

Real People, Real Impacts: The Climate Impact Equity Lens

Key Findings

- Policymakers often rely on economic models of climate change impacts on the world as a whole, or large regions, but these aggregate figures – and the per capita averages they produce – do not reflect the wide range of projected climate outcomes, or the severity of impacts on some people.
- The Climate Impact Equity Lens (CIEL), developed by the Stockholm Environment Institute, makes it possible to look at climate impacts for real people instead of regional averages. It looks at a future in which nothing is done to prevent dangerous climate change and identifies net “winners” and “losers” based on whether the emission-reduction costs avoided are greater or lower than climate damages.
- Climate policy focused on protecting the most vulnerable individuals – some of whom are already suffering net losses – would be far more stringent than policy based on global or regional averages. In the short run, however, most people worldwide still have net gains from inaction.
- In the long run, almost everyone will be a net “loser” from climate change. By 2100, the majority of the global population will be suffering net losses from climate change in the absence of a deliberate, far-reaching climate policy to control greenhouse gas emissions.

Science indicates that climate change is an urgent problem, with enormous potential damages in sight if prompt, decisive action is not taken to reduce global greenhouse gas emissions. Most climate-economics models that inform public policy, however, suggest that damages will be fairly modest, and that there is plenty of time to deal with the problem.

Underlying this mismatch is the fact that most climate-economics models estimate damages for the world as a whole, for large regions, or at best, for whole countries. Yet those aggregate figures – and the per capita averages they produce – obscure the wide range of climate outcomes that can be expected

depending on where precisely individuals live, their income, how they earn their livelihood, and other key vulnerabilities to climate change.

In reality, some people are already facing severe climate damages, with much worse to come within the next three or four decades, while the majority of the world population continues to benefit from the status quo: they’re saving money by continuing to use fossil fuels and not investing in emission reductions.

In the long run, the science predicts, almost everyone will suffer losses from climate change – if not those who directly benefit from inaction today, their children, grandchildren or great-grandchildren. Most policymakers, however, do not look that far into the future, and conventional economic models may not even let them see clearly how their short-sightedness will affect future generations. Climate policy aimed at protecting the most vulnerable individuals, on the other hand – some of whom are already suffering net losses – would be far more stringent than policy based on global or regional averages.

The CIEL tool

The Climate Impact Equity Lens (CIEL), developed by the Stockholm Environment Institute, aims to fill this knowledge gap by providing a tool to look at climate impacts on real people. CIEL compares an individual’s climate damages in a given year to her savings from not reducing emissions, based on the best information at our disposal. CIEL does not predict exact dollar impacts in the future, but rather seeks to illustrate the extent of potential climate damages on individuals and the surprising diversity of projected impacts on people in different places and under different circumstances around the world.

CIEL can help us think about whether we are net winners (savings greater than costs) or net losers (costs greater than savings) today, and how that is likely to change over time. CIEL



Photo by Babita Sinha

Maheswar Mahto, Deoghar District, Jharkhand, India

also lends itself to thinking about whose well-being we should consider in developing climate policy: average citizens in our own communities or our own countries, the most vulnerable people around us, or people all around the world, today and in the future? Many current and future net losers from climate change live in the poorest countries in the world, which have contributed next to nothing to past emissions, and will need significant international assistance in keeping emissions down as their economies grow.

Tallying costs and benefits

In CIEL, the projected costs of climate change are estimates of damages – flooding, storm damages, lost income – expected to result from higher average temperatures, sea-level rise, and changes to historical weather patterns; these damages are averaged over the 10-year period surrounding a given year. The benefits of climate change are our savings from not spending money to reduce emissions. If instead we were to take vigorous action to permit the best possible chance of avoiding dangerous climate change, we would have to pay non-trivial costs for new technologies and alternative energy sources.

For each individual, climate damages and savings from not reducing emissions are compared on the CIEL graph. (See Figure 1, described in detail in the section below.) Each marker (here, a two-letter abbreviation) maps an individual's losses from climate damages as a share of income against her savings from avoided emission reduction costs as a share of income. Individuals above and to the left of the break-even line suffer net losses in a given year; individuals below and to the right of the red line reap net gains.

The data used in CIEL comes from two scenarios from another SEI-developed model, Climate and the Regional Economics of Development (CRED): a no climate policy, business-as-usual scenario, where nothing is done to prevent dangerous climate change; and a very-low-emission scenario, where everything that can be done to slow emissions is done. The ideas behind CIEL model come from the literature analyzing the political economy of the environment, which has a strong focus on questions of equity.

