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EMPOWERING MARGINS: FROM CLIMATE CHANGE POLITICS AND TECHNOLOGIES OF AGGREGATE STATES TO PLACE BASED HUMAN CONTRIBUTIONS

ENFRENTANDO AS MUDANÇAS CLIMÁTICAS NAS MARGENS – UMA EXPLORAÇÃO ETNOGRÁFICA DE ESTRATÉGIAS DE RESILIÊNCIA LOCAIS

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Abstract: As conventional mitigation efforts seem insufficient to achieve the goals set by the Paris Agreement, the use of alternative pathways seems inevitable. This paper argues for an empowerment of the conceptual and spatial margins of climate change. This means pluralizing ontologies of climate change, securing and developing existing low-emission practices and recognizing and promoting place-based adaptation strategies. Placing the human and cultural contributions and resilience strategies of the low-emitting half of humanity at the conceptual center of climate action provides an essential and necessary complement to established climate change policies and promises to secure and promote biocultural diversity and low-emitting ways of life.

Keywords: Climate change ontology; mitigation politics; carbon inequality; human and cultural contributions; conceptual and spatial margins.

Resumo: Como os esforços convencionais de mitigação parecem insuficientes para atingir os objectivos estabelecidos pelo Acordo de Paris, o recurso a vias alternativas parece inevitável. Este documento advoga a capacitação das margens conceptuais e espaciais das alterações climáticas. Isto significa pluralizar as ontologias das alterações climáticas, garantir e desenvolver práticas existentes de baixas emissões e reconhecer e promover estratégias de adaptação baseadas no lugar. Colocar os contributos humanos e culturais e as estratégias de resiliência da metade da humanidade com baixas emissões no centro conceitual da ação climática constitui um complemento essencial e necessário às políticas estabelecidas em matéria de alterações climáticas e promete assegurar e promover a diversidade biocultural e os modos de vida com baixas emissões.

Palavras-chave: ontologia das alterações climáticas; políticas de mitigação; desigualdade de carbono; contributos humanos e culturais; margens conceituais e espaciais.

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REFRAMING PERSPECTIVES: PLURALISING ONTOLOGIES OF CLIMATE AND SUSTAINABILITY

This paper brings together several lines of thought and experience from the NISANSA[2] subproject "Local Climate Initiatives between Regional Conditions, National Policies and Global Programmes".[3] It is based on the assumption that global climate policy follows very specific ontological principles, supported by a complex epistemological scientific apparatus that provides data, produces evidence, develops models and drives the search for technological solutions. International climate policy is built on these principles, and it is this constellation that lies at the heart of the most common and internationally accepted perceptions of climate change and the resulting mitigation and adaptation efforts at different scales.

Mitigation under these conditions most commonly takes the form of reducing fossil CO_2 emissions, but it can also make large-scale geoengineering projects for capturing and sequestering atmospheric carbon sound plausible or even promote science fiction-like geoengineering radiative forcing to alter the Earth's radiative energy budget and stabilise or reduce global temperatures.[4] What seems less obvious, however, is that dominant climate change and sustainability paradigms render alternative perceptions and practices for addressing climate change invisible and marginal. Since conventional mitigation efforts appear not to be sufficient to achieve the goals set by the Paris Agreement, the use of alternative pathways seems inevitable. This paper argues that such alternative pathways must go beyond the established paradigms of techno-scientific solutions and suggests taking the plural ontologies of climate and climate change into account[5], acting to secure and develop existing low-emission practices and adaptation strategies, and applying holistic and place-based notions of sustainable practices.

[2] www.nisansa.org

[3] I would like to thank Michaela Meurer for her comments and discussions of earlier drafts. Early versions of these arguments were presented at the Forum: Social Impacts of Climate Change in the Global South at the Universidad de Santa Marta, Colombia/Foro: impactos sociales del cambio climático en el sur global at the Universidad de Santa Marta, Colombia (27.2.-1.3. 2023) and at the workshop Territories of traditional communities in the face of climate change: debates and situations/Território de comunidades tradicionais face às mudanças climáticas: debates e situacionalidades at the Universidade Federal do Para, Belém (22-23.3.2023).

[4] See Fawzy et. al. (2020). German and international media (The Guardian 2023, Der Spiegel 2023) reports in February 2023 about an enormous US research campaign on this and the idea of a research group that wants to send moon dust into space with huge cannons to minimise solar radiation on Earth (Bromley et. al. 2023). Factories that resublimate carbon from the atmosphere, i.e. turn it back into solid coal, already exist. No information has been found in the business magazines that euphorically report on this on the extent to which their energy input could be even remotely sustainable (Boudreau 2023).

[5] See for example Goldman et. al. (2018)

It is argued that the reduction in CO_2 emissions needs to be complemented by the potentials, experiences and alternatives from the margins that are constituted by most of the human population. As we have argued in another context (Naucke & Halbmayer 2024), margins can be understood as both conceptual and socio-spatial sites. Being on the margin is not an essential condition, but a relation that results from socio-cultural and power-political processes of marginalisation "in which people are marginalized as their perspectives are cast to the side or excluded" (Tsing 1994: 5). However, a margin is neither a binary nor a discrete, sharply differentiated opposition, but comprises closely intertwined relationships that run correlatively through the marginalised and the marginalising.

This means that margins can also become sites with the creative and emancipatory potential to enact change and transformation – and, in our case, provide alternative concepts and practices for dealing with climate change. Margins emerge as conceptual and socio-spatial sites where onto-epistemological alternatives to scientific notions of climate change are enacted, and where people who produce barely any emissions are not only significantly affected, but their resilience strategies are silenced, invisibilised and not recognised as adaptive efforts (see also Meurer *et al*., this volume). These human and cultural contributions to avoiding emissions, enhancing biodiversity and coping with the consequences of climate change remain largely invisible.

