clear gap can be observed in its implementation. The labor department being an important stakeholder in the Telangana HAP plays an active role in the HAP meetings, in conjunction with the weather department. It was mentioned that heat breaks could only be suggested to the sites and there is no mechanism to turn it into a policy.

More than 30% of the workforce in the construction sector in India now constitutes women, many of whom migrate with their family to work on site (Bhattacharyya and Korinek 2007). Even with the rising workforce, construction sites have failed to take into account workplace facilities catering to this section of the workforce. Hence, aspects like child support, maternity care, and access to sanitation for female workers were crucial elements to explore during the field work.

Of the 12 interviewees, four were new mothers with children younger than one year. On site, it was observed that women would breastfeed or look after their children while simultaneously working in the construction site. Participant 10 said that she gave birth to a baby only a month ago and had resumed work. She said:

> *There's no one to look after the child. My husband and I work here so I'll have to look after the baby. So, wherever we go, we take him there.*

Other participants echoed similar sentiments. Participants 7 and 9 mentioned that as there was no childcare option, they had no alternative but to bring the baby to work. They mentioned that they would generally lay a hammock inside the building that is under construction and lay the baby to sleep.

Another participant highlighted that, due to the lack of childcare and informal networks of help, she would leave the children to play out in the sun, which exacerbated heat stress symptoms in the children too. If they got ill due to being exposed to sun all day, she would have to get them treated at her own expense.

This absence of day care facilities not only restricted the women's capacity to cope, but also had cascading effects of heat stress on children, in addition to exposure to accidents at the site. Although construction sites are mandated to provide daycare facilities under the BOCW act, this was not implemented in any of the interview locations.

In the secondary interview, the site supervisor, who forms a decision-making stakeholder, mentioned that the site does not contain any daycare facilities for the children of the employees and that women only relied on informal networks of support, such as another family member or an acquaintance.

Another factor that severely limited the coping capacity was that they were not given paid leaves from work or compensation for workplace accidents. All the participants interviewed agreed that if they fell ill due to heat exposure, they would not be paid for medical expenses or for the days they did not work. As highlighted

by participant 1, even for workers who fall under the purview of the BOCW Act, compensation is only given in case of a serious accident or death. Heat stress and heat related illnesses are not considered as grounds for medical compensation.

Housing and Energy Access as a Coping Capital

One of the crucial aspects of the study delves into housing provided by the construction companies to workers. Of the four, two sites were owned by private construction companies where the company provided makeshift accommodation next to the sites for the workers. Five of the respondents claimed that the accommodation provided was not adequate to cope with hot days and nights. Participant 8 pointed out that all the supervisors provided was a small piece of land and *tadika* (roof made of coconut and palm leaves) and that they had to make their own huts from scratch.

> *They give us some open land and some tadika and we must make our own huts. Now, if this site is finished, we have to look for another place and set up a life all over again. And these huts are so unbearably hot even in the night, but we do not have any other option.*

She further pointed to the lack of electricity in the huts, exposing them to various seasonal stressors. Participant 12 also emphasized that housing provided by the company was a makeshift one made of metal sheets that got unbearably hot in summer, making it difficult to cope with heat even in the evenings. She said:

> *It gets so hot in those houses at night. So, I sometimes take my baby and sleep outside because we do not have any air conditioning.*

Although in the secondary interview the site supervisor in Yapral mentions that construction company facilitates free electricity to these settlements, limited financial capacity due to lack of fair wages meant that workers could not afford any means of air conditioning. As the responsibility of childcare and cooking solely rested on women, it could be seen that the lack of energy access made women further vulnerable to heat stress even in the evenings. Additionally, there was no mention of the importance of adequate housing from stakeholders at a higher level, such as the labor department which is responsible to implement the BOCW act.

Unionization and Workers' Rights

The challenges faced by the laborers to cope with occupational heat stress can be traced back to the lack of workers' welfare benefits, which is ensured to those registered under the workers' act (Government of India 1996).

As discussed earlier, only one of the research participants was a registered worker and was getting fair wages. The other participants were unregistered, hence getting lower wages, and were devoid of any benefits. Furthermore, they were not aware of the existence of any workers registration mechanism.

Participant 6 claimed that she has been working as a construction worker for as long as she can remember but has never been officially registered. A similar pattern can be seen with out-of-state workers. They were counting on the *tekedar* to provide them with registration cards.

Coping within layers of vulnerability

Amid the lack of social and financial capitals, it is crucial to look at how these women cope with extreme heat. A common pattern observed was that of helplessness and not being able to have much say in the situation. For instance, participant 11 mentions:

> *What to do, we are poor so just have to work wherever. I don't have any land back in the village, so we need to work wherever there's any kind of work.*

A similar response was recorded from participant 10. She mentioned:

> *What do we do when there's too much sun? Whatever the sir (supervisor) tells us, we need to do. We don't get any rest. These people (construction company) don't get me treated if I get sick. I must bear the expenses myself. If I'm too sick maybe I will take rest for about two days but I lose the wages.*

One of the feasible strategies highlighted was the presence of drinking water and the one-hour break in the afternoon.

Housing was also highlighted as an important coping strategy. The lack of adequate housing and access to electricity increased the exposure to heat stress and further contributed to discomfort levels even at night. Some participants, such as 5, 7, and 9 had a ceiling fan at home, which provided much-needed access to cooling at least after work. Some participants mentioned that they could not afford to have any air conditioning at home, which made coping with high nighttime temperatures very difficult. This was also attributed to the fact that the accommodation provided to the workers was inadequate to protect them from extreme heat. Participant 12 raised this issue, stating:

> *Even if I get sick, what will I do? There is so much heat and they've given us houses made of tin sheets. It is so hot inside that room. At night too, it's so hot sometimes I don't sleep inside. I just go out in the open and sit or put a damp cloth over myself to cool down. What else to do?*

A similar experience was shared by another worker on the same site, who had a month-old baby. The participant said that on nights when it is too hot, she would just take her baby outside for some breeze and sleep outdoors.

Participant 8 mentioned that the construction company did not give them adequate housing. Hence, she had to end up making the thatched huts with her family and highlighted the exposure to seasonal stressors due to inadequate living conditions.

> *We are exposed to different stressors in different seasons. In summer, I get heat stroke. Once monsoon arrives, there's cold, flu, a lot of dust. During summers, it's so hot inside the hut but if we step out, there are so many mosquitoes that it is difficult to stay put. Once monsoon arrives, there are scorpions and snakes coming into the hut.*

This section discussed how the work conditions of the participants limited or furthered their coping capacity. In this case, occupational heat stress was linked to the informality of the construction sector, which restricted the financial and, in some cases, human capital of the interviewees. Many of the issues faced by the participants were directly linked to being unregistered, especially in terms of social benefits such as childcare, housing, and wage rate. This further made them vulnerable to occupational heat stress.

Hence, to build coping capacity among workers, it is first important to recognize this informality and address it. Further, it is of priority to understand the link between heat waves and outdoor work activity. This would enable institutions to better implement heat stress mitigation plans to build adaptive capacity among workers.

Institutional interventions

To explore institutional interventions for occupational heat stress mitigation, this researcher took up with stakeholders who form a part of the Telangana HAP. This included decision-maker the IMD, who is one of the primary decision makers in HAP. Hence, an interview was taken up with the director of IMD Hyderabad. The scientist emphasized the need to shift and stagger work timings for outdoor workers to mitigate heat stress. The aspect of heat breaks in peak afternoon hours was also highlighted. Highlighting the indoor discomfort level for those living in informal settlements, cool roofing using white reflective paint was recommended as one of the important strategies to protect vulnerable populations from heat stress. The participant also explained that HAPs are revised every year in collaboration with the state disaster management department, the health department, and the labor department.

In a stark contrast to this, the labor department personnel highlighted that, although they are a stakeholder in the Telangana HAP, they could only issue suggestions to construction sites and that the department has little power to enforce

these breaks as a mandate. Further, the personnel also told that no site safety inspections have been taken up of late to track safety standards on any sites across Hyderabad. And there was no mention of the department's plans to resume them.

The lack of safety enforcement was also seen in the responses given by the site supervisor. At the Yapral site, where the supervisor was interviewed, it was found that there are about 200 people working on the site, but the only aid available in cases of accidents was a first aid kit. Further, there are no regulations in place for medical coverage or insurance for major accidents. The lack of implementation was seen affecting on ground, where workers had to resort to personal coping strategies.

Discussion

Based on the responses from both primary and secondary participants, it is seen that rising heat waves pose a significant risk to female outdoor workers, due to vulnerabilities arising from lack of social welfare measures such as access to childcare, gendered sanitation facilities, housing, and energy. This has led to weak human, social, and financial capitals, in turn leading to weakened coping capacity against rising threat of heatwaves. Yet, there have been few mitigation measures at the institutional level to address this concern. Although HAPs are on the rise across Indian cities, it is found that the focus of the plans is mainly on short-term strategies like temporarily shifting work hours and ensuring immediate cooling strategies (Pillai and Dalal 2023). Further, only 8% of the strategies account for energy-efficient cooling, although this has not taken into account the financial capital and inequitable energy access.

An analysis of decision-making for energy transition shows that it has only focused on aspects such as mobility and urban habitats while overlooking vulnerable communities including women (Avelino and Wittmayer 2016). Research focused on gender and energy access has also illustrated that existing social structures and norms around gender restrict women's ability to express their energy needs (Pearl-Martinez and Stephens 2016). In the case of institutional interventions like HAPs, policies are yet to account for the gender disparity in accessing energy as a barrier to long-term adaptability and coping capacity against rising heat waves. Additionally, HAPs are yet to address how existing gender hierarchy makes women more vulnerable to heat stress exposure.

In the case of Hyderabad's informal women workers, it can be seen that the participants lacked both energy access and opportunities for skills upgradation resulting in fairer wages and social protection. Further, the double burden or informal work and gendered expectations of unpaid domestic labor would demand an increased energy need for coping with heat stress, which was out of reach for many of the women.

The building and construction sector occupies a major share of energy usage in the country, accounting for over 30% of the energy consumption (Bureau of Energy Efficiency). But the benefits of energy access have not trickled down to the workers on whom the industry relies heavily.

Although the country aims to achieve net zero by 2070, the country's energy transition plans are yet to present a roadmap for addressing gender inequity in clean energy access. This research has also found a knowledge gap between workers in the informal sector and energy poverty, which policies on energy transition need to address in order to ensure climate equity.

Conclusion

This research was taken up at a crucial time when many parts of South Asia, including the study site, were experiencing intense heat waves that commenced earlier than the usual. The case of female construction workers highlights layers of vulnerability and how little has been done at the institutional level to understand the seriousness of this problem.

The fieldwork for this study was done in a limited time frame of 30 days, due to which trust building with the participants was not feasible. Gaining the community's trust posed a major challenge during the initial couple of weeks of fieldwork. Many women refused to be interviewed, as they feared what they said would be reported to their supervisors or government representatives. Hence, the primary participants had to be scaled back to 12. This lack of trust was also seen among construction firms. Thus, only the sites where I had previously established contacts were approached for interviews.

Despite these limitations, this research shows that women integrated at the bottom end of the industry possess very little capitals to cope with frequent climate extremities. With heatwaves becoming more intense, it is of high priority to protect these informal workers

From this study, it can be said that much needs to be done to make the sector and the workers in it resilient to heat stress. As climate-induced disasters are increasingly becoming a daily reality for many workers across the country, it is of high priority to explore the nexus between climate disasters and the informal economy of the country. India's HAPs have a high potential in linking current welfare policies with climate disasters to build adaptive capacity among vulnerable populations. Further, it is also of a priority to explore energy inequity as a barrier to adaptive capacity among vulnerable populations, specifically in the informal sector.

