Institute and Faculty of Actuaries

Climate Inequality & Just Transition

An Introduction for actuaries

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Pathways to Sustainability

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1. Understanding climate inequality

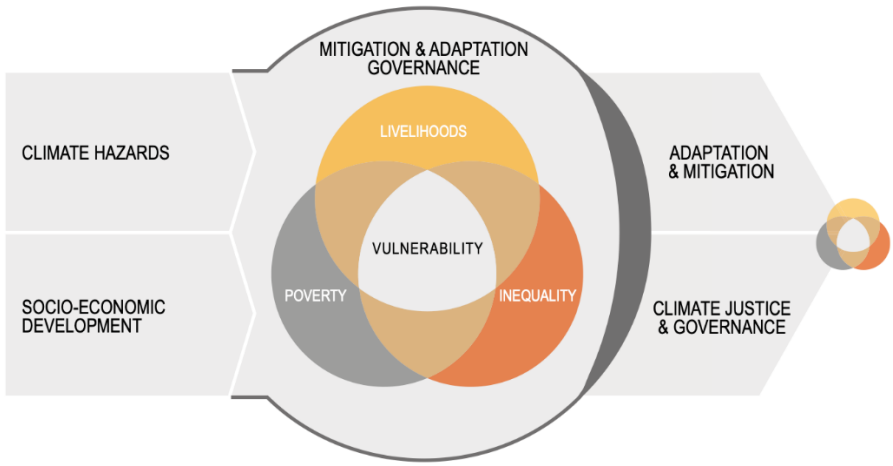
1.1 What is Climate Inequality?

Climate change inequality, or climate inequality, is typically defined as unequal distribution of the impacts and consequences of climate change among different individuals, communities, and regions. It recognizes that certain groups and areas are more vulnerable and disproportionately affected by the effects of climate change, while others may have more resources and capacity to adapt and mitigate its impacts. This could be intra-generational, inter-generational, within and across countries.

1.2 Dimensions of inequalities from direct climate change impacts [1]

Chapter 8 of the IPCC's 6th Assessment Report (AR6) focuses on the impacts of climate change on Poverty, Livelihoods and Sustainable Development. It identifies that the adverse impacts of climate change, development deficits and inequality exacerbate each other. Existing vulnerabilities and inequalities intensify with the adverse impacts of climate change, as the impacts disproportionately affecting marginalised groups, amplifying inequalities and undermining sustainable development. Poor communities, especially in regions with high levels of vulnerability and inequality, are less resilient to diverse climate impact.

Figure 1: Human dimension of climate change at the nexus of climate change, climate hazards and socio-economic development (IPCC AR6, 2022)



It is worth noting that individuals do not fit neatly into one group, and consideration of intersectionality when coming up with solutions to address climate is key. Some of the dimensions of climate change inequality are:

- Gender – Women, especially in low- and middle-income countries, face heightened climate change impacts due to their dependence on natural resources and roles in agriculture. Climate change also exacerbates gender-based violence through increased resource scarcity, conflict, and economic insecurity [2]

[1] IPCC (2022). *Chapter 8: Poverty, Livelihoods and Sustainable Development*. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. [online] Available at: https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Chapter08.pdf

[2] UN Women (2022). Explainer: How gender inequality and climate change are interconnected. [online] Available at: https://www.unwomen.org/en/news-stories/explainer/2022/02/explainer-how-gender-inequality-and-climate-change-are-interconnected

- Geography
    - For the 3.3 billion people who live in countries of very high, or high vulnerability, (e.g., Mozambique, Somalia, Nigeria, Nepal and Haiti), there was 15-times the average mortality from flood, drought and storms over the past decade than for the 1.8 billion living in low vulnerability countries such as the UK, Australia, Canada and Sweden [1] [3]
    - Coastal communities and island nations are more vulnerable to rising sea levels [4]
- Intergenerational – The younger generations are likely to experience a nearly 4-times increase in extreme events compared to the older generations [5]
- Socioeconomic [6]: Hallegatte and Rozenberg (2017) [7] found that across 92 developing countries, the poorest 40% of the population experienced losses that were 70% greater than the losses of people with average wealth. More generally,
    - Low-income households, small-scale producers, and Indigenous communities depend directly on economic activities which are hit hardest by climate change e.g. agriculture and fishing. They face increased risk of reduced crop yields and fish catches that threaten their livelihoods
    - Outdoor workers are more exposed to extreme weather, impacting their health and productivity
    - Cultural losses are unequally distributed, with indigenous populations facing significant risks to their heritage and livelihoods