Such margins will bring to light local resilience strategies and may initiate a reordering of hierarchies and power relations between scientific and policy experts and local contextual practices, experiences and knowledge. For such a reordering, it will be necessary to recognise alternatives to neoliberal economic programmes and the associated commodification of nature, and push for policies that complement and diversify dominant approaches by providing space, support and recognition for initiatives that maintain, expand and develop existing sustainable, low-emitting and biodiverse ways of life.

The argument developed here is related to one of the initial hypotheses of the NISANSA project. We argued that climate change and its consequences are creating new spaces beyond the nation state in which climate-related social change processes are understood and shaped in a context-specific manner.[6] The knowledge generated in these processes should be used to develop new theoretical and practical approaches. The question about these new spaces that we posed at the beginning of the project has much broader implications than was originally assumed, and it is argued

[6] See also Ahrens & Halbmayer (2023).

here that the dominant discourses and politics of climate change create their own socio-spatial and conceptual margins.

This paper claims that sustainable ways of dealing with the consequences of climate change need to take alternatives to the dominant image of global climate change into account. It therefore highlights the selectivity of the dominant climate discourse, and the importance of socio-spatial initiatives that expand the dominant frames, ontologies and epistemologies in which climate change is conceived. It is a call to value and support sustainable, low-emitting ways of life and everyday forms of resilience with regard to the consequences of climate change.

Such context-based and place-based initiatives and practices are located within multiple translocal relations, one of which is climate change itself. Their experiences and practices are embedded in historically shaped, culturally specific environmental and biophysical settings, and in political, economic and social contexts, relationships and hierarchies. As these contexts change, strategies must be developed that provide responses that take these changes into account. Contextual practices are likely to involve ontological principles and epistemic procedures that remain outside the scientifically and politically recognised modes of attention and are consequently silenced and marginalised. This is particularly evident with respect to the knowledge, practices and perceptions of local populations from the margins. To rephrase a now common wisdom, those who contribute less to the climate crisis, for example in southern Africa or northern South America[7], are often the most affected, while their efforts, experiences and knowledge in dealing with such situations are less recognised. Perceived as vulnerable populations who lack resilience, their perceptions and actions remain largely unseen and their resilience strategies not recognised as such.

In this chapter I will first present specific ontological principles of the scientific understanding of climate change. Then I will introduce carbon inequality, and present conceptual and socio-spatial alternatives from the margins as well as the threats they are facing, including green extractivism. Finally I will argue for a holistic notion of sustainability based on diversity, the empowerment of the margins, and the recognition of human and cultural contributions to biodiversity and low-emitting forms of life.

"PLANETARY" CLIMATE CHANGE AND THE POLITICS OF AGGREGATE STATES

[7] These were the two regions on which the NISANSA project focused.

One of the paradoxes of climate change is that it is simultaneously a global or planetary phenomenon, while its causes and consequences are specifically localised. In the dominant ontology, climate change is caused by anthropogenic physico-chemical processes that alter the atmosphere and, consequently, the hydrosphere, lithosphere and biosphere. Thus, human activities are transforming the biosphere, and the resulting environmental changes are affecting societies and human life.

The dominant concept of climate change can be characterised by three key elements. First, the scientific understanding of meteorological climate and climate change is highly abstract, suspending direct perception. Second, it is a deeply naturalistic understanding that, third, is caused by the industrialised economy, and the solutions promoted are embedded in the current logic of the liberal economy and politics.

To understand transnational climate politics, it is necessary to consider that the underlying concept of climate does not refer to a local or regional climate, but to the climate of planet Earth as a whole. An early definition by the IPCC (Intergovernmental Panel on Climate Change), which, as its name suggests, is a "strange hybrid" of science and politics,[8] characterises climate as the "average weather state" or, more precisely, "a statistical description of the weather in terms of mean values and variability of the quantity of interest over periods of several decades (typically three decades, as defined by the WMO[9]). These quantities are almost always surface variables (e.g. temperature, precipitation, or wind), although 'climate' in a broader sense is a description of the state of the climate system" (IPCC 1995: 4).

Climate is thus, by definition, a highly abstract mathematical synthesis that suspends the universe of direct experience. It is removed from immediate human perception and only finds its expression by bypassing the concrete place and time; as such, it is non-terrestrial and out-of-this-world, in the words of Latour (2020). This kind of climate knowledge is decontextualised and objectified[10] and as such hides its own geopolitics of power and resulting hierarchies in historical, ontological and epistemological terms.[11] Climate, despite its intensive quantitative research, is based on parameters that are measurements of subordinate elements, such as precipitation, air pressure,

[8] The IPCC summarises and frames scientific findings, defines the state of the world's climate and its most likely consequences, while its statements are quoted and adopted by scientists (see e.g. Kappas 2009: 3).
[9] World Meteorological Organization
[10] Therefore something quite different from the concrete localised and contextualised consequences that may be perceived.
[11] Thus the coloniality of climate is only slowly being recognised (Bhambra & Newell 2023; Mahony & Endfield 2018, Upadhyay 2016).