References

Alsaawi, A. (2014). *A Critical Review of Qualitative Interviews*. Rochester, NY: SSRN Scholarly Paper. doi:10.2139/ssrn.2819536

Avelino, F., Wittmayer, J. M. (2016). Shifting Power Relations in Sustainability Transitions: A Multi-Actor Perspective. *Journal of Environmental Policy & Planning* 18 (5): 628–649. doi:10.1080/1523908X.2015.1112259

Barthwal, V., Jain, S., Babuta, A., Jamir, C., Sharma, A., Mohan, A. (2022). Health Impact Assessment of Delhi's Outdoor Workers Exposed to Air Pollution and

Extreme Weather Events: An Integrated Epidemiology Approach. *Environmental Science and Pollution Research*, 29(February), 1–13. doi:10.1007/s11356-022-18886-9

Bhattacharyya, S., Korinek, K. (2007). Opportunities and Vulnerabilities of Female Migrants in Construction Work in India. *Asian and Pacific Migration Journal,* 16(December), 511–531. doi:10.1177/011719680701600404

Chanchal, A., Chanchal, A. (2022, 17. Juni). Summers like None Other. *Greenpeace India Society*.

Chief Labour Commissioner. (1996). *The Building and Other Construction Workers Act 1996*. https://clc.gov.in/clc/acts-rules/building-and-other-construction-workers

Chinnadurai, J., Venugopal, V., Kumaravel, P., Paramesh, R. (2016). Influence of Occupational Heat Stress on Labour Productivity – a Case Study from Chennai, India. *International Journal of Productivity and Performance Management,* 65(2), 245–55. doi:10.1108/IJPPM-08-2014-0121

Coates, L., Haynes, K., O'Brien, J., McAneney, J., Dimer de Oliveira, F. (2014). Exploring 167 Years of Vulnerability: An Examination of Extreme Heat Events in Australia 1844–2010. *Environmental Science & Policy*, 42(October), 33–44. doi:10.1016/j.envsci.2014.05.003

Cohen, N., Arieli, T. (2011). Field Research in Conflict Environments: Methodological Challenges and Snowball Sampling. *Journal of Peace Research*, 48(4), 423–435.

Construction Workers in Hyderabad. (o. D). *Thefansworld* (blog). https://www.actionaidindia.org/publications/construction-workers-in-hyderabad/ [abgerufen am 16.07.2023].

Dash, S. K., Kjellstrom, T. 2011. Workplace Heat Stress in the Context of Rising Temperature in India. *Current Science*, 101(4), 496–503.

Davies, M., Guenther, B., Leavy, J., Mitchell, T., Tanner, T. (2009). Climate Change Adaptation, Disaster Risk Reduction and Social Protection: Complementary Roles in Agriculture and Rural Growth? *IDS Working Papers*, 2009(320), 1–37.

Dehury, R. K., Dehury, P. (2017). A Review of Measures against Increasing Temperature and Climate Change for the Safeguard of Workers in India. *Journal of Clinical & Diagnostic Research*, 11(10), 1–4. doi:10.7860/JCDR/2017/29304.10769

Devi, K., Kiran, U. V. (2013). Status of Female Workers in Construction Industry: A Review. *International Journal of Humanities and Social Science,* 14(August), 27–30. doi:10.9790/1959-1442730

Dusek, G., Yurova, Y., Ruppel, C. (2015). Using Social Media and Targeted Snowball Sampling to Survey a Hard-to-Reach Population: A Case Study. *International Journal of Doctoral Studies*, 10(January). doi:10.28945/2296

Gao, C., Kuklane, K., Östergren, P.-O., Kjellstrom, T. (2018). Occupational Heat Stress Assessment and Protective Strategies in the Context of Climate Change. *International Journal of Biometeorology*, 62(3), 359–71. doi:10.1007/s00484-017-1352-y

Golechha, M., Mavalankar, D., Bhan, S. C. (2021). India: Heat Wave and Action Plan Implementation in Indian Cities. In Ren, C., McGregor, G. (Hrsg.), *Urban*

Climate Science for Planning Healthy Cities, 285–308. Cham: Springer International Publishing. doi:10.1007/978-3-030-87598-5_13

Hatab, A. A., Ravula, P., Nedumaran, S., Lagerkvist, C.-J. (2022). Perceptions of the Impacts of Urban Sprawl among Urban and Peri-Urban Dwellers of Hyderabad, India: A Latent Class Clustering Analysis. *Environment, Development and Sustainability*, 24(11), 12787–12812. doi:10.1007/s10668-021-01964-2

Hatvani-Kovacs, G., Belusko, M., Skinner, N., Pockett, J., Boland, J. (2016). Heat Stress Risk and Resilience in the Urban Environment. *Sustainable Cities and Society*, 26(October), 278–288. doi:10.1016/j.scs.2016.06.019

International Labour Organization (2019): *Women and Men in the Informal Economy: A Statistical Picture* (3. Aufl.). http://www.ilo.org/sites/default/files/wcmsp5/groups/public/@dgreports/@dcomm/documents/publication/wcms_626831.pdf [abgerufen am 11.07.2024].

International Labour Organisation. (2019). *Working on a warmer planet: The effect of heat stress on productivity and decent work*. https://www.ilo.org/global/publications/books/WCMS_711919/lang--en/index.htm [abgerufen am 11.07.2024].

Intergovernmental Panel on Climate Change. (2023). Summary for Policymakers. In Lee, H., Romero, J. (Hrsg.), *Climate Change 2023: Synthesis Report. A Report of the Intergovernmental Panel on Climate Change. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Geneva: IPCC.

International Renewable Energy Agency. (2011). *Renewable Energy Jobs: Status, Prospects, and Policies*. https://www.irena.org/-/media/Files/IRENA/Agency/Publication2012/RenewableEnergyJobs.pdf

Johnson, O. W., Han, J. Y.-C., Knight, A.-L., Mortensen, S., Aung, M. T., Boyland, M., Resurrección, B.P. (2020). Intersectionality and Energy Transitions: A Review of Gender, Social Equity and Low-Carbon Energy. *Energy Research & Social Science*, 70(December), 101774. doi:10.1016/j.erss.2020.101774

Kjellstrom, T., Otto, M., Lemke, B., Hyatt, O., Briggs, D., Freyberg, C., Lines, L. (2016). Climate Change and Labour: Impacts of Heat in the Workplace. *UNDP*, 36(April).

Krishnamurthy, M., Ramalingam, P., Perumal, K., Kamalakannan, L. P., Chinnadurai, J., Shanmugam, R., Srinivasan, K., Venugopal, V. (2017). Occupational Heat Stress Impacts on Health and Productivity in a Steel Industry in Southern India. *Safety and Health at Work*, 8(1), 99–104. doi:10.1016/j.shaw.2016.08.005.

Karin, L., Kuklane, K., Gao, C., Holmér, I. (2013). Effects of Heat Stress on Working Populations When Facing Climate Change. *Industrial Health*, 51(1), 3–15. doi:10.2486/indhealth.2012-0089

Marar, A. (2022, 4. Mai). *Frequent, Intense Heatwaves Made April Third Warmest in India in 122 Years*. https://indianexpress.com/article/india/frequent-intense-heatwaves-made-april-third-warmest-in-india-in-122-years-7899014/ [abgerufen am 11.07.2024].

Moir, S. (2016). Building Bridges: A Comparative Study of Women Working in the Construction Industry in India and the US. *Labour & Development*, 22(2), 1–17.

Nadarajan, G. D., Rao, GV. R. Keshav Reddy, Gimkala, A., Janumpally, R., Ang, Y., Woo, C. T. Z., Neo, T. H., Wong, X. Y., Ong, M. E. H. (2021). Characteristics of Prehospital Heat Illness Cases During the Annual Heat Wave Period in Telangana, India. *Prehospital and Disaster Medicine*, 36(4), 385–392. doi:10.1017/S1049023X21000583

Naraparaju, K. 2014. Well Being of Migrant Workers: Perspectives from Daily Labour Markets in Navi Mumbai. *Urban India*, 34(1), 68–86.

Nunfam, V. F., Adusei-Asante, K., Van Etten, E. J., Oosthuizen, J., Adams, S., Frimpong, K. (2019). The Nexus between Social Impacts and Adaptation Strategies of Workers to Occupational Heat Stress: A Conceptual Framework. *International Journal of Biometeorology*, 63(12), 1693–1706. doi:10.1007/s00484-019-01775-1

Pai, D. S., Srivastava, A. K., Nair, S. A. (2017). Heat and Cold Waves Over India. In Rajeevan, M. N., Nayak, Sh. (Hrsg.), *Observed Climate Variability and Change over the Indian Region*, 51–71. Singapur: Springer. doi:10.1007/978-981-10-2531-0_4

Panneer, S. (2019). Health and Safety of Women Workers in Informal Sector: Evidences from Construction and Beedi Rolling Works in India. In Panneer, S., Acharya, S. S., Sivakami, N., *Health, Safety and Well-Being of Workers in the Informal Sector in India: Lessons for Emerging Economies*, 61–75. Singapur: Springer. doi:10.1007/978-981-13-8421-9

Parsons, L. A., Shindell, D., Tigchelaar, M., Zhang, Y., Spector, J. T. (2021). Increased Labor Losses and Decreased Adaptation Potential in a Warmer World. *Nature Communications*, 12(1): 7286. doi:10.1038/s41467-021-27328-y

Patel, R., Pitroda, J. (2016). *The role of women in construction industry: an Indian perspective*. https://www.researchgate.net/publication/294355586_THE_ROLE_OF_THE_WOMEN_IN_CONSTRUCTION_INDUSTRY_AN_INDIAN_PERSPECTIVE

Patz, J. A., Frumkin, H., Holloway, T., Vimont, D. J., Haines, A., (2014). Climate Change: Challenges and Opportunities for Global Health. *Jama*, 312(15), 1565–1580.

Pearl-Martinez, R., Stephens, J. C. (2016). Toward a Gender Diverse Workforce in the Renewable Energy Transition. *Sustainability: Science, Practice and Policy*, 12(1), 8–15. doi:10.1080/15487733.2016.11908149

Pillai, A. V., Dalal, T. (2023). *How is India adapting to heatwaves? An assessment of heataction plans with insights for transformative climate action*. CPR report.

