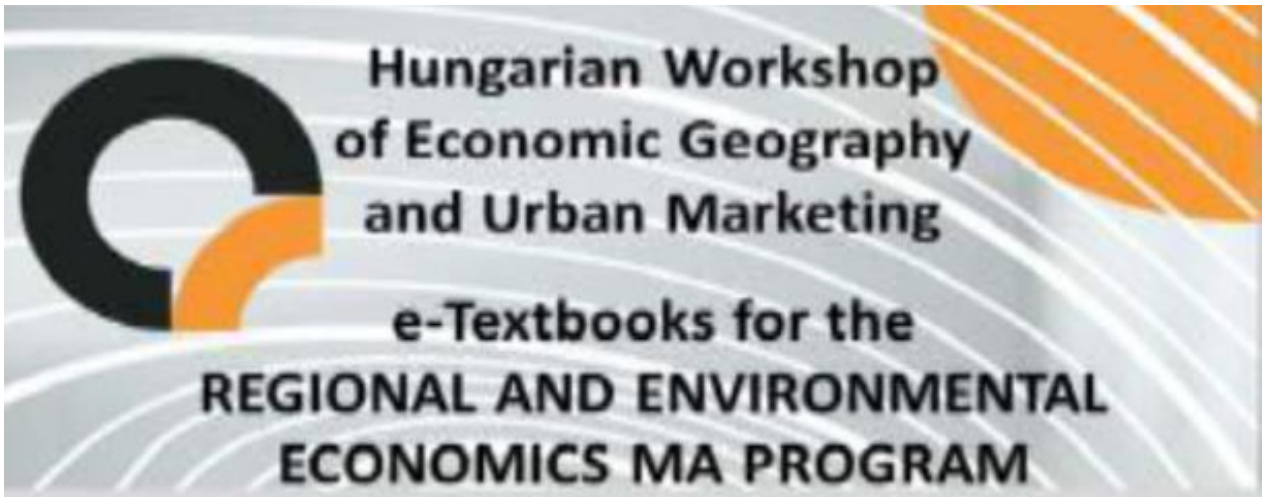

Human Ecology and Environmental Ethics

Reader

Antal Ferenc Kovács (ed.)

Magyar Gazdaságföldrajzi és Településmarketing Mûhely
Hungarian Workshop for Economic Geography and Urban Marketing
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Antal Ferenc Kovács (ed.)

John von Neumann University
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Editorial preface

This READER is a complementary to the class presentations and literature readings of the course Human Ecology and Environmental Ethics offered to students of the Regional and Environmental Economics program (REKO) at John von Neumann University, Hungary. The case studies presented in the volume are partly from open access sources. However, with an intent to illustrate how the concepts discussed during the course can be applied to real life situations around the world, some of the cases have been selected from essays prepared by students of the REKO program.

Human ecology, with its roots in the first half of the 20th century, is a scientific discipline with its own right. It is the study of the interrelationship between human systems and the natural environment that provides perspective to address problems arising from this interrelationship as the consequence of human actions. Human ecology backed by the principles of environmental ethics, a branch of philosophy, is a framework for pursuing sustainable development: healthy environment, social justice and economic welfare.

The natural environment and ecosystems provide primary goods and services for the socio-economic system. Therefore, the state of the environment is crucial with regards to these services, ultimately the performance of the economy. The deterioration of the environment at a global scale is the result of contradiction between sustainability and the economic rational, as well as the institutions built by humanity on the perception of humans' utilitarian attitudes. Advancing sustainability seems unlikely without changes in people's attitudes and the ethical principles, based on which decisions are made in politics, as well as by the individuals regarding consumption and attitude in daily life. The course Human Ecology and Environmental Ethics provides a platform to get acquainted with and discuss the principles and concepts of change, nevertheless the real-life cases offer the best illustration for their application. Hopefully, the case studies in the READER will serve this purpose.

Case Studies

1. *A case study of the Renewable Energy for Electrification in Liberia (REEL) Project in Nimba County, Liberia.*

Energy is a key driver of growth; the lack of reliable electricity has been a significant constraint on Liberia's economic development, particularly for small businesses, manufacturing, and the agricultural sector. Renewable energy projects, such as mini-grids and solar installations, are expected to generate employment opportunities in construction, installation, and maintenance. Liberia has been working to attract private investments in off-grid and grid-connected renewable solutions to reduce public spending. Much of the funding comes from bilateral partners, with grants and loans to scale rural electrification and build grid infrastructure.

Liberia has taken several steps to support renewable energy development, with the assistance of key partners, including the World Bank, the African Development Bank, and the United

States Agency for International Development (USAID). It has initiatives like the Regional Emergency Solar Power Intervention (RESPITE) Project and the Liberia Energy Access and Solar Power Project (LEASP).

Liberia's renewable energy expansion project is part of a broader national effort to improve access to electricity, reduce dependence on fossil fuels, and promote sustainable development. The REEL project is an initiative of the Renewable Energy Expansion Project. The expansion of renewable energy in Liberia is primarily driven by:

- Low electrification rates in the country- As of the early 2020s, only about 30 percent of the population had access to electricity, and rural communities are significantly underserved
- High Energy Costs—Liberia has one of the highest electricity tariffs in the world, partly due to its reliance on imported diesel for power generation.
- Fragile Energy Infrastructure – Liberia has a nonexistent energy infrastructure. The minimal infrastructure available is severely damaged due to decades of conflict and underinvestment.

2. *Balancing Progress amid Ethical Dilemmas in Singapore's Coastal Expansion Project "Long Island"*

The coastline expansion project of Singapore, which is referred to as "Long Island," is intended to meet the nation's long-term requirements by reclaiming around 800 hectares of land off the East Coast. In addition to enhancing recreational areas, this huge project is intended to defend against the effects of rising sea levels, build new residential and commercial spaces, and create new jobs. Nevertheless, it also creates substantial ethical considerations in relation to the sustainability of the environment, social equality, and the rights of a variety of stakeholders. Long Island in Singapore is undergoing development, which presents a complicated interaction of economic interests, environmental sustainability, and social equality between the various stakeholders. To handle the ethical concerns that are linked with this project, it is necessary to take a collaborative approach that prioritizes and strikes a balance between the well-being of all stakeholders in the most equitable manner possible. This is necessary after an attempt has been made to determine the various probable scenarios for finding a solution. Through the implementation of inclusive planning, sustainable practices, equitable labor standards, and policy reforms, stakeholders can strive towards the development of urban areas that are more responsible and balanced.

3. *Environmental, Social, and Ethical Implications of the Thar Coal Block II Development in Pakistan*

Pakistan faces a significant energy shortfall, a challenge exacerbated by a growing population, increasing industrialization, and an historical reliance on imported fossil fuels, particularly oil and natural gas. This dependence has led to economic vulnerability due to fluctuating international fuel prices and has contributed to a circular debt crisis within the power sector. To address these issues and enhance energy security, Pakistan is turning to its vast indigenous coal reserves, estimated at over 184 billion tons, with the Thar coalfield in Sindh province holding approximately 175 billion tons. This makes Pakistan the 7th largest holder of lignite resources globally. The development of the Thar coalfield, particularly through projects under the China-Pakistan Economic Corridor (CPEC), is viewed as crucial for energy production and economic development. However, these large-scale coal mining and power generation projects, such as those in Thar Block II, pose significant environmental, ecological, social, and ethical challenges, impacting the local communities and the fragile desert ecosystem.

This case study focuses on the development within Thar Block II, examining the potential and realized impacts based on available Environmental and Social Impact Assessments (ESIAs) and related studies. It aims to provide a comprehensive overview of the project's setting, its various impacts, the ethical considerations raised by stakeholders, and the broader challenges and alternatives in the context of sustainable development in Pakistan.

4. Climate Change & the Paris Deal

The Paris Deal/Agreement is a legally binding international treaty on climate change. It was adopted by 195 Parties at the United Nations Climate Change Conference in Paris, on 12 December 2015. Its overarching goal is to hold "the increase in the global average temperature to well below 2°C above pre-industrial levels" and pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels." However, in recent years, world leaders have stressed the need to limit global warming to 1.5°C by the end of this century. That's because the UN's Intergovernmental Panel on Climate Change indicates that crossing the 1.5°C threshold risks unleashing far more severe climate change impacts, including more frequent and severe droughts, heatwaves and rainfall. To limit global warming to 1.5°C, greenhouse gas emissions must peak before 2025 at the latest and decline 43% by 2030. The Paris Agreement is a landmark in the multilateral climate change process because, for the first time, a binding agreement brings all nations together to combat climate change and adapt to its effects.

5. The EU-US Dispute over Regulation of Genetically Modified Organisms, Plants, Feeds, and Foods

In the middle of 1990s advances in genetics raised the opportunity of adding recombinant DNA techniques to the array of methods used by breeders to improve new types of plants. Recombinant DNA technology (gene splicing) involves isolating the fragments of DNA expressing the genes that carry a wanted characteristic in one variety, splitting the DNA molecule of another variety with other desired characteristics, combining the two partial DNA molecules into a single new DNA molecule, and then inserting that new DNA molecule into a cell and providing appropriate conditions in a lab that will enable the new (recombinant) DNA molecule to replicate. If the process is successful, the cells with the recombinant DNA can then be used to grow a new variety of plants with tissue culture methods identical to those used by traditional hybridizers. Though the goal, development of hybrid plants or animals with desirable characteristics of two or more "parent" varieties, is like that of traditional crossbreeding through grafting of plants or artificial insemination of animals, the process was unproven. In addition, some of the prospects described by gene splicing enthusiasts inspired fears among other observers that recombinant DNA techniques could result in the breeding of very pernicious varieties. While traditional hybridizing and artificial insemination techniques can be applied only to plants or animals that will crossbreed as whole organisms, recombinant DNA techniques could bypass that problem, and observers who believed the natural barriers to crossbreeding are part of nature's defence against evolution of dangerous varieties looked with dismay at the prospect of jumping over that barrier.

6. Intergenerational justice and climate litigation. Some considerations about law and the contemporary economic, social and political issues

The recent debate on the climate changes/crisis, environmental protection, and sustainable development is closely related to thinking about future generations' life. There is a renewed interest in intergenerational justice and a revival of the previous theories formulated by John Rawls and Edith Brown Weiss. Recently, again, the pages of the European Journal of International Law show two polarised positions: one against and one in defence of future generations. There are many challenges that the law faces in responding to the climate issues.

Economic theories on the one hand and legal doctrines on the other ones recall the fundamental opposition between the ethnocentrism and individualism designed by Western law and the holism and diffusionism typical of systems outside the Western legal tradition. Thus, it becomes crucial to design a new balance between contemporary issues of environmental law, thanks to the help of comparative law.

I. The Renewable Energy for Electrification in Liberia (REEL) Project in Nimba County, Liberia.

Lisa Netty Barlea

Background:

Energy is a key driver of growth; the lack of reliable electricity has been a significant constraint on Liberia's economic development, particularly for small businesses, manufacturing, and the agricultural sector. Renewable energy projects, such as mini-grids and solar installations, are expected to generate employment opportunities in construction, installation, and maintenance. Liberia has been working to attract private investments in off-grid and grid-connected renewable solutions to reduce public spending. Much of the funding comes from bilateral partners, with grants and loans to scale rural electrification and build grid infrastructure.

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Liberia's renewable energy expansion project is part of a broader national effort to improve access to electricity, reduce dependence on fossil fuels, and promote sustainable development. The REEL project is an initiative of the Renewable Energy Expansion Project. The expansion of renewable energy in Liberia is primarily driven by:

1. Low electrification rates in the country- As of the early 2020s, only about 30 percent of the population had access to electricity, and rural communities are significantly underserved
2. High Energy Costs—Liberia has one of the highest electricity tariffs in the world, partly due to its reliance on imported diesel for power generation.
3. Fragile Energy Infrastructure – Liberia has a non-existent energy infrastructure. The minimal infrastructure available is severely damaged due to decades of conflict and underinvestment

Liberia faces significant challenges in energy access, with less than 2% of households connected to electricity services. To address this, the REEL project aims to harness the hydropower potential of the Gbedin Falls and extend the electricity network to underserved areas, supporting economic growth, reducing poverty, and improving living standards.

Policies:

Liberia has taken several policy steps to support renewable energy development. The existing National Energy Policy (NEP) of 2009, the first policy implemented after years of civil war, serves as a roadmap for post-conflict development, emphasizing energy access, diversification, and the promotion of renewable energy sources.

Liberia established the Liberia Electricity Regulatory Commission (LERC) to oversee and regulate the energy sector, as outlined in the Electricity Law of 2015. There is also a planning tool, the Least-Cost Power Development Plan (LCPDP), which prioritizes renewable energy

sources, such as hydropower and solar, to meet future energy demands. Lastly, the Liberia SEforALL action agenda is aligned with the UN's "Sustainable Energy for All" initiative, aiming to increase renewable energy use and achieve universal access by 2030.

The Renewable Energy Electrification in Liberia (REEL) Project, involving the construction of a hydropower dam at Gbedin Falls, must comply with various national laws, AfDB safeguard policies, and international standards to ensure its environmental and social sustainability.

National Policies and Regulations

- Environmental Protection and Management Law (EPML) of Liberia (2003): Requires a comprehensive Environmental and Social Impact Assessment (ESIA) for all significant projects, including dams, to ensure compliance with national environmental standards and promote public participation.
- EPA of Liberia Guidelines: Mandate procedures for conducting Environmental and Social Impact Assessments (ESIs), stakeholder engagement, and continuous monitoring to minimize environmental and social impacts.
- Land Rights Act (2018): Governs land acquisition processes, ensuring fair compensation and the protection of customary and private land rights. Requires free, prior, and informed consent (FPIC) from affected communities.
- Liberia Water Resources and Sanitation Policy (2009): Emphasizes sustainable water management and requires that dam projects consider the impacts on water quality, availability, and ecosystem health.
- Liberia National Disaster Management Policy (2012): Mandates disaster risk reduction measures and emergency preparedness plans to safeguard communities and infrastructure from potential risks, such as dam failure and floods.

African Development Bank (AfDB) Safeguard Policies

- OS 1: Requires a comprehensive ESIA for projects with significant impacts.
- OS 2: Requires ARAP or RAP for involuntary resettlement, ensuring fair compensation and restoration of livelihoods.
- OS 3: Ensures the conservation of biodiversity and ecosystem services.
- OS 4: Addresses pollution prevention, hazardous materials management, and resource efficiency.
- OS 5: Ensures health, safety, and fair labor conditions for workers.
- OS 7: Requires notification and cooperation with Riparian countries for projects on international waterways.

International Standards and Guidelines

- International Hydropower Association (IHA) Sustainability Guidelines: Encourage sustainable hydropower development through comprehensive assessments and stakeholder engagement.
- International Finance Corporation (IFC) Performance Standards: Provide best practices for managing environmental and social risks, particularly in areas such as community health and safety and cultural heritage.

- World Commission on Dams (WCD) Guidelines: Recommend transparent decision-making, thorough impact assessments, and equitable sharing of benefits with affected communities.

Institutional Roles and Responsibilities

The construction of a hydropower dam at Gbedin Falls under the Renewable Energy Electrification in Liberia (REEL) Project involves the coordinated efforts of multiple government bodies to ensure compliance with environmental and social standards, legal requirements, and best practices:

- Rural and Renewable Energy Agency (RREA): Leads the overall implementation and management of the Resettlement Action Plan (RAP) and ensures compliance with national and international standards.
- Environmental Protection Agency (EPA): Provides oversight to ensure environmental compliance, approves the Environmental and Social Impact Assessment (ESIA), and monitors implementation of mitigation measures.
- Ministry of Agriculture (MoA): Sets guidelines for crop compensation rates and provides agricultural support to Project Affected Persons (PAPs).
- Ministry of Lands, Mines, and Energy (MLME): Oversees energy policy and regulatory frameworks, provides technical guidance on dam safety, water management, and energy generation standards.
- Ministry of Finance and Development Planning (MFDP): Manages financial resources, ensuring proper allocation for compensation and project activities.
- Ministry of Internal Affairs (MIA): Facilitates community engagement and mediation between project developers and local communities.
- Ministry of Justice (MOJ): Ensures legal compliance in land acquisition, resettlement, and compensation processes, and resolves disputes.
- Liberia Hydrological Service (LHS): Provides hydrological data, conducts water flow analysis, and supports water management strategies.
- Ministry of Public Works (MPW): Oversees construction and maintenance of access roads and related infrastructure.
- Ministry of Health (MoH): Monitors public health risks, provides guidance on health and safety for construction workers and local communities.
- Ministry of Gender, Children, and Social Protection (MoGCSP): Ensures that social protection and gender-sensitive approaches are integrated into the project.
- National Bureau of Concessions (NBC): Regulates and oversees concession agreements to ensure alignment with national policies.
- Ministry of Education (MoE): Supports educational facilities impacted by the project and promotes awareness in local communities.
- Local Government Authorities: Facilitate communication between developers and communities, ensuring that local concerns are addressed.
- Liberia Revenue Authority (LRA): Ensures tax compliance and transparency in financial transactions.
- National Investment Commission (NIC): Promotes investment in infrastructure projects and aligns investment agreements with national objectives.
- Liberia Electricity Corporation (LEC): Integrates electricity generated by the dam into the national grid, ensuring efficient distribution and transmission.

Summary

The Renewable Energy for Electrification in Liberia (REEL) Project aims to enhance Liberia's renewable energy capacity by developing the Gbedin Falls hydropower plant, a 9.34 MW run-of-river facility located in Nimba County. This initiative aims to provide reliable electricity to over 60,000 residents, thereby enhancing socio-economic conditions in the region. Assessments (ESIs) have been conducted and disclosed to the public to address potential environmental and social impacts. This assessment was crucial to the project, as it helped identify potential ecological and social impacts and develop a mitigation plan to address adverse effects on local ecosystems and communities. Liberia's Environmental Protection Agency (EPA) has played a crucial role in overseeing these processes, ensuring compliance with both national and international standards.

Context:

The Renewable Energy for Electrification in Liberia (REEL) Project is an African Development Bank (AfDB)-funded initiative aimed at increasing access to affordable and reliable electricity and promoting the use of renewable energy sources in Liberia**.** It seeks to establish a mini-hydropower plant in Nimba County, providing reliable and affordable energy services to approximately 33,250 customers in the county. The REEL Project supports the implementation of the Liberia Investment Plan for Renewable Energy (IPRE) prepared by the Government in October 2013. The Project seeks to support a mini grid powered mainly by renewable energy in major population centres and small towns in Nimba County, strengthening institutions and regulations for decentralized electricity services. The Project also supports the scale-up of the Government's initiative to foster the creation of a market for modern solar lanterns and home systems and pilot an area-based rural electrification project for rural dispersed last-mile areas that would provide sustainable lighting solutions to improve living conditions of the population living in the regions that are unlikely to receive electricity from the grid. In addition, the project advances the Government's commitment to gender equality and women's rights by implementing gender-smart solutions, focusing on consultation, gender assessment and action plans, sex-disaggregated data collection, income-generating activities, and the productive use of energy.

