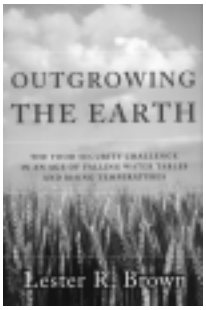

Brown L R. 2004. **Outgrowing the Earth: The food security challenge in an age of falling water tables and rising temperatures**

USA: Earth Policy Institute. 239 pp.

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Over the past half-a-century, the world population has grown manifold and this has come combined with a dramatic expansion of the global economy. Increasing numbers and growing affluence have created demands on the environment that are beginning to threaten the essential life support functions of nature. Impacts are already being observed on a world-wide scale in the form of growing desertification, depleting aquifers, rising temperatures, and so on. One of the results of such environmental trends is that the world food supply has been slackening while the world grain demand continues to expand at a robust pace. Aggravating the food supply problem are factors like the shrinking backlog of unused agricultural technology, conversion of cropland to non-farm uses, and diversion of irrigation water for urban consumption.

Lester R Brown's book *Outgrowing the Earth: The food security challenge in an age of falling water tables and rising temperatures* presents the above scenario in compelling detail. The numbers themselves tell the story: an increase of global population by 76 million each year; global grain production falling short of consumption in each of the first four years of the new century; world food stocks at their lowest level in 30 years; etc. But the book is not all about an impeding and inevitable food-supply-related doom; what finally emerges as the core theme of the book is that policy concerns need to be realigned so that the current environmental trends are given the attention and priority that they deserve; that it be recognized that policy-making is not an exercise in isolation but rather should take into account interdependencies and externalities of economic activities in their entirety, and that it is still possible, if not to reverse at least to check, the current environmental trends that carry potentially disastrous implications for the world's food security in the not-so-far future.

Structurally, *Outgrowing the Earth* is organized into ten chapters that contain an approach to the issue of global food security based on the specific environmental trends currently being observed world wide. Brown starts by looking at the environmental fallout of economic growth and what this has meant for the world grain production, a global indicator of food security. While the long-standing environmental trends such as soil erosion, desertification, and growing non-farm land use continue to impact cumulatively on the agricultural production and land productivity, there are a couple of newer environmental trends that take the centrestage in Brown's analysis. First, aquifer over-pumping owing to irrigation and the growing urban needs are leading to drastically falling water tables worldwide, and, second, changing

climatic conditions are being felt in the rising temperatures and frequent heat waves. Both these trends contain serious implications for the food security of the fast-industrializing countries that are also densely populated. Identical experiences of Japan, South Korea, and Taiwan and the emerging situation in China suggest that there may exist for countries with similar initial conditions, a common set of interacting trends which appear as the industrialization proceeds and leads to shrinkage in the grain area and decline in grain production over time. Brown terms this the 'Japan syndrome'.

What influences explain the environmental trends being discussed? Traditionally, a rapidly growing population depending for food on limited land supply has been recognized to be the most important contributor to food shortages in the long run. Brown links the population factor to food security by bringing in the processes – shrinking land holdings, shifts in land use to non-farm sector, water shortages, and greater energy use – with the likely environmental fallouts. More importantly, the current pattern of demographic change suggests that most of the population growth in the future will take place in the developing countries, particularly in the Indian sub-continent and sub-Saharan Africa, where concern for rapid economic growth has already been creating severe pressures on the natural resources. A further dimension, rather unconventional, to the population issue is added in the form of the phenomenon whereby vast chunks of the world's population seek to move up the food chain and add to the global demand for animal protein. This has added to the pressures on natural resource systems like fisheries and rangelands to such an extent that in many cases there has occurred a complete collapse and species extinction.

The growing demand for food obviously prompts attention to options that can increase cropland productivity. During the second half of the past century, significant achievements on this front were possible because of genetic advances, agronomic improvements, and synergies between the two. However, as Brown points out, the yield gains from biotechnology appear to have reached the physiological limit and, therefore, future options are limited to improved farm practices.