Rathi, S. K., Sodani, P. R. (2021). Summer Temperature and All-Cause Mortality from 2006 to 2015 for Hyderabad, India. *African Health Sciences*, 21(3), 1474–1481. doi:10.4314/ahs.v21i3.59

Rathi, S. K., Chakraborty, S., Mishra, S. K., Dutta, A., Nanda, L. (2022). A Heat Vulnerability Index: Spatial Patterns of Exposure, Sensitivity and Adaptive Capacity for Urbanites of Four Cities of India. *International Journal of Environmental Research and Public Health*, 19(1), 283. doi:10.3390/ijerph19010283

Raval, B., Vankar, P., Academy SEWA. (2000, 9. Juni). *Labouring Brick by Brick: A Study of Construction Workers*. https://www.sewaresearch.org/pdf/researches/labouring_by_brick.pdf

Roy, S., Naik, M. (2017). *Evaluating the Welfare Framework for Building and Other Construction Workers in India*. https://www.researchgate.net/publication/337150887_ Evaluating_the_welfare_framework_for_building_and_other_construction_workers_in_india

Satyanarayana, G. Ch., Bhaskar Rao, D. V. (2020). Phenology of Heat Waves over India. *Atmospheric Research*, 245(November): 105078. doi:10.1016/j.atmosres.2020.105078

Sett, M., Sahu, S. (2014). Effects of Occupational Heat Exposure on Female Brick Workers in West Bengal, India. *Global Health Action*, 7(1). doi:10.3402/gha.v7.21923

Srikanth, K., Swain, D. (2022). Urbanization and Land Surface Temperature Changes over Hyderabad, a Semi-Arid Mega City in India. *Remote Sensing Applications: Society and Environment*, 28(November), 100858. doi:10.1016/j.rsase.2022.100858

Srivastava, A. K., Kothawale, D. R., Rajeevan, M. N. (2017). Variability and Long-Term Changes in Surface Air Temperatures Over the Indian Subcontinent. In Rajeevan, M. N., Nayak, S., *Observed Climate Variability and Change over the Indian Region*. Singapore: Springer. doi:10.1007/978-981-10-2531-0_2

Srivastava, R., Sutradhar, R. (2016). Labour Migration to the Construction Sector in India and Its Impact on Rural Poverty. *Indian Journal of Human Development*, 10(1), 27–48. doi:10.1177/0973703016648028

Tinch, R., Jäger, J., Omann, I., Harrison, P. A., Wesely, J., Dunford, R. (2015). Applying a Capitals Framework to Measuring Coping and Adaptive Capacity in Integrated Assessment Models. *Climatic Change*, 128(3): 323–37. doi:10.1007/s10584-014-1299-5

Tiwary, G., Gangopadhyay, P. K., Biswas, S., Nayak, K., Chatterjee, M. K., Chakraborty, D., Mukherjee, S. (2012). Socio-Economic Status of Workers of Building Construction Industry. *Indian Journal of Occupational and Environmental Medicine* 16 (2): 66–71. doi:10.4103/0019-5278.107072

Venugopal, V., Latha, P. K., Shanmugam, R., Krishnamoorthy, M., Johnson, P. (2020). Occupational Heat Stress Induced Health Impacts: A Cross-Sectional Study from South Indian Working Population. *Advances in Climate Change Research*, 11(1), 31–39. doi:10.1016/j.accre.2020.05.009

Venugopal, V., Rekha, S., Krishnamoorthy, M., Perumal Kamalakkannan, L., Viswanathan, V., Nalini, G., Kumaravel, P., Chinnadurai, S. J. (2016). Heat Stress and Inadequate Sanitary Facilities at Workplaces – an Occupational Health Concern for Women? *Global Health Action*, 9(1), 31945. doi:10.3402/gha.v9.31945

Wakode, H., Baier, K., Jha, R., Azzam, R. (2013). Analysis of Urban Growth Using Landsat TM/ETM Data and GIS – a Case Study of Hyderabad, India. *Arabian Journal of Geosciences*, 7(January). doi:10.1007/s12517-013-0843-3

Zografos, C., Anguelovski, I., Grigorova, M. (2016). When Exposure to Climate Change Is Not Enough: Exploring Heatwave Adaptive Capacity of a Multi-Ethnic, Low-Income Urban Community in Australia. *Urban Climate*, 17(September), 248–65. doi:10.1016/j.uclim.2016.06.003

Max Reisinger

Safe Water and Saved CO_2: CO_2 Reductions and SDG Impacts of Solar Water Disinfection (SODIS) with WADI – Project Evaluation of "Clean Air and Safe Drinking Water for Soroti" (Uganda)

Introduction and Context

The Global Climate Challenge

The latest IPCC report shows that we as humanity only have three years left to completely change our behavior on this planet. By 2025 at the latest, we have to reach "peak carbon" in order to have a chance to stabilize the global climate at around + 1.5°C as agreed in the Paris Agreement (IPCC Press Office 2022b). Reaching this goal is essential to nothing less than our own future and the life of countless other species on earth.

Within these three years, the global carbon emission needs to turn around from further annual increases to constantly decreasing. That means rapid and deep systemic change from today on. From 2025 till 2030, carbon emissions have to fall by 43%, and we should live as carbon neutral societies from 2050 onwards (IPCC Press Office 2022b). Only if we manage to do so, are the UN climate goals of "staying well below 2°C, preferably 1.5°C of global warming" (UNFCCC 2016, 4) still realistic. If we don´t, severe changes could destabilize our known ecosystems leading to many catastrophes around the globe (Pörtner et al. 2022; Vaughan 2022).

We need to accelerate the climate transition dramatically. Emissions need to be reduced by several percentage points per year:

> *We do not have time to pick only the low-hanging fruits; we need to start picking all the fruits. The whole of society needs to engage, in all sectors and at all levels, including policymakers, firms, municipalities and citizens. The decisions and actions taken this decade will have a critical impact on our ability to reach zero emissions. (Zetterberg et al. 2021, 4)*

That urgency leads to many questions: How are we going to reduce our carbon emissions that drastically? How can we ensure that we simultaneously develop

decarbonized systems and behaviors? In which ways can we walk alongside low-income societies of the Global South and assist them to strengthen their resilience and sustainable development? How can we as a high-polluting continent (next to trying our best to reduce our own emissions radically) honestly and genuinely help people that have contributed the least to, but will suffer the most from, the climate crisis? How can sustainable development projects and climate mitigation projects have a beneficial impact? For the transition to a carbon neutral world, many changes are needed: alternative production processes need to be possible without carbon emissions and sustainable consumption patterns have to follow, the energy sector should be mainly renewable, the whole agricultural sector needs to shift towards regenerative agriculture, land use patterns can no longer be exploitive but should repair and heal degraded land, construction and housing should be based on natural materials, and mobility and transport patterns should be fossil fuel independent. That is a huge transition and needs to be done step by step.

For the transition phase, climate mitigation projects financed by carbon credits could be one of the useful stepping stones contributing to that important change (Broekhoff et al. 2019; Streck 2021). These projects – often also called "sustainable development projects" or "carbon offsetting projects" – try to build a bridge between helping vulnerable, low-income communities to reach better health and wellbeing and at the same time reduce carbon emissions (BOKU Competence Centre for Climate Neutrality n.d.). One of these projects is going to be in the spotlight in this thesis: "Clean Air and Safe Drinking Water for Soroti", an Empirical Study in Uganda.[1]

A Gap in SODIS CO_2 Monitoring

While providing safe drinking water, SODIS brings many additional co-benefits to its users. One of them is that it makes boiling of water for disinfection redundant and therefore saves a lot of wood, which doesn't have to be burned. That again reduces CO_2 emissions of many households (HHs) which have previously been dependent on boiling. Summed up globally among all SODIS users, this has an essential, positive impact on the climate. How much climate potential there is in SODIS globally can only be estimated. Little attention has been given to the CO_2 impact of SODIS by the scientific community so far. While its technical and chemical process and the water quality requirements and the health benefits are well described, there is a gap in precise quantitative CO_2 monitoring and its CO_2 reduction potential. Almost no scientific literature can be found. This thesis aims to address this gap.

1 Deep and systemic change is needed. Solutions like Solar Water Disinfection (SODIS), the SDGs and ambitious climate mitigation projects can be important stepping stones in that transformation. A combination of these solutions is found in an ongoing drinking water project in Uganda, that was analyzed by a master work, that is presented here in a brief version. The study was carried out under the framework of the international Master Programme Telangana Heatwave Action Plan and its results are playing an active role in the Heatwave Action Plan.

Research Objectives

Research Question

The central research question is:

What benefits and co-benefits can be described through the application of SODIS with WADI within the project "Clean Air and Safe Drinking Water for Soroti [Uganda]"?

Two sub-questions help to break down the research question:

How many tons of CO_2 emission reduction can be achieved through the project in total?

What is the impact of the project's first three years on the relevant SDGs, with special focus on SDG 13 (Climate Action)?

These research questions will be answered by conducting an empirical project study and comparing the derived results to the baseline study which was done by Wornig (2021) at the beginning of the project. This piece of work acts as a reference study. In addition, a literature review about the SODIS method and different methodologies for assessing the SDG impacts and the CO_2 reductions via carbon credits was conducted to understand the scientific context. Relevant publications were found through different search engines like BOKU LitSearch, Google Scholar, and Karlsruhe Virtual Catalogue by using keywords like "SODIS"/"Solar water disinfection," "Carbon emission reduction"/"CO_2 emission reduction," "drinking water," "Uganda," "SDG impact measurement," "carbon credits," "Gold Standard Methodology," "firewood," "3 stone stove," and "climate change." These terms were used in different combinations. Additional publications were found through reference lists of relevant papers.

Scope and Limitations

The Soroti SODIS project involves 2,000 HHs in 10 different villages of the district Soroti in rural Uganda. With an HH size of 8.12 persons on average, the project activities reach over 16,000 people directly day by day. The empirical part of this study involved 223 randomly selected households from across the 10 different villages, with the aim of generating a representative understanding of all 2,000 HHs participating in the project.

This thesis gives a detailed zoom in into this specific project. It should be a reference study for all upcoming studies measuring the impacts of SODIS, especially on carbon reduction potential on the HH level. So far, there is not much scientific literature around to compare and benchmark these results to. A major limitation is that due to the travel restrictions during the COVID-19 pandemic, the field visit couldn't take place as planned. The survey had to be conducted by the local field team on their own without the presence of the researcher himself. To still ensure

a successful field visit, training of the field team, regular updates via mail, and a debriefing meeting took place together with the researcher. The data was collected successfully, but there were no on-site observations. To attempt to address this gap, three days of online interviews and a focus group (accompanied by technical problems) with different stakeholders of the project took place. Nevertheless, these impressions are just not the same as being on site for oneself. (On the plus side, inability to travel to Soroti and return did reduce the overall carbon emissions of the project by about 2.2 t of CO_2 e [BOKU Competence Centre for Climate Neutrality n.d.]). Furthermore, the local effects of the pandemic on the project activities and beneficiaries are only assessed to a small extent.

To truly assess the impacts that SODIS has on the people's lives in Soroti from afar, with a completely different cultural background and based on very simplified data in comparison to the complexity of influencing factors and motivations, is enormously ambitious. The situation in the project area is non-static, as people, weather, climate, politics, pandemics, and all their interrelations influence the actions, motivations, needs, and behaviors of the people day by day. Therefore, to put this living complex system into numbers only ever can be a rough best estimate approach to describe the situation quantitatively in some numbers. Clear and narrow system boundaries are needed. To get a 360-degree insight, many things like historical cultural backgrounds, sociologic research, policy observations, and market analyses outside these boundaries would also have to be looked at. As this exceeds the frames of this thesis, further research on those details is recommended.

Even when trying to be as reflective as possible, this is still a study from a researcher socialized in a scientific and Eurocentric society who has never experienced water scarcity or severe climate change impacts at all. This fact might be the biggest limitation.

Fundamentals

The SODIS Method (with WADI)

> *Solar water disinfection (SODIS) is one [of] the cheapest and most suitable treatments to produce safe drinking water at the household level in resource-poor settings.* (García-Gil et al. 2021, 1)

Millions of people rely on surface waters for their daily water supply. About 11% (844 million people) of the world's population still has no access to basic water services at all. Another 2.1 billion people only have access to unsafe or insufficient amounts of water (UN 2018). Often this water has to be disinfected due to bacterial contamination. Figure 1 shows the most common disinfection practices at the HH level and their characterizations.