The Gbedin Waterfall is situated in a remote area of dense forest, approximately 280 km northeast of Monrovia and 7 km from Gbedin Town in the Sanniquelle Mahn District, Nimba County. Access to the site is possible only from the left bank, as the right bank forms the border with the Republic of Guinea. The Waterfall area belongs to Gbalasonnoh Town, located approximately 5.6 km south of Sanniquelle, while the rest of the project footprint falls under Gehwee Town and Kitoma Town.

The Renewable Energy Electrification in Liberia (REEL) Project is situated at the Gbedin Waterfalls, approximately 280 km northeast of Monrovia, in a remote area characterized by dense forests in the District of Sanniquellie Mahn, Nimba County. The project's location has been strategically chosen to harness the hydropower potential of the Mani River, which flows through the Gbedin Falls, providing a sustainable energy source for the surrounding regions. This area, despite its remoteness, has significant potential for energy generation that can benefit both local communities and regions beyond, fostering regional development and cross-border cooperation.

The core of the REEL Project involves constructing a hydropower plant with an installed capacity of 9.34 MW. This plant will feature a low-height weir and a powerhouse situated at

the base of the waterfalls. Designed as a run-of-river scheme, the plant will harness the natural flow and elevation drop of the river at the Gbedin Falls to generate electricity without requiring a large reservoir, thereby minimizing environmental and social impacts. The hydropower plant is expected to produce approximately 56.4 GWh of electricity annually, contributing to a more sustainable and reliable energy supply for both rural and urban areas in Liberia.

To connect the generated electricity to broader networks, a new 33 kV transmission line, extending 7.8 km, will be constructed. This transmission line will link the powerhouse substation directly to the existing cross-border network with Côte d'Ivoire. This connection not only enhances Liberia's energy infrastructure but also supports regional energy integration, facilitating electricity trade and improving energy access in both Liberia and its neighboring countries.

Additionally, the project incorporates significant infrastructure enhancements to improve access to the hydropower plant site. These enhancements include the rehabilitation of a 9.4 km segment of the existing road and the construction of a new 5.6 km road. These access roads are essential for the construction phase and will remain important for ongoing operation and maintenance activities. The upgraded road network will also enhance connectivity for local communities, supporting economic activities and accessibility in this remote area of Liberia.

Overall, the REEL Project represents a comprehensive approach to developing renewable energy infrastructure in Liberia, leveraging natural resources to provide sustainable electricity, improving regional connectivity, and fostering economic development in both rural and urban areas.

The Case:

The REEL project is a flagship energy initiative, financed by the African Development Bank (AfDB) and implemented by the Rural and Renewable Energy Agency (RREA), aimed at developing the Gbedin Falls hydropower plant in Nimba County, Liberia.

The key components are:

- Hydropower Plant: constructing a 9.34 MW run-of-river hydropower facility on the site. John River.
- Distribution Network (T&D): Constructing a 33-kV transmission line and distribution network to connect underserved towns.
- Mini-Grids & Standalone Systems: deployment in rural communities for clean energy access
- Capacity Building: Institutional strengthening of RREA and stakeholder engagement.

The REEL project aims to electrify and promote economic development by expanding and increasing rural and peri-urban electricity access, particularly in Nimba, Bong, and Lofa counties. It also aims to boost local economies by providing efficient and stable electricity to small businesses, schools, health centers, and farming cooperatives. Lastly, it seeks to reduce energy costs by replacing heavy dependence on diesel generators with cheaper, sustainable hydropower, lowering the cost of electricity.

The REEL project will also create jobs through direct employment in plant and infrastructure construction, maintenance, and administration. Improved energy access and electricity infrastructure will encourage micro-enterprises and agricultural processing, thereby creating

indirect livelihood opportunities. This will create a more attractive environment for foreign and local investment, particularly in the agriculture and light industry.

Possible Scenarios:

The vast majority of the rural population depends on biomass, such as wood and charcoal, for their energy needs, which contributes to environmental degradation and limits economic opportunities. The Renewable Energy Electrification in Liberia (REEL) Project is designed to address these challenges by providing affordable and reliable electricity to communities in Nimba County. By improving access to electricity, the project aims to enhance local livelihoods, create jobs, stimulate economic growth, and ultimately reduce poverty in these underserved areas.

However, the construction of the transmission line and associated infrastructure necessary for the REEL Project will have some adverse impacts on local communities.

Despite REEL being a green energy project, several environmental concerns have already been experienced by the project-affected people, communities, consultants, and the RREA.

Water Ecosystem Damage: The hydropower plant alters the St. John River's flow, potentially affecting fish migration, biodiversity, and water availability downstream. Construction could also cause sedimentation, soil erosion, and contamination from machinery.

Deforestation and Habitat loss: Land clearing for plants and transmission lines has affected tree crops, which are critical for forest habitats. This impacts wildlife and carbon sequestration efforts.

Climate Resilience risks: Liberia is vulnerable to climate variability. Overreliance on hydropower may expose the country to energy insecurity during dry seasons or periods of drought.

Social Impacts and Ethical Issues:

Land Acquisition and Displacement – the project requires land for the dam, plant, and distribution infrastructure. The people of the project-affected communities need this land for farming and other forms of livelihood. The acquisition of land for the project's benefit has resulted in the loss of agricultural land for farmers, leaving them displaced or forced to find alternative land for farming purposes, and disrupting their traditional livelihoods. The REEL project has already compensated project-affected individuals for the loss of land and crops resulting from the project.

Community Engagement Gaps—The project has community liaison officers, but language barriers, low literacy rates, and power imbalances limit meaningful participation. Some residents have reported being unaware of their rights or fearful of raising concerns.

Cultural Heritage - The project has impacted on some sacred sites and historically significant land.

Health and Safety Concerns: worker safety violations, increased traffic and accidents, dust, noise, and air pollution affecting nearby residents.

Solutions:

To address current and future environmental, social, and ethical issues, the REEL project has the following safeguards plans/ policies:

An Environmental and Social Impact Assessment (ESIA) has been conducted and made publicly available. This assessment also includes biodiversity, water, and resettlement plans.

Grievance Redress Committee – established within the project for community engagement and mainly for reporting and resolving disputes through all project phases.

The Livelihood Restoration plan was developed for farmers and vulnerable households affected by changes in land use. It is also for project-affected people; the project provides compensation for damaged cash crops, supplies farming tools, and offers existing and alternative seedlings of cash crops to farmers within the project area, as well as cash compensation, among other benefits.

Environmental Monitoring—The Liberian EPA conducts ongoing (quarterly) audits. The RREA Liberia conducts quarterly monitoring of the project and reports to the AfDB to ensure transparency and compliance, in line with the Environmental Management Law of Liberia.

Conclusion:

The REEL project is an energy investment in Liberia with obvious economic benefits; however, without rigorous oversight, there may be a risk of injustices related to land rights, ecological damage, and community exclusion. To succeed sustainably and ethically, the project must prioritize transparency, inclusion, and environmental stewardship at every phase.

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II. Case Study: Balancing Progress amid Ethical Dilemmas in Singapore's Coastal Expansion Project “Long Island”

Ka Wing Mok

Summary
The coastline expansion project of Singapore, which is referred to as "Long Island," is intended to meet the nation's long-term requirements by reclaiming around 800 hectares of land off the East Coast. In addition to enhancing recreational areas, this huge project is intended to defend against the effects of rising sea levels, build new residential and commercial spaces, and create new jobs. However, it also creates substantial ethical considerations which present a complicated interaction of economic interests, environmental sustainability, and social equality between the various stakeholders.

To handle the ethical concerns that are linked with this project, it is necessary to take a collaborative approach that prioritizes and strikes a balance between the well-being of all stakeholders in the most equitable manner possible. This is necessary after an attempt has been made to determine the various probable scenarios for finding a solution. Through the implementation of inclusive planning, sustainable practices, equitable labor standards, and policy reforms, stakeholders have the ability to strive towards the development of urban areas that are more responsible and balanced.

While development is still essential for a low-lying, land-scarce country like Singapore, it must be carried out in an environmentally conscious and ethical manner. The case study of Singapore's Long Island coastal expansion project highlights the significance of striking a balance between economic goals and a strong dedication to ecological preservation and social justice in order to ensure a sustainable and just future for all parties involved.

Introduction

Singapore's coastal expansion project, known as "Long Island," aims to address the nation's long-term needs by reclaiming approximately 800 hectares of land off the East Coast. This ambitious project is designed to protect against rising sea levels, create new residential and commercial spaces, and enhance recreational areas. However, it also raises significant ethical concerns related to environmental sustainability, social equity, and the rights of various stakeholders.

Background Information

Economic and Policy Background

The Long Island project is part of Singapore's broader strategy to combat climate change and ensure sustainable urban development. Announced in 2023, the project is a response to the projected rise in sea levels, which could threaten low-lying areas of the city-state. The planned

Long Island dredging project is the latest strategy and solution that the low-lying country is using to get ready for the devastating effects that rising sea levels could have.

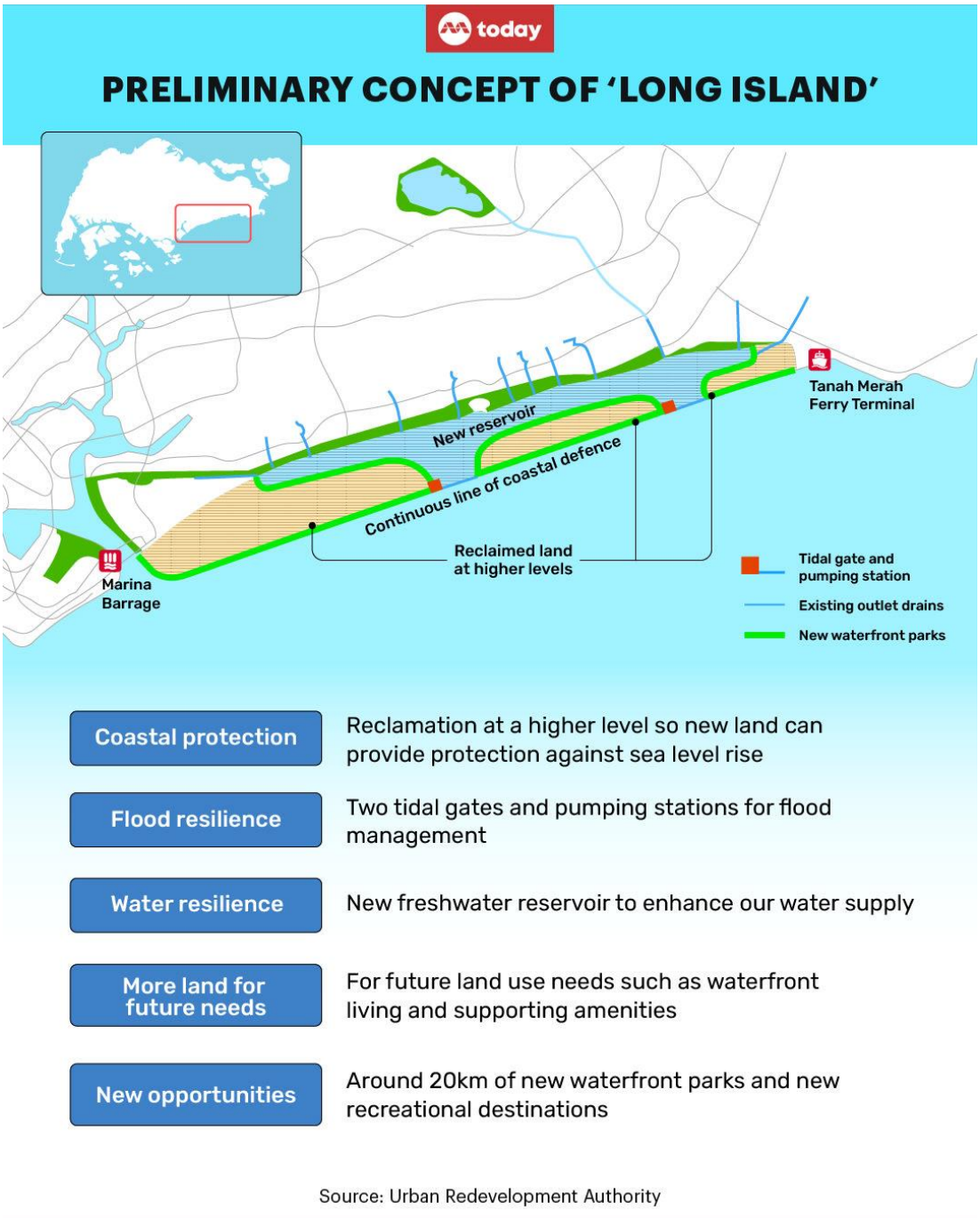

Figure 1. Preliminary concept of 'Long Island'

The Urban Redevelopment Authority (URA) and the Public Utilities Board (PUB) are leading the initiative, which aligns with Singapore's long-term economic goals and its commitment to sustainable development.

While its economic contributions are undeniable, the project will also incur substantial ecological costs, making it a compelling case for analysing the ethical trade-offs between

economic requirements and environmental and social responsibilities in a densely populated island nation.

Project Details

Singapore intends to construct a new island out of reclaimed land off its east coast where a recreational park - the country's largest - lies less than 5m above mean sea level. As a low-lying nation with 30 per cent of its land less than 5m above mean sea level, Singapore may lose important and vast areas of land even if sea levels only rise by 1m by 2100, as projected by Singapore's national water agency PUB.

Long Island also marks one of the first long-term, coastline-specific measures to be rolled out since Singapore began, in 2021, progressive studies of its different shores.

The project involves reclaiming land to create three lengthy tracts extending from Marina East to Tanah Merah.

These tracts will house a mix of public and private properties, recreational facilities, and a new reservoir to enhance Singapore's freshwater supply.

The development aims to provide coastal protection, mitigate flood risks, and meet future development needs.

Environmental Impacts

Habitat Destruction

The reclamation process will significantly impact the coastal and marine ecosystems. Key concerns include:

- **Loss of Biodiversity:** The removal of marine habitats, such as coral reefs and seagrass beds, will lead to a decline in biodiversity. These ecosystems are crucial for maintaining marine life and supporting fisheries.
- **Fragmentation of Ecosystems:** The creation of artificial land masses can fragment existing ecosystems, disrupting the natural movement and interaction of species.
- **Impact on Urban Greenery:** The reduction of natural coastal areas can diminish the ecological benefits provided by these green spaces, such as air purification and temperature regulation.

Carbon Emissions

The construction and operation of the Long Island project will contribute to carbon emissions through:

- **Construction Activities:** The use of heavy machinery and transportation of materials will generate significant greenhouse gases.
- **Increased Urban Density:** Higher energy consumption for heating, cooling, and transportation in the new urban areas will further increase carbon emissions.
- **Urban Heat Island Effect:** The replacement of natural vegetation with buildings and infrastructure can worsen the urban heat island effect, increasing energy demand for cooling.

Sustainable Practices

To mitigate these impacts, the project incorporates several sustainable practices:

- **Green Building Technologies:** The development aims to achieve high standards of energy efficiency and sustainability through the use of green building technologies.
- **Water Management:** Sustainable water management practices, such as rainwater harvesting and greywater recycling, will be implemented to reduce water consumption and manage stormwater runoff.
- **Waste Management:** Efficient waste management systems, including recycling programs and waste-to-energy technologies, will minimize the environmental impact of waste generated by the development.
- **Green Spaces and Landscaping:** Incorporating green roofs, vertical gardens, and urban parks within the development can help mitigate the loss of natural habitats and provide essential ecosystem services.

Long-Term Environmental Monitoring

Continuous monitoring and evaluation of the environmental impacts are crucial to ensure that the sustainable practices are effective and that the development does not adversely affect the environment over time. This includes:

- **Regular Environmental Audits:** Conducting regular environmental audits to assess the performance of sustainable practices and identify areas for improvement.
- **Stakeholder Engagement:** Engaging with environmental groups, local communities, and other stakeholders to gather feedback and ensure that the development aligns with broader sustainability goals.
- **Adaptive Management:** Implementing adaptive management strategies that allow for adjustments to be made based on monitoring results and changing environmental conditions.

Social Impacts

Displacement of Residents

The development of luxury residences may lead to the displacement of residents from affordable housing, worsening social inequalities.

This raises ethical concerns about the impact of gentrification process on disadvantaged communities.

Impact on Local Culture

The transformation of the coastal area may affect the cultural heritage of the region, particularly historical sites and local traditions.

Preserving the cultural identity of the community while pursuing urban development is a critical ethical issue.

Community Engagement

Local communities have expressed concerns about the lack of inclusive planning and engagement in the development process.

Ethical urban development requires meaningful consultation with residents to ensure their needs and voices are considered.

Stakeholder Perspectives and Ethical Dilemmas

Understanding the ethical dimensions of the Long Island development requires considering the perspectives of various stakeholder groups involved or affected by the project.

The development of Long Island clearly demonstrates the complex ethical issues that arise when a nation prioritizes large-scale coastal expansion project in the face of significant environmental and social consequences.

The vast scale of habitat destruction, particularly the loss of irreplaceable coral reefs and mangrove forests, raises critical questions about whether the significant economic gains truly justify the ecological costs.

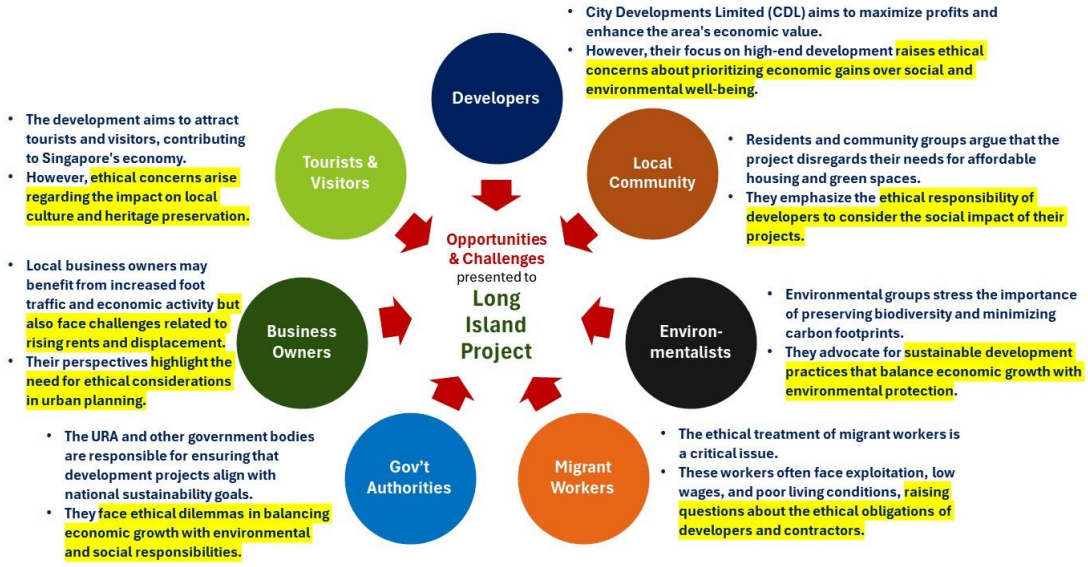

Figure 2. Connected stakeholders in the Long Island project

Developers

City Developments Limited (CDL) aims to maximize profits and enhance the area's economic value.

