Demography India
Vol. 19, No. 1 (1990), pp. 65-69

Kamu Kasturi*

The Impact of Population on Environmental Conservation

INDIA'S burgeoning population is imposing an increasing burden on the country's limited and continually degrading natural resource base. The number of people a particular piece of land can support— the carrying capacity of the land — depends on climatic factors, the inherent productivity of the land, the products it yields, and the resource demands of the population. The natural resources are under increasing strain, even though the majority of people survive at subsistence level. It will be increasingly difficult to satisfy the basic needs of a growing population even at present levels of consumption, and the situation will deteriorate progressively as the per capita consumption of resources mounts. It is therefore, imperative to rein in population growth to stem the rising tide of en vironmental deterioration. We will first focus on the importance of different constituents of the ecosystem, and the impact of the growth in population on the environment. It is not merely the sheer numbers involved that affect the environment, but the demands made upon natural resources that have to be considered— this becomes increasingly important as the levels of consumption rise, as in the case of the urban population.

Impact of Rural Population on Ecosystems

Today every million hectares of land supports 2.5 million people, and by the end of the century this number will go up to 3 million[1]. Forty seven percent of the land is under cultivation, one of the highest in the world. Since independence, the total area under cultivation has increased from 118.75 million hectares (mha) to 140 mha in 1984-85. Most of this expansion has taken place at the expense of forest and grazing land. Upto 1980, 2.6 mha of forest land have been diverted to agriculture. However, there is very little room for any further expansion of the area under cultivation, as the forest cover has not only to be maintained, but increased so that one third of the country's area is forested[6]. This is necessary to sustain the land's agricultural productivity as forests affect soil, climate and the availability of water[2]. (Since the enactment of the Forest Conservation Act, only 16,700 hectares of land have been diverted every year between 1981 -86). Foodgrain production has managed to keep pace with the growth in population, from 70 million tonnes in 1965-66 to

* Dr. Kamu Kasturi works with World Wide Fund for Nature, Lodi Estate, New Delhi.

172 million tonnes in 1988-89. Any further growth in yield can only come from increased productivity. In the meanwhile, however, the degradation of the land is proceeding apace. The country possesses only about 266 million hectares of arable land, of which 90 million hectares are degraded due to denudation, waterlogging, and salinisation. Another 85 mh, are partially productive, and form part of the total 143 mha under cultivation; and must be salvaged from further degradation. It is not alarmist to assume that the situation will assume crisis proportions within the next decade or two unless energetic and urgent attempts are taken to control the growth in population.

With less than 2% of the world's total forest area, the country supports 15% of its population. Only 11% of the country's land mass is under forest cover, as opposed to a requirement of 30% [6] (20% in the plains and 60% of the hills). The per capita forest area decreased from 0.2 ha in 1951, to 0.1 in 1981, and are in increasing peril, with each passing day. Forests store nutrients in the vegetation, retain and contribute towards the fertility of the soil. In addition, forests encourage the absorption of water by the soil, decreasing the loss of water by run-off to streams and rivers, and reduce the possibility of soil erosion. Moreover, it has been suggested that forests influence rainfall patterns by affecting the hydrological cycle. It has been observed that with increasing deforestation, the amount of rainfall tends to decrease[8]. The hydrological stability of mountain watersheds is damaged by the destruction of forests due to overgrazing and the growth of non-terraced agriculture to meet the needs of a growing population. However, the magnitude and impact of such practices is unknown, and the issue merits further investigation . Deforestation, along with practices such as the cultivation of monoculture plantations to replace natural mixed forests, has compromised the capacity of the soil to retain water, and have wrought havoc in upland watersheds. There is an increased runoff of rain-water resulting in floods. This is accompanied by soil erosion— the magnitude of the disaster can be guaged from the fact that 6 billion tonnes of topsoil is lost to the Ganga[4]. The decreased retention of water by the soil results in drought, caused by the scarcity in surface and ground water. The supply of potable water has declined drastically in recent years — for example, water shortage afflicted 17,000 villages in U.P. in the sixties, but this number had increased to 70,000 by 1985. In M.P., the number of villages suffering from water shortage increased from 36,400 to 64,500 in 1985[7]. This situation is bound to deteriorate in the years to come, with increased competition for scarce resources.