In CIEL, vulnerability to climate damages is estimated using four factors:

- Income per capita – household income divided by the number of people in the household
- Economic vulnerability – share of household income derived from industries that are especially vulnerable to climate change, such as agriculture, fishing and tourism.
- Sea-level rise vulnerability – vulnerability of home to sea-level rise
- Water shortage vulnerability – adequacy of local water supply

Emission-reduction costs are determined by income per capita (the poorer you are, the greater your savings from not paying emission-reduction costs are as a share of your income) and region of origin (each region has a different pattern of energy use). The nine world regions used in CIEL are:

- Africa (AF) includes Sub-Saharan and North Africa;
- China (CH) includes Hong Kong but not Taiwan or Macau;
- Eastern Europe (EE) includes Russia and non-EU Eastern Europe, i.e., European ex-USSR, ex-Yugoslavia, and Albania;
- Europe (EU) includes EU-27, Norway, Switzerland, Iceland, and Turkey;

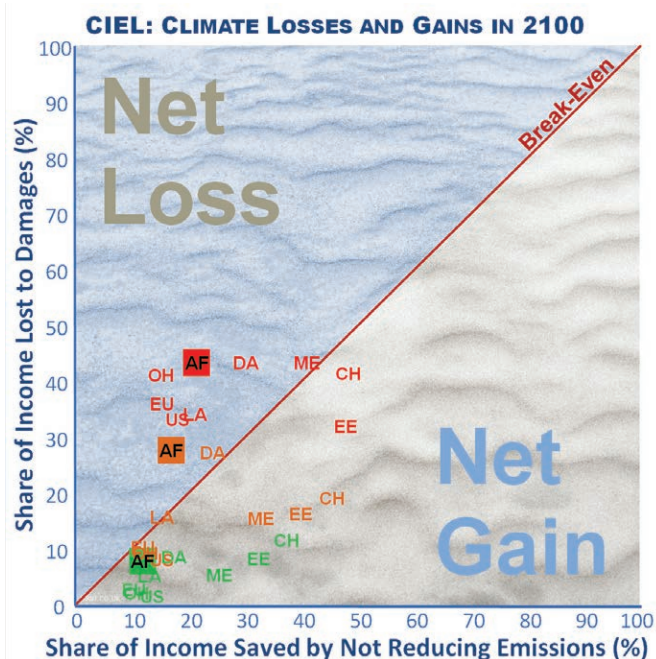


Figure 1: Most vulnerable, average person, and least vulnerable in 9 world regions, 2100

Note: RED=most vulnerable; ORANGE=average person; and GREEN=least vulnerable. AF=Africa; CH=China; DA=Developing Asia/Pacific; EE=Eastern Europe; EU=Europe; LA=Latin America/Caribbean; OH=Other High Income; ME=Middle East; and US=United States.

- Latin America and the Caribbean (LA) includes Puerto Rico and all Virgin Islands;
- Middle East (ME) excludes North Africa;
- Other High Income (OH) includes Canada, Japan, South Korea, Australia, and New Zealand;
- Developing Asia/Pacific (DA) includes South and South-east Asia, Taiwan, Asian ex-USSR and Pacific;
- United States (US) excludes Puerto Rico and smaller island territories such as Guam and American Samoa.

It is important to note a key modelling choice in CIEL: Although in international climate policy discussions, it is presumed that developing countries' mitigation costs will be partly or fully covered by their wealthier neighbours, CIEL assumes that each country pays its own costs, with no international aid.



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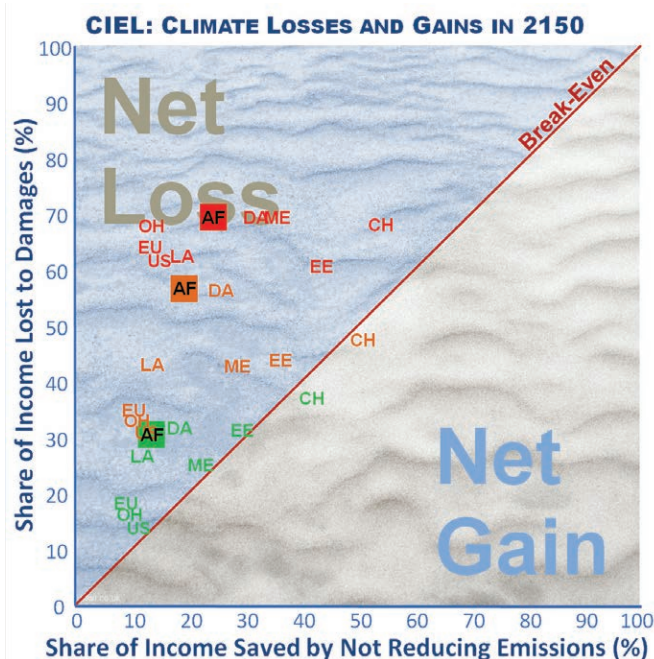


Figure 2: Most vulnerable, average person, and least vulnerable in 9 world regions, 2150

Note: RED=most vulnerable; ORANGE=average person; and GREEN=least vulnerable. AF=Africa; CH=China; DA=Developing Asia/Pacific; EE=Eastern Europe; EU=Europe; LA=Latin America/Caribbean; OH=Other High Income; ME=Middle East; and US=United States.

