

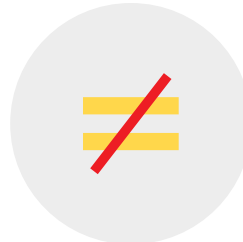
POLICY BRIEF

**ENVIRONMENT AND INEQUALITY**

**HOW HAS THE ASIA-PACIFIC REGION PERFORMED  
IN REDUCING INEQUALITY OVER THE LAST 20 YEARS?**

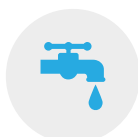
THE ASIA-PACIFIC REGION'S COMBINED INCOME INEQUALITY **INCREASED BY OVER 5%** CONTRARY TO THE TREND IN ALMOST ALL OTHER REGIONS

**INCOME INEQUALITY** GREW IN ALMOST **40%** OF ALL COUNTRIES, INCLUDING IN 4 OF THE 5 MOST POPULOUS COUNTRIES IN THE REGION, REPRESENTING OVER **70%** OF THE REGION'S POPULATION



THE NET WORTH OF THE REGION'S **846 BILLIONAIRES** WAS **MORE THAN 7 TIMES** THE **COMBINED GDP** OF THE REGION'S LEAST DEVELOPED COUNTRIES

**ACCESS TO BASIC OPPORTUNITIES ARE UNEVENLY SHARED**



**300 MILLION** PEOPLE IN ASIA-PACIFIC DO NOT HAVE ACCESS TO **SAFE DRINKING WATER**



**425 MILLION** PEOPLE IN ASIA-PACIFIC DO NOT HAVE ACCESS TO **ELECTRICITY**



**1.52 BILLION** PEOPLE IN ASIA-PACIFIC LACK BASIC **SANITATION**

The stark increase in inequality of income and lingering inequality of opportunities in the Asia-Pacific region coincides with worsening of environmental performance in terms of pollution and unsustainable use of natural resources. As shown by three cases discussed in this policy brief, namely, on air pollution; natural resource management; climate change and natural hazards, the poor and the marginalized are more vulnerable and exposed to the impact of environmental hazards. At the same time, there is evidence that the developing countries bear a higher impact of environmental degradation. These differential impacts of environmental degradation can exacerbate inequalities both within and between countries. To add to this complexity, conflicts arising from natural resource use and management can further disproportionately impact the poor. Policy makers need to look at environmental policies as an integral policy tool to address rising income

inequality. This policy brief offers guidance in this direction.

## THE CASE OF AIR POLLUTION

Air pollution is a growing threat to the wellbeing of people in the Asia-Pacific region. The region's rapid industrialisation, urbanisation and rising vehicle ownership is driving this upward trend.<sup>1</sup>

Some cities have become notorious for smog that carry high detrimental health impacts including premature death. In parts of the region, cross-border haze is a frequent challenge. Indoor air pollution is also a serious health issue in developing countries, in both rural and urban areas. In South-East Asia, 62 per cent of households use wood or charcoal for cooking, while 32 per cent of households rely on highly polluting kerosene and oil lamps.<sup>2</sup>

THE AVERAGE **LOSS IN PRODUCTIVITY** AS A PERCENTAGE OF GDP DUE TO **POLLUTION** IS MORE THAN

**8 TIMES**

**HIGHER IN DEVELOPING COUNTRIES** THAN IN DEVELOPED COUNTRIES IN THE REGION

The average loss in productivity as a percentage of GDP due to pollution<sup>3</sup> is more than 8 times higher in developing countries (0.25 per cent of GDP) than in developed countries (0.03 per cent of GDP) in the region, with majority of impact arising from ambient and household air pollution.<sup>4</sup> This implies that pollution can be an important factor that exacerbates income inequality between the region's developed and developing countries.

