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Human Carrying Capacity and Human Health

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The issue of human overpopulation has fallen out of favor among many demographers, economists, and epidemiologists. Discussing population growth has become a taboo topic. Yet, this taboo has major implications for public health.

The silence around overpopulation prevents the global health community from addressing the necessary link between the planet's limited ability to support its growing population (see sidebar on following page) and health and development. In this article, I describe how popular thinking on population control has changed over the last 200 years, and how our failure to address the population explosion is a major cause of recent epidemics and social unrest.

Overpopulation Concerns Peak, Then Decline

The question of human overpopulation and its relationship to human health has been controversial for over two centuries. In 1798 the Reverend Thomas Malthus forward the hypothesis that population growth would exceed the globe's carrying capacity, leading to the periodic reduction of human numbers by either "positive checks" (disease, famine, and war), or "preventive checks", by which (in the case of preventive checks, such as contraception) Malthus meant restrictions on marriage. This "Malthusian model" was accepted by most politicians, demographers, and the general public until fairly recently.

Malthus's worst fears were not borne out through the century following his death—food production largely kept pace with the slowly growing global population. Soon after 1934, the global population began to rise steeply as anti-famine technology increased life expectancy. By the 1960s, concerns of a global population and global food supply peaked—expressed in books such as Paul Ehrlich's 1968 *The Population Bomb* [1]. This book predicted a future of famine, epidemic, and war—the three main Malthusian positive checks.

In 1966, United States President Lyndon Johnson shipped wheat to India on the condition that the country accelerate its already vigorous family planning campaign [2]. Johnson was part of an unbroken series of US presidents who ignored the harmful effects of rapid population growth in developing countries (at least) from John F. Kennedy to Jimmy Carter. George H. W. Bush was

this view, prior to becoming vice president in 1981.

But the 1970s surprised population watchers. Instead of being a pe calamitous famine, the new crop strains introduced by the “Green F grains such as rice, wheat, and maize) caused a dramatic increase production of cereals, the main source of energy in the global diet. development community, despair turned into cautious optimism. By the public health community felt sufficiently empowered to proclaim Year 2000”. Average life expectancy continued to zoom upwards a even in sub-Saharan Africa.

The introduction of safe contraception contributed to a rapid fertility countries. But while the rate of global population growth declined fr 1960s, the absolute increment of increase in annual global populat Most population-related scientists, including food scientists and de US President Jimmy Carter, continued to be very concerned about g In 1970, the father of the Green Revolution, the agricultural scientis awarded the Nobel Peace Prize. In his Nobel lecture, Borlaug warne the Green Revolution would buy a breathing space for humankind c unless equivalent action was taken to reduce fertility rates [3]. Chin policy in this decade, introducing its one-child policy in 1979.



We are failing to confront the population explosion
(Illustration: Sapna Khandwala)
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Concern for the Third World Fades

With hindsight, the 1970s can be seen as the decade when widesp overpopulation started to fade. The social and economic milieu of n countries, especially in the US, started to change. US foreign aid, as gross national product, declined from the late 1960s, perhaps in pa competing needs of the Vietnam War but also perhaps because of of development in the Third World. The economic policies known as had been dominant since the end of World War II in many develope sustained attack. These policies had placed a high value on full em security. Keynesian policies restrained domestic inequality through promotion of social norms that censured conspicuous consumptior

executives exercising restraint in their personal salaries and people's houses). Shortly before his death, J. M. Keynes had also been crucial to the establishment of the World Bank. Keynes appears to have been pessimistic about the advance of global justice, and to the reduction of inequality both in rich and poor nations [4].

The world oil shock in 1973 contributed both to “stagflation”—a combination of unemployment with higher prices—and to increased economic problems in developing countries of the Third World. Indeed, the term “Third World” was considered pejorative and was replaced by the “South”. Stagflation was a failure of Keynesian policy. The demise of Keynesianism was accompanied by a decline in concern for Third World development among elite economic circles and the public.

It is unlikely that the issue of global population policy figured into the agenda of President Ronald Reagan when he took office in 1980. Nevertheless, Reagan cemented a new orthodoxy about global overpopulation and development. Like his republican predecessor, Richard Nixon, Reagan considered controlling world population size to be “vastly exaggerated” [5]. In the same year, the US abandoned family planning world leadership by abdicating its previous leadership in the field of family planning, at the International Conference on Population, held in Mexico City. The US took this position against the strenuous opposition of the Population Council of America, which represented many US demographers [5].

As foreign aid budgets fell, the “Health for All” targets began to slip. In the 1980s, international agencies promoted structural adjustment programs, higher charges for patients (“user fees”), and the “trickle down” effect as the best way to achieve development. It is plausible that a fraction of the public who remained concerned about Third World development thought that these new economic policies would lead to development. Less charitably, the new economic policies also appeared to allow the wealthy to be financially comfortable to abdicate concern for Third World development. The new orthodoxy asserted that market deregulation, rather than aid, was the best way to achieve development. The increased domestic inequality of recent decades in the United States [6] probably also contributed to a reduction in concern for Third World development. Working people have had to struggle harder to keep their position in the economy.