1.3 Inequalities exacerbated by climate change mitigation and adaptation efforts

While climate adaptation strategies can reduce vulnerability to climate events, poorer communities often have limited capacity to adapt. Without adequate access to healthcare, education, and social safety nets, they are less equipped to prepare for, respond to, and recover from impacts like extreme weather, food insecurity, and health crises. This lack of support hinders their ability to build resilience, making them more susceptible to repeated shocks. Consequently, they remain trapped in a cycle of poverty, with each climate disaster intensifying their struggles and widening inequalities.

[3] where mortality rates measured as death per hazard event and calculated by averaging the country values of mortality per event falling in different vulnerability categories.

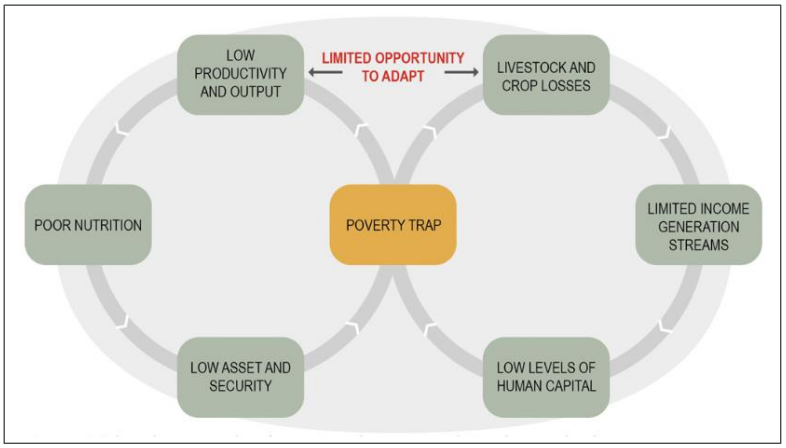
[4] Amaratunga, D. (2024). How does climate change affect coastal regions? Land Journal, [online] Available at: https://ww3.rics.org/uk/en/journals/land-journal/how-does-climate-change-affect-coastal-regions-.html

[5] IPCC (2022). FAQ 3: How will climate change affect the lives of today's children tomorrow, if no immediate action is taken?. [online] Available at: https://www.ipcc.ch/report/ar6/wg2/about/frequently-asked-questions/keyfaq3/

[6] Carbon Brief (2022). In-depth Q&A: The IPCC's sixth assessment on how climate change impacts the world. [online] Available at: https://www.carbonbrief.org/in-depth-qa-the-ipccs-sixth-assessment-on-how-climate-change-impacts-the-world/

[7] Hallegatte, S. and Rozenberg, J. (2017). Climate change through a poverty lens. Nature Climate Change, 7(4), extracted from IPCC AR6 Chapter 8 in https://www.ipcc.ch/report/ar6/wg2/chapter/chapter-8/

Figure 2: Representation of a poverty-environment trap that can increase recurrent poverty. Source: IPCC (2022)



Besides, maladaptation actions (where adaptation actions taken may increase the risk of adverse climate-related outcomes) have been increasingly observed and have a particularly adverse impact on groups that are already vulnerable, so worsening the existing inequalities. For example, desalinization plant that led to higher water costs which disproportionately affected the poorer communities.