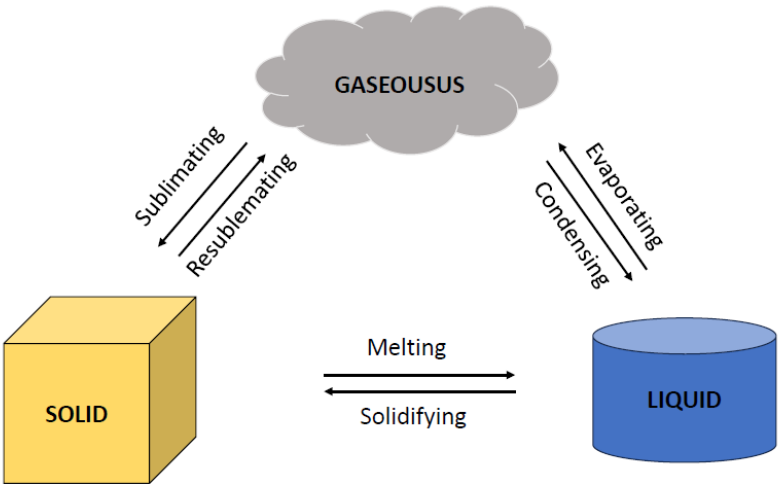
wind speed, temperature or humidity. It therefore has the character of a "synthesis"; it is an indicator that represents the world climate (Rossbach de Olmos & Halbmayer 2014).

Scientific climate change is a naturalistic concept based on the metamorphosis of carbon and its equivalents between different states of aggregation. The underlying physico-chemical processes are based on the emission of greenhouse gases such as CO_2, methane (livestock, energy sector) and N_2O (from nitrogenous fertilisers in agriculture and animal husbandry, the chemical industry and combustion processes). CO_2 emissions are caused by our ability to "turn rocks into air" (DALBY 2022: 62), the metamorphosis of fossil (oil and coal) and non-fossil (land use and deforestation[12]) carbon in its solid or liquid form into carbon dioxide. The focus is therefore on processes of sublimation, i.e. the transformation of solids into gases, or evaporation, i.e. the transformation of liquids into gases, and thus the transition of carbon between different aggregate states.

At the same time, these physico-chemical processes undermine the distinction between natural and socio-cultural processes. As Latour points out, climate change is "Gaia's revenge"[13] on the modern view in which "nature" is deprived of its agency or "incapacitated", reduced to the status of an object that can be manipulated by the human subject or culture. However, it remains a naturalistic nature based on the unity of physical processes.[14] In other words, even in Western ecocosmology and natural sciences, the physical natural space of the biosphere is no longer given, but socially co-produced, and thus no longer a stable framework within which social relations develop. In this new climate regime, as Latour calls it, the framework has become unstable. "It's as if the set has come on stage to share the drama with the actors. (…) the political order now includes everything that previously belonged to nature – a figure that becomes an increasingly indecipherable enigma in a continuing backlash effect" (Latour, 2017: 3). Nevertheless, it is this transformation between aggregate states, of solid or liquid carbon into gas, that is to be reduced or mitigated by political measures to limit global warming.

[12] See for example Winkler et. al. (2021), Prestele et.al. (2017), Stone (2009).
[13] He is referring to the Gaia thesis of James Lovelock and Lynn Margulies, which states that the atmosphere and surface of planet Earth behave like a system in which life, its characteristic component, is responsible for the self-regulation of its essential conditions such as temperature, chemical composition and salinity in the case of the oceans.
[14] See Descola (2013) for the distinction between Naturalism, Animism, Totemism and Analogism as specific ontological schemes.

Fig. 1- Aggregate states of matter



The acceleration of this transformation comes from an industrialised economy oriented towards economic growth, while mitigation and adaptation policies are paradoxically implemented within this logic and within established global hierarchies, which are thereby perpetuated (O'lear 2016). The carbon-fuelled industrial revolution promoted the spread of industrial practices, and the addition of petroleum to coal led to greater technological possibilities and immense population growth, as well as accelerating the speed and reach of globalisation and energy use. Nearly half of all emissions since the industrial revolution have occurred since 1990. Thus, the human impact on the planet has increased enormously, a situation now variously referred to as the Anthropocene (Crutzen 2002), Plantationocene, Econocene (Norgaard 2013), Capitalocene (Malm & Hornborg, 2014, Moore 2016), Technocene (Hornborg 2015) and Chthulucene (Haraway 2015, 2016).

Strategies to combat climate change and its consequences barely aim to replace dominant economic principles, but still assume the inevitability of continued economic growth as the solution to these societal problems. In contrast to earlier versions of economic growth, which we have learned are unsustainable, the focus is now on "sustainable development", originally promoted by the Brundtland Report.[15] However, the assumption of growth and the development models that are based on it remain intact. Sustainable development is, among other things, about using technology and investment to find a way out of the consequences of climate change. The reduction of CO_2 emissions

[15] World Commission on Environment and Development (1987).

in the context of a market-based green economy and within the framework of given transnational policies has not paved the way for a non-anthropocentric politics of nature, solidarity-based forms of economic activity or the pluralisation of ontologies and epistemologies, but instead triggered the economisation of nature. CO_2 emissions have been priced, a global market for emissions trading has been created – with limited success so far – and ecosystem services are being given a market value.

Binding new developments are planned. This should lead to more emission-reducing forms of economic activity or, alternatively, to investments in carbon sinks or global forest conservation and reforestation programmes such as the REDD+ programme[16], primarily outside the Global North and in many cases having strong impacts on local or indigenous territories, rights and forms of self-determination. For example, when water-intensive foreign tree monocultures are planted in arid areas as "reforestation" programmes, rationalised, simplified and impoverished ecologies are established that may sequester CO_2, but are highly questionable in terms of local ecological, economic and social sustainability and biodiversity.

In many cases, emissions have not been banned or avoided, but substitutes have been created. Germany is phasing out coal and ending lignite mining, while coal imports from Colombia have increased sixfold. As Henrietta Moore argues: "The rhetoric of commitment to sustainability is underpinned by ideas of environmental security and safeguarding which in turn support the aspiration for continued economic growth. Sustainability thus marks not a commitment to change but a desire for continuity in ways of being and doing" (2017: 69).