García-Gil et al. (2021) state that boiling unsafe water is accepted by users around the world as a method of making drinking water safe, and that boiling is highly effective in removing microbial contamination. In simple financial terms, it

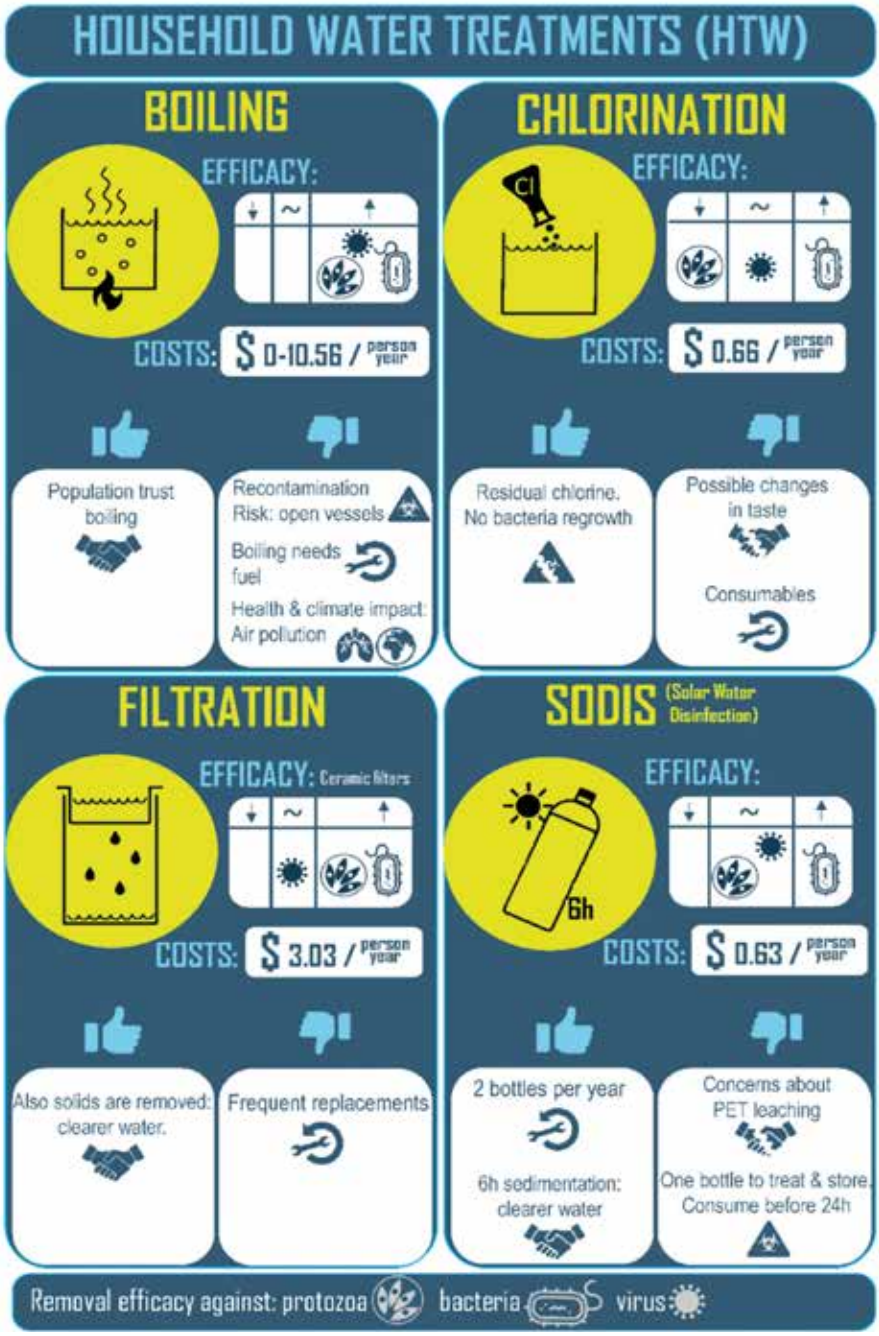


Figure 1. Common HH Water Treatments (García-Gil et al. 2021, 4, fig.1)

may be the cheapest way of disinfection as long as the fuel used is free of cost. In many cases therefore firewood is used. Its collection may be free but is very time consuming and can have negative effects on the biosphere due to deforestation.

SODIS is a more sustainable option. People just need to fill a suitable PET or glass bottle with unsafe water and place it horizontally in the sunlight. The UV radiation in combination with the heat of the sun kills bacteria and can even be effective against viruses and protozoa due to its germicidal effect (García-Gil et al. 2021; Luzi et al. 2016). This effect has been proven repeatedly by many studies over the last 30 years. Exposure times required to kill the pathogens vary between 6 h and 48 h, depending on the intensity of the sunlight and the pathogen structure (McGuigan et al. 2012). Countries closer to the equator are more suitable for SODIS, as the effectiveness of the method is all about solar exposure and the resulting penetration's depth of the UV radiation (Luzi et al. 2016). About five million people in over 50 different countries spread across the globe daily depend on SODIS (McGuigan et al. 2012). The WHO (2013) recommends SODIS for low-income countries as well as for emergency situations.

For a HWTS (=HH water treatment and storage) system to be culturally acceptable and replace traditional methods like boiling, it needs to be easy to use, cheap, and sustainable. As SODIS combines these properties, it has become more popular within the last decade (McGuigan et al. 2012).

A standard SODIS method has been developed by Eawag, the Swiss Federal Institute of Aquatic Science and Technology (Luzi et al. 2016). The process of disinfection is quite simple but the pretreatment before applying SODIS is essential to remove suspended matter. Different methods like aeration, sedimentation, and filtration are endorsed (WHO 2013). For example, the water is filtered through a cloth in a first step and then poured into a transparent bottle or container. Glass bottles and PET bottles are both UV permeable and work for SODIS. PET bottles are usually favored. They are easier to access in low-income countries and they are also more durable, as they don't break as easily (McGuigan et al. 2012).

Nevertheless, it is still a common psychological barrier to consume water from a PET bottle which was continuously exposed to direct sunlight. There prevails the fear that toxic substances from microplastics could leach into the water and be dangerous for human health. It is true that glass in comparison to PET is totally inert to sunlight and does not release any photoproducts. Luzi et al. (2016) argued that because of the material safety of PET, it is used for all kinds of food and drinks packaging, and many studies found that PET bottles do not leach considerable amounts of substances dangerous for human health (McGuigan et al. 2012; Wegelin et al. 2001). Sometimes terephthalate can be found but it stays at the surface of the bottle without leaching into the water (Wegelin et al. 2001). Other substances like plasticizers or carbonyls that could be found in marginal amounts are far below the limits for classifying safe drinking water. Only when the same PET bottle is used six months or longer, negative genotoxicity can occur (Ubomba-Jaswa et al. 2010). Therefore, the SODIS water out of PET bottles can be consumed unhesitatingly if bottles are renewed at least every half a year (McGuigan et al. 2012). The minimal health risk in consuming drinks out of them with or without exposure to sunlight

is comparable. Bottles made out of other plastic materials like polycarbonate (PC), or polyvinylchloride (PVC) are not suitable for SODIS. They can release bisphenol A (BPA) which is carcinogenic and can harm the hormone balance. These harmful substances are not used in PET bottles (Luzi et al. 2016).

Since the 1980s, ongoing research around the SODIS application has made it safer and easier to use and many technical advances have increased its effectiveness:

- Solar reflectors focus more sunlight at the point of application.
- Dark surfaces beneath the bottles increase the absorption of heat and sunlight.
- Optimized bottle designs and bottle positioning increase the UV penetration depth.
- Indicators for UV radiation (e.g., WADI device) increase the user's confidence and the SODIS image.

Most of these advanced designs of the SODIS method have not been scaled up through widespread commercial products (Luzi et al. 2016), but recently a device was developed which incorporates a UV radiation indication. The WADI as an essential technology in this thesis is explained in the next section.

The WADI – developed the Austrian company Helioz – aims to increase people's confidence in practicing SODIS. It is a little solar powered device, which runs by a photovoltaic cell and stores some energy in a battery. This enables its use regardless of any additional power supply or electric infrastructure. The WADI is put next to the bottles at the start of a standard SODIS process where it is exposed to the same amount of sunlight as the water. There it just measures the UV radiation of the placed spot with a sensor. It does not do any disinfection of the water itself, but using an emoji that gradually changes from a frowning face to a smiling one, plus a line that moves from one bar to five, it visually depicts the progress of the solar disinfection (Helioz n.d.–b). Figure 2 is a schematic illustration of the WADI application.

Figure 2. WADI Application in SODIS Process (Helioz & BOKU 2018, 3)

The WADI tackles two of the standard SODIS disadvantages named by Luzi et al. (2016). Firstly, there normally is no visual indicator of when the water is entirely disinfected and safe to drink. People often are unsure when the SODIS process is finished, as the water looks the same before and after disinfection. The WADI overcomes this challenge by measuring the UV radiation and duration and displays a laughing smiley when the water is finished. Before, the WADI just shows a sad smiley. Therefore, people (whether literate or not) have a clear indication when the water is ready to drink (Helioz n.d.–b). This is especially useful on cloudy days, as the radiation intensity is difficult to estimate. As the disinfection process is highly dependent on the weather, the WADI can bring additional clarity. Furthermore, it increases the efficiency of the whole SODIS process by securing the water safety and minimizing unnecessary waiting time (Helioz & BOKU 2018).

Secondly, the standard SODIS method often has the image of being a "poor peoples'" thing. The advantage of being a trivial low-tec solution, only requiring PET bottles and sunlight, often is a barrier to people's acceptance. The bottles are often collected from the bins or landfills, as there they are accessible for free. This is causing SODIS's poor image. The WADI adds a more technological and modern image, which can increase the beneficiaries' acceptance and SODIS usage rate (Luzi et al. 2016).

What Makes a "Good" Carbon Credit

Carbon credits traded within this compliance and voluntary schemes differ in quality. In general, it is much easier to measure real emissions than to measure emission reductions to predict the impact of offsetting projects. The quality therefore describes the precision of the emission reduction description. If some company buys a carbon credit, this always should be an equal supplement for the reduction of its own emissions by the same amount of CO_2. So, the world should be as well off in both cases regarding the emission reduction and also all other social and environmental consequences. The quality therefore describes the trust one can have that this principle will be met by the credit (Broekhoff et al. 2019). In other words, overall carbon credits and trading them on the market shall preserve "environmental integrity" defined by Schneider and La Hoz Theuer (2019).

According to Broekhoff et al. (2019, 18), the two main criteria for quality offset credits are:

> *[First] a quality offset credit must represent at least one metric tonne of additional, permanent, and otherwise unclaimed CO_2 emission reductions or removals. Second, a quality offset credit should come from activities that do not significantly contribute to social or environmental harms.*

Furthermore, the GHG reductions or savings must be "additional, not overestimated, permanent, not claimed by another entity and not associated with significant social or environmental harms" to be high quality (Broekhoff et al. 2019, 18).

Even if the highest quality is ensured by a program, healthy skepticism about its pledges and its effectiveness in reducing the global emissions is absolutely valid. Also, the carbon crediting and carbon trading per se have been seen as very controversial from the beginning.

The BOKU CO_2 Offsetting Program

The BOKU CO_2 offsetting program is active in the Austrian voluntary carbon market. It has been hosted by BOKU since 2011 and offers carbon credits generated by climate mitigation projects that were developed together with scientists from BOKU University and external partners. It includes biogas, afforestation, forest protection, composting, and drinking water projects in Uganda, Ethiopia, Nepal, Costa Rica, and Colombia, with CO_2 reductions on microscale level. With a total volume of 150,000 carbon credits aimed to be reached within the next years, it is more than a thousand times smaller in volume in comparison to the GS.

Nevertheless, it aims for ensuring highest possible quality based on the GS methodologies which are adapted for every of its projects. The uniqueness is that BOKU claims to be the first and only university developing their own climate mitigation projects and generating carbon credits. These are bought by companies, BOKU faculties, and private people to offset their CO_2 emissions. The scientifically monitored projects also have a strong focus on the SDGs and on social benefits for local communities. An external scientific advisory board consisting of important stakeholders of the Austrian CO_2 scene assures the program's quality (BOKU n.d.). One of their projects called "Clean Air and Safe Drinking Water for Soroti" is in the center of this thesis. In the next section this project is described in more detail.

