**Planetary Health Research Digest**

**Land use emissions**

Greenhouse gas emissions from land use, whether associated directly with human activity on the land or the removal of carbon sinks such as forests, constitute a major source of anthropogenic emissions. These emissions are more difficult to characterise than those from sources such as fossil fuel combustion and so have been less comprehensively assessed.

Chaopeng Hong (University of California, Irvine, USA) and co-authors investigated emissions associated with land use in 229 countries from 1961–2017. Emissions remained relatively consistent (around 11 Gt CO$_2$e) up to around 2001 as increases in the production and emissions intensity of land use were balanced out by reductions in associated land intensity. From 2001 to 2017, emissions increased to around 14-6 Gt CO$_2$e, with the greatest increases occurring as a result of expansion of agricultural production in countries with lower productivity and higher emissions intensity per area of agricultural land. The authors note that even if food production could be optimised, land use emissions would still pose a challenge for meeting the 1·5°C target of the Paris Agreement, with substantial changes in future food demand and production needed.

**Protected area adaptability**

Among the Aichi Biodiversity Targets established in 2010 was a call to expand terrestrial protected areas by the year 2020. In response, many countries established new protected areas, but the ability of these areas to support biodiversity under future climate change is unclear.

Luis Carrasco (National Institute for Mathematical and Biological Synthesis, USA) and co-authors identified protected areas established globally since 2010 and assessed their ability to adapt to climate change in terms of their rate of expected climate change, topographic diversity, and connectedness with other protected areas. They found that 51% of countries established new protected areas with lower climate change velocities than in unprotected areas and 58% established them in areas of greater topographic diversity. However, the connectivity among protected areas declined in 51% of countries, and 94% could improve the ability of their protected areas to sustainably support biodiversity according to these measures. Although promising increases in protected areas have occurred, the future adaptability of these areas has so far not been a priority, and this work highlights that many opportunities still exist to enhance future land protection approaches.

**West coast wildfires**

Wildfires have been a growing problem in the western US in recent years, with their scale and frequency greatly diverging from historical patterns. Given their known risks to health, it is essential to understand how wildfires will be affected by climate change in coming years.

A consortium of consulting, academic, and US government partners explored future health impacts of PM$_{2.5}$ emissions associated with wildfires in the western US, and how these changed with different climate change scenarios. Compared with baseline (1996–2005), mortality associated with wildfire PM$_{2.5}$ in 2090 was 3·7 times higher under a middle-of-the-road greenhouse gas emission scenario (RCP 4·5) and 4·2 times higher under a high emission scenario (RCP 8·5). The associated morbidity and mortality were valued at $36–43$ billion in 2090, depending on scenario, compared with a figure of $7$ billion in the baseline period, with 60% of the increase attributed to climate change under the high emissions scenario. By demonstrating the potential impacts of climate change on wildfires and health, the authors show benefits that could be achieved with appropriate mitigation efforts.

**Coherent agendas**

2015 and 2016 were important years for international efforts to address global challenges, with the ratification of the Paris Agreement, 2030 Agenda for Sustainable Development, Sendai Framework for Disaster Risk Reduction, and New Urban Agenda. While these agendas all overlap to some degree, their coherence regarding human health has not been studied.

Kathryn Bowen (Institute for Advanced Sustainability Studies, Germany) and co-authors conducted a content analysis of the agreement documents to identify potential synergies and areas where cohesion could be improved with respect to health. They identified the lack of specific mentions of health systems strengthening and a need for governance mechanisms to encourage cohesion between agendas as key areas for improvement. The health themes of food security and gender equality were identified in all four agreements, showing the potential for synergies in advancing these outcomes, and health leadership was found to be key to bringing diverse stakeholders together. Given the interlinked nature of these agreements, Bowen colleagues argue that a planetary health approach could be a powerful tool for aligning agendas and enhancing progress.

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