

The Great Myth: Why population growth does not necessarily cause environmental degradation and poverty

David Maier

MSc Environment and Development, London School of Economics and Political Science

Abstract

This article addresses the question of whether population growth can be seen as the main cause for environmental degradation and poverty in poor countries. This question becomes particularly important when appraising and prioritising different policies and their likelihood in contributing towards sustainable development. The aim of this research is to critically assess whether there is enough supporting evidence that population growth is the variable starting the causal chain of degradation and poverty. By considering the variety of possible links between the three, this paper concludes that there is no such causal relationship; however, there is a significant correlation between high and increasing population numbers, environmental degradation, and persisting poverty. Furthermore, this paper finds that there are a considerable number of other factors that have an impact on the two processes and that a more context sensitive and multidisciplinary approach must be formulated.

INTRODUCTION

The world population is estimated to increase to 8.1 billion by 2025 and to 9.6 billion by 2050 (World Population Report, 2012). Most of this growth is going to take place in the developing world. Some of the fastest growing regions encompass several of the world's poorest countries such as the Democratic Republic of Congo (DRC), Niger, and Ethiopia where environmental degradation is widespread and persistent (World Population Report, 2012). Given the straightforward nature of those figures, a significant number of authors conclude that there is a causal link between a rising number of people, high levels of poverty and environmental degradation. Ehrlich (1968) finds population growth to be the major cause of world poverty and natural degradation. Similarly, Dietz et al. (2007) observe that population growth and consumption are the two main drivers behind humanity's ecological footprint. As a result, these authors ask to shape development policies accordingly and focus on promising approaches to tackle the "*population problem*" (Dasgupta, 2005, p. 415). Given both the limited funds of many developing countries' governments and international donors, it is of utmost important to clarify the link between an increase in population numbers, natural degradation and poverty. The aim of this paper is to critically assess whether there is enough evidence to argue that population growth is at the origin of the causal chain. Considering a variety of possible links between the three processes, the essay concludes, that, rather than causality, we must talk about correlations between high and increasing population numbers, environmental degradation, and persisting poverty. This introduction is followed by a brief definition of the central terms in this paper. The body consists of several sections identifying the links in this complex relationship, drawing on recent literature and research data. The last section explores the implications for policies aimed at environmental protection and poverty alleviation. The conclusion will summarise the main points and provide a final reflection on the wider significance of the findings.

DEFINITIONS

The Millennium Ecosystem Assessment defines natural degradation as follows: "rapid land-use change has meant that many natural environments and habitats are disappearing quickly, with the result that critical ecological services are lost" (Millenium Ecosystem Assessment, 2005, p. 26).

The World Bank's definition of poverty is straightforward and points at the multidimensionality of the problem: "Poverty is pronounced deprivation in well-being, and comprises many dimensions. It includes low incomes and the inability to acquire the basic goods and services necessary for survival with dignity. Poverty also encompasses low levels of health and education, poor access to clean water and sanitation, inadequate physical security, lack of voice, and insufficient capacity and opportunity to better one's life" (Ames et al., 2001, p.2).

Sustainable development embraces both development and natural preservation. The Brundtland Commission created the most commonly used definition: "*Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" (World Commission on Environment and Development 1987, p. 37).

INTERFACES, CHAINS, AND CORRELATIONS: APPROACHING A COMPLEX NEXUS

Status of the debate

The discussion about the implications of rising population numbers on environmental issues goes back to Thomas Malthus, whose central academic term was *carrying capacity*. Malthus' main concern was the scarcity of food supply due to an increasing number of mouths to feed. His central idea was that, in a general-equilibrium model, a given area of land can only provide food for a limited number of people. When reaching a certain population threshold, readjustment mechanisms should/would automatically take place and reduce the number of people by failing to simultaneously increase food supplies (famines). However, the Malthusian framework ignores the potential for technological progress (Mazzucato and Niemeijer, 2002). The best evidence for the importance of this theory was its internalisation by British government officials during the Irish famine from 1845-52: in London the famine was perceived as the readjustment process resulting from fertility rates that were considered far too high (Ó'Gráda, 1995).