Different regions, different climate impacts

We start by calculating aggregate climate impacts in the nine regions, mapping out the outcomes for the average person in each region in 2100, as shown by the orange markers in Figure 1. The average persons in Africa and Developing/Asia suffer net losses in 2100; that is, their climate damage costs are larger than their savings from not reducing emissions. In Latin America and the Caribbean, and Europe, climate damages and savings are approximately equal (with a net value of about zero) for the average person. And in China, Eastern Europe, Middle East, Other High Income, and the United States, the average person sees net gains.

As noted before, however, regional averages obscure an enormous diversity of projected outcomes. The red and green markers complete the picture, showing the projected damages for the most vulnerable (red) and least vulnerable (green) people in each region.

For example, the high-vulnerability person from Africa is from Comoros, a nation composed of several islands in the Indian Ocean. This sample person supports four children on \$500 a year (or \$100 per household member), all of which comes from fishing – an economic sector that is, because of warming waters and ocean acidification, particularly vulnerable to climate change. She lives very close to the ocean at less than 1 meter of elevation, and fresh water is abundant in her local area.

The low-vulnerability person from Africa, meanwhile, also lives in a coastal area, in Gabon, but her home is not threatened by sea-level rise or storm-surge flooding. Her household of three makes \$38,000 (\$13,000 per person) a year, all derived from the oil industry. She faces no risk of water shortage.



Rebecca Sharpless, Miami, Florida, United States

In 2100, the low-, average-, and high-vulnerability people from Africa have very different experiences: from net gains for the person in Gabon, to small net losses for the average African, to much larger net losses for the person in Comoros.

Ultimately, almost everyone loses

Figure 2 shows the longer-term outlook: By 2150, all three sample Africans are experiencing damages greater than savings, although net losses for the most vulnerable would be especially devastating. All nine world regions have a similarly wide spread of climate impacts among individuals in CIEL:

- Damages increase over time; avoided emissions reductions costs do too, but nowhere near as quickly.
- There is a very wide diversity of costs and benefits within each region that is not well-represented by the average person's experience.
- In 2100, the low-vulnerability person in all regions sees net gains from failing to act on climate change, whereas the high-vulnerability person sees net losses everywhere except in Eastern Europe and China.
- By 2150, even the low-vulnerability person sees net losses in every region except for China.

Why do the sample people from Eastern Europe and China have a more optimistic outlook? In Eastern Europe, less than 3 percent of the population lives near the coast and at elevations lower than 5 meters above sea-level, and no country (as a whole) experiences water scarcity. While incomes are low compared to Europe, Other High Income, and the United States, they are still fairly high in comparison to Africa, China, and Developing Asia/Pacific. In both Eastern Europe and China, high savings from not reducing emissions have a big impact on net losses and gains. China's damage costs are relatively high for all three sample people, but their savings from not reducing emissions are also high (as a share of their incomes) compared to savings in other regions.

Failing to stop climate change is a bad deal for many people by 2050 and an even worse deal for most people by 2100. Acting to greatly reduce emissions down to levels consistent with avoiding dangerous climate change (which in CIEL means a good chance of keeping warming below 2°C) carries substantial costs, but it's a lot cheaper than the alternative.

Policy recommendations

Climate change presents an enormous challenge to policymakers. To make the best decisions, it is important they keep the best interests of the net losers in mind. We offer this checklist for climate negotiators to help them think about what it takes to construct a climate policy that will protect the most vulnerable both now and in the future:

- **Is it fast enough?** We have only until about 2020 to begin large-scale reductions to greenhouse gas emissions.
- **Is it stringent?** Small reductions won't do the job. By 2050, climate science suggests, emissions must be halved. By 2100, net emissions must be next to nothing.
- **Is it feasible?** The global community committed to "common but differentiated responsibilities" for a reason: Climate policy will fail if it does not give developing countries – and especially the very poorest countries – special rights to emit as their economies grow and special assistance in developing low-carbon technologies.
- **Is it fair?** What is feasible and what is fair go hand in hand. Industrialised countries have created the climate problem; they need to both pay for their own emission reductions and support reductions in the developing world.
- **Is it politically viable?** If a fast, strong, feasible and fair climate policy is not politically viable, then it is the role of climate negotiators and other policymakers to make it viable.

This policy brief is based on the report *Real People, Real Impacts: The Climate Impact Equity Lens*, by Elizabeth A. Stanton, Ramón Bueno and Marion Davis, published by the Stockholm Environment Institute in November 2011 and available on the SEI website.

All people pictured in this document are profiled in the full report.

To learn more about CIEL, visit www.SEI-CIEL.org.



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