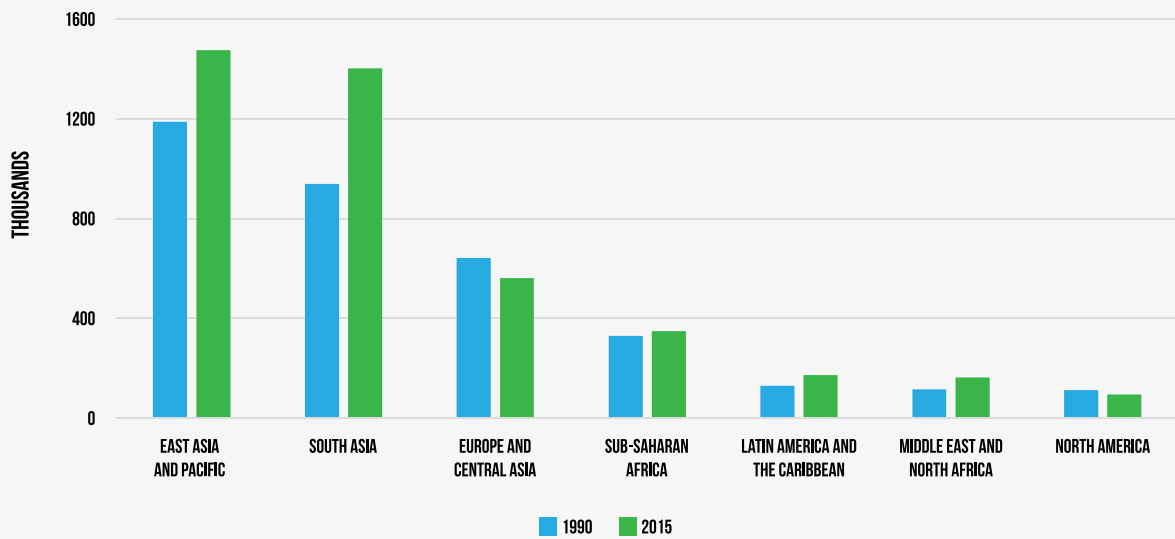
One of the reasons of adverse economic impact is through health impact and loss of life. Air pollution is estimated to claim over 4 million lives per year, mainly in developing countries in the region. Damage from particulate emissions provides a good proxy variable to measure the aggregate damage caused by air pollution.<sup>5</sup> Figure 1 shows parts of the Asia-Pacific region, especially East Asia and Pacific and South Asia, experienced the world's sharpest rise in premature deaths as a result of ambient air pollution (PM 2.5) between 1990 and 2015.



**EAST ASIA AND PACIFIC AND SOUTH ASIA**  
EXPERIENCED THE **WORLD'S SHARPEST RISE IN PREMATURE DEATHS** FROM AIR POLLUTION BETWEEN **1990 AND 2015**



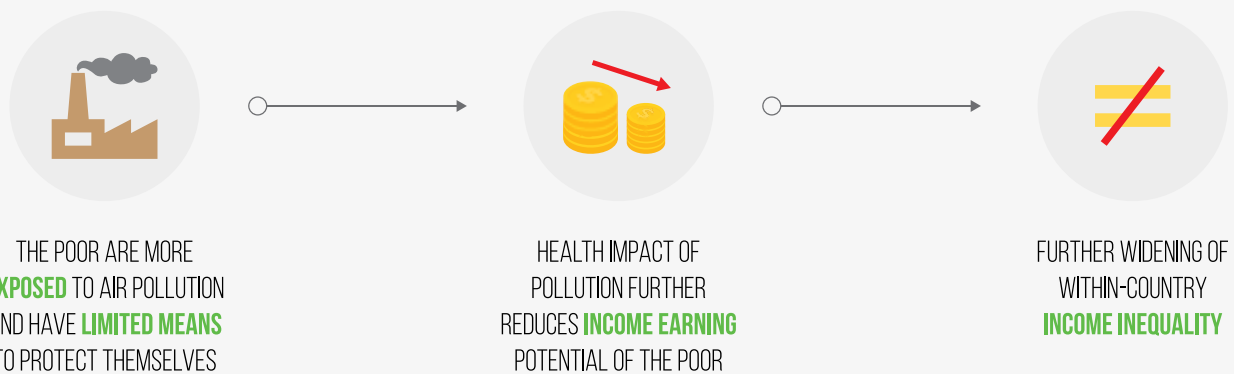
**Figure 1: Premature deaths from ambient air pollution (PM2.5), 1990 and 2015**



Source: Recreated from Lange et al (2018)