However, Malthus' view did not remain unchallenged. Ester Boserup argued that technology is capable of significantly increasing yields to keep up with increasing demand (Mazuccato and Niemeijer, 2002; Sinding, 2009). This was the first step towards recognising the multidimensionality of population growth and her views rightfully influenced a number of reports. Edward Barbier and others focused their research on the so-called "*population-poverty-environment*" nexus, adding the population variable to the poverty-environment link previously introduced by World Bank researchers (Minot and Baulch, 2002). By creating his own expression that embraces all three phenomena, he articulated the interconnectedness and complexity of the issue (Barbier, 2010; Dasgupta, 2005).

Interfaces, chains and correlations

When authors draw theories on how population growth can trigger poverty and natural degradation, they employ distinct theoretical mechanisms to explain how a chain of events leads to ecological and human deprivation. Dasgupta (2005) argues that an increasing number of people equals growing demand for natural resources and can therefore lead to their rapid depletion. As a consequence of this shrinking resource base, more labour is required in order to collect resources from a much farther distance, providing a demand for more helping hands and an incentive for additional children. Consequently, rural poor in developing countries are more likely to have larger families, and it is common for children to participate in family farming and agricultural activities. Barbier (2010) agrees that given the presumed poverty of the rural population in many developing countries they are likely to procreate regarding further offspring as productive assets. According to this, Aassve et al. (2012) find a positive correlation between high levels of poverty and child labour. In summary, Dasgupta (2005) argues that persisting poverty leads to high fertility rates, as a result of which the natural resource base is depleted and in turn more poverty is produced. According to her, this process will only be interrupted when external factors, such as the availability of land, stop the spiral (2005). Other authors, however, fear that shrinking resources and high population numbers could even lead to a battle for resources in the long run (Durham, 1979; Homer-Dixon, 1991).

Following this theoretical pathway, population growth should be a concern due to its implications for levels of poverty and environmental degradation. Cleaver and Schreiber (1994) provide evidence to support the theoretical assumption that high levels of population growth can accompany deteriorating welfare standards and

the depletion of the natural resource base. They find correlations between poverty, fertility, and deterioration of the local environmental resource base in their studies in sub-Saharan Africa, drawing on cross-country data (Cleaver and Schreiber, 1994). They refrain from drawing causal conclusions, but their findings do show that there are ways in which population growth can lead to poverty and environmental degradation.

A number of studies have been conducted since these theories were first formulated and new findings raise doubts about a causal connection (Mazuccato and Niemeijer, 2002; Geist and Lambin, 2004). The relationship between poverty and fertility provides significant room for discussion, particularly if studies are conducted on different dimensions of the phenomena. While macro-studies normally conclude that increases in absolute poverty are due to higher levels of fertility (Eastwood and Lipton, 1999), micro-studies often find that poor families tend to have more children and frequently indicate a reverse causality (e.g. poverty leading to higher fertility). In their studies, however, Mohanty and Ram (2011) highlight that even the poor have contributed to an overall decline in fertility rates in the states Uttar Pradesh and Bihar in India. Aassve et al. find that poor families do not necessarily have more children but rather that their risk of entering poverty increases with every additional offspring (Aassve et al., 2005).

Are the rural poor to blame?

Barbier (2010) observes that the rural poor in developing countries are the most vulnerable to loss of ecosystem resilience. By 2025 the rural population of the developing world will have reached 3.2 billion. The 1.3 million currently living on fragile land are putting the greatest pressure on a declining resource base. Rather than the economic situation of the poor itself, it is the rural poor's lack of resources in concert with their tendency to be clustered on marginal land and fragile environments that leads to ecosystem and biodiversity loss.

Evidence from Jamaica reveals such a positive correlation between high population numbers, poverty, and deforestation. Assessing satellite deforestation and household data from 33 constituencies, Tole (2002) found that the contribution of fuel wood dependency to deforestation was significant. These findings are consistent with a dependency of the asset-less poor on natural resources. These results are the basis of an increasing body of literature expressing deep concern about the status of forests, especially tropical ones.