Brown identifies four natural resources as central to the future food security: cropland, water, rangeland, and the earth's climatic system. These are the resources which are being subject to the most severe threats from the environmental fallouts of growing economic activities all round the world. Thus, for instance, the 900 million hectares of land area affected by water and wind erosion is substantially greater than the world's grainlands (some 670 million hectares). What is more frightening is the rate at which degradation is proceeding on account of over-ploughing and increasing cultivation of the vulnerable land areas. In its most extreme form, we have large areas of cultivated land turning into useless dust bowls and deserts that have their own further environmental consequences, in terms of top soil loss and dust storms. At another level, increasing urbanization and population growth continues to add to the problem of land loss by diverting cropland to non-farm purposes (for example, residential complexes, parking lots, roads, etc.).

With 70% of the current world water use going for irrigation purposes, sufficient water availability becomes critical to the future global food security. World wide, aquifer over-pumping has led to falling groundwater tables. In many countries, overuse of river water is contributing to the drying up of major rivers, and, in situations where rivers are shared among different countries, competing claims from nations may very well turn into military flare-ups. Even within countries, both the developed and developing, agriculture is losing out to competing claims from other users. While overuse of water for irrigation is affecting the overall availability of the resource, both at the surface and sub-surface levels, the forces of urbanization and growing incomes have

combined to divert the increasing quantities of water from farm use to cities.

Compounding the above challenges to global food security in the future is the rising trend of earth's temperature as a consequence of the global warming phenomenon. Apart from its directly negative impact on crop yields, the earth's rising temperature affects food security by affecting river sources, increasing evaporation rates, creating new crop diseases, causing heat waves, and rising sea levels.

What needs to be the policy response, then? Brown's arguments are not against economic development processes, rather, he emphasizes the need to integrate the environmental concerns in policy-making and prioritize practices and technologies that contribute to the sustainable use of natural resources. Thus, for each of the four resources identified to be critical for food security, technology that has proven to be resource-conserving elsewhere is discussed. At the same time, introduction of such technology has to be accompanied by appropriate and effective incentive structures. Thus, for example, conserving top soil in productive lands requires greater and faster spread in farming practices such as terracing, contour strip farming, conservation tillage, etc., all of which signify significant changes in the production behaviour of framers in the developing countries and which may be forthcoming only when appropriate economic incentives are introduced. A similar approach holds true for increasing the efficiency in water and energy use as part of the demand-side measures to reduce the pressure on sources. As for supply-side interventions, policy-makers need to look at development models based on environmentally benign technologies and practices. The obvious example from the climatic point of view relates to efforts aimed at harnessing renewable energy sources. Brown illustrates the important need for policy-making to take cognizance of the efficiency criterion from the environmental perspective in context of design of the urban centres where efficient land use planning requires an appropriate policy on transportation systems so as to minimize the diversion of cropland to non-farm uses.

The China factor is a recurring theme throughout the book and for good reason. Recent declines in China's grain harvests have focused attention on the potential of the country's grain imports to overwhelm world markets and trigger an increase in food prices. Environmental trends in the region suggest that it would be difficult to reverse the downturn in grain production. There is also the related danger of political instability in the country resulting from rising food prices and its likely consequences on both regional and global security. The other country which receives special attention in the book is Brazil, primarily because of its potential to contribute to world grain production by extending the agricultural frontier of the country into ecologically fragile areas.

The concerns articulated by Brown have a strong relevance to the Indian context. With a population growing at the rate of 18 million per year, and environmental trends like shrinking cropland area and falling aquifer levels strong in their presence in large parts of the country, India's food security is likely to be severely threatened unless given the priority and attention it deserves from policy-makers.

Outgrowing the Earth is a timely reminder of the growing pressures on our planet that flow from mankind's unrestrained and short-sighted quest for economic betterment. Brown makes compelling use of facts and figures to come up with an account of the emerging global food security challenge owing to the current environmental trends, which is as notable for its easy readability as for the stark images that it implants in one's mind and, possibly, in one's conscience.