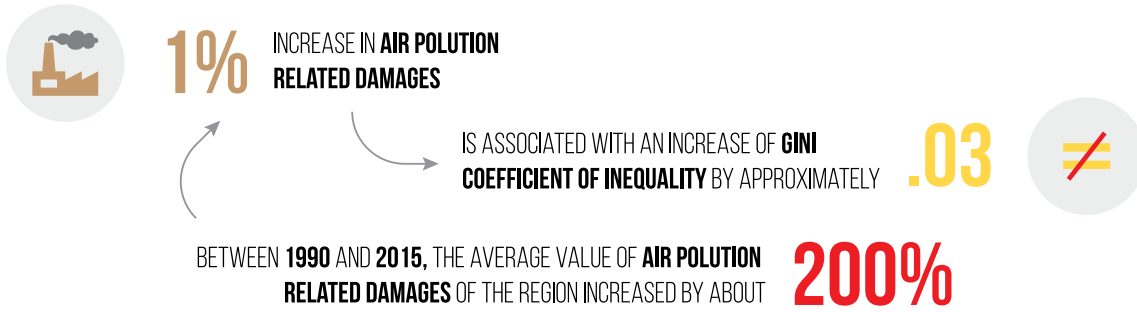
Disaggregated evidence from the region shows that the poor and disadvantaged groups have higher exposure to air pollution, and show higher prevalence of respiratory and other illness.<sup>6</sup> There is also evidence that the poorer households resort to less effective means of protecting themselves from air pollution.<sup>7</sup> This substantiates a potential mechanism of transmission of impact of air pollution to widening inequalities as shown in figure 2.

**Figure 2: Mechanism of transmission of impact of air pollution on inequality within countries**

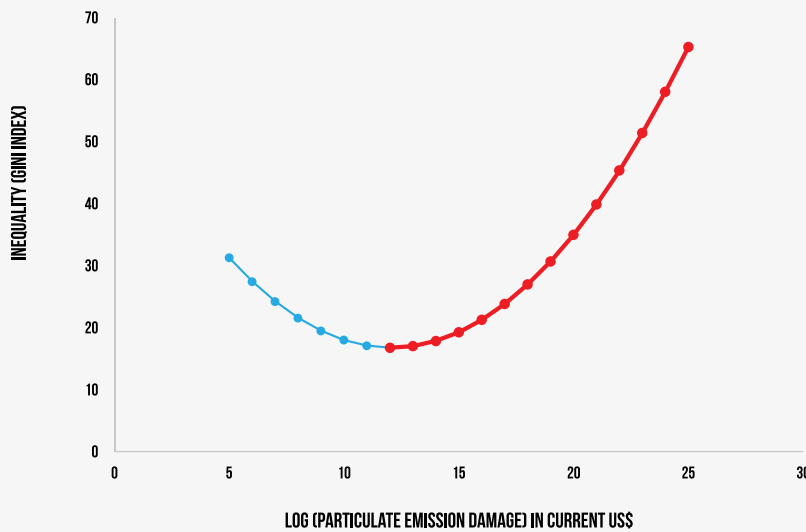


Cross-country regression analyses of drivers of inequality from the region finds that as the air pollution exceeds certain thresholds, it is associated with a sharp increase in levels of inequality within countries,<sup>8</sup> (see figure 3) as predicted by the mechanism of transmission in figure 2.

A 1% increase in the air pollution related damages, at the current average level for the region, seems to be associated with an increase of Gini coefficient by .03 units. To put things in perspective, the average value of particulate emission damages of the region saw an increase of about 200 % between 1990 and 2015.<sup>9</sup>



**Figure 3: Inequality and particulate emission damages within countries**



Source: Based on ESCAP (2018)

These findings underscore the need to systematically study the impact of pollution on low-income households and to identify innovative interventions to reduce their exposure particularly in countries with large exposure to air pollution. Examples of such interventions could involve regular health screenings in neighborhoods with low socioeconomic status (see policy conclusions for more examples). The findings of this section imply that these solutions to tackle air pollution can also have significant co-benefit of reducing inequalities, providing additional incentives for their implementation.

