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Hardin's oversimplification of population growth

Garrett Hardin's *Tragedy of the Commons* put forward underdeveloped arguments that continue to be reflected in simplistic debates about the drivers and implications of demographic dynamics. It's time to embrace the complexity that Hardin lacked in order to develop better-informed policy.

Lori M. Hunter and Aseem Prakash

In the fifty years since Garrett Hardin's *The Tragedy of the Commons*, the article¹ has generated an impressive literature across many disciplines, garnering over 38,000 citations. However, while Hardin's contentions regarding the role of property rights in sustainable resource use have been long critiqued, we suggest that Hardin also outlines a rather simplistic model of fertility decision-making, an issue of profound importance at multiple levels and scales. We further contend that his Malthusian focus on population as a primary driver of unsustainable resource use remains reflected in contemporary public and policy debate. We conclude this Comment with three recommendations in response to Hardin's legacy regarding the overpopulation thesis.

Hardin's now-famous parable engages hypothetical herdsmen that, he argues, will increase their herd size (the overpopulation thesis) to take advantage of the communal pasture (the institutional deficit thesis). For Hardin, actors are utility maximizing — they will add animals to their herd if the marginal costs (of appropriating common resources) are less than the marginal benefits (the value of an additional animal). Since all actors are assumed to follow the same logic, the herd size (population) will increase to a level where resources are overused. Ultimately, 'the commons' collapses, hence the tragedy.

Hardin applied this Malthusian logic to human childbearing, arguing that "the freedom to breed will bring ruin to all" since individuals will not constrain procreation if not bearing the entire cost of raising children. And, according to Hardin, society's commitment to the welfare state means that this cost is shared.

We contend that Hardin oversimplified human childbearing decision-making on two counts. First, he ignored the influence of a broader array of social institutions in shaping fertility choices. Second, he assumed one-way causality, as opposed to a reciprocal connection, between fertility choices and environmental context. Ignoring these associations can lead to misguided policy that undermines sustainability goals.

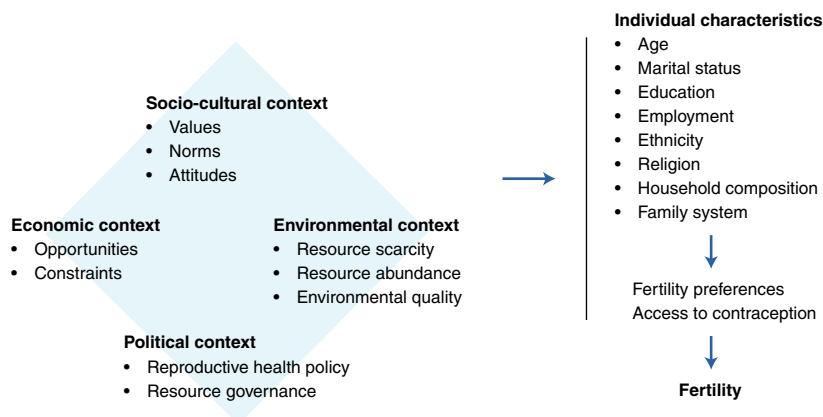


Fig. 1 | The complexity of human fertility decision-making.

Shortcomings of the thesis

For Hardin's supporters, his institutional deficit thesis finds confirmation in the context of climate change. The commons — the global atmosphere — represents a repository for greenhouse gases and is an open-access resource with few legal constraints on fossil fuel emissions. Global climate change thus results from the lack of 'ownership' of the global atmosphere combined with the benefits of fossil fuel-based economic expansion.

For Hardin's critics, the institutional deficit thesis is rooted in incorrect assumptions about the absence of property rights in common-pool resources and therefore leads to perverse policy solutions. Critics have demonstrated that private property rights are not essential since local communities are able to devise communal governance for sustainable use of natural resources such as forestry, fisheries and water^{2,3}.

Hardin's predictions find mixed support in today's context of climate change. Most members of the international community have implemented policies such as the Kyoto Protocol and the Paris Agreement through which some large-scale herdsmen (industrialized economies) have agreed to mandatory herd size limits (greenhouse

gas emissions). Yet, as evidenced by the recent Conference of the Parties meeting in Poland, there is opposition from a handful of countries that have sizeable fossil fuel resources. Similarly, most of the countries are not on track to meet the Paris targets.