SPACES OF CARBON INEQUALITY: A PROBLEM CAUSED BY A MINORITY THAT IMPACTS THE WORLD

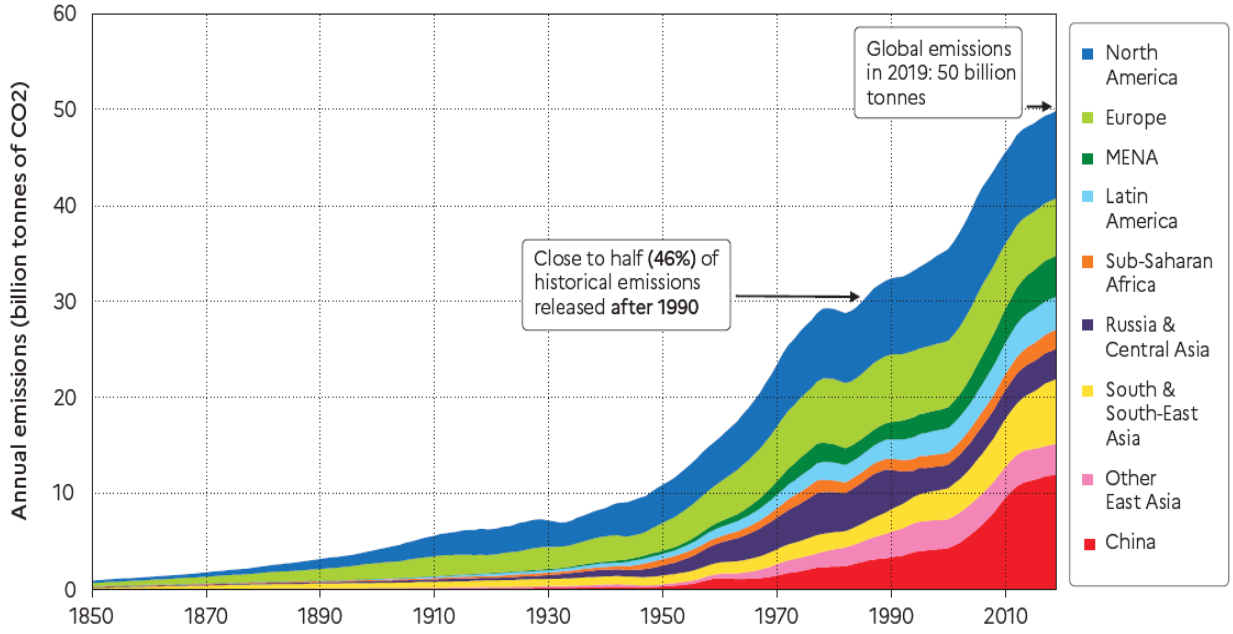
Within the margins of dominant economic and social paradigms, heterodox theoretical frameworks and practices are continuously being developed and refined, but their influence on mainstream policy remains minimal. These margins are not only conceptual, but also socio-spatial in terms of unequal CO_2 emissions. The question is who the main drivers of climate change are. The answer is that it is a minority that contributes in an extraordinary way, while the bottom 50 % of the world's population emits just 12 % of global emissions, an average of 1.6 tonnes of CO_2 per person per year.[17] If we look at the emissions of individuals related to private consumption, public and

[16] For evaluations of the REDD+ Programme, see for example Milne et al. (2019).
[17] The data on carbon inequality are taken from Chancel et al. (2022), Chapter 6. On the issue of carbon inequality, see also Kenner (2019) and Hubacek et al. (2017).

private investment, and the import and export of carbon embedded in goods and services traded with the rest of the world, the super-rich 1 % emit 110 tonnes of CO_2 per person per year and are responsible for 16 % of global carbon emissions. The richest 1 % emit the same amount of CO_2 as the poorest two thirds of humanity (five billion people). Furthermore, the top 10 %, emitting 31 tonnes of CO_2 per person per year, are responsible for almost half (47.6 %) of global carbon emissions, while half the world's population barely contributes to global emissions at all. Thus, in addition to the large differences between countries, inequalities within countries in terms of people's emissions have become increasingly important.

The low-emitting bottom half of humanity lives mainly in sub-Saharan Africa, India and the rest of Asia[18], but also in China, Latin America and the MENA region, even though these latter countries have a substantial number of high emitters. In contrast, in Europe, the United States, Russia and Central Asia, although there are still large gaps between rich and poor, most of the population tends to be in the top half. While historically the US and Europe were responsible for most of the emissions, today the largest emitting countries are the US and China. In the past 40 to 50 years, emissions have grown in particular in China, South and Southeast Asia, and Latin America. Emissions are growing fastest in the bottom 50 % and top 10 % of humanity.