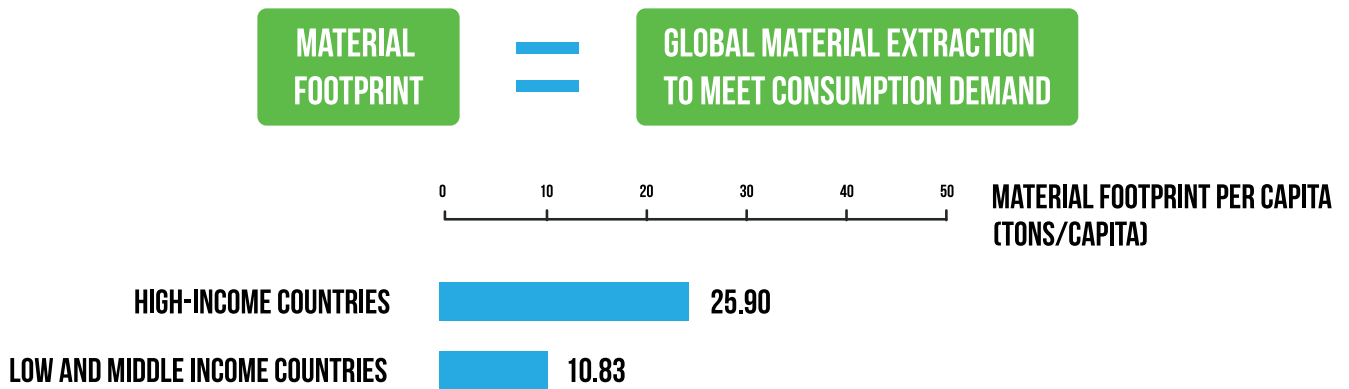
### THE CASE OF NATURAL RESOURCE MANAGEMENT

All societies are inextricably linked to the natural world, but the connections are deepest and most obvious for rural households, small-holders, forest-dependent communities and artisanal fishing villages. Patterns of natural resource use in the region are changing drastically due to

urbanisation, industrialisation and changes in consumption choices. Resulting overuse and degradation of natural resources can have significant implications for inequality between countries and within them.

The bulk of demand for natural resources arises from outside of the low-income countries as they increase their participation in global value chains. The material footprint, a measure of the global material extraction used to meet the domestic final consumption demand of each country, in high-income countries is more than double that of the low-income countries of the region. Some resource-rich developing countries are also forced by market pressure to use their natural capital at a much faster rate than can be supported by their macroeconomic and institutional capacity.<sup>10</sup> As a result, developing countries often bear the disproportionate negative externalities of accelerated natural resources use and over exploitation.

Resource exploitation, such as deforestation,



often has skewed distributional effects - benefiting certain groups while leaving rural poor and groups such as indigenous communities worse off.<sup>11</sup> Unequal distribution of land resources, insecure land tenure or use rights further contribute to the vulnerability of many households and communities across the region. Recent estimates from global comparative analysis of households in developing countries find that environmental income accounts for 28% of total household income, 77% of which comes from natural forests and environmental

income shares are higher for low-income households.<sup>12</sup> Therefore, ensuring access to natural resources and associated ecosystem services have great implications for reduction of multi-dimensional poverty and inequality.<sup>13</sup>

So what happens when natural resources on which the poor depend the most are increasingly depleted? It can potentially lead to increase in income inequality as shown by the mechanism in figure 4.

**Figure 4: Mechanism of transmission of impact of natural resource degradation on inequality within countries**



The measure of “natural capital” of a country, which is the value of its stock of natural resource, provides a good proxy for assessing trends in natural resource use patterns. The cross-country regression analyses of drivers of inequality show that fall in value of renewable natural capital<sup>14</sup> of countries is associated with a significant increase of inequality or in other words, rise in value of renewable natural capital can be associated with a fall of inequality within countries.<sup>15</sup>



