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Arctic: Warming impact is uneven

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Uneven impacts of Arctic warming

We support the call for more rigorous integrated modelling of the costs and benefits of Arctic warming (G. Whiteman *et al.* *Nature* **499**, 401–403; 2013). Such modeling should examine the distribution of these costs and benefits within as well as between countries.

Whiteman *et al.* show that melting permafrost gives rise to economically costly methane emissions. In addition, it damages the infrastructure needed for gas, oil and mineral mining, shipping and transport at high northern latitudes, as previously solid ground loses its structural integrity. Madrid-based humanitarian organization DARA expects the cost of this damage in the Arctic to reach US\$80 billion annually by as soon as 2030 (see go.nature.com/vnlzax). These losses will be very unevenly distributed, with over 90% likely to occur in Russia. At the same time, the benefits from natural resource extraction will also vary significantly between countries.

Within Arctic countries, indigenous peoples, who are already marginalized, will be subjected to further economic hardship and deteriorating conditions for their traditional hunting and land-use practices. We believe that the uneven distribution of costs and benefits of Arctic warming calls for a new approach to governance in the region. This should ensure equitable compensation and support for those expected to be affected most.

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