Oversimplification of freedom to breed

Hardin's second argument, the overpopulation thesis, has not received the same critical attention although we contend it has two important shortcomings in its unidimensional and unidirectional approach to understanding fertility–environment linkages. We further contend that a more-complex understanding must ground policy.

First, parallel to the tragedy's ignorance of communal resource governance, Hardin ignored the role of sociocultural and political institutions other than property rights in shaping decisions regarding childbearing.

The power of these processes is illustrated by Rwanda, a relatively poor Central African nation. Prior to 2005, Rwanda was characterized by persistently high fertility levels. However, between 2005 and 2010, the nation experienced a stunning 25% decline in the total fertility rate from 6.1 to 4.6 children per woman. Scholars attribute the decline primarily

to increasing levels of contraceptive use — from 17% to 52% during this same five-year period — a product of national prioritization of family planning⁴. National population policy also combined with broad socio-cultural changes including rises in educational levels for both men and women, as well as greater exposure to mass media and, therefore, the norms and values of other cultures. This constellation of socio-cultural and political changes shifted one of the largest barriers to fertility decline — men's opposition to family planning⁵.

Second, also missed in Hardin's essay is that fertility decision-making is, itself, not separated from environmental context, the issue of reverse causality. An emerging body of demographic literature connects local natural resource conditions to perceptions of ideal family size as well as actual decisions regarding fertility⁶.

In low-income settings, rural households often depend heavily on local natural resources, both for sustenance and for income generation⁷. In some regions, scarcity of local resources has been linked to population growth through the 'vicious circle model', which contends that local resource shortage can result in heightened demand for child labour and, therefore, fertility⁸. The circle is vicious since higher population growth further exacerbates resource shortage, an argument that reverses Hardin's causal arrow.

Recent research in Nepal and several African nations has identified this connection. In rural Nepal, women are primarily responsible for firewood collection and for gathering fodder to feed animals — both activities dependent on local environments. Women who experience increases in the amount of resource collection time, a reflection of resource scarcity, express larger desired family sizes⁹.

The vicious circle model is certainly not universal¹⁰. Yet we contend that failing to recognize the two-way relationship between childbearing decision-making and resource availability can lead to policies aimed only

at fertility decisions' social aspects, thereby missing the important influence of local environments. These dynamics will become increasingly influential in the context of contemporary climate change.

Moving beyond simplistic ideas

Similarly to Hardin's singular focus on property rights as drivers of resource degradation, he also presented an alarmist response to population growth — that of mandated control. Yet sustaining the global commons will require a careful understanding of childbearing decision-making and population growth, including how socio-cultural factors and climate change unleash new forces that will influence future demographic change and pressures on the natural environment (Fig. 1).

Hardin also put forward a Malthusian focus on population as a singular driver of unsustainable resource use and we contend that this simplistic understanding continues to redirect critique away from consumption in the global North to instead focus on population growth in the global South. Overpopulation is deeply ingrained in both scientific and public thinking. Although the birth rate in United States is at its lowest for 30 years, recent opinion polls suggests that 51% of people in the United States believe that population is growing too fast¹¹. Interestingly, polls also note that the scientific community is even more concerned about population size than the public¹².

Certainly, there is much to worry about when considering that the current global population of 7.6 billion may reach 11.2 billion by 2100, with the vast majority of this growth occurring in the global South¹³. Yet these aggregate numbers should not obscure dramatic variation in carbon emissions per capita, with US residents at 16.49 tonnes per capita contrasted with 0.22 tonnes per capita in Tanzania, where the population is rapidly growing¹⁴. Increasing attention to these vast disparities in climate impacts requires moving past Hardin-esque population

alarmism. Action by at least three sectors will be important. First, researchers should better communicate information about the complexities within fertility processes, as well as the multi-faceted nature of drivers of environmental change. Second, the media will also play an important role in improving public understanding of childbearing decisions, including the ways in which climate change may alter these decisions. Finally, governments have the potential to address the complex drivers of environmental change through multi-sectoral programmes and policies that address both population growth and unsustainable consumption. □

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