However, their focus on high-end development raises ethical concerns about prioritizing economic gains over social and environmental well-being.

Local Communities

Residents and community groups argue that the project disregards their needs for affordable housing and green spaces.

They emphasize the ethical responsibility of developers to consider the social impact of their projects.

Environmentalists

Environmental groups stress the importance of preserving biodiversity and minimizing carbon footprints.

They advocate for sustainable development practices that balance economic growth with environmental protection.

Migrant Workers
The ethical treatment of migrant workers is a critical issue.

These workers often face exploitation, low wages, and poor living conditions, raising questions about the ethical obligations of developers and contractors.

Government Authorities
The URA and other government bodies are responsible for ensuring that development projects align with national sustainability goals.

They face ethical dilemmas in balancing economic growth with environmental and social responsibilities.

Business Owners
Local business owners may benefit from increased foot traffic and economic activity but also face challenges related to rising rents and displacement.

Their perspectives highlight the need for ethical considerations in urban planning.

Tourists and Visitors
The development aims to attract tourists and visitors, contributing to Singapore’s economy.

However, ethical concerns arise regarding the impact on local culture and heritage preservation.

Collaborative Stakeholder Management for Optimal Solution
Various stakeholders have different viewpoints on potential solutions. The government and developers tend to focus on technical solutions and greening projects to improve Long Island's sustainability while retaining its economic viability. Their strategy frequently focuses on incorporating sustainability into the existing development framework, aiming to strike a balance between economic growth and environmental responsibility through innovation and efficiency gains.

There is disagreement over these suggested solutions' efficacy and ethical implications. Greening and carbon reduction initiatives are good things, but it is still unclear if they can completely make up for the irreparable loss of special ecosystems like coral reefs. Ethically, it is essential to make sure that these solutions are not just "greenwashing" to boost public opinion without addressing the underlying environmental harm, but rather reflect a sincere dedication to ecological restoration and the welfare of all stakeholders. These mitigation plans' long-term viability will rely on their scope, execution, and the genuine commitment of all stakeholders to prioritizing environmental sustainability alongside financial goals.

Inclusive Planning
Developers should engage with local communities to ensure their needs are met.

This includes providing affordable housing options and preserving green spaces.

Sustainable Practices
Implementing green building technologies and sustainable construction methods can mitigate environmental impacts.

Developers should adopt more stringent sustainability practices to ensure long-term environmental protection.

Fair Labor Standards
Ensuring fair wages, safe working conditions, and proper living arrangements for migrant workers is essential.

Developers and contractors must adhere to ethical labor standards.

Policy Adjustments
The government can revise policies to enforce stricter environmental and social impact assessments.

This ensures that large-scale projects align with ethical standards.

Stakeholder Collaboration
Facilitating dialogue among all stakeholders can lead to more balanced and ethical decision-making.

This includes regular consultations and transparent communication.

The Path Towards Ethical Large-Scale Development in Singapore
The case study of Long Island highlights the severe ethical dilemmas and consequences of extensive urban development growth in a country with limited land, such as Singapore. The initiative emphasizes the fundamental deadlock that exists between the objective of rapid economic expansion and the necessity to safeguard the environment and the well-being of local populations.

Singapore's emphasis on urban expansion provides many economic benefits, but there are also substantial ecological consequences, such as the almost complete loss of crucial mangrove and coral reef habitats and potential disruption to traditional fishing livelihoods. Given the long-term impact of such extensive environmental damage on future generations and Singapore's resilience to climate change, the sustainability of this development model raises substantial ethical concerns.

Consequently, a more robust ethical framework that prioritizes sustainability, ecological integrity, and social fairness must guide future significant development initiatives in Singapore. The following are a number of critical factors that are required:

- **Thorough Environmental and Social Impact Studies:** To completely comprehend and reduce any possible adverse effects, thorough studies that are carried out prior to project start-up with independent review and public consultation are crucial.
- **Strong Commitment to Stakeholder Engagement:** To guarantee that different viewpoints are taken into account and that development decisions are more equitable, meaningful engagement with stakeholders—including the public, environmental

organizations, and possibly impacted communities—is essential throughout the project lifespan.

- **Adoption of Precautionary Principle:** In the face of unpredictable potential impacts on the environment or society, a prudent approach should be adopted, favoring protective measures.
- **Investigation of Sustainable Alternatives:** To reduce ecological footprints, careful thought should be given to less harmful alternatives and creative sustainable development strategies.
- **Frameworks for Environmental Compensation and Restoration:** To address inevitable environmental harm through compensation programs and ecological restoration projects, clear and thorough frameworks should be created.
- **Frequent Observation and Flexible Management:** Mechanisms for adaptive management and accountability must be in place, and environmental and social impacts must be continuously monitored and evaluated both during and after project completion.

Conclusion

The development of Long Island in Singapore presents a complex interaction of economic interests, environmental sustainability, and social equity.

As a nation, Singapore recognizes the critical importance of achieving economic growth in tandem with environmental protection to ensure a prosperous and sustainable future that benefits not only the present generation but also those to come.

While development remains a necessity for a land-scarce and low-lying nation like Singapore, it must be pursued in a manner that is ethically sound and environmentally responsible.

Addressing the ethical issues associated with this project requires a collaborative approach that prioritizes and balances the well-being of all stakeholders as equitably as possible. By adopting inclusive planning, sustainable practices, fair labor standards, and policy adjustments, stakeholders can work towards more balanced and responsible urban development.

Moving forward, future large-scale development projects in Singapore must be guided by a more robust ethical framework that prioritizes sustainability, ecological integrity, and social justice.

The case study of Singapore's Long Island coastal expansion project emphasizes the importance of balancing economic aspirations with a deep commitment to ecological preservation and social well-being, ensuring a sustainable and just future for all stakeholders.

III. Environmental, Social, and Ethical Implications of the Thar Coal Block II Development in Pakistan

Humaira Jamali

DECLARATION: The case study is written by AI (Notebook LM) based on the outline and data sources (research papers, case studies, reports etc.) provided by the author.

Introduction

Pakistan faces a significant energy shortfall, a challenge exacerbated by a growing population, increasing industrialization, and an historical reliance on imported fossil fuels, particularly oil and natural gas. This dependence has led to economic vulnerability due to fluctuating international fuel prices and has contributed to a circular debt crisis within the power sector. To address these issues and enhance energy security, Pakistan is turning to its vast indigenous coal reserves, estimated at over 184 billion tonnes, with the Thar coalfield in Sindh province holding approximately 175 billion tonnes. This makes Pakistan the 7th largest holder of lignite resources globally. The development of the Thar coalfield, particularly through projects under the China-Pakistan Economic Corridor (CPEC), is viewed as crucial for energy production and economic development. However, these large-scale coal mining and power generation projects, such as those in Thar Block II, pose significant environmental, ecological, social, and ethical challenges, impacting the local communities and the fragile desert ecosystem.

This case study focuses on the development within Thar Block II, examining the potential and realized impacts based on available Environmental and Social Impact Assessments (ESIAs) and related studies. It aims to provide a comprehensive overview of the project's setting, its various impacts, the ethical considerations raised by stakeholders, and the broader challenges and alternatives in the context of sustainable development in Pakistan.

Thar Block II Project Overview

Thar Block II is in the Energy Park within the Thar Coalfields, situated in the Tharparkar District of Sindh province, Pakistan. The Block II area spans 95.5 square kilometers and was awarded to Sindh Engro Coal Mining Company (SECMC), a joint venture between the Government of Sindh and Engro PowerGen Limited. Within Block II, an Energy Park covering about 2 square kilometres (500 acres) is being developed, intended to house six power plants with a combined capacity of approximately 4,000 MW.

The specific project under consideration includes the 1x330 MW coal-based power plant developed by Thar Energy Limited (TEL), a subsidiary of The Hub Power Company Limited (HUBCO). This plant is located on a 0.28 square kilometre plot within the Energy Park, adjacent to the 2x330 MW Engro PowerGen Thar (Private) Limited (EPTL) coal power plant, the EPTL 660 MW project (2x330 MW) and Another 330 MW plant by ThalNova Power Thar (Private) Ltd. (TNPTL) in the Energy Park.

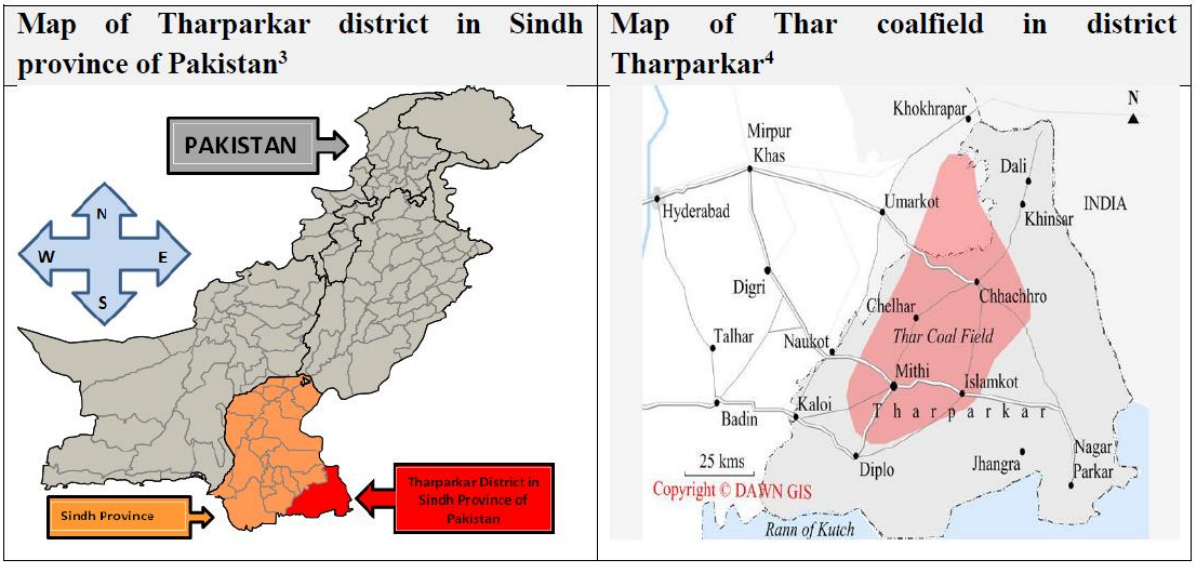

Figure 1. The location of Thar coalfield

The power plants in Block II primarily use Circulating Fluidized Bed (CFB) boiler technology with sub-critical steam parameters. CFB technology is considered suitable for low-grade fuels like Thar lignite, which has high ash, variable quality, high moisture, and high sulphur content. The main fuel is Thar Lignite coal from Block II mine. The average quality parameters of Thar lignite include around 48% moisture, 7% ash, and 1.4% sulphur (average from one source), while another source reports 45.71% moisture, 9.69% ash, and 0.9-1.2% sulphur. Recent analysis of samples from Block II shows a mean moisture content of 46.26%, ash 6.42%, and sulphur between 0.26% and 2.90% (mean 0.95%). The coal has a lower heating value (LHV) averaging around 2675 kcal/kg or 3030 kcal/kg. Approximately 1.9 million tons of coal per year are consumed by a 1x330 MW plant. Coal is transported via truck from the mine stockyard, which is less than 5 km away.

Major inputs for the power plant, besides coal, include water and limestone. The anticipated water demand for the 1x330 MW plant is 740 m3/hour. The primary water source is treated water from the Left Bank Outfall Drain (LBOD) canal, with an allocation of 8.75 cusec (892 m3/hour). Mine dewatering water, if available in sufficient quantity after treatment (Reverse Osmosis - RO), could serve as a secondary source. Limestone is injected into the CFB boiler for SO2 control. Key outputs include electricity (300 MW net to the grid), air emissions (SO2, NOx, PM10, PM2.5, Hg), ash (ash-lime residue), and wastewater. Ash residue is temporarily stored in an ash yard before being transported to the mine area for final disposal as backfill in the spent pit. Wastewater is treated and recycled or disposed of via third aquifer reinjection or evaporation ponds.

Pakistan's Air Quality and Emissions Overview

Pakistan is the third most polluted country in the world after Chad and Bangladesh when ranked by population weighted PM 2.5 concentration according to World Air Quality Report by IQAir in 2024. According to the State of Global Air 2024 report, air pollution accounted for nearly **15% of all deaths** in Pakistan in 2021, further details of report are below in the snapshots:

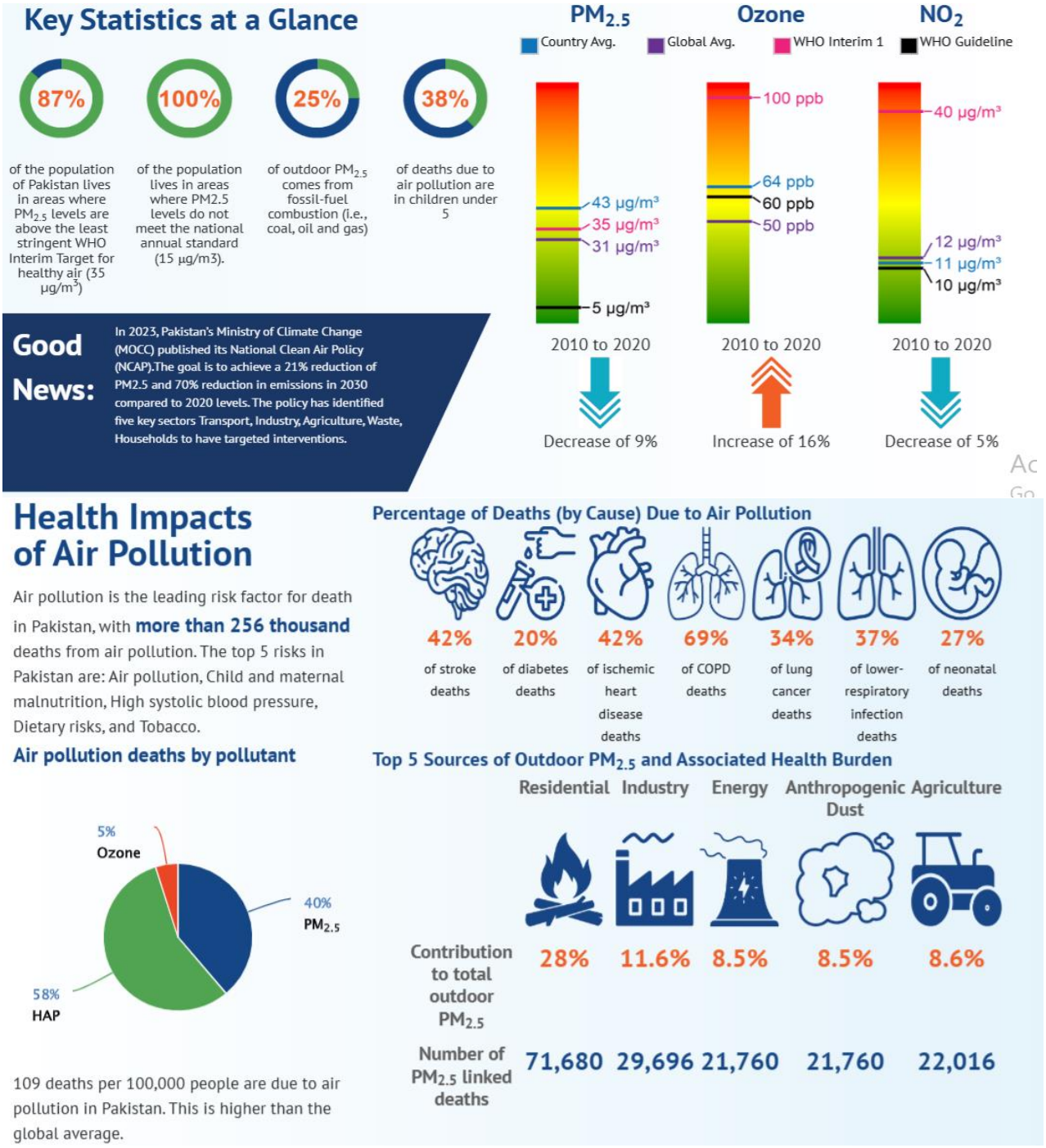

Figure 2. Key Statistics of Pakistan

The above statistics show that air pollution is a major problem across the country and energy is a significant source of particulate matter in the atmosphere and a cause of deaths. While other countries across the world impacted by areas impacted by air pollution have achieved improvements by majorly reducing the emission of harmful pollutants across sectors either by shifting to better and more cleaner options or by strengthening the emission standards and norms, Pakistan is adding more sources of air pollution in the form of fossil fuel burning capacity in Pakistan through coal based power plant additions, as shown by the charts from International Energy Agency (IEA) below:

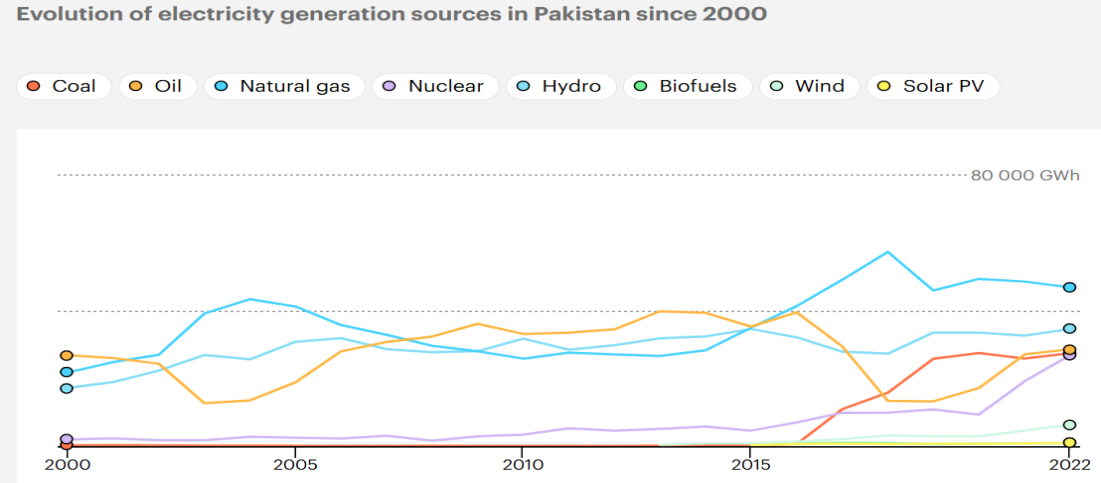

Figure 3. Evolution of electricity generation sources in Pakistan since 2000

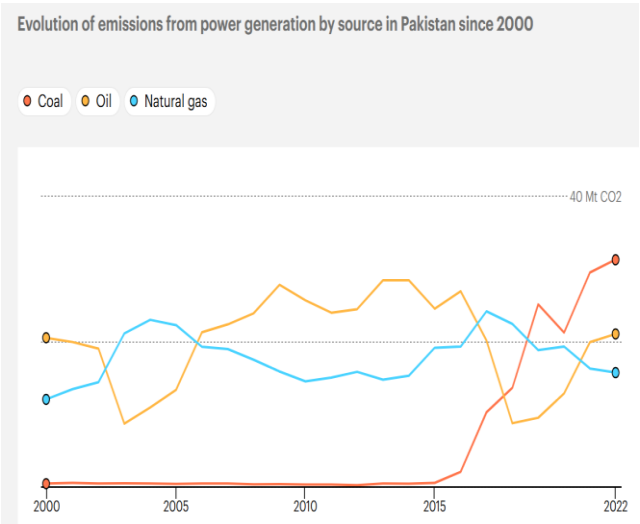

Figure 4. Evolution of emissions from power generation in Pakistan

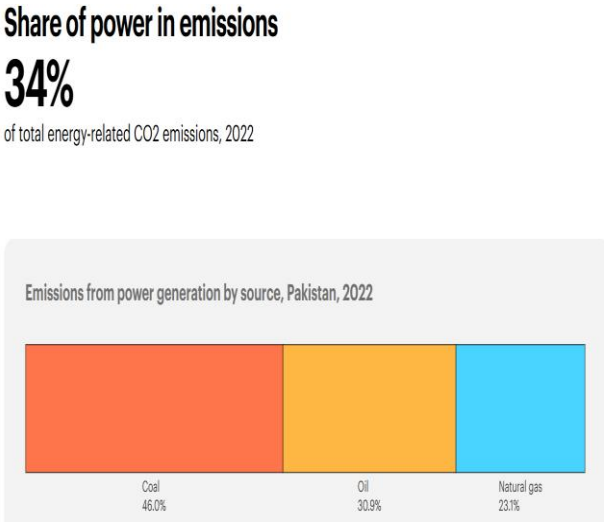

Figure 5. Emissions from power generation by sources in Pakistan

Environmental Impacts

The development of Thar Coal Block II presents significant environmental challenges to the arid desert region.