On the other hand, climate change mitigation initiatives which are intended to reduce the frequency of climate disasters, could also exacerbate the inequalities. For example,

- As part of an afforestation drive in India, communities have been forcibly evicted from traditional lands and left homeless [8]
- Planting trees as a climate mitigation method requires a significant amount of land, potentially reducing the land available for agriculture – and therefore potentially increasing inequality by way of higher food prices and a larger population at risk of hunger [8]
- An estimated 50–80% of transition minerals are found on or near Indigenous Peoples' lands, exposing these communities to significant risks of land sequestration, environmental harm, and human rights abuses [9]

[8] Oxfam International (2021). Tightening the Net: The implications of net zero climate targets for land and food equity. [online] Available at: https://www.oxfam.org/en/research/tightening-net-implications-net-zero-climate-targets-land-and-food-equity

[9] Oxfam (2023). Climate Equality: A planet for the 99%. [online] Oxford: Oxfam International. DOI: 10.21201/2023.000001. Available at: https://policy-practice.oxfam.org/resources/climate-equality-a-planet-for-the-99-621551/

2. Wider perspective: Climate justice

Populations that suffer the most are often those contributed the least to climate change. This is true when making comparisons within countries or between countries and reflect direct climate injustice.

“Climate Justice links development and human rights to achieve a human-centred approach to addressing climate change, safeguarding the rights of the most vulnerable people and sharing the burdens and benefits of climate change and its impacts equitably and fairly.” (MRFJC, 2018).[10]

In this section, we describe the principles and developments related to Climate Justice.

Box1: Historical pollutions that contribute to climate injustice [11]

- Socioeconomic: [9]
    - In 2019, the super-rich 1% were responsible for 16% of global carbon emissions, which is the same as the emissions of the poorest 66% of humanity (5 billion people).
    - The least polluting 50% of households contribute only 13-15% of global consumption-based household greenhouse gas emissions, while the most polluting 10% contribute 34 – 45% of global emissions. Since the 1990s, the super-rich 1% burned through twice as much of the carbon budget as the poorest half of humanity combined. This is often referred to as the cumulative emissions.
- Intergenerational: To limit global warming below 1.5’C pre-industrial level, younger generations (an average person born around 2017) can emit only an eighth of the lifetime emissions of their grandparents (someone born in 1950), and even so, they are still likely experience nearly four-fold increase in extreme events. [5] [12]

2.1. Differences between (in)equality, equity and justice

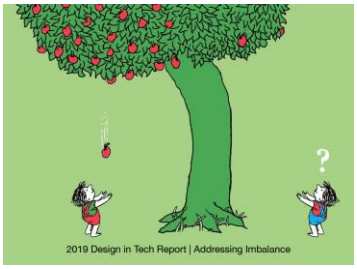
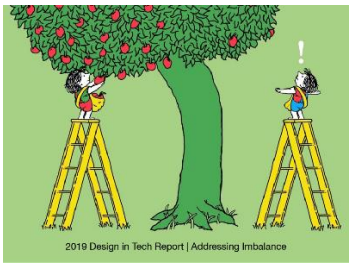
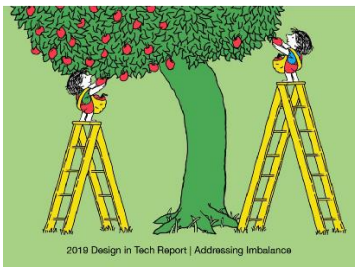
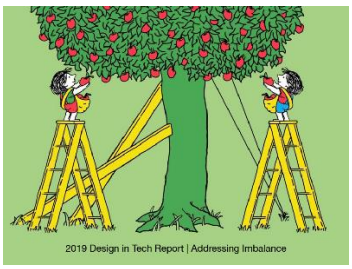
First, let’s understand the differences of some terminologies and concepts related to inequality and justice. For further details, please read the report "Readjusting the Rations" by the IFoA Financial Inequality Working Party (2014) [13], which provides a comprehensive analysis of financial inequality issues.

[10] IPCC (2022). Annex II: Glossary. In: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Möller, V., R. van Diemen, J.B.R. Matthews, C. Méndez, S. Semenov, J.S. Fuglestvedt, A. Reisinger (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp. 2897–2930. Available at: https://www.ipcc.ch/report/ar6/wg2/downloads/report/IPCC_AR6_WGII_Annex-II.pdf

[11] IPCC (2023). Summary for Policymakers. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. [online] Available at: https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_SPM.pdf

[12] Hausfather, Z. (2019). Analysis: Why children must emit eight times less CO2 than their grandparents. Carbon Brief. [online] Available at: https://www.carbonbrief.org/analysis-why-children-must-emit-eight-times-less-co2-than-their-grandparents/

