

Lecture 38: Role of Population in Models of Sustainable Development

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EFFECT OF POPULATION ON SUSTAINABLE DEVELOPMENT

Population size and demographic processes are intricately linked with sustainable development though population is not the only source of environmental crisis. Mode of social organization and technological development also affect a society's potential to develop in a sustainable manner. High rate of growth of population not only raises the demand for natural resources, it also affects most of those proximate variables which hamper the sustainability of development, e.g. organization of production, innovations, technological developments, politics, values and market forces. Population processes also affect the other indicators of sustainability such as equality, justice, absence of abject poverty, and greater participation of people in development.

In the less developed countries where population growth rates are high, and particularly in those countries where density of population is also high, the possibility of raising carrying capacities of scarce land resources (i.e. the maximum numbers that resources can support) is low, and alternative employment opportunities are limited, people would be forced to exploit natural resources without regard for future. Here people are forced to expand agricultural lands into unsuited areas, enlarge the size of their herds of livestock, and outmigrate to other areas. Ironically, the less developed countries also have low caring capacity, i.e., "the social, developmental and institutional variables that underpin the ability of institutions to cope with environmental stresses" (UNFPA, 2009).

Population growth leads to fragmentation of land, and causes low productivity, unemployment and reduced supply of fodder. People may respond to low farm productivity by increasing the number of livestock. Then the agricultural expansion and growth of livestock destroy the forests and pastures. They also cause soil erosion and thus ecological imbalance. As a matter of fact population growth, poor economic conditions, deforestation, soil desiccation and ecological imbalance tend to reinforce each other through dynamic multi-cyclic structures.

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According to Demeny (1990), a significant change in the demographic parameters is found to cause shifts in relationships between population, income and resource-use intensity, sometimes compensating and sometimes reinforcing the environmental impact. To quote:

In particular, over time non-linearities to scale may appear. Quantitative increases can generate qualitative changes; thresholds separating, for example, tolerable levels of pollution from levels that generate unacceptable risks for human health may be crossed. Up to a certain level, damage to a renewable resource such as a forest ecosystem, may be corrected by a spontaneous and relatively rapid biological process; beyond that level the damage may be irreparable, or the natural recovery or the human-engineered repair of the ecosystem in question may require a very long time or entail exorbitant cost.

In simple language, the relationship between population and environment is not amenable to one simple formulation. Population dynamics may offset or catalyze the effect of population size on environment. It depends on a number of socio-economic, political, cultural, technological and environmental factors. It also depends on whether we are focusing at micro level or macro level. Imagine that due to increase in family size in moderate fertility context there is a division of land, and in per capita terms the family becomes poorer. The family may respond by increasing fertility with the aim of diversification of economic activities and benefiting from division of labour and offset the negative effect of population growth on development. The family may increase fertility without having the possibility of raising income and the negative impact of population may be reinforced. In the same way there are different possibilities for societies and nations. In absence of capital they may decide to substitute capital by labour and thus ignore or encourage high fertility. They may benefit from this strategy. They may simply increase fertility due to religious, cultural or political reasons. Then they suffer more. Ironically, some of the poorest countries of the world have high fertility levels though it would be rational if they control it.

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EFFECT OF ADOPTING SUSTAINABLE DEVELOPMENT STRATEGIES ON POPULATION

Sustainable development strategies too affect population growth. In literature on population role of demographic factors in development has been greatly explored, but the role of sustainable development in population management is less understood. In 1987 the World Commission on Environment and Development—the Brundtland Commission—urged that “all should keep in mind that sustainable economic growth and equitable access to resources are two of the most certain routes towards lower fertility rates.” The State of World Population 1993 has clearly demonstrated that more often than not international migration has been caused by environmental disruption; sustainable development and environmental planning therefore need control of migration.

Part of the difficulty in treating sustainable development as a determinant of demographic processes arises from the fact that there is no single blueprint of sustainability. Economic and social systems differ widely among countries. Thus although sustainable development has become a global objective, each nation will have to work out its own concrete policy. Also in the different regions of the world the nature of population problems is different. The developed countries are in general characterized by low birth and death rates, low infant mortality rate, below replacement fertility, near zero or negative growth rate, high percentage urban and the problem of population implosion. The less developed countries are in general characterized by high but falling birth rate, falling death rate, falling infant mortality rate, high growth rate, high maternal mortality rate, low percentage urban and the problem of population explosion. Several countries in both developed and less developed categories have unique demographic situation and they do not conform to the generalized pattern. Sustainable development policies may have both desirable and undesirable consequences in both developed and developing countries. Generalized connections may not exist. Each country requires its own response to population processes as well own strategies for sustainable development.