Air Quality and Emissions: The Thar Desert environment is naturally dusty, leading to high baseline concentrations of particulate matter (PM10 and PM2.5). Measured baseline PM10 concentrations (median 139.8 µg/m3) exceed both the Sindh Environmental Quality Standards (SEQS) annual limit of 120 µg/m3 and the International Finance Corporation (IFC) Environmental, Health, and Safety (EHS) annual limit of 70 µg/m3. PM2.5 concentrations (median 32.5 µg/m3) also exceed the IFC EHS annual limit of 35 µg/m3, although they are within the SEQS annual limit of 40 µg/m3. The area is considered a non-degraded airshed for SO2 and NOx, as baseline levels are low. However, the high natural particulate matter levels technically categorize it as a degraded airshed according to national standards.

Power plant operations release gaseous emissions, primarily sulphur dioxide (SO2), oxides of nitrogen (NOx), and particulate matter (PM). The TEL plant incorporates emission control technologies: limestone injection for SO2 control (target ≤ 850 mg/Nm3), dry low NOx burners for NOx control (target ≤ 510 mg/Nm3), and dry electrostatic precipitators (ESP) for particulate matter control (target ≤ 50 mg/Nm3, >99% efficiency). While the estimates from a single plant such as TEL plant's contribution to ambient SO2, NOx, and PM concentrations is predicted to be small, and levels are expected to remain within SEQS and IFC limits for the individual plant, the cumulative impact from multiple power plants in Block II and neighbouring blocks is more significant. Cumulative impacts show a noticeable increase in SO2 and NOx concentrations, leaving limited room for further development before standards are approached. Cumulative PM concentrations also show a noticeable increase in 24-hour averages, and annual PM10 levels continue to exceed standards due to the high baseline.

Beyond traditional pollutants, coal combustion also releases mercury (Hg) and other heavy metals. The Thar power plant cluster is projected to emit approximately 1400 kg of mercury per year. An estimated 22% (around 320 kg) of this mercury is deposited locally, with potentially dangerous deposition rates (>125 mg/ha/yr) occurring over a 1,300 km2 area impacting around 100,000 people. This deposition can increase mercury concentrations in crops. Air pollution from coal mining operations, particularly fugitive dust from site clearance, overburden removal, and coal handling, also contributes significantly to local particulate matter levels.

Water Resources: Water is a critical and scarce resource in the Thar Desert. Underground water is the major source, but it is predominantly brackish and saline, often unfit for human consumption due to high levels of sodium, sulphate, chlorides, and total dissolved solids (TDS). Rainwater collected in depressions (tarais/tankas) supplements the supply.

Coal mining operations, especially open-pit mining as used in Block II, require extensive dewatering of aquifers above, within, and below the coal seams. This continuous dewatering, estimated at about 25 million m3/year for Block II, significantly lowers the groundwater table. This depletion poses a serious threat to the local communities who rely heavily on dug wells for drinking water and livestock. The scale of dewatering surplus is substantial, discharged at about 3600 m3/hr. This brackish water needs to be managed. Disposal methods for the dewatering surplus and wastewater from the power plant include evaporation ponds and third aquifer reinjection.

Evaporation ponds can lead to the formation of salt lakes, and groundwater downstream may be affected by high salinity over time. The construction of effluent disposal reservoirs, such as those planned or built at Gorano and Dukar Chau as part of the Block II scheme, has been highly contentious, raising concerns about the disposal of potentially toxic wastewater and its impact on nearby water sources and the environment. Stakeholders emphasize the need for a comprehensive government plan for water and wastewater management and advocate for treating dewatering surplus for beneficial uses, including supplying local needs. For example, companies irresponsibly dumped increasing volumes of effluent water, affecting villages Jaman Samoon and Bitra. Livestock deaths (camels, cows, sheep, goats) have occurred after drinking the wastewater. Wastewater has also created mosquito breeding grounds, leading to malaria becoming endemic. In October 2021, Sino Sindh Resource Limited (SSRL) dumped wastewater into grazing land of Tilwaiyo and Warwai, (in Block-I) contaminating a vital well in Tilwaiyo used by 250 families and 500 animals, rendering it unusable after a Rs. 700,000 investments.

At least fifty camels and many sheep/goats have died from the toxic water in Tilwaiyo and Warwai.

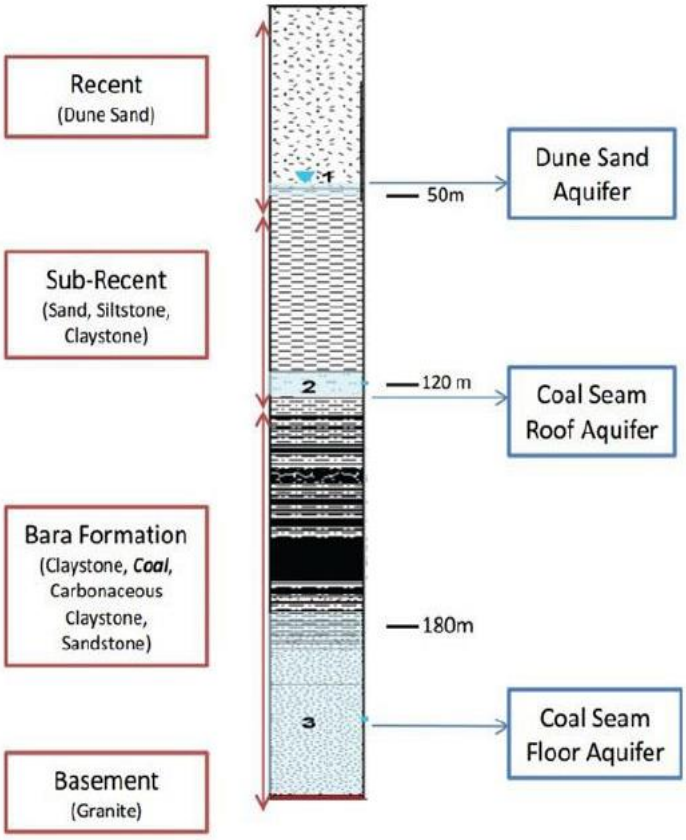

Figure 6. Three Aquifers of Thar coalfield

Figure 7. Wastewater from SECMC coal power plant

Soil and Land Use: The Thar Desert is characterized by sand dunes stabilized by shrubs and grasses, interspersed with flatter plains. Soils are generally coarse, well-drained, calcareous, and infertile, prone to wind erosion. Land use includes settlements, agriculture (where alluvial soil exists), and grazing areas.

Mining involves the removal of massive quantities of overburden (earth material above the coal). This process, particularly surface mining, can destroy the ecosystem, stripping away

vegetation and topsoil, permanently changing the landscape and reducing soil productivity. Waste dumps are created from this overburden. The construction management plan includes measures to minimize dust emissions, erosion, and soil contamination, as well as reinstatement of disturbed areas. Ash from the power plant is planned for disposal as backfill in the spent mine pit, requiring temporary storage yards with leaching protection.

Noise: Baseline sound levels in the Study Area are generally low, particularly in desert background areas. Villages have slightly higher levels due to human activity and livestock, while villages near major roads experience the highest levels, sometimes exceeding nighttime standards due to traffic. Construction and operation of the power plant and mine will generate noise and vibration. Mitigation measures are required to reduce noise impacts on workers and nearby communities.

Ecological Impacts

The Thar Desert ecosystem is home to various flora and fauna adapted to arid conditions. The Study Area for the ESIA is within a 5 km radius of the Energy Park. No plant species of conservation importance were found in the Study Area. Mammals are present, including the Near Threatened Striped Hyaena, but none are exclusively found in the Study Area, and their habitats are widespread. Herpetofauna includes endemic species, but they are also widespread and not restricted to specific habitats within the Study Area.

A significant ecological concern is the impact on **birds**, particularly **vulture species**, which are of conservation importance. The Egyptian Vulture is listed as Endangered, while Oriental White-backed Vultures (among others) are Critically Endangered. Vultures nest on Prosopis cineraria trees in the Thar Desert. Site clearance for the power plant reduces potential vulture habitat. Although the risk of direct killing of animals during site clearance is considered minimal as they tend to move away, a program for managing the vulture population in the vicinity of the Energy Park is required, potentially including planting alternative nesting trees outside impacted areas. Other notable birds include the Vulnerable Greater Spotted Eagle and the Near Threatened Laggar Falcon, which have been observed in the area.

The nearest protected area is the Rann of Kutch Wildlife Sanctuary, located 32 km from the Study Area, which is also part of a Ramsar Site (wetlands of international importance). The Rann of Kutch Ramsar Site is richer in biodiversity than the Study Area. The proposed power plant is unlikely to adversely affect this sanctuary due to the distance. However, broader mining activities might have impacts.

Overall, while impacts on most flora and fauna are anticipated to be limited and incremental to mining activities, the potential impact on endangered vulture populations is a significant concern.

Socio-economic Impacts

Tharparkar District is a sparsely populated area with a low population density compared to Sindh and Pakistan. The Study Area's population of around 6,200 resides in ten villages. The population has a high proportion of children, indicating high birth rates, but also shows a low life expectancy. The area is characterized by high poverty and is consistently ranked among the most deprived districts in Sindh and nationally. Livelihoods primarily depend on agriculture (rain-fed crops) and livestock rearing. Frequent droughts significantly impact these livelihoods, leading to migration and indebtedness. Access to basic infrastructure and services is weak compared to national and provincial averages. Water supply is a major problem, with most

underground water being brackish. Health facilities are inadequate, requiring travel to nearby towns. Literacy rates are low, although improving, with significant gender disparity.

The Thar coal projects are expected to bring positive socioeconomic impacts, primarily through increased electricity generation and job creation. Across all planned projects in Block II, the cumulative direct permanent employment is estimated at around 3300 persons. Efforts are planned to maximize local employment through vocational training programs. The addition of 300 1320 MW net power from Block-II plants helps address Pakistan's energy crisis, supporting economic growth and diversifying the fuel mix towards indigenous resources.

However, the projects also bring significant challenges. Increased job opportunities lead to in-migration of job seekers, potentially straining existing inadequate infrastructure (housing, sanitation, health) and causing conflict between locals and newcomers. The loss of agricultural and grazing land due to mining activities directly impacts traditional livelihoods. While compensation for acquired land is provided, there are concerns about the long-term financial planning of beneficiaries and the potential for conflict once funds are depleted without sustainable income sources. Community concerns also include the potential increase in health issues like asthma and skin diseases due to pollution, exacerbated by limited local healthcare access.

Ethical Considerations

The development of the Thar coalfield, particularly Block II, raises several ethical issues concerning the rights and well-being of the local indigenous communities and the principles of justice and sustainability.

A major concern is the **displacement and resettlement** of communities residing in the project area. Villagers near the proposed effluent disposal reservoirs, for instance, protested against being forced to leave their homes without adequate compensation or a proper resettlement plan. While a Resettlement Action Plan and Policy Framework exist, locals reported being unaware of formal land acquisition notifications and claimed the plan was yet to be implemented. The use of laws like the Sindh Land Acquisition Act, described as "exploitative in nature," in acquiring land raises questions of **procedural and distributive justice**.

The potential **health risks** associated with air and water pollution from mining and power generation are a significant ethical concern. Communities fear increased respiratory and skin diseases from dust and emissions, and health impacts linked to high PM levels and potential contaminants like arsenic. The projected health impacts from the cumulative coal cluster, including thousands of premature deaths and increased disease burden, highlight the severe human cost of relying on coal. Ensuring access to adequate healthcare facilities and implementing effective pollution control and health mitigation measures are ethical imperatives.

Transparency and compliance issues in the environmental assessment process have also been raised. Stakeholders expressed dissatisfaction with how Environmental Impact Assessments (EIAs) were conducted and whether they adequately reflected community concerns or potential impacts. **Inadequate public participation** mechanisms in the EIA process and the lack of legally binding guidelines limit the public's ability to influence project decisions or seek redress for grievances. The absence of a robust institutional structure and mechanism for post-approval environmental monitoring of EMP implementation further weakens accountability.

The perception among some community members and experts is that they are treated as beneficiaries or affectees but are **not a party** to the project's decision-making processes. This lack of meaningful participation undermines principles of **procedural justice**. The conflict over the Gorano reservoir exemplifies this, where construction proceeded despite community protests and legal challenges.

Furthermore, the focus on short-term economic benefits from coal, such as job creation and increased power supply, versus the long-term environmental degradation, biodiversity loss, and health impacts, raises questions about **corporate responsibility versus socioeconomic benefits**. The potential for in-migration to drastically alter the local demographics and potentially marginalize the indigenous population is another sensitive issue with ethical dimensions related to cultural preservation and self-determination. Finally, the decision to heavily invest in coal despite its known climate change impacts and Pakistan's vulnerability to climate change, while other countries are phasing it out, poses an ethical dilemma concerning **intergenerational justice** and Pakistan's international commitments.

Legal and Regulatory Framework

Environmental protection in Pakistan is governed by the Pakistan Environmental Protection Act 1997 (PEPA 1997) and provincial laws, such as the Sindh Environmental Protection Act 2014 (Sindh Act 2014). The Sindh Act 2014 empowers the Sindh Environmental Protection Agency (SEPA) to implement environmental regulations and standards (SEQS). It requires an Environmental Impact Assessment (EIA) or Initial Environmental Examination (IEE) for new projects before construction or operation begins. Coal power projects above 50 MW require an EIA. The EIA report must be submitted to SEPA for approval, a process that includes public participation.

Pakistan has endorsed several international environmental treaties relevant to the Thar projects, including conventions on climate change (UNFCCC, Kyoto Protocol), biodiversity (Convention on Biological Diversity, Ramsar Convention on Wetlands), desertification, and waste management. These international commitments often set stricter benchmarks than national standards and highlight global expectations regarding sustainable development.

However, concerns exist regarding the effectiveness of the legal and regulatory framework in practice. The adequacy of EIAs, the transparency of the review process, the non-legally binding nature of public participation guidelines, and the lack of robust post-approval monitoring mechanisms are seen as limitations that hinder effective environmental protection and stakeholder engagement. Compliance with SEQS and IFC EHS guidelines is stated as a project objective, but issues like the high baseline PM levels exceeding standards raise questions about the application of "degraded airshed" limits and the stringency of required mitigation.

Cumulative Impacts

The development in Thar Block II is part of a larger plan involving multiple coal mines and power plants across various blocks. This concentration of projects leads to significant cumulative impacts on the environment and society that must be addressed collectively.

Air Quality: Cumulative air quality impacts from operational plants show a noticeable increase in SO2 and NOx concentrations, although modelled results suggest they remain within standards, leaving limited capacity for further development. Cumulative PM impacts are also noticeable, with annual PM10 levels exceeding standards primarily due to the high natural baseline and contributions from mining dust.

Water Resources: The combined effect of dewatering from multiple mines is expected to have a significant impact, further lowering the regional groundwater table. The total water consumption for all planned power plants is substantial, estimated at 20,400 to 23,800 m3/hr. A synergistic plan is needed among developers for water use and disposal to minimize the cumulative impact on local water resources.

Socioeconomics: Cumulative projects increase direct and indirect employment opportunities. However, they also exacerbate the challenges of immigration, straining local infrastructure and increasing the potential for social conflict. Managing these cumulative social impacts requires coordinated efforts beyond individual project boundaries.

Analysis of Alternatives

Considering the significant impacts of coal development, alternatives for meeting Pakistan's energy needs and developing the Thar region have been explored.

No Project Alternative: This would mean continued reliance on imported fuels, high electricity costs, and persistent energy shortages, hindering economic growth. However, it would avoid the environmental and social impacts associated with the Thar coal projects.

Alternative Locations: Locating power plants away from the mine, such as at Port Qasim, was considered. A mine-mouth location within Block II was preferred due to guaranteed fuel supply, ease of land acquisition, and the ability to use ash for mine backfill, despite challenges like lack of existing infrastructure (water, grid) and transportation requirements. Locating at Port Qasim would avoid impacts on the sparsely populated Thar region but would add transportation costs for coal and concentrate emissions in an already industrialized, potentially degraded airshed near a major city.

Alternative Fuel Sources: Importing high-quality bituminous coal is an alternative. However, Thar lignite is preferred to avoid the environmental impacts of transporting imported coal through densely populated areas, to stimulate the local economy, and to enhance energy independence by utilizing indigenous reserves.

Alternative Technologies: For power generation, CFB technology was chosen for Thar lignite due to its suitability for high-ash, high-sulphur coal and its integrated SO2 control capability compared to pulverized coal (PC) technologies. For particulate matter control, ESPs were selected over fabric filters, cyclones, and wet scrubbers due to their high efficiency and lower maintenance needs, which are crucial given the high natural dust levels.