Of the total of 75.18 mha officially smder forest, only 38.47 mh have full forest cover with crown density of over 40%[l2]. Such forests are being lost at the rate of 1.3 mh per year [6], due to a variety of reasons, including deforestation. 4.35 mha are subject to shifting cultivation, and 0.7 mha encroached upon for permanent cultivation. The forests are subjected to both industrial and domestic demand. It is estimated[2] that the current demand (1987) for firewood, both rural and urban, is 157 mt, while the permissible availability is only 58 mt, the shortfall being met by illegal felling. On the other hand, industrial demand for timber is estimated to be just 27 mt; 12 mt is available legally, the gap being 15 mt. Firewood needs are assumed to be the major cause of deforestation . Many experts believe that although the major proportion of wood is used for firewood, the rural demand is not the prime cause for deforestation, since the poor utilise mostly small twigs and branches as fuel, as shown by energy surveys. The urban consumer uses logs for fuel — this being the main

cause of deforestation. A study made by the National Council of Applied Economic Research estimated that in 1978-1979, the country consumed about 95 million tonnes of firewood, of which 63 million tonnes were in the form of twigs and branches. Moreover, a large proportion of the logs originated from private lands. It was concluded that the rural demand was not the major cause of deforestation[6]. If this is indeed the case, the forests are jeopardised by the expansion in urban demand.

The forests are further burdened by overgrazing, which impedes their regeneration. The growth in the population of livestock, has not lagged behind the human population. The number of livestock has increased from 292.02 million in 1951 to 415.94 million in 1982. While the number of cattle has increased by only 7%, goats have increased by over 40%. Goats are the principal agents of ecological degradation, lying waste to forests with alarming efficiency. The urgency of the situation can be guaged from the fact that only 12 mha or 4% of the land is classified as permanent pasture, and its area is decreasing continuously[1, 2]. Through overuse, these lands are among the most degraded in the country. An equivalent amount of land is legally available for grazing in the national parks and sanctuaries[1]. This is not sufficient to sustain the livestock population, and the cattle take to grazing in forest land. The number of animals grazing in the forest rose from 35 million in 1957-58 to 60 million in 1973- 74. An estimated 99 million head of cattle (goats have been included in this figure, 2 goats being considered equivalent to one cow), graze in forests at present[2], while not more than 31 million head of cattle should be permitted under sustainable conditions. In spite of this there is a shortfall in the requirement of fodder, to the extent of fifty percent. Overgrazing poses a severe threat to the regeneration of forests, and causes soil erosion. It would not be an exaggeration to claim that the demand for firewood, whether rural or urban, and overgrazing are the two factors most responsible for the destruction of forests. These problems will only worsen with the rise in population, and increasing demand. As the demand for industrial timber escalates, the burden on the forests will become well high unbearable.

Impact of Industry and Urban Population on Environment

As the per capita consumption of resources rises with growing affluence, and the consequent expansion in industrial development, the environment will come under increasing strain.

Air Pollution

With increasing industrial development environmental pollution is on the rise. To meet expanding energy requirements, pollution from coal-fired thermal power plants: is on the upswing. Coal production has increased from 35 mt in 1950, to 150 mt in 1980; and is projected to be 240 mt in 2000. The sulphur content of Indian coal is low, but the ash content is high at 30%. Combustion leads to the production of nitrogen oxides and sulphur dioxide. These dissolve in rain water to form nitric and sulphuric acids, respectively, that destroy forests and lakes. Sulphur dioxide emissions increased from 1.38 mt in 1960 to 3.2 mt in 1979, an increase of 21% in 13 years as compared to an increase of 8.4% in the USA over the same period .