Fig. 2 - Global annual CO_2 emissons by world region, 1850-2019

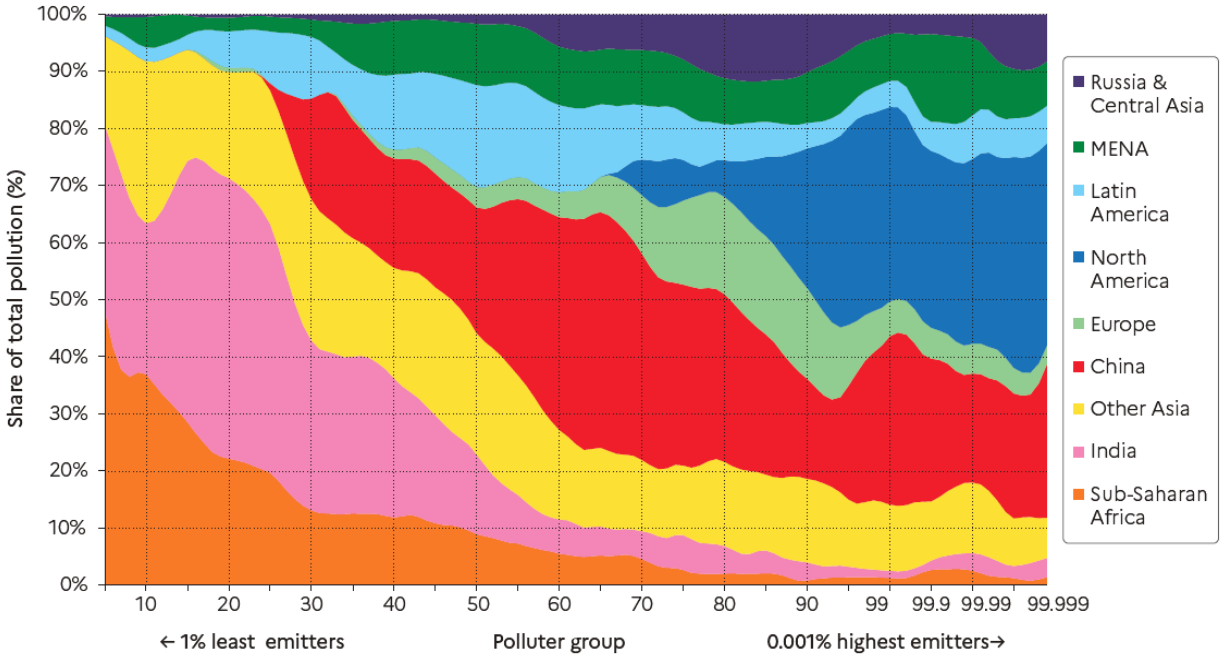


(from Chancel et.al. 2020:116).

[18] In other words, excluding India, China, Russia and Central Asia.

The global orientation towards Western development concepts and economic practices means that more and more of humanity is being driven into high-emitting forms of life. Policies aimed at transforming unsustainable lifestyles, especially but not exclusively among the top 10 %, are therefore absolutely necessary. However, such strategies will not be sufficient if more and more of the population turns to high-emitting lifestyles, and if global mitigation strategies create new dangers, especially for the low-emitting groups in the margins. It will be necessary to promote existing sustainable lifestyles and economic practices at the same time. They will need to be positively recognised, empowered and provided with rights that will allow them to maintain and develop their ways of life in a sustainable manner. This means preventing their increasing displacement and slide into unsustainable lifestyles. It concerns reassessing the performance and contribution of sustainable forms of living and economic activity to combat climate change and for the future of the planet, and rewarding both existing and new human and cultural contributions[19] to a small ecological footprint and low emissions.

Fig. 3 - Geographical composition of global emitter groups, 2019



(from Chancel et.al. 2020:127).

[19] With regard to biodiversity, see e.g. Levis et al. 2024.

Therefore the resilience strategies and resourcefulness of marginalised populations should be valued, different understandings of development should be generated, and alternative futures and forms of good life should be imagined. Sustainability framed in highly selective terms of emissions or economic growth will need to be reframed in holistic terms – beyond sustainable development within the current paradigms of liberal economy – and the resulting visions of changing unsustainable forms of economy and life will become pluralised. We will need to envision sustainable practices holistically, highlighting the human and cultural contribution in terms of local and indigenous knowledge and life practices. Low-emission margins, still largely silenced and invisible today, will need to be understood as conceptual and socio-spatial sites where resilience strategies are developed, refined and applied, providing a pool of innovative human contributions and locally adapted solutions to address climate change.

CONCEPTUAL AND SOCIO-SPATIAL ALTERNATIVES FROM THE MARGINS

Local and indigenous concepts of climate and practices of resilience to the impacts of climate change are multiple and diverse because they are embedded in specific local ecological and socio-cultural conditions. Such resilience practices are more than functional and specific technical adaptation measures; they are integrative models of resilience, locally adapted, multifunctional in their need to address local social and ecological complexities, and with their own limits (see Meurer *et al*., this issue).

The forms of resilience developed by these low-carbon groups address climate change and its consequences, but are not exclusively specific to this phenomenon. Climate change impacts are usually only one dimension of resilience strategies, which may include struggles for land and political rights, food autonomy and social security in areas where living conditions are characterised by conflict, multiple insecurities and power hierarchies. In addition, such place-based initiatives apply innovative strategies based on empirical experiences that can be consolidated across generations to continue local ways of life and provide forms of good living in the face of multiple challenges, including the consequences of climate change. Place here is not so much a “natural locus” because it is constituted through historically grown and embodied practices with specific landscapes and is

therefore a processual concept (Blaser 2004:29, Halbmayer 2018[2012]).[20] In doing so, they develop local technical practices in everyday life, establish specific forms of knowledge acquisition and exchange, organise themselves in new ways, and pool their efforts through communal strategies and strategic alliances beyond local settings. In these processes, they selectively adapt new practices (see Meurer *et. al*., this issue).

By adjusting to local complexities, these strategies differ from transnational climate policies, which are based on abstract concepts and apply highly selective, functionally specific measures that often cut across local complexities and thus tend to have unintended and harmful consequences. Place-based resilience strategies seek answers in the light of local complexities and available opportunities, and are not necessarily based on specific metamorphic carbon cycles or the naturalistic dichotomy between nature and culture. To emphasise that distinction, they are not development projects, but "life projects" (Blaser *et al*. 2004) that sustain and express their own visions of a "good life".[21]

There, the concrete local extent and sequence of climatic elements, such as rain, solar radiation, wind, storms and temperature, become important. "Climate change" manifests itself primarily through place-based or territorialised perceptions of changing and extraordinary occurrences of climate elements, such as temperature, rain, wind, drought etc., and the consequences of these. Attributions of the causes and drivers of such changes generally go beyond global emissions of greenhouse gases and land-use changes. Nevertheless, they are usually also anthropocentric and make specific attributions to human causes, generally based on the perception of meteorological, astronomical, biological, physical-geographical etc. indicators (Ulloa 2019: 81.) that become morally evaluated in contextual relations that affect community life and local practices, and often include self-blame (e.g. Rudiak-Gould 2014, Schnegg *et. al* 2021).