[13] Financial Inequality Working Party (2014). Readjusting the Rations Report of the Financial Inequality Working Party 2014. [online] London: Institute and Faculty of Actuaries. Available at: https://www.actuaries.org.uk/system/files/documents/pdf/b2-wp-inequality-full-paper-final.pdf

Figure 3: Differences between Inequality, equity and justice [14]	
	**Inequality** Two individuals have unequal access to the fruits
	**Equality** Same type and number of tools are given to the two individuals, but the access to the fruits is still different.
	**Equity** An equitable solution should provide different tools for everyone to achieve the same outcome.
	**Justice** Justice fixes the systems that leads to long-term, sustainable, equitable access for future generations.

2.2. Principles of Climate justice [15]

Generally, Climate Justice answers questions such as:

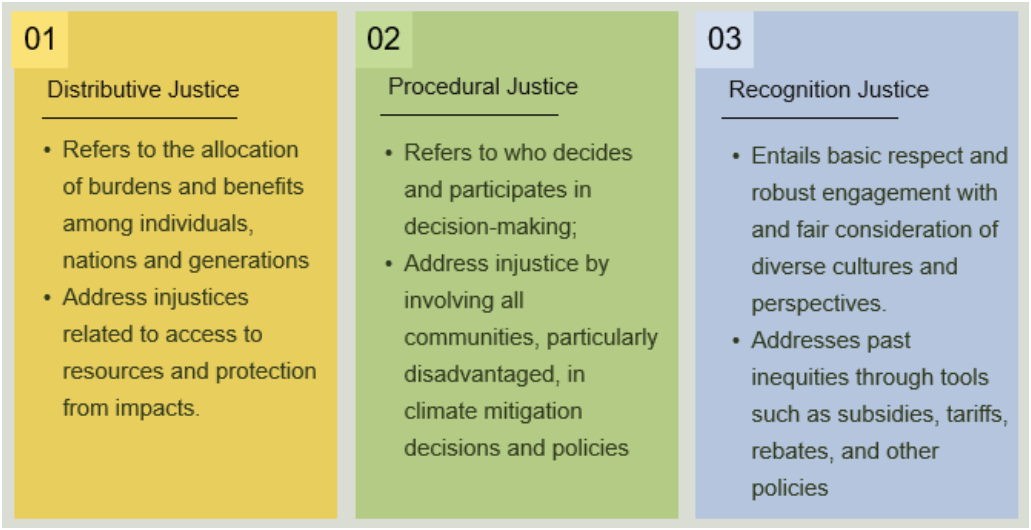
- What climate responsibilities do current generations have to future generations?
- Who has what responsibilities to address climate change?
- Given that there is a limited “greenhouse gas budget”, how should it be distributed?

For further information, we recommend reading the Stanford Encyclopaedia of Philosophy entry on climate justice (Caney, 2021)

[14] George Washington University (2020) Equity vs. Equality: What's the Difference? Available at: https://onlinepublichealth.gwu.edu/resources/equity-vs-equality/#:~:text=Equality%20means%20each%20individual%20or%20group%20of%20people%20is%20given

[15] Caney, S. (2021) 'Climate Justice', in Zalta, E.N. (ed.) The Stanford Encyclopedia of Philosophy. Winter 2021 edn. Available at: https://plato.stanford.edu/archives/win2021/entries/justice-climate/

Box 2: General principles for climate justice (IPCC AR6, 2022) [16]



Box3: Current global developments on climate justice

Climate justice is not a topic for just individuals and companies but between countries. Here we summarise the negotiations between countries related to climate justice as of COP 28 in November 2023.[17] [18]

- Developing countries have been emphasizing the principles of Common but Differentiated Responsibilities and Respective Capabilities (CBDR-RC) as stated in UNFCCC and Paris Agreement.

- Developed countries such as the US, UK, and EU have pledged to contribute to Loss and Damage fund over $700m, however this is less than 0.2% of the irreversible economic and non-economic losses developing countries are facing from global heating every year.

- Developed countries pledged to contribute USD100 billion per year by 2020 for developing countries for reducing emissions. Based on preliminary data, developed countries seemed to have achieved the goal as of 2022 but mostly non-concessional loans, not grants.