About 800 million people live in or near tropical forests. This is particularly alarming as many of these people are living on two dollars a day on frontier and disputed areas neighbouring the remaining havens of biodiversity (Chomitz et al., 2005). Between 30 and 35 per cent of mangroves, coral reefs, and tropical forests are already victims of land-use changes: this has resulted in a massive loss of ecosystem services (Barbier, 2010). It seems reasonable in this context to consider the geographic situation of the poor as a variable that has an impact on the levels of environmental degradation.

Choices and trade-offs

Even when agreeing that the rural poor strongly depend on the natural resource base, the actual degree of deforestation and ecosystem loss still strongly depends on a range of choices of the actors involved. In turn, the actors' choices are limited by a number of factors such as their access to primary markets (Barbier, 2010). In a review of 153 case studies on land cover change and deforestation, de Sherbinin et al. (2007) find that in most cases deforestation was driven by population growth, but always in concert with high levels of poverty and other

variables such as local institutions, policies and markets. Similarly, Banerjee and Duflo (2007) find that the links between poverty, lack of income opportunities, bad access to infrastructure and education correlates with high rates of resource extraction in many tropical forest regions. Therefore, to turn to a single factor as the source of natural degradation and poverty would mean ignoring the nexus' mutually reinforcing nature that develops its own dynamics and chains of effects.

For this reason, this paper supports Dasgupta's position that population growth is not harmful alone but becomes a problem if the right mechanisms of adaptation are not in place (2005). To address a multidimensional problem such as the "*population-environment-poverty nexus*", the corresponding policy answers must therefore include a number of mechanisms. A focus on decreasing high fertility rates would not be as effective as if combined with other development initiatives in the affected regions.

POLICY IMPLICATIONS

With mutually reinforcing phenomena and the absence of clear causalities, policy must be shaped accordingly. Given the apparent complexity of the problem it is reasonable to follow a holistic approach to tackle the different manifestations of the same issue. For example, female empowerment is expected to trigger a chain of positive effects that has the potential for poverty alleviation (Dasgupta, 2005; Aassve et al., 2005; Sen, 1999). The unmet need for contraceptives is still considerably high in the developing world. Singh et al. (2010) estimate that roughly six in ten pregnancies in South America and southern Africa were unintended. Mohanty and Ram (2011) and Robey et al. (1992) emphasise the need for improved access to contraception and family planning centres to decrease the number of unwanted pregnancies and influence preferences about the number of children.

Given both the vulnerability of the fragile environment and the people living on or close to it, compromises have to be made to achieve sustainable development. The direct dependency of the rural poor on forests and watersheds provides potential for development through schemes that include payments for ecosystem services. So far the most successful program was implemented in Costa Rica, and now has nearly one million hectares of land and a forest cover rate of 50 per-cent of the country's total surface (Barton, 2013). These schemes provide the incentives for environmental conservation through the allocation of economic value to environmental goods. They increase household earnings for the families participating in the programme through payments from those who directly benefit from conservation. When thoroughly planned and implemented, this is a viable approach to directly tackle both poverty and environmental degradation. The identification of possible obstacles (e.g. the identification of the financial flow's source) and the establishment of effective monitoring mechanisms for the implementation of such schemes are strongly recommended.

The most important recommendation is to invest in local bottom-up economic development and strong institutions (Asquith, 2013). This is likely to produce growth which, as many scholars find, produces job opportunities and raises salaries for both males and females. In turn, economic growth is associated with a decline in fertility rates (Sinding, 2009). Growth can also decrease the rural poor's dependency on forest products such as firewood and help them to diversify their livelihoods (Sinding, 2009). For instance, investment in local infrastructure such as roads has a potential to increase labour opportunities for the rural poor, as evidence from rural Pakistan indicates (Shami, 2010). Rather than assuming an unending cycle between

population growth, poverty, and environmental degradation, adjustment mechanisms for an increasing number of factors are required. Success stories from South Africa, Guinea and Ghana indicate that this is possible even in the poorest regions (Afikorah-Danquah, 1997; Fairhead and Leach, 1996; Kepe, 1997).

