

The Impact of Climate Variability on Inequality: Evidence from Indonesia

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MAIN MESSAGE

Households in Indonesia that are rural, older, larger, and/or headed by women experience worsening income, deeper poverty, and social exclusion as a consequence of climate instability.

New research finds that inequality increases with changes at the extreme temperatures (below 18 and above 27 degrees Celsius), but it decreases around average climatic conditions.

The study notes that climate change and climate variability may have disproportionately larger effects on disadvantaged populations in places like South East Asia with high risks of climate hazards, and potentially lower ability to absorb and recover from the damage.

The authors investigate whether climate variability in Indonesia and Vietnam has any regressive effects on income stability and inequality,

unpacking which household characteristics drive the relationship.

CONTEXT & MOTIVATION

About 40% of the population in Indonesia faces high mortality risks due to multiple climate hazards, such as tsunamis, floods, landslides, drought, and earthquakes.

Some studies suggest that the biggest losses are faced by agriculture, the biggest income source for poorer people in Indonesia.

Other studies indicate that agricultural is not the only sector affected by climate variability. Rapid development in Indonesia has also moved many people out of farm activities to wage and non-farm employment. Some are the most marginalized and disadvantaged, such as migrants, the elderly and low-skilled women. Due to lack of resources and opportunities, the

poorest and most marginalized groups are bound to be the most exposed and vulnerable to climate impacts.

The new study examines whether climate variability has a regressive effect and, if so, among which households in Indonesia and Vietnam.¹

METHODS

The authors analyze the direct effects of annual and seasonal temperature on income and income inequality over time. They examine this for each country's population as a whole and also investigate how these impacts change for the most vulnerable and marginalized groups.

The analysis uses panel data on 4,909 households interviewed in five rounds of the regionally representative Indonesian Family Life Survey (IFLS 1993/94, 1997, 2000, 2007, and 2014/15).

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RESULTS

Disparities between Indonesia's richest and poorest have been progressively increasing, especially in the Sulawesi and Kalimantan regions where income per capita has grown 58% more than in Java and 39% more than in Sumatra since 1993 (see Figure 1).

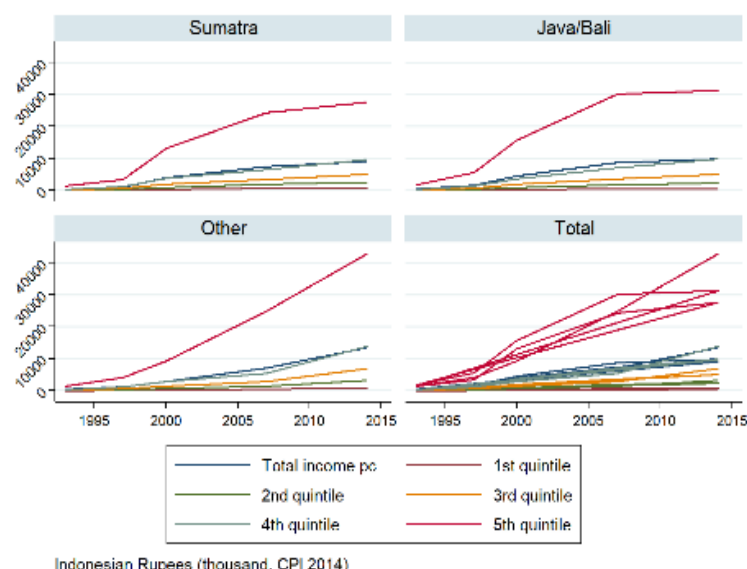
Poor, agricultural, and rural households have generally lagged behind. Similarly, households headed by women, older individuals, or people with low education have experienced lower income growth than the average.

This study shows that climate variability reduces household income and that the strongest effect is for changes at the extreme ends of the temperature distribution (below 18 and above 30 degrees Celsius), especially for poor and low educated households.

Farm income is the most affected livelihood source. However, changes in climatic conditions also reduce non-farm and wage income for certain groups.

Some studies suggest that older people adapt more slowly and less

Figure 1 Historical trend of household income across income quintiles from 1993 to 2014 in



Source: Authors' calculation using IFLS datasets (1993–2014)

efficiently to climate variations than other vulnerable groups. This is confirmed in this study's results.

Some research argues that remittances may be used by the most vulnerable households as insurance in times of higher climate variability.

Disaggregating by livelihood sources shows that rural households who are less likely to migrate might be able to offset the negative impact of climate variability using transfers and remittances income sources.

The study also shows that inequality increases consistently where there is climate variability at the extreme ends of the temperature distribution. The effect is larger in provinces where poor households and those headed by older people are located.

However, changes in temperature around average values (24–30 degrees Celsius) reduce provincial inequality, suggesting a non-linear relationship between changing climatic conditions and inequality.

RECOMMENDATIONS

- ▶ The use of transfers and remittances for coping with climate variability is not sustainable. Indonesia's government should encourage adoption of longer-term approaches, such as 'climate-smart' practices and technologies, especially by households that are elderly, low-skilled, rural, or headed by women, which social assistance often misses.²
- ▶ Indonesia's elderly population is small, but has the highest probability of falling into poverty because of climate variability. The government should adapt conditional cash transfers to changes in climatic conditions and ensure the participation of the elderly.
- ▶ *Ad-hoc* social protection schemes – such as educational stipends for girls, women's participation in community-led social protection activities – and active labor market policies for women not in education, employment, or training should be introduced or strengthened, especially in areas most vulnerable to climate hazards.

¹ Pacillo, G. et al. (2020). Who bears the burden of climate variability? A comparative analysis of the impact of weather conditions on inequality in Vietnam and Indonesia, *AFD Research Papers No.147*, 2020.

² OECD (2019), Social Protection System Review of Indonesia, OECD Development Pathways, OECD Publishing, Paris.