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Climate change, food systems and population health risks in their eco-social context

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ABSTRACT

The establishment of ecological public health as crucial to modern public health is overdue. While the basic concepts have been gestating for decades, receptivity within broader public health has been limited. This position is changing, not least as the population-level impacts of climate change and, more broadly, of limits to growth are emerging from theory and forecasting into daily reality. This paper describes several key elements of ecological public health thinking. These include the 'environmental' risks to human health (often systemic and disruptive, rather than local and toxic) posed by climate change and other forms of adverse global environmental change. Closer recognition of the links between social and environmental factors has been urged – an 'eco-social' approach – and, relatedly, for greater co-operation between social and natural sciences. The authors revisit critics of capitalism who foresaw the global capture and transformation of ecosystems for material human ends, and their resultant despoliation. The perennial call within public health to reduce vulnerability by lessening poverty is more important than ever, given the multifactored threat to the health of the poor which is anticipated, assuming no radical strategies to alleviate these pressures. But enhanced health security for the poor requires more than the reconfiguring of social determinants; it also requires, as the overarching frame, ecological public health.

Introduction

Global environmental change, of which profound alteration to the climate is but one aspect, is now widely accepted as a reality. This new phase of Earth system history has been called the 'Anthropocene' – an era in which the collective force of one species, it is recognized as changing the planet's operating system. Here, the social causes of the Anthropocene, and manifestations including climate change, the world food system, and the prospects for health are briefly considered.

Climate change is part of a larger syndrome of systemic environmental changes, including stratospheric ozone depletion, biodiversity losses, ocean acidification, disruption of the global cycling of nitrogen, phosphorus and sulphur, and

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depletion of fertile soils, freshwater supplies and marine productivity. These great changes, all of which intensified in the latter third of the twentieth century (though some only became evident in this time), are unprecedented at global scale. They reflect the excessive, escalating, demands that the still-expanding global human population is now putting on the biocapacity of the planet – the capacity to generate, replenish and absorb. The best approximate estimate is that, globally, people are living well beyond Earth's means, using 1.5 times as much as can be supplied on a continuing basis. That move into deficit ecological budgeting emerged just 35 years ago, and is increasing every decade.

In consequence, Earth's long-term human life support system is faltering as people subsidize their ways of living by raiding nature's capital stock; and so the natural resource base shrinks.[1] Average global life expectancy and population size continue to rise, and mainstream forecasts are for these trends to continue for decades to come. But while some of this increase is due to technological improvement, a large fraction of these phenomena has been underwritten by the combustion and consequent degradation of irreplaceable planetary material – especially fossil fuel.[2] The biosphere has been altered enormously in order to meet human needs and wants, but its transformation risks exceeding a threshold, beyond which the health of human populations will decline. The risks that have been faced are likely to accelerate over the coming decades and beyond. They will, inevitably, impinge unevenly in populations around the world, reflecting differences in geographic region, local physical environments, economic resources, levels of frank poverty, know-how and governance. Many of the energy-intensive technological choices, production methods and commercially-cultivated consumer behaviours that erode human health, especially in richer modernising populations, are major contributors to global greenhouse gas emissions.

Climate change and type II diabetes are both substantially the outcome of resource over-consumption – and they are linked. Fossil fuel-based energy, by far the dominant source of the human-generated greenhouse pollutants, powers the basic needs (lighting, hot water, communications, most of the public transport and the industrial food system), labour-saving devices (mechanized industrial production, private cars, ride-on lawnmowers), and production and distribution of the superfluous material goods that those with abundant money (or credit) buy. Labour-saving devices at home and work, private transport, and consumption of increasingly processed diets high in energy, especially fats and sugars, have been major contributors to the rise in obesity and subsequent type II diabetes. Solar and other new forms of renewable electrical energy, which preserve fossil fuels and which do not worsen climate change, are growing rapidly, but from a very low base.[3]

At core these are ecological issues, referring to the ways that societies live. They do not conform to conventional 'environmental health hazards' in the same way as localized toxicity or physical (e.g. radiation) injury, rather they signify the weakening of global/regional life-support systems which underpin human health and survival. The current system of bio-spherically charged production and consumption is much more complex, and in this sense is hard to classify as a public health issue as the authors explore in the coming sections.

Climate change

The slow pace of public understanding of human-caused climate change appears to have historical analogies in heliocentricism and evolution, previous revolutionary shifts in human consciousness for which acceptance was delayed not only by denial and suppression but by their cognitive complexity. The realisation that this species, collectively, is a driver of planetary change appears too large a cognitive challenge for many people. Recognition is further delayed by a coalition of forces organized particularly by those who profit from the burning of fossil fuels,[4] using denialism, well-known in public health circles from previous campaigns to obscure the recognition of health hazards from tobacco to asbestos.[5]

Even so, doubts about the reality of climate change are fading with a growing list of governments introducing policies to curb carbon emissions, to adapt to increased warming and torrential downpours. The world has warmed by around 0.6 °C since the 1970s, and has done so much faster at high northern latitudes (northern Norway has warmed by 2 °C). Current modelled estimations by international climate science indicate a rise of 3–5 °C by 2100, and twice that in the Arctic region. This is well-over the 2 °C 'guardrail' formerly accepted as the maximum tolerable.[6] As global temperatures, adjusted for year-to-year modulations due to natural forcings (the El Niño/La Nina cycle, volcanic emissions and minor variations in solar activity), continue to rise,[7] there is some partial offset by aerosols of anthropogenic origin, such as from the burning of coal and biomass, which slow climate change, but harm health through non-climatic pathways.[8] While most of the energy released from this combustion benefits human well-being, some is lost through inefficiencies, including energy transmission, poorly insulated dwellings and the use of private instead of public transport,[9] and through various wasteful uses.

The influences of climate change on health outcomes are predominantly on whole communities, even whole populations. Certainly, individuals and sub-groups are often more or less vulnerable than the group average, but the main point stands: the impacts of climate change are of an *ecological* kind. At their simplest they result from exposures that impinge on all people in a community (such as heatwaves or exacerbated air pollution) and at levels that also influenced by characteristics of the shared living environment. Many other risks result from climate-related changes in environmental conditions, ecosystems, the distribution of species and, hence, in the internal relations and dynamics within that complex. Two major examples are: first, changes in infectious disease patterns, reflecting altered microbial activity and distribution, human contact with animals, microbes and with one another and changes in infection transmission probabilities; and second, changes in food yields and hence in food prices, availability, nutritional states and child and adult health. It is no surprise that the first two of the biblical Four Horsemen of the Apocalypse were Pestilence and Famine. There are many other indirect, often deferred and diffuse, health impacts of climate change – including the oft-overlooked anxieties, stresses and frank mental health disorders that result from extreme weather events and their resultant losses; from

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