Success tends to follow an altered institutional framework supported by further market integration, which is the last recommendation of this chapter. Improved performance of formal institutions can be achieved through the creation of structures that decrease incentives for corruption and improve local governance structures. Informal institutions such as the Grameen Bank make access to microcredit conditional on adherence to certain principles regarding fertility, respect for the environment, and gender equality (Mainsah et al., 2004). Informal institutions and microcredit in particular provide a significant potential for development outcomes by bridging the gap between the poor and the markets from which they are excluded.

CONCLUSION

A causal chain deriving from unhampered high levels of population growth has been majorly refuted in the body of this paper. Allocating the scarce resources in the development sector solely on projects with a corresponding emphasis on fertility reduction is unlikely to produce the intended results. Dire predictions about the consequences of increasing population numbers should not be taken as deterministic, although several interesting correlations in the so-called “*environment-population-poverty nexus*” such as the geographic location of the rural poor on marginal lands were found. Population growth, high levels of poverty and natural degradation are mutually reinforcing and must be addressed together. Policies that focus solely on high fertility rates are unlikely to achieve their full potential in the long run. This essay provided evidence that 1) fighting population growth alone, even if successful, does not automatically lead to environmental conservation and poverty alleviation and 2) there is no panacea to fight poverty and natural degradation at the same time. Many of the studies show reverse causal patterns and links that remain unclear. Investment in local economic development and the implementation of schemes for ecosystem services should therefore accompany birth control policies. There is a need for further research about the causal links and directions of the different pathways, which is only achievable by conducting more case studies that also employ cross-regional and cross-country data. This will produce more reliable comparative analyses and insightful results that account for country-specific differences. These can help shape the formulation and application of more context-sensitive policies in developing countries.

REFERENCES

- Aassve, A. Engelhardt, H., Francavilla, F., Kedir, A., Kim, J., Mealli, F., Mencarini, L., Pudney, S. and Prskawetz, A. (2005) 'Poverty and Fertility in Less Developed Countries: A Comparative Analysis', ISER Working Paper 2005-13.
- Afikorah-Danquah, S. (1997) 'Local Resource Management in the Forest-Savanna Transition Zone: the Case of Wenchi District, Ghana', *IDS Bulletin*, 28(4), pp36-46.
- Ames, B., Brown, W., Davarajan, D. and Izquierdo, A. (2001) 'Macroeconomic Policy and Poverty Reduction', IMF: PRSP Sourcebook.
- Asquith, N. (2013) 'Investing in America's water factories: incentives and institutions for climate compatible development', *ReVista: Harvard Review of Latin America*.
- Banerjee, A. V. and Duflo, E. (2007) 'The Economic Lives of the Poor', *Journal of Economic Perspectives*, 21(1), pp141-168.
- Barton, D. N. (2013) 'Payment for ecosystem services, Costa Rica's recipe,' International Institute for Environment and Development [online]. Available from: <http://www.iied.org/payments-for-ecosystem-services-costa-rica-s-recipe>.
- Barbier, E. B. (2010) 'Poverty, development, and environment', *Environment and Development Economics*, 15(6), pp635-660.
- Chomitz, K. M., Buys, P. and Thomas, T. S. (2005) 'Quantifying the Rural-Urban Gradient in Latin America and the Caribbean', World Bank: Policy Research Working Paper 3634.
- Cleaver, K. M. and Schreiber, G. A. (1994) *Reversing the Spiral: The Population, Agriculture and Environment Nexus in Sub-Saharan Africa*. Washington, D.C.: World Bank.
- Dasgupta, P. (2003) 'Population, Poverty and the Natural Environment' in Maler, K. G. and Vincent, J. R. (eds.) *Handbook of Environmental Economics Vol. 1*. Cheltenham: Edward Elgar.
- Dasgupta, P. (2005) 'Regarding Optimum Population', *Journal of Political Philosophy*, 13(4), pp414-442.
- De Sherbinin, A., Carr, D., Cassels, S. and Jiang, L. (2007) 'Population and Environment', *Annual Review of Environment and Resources*, 32(1), pp345-373.
- Dietz, T., Rosa, E. A. and York, R. (2007) 'Driving the human ecological footprint', *Frontiers in Ecology and Environment*, 5(1), pp13-18.
- Durham, W. H. (1979) *Scarcity and Survival in Central America: Ecological Origins of the Soccer War*. Stanford: Stanford University Press.
- Ehrlich, P. R. (1968) *The population bomb*. Rivercity, MA: Rivercity Press.
- Ehrlich, P. R., Ehrlich, A. H. and Daily, G. C. (1993) 'Food Security, Population, and Environment', *Population and Development Review*, 19(1), pp1-32.
- Fairhead, J. and Leach, M. (1996) *Misreading the African Landscape: Society and Ecology in a Forest-Savannah Mosaic*. Cambridge: Cambridge University Press.
- Geist, H. and Lambin, E. (2004) *What drives tropical deforestation? A meta-analysis of proximate and underlying causes of deforestation based on subnational case study evidence*. Louvain-la-Neuve: CIACO.
- Homer-Dixon, T. F. (1991) 'On the threshold: environmental changes as causes of acute conflict', *International Security*, 16(2), pp76-116.