Such conceptions may include non-human entities such as animal masters (Fernández-Llamazares & Virtanen 2020), personified notions of stars, wind and lightning (Rosengren 2019, Rosengren *et al*. 2023) or, among others, Christian notions of God (Schnegg 2021). Climate is, as Ulloa argues, "often not a category, or something 'natural', but is the result of relations between

[20] Different histories and practices related to same natural locus may lead to ontological conflicts. Blaser defines place-based collectives as heterogenous assemblages (2019: 84) and a network of (human and non-human) persons entangled by social bonds and interdependent in their existence.

[21] For discussions in the context of climate change mitigation of "human wellbeing" and "demand -side solutions" see f.e. Lamb and Steinberger (2017) and Creutzig et al. (2022).

humans and non-humans" (2019: 79), while also coming from the moral evaluation of relations among humans and their effects on weather, health and disease or agriculture.

Among the Yukpa, an indigenous group living in the northern border region between Venezuela and Colombia and with whom I work, elements of weather are personalised, such as the *witcho* sun, *kuno* moon and *shiku* stars, thunderstorms, *dümonra*, which is thought to be a giant wasps nest, or *shoro*, the wind. Different types of rain are associated with different qualities, seasons and constellations. Once when it started to rain softly as the sun was shining, I referred to this rain as *kiopo*, the common word for rain. Ignacio, a local friend, corrected me by saying: "That's not rain; that's *witch shuta*, the emiction of sun." However, in the context of fishing expeditions that take place towards the end of the dry season, rain can be described as fish tears in the sky (Halbmayer, 2018). If it begins to rain during the nightly grinding and preparation of the roots for the barbasco, it is considered a joyful and good sign, and is commented upon as the fish in the sky crying for imminent death. This idea expresses conceptions of space and a hydro-cosmological cycle that are obviously very different from the naturalistic hydrological cycle. The Yukpa assume the existence of several stratified, coexisting and interconnected worlds, which manifest themselves in the visible world in the landscape or in significant changes in the natural environment. In this logic, there is a constant possibility of mutual influence between these worlds. Rivers and lakes exist not only in this world, but also in heaven, and this celestial water is connected throughout the firmament across the horizon with the rivers and lakes of this world. It is the fish of these heavenly rivers that weep at the impending death of the fish of the earth, heralded by the crushing of the root of the bearded fish, and their tears falling to the earth in the form of rain.

What is remarkable is that in this example, human activity, the crushing of the mullet, produces the rain. This logic is even more pronounced when the rainy season does not arrive, as was the case in 2016. Then, the Yukpa performed a ritual, made maize buns and danced for Osema, a mythical and now deified figure who introduced maize and agriculture to the Yukpa. They honoured Osema by processing maize, performing dances, praying and singing, as were demanded by him in original times and are explained in contemporary myths (Goletz 2023). These ritual interventions and the reactivation of the relationship with Osema through the dances activate "his gratifying potential that materializes in the rain" (ibid.). Thus, the ritual relationship with the deified figure indirectly produces rain. More direct interventions, such as ritual blowing, may be used to expel rain. Therefore the Yukpa's understanding of rain is contextual, and different logics and ritual practices may be used to produce or scare away rain. What to a naturalistic mind may appear a set of strange beliefs is in

reality an experience-based science of the concrete, with established connections between seasonal changes, and meteorological, astronomical and biological observations in flora and fauna, and is inscribed in practices that relate to the landscape, myth and local economic practices.

Thus, climatic elements can be personalised, interconnected and intertwined with conceptions of space and time, inscribed in the landscape and territory, related to behaviours, values and norms, and part of social relations that include more than just the living Yukpa (owners, spirits, original beings, the dead who can manifest in fog and small whirlwinds etc.). These relationships involve respect, forms of reciprocity, exchange, negotiations, contextualised relationality, and community-based governance to ensure agricultural success, quality of life and health through communal recognition and reverence of certain non-humans as life-givers.

Embedded in such historically and ontologically specific experience-based terrestrial relations, climate elements and their change are not only perceived in specific ways, but the naturalistic notion of climate change is also received locally (Rudiak-Gould 2011, de Witt & Haines 2022). It is also included and localised in specific ecological conditions, experience-based knowledge and its ontological foundations, as well as in the prevailing political situation and power hierarchies. This is part of the downscaling of hegemonic scientific climate knowledge, the sharing and transfer of climate knowledge through the media, NGOs and government agencies, as well as specific climate education and climate literacy efforts. Such initiatives are often based on the false assumption of local populations' "lack of knowledge, understanding and resilience". The results of such localisations of climate change seem to lead most often to hybridisation, which Rossbach de Olmos calls climate syncretism (Rossbach de Olmos 2011), while a pluralism of different concepts or processes of domination/resistance are reported less frequently (Schnegg *et al*. 2021).