Renewable Energy: Pakistan has significant potential for renewable energy sources, including solar, wind, and hydro power. Experts argue that renewable energy technologies are becoming increasingly cost-effective compared to fossil fuels and offer substantial environmental and social benefits. Transitioning towards renewables aligns with climate change commitments (Paris Agreement, NDCs) and sustainable development goals (SDG 7). Studies suggest that replacing planned coal capacity with renewables could lead to significant CO2 emission reductions and cost savings. However, challenges include policy implementation, grid integration, technology build-up, and attracting sufficient investment. A "Just Energy Transition" is proposed to ensure that communities dependent on coal development are supported during a shift to renewables, focusing on job creation and equitable distribution of benefits.

Challenges and Concerns Specific to Thar Block II
Beyond the general impacts of coal, Block II faces specific challenges highlighted in the sources:

- The **Gorano reservoir dispute**, where community resistance and legal action arose over the location and perceived harmful impacts of the effluent disposal site.
- Concerns about the **accuracy and transparency of the ESIA**, particularly regarding mercury emissions, cumulative impacts of mine and power plant, and the application of environmental standards in a naturally dusty environment.
- The **effectiveness of planned mitigation measures**, such as dust suppression, wastewater treatment, and resettlement programs, in adequately protecting the environment and compensating affected communities.
- The **potential for long-term social disruption**, including the breakdown of traditional social structures, increased alienation, shrinking livestock populations, and changing attitudes, as noted by development experts.
- The risk of **power locking and increasing capacity payments**, potentially burdening Pakistan with significant financial costs, exacerbated by lower-than-expected electricity demand and high debt levels.

These issues underscore the complexities of implementing large-scale industrial projects in a vulnerable socioeconomic and environmental setting and highlight the gap between development goals and local realities.

1. Conclusion

The development of Thar Coal Block II, while framed as a strategic initiative to address Pakistan's energy crisis and promote economic growth through the utilization of indigenous resources, presents a classic case of balancing energy security with environmental, social, and ethical sustainability. The project brings potential benefits through increased power generation, job creation, and economic stimulation. However, it also entails significant risks and impacts, including air and water pollution, ecosystem degradation, displacement, disruption of livelihoods, and potential health issues for local communities.

The quality of Thar lignite necessitates the use of specific technologies and stringent emission controls, yet concerns remain about the effectiveness of mitigation measures and the adequacy of the regulatory framework, particularly in addressing cumulative impacts and ensuring transparency and public participation. The ethical dimensions, especially regarding displacement, health risks, and the fair treatment of indigenous communities, are critical and require a human rights-based approach that prioritizes community consensus and well-being over solely economic objectives.

Ultimately, while coal may offer a relatively cheaper short-term solution for power generation based on indigenous resources, the long-term costs, including environmental damage, health burden, social disruption, and potential financial liabilities, are substantial. The analysis of alternatives, particularly the potential of renewable energy, suggests a more sustainable pathway for Pakistan's energy future, aligning with global trends and climate commitments. Achieving this transition requires strong political will, effective policy implementation, significant investment in renewable infrastructure and technology, and a commitment to a just transition that supports coal-dependent communities. Addressing the cumulative impacts of the Thar coal cluster necessitates coordinated action among all developers and the government to minimize harm and ensure responsible development for the long-term prosperity and sustainability of the Thar region and Pakistan as a whole.

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12. View of ENVIRONMENTAL IMPACT ASSESSMENT OF POTENTIAL MINING CONCERNS AT THAR COAL FIELDS AND THEIR REMEDIES

IV. Climate Change & the Paris Deal

Robert Moser and Patrick McDonald[1]

In December 2015, representatives from 195 nations gathered in Paris and signed an international agreement to address climate change, which many observers called a breakthrough for several reasons. First, the fact that a deal was struck at all was a major accomplishment, given the failure of previous climate change talks. Second, unlike previous climate change accords that focused exclusively on developed countries, this pact committed both developed and developing countries to reduce greenhouse gas emissions. However, the voluntary targets established by nations in the Paris climate deal fall considerably short of what many scientists deem necessary to achieve the stated goal of the negotiations: limiting the global temperature increase to 2 degrees Celsius. Furthermore, since the established targets are voluntary, they may be lowered or abandoned due to political resistance, short--- term economic crises, or simply social fatigue or disinterest.

As philosophy professor Stephen Gardiner aptly explains, the challenge of climate change presents the world with several fundamental ethical dilemmas. It is simultaneously a profoundly global, intergenerational, and philosophical problem. First, from a global perspective, climate change presents the world with a collective action problem: all countries have a collective interest in controlling global carbon emissions. But each individual country also has incentives to over---consume (in this case, to emit as much carbon as necessary) in response to societal demands for economic growth and prosperity.

Second, as an intergenerational problem, the consequences of actions taken by the current generation will have the greatest impact on future generations yet to be born. Thus, the current generation must forego benefits today in order to protect against possibly catastrophic costs in the future. This tradeoff is particularly difficult for developing countries. They must somehow achieve economic growth in the present to break out of a persistent cycle of poverty, while limiting the amount of greenhouse gasses emitted into the atmosphere to protect future generations. The fact that prosperous, developed countries (such as the U.S. and those in Europe) arguably created the current climate problems during their previous industrial economic development in the 19th and 20th centuries complicates the tradeoffs between economic development and preventing further climate change.

Finally, the global and intergenerational nature of climate change points to the underlying philosophical dimensions of the problem. While it is intuitive that the current generation has some ethical responsibility to leave an inhabitable world to future generations, the extent of this obligation is less clear. The same goes for individual countries who have pledged to reduce carbon emissions to help protect environmental health but then face real economic and social

[1] Source: https://ethicsunwrapped.utexas.edu/wp-content/uploads/2022/10/31-Climate-Change-the-Paris-Deal.pdf

costs when executing those pledges. Developing nations faced with these costs may encounter further challenges as the impact of climate change will most likely fall disproportionally on the poor, thus also raising issues of fairness and inequality.

Discussion Questions:

1. On the one hand, what harms are potentially produced by failing to take action to control climate change? On the other hand, what harms are potentially produced by acting to lower carbon emissions?
2. To what extent do humans have a moral responsibility to future generations that are yet to be born? Explain your reasoning.
3. Arguably, actions to cut carbon emissions and curb global warming right now have real costs for certain segments of the global population while the benefits of such actions are more abstract. How should we balance the tangible costs in the present and abstract consequences in the future when addressing climate change? Explain.
4. If you were in a position to recommend environmental policy changes or actions, what would you advocate and why?
5. Do prosperous countries have a greater responsibility to take action and bear more of the costs of controlling climate change than developing countries? Explain your reasoning.
6. Considering that the negative impacts of climate change will likely fall disproportionally on the poor, yet developing countries must often increase consumption and emissions to achieve greater economic growth, do you think developing nations should be exempt from actions to control climate change? Why or why not?
7. The climate change agreement approved in Paris is based on voluntary goals and pledges by participating countries. Would it be ethically permissible to impose carbon emission goals on countries and individuals and enforce them with penalties? Explain your reasoning.

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V. The EU-US Dispute over Regulation of Genetically Modified Organisms, Plants, Feeds, and Foods

[Modified from material by MJ Peterson with research and drafting assistance from Paul A. White][1]

What are the Ethical Concerns about Genetically-Modified Foods?

High ethical concern about GM organisms has two sources: concerns for the integrity and sustainability of the natural environment and concern about the social consequences of allowing the supply of seeds or breeding stock to be controlled by developers (mainly though not exclusively large multinational corporations) having 20-year monopolies over the distribution of any particular genetic material as a consequence of patent rights.

Differing Views on GMOs in the EU & US

Scientific uncertainty and ethical concern have played out differently in the European Union and the United States since the mid-1990s because of differences in initial assumptions about genetic modification technologies. The EU treats genetically modified organisms, plants, feeds, and foods as very different from "conventional" varieties developed with traditional crossbreeding and hybridization techniques. The EU also relies very heavily on the precautionary principle as the guide to decision-making. This principle mandates avoiding a new activity or technology while its long-term consequences remain unknown.

The US treats genetically modified organisms, plants, feeds, and foods as basically similar to varieties produced by traditional breeding methods unless there is solid proof of a significant difference. The US does not rely as extensively on the precautionary principle; most policy decisions are guided by the rule that a new activity may proceed until it is shown to cause significant harm.

The US government's decision that genetically modified plants, animal feeds, and human foods are basically similar to conventionally-bred products require regulators to demonstrate that they are notably less safe before they can block cultivation or sale. In the EU, a largely opposite dynamic has prevailed since 1998. European regulations, incorporating the precautionary principle, start from the proposition that GM plants, feeds, and foods are significantly different from conventionally-bred ones and those who want to plant or sell them must prove to regulatory agencies that the product is safe.

[1] Source: https://www.umass.edu/sts/ethics/online/cases/GMO/case.html

How have differing attitudes towards GM foods been reflected in policy?

In the late 1980s, before these regulatory differences developed, business leaders and policy-makers in the EU and the US agreed that coordinated policy approaches on a range of trade issues would be helpful to both industry and consumers. In 1995 European and American business leaders created the Transatlantic Business Dialogue (TABD) to push for the liberalization and harmonization of trade laws on both continents. From its beginnings the TABD urged the United States and the European Union to adhere to a shared policy on genetically modified food. Its recommendations were forwarded to the Transatlantic Economic Partnership (TEP), an EU-US governmental working group charged with developing common policies. In 1998 the TEP created a Biotechnology Working Group that attempted to create a process for the simultaneous regulation of particular GMOs on both sides of the Atlantic.

Before the TEP's project got underway, however, such an alignment was undermined by the rise of anti-genetically modified food protests in Europe that sent the EU policy process in a different direction and prevented convergence on a common position. Strong protests from consumer and environmental groups persuaded some EU governments to adopt more restrictive national policies. US biotech firms were aware of these sentiments, and Monsanto (one of the largest of these companies) sought in vain to counter them with a public relations campaign that, by suggesting critics were irrational and anti-science, only strengthened opposition to GM foods by allowing environmental groups to present the controversy as one of an embattled civil society against big business. All agricultural applications of GM technology were cast into doubt as environmentalists deployed a combination of worst-case scenarios about environmental damage, fears about the unknown health consequences of GM foods, and arguments that GM technology primarily benefits those engaged in large-scale "industrial" farming to raise effective technical and ethical concerns among the public.

Austria led the way to policy divergence in February 1997 by invoking a "safeguard clause" allowing member states to ban growing plants from particular GM seeds if they judge that growing them will threaten the country's environment. Austria's decision covered one GM plant: Novartis Bt 176 maize (corn). Austria's decision inspired other governments to take similar steps and between 1997 and 2000, six EU members – Austria, Luxembourg, France, Greece, Italy, and Germany – invoked the safeguard clause on 12 occasions to ban particular GM plants.

Responding to the public discontent, the European Commission announced in November 1997 that it would amend its policies to address the concerns of its member states and place a moratorium on further approvals of GM products until new regulations were in place. This decision was reaffirmed in June 1999 when the EU Council outlined its thinking on a new, more restrictive regulatory scheme. Previously issued permits remained valid, but strong consumer resistance meant that sales of GM seeds and GM-containing feeds and foods fell drastically. The value of American GM corn exports to EU countries fell from around $211 million in 1997 to $200,000 in 2005, while GM soybean exports fell from $2.3 billion to $511 million over the same period.

The EU adopted new regulations on GM products in 2001 and 2003 but did not start considering new approvals because public opposition to GM foods remained strong. US firms and food distributors, who believed strongly that their products were both safe and beneficial, were irritated by what they saw as an effort to keep the moratorium on new GM food products in place even though new policies had been adopted. Many of them also thought that the EU was

using public opinion as a smokescreen for policies actually meant to protect European seed companies, farmers, and food wholesalers from foreign competition. Such suspicion was not entirely unreasonable; the EU has a long record of maintaining high trade barriers against foreign agricultural and food products.

What was the response of GM exporters to EU policies restricting approval of their products?

On 13 May 2003, the United States, Canada and Argentina filed complaints with the World Trade Organization contending that the European Union moratorium on approving new genetically modified food amounted to unfair protectionist measures against their countries' GM products. The complainants also claimed that African countries were refusing US food aid – which contained GMOs – despite famine and starvation because the African countries feared losing future access to EU markets.

When initial consultations between the EU and the US, Canada, and Argentina failed to resolve the dispute, the WTO Dispute Settlement Body created a panel to settle the matter.

The WTO Panel's final report ruled that the EU's pre-market approval system for GM products violated WTO provisions prohibiting unnecessary delays. The Panel set a date of 21 November 2007 for the EU to lift its moratorium on the approval of GM products, or risk facing WTO sanctions. The Panel also requested that member states with national safeguard measures in place bring their laws into accordance with WTO regulations.

While the ruling could be interpreted as a victory for pro-GM interests, the Dispute Settlement Panel did not offer any opinions that would prevent the EU from continuing to develop stricter regulations on GM products, ruling on neither the legality of the pre-market approval and risk assessment procedures adopted by the EU nor on whether the precautionary principle was a valid part of international law. The Panel also avoided any conclusions on the question of whether GM foods are substantially similar to their conventional counterparts, the position of many in the US who support a less regulated environment. Thus the WTO ruling went against the European Union on the technicalities of its de facto moratorium, but did not include any ruling that would force the EU into the complete revision of its regulatory system on GM technology.

Why are GM foods conceived of differently in the EU than in the US?

Public opinion of GM organisms and products is far more negative in Europe than in the US for several reasons:

1. US firms developing agricultural applications of GM technology formed an effective nationwide industry lobby while European GM-development firms did not. As a result, the European GM debate includes fewer advocates for GM agricultural applications than the US debate.

2. Most GM plants are bred for disease resistance, herbicidal properties, or pesticidal properties, and these traits are most useful to farmers engaged in highly mechanized cultivation on large fields. There are more such farmers in the US than in the EU.

3. European food sellers typically purchase much of their food from local or regional suppliers rather than the transcontinental suppliers selling to most US supermarket chains. Genetic

modifications that improve the shelf-life or shipping hardiness of vegetables, fruit, and other foods are less important to European than to US suppliers.

4. On average, European consumers place higher value on freshness and local varieties of food than do US consumers. GM organisms and plants are perceived by European consumers as highly standardized "industrial-style" products without character. There is a growing "buy local" movement in the USA but it still accounts for only a small part of US food consumption.

5. The initial US decision that GM organisms and plants are "substantially similar" to conventionally-bred organisms and plants meant that regulatory agencies did not see the need for new rules. Thus, neither Congressional debates nor the public comment process involved in agency rulemaking occurred at an early stage of technology use. Because of the economic and consumer attitude differences noted above, agricultural use of GM technology was far less widespread in Europe when opposition arose, so it was easier to interrupt approvals and press for adoption of more restrictive rules.

6. Multiparty political systems, which exist in most EU member states, make it easier for new groups, such as environmentalists, to form political parties than do two-party systems, as exist in the US and the UK. When a country also uses a proportional representation system, in which members of the legislature are elected in large multi-member districts and each party wins seats in proportion to its share of the vote in the district, it is easier for relatively small parties to win seats than in countries where each district elects only one member. These features of European national politics encouraged European environmentalists to put a lot of energy into mobilizing ordinary voters. A two-party system, single-member districts, and greater opportunities for influencing policy through lobbying and litigation in the courts encouraged more US environmentalist energy to flow towards those areas.

What was the Reaction of the GM Industry to the Regulatory Restrictions and Public Outcry?

Monsanto and other developers of GM products modified their plans after the public hammering they received in the late 1990s. Brian Hindo (1) noted in June 2008 that:

The political battles over genetically modified organisms (GMOs) through the 1990s left the company bruised, profitless, and with scaled-back ambitions on the consumer food front. Out were promises of GMO wheat, rice, and tomatoes. In was a focus on corn, soy, and cotton--big-volume crops destined for industrial uses such as animal feed, ethanol, and textiles. The gambit worked. Since 2003, Monsanto has transformed itself from a money-losing pariah into a $5 billion agribusiness titan with 20% profit margins and a stock price that is up1,200%.

Monsanto may not be a pariah these days, but it certainly remains the main bogeyman to many environmentalist and consumer groups. Its ability to recover by taking advantage of the increasingly evident split between acceptance of GM varieties for industrial and feed uses and rejection of GM varieties for direct human consumption is consistent with the growing sentiment among scientists and government regulators that the environmental impacts of GM crops depend on the traits being developed and the particular ecosystems into which they will be introduced. In this view neither blanket opposition to GM technology nor blanket approval is an appropriate attitude.

Citations:

(1) Brian Hindo, "Monsanto on the menu," *Business Week,* 23 June 2008 (issue no. 4089).
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Source: https://www.umass.edu/sts/ethics/online/cases/GMO/case.html

VI. Intergenerational justice and climate litigation. Some considerations about law and the deal with contemporary economic, social, and political issues

di Clarissa Giannaccari[1]

Abstract: *Giustizia intergenerazionale e contenzioso climatico. Alcune considerazioni sul rapporto tra il diritto e le questioni economiche, sociali e politiche contemporanee* – The recent debate on the climate crisis, environmental protection, and sustainable development is closely linked to thinking about future generations. In particular, there is a renewed interest in intergenerational justice and a revival of the older theories formulated by John Rawls and Edith Brown Weiss. Recently, again, the pages of the European Journal of International Law show two polarised positions: one against and one in defence of future generations. There are many challenges that the law faces in responding to the climate issues. Economic theories on the one hand and legal doctrines on the other ones recall the fundamental opposition between the ethnocentrism and individualism designed by Western law and the holism and diffusionism typical of systems outside the Western legal tradition. Thus, it becomes crucial to design a new balance between contemporary issues of environmental law, thanks to the help of comparative law.
Keywords: Climate justice; Intergenerational justice; Global North and South; Future generations

1. Introductory remarks

The most recent debate about the climate crisis, environmental protection, and sustainable development is closely linked to the reflection on future generations.

Discourses are really intricate because of the era the world is living. It's the so-called Anthropocene era and represents the theorization of the complex relationship between fossil fuels, environmental degradation, and inequality, arguing that ecological vulnerability has to become a political theory, due to the unprecedented scale and pace of human impact[2]. So, the question of justice unfurls on spatial and temporal scales at a global and microscopic level, and legal and political concepts of causation and responsibility are complicated by the growing awareness of the intergenerational consequences of past and contemporary choices. In that way, it can be explained (i) the renewed interest in intergenerational justice and the revival of the older theories formulated by John Rawls and, more recently, by Edith Brown Weiss and (ii) the spread-out of climate litigation, vehicle of lots of social instances.

The mentioned theories and their developments show how difficult is to design a theoretical framework useful for making intertemporal protection demands effective, considering the urgency of the issues involved in the climate matter. All approaches seem to be inadequate.
In that scenario, climate litigation has emerged as an alternative governance mechanism to address climate change[3] and has many different contents. The phenomenon was defined as any piece of federal, state, tribal or local administrative or judicial litigation in which party filings

[1] Source: https://www.dpceonline.it/index.php/dpceonline/article/download/2234/2535/3580
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or tribunal decisions directly and expressly raise an issue of fact or law regarding the issue or policy of climate change, its causes or impacts[4]. Additionally, it was defined as cases that have the issue of climate change at their core and that generally raise climate-specific arguments or judicial analysis referring to climate change4[5]. Surely, it's a precious instrument to observe how living law works in constitutional interpretation, statutory interpretation, and under all areas of law.