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Although there may be strong theoretical linkages between sustainable development and population, sustainable development is neither a necessary nor a sufficient condition for effective population management. The reverse is equally true. Falling birth rates have also not been associated with better environmental management. It may be emphasized that both the developed and the less developed countries will have to work on sustainable development and population simultaneously.

TOTAL ENVIRONMENTAL IMPACT

The total impact on the environment is determined by interaction of three factors: size of population, consumption standards, and wastages of resources for each unit of consumption (UNFPA, 1992).

$$\text{IMPACT} = \text{POPULATION} \times \text{CONSUMPTION PER PERSON} \times \text{TECHNOLOGY EFFECT}$$

The above formula shows that the total impact on environment depends not only on population but also on consumption per capita and technology. Environment will be least disturbed if:

- Population is growing at a slower rather than a faster rate
- Consumption per capita is less, i.e., people exercise restraint on consumption
- Technology is environment saving rather than environment degrading

And environment will be most degraded if:

- Population is growing at a faster rather than a slower rate
- Consumption per capita is uncontrolled
- Technology is environment degrading rather than environment saving

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The above equation explains why the developed countries are more responsible for environmental damage despite the fact that they have lower population and more advanced (often environment friendly) technology. For example, United States has only 4.61 percent of the world population (a population of 314.7 millions) but its contribution to cumulative carbon dioxide emissions from fossil fuels is 29.3 percent. Same is the case with EU with 26.5 percent contribution to carbon dioxide. India has 17.5 percent of the world population (1,198.0 millions) but its contribution to cumulative carbon dioxide emissions from fossil fuels is only 2.2 percent. The developing countries are far behind the developed countries in income and consumption but they are increasingly developing the philosophy of development based on the experience of the developed countries. Their population and consumption behaviour are changing fast and as they produced sudden population explosion in the second half of the last century they may soon cause the collapse of the ecological system.

ENVIRONMENT IMPACT ANALYSIS

For legal and ethical reasons, now it has become quite common to go for environment impact analysis of a development project. The concept of environment impact analysis suggests that an economic project has environmental impact and it is important to know what it is. Imagine that we establish a thermal power station in a tribal area. It certainly has economic benefits. But it also has some adverse impacts. Sometimes even desirable development projects such as dams and canals have impacts on population and society. Irrigation canals have helped in improving agricultural productivity and diversification and led to multiple cropping in several parts of Rajasthan but this has also created new problems. In the earlier days when they had water scarcity life was certainly difficult. Now threat to physical survival is reduced but risks have increased manifold. They include malaria, social conflicts, violence and dissatisfaction due to rising aspirations. It is important to know before establishing a project what its impacts are.

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The impacts may be in various forms:

- Demographic impacts – measured in terms of population size, growth rate, density of population, birth rate, death rate, infant mortality rate, maternal mortality ratio, life expectancy, aging, sex ratio, etc.
- Economic impacts – measured in terms of employment and unemployment rate, per capita income, per capita expenditure, percent expenditure on food items, percent employed in the formal sector, percent below poverty line, wealth index, percent living in pucca house, etc.
- Social impacts – school enrolment rate, literacy rate, percent migrants, ethnic diversity, degree of social integration, empowerment of women and other vulnerable groups, social capital or social support, trust, spirit of voluntarism, degree of alienation, etc.
- Political impact – political participation, political schisms, voting behaviour, etc.
- Governance – fairness in implementing various schemes, efficiency and effectiveness, transparency, etc.
- Quality of environment – measured in terms of presence of different types of toxic elements in air and water, noise, climatic changes, etc.

It may be noted that the above impacts do not exhaust the impacts of projects, some of which are positive, some negative. Impact assessment theories require improvement in measurements and data, and greater consensus regarding standards of toxic elements that are humanly safe, looking at both what the experts believe and what the people say.