[16] IPCC (2022). National and Sub-national Policies and Institutions. In: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. [online] Available at: https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_Chapter13.pdf

[17] Third World Network (2023). Dubai Climate News Updates (November-December 2023). [online] Available at: https://www.twn.my/title2/climate/fullpdf/Dubai Climate News Updates NovDec23final.pdf

[18] Evans, S. and Gabbatiss, J. (2023). COP28: Key outcomes agreed at the UN climate talks in Dubai. Carbon Brief. [online] Available at: https://www.carbonbrief.org/cop28-key-outcomes-agreed-at-the-un-climate-talks-in-dubai/

3. What does the future hold for climate inequality and justice?

Does climate inequalities and justice matter to everyone including those at the privileged side? Beyond the moral case, this chapter will examine how the impacts of inequalities affect everyone.

3.1. Consequences of income inequality

In their book "The Spirit Level", Wilkinson and Pickett showed that there are strong correlations between income inequality vs. health and social problems. The consequences of inequality include adverse impacts on child wellbeing, mental health, homicides and imprisonment. [13]

The rich are also affected by widening income inequalities. [19] [20] For example,

- Increased in robbery rates and vehicle crime rates[21]
- Reduced economic growth as due to low overall household spending, and lower productivity as poor children couldn't afford better education
- Financial crisis as studies shows that higher inequality in advanced economies was associated with the global financial crisis by intensifying leverage, overextension of credit, and a relaxation in mortgage-underwriting standards and allowing lobbyists to push for financial deregulation
- Eroding social cohesion: Instead of making decisions on education and occupation, individuals are incentivised to secure privileged treatment, which increases resource misallocation, corruption, and nepotism and subsequently reduces confidence in institutions

3.2. Consequences of climate inequality and injustice

As climate change widens the inequality gaps, it worsens the impacts of income inequality that affects everyone e.g., the climate displacement. What's worse, it also obstructs climate transition.

3.2.1. Climate displacement

A particular impact of climate inequalities will be the rising numbers of people displaced by impacts of climate change both through direct impacts of severe weather and flooding, and the indirect impacts from conflicts and food insecurity. The World Bank 2018 Groundswell, report, stated that up to 216 million people may be displaced by climate by 2050. And most all the displaced will not migrate to other countries, this will be a material geopolitical challenge.

Climate displacement is also not restricted to tropical regions nor the global south. In 2020, Propublica wrote how "climate change will force a new American migration" [22]. The article maps out the danger zones that will close in on Americans over the next 30 years. It states that these populations shift eat away at prosperity, dealing repeated economic blows to coastal, rural and

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[19] Dabla-Norris, E., Kochhar, K., Suphaphiphat, N., Ricka, F. and Tsounta, E. (2015). Causes and Consequences of Income Inequality: A Global Perspective. IMF Staff Discussion Note SDN/15/13. [online] Available at: https://www.imf.org/external/pubs/ft/sdn/2015/sdn1513.pdf

[20] McKay, L.C. (2023). The state of income inequality. [online] Federal Reserve Bank of Minneapolis. Available at: https://www.minneapolisfed.org/article/2023/the-state-of-income-inequality

[21] Newbum, T. (2016). Social Disadvantage, Crime, and Punishment. In: H. Dean and L. Platt, eds., Social Advantage and Disadvantage. Oxford: Oxford University Press, pp.322-340. [online] Available at: https://eprints.lse.ac.uk/68133/1/Newburn_Social%20Disadvantage%20and%20Crime.pdf

[22] Lustgarten, A. (2020). Climate Change Will Force a New American Migration. [online] ProPublica. Available at: https://www.propublica.org/article/climate-change-will-force-a-new-american-migration

Southern regions, which could in turn push entire communities to the brink of collapse. A process it says that has already begun in rural Louisiana and coastal Georgia.

In UK, whilst confirmed withdrawal of erosion or flood support has largely been restricted to small villages in coastal regions bigger challenges lie ahead. Hard choices will be required in regions such as the Somerset levels, Thames estuary and Eastern England, on whether to make significant investment in flood prevention, or whether not to.