**1%** REDUCTION IN RENEWABLE NATURAL CAPITAL OF COUNTRIES



IS ASSOCIATED WITH AN INCREASE OF GINI COEFFICIENT OF INEQUALITY BY APPROXIMATELY **.04**

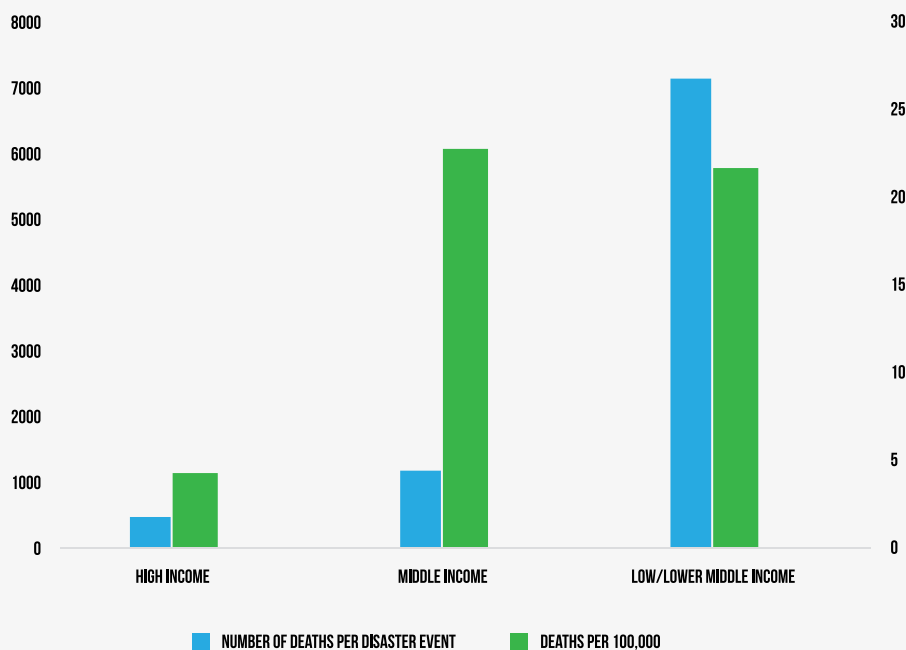
A 1% reduction in renewable natural capital of countries is associated with an increase of Gini coefficient of inequality by approximately .04, which amounts to approximately 0.1% of the market Gini coefficient of the region during 2010-14.<sup>16</sup>

Hence, sustainable management of natural resources and ensuring equitable access to natural resources of a country can be an important entry point for addressing inequality.

### THE CASE OF NATURAL HAZARDS AND CLIMATE CHANGE

The Asia Pacific region is more exposed to the impacts of climate change than any other region. 6 of the 10 countries most affected by climate change during 1996 to 2015 are in the region.<sup>17</sup> Over the past century, most of the region has seen warming trends and greater temperature extremes. Climate change magnifies the risk of

**Figure 5: Deaths per disaster event and per 100,000 inhabitants in countries in the Asia- Pacific region, by country income group, 2000-2015**



Source: ESCAP (2017) based on data from EM-DAT database.





COUNTRIES WITH **LOW- AND MIDDLE-INCOME STATUS** HAVE MORTALITY RATES THAT ARE **4-5 TIMES HIGHER** THAN IN **HIGH-INCOME COUNTRIES**

**IN 2017**

THE REGION ACCOUNTED FOR **43%** OF ALL REGISTERED DISASTER EVENTS AND **68%** OF ALL FATALITIES IN THE WORLD



**THE ASIA-PACIFIC REGION**  
IS MORE EXPOSED TO THE IMPACTS OF  
**CLIMATE CHANGE**  
THAN OTHER WORLD REGIONS



UP TO **35%** OF THE POPULATION IN THE AFFECTED AREAS WAS LIKELY TO **FALL BELOW THE POVERTY LINE** AS A RESULT OF THE DISASTER

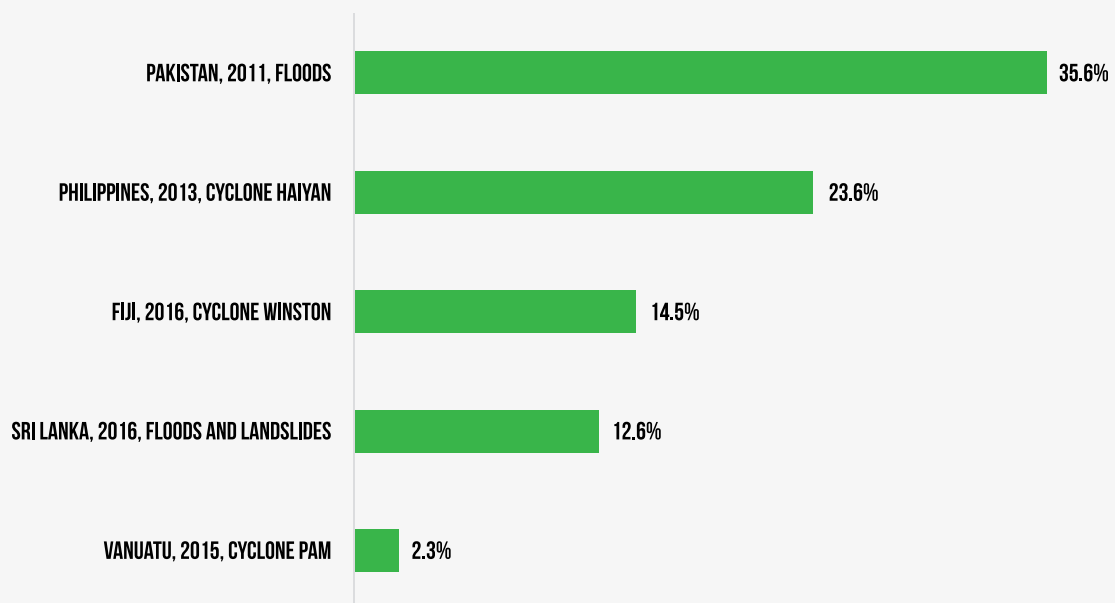
disasters and increases their costs. In 2017, the region accounted for 43 per cent of all registered disaster events and 68 per cent of all fatalities<sup>18</sup> in the world. The impact of disasters on human lives is very unevenly distributed among countries in different income groups. Countries with low- and middle-income status have mortality rates from disasters that are 4-5 times higher than in high-income countries.