This essay tries to recall the main definitions of intergenerational justice and how the future generation come into legal discourse in order to underline future challenge for the law.

2. Intergenerational justice

2.1. From John Rawls to Derek Parfit

John Rawls was the first to analyse the problem of intergenerational justice[6]. In his view, starting from the perspective of social contract theory, all generations are posed in a hypothetical original position, which corresponds to the "state of nature" in Enlightenment political theory. In this original contracting position, no one knows their place in time, social status, wealth, or intelligence: all parties are behind a "veil of ignorance". When parties choose the basic distribution of benefits and burdens that will apply across time, they each try to secure the agreement on the best possible terms for themselves due to humans are rational self-interested beings. But the veil of ignorance makes the choice of unequal distribution unacceptable: no one wants to find himself in a poor generation. So, the parties choose a distribution that leaves no single generation in a position less favourable than that of any other generation.

Rawls, concerned with the subject of intergenerational justice, tried to organize an improved Kantian theory of justice and an alternative way to classical utilitarianism[7]. With his conception, he asserts the priority of individual rights over an encompassing theory of the commons[8]. So, in that perspective, people are forced to choose the governing principles of their future society based on a conception of individual moral rights that exists independently of, and before, any conception of a good society[9]. Only in that way, a society begin to take on the characteristics of an intergenerational community. In particular, as Rawls makes clear, the values of association and community can only be accounted for «by a conception of justice that in its theoretical basis is individualistic»[10], and the intergenerationally fair distribution that results from the original contract occurs only because each party acts «to achieve his own greatest good, to advance his rational ends as far as possible»[11].

This vision of the individualized self anyway fails to account for the rich diversity of our social and moral experience, and, ultimately, is «less liberated than disempowered»[12]

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[4] D. Markell, J.B. Ruhl, *An Empirical Assessment of Climate Change in the Courts: A New Jurisprudence or Business as Usual*?, in 64 *Florida Law Review* 15–86 (2012).
[5] J. Peel, H.M. Osofsky, *Climate Change Litigation: Regulatory Pathways to Cleaner Energy*, Cambridge, 9–25.
[6] J. Rawls, *A Theory of Justice,* Cambridge (MA), 1971.
[7] B.C. Bobertz, *Toward a Better Understanding of Intergenerational Justice*, in 36 *Buffalo Law Review* 167 (1987).
[8] For a discussion about deontological issues in Rawls, see M.J. Sandel, *Liberalism and the Limits of Justice*, Cambridge, 1982*,* 18–24.
[9] *Ivi,* 24–28.
[10] J. Rawls, *A Theory of Justice*, cit., at 264.
[11] *Ivi*, at 23.
[12] M.J. Sandel, *Liberalism and the Limits of Justice*, cit., at 178. .

Rawls's view is shared by those who look at intergenerational justice as a matter of rights[13]. Because a right is limited by the individual rightsholder's capacity to possess it, the problem is that members of future generations cannot be identifiable rightsholders in the usual sense. This strikes at the core of the rights model of intergenerational justice.

The absence of identifiable persons in future generations is taken to extreme consequences by the British philosopher Derek Parfit[14] In strongly summary, the non-identity problem shows that an act may still be wrong even if it is not wrong for anyone. More precisely, the nonidentity problem is the inability to simultaneously hold the following beliefs: (i) a person-affecting view; (ii) bringing someone into existence whose life is worth living, albeit flawed, is not "bad for" that person; (iii) some acts of bringing someone into existence are wrong even if they are not bad for someone[15]

In particular, with the regard to environment and sustainability, Parfit imagines how a future society might react to a choice made by the present generation to follow a dangerous energy policy which ultimately leads to catastrophe[16] and exemplifies the logical traps of thinking about rights and injuries solely in individualized terms[17]. A dangerous energy policy can cause the deaths of thousands. However, as Parfit points out, the particular persons killed would never have been born if society had chosen to follow a different energy policy. Since the dangerous policy leads to a higher standard of living over the short run, it indirectly causes different marriages, different conception decisions, and hence different children being born. From this viewpoint, the present generation can never take actions that are unjust to future generations, because every action determines the identity of the individuals conceived and born[18]17.

The identity paradox leads to the troubling conclusion that society owes no moral obligations to future generations. Many authors, including Parfit himself, resist the moral implications of the identity paradox[19]18. Nevertheless the theory strongly struggles with the reality where it's urgent and pressing an intuitive sense of concern for the future.

2.2 From the concern for climate change to Edith Brown Weiss's theories

The concern for the future has become quite urgent with the focus on climate change, a phenomenon with a polycentric nature, caused by the accumulation of direct and indirect impacts of all human activities, on various scales and in different countries, with equally differentiated and multi-scalar consequences[20].

Furthermore, climate change is intrinsically linked to social conflict which originates from the desire for development of each community and concerns the distribution of wealth on the

[13] For an interesting overview about the origins of the analysis of the intergenerational justice in terms of rights theory, see B.C. Bobertz, *Toward a Better Understanding of Intergenerational Justice*, cit., at 168; at last, for a recent systematic study of all theory, see L.H. Meyer, *Intergenerational justice,* in *The Stanford Encyclopedia of Philosophy,* 2021.

[14] D. Parfit, *Reasons and Persons*, Oxford, 1984; D. Parfit, *Future Generations: Further Problems,* in 11 *Philosophy & Public Affairs* 113–172 (1982).

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[20] E. Fisher, E. Scotford, E. Barrit, *The legally Disruptive Nature of Climate Change,* in 80 *The Modern Law Review* 178 (2017).

microscopic and the global scale[21]. This highlights the socio-political character of climate controversies, even before the legal one. In this sense, climate change has reawakened the ethical sentiment of communities, linking the debate on environmental protection to that of future generations[22].

Indeed, the irreconcilability of human needs – with those of nature – seems to have reached a point of no return and calls for a rethinking of the traditional categories of philosophy and law. Precisely the need to take into account a future rights and interests distinguishes the protection of the ecosystem, from the other areas in which the reference to the intergenerational question can be find[23]. The irreversibility of choices having an impact on nature, therefore, poses significant problems in terms of balancing in the present instances that can only be intercepted in the future[24].

By now, there's no debate about the ethical considerations that lead us to think about future generations: people share intuitive feelings of concern and responsibility for future generations, despite paradoxical theories about the existence of future people[25].

Sustainability requires a reversal of trends in the way natural resources are used and its development planned, concerning environmental externalities. The costs and benefits have to be assessed not only from the perspective of the present generation[26].

In that viewpoint, Brown Weiss pointed out that sustainability requires that we look at the earth as a «trust passed to us by our ancestors for our benefit, but also to be passed on to our descendants for their use»[27]. In her view, a theory of intergenerational equity comprehends both rights and responsibility: as members of the present generation, we are both trustees, responsible for the robustness and integrity of our planet, and beneficiaries, with the right to use and benefit from it for ourselves. So, intergenerational equity states that all generations have an equal place concerning the natural system and that there is no basis for preferring past, present, or future generations in relation to the system. This notion has deep roots in international law[28]. Finally, two relationships must shape any theory of intergenerational equity in the environmental context: our relationship with the natural system of which we are a part, and our relationship with other generations[29].

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[26] Report of the World Commission on Environment and Development, *Our Common Future* (Brundtland Report), 1987.

[27] E. Brown Weiss, *In Fairness To Future Generations and Sustainable Development,* in 8 *American University International Law Review* 20 (1992).

[28] The preamble to the universal declaration of human rights recognizes dignity and equal and inalienable rights to all members of the human family. See *Universal Declaration of Human Rights,* pmbl., G.A. Res. 217, U.N. GAOR, 3d Sess., at 71, U.N. Doc. A/810 (1948). The reference to all members of the human family has a temporal dimension which brings all generations within its scope. The reference to equal and inalienable rights affirms the basic equality of such generations in the human family. Also the United Nations Report, *Our Common Future,* known as Brundtland Report, published in 1987, followed Brown Weiss view.

[29] E. Brown Weiss, *In Fairness To Future Generations and Sustainable Development,* cit., 20–21.

An intergenerational obligation arises to care for the natural system: costs of the improvement of the human condition should be distributed across generations. The corollary to the premise of equality is a partnership among generations[30]. The purpose of this partnership is to realize and protect the well-being of every generation in relation to the planet.

Brown Weiss uses Jonh Rawls's theory to determine the nature of responsibilities and obligations towards future generations, concluding that each generation has to «leave the planet in no worse condition than it received it, and to provide succeeding generations equitable access to its resources and benefits»[31], according to traditional liberal political theory.

From that, three normative principles of intergenerational equity are designed[32]. First, each generation must conserve options. This means conserving the diversity of natural and cultural resources so that each generation does not unduly restrict the options available to future generations in solving their problems and satisfying their values. Second, each generation should be required to maintain the quality of the planet so that it is passed on in a condition no worse than that in which it was received. Third, each generation should provide its members with equitable rights of access to the legacy of past generations and conserve this access for future generations. International law and climate diplomacy have implemented the structure outlined above, identifying the idea of (i) intergenerational equity in the exploitation of resources and (ii) the environment as the common heritage of humanity[33].

Even though intergenerationality permeates the social structure, the diachronic management of resources poses following problems: (i) defining which heritage, material and immaterial, should be handed down from one generation to the next and (ii) framing this relationship between generations in legal terms[34].

In that way, the minimum content of a principle of transgenerational responsibility binds each generation towards the following ones in order to guarantee them the possibility of coming into existence and of realizing the needs linked to fundamental rights[35]. This is the perspective of the so-called eco-sufficientarianism[36], according to which the management of the planet's natural resources, in light of the principle of intergenerational equity[37], has to allow us to ensure the satisfaction of basic needs for the next generation[38].

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[30] E. Burke, *Reflections on the Revolution in France,* New York, 1790, 139–140.
[31] E. Brown Weiss, *In Fairness To Future Generations and Sustainable Development,* cit., at 21.
[32] E. Brown Weiss, *In Fairness To Future Generations and Sustainable Development,* cit., 22–25.
[33] E. Frumento, *Lo Stato ambientale e le generazioni future per una tutela del diritto fondamentale all'ambiente,* in *AmbienteDiritto,it,* 2021. Furthermore, there are lots of Constitutions that use the idea of the trust in order to protect the environment, like Swaziland, New Guinea and Japan (see, A. D'Aloia, *Generazioni future (diritto costituzionale),* in *Enciclopedia del diritto. Annali,* Milano, 2016*,* 377 ss.).
[34] T. Andina, *Prolegomeni per una giustizia intergenerazionale*, cit., *passim*.
[35] B. Almassi, *Climate change and the Need for Intergenerational Reparative Justice,* in 30 *Journal of Agricultural and Environmental Ethics* 199 (2017).
[36] For a systematic presentation, see P. Kanschik, *Eco-Sufficiency and Distributive Sufficientarianism – Friends of Foes?*, in 25 *Environmental Values* 553 (2016).
[37] L.A. Nicotra, *L'ingresso dell'ambiente in Costituzione, un segnale importante dopo il Covid*, in *Federalismi.it*, n. 16/2021; F. Francioni, *Sviluppo sostenibile e principi di diritto internazionale dell'ambiente*, in P. Fois (ed.)*, Il principio dello sviluppo sostenibile nel diritto internazionale ed europeo dell'ambiente. XI Convegno SIDI, Alghero 16-17 giugno 2006*, Napoli, 2007, at 42.
[38] L.H. Meyer, *Dimensioni temporali nel dibattito sulla giustizia climatica,* in *Lessico di etica pubblica,* 2, 2019, at 22.

The ability of intergenerational responsibility to establish itself as a general principle, starting from the developments of international law, does not solve the problem of having to face a legal category that is imperfect in content and binding capacity.

3. Future generation and Law and Economics approach

In that scenario, there is an urgent need to examine how a 'future generations' rhetoric translates into the existing legal and institutional context within which climate policy is situated. Despite the intuitive bases and increasingly robust literature on the protection for future generations, modern legal systems today overwhelmingly fail to grant legal protection to future generations and tend to focus on the short term[39]. This is more difficult because solutions must be shared by different cultural traditions and must be generally acceptable to different economic and political systems.

The leap from the ethical to the legal perspective presents strong critical elements[40]. Indeed, the fragility of the intertemporal effects of current choices and attitudes is even more complicated because the subjects – to whom protection is aimed – do not yet exist, nor are identifiable. Therefore, they cannot demand protection, nor negotiate behaviors and decisions[41].

The phenomenon seems to be at the crossroads between remedies and subjectivity. The concept of future generations appears as the consequence of the contemporary evolving social demands. With his stronger issue, the legal disruption of climate change has undermined the stability of society, the sovereignty of states, and the self-determination of individuals: it is, therefore, reasonable to expect that the rethinking of the balance between rights, principles, and interests will undermine the limits to freedom of private economic initiative[42].

Existing approaches to solve the problem seem to fall into two general categories: rights-based theory and cost-benefit analysis.

3.1 The individual rights-based approach

The first ones asserts the priority of individual rights over a comprehensive theory of commons[43]. Starting from Rawls's position[44], according to Parfit's nonidentity argument[45], the sense of intergenerational justice in rights-oriented language is acutely frustrated[46].

This frustration is evident, for example, in United States law, looking at the case-law development of the Natural Historic Preservation Act, where it's explicit the concern for future generations[47]. Amended in 1980, with a new emphasis on its purpose to «fulfill the social,

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[39] S. Caney, *Global Climate Governance, Short-Termism, and the Vulnerability of Future Generations*, in 36 *Ethics & International Affairs* 137–55 (2022); F. Stewart, *Overcoming Short-Termism: Incorporating Future Generations into Current Decision-making*, in 31 *Irish Studies in International Affairs* 171–187 (2020).

[40] D. Porena, *Il principio di sostenibilità. Contributo allo studio di un programma costituzionale di solidarietà intergenerazionale,* Torino, 2017, *passim*.

[41] A. D'Aloia, *Generazioni future*, cit., at 374.

[42] 41 T. Guarnier, *La solidarietà intergenerazionale nella prospettiva costituzionale*, cit., at 13.

[43] B.C. Bobertz, *Toward a Better Understanding of Intergenerational Justice*, cit., *passim*.

[44] See *supra*.

[45] For the latest systematic presentation of the argument see D. Boonin, *Parfit and the Non-Identity Problem*, in S.M. Gardiner (ed.), *The Oxford Handbook of Intergenerational Ethics,* Oxford, 2021; for the latest publication of the Author, see D. Parfit, *Future People, the Non-Identity Problem, and Person-Affecting Principles*, in 45 *Philosophy & Public Affairs* 118–157 (2017).

[46] B.C. Bobertz, *Toward a Better Understanding of Intergenerational Justice*, cit., at 170.

[47] The National Historic Preservation Act of 1966 declared the policy of Congress «to insure future generations a genuine opportunity to appreciate and enjoy the rich heritage of our Nation» See 16 U.S.C. § 470(b)(5) (1982).

economic, and other requirements of present and future generations»[48], the legislative history of the Act indicates that its primary goals are intergenerational[49].

Similarly, under the National Environmental Policy Act of 1969[50], the federal government is directed to «use all practical means» to «fulfill the responsibilities of each generation as trustee of the environment for succeeding generations»[51].

In addition to these mentioned rules, several other federal and state statutes suggest intergenerational objectives[52] that get considerable frustration in practice, as a result of an individualistic conception of justice.

The *Sierra Club v. Morton* case[53] shows all the uselessness of the traditional legal language about individual rights concerning environmental defense suits.

The case originates from the development of Mineral King Valley for recreational purposes. In the late 1940s, Walt Disney Enterprises won a bid to start surveying the valley that would require the construction of a new highway and massive high-voltage power lines running through the Sequoia National Forest. The Sierra Club tried to stop this project to protect the land. So, the Club filed preliminary and permanent injunctions against federal officials to prevent them from granting permits for the development of the Mineral King Valley. The district court granted these injunctions. The U.S. Court of Appeals for the Ninth Circuit overturned the injunctions because the Sierra Club did not show that it would be directly affected by the actions of the defendants and therefore did not have standing to sue under the Administrative Procedure Act. Alternatively, the appellate court also held that the Sierra Club had not made an adequate showing of irreparable injury or likelihood of their success on the merits of the case. The United States Supreme Court granted the Sierra Club's petition for certiorari[54]. In the federal decision, Justice Potter Stewart wrote the majority opinion for the 4–3 majority, in which the Court held that, in order to have standing to sue under the Administrative Procedure Act, the plaintiffs must demonstrate they had directly suffered an injury as a result of the actions that led to the suit. Although building roads and high voltage power lines through the wilderness upsets the beauty of the area and the enjoyment of some, such "general interest" in a potential problem is not sufficient to establish that a plaintiff has been injured in the manner that standing doctrine requires. Although it rejected the Sierra Club's assertion of standing, the Court nevertheless made it clear that an amended complaint would meet the standing requirement if it alleged harms suffered to an individualized interest[55].

Different dissenting opinions were written. Justice William O. Douglas wrote a dissenting opinion in which he argued that the standing doctrine should allow environmental organizations such as the Sierra Club to sue on behalf of inanimate objects such as land. In his separate

[48] *Id.* § 470-1(1), (3). This declaration of policy was added to the Act by Pub. L. 96-515, Title I, § 101(a), 94 Stat. 2988 (1980) (codified at 16 U.S.C. § 470-1 (1982)).
[49] B.C. Bobertz, *Toward a Better Understanding of Intergenerational Justice*, cit., at 171.
[50] 42 U.S.C. §§ 43214361 (1982).
[51] *Id.* § 4331(b)(1).
[52] The discourse concerns The Clean Air and Water Acts, the Wilderness Act and The Endangered Species Act.
[53] 405 U.S. 727 (1972). M.M. Mckeown, The *Trees Are Still Standing: The Backstory of* Sierra Club v. Morton, in 44 *Journal of Supreme Court History* 189–214 (2019); S.W. Scott, *Standing for Everyone: Sierra Club v. Morton, Supreme Court Deliberations, and a Solution to the Problem of Environmental Standing*, in 30 *Fordham Environmental Law Review* 21–103 (2018).
[54] Sierra Club v. Morton, 401 U.S. 907 (1971) (order granting certiorari).
[55] 405 U.S. at 736 n.8.

dissenting opinion, Justice Harry A. Blackmun argued that, when faced with new issues of potentially enormous and permanent consequences, such as environmental issues, the Court should not be quite so rigid about its legal requirements. Justice Blackmun proposed two alternatives for how to proceed in this case: either the Sierra Club's request for preliminary injunction should be granted while it is given time to amend its complaint to comport with the requirements of the standing doctrine, or the Court should expand the traditional standing doctrine to allow this type of litigation. Justice William J. Brennan, Jr. also wrote a separate dissent in which he agreed with Justice Blackmun regarding the Sierra Club's standing and argued that the Court should have considered the case on its merits.