The societal consequences of displacement, both inside and outside of each of our sovereign borders, will be far reaching.

3.2.2. The risks of losing Indigenous rights and local community knowledge

Climate injustice can also undermine the Indigenous rights and their engagement. Lower engagement risks losing the local traditional knowledge that is associated with better management/ conservation and biodiversity sustainability. Local traditional knowledge is increasingly seen as fundamental to risk reduction, food and water security, and more equitable, effective and durable adaptation outcomes. [23]

3.3. The Consequences of Unjust Transition: Perceptions and Reality

The London School of Economics and Political Science published a paper[24] in June 2024, explaining that an unjust transition, whether it is actually happening or is just perceived to be happening, can "heighten the risk of social unrest and transition delay occurring, which in turn can translate into financial risk with implications for both corporate investors and sovereign bondholders."

[23] Carmona, R., Dorough, D.S., MacDonald, J.P. and Rai, T.B. (2023). The Indigenous World 2023: The Intergovernmental Panel on Climate Change (IPCC). [online] IWGIA. Available at: https://www.iwgia.org/en/ip-i-iw/411-ipcc/5156-iw-2023-ipcc.html

[24] Just Transition Finance (2024). Mapping justice in national climate action. [online] Available at: https://justtransitionfinance.org/wp-content/uploads/2024/06/Mapping-justice-in-national-climate-action.pdf

4. Just Transition as the solution

4.1. Importance of Just Transition

The challenges of solving climate inequality, promoting climate justice, and a transition to a greener environment are interrelated. The IPCC AR6 notes that “climate resilient development is enabled when governments, civil society and the private sector make inclusive development choices that prioritise risk reduction, equity and justice.”

4.2. How can a just transition be achieved?

There is not a single route to achieving a just transition, but the recommendations in IPCC AR6 [25] are a good place to start:

- "A key pathway to climate resilience in the health sector is universal access to healthcare”
- “Policy mixes that include weather and health insurance, social protection and adaptive safety nets, contingent finance and reserve funds, and universal access to early warning systems combined with effective contingency plans, can reduce vulnerability and exposure of human systems”
- “Social safety nets that support climate change adaptation have strong co-benefits with development goals such as education, poverty alleviation, gender inclusion and food security”
- “Land restoration contributes to mitigation and adaptation with synergies via enhanced ecosystem services and with economically positive returns and co-benefits for poverty reduction and improved livelihoods”

Other papers that put forward suggestions on how to achieve a just transition include the World Inequality Lab’s Climate Inequality Report 2023 [26] and the Grantham Research Institute on Climate Change and the Environment’s paper[27] “Just Nature – How finance can support a just transition at the interface of action on climate and biodiversity”. This latter paper concludes with five recommendations for financial institutions to support the just nature transition, which is one aspect of an overall just transition. In brief, financial institutions should:

1. Include just transition principles in their own plans for net zero, nature and biodiversity
2. Set just transition expectations of the businesses they lend to and invest in and ensure that these are included in the net zero and biodiversity plans of nature-exposed companies
3. Purposely channel finance to companies committed to and making progress to support a just transition for workers, suppliers, communities and consumers
4. Engage with policymakers to reform agricultural, forestry and nature policies so that they support a just transition and provide the incentives, the rules as well as the catalytic public finance that is needed to scale up private investment
5. Work to ensure that social and just transition factors are effectively included in key frameworks for reporting and transparency, such as the Task Force for Nature-related Financial Disclosures (TNFD); and publicly disclose strategies, policies and performance on social issues in the nature transition

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[25] IPCC (2023). Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)]. IPCC, Geneva, Switzerland. Available at: https://www.ipcc.ch/report/ar6/syr/downloads/report/IPCC_AR6_SYR_LongerReport.pdf

[26] Chancel, L., Piketty, T., Saez, E. and Zucman, G. (2023). Climate Inequality Report 2023. [online] World Inequality Lab. Available at: https://wid.world/wp-content/uploads/2023/01/CBV2023-ClimateInequalityReport-3.pdf

[27] Robins, N., Muller, S. and Szwarc, K. (2022). Just Nature: How finance can support a just transition at the interface of action on climate and biodiversity. [online] London: Grantham Research Institute on Climate Change and the Environment. Available at: https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2022/08/Just_Nature_How_finance_can_support_a_just_transition_at_the_interface_of_action_on_climate_and_biodiversity.pdf

5. How might actuaries contribute to a just transition?

5.1. Why is this relevant for actuaries?

Firstly, understanding climate change and sustainability issues or risks is part of the Actuaries Code under the duties of competency and care.