The relative economic impact of climate hazards on low-income countries is dramatically higher - losses representing 5 per cent of GDP in low-

income countries as compared to 0.2 per cent in high-income ones.<sup>19</sup> This disproportional economic damage on low-income countries is clearly hampering their development efforts, especially due to their impact on sectors such as agriculture and marine resources. New evidence suggests that developing countries that have contributed least to climate change, and are most vulnerable to extreme events, are projected to experience the strongest increase in climate variability.<sup>20</sup>

Climate variability and disasters can widen

**Figure 6: Estimated percentage of people falling into poverty from selected disasters**



Source: ESCAP, 2017

Note: figure shows population that can potentially slip below poverty line.



income gaps. In the region, there is a positive relationship between the number of disasters that countries were affected by and their income inequality measured by Gini.<sup>21</sup> Figure 6 shows that up to 35 per cent of the population in the affected areas was likely to fall below the poverty line as a result of the disaster. These findings highlight the vulnerable situation of the large numbers of people in the Asia-Pacific region categorized as “near poor”. Human and asset losses tend to be greater in the poorest communities living in places and conditions that expose them to natural hazards so are least able to withstand disaster impacts. At the same time, disasters destroy many of their already meagre assets, trapping them in poverty that can be transmitted from one generation to the next<sup>22</sup> and exacerbating income inequalities.

Therefore, building resilience of the poor and the disadvantaged sections of the society against risk of natural hazards and adverse effects of climate change is paramount to address inequality, especially in societies where elevated risk of such hazards exist.

### ENVIRONMENTAL INEQUALITIES AND CONFLICTS

Natural resources provide an important basis for rural livelihoods and for economic activity of a majority of population in Asia and the Pacific. Consequently, resource scarcity coupled with poverty, inequality, insecure land tenure and imbalances of power all heighten the risk of conflict.



**40%** OF ALL INTRASTATE **CONFLICTS** ARE ASSESSED AS HAVING A LINK TO **NATURAL RESOURCES** IN THE LAST 60 YEARS

Globally, at least 40 per cent of all intrastate conflicts are assessed as having a link to natural resources in the last 60 years.<sup>23</sup> Worse is that among the poor, conflicts disproportionately constrain their adaptive capacity and choices. In these circumstances, inequality across societies grows quickly. It has therefore become a matter of urgency to recognize that in addition to more conventional peacebuilding approaches, climate adaptation and disaster risk reduction are entry points for preventing conflict. In situations where conflict is based on competition for scarce resources, better management of natural resources that promotes equitable access, combined with climate change adaptation, must channel competing interests into non-violent resolutions.

### POLICY LESSONS

The insights from the analyses of interactions of environment and inequality underscore the need to apply an environment lens in efforts to address inequalities. Targeted policy measures that reduce exposure of the poor and disadvantaged to environmental hazards are critical to close inequalities within countries. Some policy responses in this direction are identified below.

#### Address disproportionate impacts of air pollution

- While taking action to reduce pollution overall, make focused efforts to protect vulnerable groups, especially children and elderly, and residents of areas with low socioeconomic status.
- Enhance city planning and zoning to reduce exposure to pollution. Establish regular health screenings in neighborhoods with low socioeconomic status, especially in schools.



