

Population, Resources and Environment Linkages in India

Dr U V Somayajulu, Director
Mr Tilak Mukherji, Principal Advisor

Sigma Research and Consulting Pvt Ltd, C23, South Extension I, New Delhi – 110 049
email : ulimiri_vs@yahoo.com

1. Introduction

Study of linkages between population, resources and environment in a country like India would of great interest in view of its size as well as wide ranging variation one can find in the Indian sub continent. India, home to more than a billion people, accounting for nearly a sixth of the World's population is committed to the principles of sustainable development under MDGs.

2. Objectives, Data sources and Variables

This papers aims at understanding the linkages between population, resources and environment variables in India at national as well as state level. The paper uses secondary data from sources such as Indian Census, FSI, NSSO, Planning commission, FAO et al.

The variables considered for multi variate analysis pertain to the broad areas listed in Table 1.

Table 1 Variables considered

Population	Resources	Environment
<ul style="list-style-type: none">❖ Population❖ Population density❖ Population growth❖ Urbanization❖ Human habitat❖ Poverty❖ Tribal population❖ HDI	<ul style="list-style-type: none">❖ Riverine system❖ Ground water resources❖ Soils❖ Mineral resources❖ Forest resources❖ Land use pattern-rural and urban❖ Demand and supply of water❖ Quality of water❖ Food security❖ Livelihoods	<ul style="list-style-type: none">❖ Climate❖ Bio diversity❖ Water pollution❖ Air pollution/quality❖ Noise pollution❖ Impact of tourism❖ Vulnerability to disasters❖ Change in forest cover❖ ESI

3 Preliminary Findings

Resources

In India, majority of the poor live in rural areas and depend directly on natural resources and ecological services for their livelihood. As per estimates, over 60% of India's work force depends on agriculture, fisheries and forests for their livelihood. The evidence suggests that as human population continues to expand, the resource base continues to shrink, posing a new challenge to humanity. In rural as well as urban areas of several Indian states, water scarcity is emerging as major problem and tropical forests are depleting at an alarmingly high rate. Traditional crop varieties that are indispensable for food security are being lost.

Over the last two decades, availability of natural resources to rural community, especially the poor sections, has eroded severely. More than 57% of the total geographical area of India was found to be degraded, recording an increase of 53% since 1994, which can be attributed to soil erosion and wind erosion.

India with its moderately high population growth faces different situation with regard to distribution of population among sources of livelihood, level and trend of population pressure on natural and investment resources. The analysis indicates that high population growth rates led to more intensive use of resources, exacerbating existing scarcities and over exploitation.

Availability of Land resource is much below the World average mostly due to unaffordable natural conditions and continued population growth, which led to high population density.

Water

Fixed water resources and higher population pressure may push India to water stress zone by 2025. Water scarcity, induced by mounting population density and air pollution, partly due to growing urban traffic are the merging issues in India.

Annual internal renewable water resources in India fell by 652 cubic meters per capita from 1896 cubic meters in 1998 to 1244 cubic meters in 2000.

Land

The land degradation, a serious issue in India, is attributed to population related factors and land shortage, while the later is a consequence of continued high population growth. For instance, during 1980-1990, growing population pressure led to decrease in agricultural land per person by 14%.

Forestry

Forestry is the second largest land use in India after agriculture with a forest and tree cover of 24% of geographical area. It has about 2.6% of World's geographical and 1.8% of forest area and supports 16% of World's population. About 275 million rural poor in India (27% of total population) depend on forests for their subsistence and livelihoods. Half of the 89 million tribal people who live in forest fringe areas have cultural and economic linkages with forests. Forestry and logging accounted for 1.1% of India's GDP in 2001. Table 2 gives the change in forest and mangrove cover during 2001-2003

Table 2 Change in Forest Cover and Mangroves

Forest Area (Sq Kms)	2001	2003	Change
Dense forest	416809	390564	-26245
Open forest	258729	287769	29040
Total forest cover	675538	678333	2795
Mangrove cover	4482	4461	-21

The analysis also indicates huge gap in demand and supply of wood due to under productive forest resources and extremely low per capita land availability. Increase in population pressure from within or through migrants is one of the factors contributing to break down of the shifting agriculture system caused by the rapid shortening of the cycle from 20-30 years to 5 years

Disasters

High dependence on natural resources for livelihoods also found to be increasing the vulnerability to disasters, environmental and eco system degradation and natural calamities. This is evident from the fact that while 11% of the total land area was flood prone in 1988, 37% of the area was inundated by floods in 1998.

Urban environment

Migration to urban areas and urbanization choked the natural ability of urban environments to absorb the wastes and emissions from human activities. Delhi is estimated to have the maximum number of vehicles on its roads which contribute to two third of total pollution in Delhi.

Human Development

The analysis indicates that environmental factors were responsible for 20% of the burden of disease in India. On the other hand, water and sanitation are responsible for 11% of burden of disease, while indoor air pollution contributed to 6%.

Table 3 gives the Human Development Index and Environmental Sustainability Index

Table 3 HDI and ESI

Indicator	Value
HDI	0.595
HDI rank	127
ESI	45.2
ESI rank	101

State wise analysis indicates that only 6 of the 20 states for which the data is available are environmentally sustainable in terms of FAO's environmental sustainability index. In terms of food security, 6 states are moderately food secure states.

Correlation analysis indicates that at state level, forest cover, poverty and tribal population have positive relation. This can be attributed to dependence of tribals and vulnerable groups on forest, which is getting degraded due to population pressure.

4 Implications

The preliminary analysis provides evidence for the inter relation between variables relating to population, resources and environment at state as well as national level in India.

The analysis indicates the need to balance the growth and development needs of people with the pattern and rate of resource consumption. There is also an urgent need to create awareness regarding environmental protection and management as well as efficient use of resources. Efforts must continue to fasten the process of population decline in most populous states of the country.

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