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Biodiversity, Food and the Future: India

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Every academy of sciences in the world has agreed for more than 15 years that foods derived from transgenic crops not only are perfectly safe for human health, but that in fact they had nothing in common by virtue of which they could even theoretically pose any common danger. Despite this sturdy scientific consensus, India and many other countries continue to delay the approval of such crops. Arguments about them have become politicized and are being used for fund-raising purposes by organisations such as Greenpeace, and by individuals who stridently condemn them even though there is literally nothing concrete to condemn. The world faces a number of really serious problems, but this is not one of them. It is time to move on.

How did we get to this point? Approximately 200 years ago, when Britain was consolidating its conquest of India, the countries of the world and their colonies had expanded to take up all of our planet's ice-free land. The human population of the world had reached one billion people, with the population of India about 270 million of them. Most of the history of the world since has involved fighting for territory and resources, and, tragically, about 200 million people have died in wars during these centuries. Meanwhile, the global population has expanded to 7.4 billion people and that of India to 1.3 billion. By the year 2050, world population is projected to grow to 9.9 billion people, adding roughly 250,000 net per day, and that of India to 1.7 billion. There is much wishful thinking about stabilization sooner, but the sheer numbers of people and the time it takes to reach the end point of existing trends indicates that stabilization will require decades of gradually slowing growth (www.prb.org). What effect are these numbers of people having on our planetary home?

Global Footprint Network (www.footprintnetwork.org) estimates that the people of the world together are consuming about 164% of our planet's sustainable productivity. In other words, it would require about 64% more sustainable productivity than exists on earth for us to attain collective sustainability. We could achieve stability by attaining a level population, socially justifiable levels of consumption, and improving our technology, but we are not gaining on the problem at present. In the 1960s, we were using about two-thirds of total sustainable productivity, with the subsequent doubling of our population and greater increases in consumption have sent us well past our planet's total capacity.

We have reached this point because of our cultivation of crops, starting some 12,000 years ago. By that time, our species was 200,000 years old; it had reached Eurasia and Australia about 60,000 years earlier. Once stored food was available, people could settle and form villages, towns, and cities, in which individuals who lived earlier as hunter-gatherers could adopt individual specialized professions and build our modern civilization. The more people, and the more they subdivided the world, the more was the competition and warfare.

Some countries consume more than their share of the world's productivity. Since our use already exceeds the total amount of productivity available, a given country can increase its standard of living only through improved technology and resource management or by taking something away from another country. India's Ecological Footprint per Person has doubled since 1961, while its population has grown from 460 million to 1.3 billion people – nearly tripling, so that the average footprint per person (amount of consumption available per person) has decreased. Clearly, some citizens are enjoying an enhanced standard of living, while most are not benefiting from the economic boom. It will require incredibly careful management of natural capital for India to shift from an economy that has grown at the expense of its environment to one that flourishes by nurturing and preserving it.

In the same period of time, China's Ecological Footprint per Person has tripled, while its population has doubled – and much of the growth has taken place in a period of nearly stable population. Individuals in China have become markedly better off during this

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period, but in the case of both China and India, much of the improvement is fueled from abroad.

For India, achieving its global emissions goals and meeting the targets set in Paris in December 2015 is proving difficult, with multiple missions and agencies involved in the national effort to lower emissions and achieve increased energy efficiency. Globally, it may already have become impossible to hold global temperature increases within the 2°C target set at the Paris meeting. Irregular monsoons, glaciers melting, the intensified use of water that accompanied the Green Revolution in India, and the projected 2 meter sea level rise in the remainder of this century will certainly adversely impact agricultural productivity in India and as well as globally.

India is a net exporter of food, the world's seventh largest, but still runs a substantial negative trade balance. Even with no increase in population, India would still need to increase its agricultural production greatly to feed its people adequately. From the time of the Bengal Famine (1943) to the start of the Green Revolution (1967), millions of Indians starved to death, and there are now three times as many people to feed as there were during that period. The Green Revolution resulted in increasing croplands, double-cropping through intensive irrigation, and introducing improved genetic strains of crop plants. The population was increasing more rapidly than food production, however, during this whole period. No level of agricultural productivity can feed a continually increasing population.

To feed all its people, the world will need to attain a level human population that might not be as large as the one we have now. Consumption levels will need to be adjusted by the principles of social justice; women and children will need to be empowered if social justice is to be attained. Technology will need to continue to be improved as one element of the equation. Obsolete economic theories that assume that the goods we get from nature are as expandable as, for example, labour, will need to be modified to take into account the conditions of the actual planet that we inhabit. On a finite planet, it verges on immorality to assume that economic prosperity can be attained by adding more children to a given population. In India, this is vividly illustrated by the falling rates of consumption of the poor during the past two decades of prosperity for a part of the population.

In improving agricultural productivity, it seems a mystery to the world that India, the greatest beneficiary of the Green Revolution, has been so oddly backward in adopting current improvements in crop genetics. Genetically modified (transgenic) crops provide a concrete example. The struggles that have taken place in a bureaucratic setting that very often failed to take into account the findings of science have done nothing but contributed to the hunger of the Indian people, and it is heartening that the barriers are starting to break down, although very slowly. We can only wish that ways may be found to accelerate the process for the good of the Indian people. Among the problems has been the fight against utilizing Golden Rice; those who have opposed its introduction and widespread use should realistically be held responsible for the deaths of hundreds of thousands of children and the blindness of many more each year – and without a shred of factual evidence against its rapid introduction.

Human pressures on the environment, exacerbated by inefficient agriculture and urban spread, are also causing what will in the future doubtless be seen as the most serious problem of our time, the extinction of perhaps half of all living species of organisms during the course of this century. India's biodiversity is among the world's richest, with most species still unknown in all but a few groups, such as vertebrates and plants. Meanwhile, bureaucratic snarls and lack of interest retard both the efficient acquisition of knowledge about these organisms and their conservation. We derive all of our food and most of our medicines from them, and that we are just beginning to understand the ways in which they function to protect the water and the soils that support us and provide the beauty that enriches our lives, our inefficiency and stubbornness in getting on with the job seems incredible. No wonder that Harvard University's E.O. Wilson has termed the loss of biodiversity that we are driving as the sin for which our descendants are least likely to forgive us.

There is no future for India or any other nation if we do not find better ways to cooperate with one another to fashion a sustainable planet while there is still some room to maneuver. In doing so, we must embrace both the principles of science and the moral precepts that we have developed over the years to find peace based on mutual love and mutual accommodation. The question is really not whether we can do better – we simply must.