- Map out the sources of pollution, especially in poorer neighborhoods. Use the mapping to enforce regulations on emissions to proactively apply the “polluter-pays” principle, with adequate measure to increase compliance, reduce corruption and channel funds generated towards resilience building of vulnerable groups.

### Adopt inclusive approaches in sustainable management of natural resources

- Adopt inclusive approaches in sustainable management of natural resources, including payment of ecosystem services and promotion of ecotourism that benefits local communities, which can help in conserving natural capital and simultaneously generate income for the communities most dependent on natural resources.
- Improve access to justice to help subsistence-oriented communities defend the resources they rely on for their livelihoods and continued existence. Consider establishing special courts for resolving conflicts over land and other natural resources.
- Strengthen mechanisms for social and environmental assessments of large-scale investments in agriculture and other sectors that have implications for natural resources such as forests and involve local communities whose interests and livelihood resources are at stake in the decision making.

### Reduce vulnerabilities to climate change impacts and help improve resilience to natural hazards

- Prevent informal settlements in flood-prone urban areas by creating opportunities for affordable housing in safer locations.
- Ensure that disaster preparation drills reach also disadvantaged communities and involve especially vulnerable groups, such as women, children, elderly, people with low education, and those with disabilities. Develop evacuation plans and build storm shelters in rural areas likely to be affected by strong cyclones.
- Facilitate access to natural hazard and crop-insurance for low-income communities.

### Cross-cutting actions

- Identify early warning signs of emerging conflicts related to natural resource usage and adopt measures to prevent such conflicts.
- Generate disaggregated data systems (including gender disaggregated) and conduct more systematic research especially in developing countries, that would deepen understanding of the specific channels by which environmental hazards impact the poor and the disadvantaged groups.
- Incorporate the right to a clean, safe and healthy environment in national constitutions. Although constitutional provisions do not guarantee good environmental stewardship, they provide opportunities for all citizens, regardless of social status, to demand protection from environmental hazards through the judiciary.

## ENDNOTES



1. Mannucci, P.M. and Franchini, M. (2017).
2. World Health Organization (2016)
3. Including ambient and household air pollution, unsafe water and unsafe sanitation, and exposure to lead pollution.
4. Landrigan et al. (2018)
5. Particulate emissions damage is the damage due to exposure of a country's population to ambient concentrations of particulates measuring less than 2.5 microns in diameter (PM2.5), ambient ozone pollution, and indoor concentrations of PM2.5 in households cooking with solid fuels. Damages are calculated as foregone labor income due to premature death. See more details on the variable: <http://databank.worldbank.org/data/reports.aspx?source=2&type=metadata&series=NY.ADJ.DPEM.CD>
6. Kan et al.( 2008), Pant et al. (2016), Schoolman and Ma (2012), World Bank (2006)
7. Zheng et al. (2015)
8. This result also holds in a global cross-country regression analysis suggesting this result is not driven by region specific effects, see Jacob, A. (2018)
9. Jacob, A. (2018)
10. Lange et al (2018)
11. Millennium Ecosystem Assessment (2005)
12. Angelsen et al (2014)
13. Suich et al. 2015
14. Renewable component of natural capital, namely, forests, agriculture land and protected areas in the analyses in this section. This renewable component of natural capital can be increased in value by measures such as increasing the forest cover, protected areas, promoting alternate higher value of existing forests in the form of eco-tourism, improving of crop-yield and bringing more land into productive use.
15. This result also holds in a global cross-country regression analysis suggesting this result is not driven by region specific effects, see Jacob, A. (2018)
16. Jacob, A. (2018)
17. ESCAP (2017) based on data from EM-DAT.
18. Munich RE (2018)
19. UNDESA (2016)
20. Bathiany et al (2018)
21. ESCAP (2017)
22. ESCAP (2017)
23. UNEP (2009)