Dissenting justices agreed with Christopher Stone who, while the case was pending before the Supreme Court, published his article[56], which argued that natural objects themselves should be conceived as jural entities capable of suffering legally compensable wrongs. Under this view, the Sierra Club would be seen as Mineral King's guardian *ad litem* suing on behalf of the valley itself[57].

The brief discussion above shows that the language of individual rights stresses the scope of suits like that of the Sierra Club Case which wants to protect diffuse interests in ecological integrity. Indeed, the complaints are geared toward emphasizing individualized injuries, such injuries are secondary because the litigants have the goal of maintaining an undegraded environment[58]. «By stressing the need for individualized impacts, the legal fiction reinforces an individualized conception of rights and injuries»: in this way, Bobertz concluded more than thirty years ago[59]. Even now, the individual conception of rights has been a primary cause of much of the confusion in the theoretical discussion of intergenerational justice.

Intergenerational rights theories and the experience of the environmental standing cases show that an individualistic conception of injury and responsibility is deeply embedded in current rights analysis. Because of the individualistic focus on rights, it becomes impossible to understand presently nonexistent persons as being the holders of individualistic rights. Thus, the rights approach to intergenerational justice begins to collapse when it attempts to confer currently enforceable rights to individuals not yet born. Although the language of rights may serve to partially articulate concern for future generations, the limitations of this language prevent the actual protection of their interests[60]

3.2 The Cost-Benefit Alternative

A nonindividualistic approach to intergenerational justice apparently can be that of cost-benefit analysis[61] as a method of assessing and choosing among policies that affect future generations[62].

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[56] C. Stone, *Should Trees Have Standing? Toward Legal Rights for Natural Objects,* in 45 *Southern California Law Review* 450–501 (1972).
[57] C. Stone, *Should Trees Have Standing? Revisited How Far Will Law and Morals Reach? A Pluralist Perspective,* in 59 *Southern California Law Review* 2 (1985).
[58] L.H. Tribe, *Ways Not to Think About Plastic Trees: New Foundations for Environmental Law,* in 83 *Yale Law Journal* 1330–1331 (1974).
[59] B.C. Bobertz, *Toward a Better Understanding of Intergenerational Justice*, cit., at 176.
[60] Motupalli, *Notes and Comments, Intergenerational Justice, Environmental Law, and Restorative Justice*, in 8 *Washington Journal of Environmental Law & Policy* 333–361 (2018).
[61] B.C. Bobertz, *Toward a Better Understanding of Intergenerational Justice*, cit., 178 ss.
[62] R.F. Blomquist, *Roots, Trunk, and Branches Of Modern Environmental Law: A Book Review Comparison of An Environmental Law Anthology and Foundations of Environmental Law and Policy*, in 5 *Buffalo Environmental Law Journal* 503 (1998); S. Chrimes, D. Swartzman, R. Liroff and K. Croke, *Cost-Benefit Analysis and Environmental Regulations: Politics, Ethics and Method*, in 1 *Pace Environmental Law Review* 229 (1983).

It seeks to measure the future effects of present action by reducing all values to a common metric, the economic one, therefore the costs of an action can be compared with the expected benefits[63].

Starting from these premises and according to the philosophy of utilitarianism – which asserts the primacy of overall good over individual rights[64] –, the present generation has obligations to maximize utility in front of future generations[65]. Utility refers to the general happiness of humans now living and yet to be born. Independently of what could be the result, it's necessary to avoid a policy of extreme sacrifice on the present generations. For this, a discount rate is calculated to limit the number of future generations that will count in the calculus, even due to human incapacity to empathize with remote generations[66]. So, society is assumed to prefer policies that favor present generations. It is argued that society, like an individual, should express a time preference that weighs future effects less heavily over time[67].

Furthermore, cost-benefit analysis can be manipulable in practice about the choosing of the discount rate, because it can serve to mask the economic interest of decision-makers[68], like in the Reagan administration when the cost-benefit analysis has instituted mandatory for executive agencies to foster a more favorable business climate for regulated industries[69].

Moreover, the analysis doesn't take into account the ethical issues[70], often leading to disastrous decisions like the case of the production of Pinto car made by Ford Motor Company[71]. Compony production of a highly dangerous automobile in the1970s, despite it became aware that a design flaw in the gas tank assembly of the Pinto made the car explosive in rear-end collisions. After dealing a business plan, the cost-effective solution was to continue producing defective cars, not warn the public of danger, and absorb the tort claim awards as they occurred[72]. Although the cost-benefit analysis was respected, this decision was clearly intolerable from an ethical perspective[73].

So the cost-benefit analysis can be seen as a way to overrun the individualistic approach to the intergenerational justice of the right-based theory because of its utilitarianism approach that serves to choose the action or policy which leads to the greatest good for the greatest number of people, among several options. In theory, cost-benefit analysis sacrifices the right of the individual for the good of all. It doesn't work in practice because (a) the discount rate minimizes the future consequences of an action; (b); policy-makers can use cost-benefit analysis for a conception of utility that can be different by the community fitness; (c) values such as human

[63] I.G. Barbour, *Technology, Environment, and Human Values,* Westport (CT), 1980, especially 173 ss.
[64] For a systematic review, see R.A. Posner, *Utilitarianism, Economics, and Legal Theory*, in 8 *The Journal of Legal Studies* 103– 140 (1979).
[65] B.C. Bobertz, *Toward a Better Understanding of Intergenerational Justice*, cit., at 178.
[66] L. Steg, G. Perlaviciute, E. van der Werff, *Understanding the human dimensions of a sustainable energy transition*, in 6 *Front Psychol* 805 (2015).
[67] H.S. Burness, R.G. Cummings, W.D. Gorman, R.R. Lansford, *Practicably Irrigable Acreage and Economic Feasibility: The Role of Time, Ethics, and Discounting*, in 23 *Natural Resources Journal* 294 (1983).
[68] B.C. Bobertz, *Toward a Better Understanding of Intergenerational Justice*, cit., at 182.
[69] Exec. Order No. 12,291, 3 C.F.R. 127 (1982), *reprinted in 5* U.S.C. § 601, at 431 (1982); Exec. Order No. 12,498, 3 C.F.R. 323 (1986), *reprinted in 5* U.S.C. § 601, at 40 (SuII 1984).
[70] R.P. Malloy, *Equating Human Rights and Property Rights - The Need for Moral Judgment in an Economic Analysis of Law and Social Policy*, in 47 *Ohio State Law Journal* 164–177 (1986).
[71] L. Strebel, *Reckless Homicide?: Ford's Pinto Trial*, South Bend (IN), 1980.
[72] *Ivi,* at 79-92, 286.
[73] S. Deva, *Human Rights and Humanizing Business,* in *Humanizing Business*, Berlin, 2022, 123–143.

life cannot be measured by monetary prices[74]. In addition, this kind of analysis expresses the individual preference, because the weight accorded to any given factor, taking into account, is determined by asking how much a person wants to pay for it[75].

Both rights-based theory and cost-benefit analysis create obstacles to our understanding of intergenerational justice. Since 1987, however, Bobertz has spotted a deeper sense in which both approaches reinforce the individualistic focus[76].

In attempting to escape this self-defeating circle, it's essential to consider alternative theories and legal structures. Development in climate litigation provides numerous concepts to envision a suitable degree of legal safeguard for future generations[77].

Recently, the pages of the European Journal of International Law show two polarised positions: one against[78] and one in defense[79] of future generations.

4. The rhetoric of Future Generations and Global North Case law

Against Future Generations is a provocative title that the author uses primarily to reveal the rhetoric hidden behind it. The concern for future generations risks hiding development policies that do not pursue instances of substantial equality, but logic of powers and the market.

The essay argues against the use of future generations as a locus for establishing responsibility for present generations, pointing out that an over-emphasis on the future can come in a paradoxical discourse. It underlines the ambiguity of the syntagm because of many reasons. Primarily, it creates a disconnection between local and global[80], designing a multi-speed world since many contradictory policies are compatible with prioritizing future generations. So the sum of future generations locally doesn't amount to their aggregate globally, because each country – in the name of future generations – decides independently what kind of mitigation policy follows and which is the most convenient choice.

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[74] B.C. Bobertz, *Toward a Better Understanding of Intergenerational Justice*, cit., 184–185.
[75] M. Sagoff, *The economy of the earth: philosophy, law, and the environment*, 2a, Cambridge, 2008.
[76] B.C. Bobertz, *Toward a Better Understanding of Intergenerational Justice*, cit., 186 ss.
[77] For an overview C.V. Giabarbo, *Climate Change Litigation and Tort Law: Regulation Through Litigation?,* in *Diritto e Processo,* 2020, 361 ss.; J. Setzer, L. Vanhala, *Climate change litigation: A review of research on courts and litigants in climate governance*, in *WIREs. Climate Change,* 2019; G. Ganguly, J. Setzer, V. Heyvaert, *If at First You Don't Succeed: Suing Corporations for Climate Change*, in 38 *Oxford Journal of Legal Studies* 841 (2018)
[78] S. Humphreys, *Against Future Generations*, in 33 *The European Journal of International Law* 1061–1092 (2022).
[79] M. Wewerinke-Singh, A. Garg, S. Agarwalla, *In Defence of Future Generations: A Reply to Stephen Humphreys,* in 20 *The European Journal of International Law* 1–17 (2023).
[80] The Author refers to global Costitutionalism, which has largely foundered in many domains. See S. Gardiner, *On the Scope of Institutions for Future Generations: Defending an Expansive Global Constitutional Convention That Protects against Squandering Generations*, in 36 *Ethics and International Affairs* 157 (2022); S. Caney, *Global Climate Governance, Short-Termism, and the Vulnerability of Future Generations*, in 36 *Ethics and International Affairs* 137 (2022).

Secondly, the syntagm doesn't consider that future persons transit into the present in a constant flood[81], so it's better to use the term intragenerational because it captures a temporal radius buffering the present beyond the forever, vanishing urgency of now[82].

Thirdly, concerning climate policy, future generations' discourse focuses on mitigation actions and only marginally deals with adaptation. On the current trend, global mitigation will be achieved at the cost of local poverty and immiseration, because of the West-centrism prefigured in the 1972 Stockholm Conference on the Human Environment[83]. Important as rapid mitigation is, it is unlikely in itself to be sufficient to meet today's climate-driven needs: absent significant international transfers, steep global mitigation is a formula for entrenched inequity[84].

The appeal of future generations risks to pursuing a parochial interest, because it prioritizes the *status quo* for developed countries, who don't contribute materially to the transition of poorer countries to low-carbon and climate-adaptive economies, forgetting their historical responsibility[85].

Fourthly, future generations' discourse invokes sacrifice and the about it becomes only a choice of values on which the society is built. The choice is rarely between responsibility and none, between sacrifice or no sacrifice[86], and often it remains at some level unexplained and unjustified, and its logic undisclosed[87]. Meanwhile, the choice of sacrifice now orients the future. From this perspective, the possibility of sacrifice runs throughout the climate problem[88].

Enlightened by these principles, all 'waves' of climate change litigation[89], also the ones between private parties, in the Global North show that a climate assessment involves (i) balancing the costs of (local) mitigation today against (local) adaptation in the future and (ii) balancing the costs of (local) climate impacts in future against the (local) costs of mitigation today[90].

So the intergenerational instance has identified itself in a declination of the principle of reasonableness or solidarity, in a parameter of constitutionality[91]. or, in contemporary times, a function of cultural and political orientation[92]. However, despite attempts to legalize relations between generations, the difficulty remains in providing binding effectiveness to political and economic activity within the horizon of sustainability. From this perspective, the legal system must find suitable guarantees to satisfy the purposes pursued, transferring ethical reasoning to the level of law. The unsuitability of the conventional conceptual tools of contemporary legal

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[81] S. Caney, *Justice and Posterity* in R. Kanbur and H. Shue (eds), *Climate Justice: Integrating Economics and Philosophy*, Oxford, 2018, at 157, 160–161.
[82] The Author recalls D. Heyd, *A Value or an Obligation? Rawls on Justice to Future Generations*, in A. Gosseries and L.H. Meyer (eds), *Intergenerational Justice,* Oxford, 2009, at 187.
[83] Stockholm Declaration on the Human Environment, 16 June 1972, 11 ILM 1416 (1972).
[84] S. Humphreys, *Against Future Generations*, cit., at 1086.
[85] S. Humphreys, *Climate, Technology, Justice*, in A. Proelss (ed.), *Protecting the Environment for Future Generations: Principles and Actors in International Environmental Law*, Berlin, 2017, at 171.
[86] The Author recalls J. Derrida, *Donner la mort*, Paris, 1999,
[87] H. Shue, *The Pivotal Generation. Why We Have a Moral Responsibility to Slow Climate Change Right Now,* Princeton (N.J.), 2021, 44–45.
[88] S. Humphreys, *Against Future Generation*, *cit.,* at 1083.
[89] For an overview J. Setzer, L. Vanhala, *Climate change litigation: A review of research on courts and litigants in climate governance*, in *WIREs Climate Change,* 2019.
[90] S. Humphreys, *Against Future Generations*, cit., at 1089.
[91] O. Bonardi, *Il principio di solidarietà intergenerazionale tra diritto dell'ambiente e diritto alla sicurezza sociale,* in *Rivista del Diritto della Sicurezza Sociale,* 3, 2022, 447
[92] R. Bin, *Che cos'è la Costituzione?,* in *Quaderni Costituzionali*, 2007, at 17.

systems appears[93]: indeed, legal discourse oscillates between the notions of principle, value, subjective right, and interest[94].

In that scenario, climate change litigation remains the most powerful instrument in order to put intergenerational issues at the center of debate and the legal language uses the tort law categories[95].

The remedy of Aquilian liability is the language of the climate change litigation, but it cannot respond to all the requests brought by the Environmental Rights[96]. The difficulties of combining climatic damage with civil law emerge: the typical mechanism of restorative justice however cannot respond to a problem of distribution justice, also in temporal perspective.

The primary role assumed by Tort Law in climatic litigation remains unclear[97], also in consideration of the high degree of failure of the disputes brought to the attention of the courts.

Conceptually civil liability is very far from the instances of climate change because it concerns humanity in general, and not the relationships between private individuals. The anti-tort structure of climatic justice, on the other hand, had already been highlighted because the instruments of civil liability are unable to face the complexity of climate change[98]. The legal category remains marked by the legacy of individualism and the mechanistic vision of causality, that doesn't belong to climate change[99].

The principle of *neminem laedere* provides, moreover, that everyone behaves reasonably to avoid the negative and predictable consequences of their actions. A sort of climate duty of care has to be designed due to putting responsibility for everyone not to act to compromise nature[100]. In this sense, in *Juliana v. United States*[101], the recognition of a right to a «climate system capable of sustaining human life» has been requested. But judges don't configure it for the impossibility of conceptualizing climate negligence, since it has the absurd consequence of making everyone damaged and damaging[102]. Also, the possibility of design a different causality fails.

Tort law tries to apply the market share tests in reference to the issue of CO2 shares for the distribution of responsibilities[103], since the publication of the first Carbon Majors Report[104],

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[93] For an analysis in practice see J. Eisen, R. Mykitiuk, D. Scott, *Constituting Bodies into the Future: Toward a Relational Theory of Intergenerational Justice*, in 51 *UBC Law Review* 1 (2018).
[94] S. Pedrabassi, *Sviluppo sostenibile: l'evoluzione giuridica di un concetto mai definito,* in *Revìsta Ibérica do Dereito,* 1, 2020, 157 ss.
[95] M. Hinteregger, *Civil Liability and the Challenges of Climate Change: A Functional Analysis*, in 8 *Journal of European Tort Law* 238 (2017).
[96] R.P. Hiskes, *The Human Rights to a Green Future,* Cambridge, 2009, at 60.
[97] W. Bonython, *Tort Law and Climate Change,* in 40 *University of Queensland Law Journal* 423 (2021).
[98] D.A. Kysar, *What Climate Change Can Do for Tort Law?,* in 42 *Environmental Law Reporter* 10739 (2012).
[99] H. Winkelmann, S. Glazebrook, E. France, *Climate Change and the Law*, *working paper Asia Pacific Judicial Colloquium*, Singapore, 2019, § 109.
[100] D. Hunter, J. Salzam, *Negligence in the Air: The Duty of Care in Climate Change Litigation,* in *University of Pennsylvania Law Review* 1741 (2007).
[101] *Juliana v. United States*, 947 F.3d 1159 (9th Cir. 2020). For a comment see E.A. Lloyd, T.G. Shepherd, *Climate change attribution and legal contexts: evidence and the role of storylines,* in 167 *Climatic Change* 28 (2021).
[102] B.C. Mank, *Standing and Global Warming is Injury to All Injury to None?*, in 35 *Environmental Law* 1 (2005).
[103] D.J. Grimm, *Global Warming and Market Share Liability: A Proposed Model for Allocating Climate Change Litigation: Drawing Lines to Avoid Strict Joint, and Several Liability,* in 98 *Georgetown Law Journal* 185 (2009).
[104] The Carbon Majors Database, *CDP Carbon Majors Report*, 2017, available at https://climateaccountability.org/pdf/CarbonMajorsRpt2017%20Jul17.pdf. For an overview of its implications,

which describes in detail the tracking of carbon emissions of anthropic origin. Thanks to it, the Courts can be able to quantify the contribution to climate change to be attributed to the defendant in court, based on carbon emissions it causes anchoring to scientific data[105]. A new application in Aquilian liability seems born and contributes to the birth of the second wave of climatic litigation, in which private individuals face each other in court to see the responsibility for these on climate change recognized, based on the shares of CO2 produced that contribute to pollution[106]. This new wave of climate litigation[107] asses the responsibility of the polluting not on traditional tort law but on the CO2 market shares, according to the Paris Agreement, with the further objective to affect the production process of the agreed companies beyond cash compensation.

After the failure of the economic considerations, Global North has placed science at the center of legal reasoning in order to try to provide some effective protection to environment and future generations.

Also the latest decision in the case *Neubauer* ruled by the German Constitutional Court in March 2021[108] represents the product of the ambiguity of the concern about future generations in the view of Global North, even if it was widely hailed as a historic victory [109]. *Bundesverfassungsgericht* found lawmakers have a human rights obligation to protect people from the effects of climate change and ruled that the German climate change law, issued in 2019, does not adequately regulate greenhouse gas emission reduction goals from 2030 onwards. In that way, law violates the government's obligation to protect the human rights of the young people who brought the case. The applicants, nine young people between the ages of fifteen and thirty-two, are concerned about the impacts the climate crisis is having on their rights, now and in the future, so they call out government inaction on climate change. The court found that Germany is required to set emission reduction targets post 2030 for the country to meet commitments under the Paris Agreement, because failing to do so would irreversibly offload major emission reduction burdens onto future generations. In particular, a violation of the State's obligation based on the art. 20a of *Grundgesetz für die Bundesrepublik Deutschland* is recognized. The State has to refrain from interfering with fundamental freedoms, the art. 20a mentioned requires that carbon emission must be distributed over time in a future-oriented perspective since a generation should not be allowed to exceed its emission budget threshold,

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see M. Grasso, K. Vladimirova, *A moral analysis of carbon majors' role in climate change*, in 29 *Environmental Values* 175–195 (2020).