Members of the IFoA should be aware of their professional obligations to "appropriately consider, and communicate clearly, the impact of climate change and sustainability issues or risks within their actuarial work".

Box 4: Standards and sets of non-mandatory guidance that cover the wider area of climate change and sustainability, as well as the IFoA's public interest obligations [28] [29] [30] [31]	
IFoA guidance	• Ethical and professional guidance on climate change (2024) • Risk alert: Climate change scenario analysis (2024) • Risk alert: Climate change and sustainability related issues (2022) • Risk alert: Climate-related risks (2017)
Standards	• Technical Actuarial Standard 100: General Actuarial Standards (UK standard) • Need to allow for "all internal or external environmental factors that have the potential to influence the technical actuarial work either directly or indirectly"
IFoA is a Royal Chartered Body	• Committed to serving the public interest • Strategy for 2020-2024 mentions using and growing IFoA's position of influence to serve the public interest

As we have seen, climate inequalities impact outcomes. What's more a successful transition will almost certainly need to be a just transition – so plausible pathways to net zero need to incorporate these just aspects.

Actuaries need to have the appropriate competencies and skills to account appropriately for the risks associated with climate change in the context of their specific area of work. In some practice areas, this will also include developing skills to manage and mitigate some of those risks directly.

Although we (the actuarial profession) might not be expected to solve climate change, at the most basic, we do need to ensure that the relevant risks are considered and communicated appropriately. Understanding the role of climate (in)justice and (in)equality in future economic pathways is part of understanding the wider picture of climate-related risk.

But more than this, some actuaries will be in professional positions to address (or exacerbate!) some aspects of climate inequality. At the very least, you would expect actuaries to want to mitigate impacts that have little to no cost to them or those they advise.

[28] Institute and Faculty of Actuaries (2024). Risk Alerts. [online] Available at: https://actuaries.org.uk/standards/risk-alerts/

[29] Institute and Faculty of Actuaries (2024). Ethical and professional guidance on climate change. [online] Available at: https://actuaries.org.uk/media/f1ih0kzh/ethical-and-professional-guidance-on-climate-change.pdf

[30] Financial Reporting Council (2023). TAS 100: General Actuarial Standards. Version 2.0. [online] Available at: https://www.frc.org.uk/documents/4287/TAS_100_General_Actuarial_Standards_Version_2.0.pdf

[31] Institute and Faculty of Actuaries (2020). Strategy 2020 – 2024. [online] Available at: https://www.actuaries.org.uk/system/files/field/document/IFoA-strategy-2020.PDF

5.2. Public interest and fairness: the role and opportunity for the IFoA

The IFoA is a Royal Chartered Body, and as such is committed to serving the public interest. In its strategy for 2020-2024 [31], the IFoA talks about using and growing its position of influence to serve the public interest. Supporting the awareness of climate injustice and the actions that can be taken, by actuaries and more widely, to address climate injustice is a natural, and probably expected, element to this. The IFoA has recently highlighted a range of public interest issues, including inter-generational fairness, sustainability and gender equality. All of these are factors magnified by climate inequalities.

As a respected professional body, IFoA representatives could take a leadership role in raising awareness of climate injustice and helping convene discussions with other organisations and policymakers. Actuaries may have a particularly valuable role in highlighting the systems impacts of intersectional factors, fairness risk perspectives, especially intergenerational, and impacts of tipping points on tail risks.

Fairness is already part of individual actuaries existing work e.g. intergenerational fairness in with-profit funds, Treating Customers Fairly ("TCF") and Principles and Practises of Financial Management ("PPFM"). "Biodiversity & Justice" published by IFoA Biodiversity Working Party recommended the following concepts set out by Rutgerd Boelens, Jeroen Vos and Tom Perreault in their book Water Justice:[32]

- "Recognition – Inequality and discrimination must be recognised and considered"
- "Participation – All those affected must be involved in the decision-making process"
- "Distribution – Resources must be allocated as fairly as possible"
- "Socio-ecological justice – Nature must be considered as a participant."