"Clean Air and Safe Drinking Water for Soroti": Project Background and Previous Findings

The project "Clean Air and Safe Drinking Water for Soroti" is one of the projects integrated in the BOKU CO_2 offsetting program. Its aim is to provide safe drinking water for 2,000 Ugandan HHs and at the same time reduce GHG emissions. Many different project activities around WASH improvements are bringing additional benefits to the people. The project is situated in rural Uganda. The following sections give details to the project area, the project history, and previous findings from a baseline study.

The project kickoff for "Clean Air and Safe Drinking Water for Soroti" happened in February 2019. Since then, the project has been implemented by three main partners: the social enterprise Helioz, who founded the WADI device and provides safe drinking water for people in many countries of the Global South, the local partner Water School Uganda (WSU), who are experts in WASH interventions in Uganda, and the University of Life Sciences Vienna (BOKU) Institute of Sanitary Engineering and Water Pollution Control, which ensures the scientific

backing. Helioz consciously decided on the monitoring by BOKU and not by any expensive official carbon credit standard like GS because the cost for certification would have been too high, less money could go directly to activities in the local communities, and they had previously collaborated with BOKU on a project in Bangladesh. The whole project is financed by carbon credits via the BOKU CO_2 offsetting program. The project aims to provide safe drinking to at least 12,000 people daily by practicing SODIS with WADI. At the same time, emission reductions of 20,000 t CO2 e will be achieved by burning less firewood for water disinfection of at least 40,000 liters of water/day. Therefore, the main aim is to shift water disinfection practices from boiling water with firewood to practicing SODIS with WADI (Helioz & BOKU 2018).

Today, four years after the start of the project, many milestones have been achieved:

- Selection of the participating HHs
- Free of cost distribution of 2,000 WADI devices for 2,000 selected HHs in Gweri
- Training of the SODIS method with WADI by WSU
- Regular field visits
- Baseline study (conducted 2019) within the master thesis of Wornig (2021)
- Annual reports by Helioz
- Behavioral change in the disinfection process
- Impacts on various SDGs through different additional project activities
- Actual CO_2 emission reductions

Figure 3. A WADI in Use During the Project Survey in 2021. The device is placed in the sun alongside the bottles. Photo credits by the author.

Figure 4. A Family Presents Their Daily WADI Routine. Photo credits by the author.

To assess the achievement of the main project objectives and the project's impacts on various SDGs, the recent project survey delivers the underlying data. The calculated results are compared to the previous baseline findings described in the next section.

Next to the activities around water disinfection, a variety of other project activities are constantly carried out. The local partners of WSU are experts in bringing holistic health and life improvements to the poorest people of Uganda. So, in addition to the WADIs and the bottles, also hand washing facilities ("tipi taps") including soap, improved latrines, drying racks, waste management facilities, and reusable pads for menstrual hygiene were given to the people according to their individual needs. In the third year of the project, over 4,700 WASH facilities, including latrines, tipi taps, bathing shelters, and drying racks have been constructed together with the beneficiaries in their HHs (Helioz 2021, 37; Helioz & BOKU 2021, 3). The HHs received proper training in how to use and maintain them. Boreholes have been repaired, efficient cook stoves ("Lorena stoves") have been constructed, separate housing for the HH's animals have been built, and health groups among the communities have been educated. Wornig (2021) describes these interventions in more detail. In 2022, two ferrocement tanks with a volume of 10,000 liters were built for Telamot and Omugenya primary school for water storage. Also, constant measures for COVID-19 preventions are carried out in the project villages (Helioz & BOKU 2022). These interventions result in manifold positive impacts to the wellbeing of the project beneficiaries.

Material and Methods – Empirical Case Study

This section explains the different methods and materials used and how they are interwoven into each other. To answer the research questions and reach the objectives of the thesis, a mixed method approach of empirical data collection and analysis was chosen.

The research approach is an empirical case study investigating the ongoing project "Clean Air and Safe Drinking Water for Soroti." The data have been mainly collected through a survey, covering different households of project beneficiaries in the project area. The derived quantitative data from this project survey was complemented by in-depth interviews adding qualitative data to the research. The findings were used for further calculations.

The results of the project study have been compared to the results of the baseline study of Wornig (2021) which she conducted before the project activities started in 2019. Through this pre and post evaluation of local data, the project impacts can be measured and described.

Explanations of the different methods of the case study follow in the upcoming sections. Firstly, the quantitative data part and the qualitative data part are explained separately; subsequently, the carbon emission reduction calculation tool and the SDG impacts assessment table is shown. The chapter concludes with a consideration of the validity and limitations of the study.

Quantitative Data

Survey Design

The survey was prepared by the researcher through adopting and refining the baseline survey of Wornig (2021). The survey questionnaire mainly consists of structured interview questions with pre-coded answers. Simple yes/no questions, as well as numeric questions and questions with multiple predefined answer categories are used. It was prepared in English language.

The interview should feel like an open dialogue, as the interviewer reads out one question after the other without mentioning the possible answers. A translator translated it into the local language, listened to the answer of the interviewee, and reported it back to the interviewer. As Uganda is a multilingual country with more than 41 native languages (Ssentanda & Nakayiza 2017), the translation was crucial, even for the Ugandan field team, as they originate from a different region. The interviewer further ticked the preformulated answer which was closest to what the respondent said, or wrote down the given answer (e.g., if numeric variables like liters, kilogram, or age).

The main content of the questionnaire is about the WASH situation. A special focus is the change in the drinking water disinfection method and the application of the project technology WADI to practice SODIS. The goal was to collect data to get a broad overview of the current situation and the developments that

have taken place since the start of the project. Visiting the participating HHs was essential to make on-site observations regarding the progress of project activities. Furthermore, trust gets built up on both sides when the project beneficiaries meet the project team.

The questionnaire consists of eight sections with a total of 72 questions:

Section Name	*Volume*
1. Beneficiary Identification	11 questions
2. Household Water and Water Treatment	9 questions
3. WADI specific water treatment	9 questions
4. WADI specific water treatment continued	8 questions
5. Energy source – Firewood	9 questions
6. Health	10 questions
7. Household sanitation and hygiene	8 questions
8. COVID-19	8 questions

Field Visit

Figure 5. Family Being Interviewed in Soroti (Source: WSU 2021)

Figure 6. Impressions from the Focus Group Interviews (Source: WSU 2021)

Qualitative Data: Focus Group and Interviews

After the quantitative data was gathered in the project survey in May 2021, some additional qualitative research was conducted in November 2021 with the aim of getting an even deeper understanding of the project impacts. The researcher developed a semi-structured qualitative research questionnaire and personally conducted an online focus group and two in-depth online interviews with different local stakeholders connected to the project. Details are described in the upcoming paragraphs.

As it had to be set up as an online focus group, the researcher was moderating the interview via video call. A notebook was placed on a table in front of the participants, who were sitting outdoors beneath a mango tree at the community area of the village. Their chairs were positioned in two rows so that everybody could see the researcher on the screen and the other way around. Every time people were asked a question, the respondents stood up and moved to sit in front of the screen next to the translator and gave their response. Technical assistants took pictures and notes and hosted the meeting locally.

Calculation of the CO_2 Emission Reduction for WADI

To quantify the measurable climate relevant impact, the Gold Standard (GS) was chosen as it is one of the biggest and most established international standards on the voluntary carbon market. Further criteria for choosing the GS have been:

- SDG focus/co-benefits: GS wants to achieve progress on all SDGs and ensure benefits on neighborhood communities through their projects. It also acts as a standard for the Sustainable Development Goals (Carbon Offset Guide n.d.–a).
- Microscale: GS allows evaluation of microscale projects (< 10,000 t annual CO_2 credits) (Carbon Offset Guide n.d.–a; Gold Standard 2019a, 3).
- Voluntary carbon market: GS only operates in the voluntary carbon market, not on the compliance market (Carbon Offset Guide n.d.–a). The resulting field of application suits the voluntary offsetting program of BOKU.
- Developing countries: Most of the projects are in developing, low- or middle-income countries resulting in specialized monitoring methods for these local conditions (Carbon Offset Guide n.d.–a).
- Previous experiences: Both BOKU and Helioz have satisfying previous experiences with applying the methodology to similar SODIS projects in Ethiopia and Bangladesh.
- Practicability: GS constantly develops and publishes new assessment documents and offers a lot of scientific background materials.
- Comparability: The results of the total emission reduction were to be compared to the baseline study, where the same GS methodology (version 2.0) was used, so it was important to stay with the same tool.

The combination of these criteria suits very well to the project set-up of "Clean Air and Safe Drinking Water for Soroti" as it is placed at the voluntary market, is at microscale level, and has a strong SDG focus.

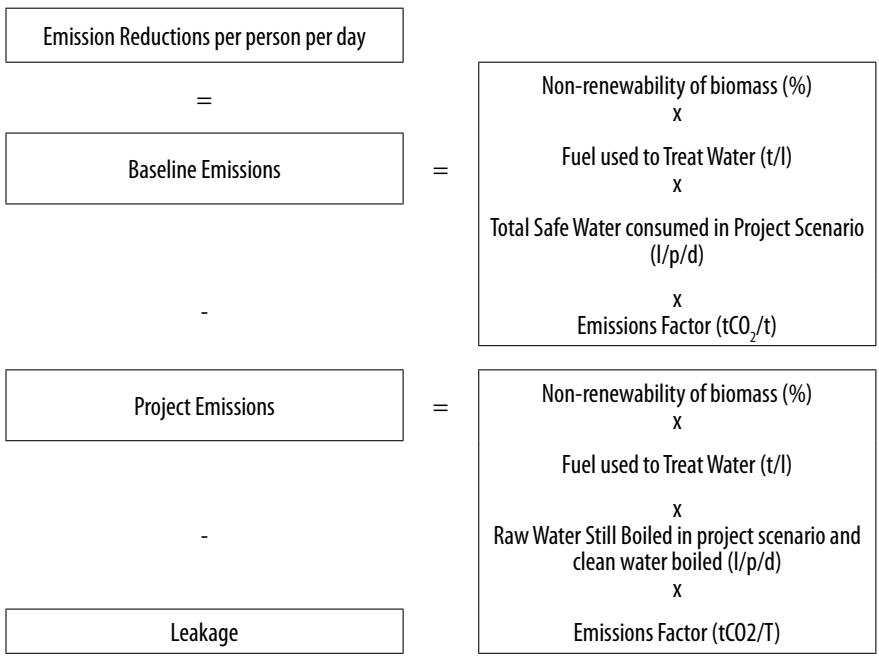


Figure 7: Simplified Calculation of Emission Reductions per Person per Day (Gold Standard 2015, 36)

In general, the emission reduction is calculated by taking the baseline emissions and subtracting the project emissions and the leakage effects. The baseline here assumes that people are boiling their water with nonrenewable firewood (the main source of energy in all HHs) which Wornig (2021) found in her baseline study.

Results, Interpretation and Discussion

Demographics of Project Study and Essential Parameters

The data base for the project survey is 223 completed and scanned questionnaires from the field visit, which have been analyzed. Two hundred twenty-three households were visited and interviewed in 10 different villages in the project area: Akuya A, Akuya B, Alere, Amodomia, Amusia 1, Amusia 2, Omugenya, Orapada, Telamot, and Tukum. About two-thirds of the interview partners were female (n = 151), one-third were male (n = 72), and all of them had given their consent to take part in the study. This gender disparity can be explained by two facts:

- Women in general are at home during daytime, when the interviewers visited the HHs, doing HH chores.
- Besides that, all the wood collection for disinfecting and provision of drinking water is typically done by women (> 93%), as typical for sub-Saharan culture (WHO 2016a). Therefore, mainly women had been given the WADIs at the start of the project and that is why these women were the main interviewees.