It is now clear that market deregulation and generally high birth rates have been disastrous in many Third World countries. “Health for All”, if recalled, was absurdly optimistic. The failure of development is most obvious in rural areas of many countries, where life expectancy has fallen substantially. But life expectancy has also fallen in Haiti, Russia, North Korea, and a handful of other nations [7]. The decline in life expectancy are multiple and complex. Causes that are common to many are HIV/AIDS (Zimbabwe and Haiti) [8,9], ethnic hatred (Rwanda) [10], corruption (North Korea) [11], poor governance and poverty (several parts of Africa) [12], and economic collapse (Russia) [13].

Causal theory is complex. Every cause has a cause, and, increasingly, causes are considered as a part of causal chains, causal webs, and causal networks. It is difficult to distinguish between identifiable “proximal” causes and deeper, un-

causes [14]. Yet, among the multitude of causes that can be identified, either total population or life expectancy, overpopulation is hardly considered by dissident public health workers such as Maurice King [15]. Demographers that would appear to be the most likely holder of the Malthusian banner are entirely silent about overpopulation in developing countries [16]. In mainstream demography, it appears that population ageing and underpopulation are the most important demographic issues for this continent. On the other hand, the role of the rapid demographic transition in China (from large families with an average of two or fewer children) is rarely credited as central to the country's economic miracle.

Overpopulation: A Cause of Crises in Africa

Often, the carrying capacity of one region at one point in time is based on the appropriation of the carrying capacity from other people and even other regions. Such resources include oil, deep sea fish, and the stability of the global ecological systems. But in Rwanda, the most densely populated country in Africa, the importation of such resources has long been limited. Unlike other developed countries such as Hong Kong and Holland, Rwanda's economy at the time of the infamous genocide, in 1994, depended almost exclusively on its primary sector. The country had little industry, few exports, and little tourism. The primary sector, the most important export, coffee, had declined steeply just before the genocide. In Asian countries, Rwanda also received few remittances from Rwandan workers abroad [17].

Among the many different explanations for the horrific 1994 Rwandan genocide, the possibility of a Malthusian check (also called "demographic entrapment") is mentioned [17,19]. A Malthusian check in Rwanda was plausible not because the total population was too large, but perhaps more importantly because population growth in Rwanda was faster than the capacity of Rwanda to support the additional people. As a result, many indicators of development were limited: agricultural capacity forced many young men into Kigali, causing overcrowding of young men with few prospects other than what they might gain in the city.

There is even less scientific discussion that entertains the possibility that the Saharan epidemic of HIV/AIDS may also be a Malthusian check [19]. If one applies a conceptual framework that combines the erosion of carrying capacity through the same rapid population growth seen in Rwanda with the decline in per capita income and food supply. Furthermore, slowly occurring as a result of the epidemic further undermined development through the loss of human capital as teachers died [20], the loss of agricultural expertise [21], and a deepening debt and loss of productivity from the country. Leaders in the developed world and many within Africa itself failed to act and provide the leadership required to quell the epidemic.

Conclusion

Maurice King refers to the silence on overpopulation as the “Hardin” after the American ecologist Garrett Hardin, who described the taboo avoid confronting the need for population control [22]. Daniel Orens Environmental Studies at Brown University, has argued that powerful debate about overpopulation in one of the world's most intractable and Palestine [23].

Whatever the cause of the scarcity of modern academic analysis, the human carrying capacity and overpopulation deserve fresh consideration. The entrapment model has an explanatory power that is lacking in more explanations. Of course, solving entrapment is very difficult, but as problems, a proper diagnosis will help identify the proper treatment.

Human Carrying Capacity

Human carrying capacity is the maximum population that can be given living standard by the interaction of any given human-ecosystem. This apparently simple concept has many nuances and is rarely used by scientists. However, in rejecting this term, purists risk making a logical flaw, that of thinking that environmental and human resources are irrelevant to human population size.

It is irrefutable that human ingenuity and cooperation can increase carrying capacity [24]. But even so, human welfare will continue to depend on the world, including for resources such as food and water. Humans are not computer ciphers nor caged mice. That is to say, while a given area has a theoretically higher density of human population than it does, the evolution in distinct groups, separated by culture, religion, and language, means that this theoretical maximum will rarely be attained. A degree of carrying capacity can be viewed as a desirable buffer around the theoretical maximum, vital for reducing tension and preventing conflict.

Even culturally homogenous groups can outgrow their carrying capacity. The case of the Great Hunger in Ireland in the 1840s, when the population was reduced because of famine, disease, and emigration. Indeed, Malthusianism was used in part, to justify the scanty aid provided to the Irish from Britain, and does not identify closely with the Irish.

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