-
- Hulme, D and McKay, A. (2005) 'Identifying and Measuring Chronic Poverty: Beyond Monetary Measures'. CPRC-IIPA Working Paper 30.
- Kepe, T. (1997) 'Communities, Entitlements and Nature Reserves: The Case of the Wild Coast, South Africa', *IDS Bulletin*, 28(4), pp47-58.
- Mainsah, E., Heuer, S. R., Kalra, A. and Zhang, Q. (2004) 'Grameen Bank: Taking Capitalism Back to the Poor', Columbia Business School: Chazen Web Journal of International Business.
- Mazzucato, V. and Niemeijer, D. (2002) 'Population Growth and the Environment in Africa: Local Informal Institutions, the Missing Link', *Economic Geography*, 78(2), pp171-193.
- Millennium Ecosystem Assessment (2005) *Ecosystems and Human Well-being*. Washington, D.C.: Island Press.
- Minot, N. and Baulch, B. (2002) 'The spatial distribution of poverty in Vietnam and the potential for targeting.' IFPRI: MSSD Discussion Paper No. 43.
- Mohanty, S. K. and Ram, F. (2011) 'Spatial Pattern of Poverty Reduction and Fertility Transition in India', *Population Review*, 50(1), pp.62-78.
- Ó'Gráda, C. (1995) *The Great Irish Famine*. Cambridge: Cambridge University Press.
- UNDESA (2013) 'World Population Prospects: The 2012 Revision. Highlights and Advance Tables' [online]. Available from: http://esa.un.org/wpp/Documentation/pdf/wpp2012_highlights.pdf.
- Robey, B., Rutsein, S. O., Morris, L. and Blackburn, R. (1992) 'The Reproductive Revolution: New Survey Findings', Population Reports Series M(11): Johns Hopkins Population Information Programme.
- Roughgarden, J., May, R. M. and Levin, S. A. (1989) *Perspectives in Ecological Theory*. Princeton, NJ: Princeton University Press.
- Sen, A. (1999) *Development as Freedom*. Oxford: Oxford University Press.
- Shami, M. (2010) 'The Impact of Market Exposure on Public Goods Provision', Institute of Food and Resource Economics, FOI Working Paper.
- Shiferaw, B. (2006) 'Poverty and Natural Resource Management in the Semi-Arid Tropics: Revisiting Challenges and Conceptual Issues', ICRISAT Working Paper Series No. 14.
- Sinding, S. (2009) 'Population, poverty and economic development', *Philosophical Transactions of the Biological Sciences*, 364(1532), pp3023-3030.
- Singh, S., Sedgh, G. and Hussain, R. (2010) 'Unintended pregnancy: worldwide levels, trends and outcomes', *Studies in Family Planning*, 41(4), pp241-250.
- Tole, L. (2002) 'Population and poverty in Jamaican deforestation: Integrating satellite and household data', *Geojournal*, 57(4), pp227-247.
- World Commission on Environment and Development (1987) *Our Common Future*. Oxford: Oxford University Press.
- Veríssimo, A., Cochrane, M. A. and Souza C. (2002) 'National Forests in the Amazon.' *Science*, 297(5586), pp1478-1480.