However, the difficulties of upscaling local climate knowledge and practices, often perceived as mere beliefs in dominant multicultural regimes of recognition, are less explored, and generally only recognised within the limits of dominant naturalistic ontologies and the given ontological hierarchies. Within the global debates on climate change in COP, proposals based on local and indigenous knowledge and practices of onto-epistemologies, even when considered desirable[22], are upscaled and incorporated into hegemonic versions of climate change, especially when groups are officially recognised and endowed with specific rights, as is the case with indigenous groups or small islands that are internationally recognised states. These are conditions enjoyed by only a small proportion of the 50 % of humanity that contributes little to global emissions.

[22] See, for example, the IPCC's attempts to open up to indigenous knowledge.

FROM CLASSICAL TO GREEN EXTRACTIVISM

Local and indigenous communities are confronted not only with the consequences of climate change, but also with the expansion of the agro-industrial frontier, extractivism and, more recently, the top-down implementation of sustainable innovations (see also Meurer *et al*., this issue). The Wayuu in north-western Colombia offer an exemplary case. A total of about 700,000 people live in the semi-arid Guajira peninsula, but also in the cities of Maracaibo and Riohacha, in northern Venezuela and Colombia, and traditionally practise small-scale agriculture, raise livestock (goats, cattle) and fish. There are twenty-three matrilineal clans in this Arawakan-speaking group associated with distinct territories that have managed to live in partial autonomy, although they have been in contact and changing since the early days of European expansion into the Caribbean and the northern coast of South America. In recent decades, their territory has been particularly affected by the opencast mining of coal, accompanied by the dispossession of territories and displacement of villages. El Cerrejón, located in their traditional territory, is the largest open-pit mine in Latin America. In a region where water is a key resource, Cerrejón consumes more than 16 million litres of water daily – in a desert region suffering from drought – and coal dust pollution and the alteration of indigenous rights have contributed to the degradation of the environment and the Wayuu way of life.

In fact, today the Wayuu territory plays a central role in providing green energy in the form of wind farms and planned hubs for the production and shipping of green hydrogen. What appears a sustainable and smart energy innovation from the perspective of the politics and technologies of the aggregate states of carbon dioxide is a new form of green extractivism and colonialism for place-based, in this case indigenous, communities.

On the website of the German Ministry of Science it states:

> Green hydrogen is the crude oil of tomorrow. The flexible energy carrier is indispensable for the energy transition and opens up new markets for German companies. With the National Hydrogen Strategy, we are making Germany a global pioneer. (...) Germany will continue to be dependent on energy imports in the future. But we want to end our dependence on suppliers of fossil fuels – natural gas, oil and coal. Hydrogen makes it possible to import green energy from sunny and windy regions of the world. At the same time, we can diversify our energy imports. Green hydrogen is produced (...) climate-neutrally from renewable electricity. We can thus store and transport the energy from the sun and wind with a versatile energy carrier. (...) In line with the motto "Shipping the sunshine", green hydrogen can be produced in regions with plenty of wind, sun and water and exported from there to meet the world's energy needs (BMBF 2023).

Reading the announcement of Germany's new national hydrogen initiative, the roles seem clearly divided. Germany is the global pioneer. The new gold from a historical perspective, the new sugar cane, the new rubber, the new soybeans are the sun, the wind and the water that will satisfy the world's energy needs. That this energy production requires a new transformation and appropriation of the land, that this land is not *Tierra Baldia*, and what the consequences are for those who are part of the 50 % of humanity who do not contribute to climate change and their life projects, remains out of sight.

When we talk about solar and wind parks, we are not talking about parks that are designed according to the rules of garden design, about large green spaces used for beautification and recreation. Solar and wind parks are spaces removed from direct human and collective use, from local subsistence and ecology. They are not parks, but new geopolitically relevant forms of plantation to harvest and export wind and sun, allowing unsustainable lifestyles and overconsumption to continue and become carbon neutral.

There are 57 proposals for wind farms in Guajira (three under construction), implemented in a top-down logic by national and international consortia, accompanied by green marketing strategies. As Ulloa (2023) shows, these make dispossession invisible and legitimate, hiding new global commodity chains and delegitimising indigenous demands. It is the creation of new extractive zones (Ulloa 2023) that shows the power relations involved and how overlapping global and national interests override local demands and indigenous rights. In the case of the Wayuu, their right to "free, prior and informed consent" was suspended, the legal enshrinement of indigenous territories as inalienable, indefeasible and unseizable was revoked, indigenous epistemologies and ontologies were ignored, and wind farms became a national priority for action, enshrined in the Energy Transition Law (2021) and the National Development Plan.

In July 2021, the new Energy Transition Law No. 2099 established the legal basis for hydrogen production in the country. This will allow companies that produce hydrogen to benefit in future from tax advantages. Siemens, Porsche and Daimler have already expressed interest in developing hydrogen projects in Colombia, and the managing director of Siemens Energy in Colombia has spoken of "creating a hub in La Guajira for production and export, for example to Germany and other target countries" (SIEPEN 2021). Colombia could become a great partner for Germany and a regional market leader in the hydrogen segment. In March 2024, Colombia and Germany set up a High-Level Green Hydrogen Group Steering Committee to promote clean energies (Ministerio de Minas y Energía 2024).

In the case of Brazil and the Amazon, with its abundance of rivers, we should not overlook the fact that green hydrogen can also be produced from hydropower and used nationally and internationally. There are impressive recent examples, such as the Belo Monte dam, of what it means both ecologically, in terms of biodiversity and the Amazon's capacity to sequester carbon dioxide, and socially, in terms of building these hydroelectric dams in the Amazon, for the Riberinhos, indigenous peoples and other local people with sustainable lifestyles. As mentioned above, a policy aimed at transforming unsustainable lifestyles is necessary, but not adequate if it does not re-evaluate, secure and give a future to existing sustainable lifestyles and economies, and creates new dangers and threats to the latter.