Nearly 60% of the HHs had taken part in the baseline survey at the start of the project three years earlier. The age of respondents was between 19 and 100 years, with an average of 42 years. Most of the people (> 90%) are farmers as their main occupation. The predominant education level is primary school level (2/3 of people). Only some had visited a secondary or even tertiary school; some don't have any education at all. The average annual income of a standard HH is 460,000 UGX which at the moment is equivalent to 120€ per HH per year. That low income is clear evidence for the very limited economic opportunities of the project beneficiaries. According to the SDG indicator 1.1, this is classified as extreme poverty condition (United Nations Department of Economic and Social Affairs n.d.). The main sources for getting drinking water are nearby boreholes for 98.7% of the HHs in both dry and rainy season.

The following essential values have been derived. Table 1 gives an overview; details are explained afterwards. The critical values are the WADI usage rate (Up,y), the Water consumption (Qp,y + Qp,rawboil,y) and the value for Firewood (Ffirewood). These have the most impact on the final emission reduction results. In comparison to the baseline study, a significantly lower usage rate was found (which is reducing the overall emission reductions), a higher amount of water needed per person was chosen on (which is increasing the overall emission reductions) and partly the concept of suppressed demand was integrated in the value of firewood

being the main source of energy, which was previously used also for boiling the drinking water for disinfection (which is increasing the overall emission reductions).

	Parameter	*Baseline Study value*	*Project Study value*
Up,y	Cumulative usage rate for technologies in project scenario p during year y	95%	58%
HH size	Number of people living in a household and using the WADI water	7.84	8.12
Np,y	Number of days multiplied with persons consuming water supplied by project scenario p through year y (Based on 365 days * 1 household filter * 8,12 person per household)	2862	2964
Qp,y + Qp,rawboil,y	Quantity of safe water in litres consumed in the project scenario p and supplied by project technology per person per day in year y plus Quantity of raw water boiled in the project scenario p per person per day	2.423 l	4 l
Qp,rawboil,y	Quantity of raw water boiled/needed in the project scenario p per person per day in year y	-	0.2 l
Qp,cleanboil,y	Quantity of safe water boiled in the project scenario p per person per day in year y	-	0 l
Ffirewood	Fraction of households using firewood as their main source of energy	51%	51%/100%
fNRB	Fraction of non-renewable biomass	82%	82%
∑LEp,y	Leakage from project scenario p in year y (tCO_2e/year)	-	0

Table 1. Overview of the Essential Parameters

For the total CO_2 emission reduction, three different scenarios were assessed: scenario 1, which includes suppressed demand, scenario 2, which excludes suppressed demand, and scenario 3, which is the average of scenario 1 and scenario 2. In scenario 3 (average scenario), the overall total CO_2 emission reduction per WADI per year is 2.12 t CO2 e. That gives an annual reduction of about 4,240 t CO2 e and a total project reduction of 21,200 t CO2 e over a project duration of five years.

Scenario 3: Average Scenario	
CO_2 reduction per WADI/per year	**2.12 t CO_2e**
Emissions from firewood burning for baseline scenario/year	5.2 t CO_2e
Emissions from firewood burning for project scenario/year	2.09 t CO_2e

Scenario 3: Average Scenario	
Total emission reductions of the project per year	2.12*2000 = **4240 t CO_2e**
Total emission reductions of the project for the whole project duration of 5 years (2019–2024)	4240*5=**21,200 t CO_2e**

Table 2. Scenario 3 – Average Scenario

Earlier experiences from a similar project in Bangladesh (Helioz 2021, 31) found a value of 1.90 t/WADI/year (Schmitz & Reisinger 2018, 19) which has been increased by project improvements to also 2.12 t/WADI/year (Reisinger 2020, 11). Helioz, the company who developed the device and is using it in many different projects in India, Kenya, Sudan, Bangladesh, Uganda, and Ethiopia, conducts impact studies and constant monitoring, which has found CO_2 savings of 2 t/WADI/year as an average (Helioz n.d.–a). Therefore, the calculated mean value of 2.12t CO_2 emission reduction gives a reasonable, realistic result which lies close to the results of other WADI projects.

Other SDG Impacts

This section aims to demonstrate the broad impacts of the project on various SDGs. In figure 8, the SDGs are arranged in the Wedding Cake Model by the Stockholm Resilience Center (2016). It offers an alternative to the official linear structure of the 17 SDGs by adding dependencies between the different goal levels and therefore overcoming the sectoral approach. These dependencies are inspired by the 3 Nested Dependencies model of sustainability: ecological, social, and economic sustainability. Thereby the biosphere level enables the society level, which in turn enables the economy level. The stable and resilient biosphere therefore is the base for all SDGs (Stockholm Resilience Center 2016). Wornig (2021) added a color code to the Wedding Cake Model. The colors highlight the nine SDGs on which the project has the most impact on.

By improving the water and hygiene situation of the people in Soroti and at the same time reducing CO_2 emissions, the core project activities have their most impact on SDG 6 (water and sanitation) and SDG 13 (climate action). Both SDGs are assigned to the biosphere level, which is the fundamental one according to Stockholm Resilience Center (2016). This legitimates the importance of project goals and activities.

An overview of the project's impacts on all other SDGs targeted in the baseline is given in table 3. The next section of this section explains the impacts in detail, drawing on the responses to the project survey of 223 HHs and the additional qualitative interviews. The layout and content are based on the SDG table of the baseline findings from Wornig (2021, 85–87) to make the results comparable. The Wedding Cake Model is used as a structure. The SDGs and its targets mentioned

Figure 8. Project Impact Shown in Amended SDG Wedding Cake (Wornig 2021, 84, see fig. 21)

in this chapter are directly cited from the official UN SDG website (United Nations Department of Economic and Social Affairs n.d.).

Biosphere Level – *Targets and Impacts*
▪ 6.1: Safe and affordable drinking water for all ▪ 6.2: End open defection and provide access to sanitation and hygiene
○ 16,200 project beneficiaries are getting access to at least 38,000l water per day ○ 16,200 project beneficiaries are getting access to improved hygiene ○ Open defecation got reduced from 26% to 8% ○ Soap access was improved from 36% to 50%
▪ 13.2.2: Indicator: Total CO_2/Year
○ Calculated emissions reduction per WADI/HH/year: 2.12t CO_2 ○ Impact: Annual emissions reduction of whole project covered by 2000 WADIs: 4240t CO_2 ○ Total emission reduction of the project (5 years project duration): 21,200t CO_2
▪ Target 15.2: End deforestation and restore degraded forests
○ Firewood reduction per year: ~ 3000t ○ Total firewood reduction of the project (5 years project duration): ~ 15,000t

Society Level – *Targets and Impacts*
▪ 1: End poverty in all its forms everywhere ▪ 1.4: Access to basic services (overlap with SDG 6)
○ Lowering the average cost for medical treatment to 11€ (-2€/treatment) ○ Time savings for firewood collection: up to 2.5h/day ○ More time and better health condition for income generating activities
▪ 3.3: By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases ▪ 3.9: By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
○ Overall sickness per HH/per month reduced by more than half (from 72% to 32%) ○ Reduction of diseases: diarrhoea (-11%), typhoid (-2%), cough (-26%), malaria (17%)
▪ 4.1: By 2023, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes
○ Time savings for children enable more school attendance possibilities ○ Health improvements enable more school attendance possibilities
▪ 5.8: Promote empowerment of woman through technology
○ 2000 WADIs were given to women to help them providing safe drinking water → female empowerment and project ownership ○ Time savings for women and girls up to 2.5h/day → new possibilities
▪ 7.1.2.: Proportion of population with primary reliance on clean fuels and technology ▪ 7.3: By 2030, double the global rate of improvement in energy efficiency
Interdisciplinary Level (connecting all 3 levels) – *Targets and Impacts*
▪ 17.3: Mobilizes additional financial resources for developing countries from multiple sources ▪ 17.7: Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional preferential terms, as mutually agreed
○ Financing the project through CO2 credits on the voluntary carbon market ○ Broad international partnership contributes to the SDGs on many levels

Table 3. Project Impacts on the SDGs

Individual Stories

Some highlight moments were shared in the interviews. For example, the health inspector was very surprised by the state of the HHs when she visited the project area after project activities were in place. This success may be due to the good set up of the program. The biggest learning for the District Health Officer in that regard was:

Start small with the community together and expand extensively so that whatever you achieve becomes sustainable. Allow communities to take decisions in a participatory manner, because in the end of the day they will be owned by the communities. So now the WADI and the bottles are owned by the communities, the ferrocement tanks are owned by the schools […], the improved cook stoves are owned by members of the HH. (District Health Officer, personal communication, November 17, 2021)

There was also a note on the importance of more efficient cook stoves because it is so much better for the people and the environment. The field worker who personally builds them said:

Three stone fires waste a lot of firewood. Therefore, every HH should have a Lorena. It's not only about cooking but about saving the environment. I love [constructing] it and I do it with passion! (Local Field Worker, personal communication, November 18, 2021)

Conclusion and Outlook

Given the various global, social, and environmental challenges we are facing, this case study shows how simple techniques on existential levels like SODIS with WADI can transform people's lives in so many ways. In global dimensions, the project might have just a small impact on climate change mitigation quantitatively with 21,200 t CO2 reduction, but on a qualitative level it enables the transformation of whole communities through HH empowerment. The identified emission reductions of 2.12 t CO2 per WADI are in line with findings from similar projects (Helioz n.d.–b; see Schmitz & Reisinger 2018).

The project "Clean Air and Safe Drinking Water for Soroti" is only one example of how carbon credits can have a meaningful impact, improving the lives of over 16,000 people. Without a doubt, carbon credits are a very controversial concept involving the risk of also being counterproductive to reach our Paris climate goals, Agenda 2030, or net-zero emissions. Nevertheless, carbon credit financing is an increasingly hot topic, which can also be a potential for necessary developments if set up with the right intentions and monitored rigorously. It can be a valuable interim solution in the near term, until broader climate policies are established. Until government regulations for CO_2 reductions, which should be compulsory on many levels, are in place, "carbon markets can act as a subsidy that smooths the transition towards a low-carbon future. As an incubator for innovation, they can address a wide array of emission sources and promote new promising technologies. Once we inhabit that future, there will not be room for carbon markets any longer" (Streck 2021, 374).

For the people in Soroti, a new area of improved health and reduced need for firewood has begun. With the WADI they have the possibility to benefit not only in health but also in time savings, increased autonomy, strengthened sense of com-

munity, more time for family or income generating activities, higher rates of school attendance, and a regeneration of surrounding trees and ecosystems, to name just a few. These positive effects of the project activities are recognized by the majority of the local people and the wish for prolonging the project duration and expanding the project area to neighboring villages has been expressed repeatedly.

Most of the findings show that there is a broad feeling of ownership among the project and that the majority of the beneficiaries practice SODIS on a regular basis, even though the total water demand can only be satisfied partly by the WADI as supply to less water is available and immediate need for water is still often satisfied by unsafe water sources. The various facilities and training provided by the local partner WSU make a remarkable improvement for the HHs in the communities. Many things on various SDGs have improved since the project started. Nevertheless, the big challenge of the COVID-19 pandemic has hindered the project progress within the last two years. As regular trainings and HH visits have not been possible, arising problems couldn't be tackled straight away and caused a slip in the HHs focus. During this pandemic, it was about bare survival, even more in these families which were suffering extreme poverty anyway.