Vehicular pollution is a major cause of pollution in the cities, accounting for 34 % of the dust and smoke iriDelhi. Although they account for only 13 % of the total pollution, two wheelers emit 8 times as many hydrocarbons per unit of fuel consumed as heavy vehicles. 3.5 million two wheelers are due to be manufactured in 1990. This percentage is bound to increase disproportionately as their numbers grow faster than those of other vehicles .

In addition, India's contribution to global warming through increasing emissions of carbon dioxide, will continue to rise unless stern steps are taken. Likewise with the consumption of chlorofluorocarbons that pose a threat to the ozone layer of the atmosphere.

Water Pollution

Dumping of hazardous industrial effluents and urban sewage in rivers will render them increasingly unfit as a source of drinking water. Groundwater is less prone to pollution, but these supplies too are under increasing threat.

Degradation of Ecosystems

The hydrological stability of upland watersheds has been undermined by the rampant growth of mining and construction activities. For example, limestone quarrying in the Mussoorie hills has destroyed the limestone aquifers, altering the surface water flow in the valley. Perennial streams have dried up, carrying only monsoon floods . In Uttarakhand, the widespread use of dynamite for quarrying, mining, and the construction of roads and dams has gravely affected the ecological stability of the ecosystem . Such depredation of the environment can only spread with increasing resource consumption.

Indirect Impact of Population

The growth in population exacerbates existing problems. Due to the inequitable distribution of land the poor lack adequate means of sustenance. As their numbers increase, they are forced to til! ecologically fragile lands, subjecting them to degradation. This may, in critical locations, undermine the stability of the entire ecosystem. In Uttarakhand, for instance, animal husbandry was the main livelihood of the local population, in pre-British times. The forests were under the management of village communities, and were culled for fodder. After the advent of colonialism, the rights to the forest land were transferred to the state, which proceeded to exploit them for industrial purposes. Massive deforestation took place, and natural mixed forests were replaced by monoculture commercial plantations of, for example, pine, that yield no fodder, and impoverish the soil. Deprived of the fodder which sustained their livestock, the people took to agriculture, clearing the few forest lands still under their control. There was greater pressure on a smaller area of land as the population grew. The people no longer had a stake in sustaining the forest, and were motivated to clear forest land for cultivation. This is one of the reasons for the destruction of upland watersheds[10].

Conclusion

Equitable land reforms, and increased access to, and control over common lands will mitigate the impact of population on the environment. Once the local inhabitants have rights to natural resources, they will seek to nurture the environment and its products, rather than depleting it. This would also prevent commercial interests from degrading the commons. The environment is exploited most rapidly by people who fear they will lose access to it[11]. It should be kept in mind that women are the prime caretakers of the environment, as the tasks of water, fuel, and fodder collection, as well as cultivation fall largely to them[10, 11]. In the course of community education and development, it would be useful to focus attention on them, to stem the ravages of environmental decline and population growth.

References

1. *Faclsheet: Land,* Centre for Science and Environment.
2. *La\,J.B.,India'sForests,MythandReality.*
3. State of the World, World Watch Report, 1988, Chapter 2, reference to F. Kenneth Hare, cited in National Research Council: Environmental Change.
4. Vohra, B, B., *The Greening of India,* The Intach Envorinmental Series, No 1.
5. Vohra, *B.B., Mainstream,* January 16, 1988.
6. *Factsheet: Forests,* Centre for Science and Environment.
7. Shiva, V. and Bandyopadhyay, J., *Economic and Political Weekly,* August 16, 1986: 1448.
8. Bandyopadhyay, *J., Economic and Political Weekly,* December 12,1987 : 2161.
9. *The State of India's Environment 1984-85,* Centre for Science and Environment.
10. Dogra, Bharat, *Forests and People: A Report on the Himalayas,* published by the author.
11. Burning, Alan, *Action at the Grassroots: Fighting Poverty and Environmental Decline, Worldwatch Paper 88; Poverty and the Environment: Reversing the Downward Spiral,* Worldwatch Paper 92.
12. Lal, J. B., private communication.