## REFERENCES



- Angelsen et al (2014) . Environmental Income and Rural Livelihoods: A Global-Comparative Analysis. World Development Volume 64, Supplement 1, Pages S1-S158 (December 2014), available <https://www.sciencedirect.com/journal/world-development/vol/64/suppl/S1>
- Bathiany, S. Dakos, V., Scheffer, M., and Lenton, T.. Climate models predict increasing temperature variability in poor countries. *Science Advances*, 2018; 4 (5): eaar5809 DOI:10.1126/sciadv.aar5809
- ESCAP (2017). Asia-Pacific Disaster Report 2017: Leave No One Behind: Disaster Resilience for Sustainable Development. Bangkok. Available at: [http://www.unescap.org/sites/default/files/1\\_Disaster%20Report%202017%20Low%20res.pdf](http://www.unescap.org/sites/default/files/1_Disaster%20Report%202017%20Low%20res.pdf)
- ESCAP (2018) Inequality in Asia and the Pacific in the era of the 2030 Agenda for Sustainable Development , available at : <http://www.unescap.org/publications/inequality-asia-and-pacific-era-2030-agenda-sustainable-development>
- Jacob, A. (2018). Does environmental degradation widen income inequality ? New evidence from global cross-country panel data regression analysis. UN ESCAP Environment and Development Working Paper *forthcoming*
- Kan et al. (2008). Season, sex, age, and education as modifiers of the effects of outdoor air pollution on daily mortality in Shanghai, China: The Public Health and Air Pollution in Asia (PAPA) Study. *Environ Health Perspect.* 2008 Sep;116(9):1183-8. doi: 10.1289/ehp.10851
- Landrigan, Philip J. et al. (2018). "The Lancet Commission on pollution and health". *Lancet.* 2018 Feb 3;391(10119), 462-512.
- Lange, Glenn-Marie, Quentin Wodon, and Kevin Carey, eds. 2018. *The Changing Wealth of Nations 2018: Building a Sustainable Future*. Washington, DC: World Bank. doi:10.1596/978-1-4648-1046-6. License: Creative Commons Attribution CC BY 3.0 IGO
- Mannucci, P.M. and Franchini, M. 2017. Health Effects of Ambient Air Pollution in Developing Countries. *Int. J. Environ. Res. Public Health* 2017, 14, 1048; doi:10.3390/ijerph14091048
- Millennium Ecosystem Assessment, 2005. *Ecosystems and Human Well-being: Synthesis*. Island Press, Washington, DC.
- Munich RE 2018. Hurricanes cause record losses in 2017 - The year in figures. Available at: <https://www.munichre.com/topics-online/en/2018/01/2017-year-in-figures>
- Pant et al. 2016. Exposure to particulate matter in India: A synthesis of findings and future directions. *Environmental Research* 147 (2016) 480–496
- Schoolman, E.D. and Ma, C. 2012. Migration, class and environmental inequality: Exposure to pollution in China's Jiangsu Province. *Ecological Economics*, Volume 75, 2012, Pages 140-151.
- Suich et al. 2015. Ecosystem services and poverty alleviation: A review of the empirical links. *Ecosystem Services*, Volume 12, 2015,137-147. <https://doi.org/10.1016/j.ecoser.2015.02.005>.
- UNDESA 2016. *Climate Change Resilience: an opportunity for reducing inequalities*. World Economic and Social Survey 2016. [https://wess.un.org/wp-content/uploads/2016/06/WESS\\_2016\\_Report.pdf](https://wess.un.org/wp-content/uploads/2016/06/WESS_2016_Report.pdf)
- United Nations Environment Programme (UNEP) (2009). *From Conflict to Peacebuilding: The Role of Natural Resources and the Environment*. Geneva.
- World Bank. 2006. *Poverty Environment Nexus: Sustainable Approaches to Poverty Reduction in Cambodia, Lao PDR, and Vietnam*. Washington, DC: World Bank.
- World Health Organization (2016). *Burning opportunity: clean household energy for health, sustainable development, and wellbeing of women and children*. Washington, D.C.
- Zheng, S, C Sun and M E Kahn 2015. Self-protection investment exacerbates air pollution exposure inequality in urban China", NBER Working paper, No w21301.



This policy brief is based on chapter 3 of a recent report by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) titled 'Inequality in Asia and the Pacific in the era of the 2030 Agenda for Sustainable Development'. The report takes a novel approach by focusing on multiple aspects of inequality – inequality of outcomes, of opportunities and of impacts. It also pays special attention to the potentially transformative role of technology and the impact that the incipient Fourth Industrial Revolution may have on inequality.

The full report is available at : <http://www.unescap.org/publications/inequality-asia-and-pacific-era-2030-agenda-sustainable-development>

Please see the full report for acknowledgments and disclaimers.