The biggest challenge may be the loss and damage of bottles and also some WADI devices. Despite a new delivery of bottles after the hard lockdown, regular emphasis for the replacement of broken bottles and devices is needed in future to ensure the possibility for constantly doing SODIS for the HHs. It is further recommended to keep up regular trainings, meetings, and HH visits to secure broad capacity building. "Building up capacities is the key!" notes the District Health Officer (personal communication, November 17, 2021), when it comes to the sustainability of the project success. Including the people impacted by the project from the very beginning onwards in a participatory manner may be the biggest learning and recommendation for similar projects.

As an outlook for the project duration, the emission reductions could go up again or can even be further increased through ambitious post-pandemic interventions and replacement of bottles. It is recommended that more and more HHs get Lorena stoves to further reduce firewood emissions. This could halve the emission from cooking. If monitored properly and included into the total CO_2 reduction calculation, these emissions could also be verified to generate carbon credits in future.

This research showed a way that a project's impact can be quantified. Through SODIS and its resulting co-benefits, a measurable effect on CO_2 reduction and various other SDG impacts could be described. Even though quantifying SDG impacts on the local project level is still in its early stages of development, possibilities exist to do so. The use of methodologies and new impact tools like the ones used and mentioned in this thesis would be favorable to see more in future scientific work. This can make the effect of SODIS and also other important project activities more visible and understandable to a broad audience.

Overall, the findings are a good example of how interconnected safe water, improved livelihood, environmental protection, and climate mitigation can be. To solve global problems like climate change, many local solutions that are sustainable, clean, and at the same time increase the livelihood for people are needed.

References

Adams, W. C. (2015). Conducting Semi-Structured Interviews. In K. E. Newcomer, H. P. Hatry, J. S. Wholey (Hrsg.), *Handbook of Practical Program Evaluation* (4. Aufl.). New York: John Wiley & Sons, 492-505. doi:10.1002/9781119171386.ch19

Alston, P. (2020). *The parlous state of poverty eradication: Report of the Special Rapporteur on extreme poverty and human rights*. https://chrgj.org/wp-content/uploads/2020/07/Alston-Poverty-Report-FINAL.pdf [29.09.2022].

Anyaegbunam, C., Mefalopulos, P., Moetsabi, T. (2004). *Participatory rural communication appraisal: Starting with the people; a handbook* (2nd edition). https://www.fao.org/3/y5793e/y5793e00.htm#Contents [abgerufen am 29.09.2022].

Babbie, E. (2008). *The basics of social research* (4th ed.). USA: Thomson/Wadsworth.

Broekhoff, D., Gillenwater, M., Colbert-Sangree, T., Cage, P. (2019). *Securing Climate Benefit: A Guide to Using Carbon Offsets*. https://www.offsetguide.org/wp-content/uploads/2019/11/11.13.19.pdf [abgerufen am 29.09.2022].

Carbon Offset Guide. (o.D.–a,b). *Gold Standard*. https://www.offsetguide.org/understanding -carbon-offsets/carbon-offset-programs/voluntary-offset-programs/gold-standard/ [abgerufen am 22.07.2022].

Carbon Offset Guide. (o.D.–c). *Mandatory & Voluntary Offset Markets - Carbon Offset Guide*. https://www.offsetguide.org/understanding-carbon-offsets/carbon-offset-programs/mandatory-voluntary-offset-markets/ [abgerufen am 08.08.2022].

Carbon Offset Guide. (o.D.–d). *Offset Project Eligibility*. https://www.offsetguide.org/understanding-carbon-offsets/carbon-offset-programs/comparisons-of-offset-programs/offset-project-eligibility/ [abgerufen am 09.09.2022].

Carbon Offset Guide. (o.D.–e). *Protocols & Standards*. https://www.offsetguide.org/understanding-carbon-offsets/carbon-offset-programs/protocols-standards/ [abgerufen am 09.09.2022].

Carbon Offset Guide. (o.D.–f). *United Nations Offset Mechanisms*. https://www.offsetguide.org/understanding-carbon-offsets/carbon-offset-programs/united-nations-offset-mechanisms/ [abgerufen am 09.09.2022].

Carbon Offset Guide. (o.D.–g). *What is a Carbon Offset? - Carbon Offset Guide*. https://www.offsetguide.org/understanding-carbon-offsets/what-is-a-carbon-offset/ [abgerufen am 8. August 2022].

Conway, D., Vincent, K. (2021). *Climate Risk in Africa: Adaptation and Resilience*. Cham: Springer International Publishing AG.

Crossette, B. (2015). *Can the SDGs live up to the hype?* https://futureun.org/media/archive1/briefings/FUNDS_Briefing35_SDGs_Crossette.pdf [abgerufen am 29.09.2022].

Environmental Protection Authority. (2022, 28. September). *About the Emissions Trading Scheme*. https://www.epa.govt.nz/industry-areas/emissions-trading-scheme/about-the-nzets/ [29.09.2022].

Fleischman, F., Basant, S., Chhatre, A., Coleman, E. A., Fischer, H. W., Gupta, D., Güneralp, B., Kashwan, P., Khatri, D., Muscarella, R., Powers, J. S., Ramprasad,

V., Rana, P., Solorzano, C. R., Veldman, J. W. (2020). Pitfalls of Tree Planting Show Why We Need People-Centered Natural Climate Solutions. *BioScience*, 70(11), 947–950. doi:10.1093/biosci/biaa094

García-Gil, Á., García-Muñoz, R. A., McGuigan, K. G., Marugán, J. (2021). Solar Water Disinfection to Produce Safe Drinking Water: A Review of Parameters, Enhancements, and Modelling Approaches to Make SODIS Faster and Safer. *Molecules*, *26*(11). doi:10.3390/molecules26113431

Garg A., Kazunari K., Pulles T. (2006). *2006 IPCC Guidelines for National Greenhouse Gas Inventories*, *Volume 2 Energy*. https://www.ipccnggip.iges.or.jp/public/2006gl/pdf/2_Volume2/V2_1_Ch1_Introduction.pdf [abgerufen am 29.09.2022].

Gold Standard. (o.D.–a). *Gold Standard for the Global Goals*. https://www.goldstandard.org/our-story/gold-standard-global-goals [abgerufen am 22.08.2022].

Gold Standard. (o.D.–b). *Gold Standard Market Report 2020*. https://www.goldstandard.org/blog-item/gold-standard-market-report-2020 [abgerufen am 23.08.2022].

Gold Standard. (o.D.–c). *SDG Impact Tool*. https://globalgoals.goldstandard.org/news-sdg-impact-tool/ [abgerufen am 22.08.2022].

Gold Standard. (o.D.–d). *Vision + Impacts*. https://www.goldstandard.org/about-us/vision-and-mission [abgerufen am 22.08.2022].

Gold Standard. (2015). *Technologies and Practices to Displace Decentralized Thermal Energy Consumption: Version 2.0*. https://www.goldstandard.org/sites/default/files/documents/revised-tpddtec-methodology_april-2015_final-clean.pdf [abgerufen am 29.09.2022].

Gold Standard. (2017). *Gold Standard Methodology*: *Technologies and Practices to Displace Decentralized Thermal Energy Consumption*. https://globalgoals.goldstandard.org/standards/407_V3.1_EE_ICS_Technologies-and-Practices-to-Displace-Decentrilized-Thermal-Energy-TPDDTECConsumption-.pdf [abgerufen am 29.09.2022].

Gold Standard. (2019a). *Microscale Project Requirements: Version 1.2*. https://globalgoals.goldstandard.org/standards/108_V1.2_PAR_Microscale-Project-Requirements.pdf [abgerufen am 29.09.2022]

Gold Standard. (2019b). *Next generation standards*. https://www.youtube.com/watch?v=nj1BwBrMfAU [abgerufen am 29.09.2022].

Gold Standard. (2022). *GUIDELINE - The SDG Impact Tool Manual v.1.1*. https://globalgoals.goldstandard.org/standards/430GV1.1_IQ_the-SDG-Impact-Tool-Manual.pdf [abgerufen am 29.09.2022].

Haya, B. (2009). *Measuring Emissions Against an Alternative Future: Fundamental Flaws in the Structure of the Kyoto Protocol's Clean Development Mechanism*. http://bhaya.berkeley.edu/docs/Haya-ER09-001-Measuring_emissions_against_an_alternative_future.pdf [abgerufen am 29.09.2022].

Helioz. (o.D.–a). *CO2*. https://www.helioz.org/en/co2 [abgerufen am 31.08.22].

Helioz. (o.D.–b). *WADI*. https://helioz.org/en/wadi [abgerufen am 06.08.2022].

Helioz. (2021). *Annual Report 2020/21*. https://www.helioz.org/database/20211020100448340 22.pdf [abgerufen am 29.09.2022].

Helioz, Universität für Bodenkultur Wien. (2018). *Clean Air & Safe Drinking Water for Soroti.* Unveröffentlichter Entwurf.

Helioz, Universität für Bodenkultur Wien. (2021). *Clean Air and Safe Drinking Water for Soroti: Annual Project Report Year 3: September 2020 - August 2021.* Unveröffentlichter Bericht.

Helioz, Universität für Bodenkultur Wien. (2022). *Clean Air and Safe Drinking Water for Soroti: Annual Project Report: September 2021 - August 2022.* Unveröffentlichter Bericht.

Hodge, J. M., Clasen, T. F. (2014). Carbon financing of household water treatment: Background, operation and recommendations to improve potential for health gains. *Environmental Science & Technology*, *48*(21), 12509–12515. doi:10.1021/es503155m

Intergovernmental Panel of Climate Change. (2022a). *Climate change: a threat to human wellbeing and health of the Planet. Taking action now can secure our future*. https://www.ipcc.ch/report/ar6/wg2/resources/press/press-release/ [abgerufen am 29.09.2022].

Intergovernmental Panel of Climate Change. (2022b). *The evidence is clear: the time for action is now. We can halve emissions by 2030*. https://www.ipcc.ch/2022/04/04/ipcc-ar6-wgiii-pressrelease/ [abgerufen am 29.09.2022].

Kabwama, S. N., Bulage, L., Nsubuga, F., Pande, G., Oguttu, D. W., Mafigiri, R., Kihembo, C., Kwesiga, B., Masiira, B., Okullo, A. E., Kajumbula, H., Matovu, J., Makumbi, I., Wetaka, M., Kasozi, S., Kyazze, S., Dahlke, M., Hughes, P., Sendagala, J. N., Zhu, B.-P. (2017). A large and persistent outbreak of typhoid fever caused by consuming contaminated water and street-vended beverages: Kampala, Uganda, January – June 2015. *BMC Public Health*, 17(1), 23. doi:10.1186/s12889-016-4002-0

Kazunari, K. (2022, 16. März). Collapse of the Clean Development Mechanism scheme under the Kyoto Protocol and its spillover: Consequences of 'carbon panic'. https://voxeu.org/article/collapse-clean-development-mechanism [abgerufen am 29.09.2022].

Knohl, A. (2012). *Wie viel CO2 wird bei der Verbrennung von Holz frei?* https://www.co2online.de/service/klima-orakel/beitrag/wie-viel-co2-wird-bei-der-verbrennung-von-holz-frei-8572/ [abgerufen am 29.09.2022].

Lamlom, S. H., Savidge, R. A. (2003). A reassessment of carbon content in wood: variation within and between 41 North American species. *Biomass and Bioenergy*, 25(4), 381–388. https://doi.org/10.1016/S0961-9534(03)00033-3

Luzi, S., Tobler, M., Suter, F., Meierhofer, R. (2016). *SODIS manual. Guidance on solar water disinfection*. https://www.sodis.ch/methode/anwendung/ausbildungsmaterial/dokumente_material/sodismanual_2016_lr.pdf [abgerufen am 29.09.2022].