The planned phase-out of fossil energy, as envisaged in the EU Green Deal 2050, is on the way to constituting a new energy geopolitics (Leonhard *et al*. 2021). The Green Deal will affect geopolitics through its impact on world markets and on coal-, oil- and gas-producing countries. At least some of these changes are likely to have a negative impact on exporting countries. At the same time, the transition to green energy, especially the production of green hydrogen, will have far-reaching consequences in the countries from where this energy is exported. In what sense will a just transition be possible, or will the new energy geopolitics establish new forms of colonialism and land grabbing by the green industry (Fairhead *et al*. 2012), as is already happening today among the Wayuu?

SUSTAINABILITY STRATEGIES, VIOLENCE AND EMPOWERMENT AT THE MARGINS

If we acknowledge the fact that "the world" is living beyond its means, and that 50 % of the human population is not part of this world of overconsumption, we see that the problem is extremely concentrated in the top 10 % of humanity, while the bottom half of humanity is not only low-emitting, but harbours the most developed examples of biocultural diversity. While we will still have to fight extreme poverty, there is an urgent need to move back within planetary boundaries and limit overconsumption, emissions beyond the available CO_2 budget and the impoverishment of the planet's surface through land-use change and deforestation. Rather than promoting substitutes for sustainable practices and allowing unlimited use of resources and production while at the same time creating programmes of absolute protection that have huge consequences for local populations who follow

comparatively sustainable ways of life, we will have to develop and diversify the relationships between humans and their changing environment.

Dominant sustainability strategies – as the energy transition or green deal have indicated – often create new forms of marginalisation, reproduce inequalities, entail strategies of domination, and drive populations into increasingly unsustainable practices by affecting their subsistence base, their forms of social organisation and their relationships with the environment. Sustainability therefore needs to be understood holistically and oriented towards sustainable practices and the creation and maintenance of diversity (Brightman & Lewis 2017), rather than focusing almost exclusively on technological adaptations and a notion of sustainability framed in terms of current economic and political priorities. The only progress possible, if we want forms of good life to progress, is to create and maintain the capacity for communal multi-species existence.

This implies the creation and systematic expansion of zones of cultural *and* biological diversity as alternatives to dominant extractive and agroindustrial modes of production, not only in remote areas, but in cities as well. This may be achieved through the development of place-based agricultural practices and forms of energy production; through alternative forms of economy and cooperation (including commoning, exchange and sharing); through the transfer and combination of knowledge and experience from the margins to develop new strategies of resilience, human niches and micro-adaptations; and last, but not least, through the promotion of human and cultural contributions that create more holistic practices that address both ecological and cultural aspects. Such solutions emphasise the linkages between biodiversity and cultural diversity already highlighted by UNESCO/UNEP (2002) and recognise the interconnections and interdependencies between biodiversity and diverse local communities.

Thus, regardless of whether one understands current sustainability discourses as having morphed into co-opted marketing strategies, sustainability strategies driven by global politics and technologies of aggregate states pursue different strategies and ultimately different goals than contextual and experience-based sustainable low-emission practices and relations. The former tend to evolve around the lowest common denominator between neoliberal economics, ecological needs and existing power relations, often applying strategies and policies that lead to simplified and economically rationalised ecologies.

The latter build on and develop socially and bioculturally highly diverse conditions and tend to cultivate a significant potential for cultural, economic, political and ecological plurality. Such responses and life projects offer a potential that, at its best, not only preserves biocultural and

ontological diversity, but also creates multi-species living arrangements and enhances human and biological diversity (Brondízio *et al* 2021, Levis *et al*. 2024). As such, they do not simply provide technological solutions, but innovatively develop relationships between humans and their changing environments. As Henrietta Moore argues: "The issue is not about technological fixes, which as history has amply demonstrated often result in failure and always have unintended consequences, but about the future relation of humans to their environments" (2017: 78).

In order to support liveable futures, approaches drawing on a diversity of world conceptions, knowledges and practices are required (Brightman and Lewis 2017, Carneiro da Cunha 2017, Escobar 2018, Virtanen et al. 2020,). We need to promote sustainable, low-emission, multi-species forms of life that enhance biodiversity and seed life, and develop anthropogenic strategies that positively impact biocultural diversity. These include management practices that enrich landscapes with useful plants, leading to increased agrobiodiversity, crop improvement and food security. Such strategies may include territorial management with the "owners" of landscapes to ensure mutual benefits, protect territories and maintain fertility, as well as the creation of human or cultural niches (Albuquerque *et al*. 2018) that alter natural selection and manage species and ecosystems, all of which can contribute to biodiversity conservation.

Such agrobiodiversity management and territorial stewardship can enhance the resilience of ecosystems to environmental change and disturbance, which may be critical for maintaining ecosystem functions and services over time. Such strategies imply the involvement of local communities in decision-making processes that recognise cultural knowledge and experience based on distinct ontologies, and forms of cooperation that enable sustainable resource use and management, and thereby ensure that natural resources are harvested and used in ways that maintain their long-term availability. The resulting ecosystem resilience ultimately promotes cultural continuity and diversity, community empowerment and sustainable resource management.

All of this implies moving beyond notions of the environment as a collection of resources that humans can use according to their own needs, and a dominant conception of sustainability that, at its best, provides a balance between such over-consumption and the limits of material reproduction of a single planet. Valuing human and cultural contributions from the margins, community engagement and participation, and recognising cultural knowledge and practices opens up possibilities for an alter-anthropocene. An anthropocene marked by a positive human impact on the global condition and multi-species living arrangements that create alternatives for future life, based on a holistic notion of

sustainability, low emissions and the promotion of biocultural diversity for the regeneration of a damaged planet marked by the ruins of capitalism (Tsing *et al*. 2017).

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