It's hard to consider a broader or more direct public interest than 'fairness'. There is a significant opportunity for the IFoA to engage and support its public interest duty through engagement on climate inequality and justice. The IFoA can leverage actuaries' distinct perspectives and borrow from a longstanding practical experience of fairness applied across many domains.

5.3. What can individual actuaries do?

With considering recommendations in section 4.1, there are four broad areas in which actuaries can take actions to influence climate change inequality:

- Developing / providing solutions[33] [13]
- Understanding the risks[34]
- Community engagement[35]
- Individual action

[32] Baxter, S. (2023). Biodiversity justice. British Actuarial Journal, 28, E3. [online] Available at: https://www.cambridge.org/core/journals/british-actuarial-journal/article/biodiversity-justice/49DCEA5C3BF15D5B01599C5B048EA6F7

[33] Society of Actuaries (2020). Social Discounting and Climate Change. [online] Available at: https://www.soa.org/resources/research-reports/2020/social-discounting-climate-change/

[34] Kikstra, J.S., Waidelich, P., Rising, J. et al. (2021). The social cost of carbon dioxide under climate-economy feedbacks and temperature variability. Nature Communications, 12, 2467. [online] Available at: https://www.nature.com/articles/s41467-021-23613-y

[35] Flood Re (2024). Flood Re. [online] Available at: https://www.floodre.co.uk/

Box 5: specific actions actuaries can take	
Developing / providing solutions	• Design financial systems that ensure equitable sharing of resources and benefits across all sectors • Product design and pricing - consider eligibility and affordability • Build more inclusive offering and coverage - find micro-finance solutions for communities to enable them to build resilience • Increase allocations to collaborative, pro-social investment
Understanding the risks	• Carrying out model-based assessments - focused on climate change inequality and justice • Integrate climate risks and opportunities in risk management and business strategies planning • Apply social discounting factor in cost-benefit analysis of projects and investments
Community engagement	• Commission and support further research that seeks and includes local community voices • Contribute to public discourse and seek to influence where appropriate - IFoA, policymakers, regulators and broader society • CPD and other learning opportunities • Engage with other stakeholders to develop innovative solutions – e.g., FloodRe in the UK
Individual action	• Take action to reduce your environmental impact • Consider climate inequality and provenance when making day to day decisions – e.g., purchases, holidays, investments • Sign climate justice petitions and take part in other grassroots activities (where consistent with the Actuaries' Code) • Raise awareness with colleagues, clients and friends

6. Conclusion: From enlightened attention to purposeful intention

Figure 4: No one is at the safe side eventually for climate change

This conclusion brings together both head and heart elements of climate injustice. When we investigate the long-term impacts, the approach that we know is morally right turns out to favour financial interests. And this is before more tail risk consequences of greater geo-political conflict, sovereign state failure or addressing the people that may be displaced by climate impacts. It's in our enlightened self-interest to act.

But is there also space for purpose and intention? Surely, self-interested attention should be the extreme minimal of our efforts. Actuaries have long reflected on fairness and justice several elements of which are embedded in regulations and guidance.

Indeed, many insurers and financial service firms have direct commitments to fairness within their values and mission statements. Individually, many actuaries take pride in living by an innate sense of fairness and find purpose in supporting it. The authors have support efforts by volunteering to writing this paper. As yet, climate justice is under appreciated and current efforts will almost certainly improve simply through better awareness.

So, self-interest action is surely a minimal baseline. Beyond attention, there is a considerable space for intention – to leverage the opportunities, to align with personal and corporate values, to stretch for the maximal, just outcomes.

Acting with intention brings purpose to us individually and also to our organisations. It's part of our license to operate but has a much deeper resonance when we can also address inequality.

Finally, once we've seen, we can't unsee. We hope we have helped bring you to the same 'seeing'. And then each of us must act as, in the words of Mahatma Gandhi, "You must be the change you wish to see in this world".

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