[105] S. Hsu, *A Realistic Evaluation of Climate Change Litigation Through the Lens of Hypotetical Lawsuit,* in *University of Colorado Law Review* 13 (2008).

[106] G. Ganguly, J. Setzer, V. Heyvaert, *If at First You Don't Succeed: Suing Corporations for Climate Change*, in 38 *Oxford Journal of Legal Studies* 841 (2018).

[107] This is what is observed in the recent cases *Lliuya V RWE AG* (Case No. 2 O 285/19), *Milieudefensie V Royal Dutch Shell* (ECLI:NL:RBDHA:2021:5337), *Notre affaire à tous and others v. Total* (N° RG 21/01661 - DBV3-V-B7F-UL6E).

[108] *BVerfG, Beschluss des Ersten Senats vom 24. März 2021 - BvR 2656/18/1, BvR 78/20/1, BvR 96/20/1, BvR 288/20 -, Rn. 1-270.* For a discussion L. J. Kotzé, *Neubauer et al. versus Germany: Planetary Climate Litigation for the Anthropocene?*, in 22 *German Law Journal* 1423–1444 (2021). A full analysis can be founded in A. Di Martino, *Intertemporalità dei diritti e dintorni: le scelte argomentative del Bundesverfassungsgericht nella sentenza sul clima e le interazioni con i processi democratici*, in *Rivista di Diritti Comparati*, fasc. 2, 2023, 65 ss.

[109] K. Connelly, *"Historic" German Ruling Says Climate Goals Not Tough Enough*, *The Guardian,* 29th April 2021; K. Rall, *Germany's Top Court Finds Country's Climate Law Violates Rights*, in *Human Rights Watch*, 29th April 2021; R. Bifulco, *Perché la storica sentenza tedesca impone una riflessione sulla responsabilità intergenerazionale*, in *Luiss Open*, 28th May 2021; R. Bin, *La Corte tedesca e il diritto al clima. Una rivoluzione?*, in *lacostituzione.info*, 30th April 2021; M. Pignataro, *Il dovere di protezione del clima e i diritti delle generazioni future in una storica decisione tedesca*, in *EuBlog.eu*, 17th May 2021.

in order to not cause a large loss of freedom for subsequent generations[110]. The intertemporal safeguarding of freedom is enshrined[111]. The Constitution, therefore, in this case, links the political process in favor of ecological issues[112]. Following this direction, the explicit inclusion of environmental protection in the interest of future generations among the fundamental principles should lead to considering environmental protection preparatory to the realization of other principles.

Though the court's treatment of a conjoined complaint from Bangladeshi petitioners also matters. While the possible positive knock-on effect for Bangladeshis of future German mitigation policy was flagged, the court did not recognize any German responsibility for current impacts in Bangladesh nor any concrete obligation to assist present (much less future) generations there through adaptation, technology or otherwise[113]. None of this is surprising: courts generally present as territorially bounded creatures, unprepared to prioritize foreign persons even in the present, much less in the future[114]. Bus it's a signal that also the formant of the law most contiguous to civil society could strike an appropriate balance between the interests of property owners exposed to risks from climate change and the interests opposing more stringent climate action[115].

Not even creative jurisprudence is able to recognize the legal relevance of the moral duty to preserve and transfer environmental heritage to posterity. It seems that a recent decision ruled in New Zealand shows all the insufficient of this Nordic view, where the judges wrote: «What should be the response of tort law to climate change? (…). Climate change is commonly described as the biggest challenge facing humanity in modern times. Its causes and its effects are now widely recognised, with scientists predicting that if greenhouse gas emissions keep increasing, the planet will eventually reach a point of no return[116]. (...) In our view, the magnitude of the crisis which is climate change simply cannot be appropriately or adequately addressed by common law tort claims pursued through the courts[117].

5. The Global South Case law and the distributive justice

Conversely, the Global South highlights a discussion relating to distributive justice, benefiting from generally looser rules of standing, constitutionally empowered judiciaries, and a tendency to be more rights-based[118].

First of all, it's necessary to remember that the first case on future generations was ruled in front of Philippines' Supreme Court. *Minors Oposa v. Factoran*[119] case serves as testament to the potential of intergenerational climate justice. The claimant group of children in *Oposa* sought to interrupt ongoing large-scale deforestation through the cancellation of timber license agreements. The Supreme Court of the Philippines granted standing to the claimant group on the basis of future generations' rights, holding that intergenerational equity was inherent to the provisions of the Philippines' Constitution, which spoke of a «rhythm and harmony with nature».

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[110] *Neubauer* decision in note 107, §§ 192-193.
[111] *Ivi* § 122.
[112] *Ivi §§* 193; 205 e 206.
[113] *Ivi* § 178.
[114] S. Humphreys, *Against Future Generations*, cit., 1087.
[115] *Neubauer* decision § 172.
[116] *Smith v Fonterra Co-operative Group Ltd* [2021] NZCA 552; [2022]2 NZLR 284 *(21 October 2021)*, §§ 1–2.
[117] *Ivi* § 16. »
[118] J. Setzer, L. Benjamin, *Climate Litigation in the Global South: Constraints and Innovations,* cit., 77–101
[119] Supreme Court of Philippines, *Oposa v. Factoran*, G.R. no. 101083, 30 July 1993, 224 SCRA 792.

Recently, a decision ruled in Pakistan shows as the case law developed from the mentioned judgment inspired courts and other actors across the world to explore the potential of the law to advance climate justice over time, like the essay on the defense of future generations underlines[120]. In *D.G. Khan Cement Company v. Government of Punjab*, the Supreme Court of Pakistan upheld a bar on the construction of new cement plants in environmentally fragile zones, consolidated this jurisprudence by powerfully stating: «Through our pen and jurisprudential fiat, we need to decolonize our future generations from the wrath of climate change, by upholding climate justice at all times»[121].

As we said before, in response to who doesn't sustain future generations' language, the most recent essay, appeared on the pages of European Journal of International Law, intervenes on defense of future generations. The Authors pointed out that adopting the language of future generations' rights has put future generations a tangible and vital part of the struggle for environmental and climate justice[122].

Enlightened by these premises, some domestic climate litigation can be read as a result of redistributive justice legal reasoning which concerns the fair and equitable distribution of resources throughout society, and provides moral guidance for the political processes and structures that affect the distribution of benefits and burdens in societies[123]. For example, in *Goa Foundation v. Union of India & Ors*[124], the Supreme Court created a trust fund for future generations by limiting the amount of mineable minerals. India's National Green Tribunal has held that intergenerational equity is inherent in the right to the environment and has enforced this understanding by ordering the regulation of vehicle traffic, reforestation and the saving of disappearing glaciers. The tribunal has also set aside orders approving the clearing of forestland, invoking future generations' rights. In the absence of competent government action, litigants are able to seek urgent and pressing climate justice through judicial protection by using the powerful device of future generations' rights[125].

In South Africa, the High Court has noted that intergenerational justice in the context of climate change necessitates the rejection of short-termism and requires consideration of the long-term impact of pollution on future generations[126]. Judges observe that the constitutionally protected right to a healthy environment could be invoked solely for the benefit of future generations and a potential violation is sufficient to establish a violation of the rights[127].

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[120] M. Wewerinke-Singh, A. Garg, S. Agarwalla, *In Defence of Future Generations*, cit., *passim*.
[121] Supreme Court of Pakistan, *D.G. Khan Cement Company v. Government of Punjab*, 2021 SCMR 834.
[122] M. Wewerinke-Singh, A. Garg, S. Agarwalla, *In Defence of Future Generations*, cit., at 12.
[123] J. Lamont, *Distributive justice* in *The Stanford Encyclopedia of Philosophy,* 2017.
[124] Supreme Court of India, *Goa Foundation v. Union of India & Ors.*, Writ Petition (Civil) no. 435 of 2012, Judgment (21 April 2014).
[125] For an overview, see R. Basu, *Intergenerational Equity Case Study: Iron-ore Mining in Goa*, in 52 *Economic and Political Weekly* 18 (2017).
[126] High Court of South Africa, *GroundWork Trust & Vukani Environmental Justice Alliance Movement in Action v. Minister of Environmental Affairs & Others*, Case no. 39724/2019, [2022] ZAGPPHC 208 (2022), para. 41; see also Constitutional Court of South Africa, *Fuel Retailers Association of Southern Africa v. Director-General: Environmental Management, Department of Agriculture, Conservation and Environment, Mpumalanga Province and Others* [2007] ZACC 13.
[127] High Court of South Africa, *GroundWork Trust & Vukani Environmental Justice Alliance Movement in Action v. Minister of Environmental Affairs & Others*, § 82.4

The High Court of Kenya, applying the principle of intergenerational equity, stressed that the present generation is legally obliged to maintain and enhance the diversity and productivity of natural resources for the benefit of future generations[128].

The essay that defends future generations[129] highlights the different point of view in which the interconnectedness of past, present, and future may be approached[130]. In particular, it refers to indigenous law and its conception of temporality that rejects the construction of the past, present, and future as separate or linear temporal categories[131]. For example, in Mā ori cultures, the intergenerationality necessitates that decisions have to be made with reference to the likely impact on the four generations hence, but encompassing all future descendants[132].

Indigenous perspective on future generations can be enucleated by the case law on ancestral land rights ruled by the Inter-American Court of Human Rights. In the first case, *Mayagna (Sumo) Awas Tingui Community v. Nicaragua* in 2001[133], it can be read: «For indigenous communities, relations to the land are not merely a matter of possession and production but a material and spiritual element which they must fully enjoy, even to preserve their cultural legacy and transmit it to future generations»[134]. Afterward, the Court emphasized the importance of effective safeguards of indigenous land ownership, in order to transmit their culture to future generations[135]. The principle of intergenerational equity furthermore served as a basis for the right of restitution of land[136], as well as for the tribal community[137]. Rights and reparations are also recognised as a part of solidarity that involves past, present, and future generations[138].

The analyzed essay shows that these principles are jointed to climate change with the concurring opinion of *Mayagna (Sumo) Awas Tingni Community v. Nicaragua* decision written by judges Cançado Trindade, Pacheco Gómez and Abreu Burelli that says: «The concern with the element of conservation reflects a cultural manifestation of the integration of the human being with nature and the world wherein he lives. This integration, we believe, is projected into both space and time, as we relate ourselves, in space, with the natural system of which we are part and that we ought to treat with care, and, in time, with other generations (past and future), in respect of which we have obligations»[139]. The expressed integration is fundamental for climate justice.

In the *Leghari Case*, the High Court of Lahore underlines that «Climate Justice links human rights and development to achieve a human-centered approach, safeguarding the rights of the most vulnerable people and sharing the burdens and benefits of climate change and its impacts

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[128] High Court of Kenya, *Waweru v. Republic of Kenya*, (2006) 1 KLR (E&L) §§ 677–696.
[129] M. Wewerinke-Singh, A. Garg, S. Agarwalla, *In Defence of Future Generations*, cit., *passim.*
[130] M. Liboiron, *Pollution Is Colonialism,* Durham, 2021.
[131] K.P. Whyte, *Indigenous Science (Fiction) for the Anthropocene: Ancestral Dystopias and Fantasies of Climate Change Crises*, in 1 *Environment and Planning E: Nature and Space*, 2018, 224 ss.
[132] M. Wewerinke-Singh, A. Garg, S. Agarwalla, *In Defence of Future Generations*, cit., at 4.
[133] IACtHR, *Case of the Mayagna (Sumo) Awas Tingni Community v. Nicaragua*, Judgment (Merits, Reparations, Costs), 31 August 2001.
[134] *Ivi* § 149.
[135] IACtHR, *Case of the Yakye Axa Indigenous Community v. Paraguay*, Judgment (Merits, Reparations, and Costs), 17 June 2005.
[136] IACtHR, *Sawhoyamaxa Indigenous Community of the Enxet-Lengua People v. Paraguay*, Merits, Reparations, and Costs, 29 March 2006, § 378.
[137] IACtHR, *Case of the Saramaka People v. Suriname*, Preliminary Objections, Merits, Reparations, and Costs, 28 November 2007, § 95.
[138] IACtHR, *Case of Bámaca-Velásquez v. Guatemala*, Merits, 25 November 2000, at 23.
[139] *Mayagna (Sumo) Awas Tingni Community*, *supra* note 109, Separate Opinions of Judges A.A. Cançado Trindade, M. Pacheco Gómez and A. Abreu Burelli, § 10.

equitably and fairly. […] Who is to be penalised and who is to be restrained?»[140]. For this reason, scientific and legal circles cannot neglect or dismiss these perspectives because climate justice recognizes that losses and damages resulting from climate change and pollution have a profound impact on indigenous communities and their territories, and the traditional knowledge and conservation practices of indigenous people have a crucial role to play in legal responses to the crises related to climate change[141].

For represent a full spectrum of climate litigation, defending future generations, Authors report the Colombian Supreme Court's landmark decision, in stark contrast to the German Federal Constitutional Court's decision in the case *Neubauer.* In *Lozano Barragán* case[142], judges take place from intergenerational equality and solidarity due to recognize future generations as rights holders and to declare the Amazon as a subject of rights. For these reasons, the judgement orders the government to formulate and implement an intergenerational pact for the life of the Colombian Amazon. The court's reasoning is presented as «heterodox legal reasoning grounded in decolonial thinking»[143], with far-reaching implications for the protection of intergenerational rights.

Therefore, it is vital to surpass tort law categories and also to transcend national borders, and adopt a more comprehensive approach to tackle the complexities of climate change more effectively.

6. Some conclusive remarks

As the review shows, there are key distributive questions related to climate change, and the first step may be recognized the disparities between the Global North and South. Reconciling different approaches and understanding different arguments can significantly improve comprehension of the interdependence between the needs and rights of present and future generations. All these matters seem to pass by the renewal debate about intergenerational justice via climate litigation[144].

Unlike strategic climate litigation in the Global North, litigants in the Global South currently do not focus on eliciting new regulatory targets or instruments from governments on reducing emissions. Rather, they use existing legislative tools and human rights discourses to highlight the vulnerability of their populations to climate change and protect their valuable ecosystems[145]. Several landmark strategic climate litigation cases in the Global North are targeted at driving governmental ambition on climate change[146]. Differently, cases in the Global South tend to include efforts to protect important native ecosystems and focus on the destruction of emblematic ecosystems, giving continuity to ongoing efforts in the environmental movement.

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[140] *Ashari Legari v. Federation of Pakistan* (W.P. No. 255501/2015), Lahore High Court Green Bench, § 21.
[141] M. Wewerinke-Singh, A. Garg, S. Agarwalla, *In Defence of Future Generations*, cit., at 6.
[142] *Andrea Lozano Barragán, et al. v. Presidencia de la República et al.*, Sentencia de la Corte Suprema de Justicia del 5 de abril del 2018, MP Luis Armando Tolosa Villabona, STC 4360-2018, Radicación no. 11001-22-03-000-2018-00319-01.
[143] P.A. Alvarado and D. Rivas-Ramírez, *A Milestone in Environmental and Future Generations' Rights Protection: Recent Legal Developments before the Colombian Supreme Court*, in 30 *Journal of Environmental Law* 524 (2018).
[144] For a systematic overview, H. Weston, *Climate change and intergenerational justice: foundational reflections,* in 9 *Vermont Journal of Environmental Law* 375–430 (2008).
[145] J. Setzer, L. Benjamin, *Climate Litigation in the Global South: Constraints and Innovations,* cit., at 85.
[146] Like the *Urgenda Case* Stichting Urgenda v. Government of the Netherlands (Ministry of Infrastructure and the Environment), ECLI:NL:RBDHA:2015:7145, Rechtbank Den Haag, C/09/456689/HA ZA 13-1396 (*Urgenda*).

The human rights-based approach kept by Global South Courts can provide procedural and substantive protection to citizens in the context of climate impacts, and can help to ensure that development-based projects do not result in adverse human rights consequences[147]. So strategic climate litigation in the Global South does not rely extensively on traditional tort-based approaches to climate damage against either state or non-state actors. In that scenario, it's important to underline the historical marginalization of communities in the Global South that have successfully vindicated collective human rights in regional human rights bodies, so some national courts have a record of innovation in human rights and environmental rights[148].

The difference in approaches is related to the socio-economic and political contexts: actually colonial and post-colonial activities of Northern countries, combined with multinational corporate actors, have closed the human rights abuses and environmental destruction to issues of equity, survival, security, and human capital development[149].

It seems a return of a fundamental contraposition: the ethnocentrism and individualism designed by the Western Law versus the holism and diffusionism typical of systems beyond the Western legal tradition. Legal pluralism[150] – shaped by international environmental law, indigenous rights, human rights – can provide a valid basis for constructing frameworks for intergenerational justice. Recognizing the value of these diverse sources enables us to broaden our temporal perspectives and understand the link between past, present, and future.

Law has to face numerous challenges concerning intergenerational justice in the climate issues. Advocates of 'free market environmentalism' claim that the best way to solve our environmental and resource problems is to lower barriers to trade and to institute property rights in resources that are currently un-owned, or commonly owned[151]. But an analysis of the intertemporal distributional effects of the market represents a crucial step toward the development of an adequate theory of justice between generations. The market does not be the appropriate instrument to limit excess and conserve crucial natural resources. That because the economic system nowadays doesn't take in account that it would be wrong do what deprive the members of future generations of productive means to provide for their basic needs. On the other hand, Environmental legislation may often fail to protect natural resources from free market forces, but in the context of environmental protection and resource conservation, it has a better track record than the free market alternative[152].

It's necessary to go beyond the narrow interests of *homo economicus* and of known legal categories. Because it has made green capitalism to respond at Anthropocene's demands by placing science at the center of legal reasoning, like the Global North approach shows. The challenge is about Law to create a novel integration of contemporary economic, social, and

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[147] J. Setzer, L. Benjamin, *Climate Litigation in the Global South: Constraints and Innovations,* cit., at 88.
[148] C.G. Gonzalez, *Environmental Justice, Human Rights, and the Global South*, in 13 *Santa Clara Journal of International Law* 151–196 (2015).
[149] L. Kotzé, *Human Rights, the Environment and the Global South*, in S. Alam et al. (eds), *International Environmental Law and the Global South*, Cambridge, 2015, 178–179.
[150] É. Gaillard, *L'entrée dans l'ère du droit des générations futures*, in 3 *Les cahiers de la justice,* 2019, 441 ss., at 448 and 449.
[151] C. Wolf, *Markets, Justice, and the Interests of Future Generations,* in 1 *Ethics and the Environment* 154 (1996). For a recent overview on capitalism, political institutions and environmental resources, see A. Somma, *Il diritto del sistema terra. Democrazia, capitalismo e protezione della natura nell'antropocene,* in *DPCE Online,* 2, 2022, 275–311.
[152] R. Taylor, *Economics, Ecology, and Exchange: Free Market Environmentalism*, in 18 *Human Studies Review* 1–8 (1992).

political issues related to environmental protection, by looking beyond the economic theoretical framework and legal reasoning of Western Legal tradition.

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