Mansell, P., Philbin, S., Konstantinou, E. (2020). Redefining the Use of Sustainable Development Goals at the Organisation and Project Levels – A Survey of Engineers. *Administrative Sciences*, 10(3), 55. doi:10.3390/admsci10030055

McAfee, K. (2016). Green economy and carbon markets for conservation and development. A critical view. *International Environmental Agreements: Politics, Law and Economics*, *16*(3), 333–353. doi:10.1007/s10784-015-9295-4

McGuigan, K. G., Conroy, R. M., Mosler, H.-J., Du Preez, M., Ubomba-Jaswa, E., Fernandez-Ibañez, P. (2012). Solar water disinfection (SODIS): A review from bench-top to roof-top. *Journal of Hazardous Materials*, *235–236*, 29–46. doi:10.1016/
j.jhazmat.2012.07.053

Milne, S. (2020). *Beyond Carbon Credits: TEDx Talk*. https://www.youtube.com/watch?v=Jiz-gYMc850 [abgerufen am 29.09.2022].

Perlman, H., Cook, J., Nieman, A. (o.D.). *All of Earth's water in a single sphere!* https://www.usgs.gov/media/images/all-earths-water-a-single-sphere [abgerufen am 31.07.2022].

Pickering, A. J., Arnold, B. F., Dentz, H. N., Colford, J. M., Null, C. (2017). Climate and Health Co-Benefits in Low-Income Countries. A Case Study of Carbon Financed Water Filters in Kenya and a Call for Independent Monitoring. *Environmental Health Perspectives*, 125(3), 278–283. doi:10.1289/EHP342

Pörtner, H.-O., Roberts, D. C., Adams, H., Adler, C., Aldunce, P., Ali, E., Begum, R. A., Betts, R., Kerr, R. B., Biesbroek, R. (2022). Climate change 2022: Impacts, adaptation and vulnerability. *IPCC Sixth Assessment Report*.

Reisinger, M. (2020). *Project Update 02/2020: CO2 Reduction & Safe Drinking Water in Bangladesh*. https://www.teamclimate.com/assets/pdfs/Bangladesh_Monitoring_Report_2020.pdf [abgerufen am 29.09.2022].

Ritchie, H., Roser, M., Rosado, P. (2020). *CO_2 and Greenhouse Gas Emissions: Production vs. consumption-based CO_2 emissions Austria*. https://ourworldindata.org/co2/country/austria [abgerufen am 29.09.2022].

Schmidt, L., Gerber, K. (2016). *A comparison of carbon market standards for REDD+ projects*. Germanwatch e.V.

Schmitz, Z., Reisinger, M. (2018). *Monitoring Report 2018: CO2 Reduction & Safe Drinking Water in Bangladesh.*

Schneider, L., La Hoz Theuer, S. (2019). Environmental integrity of international carbon market mechanisms under the Paris Agreement. *Climate Policy*, *19*(3), 386–400. doi:10.1080/14693062.2018.1521332

Shiklomanov, I. (Ed.). (1993). *World fresh water resources*. Oxford University Press. http://www.ibiologia.unam.mx/pdf/directorio/z/introduccion/world_watershed_re.pdf [abgerufen am 29.09.2022].

Ssentanda, M. E., Nakayiza, J. (2017). "Without English There Is No Future": The Case of Language Attitudes and Ideologies in Uganda. In Ebongue, A. E., Hurst, E. (Hrsg.), *Sociolinguistics in African Contexts. Perspectives and Challenges.* Cham: Springer, 107–126. doi:10.1007/978-3-319-49611-5_7

Stockholm Resilience Center. (2016). *The SDGs Wedding Cake*. https://www.stockholmresilience.org/research/research-news/2016-06-14-the-sdgs-wedding-cake.html [abgerufen am 29.09.2022].

Streck, C. (2021). How voluntary carbon markets can drive climate ambition. *Journal of Energy & Natural Resources Law*, *39*(3), 367–374. doi:10.1080/02646811.2021.1881275

Summers, S. K., Rainey, R., Kaur, M., Graham, J. P. (2015). Co2 and H2O: Understanding Different Stakeholder Perspectives on the Use of Carbon Credits to

FinanceHousehold Water Treatment Projects. *PloS One*, 10(4), e0122894. doi:10.1371/journal.pone.0122894

Tsan, M.-F., Nguyen, Y. (2019). Improving Compliance With Institutional Review Board Continuing Review Requirements. *Journal of Empirical Research on Human Research Ethics: JERHRE*, *14*(4), 365–371. doi:10.1177/1556264619837108

Turinayo, Y. K., Mudoma, J. M., Kalanzi, F., Balitta, P., Kiwuso, P., Kazigaba, D., Namuyanja V., Niyibizi, G. (2014). *Performance characterization of improved wood cooking stoves for monitoring household energy interventions in Uganda*. https://www.researchgate.net/publication/317167869 [abgerufen am 11.07.2024].

Ubomba-Jaswa, E., Fernández-Ibáñez, P., Navntoft, C., Polo-López, M. I., McGuigan, K. G. (2010). Investigating the microbial inactivation efficiency of a 25 L batch solar disinfection (SODIS) reactor enhanced with a compound parabolic collector (CPC) for household use. *Journal of Chemical Technology & Biotechnology*, 85(8), 1028–1037. doi:10.1002/jctb.2398

Uganda Ministry of Water and Environment. (2020). *Water and Environment. Sector Performance Report 2020*. https://www.mwe.go.ug/sites/default/files/library/Water%20and%20Environment%20Sector%20Performance%20Report%202020.pdf [abgerufen am 29.09.2022].

Uganda Ministry of Water and Environment. (2022). *Water Supply Atlas: District Soroti*. http://wsdb.mwe.go.ug/index.php/reports/district/44 [abgerufen am 29.09.2022].

Umweltbundesamt. (2013). *Kyoto-Protokoll*. https://www.umweltbundesamt.de/themen/klima-energie/internationale-eu-klimapolitik/kyoto-protokoll#-zweite-verpflichtungsperiode-und-zentrale-anderungen [abgerufen am 29.09.2022].

United Nations - Committee on Economic, Social and Cultural Rights. (2003). *General comment No. 15: The right to water*. https://www.refworld.org/pdfid/4538838d11.pdf [abgerufen am 29.09.2022].

United Nations - Department of Economic and Social Affairs. (o.D). *The 17 Sustainable Development Goals*. https://sdgs.un.org/goals [abgerufen am 23.08.2022].

United Nations. (o. D.). *For a livable climate: Net-zero commitments must be backed by credible action*. https://www.un.org/en/climatechange/net-zero-coalition [abgerufen am 26.08.2022].

United Nations. (2015). *The Millennium Development Goals Report 2015*. https://www.un.org/millenniumgoals/2015_MDG_Report/pdf/MDG%202015%20rev%20(July%201).pdf [abgerufen am 29.09.2022].

United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development*. https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf [abgerufen am 29.09.2022].

United Nations. (2018). *Sustainable Development Goal 6: Synthesis report on water and sanitation 2018. United Nations at a glance*. https://www.unwater.org/app/uploads/2018/12/SDG6_SynthesisReport2018_WaterandSanitation_04122018.pdf [abgerufen am 29.09.2022].

United Nations. (2019). *Communications materials: SDGs Poster*. https://www.un.org/sustainable-development/news/communications-material/ [abgerufen am 29.09.2022].
United Nations. (2020). *The Sustainable Development Goals Report 2020*. https://unstats.un.org/sdgs/report/2020/The-Sustainable-Development-Goals-Report-2020.pdf [abgerufen am 29.09.2022].
United Nations. (2022). *The Sustainable Development Goals Report 2022*. https://unstats.un.org/sdgs/report/2022/The-Sustainable-Development-Goals-Report-2022.pdf [abgerufen am 29.09.2022].
United Nations - Department of Economic and Social Affairs. (o.D.). *Sustainable Development Goals: The 17 Goals*. https://sdgs.un.org/goals#goals [abgerufen am 29.09.2022].
United Nations - Environment Programme. (2018). "When it rains, my heart sinks": Climate change takes a toll in Uganda. *United Nations Environment Programme*. https://www.unep.org/news-and-stories/story/when-it-rains-my-heart-sinks-climate-change-takes-toll-uganda [abgerufen am 29.09.2022].
United Nations Framework Convention on Climate Change. (o.D.). *The Clean Development Mechanism*. https://unfccc.int/process-and-meetings/the-kyoto-protocol/mechanisms-under-the-kyoto-protocol/the-clean-development-mechanism [abgerufen am 08.08.2022].
United Nations Framework Convention on Climate Change. (2016). *The Paris Agreement*. https://unfccc.int/sites/default/files/resource/parisagreement_publication.pdf [abgerufen am 29.09.2022].
United Nations Framework Convention on Climate Change. (2022, 21. Juli). *CDM: Fraction of non-renewable biomass (fNRB)*. https://cdm.unfccc.int/DNA/fNRB/index.html [abgerufen am 29.09.2022].
Universität für Bodenkultur Competence Centre for Climate Neutrality. (o.D.). *BOKU Climate Mitigation Projects*. https://xn--klimaneutralitt-elb.boku.ac.at/en/boku-klimaschutzprojekte/ [abgerufen am 21.07.2022].
Vaughan, A. (2022, 4. April). Global emissions must peak in just three years to stay below 1.5°C. *New Scientist*. https://www.newscientist.com/article/2314731-global-emissions-must-peak-in-just-three-years-to-stay-below-1-5c/ [abgerufen am 29.09.2022].
Water Science School. (2018). *Where is Earth's Water?* https://www.usgs.gov/specialtopics/water-science-school/science/where-earths-water [abgerufen am 29.09.2022].
Wegelin, M., Canonica, S., Alder, C., Marazuela, D., Suter, M. J.-F., Bucheli, T. D., Haefliger, O. P., Zenobi, R., McGuigan, K. G., Kelly, M. T., Ibrahim, P., Larroque, M. (2001). Does sunlight change the material and content of polyethylene terephthalate (PET) bottles? *Journal of Water Supply: Research and Technology-Aqua*, 50(3), 125–135. https://doi.org/10.2166/aqua.2001.0012
World Health Organization. (2013). *Emergency treatment of drinking-water at the point of use*. https://cdn.who.int/media/docs/default-source/wash-documents/who-tn-05-emergency-treatment-of-drinking-water-at-the-point-of-use.pdf?sfvrsn=99f943f6 [abgerufen am 29.09.2022].

World Health Organization. (2016a). *Burning opportunity: Clean household energy for health, sustainable development, and wellbeing of women and children*. https://apps.who.int/iris/handle/10665/204717 [abgerufen am 29.09.2022].
World Health Organization. (2016b). *Results of Round 1 of the WHO International Scheme to Evaluate Household Water Treatment Technologies*. https://www.who.int/publications/i/item/9789241509947 [abgerufen am 11.07.2022].
World Bank. (2019). *Ugandan Government Steps Up Efforts to Mitigate and Adapt to Climate Change*. https://www.worldbank.org/en/news/feature/2019/05/31/ugandan-government-steps-up-efforts-to-mitigate-and-adapt-to-climate-change [abgerufen am 29.09.2022].
Wornig, A. (2021). *WASH improvement for Soroti: Exploring the role of the project "Clean Air and Safe Drinking Water for Soroti" in achieving SDGs – in the case of SODIS with Wadi*. Medizinische Universität Wien: Wien.
Zetterberg, L., Johnsson, F., Larsson, H. (2021). *Accelerating the Climate Transition: Key Messages from Mistra Carbon Exit*. https://www.ivl.se/download/18.bd623ec17df7e3707b31e4/1641044446755/MistraCarbonExit_Messages_23no [abgerufen am 29.09.2022].

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