

The impact of cities on environment

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Abstract—Cities are growing at much faster rate. This causes many to think that inevitably their impact will degrade the environment. In this paper, the approaches to understanding the impact of cities on environment are analyzed namely Population Growth, Over utilization of resources, Energy depletion, Ecological foot print, Sustainability. The population growth provides some perspective on local impact, the Overutilization of resources, energy depletion, Solid waste management is also associated with the population growth and the Ecological Footprint model on global impact, only the sustainability assessment approach allows us to see the positive benefits of urban growth and provides policy options that can help cities reduce their local and global impact while improving their livability and opportunity, which continue to drive their growth. This is applied the city of Hyderabad, India.

KEYWORDS— cities / Ecological Footprint / environmental impact / population Growth / sustainability assessment

I. INTRODUCTION

The rapid growth of cities causes number of problems like pollution and global environmental problems. The problems will be analyzed and understood by the approaches like population growth, Over utilization of resources, Energy depletion, Solid waste management Ecological footprint, and sustainability.

II. POPULATION GROWTH

From the 1960s, onwards global environmental problems are started to be revealed and discussed, there was a focus primarily on the numbers of people and their potentially negative impact on the earth. “In an agricultural or technological society, each human individual, in the course of obtaining the requisites of existence, has a net negative impact on his environment.”

The rapid growth of the city’s population over the past one hundred years results from a difference between the rate of birth and the rate of death. The growth in human population around the world affects all people through its impact on the economy and environment. The current rate of population growth in cities is now a significant burden to human well-being. Understanding the factors which affect population growth patterns can help us plan for the future. Population grows. More than half of the developing world’s population will be living in urban areas by the end of the century. This growth outstrips the capacity to provide housing and services for others. The priorities for getting rid of poverty, improving food supply, ending malnutrition, and providing adequate housing coincide at all points with those required for balanced population growth and LDCs. The use of pesticides in LDCs, for example was expected to increased between 400 to 600% in the last 25 years of the twentieth century.

During the past 10 years, the world's food production has increased by 24 per cent, outpacing the rate of population growth. However; this increase was not evenly distributed throughout the world. For example, in Africa, food production decreased, while population increased. And world cereal production fell in 1993, according to the FAO, which predicted a food shortage in 20 countries during 1994. However, most experts agree that there is no shortage of food, and that equitable distribution should be sufficient to meet all needs for the future. Lack of money to buy food is the problem of malnourishment. Poverty, in effect translates the world adequacy into national and local shortages. Within households, men and boys have priority for whatever food is available, while women and children, especially girl children are the first to suffer malnutrition. Few resources are available to women, even though they are often responsible for food supply.

THE CONSEQUENCES OF RAPID POPULATION GROWTH

Rapid human population growth has a variety of consequences. Population grows fastest in the world's poorest countries. High fertility rates have historically been strongly correlated with poverty and high childhood mortality rates. Falling fertility rates are generally associated with improved standards of living, increased life expectancy, and lowered infant mortality. Overpopulation and poverty have long been associated with increased death, and disease. People tightly packed into unsanitary housing are inordinately vulnerable to natural disasters and health problems.

However, most of the world's 1.2 billion desperately poor people live in less developed countries (LDCs). Poverty exists even in MDCs. One in five Soviet citizens reportedly lives below the country's official poverty line. In the United States, 33 million people - one in eight Americans are below the official poverty line. The rapid expansion of population size observed since the end of World War II in the world's poorest nations has been a cause of their poverty. Poverty is a condition of chronic deprivation and need at the family level. Poverty is a major concern of humankind, because poverty everywhere reduces human beings to a low level of existence. Poor people lack access to enough land and income to meet basic needs. A lack of basic needs results in physical weakness and poor health. Poor health decreases the ability of the poor to work and put them deeper into poverty. Instead of allowing poverty to persist, it is important to limit our number because in dense populations too many lack adequate food, water, shelter, education and employment. High fertility, which has been traditionally associated with prosperity, prestige, and security for the future, now jeopardizes chances for many to achieve health and security.

Rich and poor countries alike are affected by population growth, though the population of industrial countries is growing more slowly than those of developing one. At the present growth rates, the population of economically developed countries would double in 120 years. The Third World, with over three quarters of the world's people, would double its numbers in about 33 years. This rapid doubling time reflects the fact that percent of the developing world's population is under the age of 15 and entering their most productive childbearing years. The world's current and projected population growth calls for an increase in efforts to meet the needs for food, water, health care, technology and education. In the poorest countries, massive efforts are needed to keep social and economic conditions from deteriorating further; any real advances in well-being and the quality of life are negated by further population growth. Many countries lack adequate supplies of basic materials needed to support their current population. Rapid population growth can affect both the overall quality of life and the degree of human suffering on Earth.

ENVIRONMENT & URBANIZATION

Global impact of environment is seen in such a way to increase automatically in response to the combination of increasing population and increasing per capita consumption, as technology has

rarely kept up with the growth in the other two factors. For example, in most developed cities, fuel efficiency has not improved since mid 1960s, while per capita car travel has increased along with population growth, and in many cities at an even faster rate. In cities, the population has been growing faster than in rural areas; the negative effect of this population and its living standard has been seen as entirely deteriorating the environment, both physically and aesthetically. The traditional cultural patterns break down in cities, and also that the high numbers of contacts with individuals not part of one's circle of regular social acquaintances may lead to mental disturbance. This shows the deteriorating global and social environment suddenly had a simple explanation – too many people and high density underlies all our urban problems was used to demonstrate the negative impact of cities on the environment and on the people living in them. Cities were seen as unnatural and unsuitable for humans, and a range of authors have supported this anti-urban, anti-density model. Up until now, the model has been used especially by antidevelopment groups wishing to “save” their suburbs from redevelopment, and sometimes in anti-immigration debates, but mostly by those with an apocalyptic view of the future of cities. However, these perspectives may not provide a complete understanding of the impact of cities, and various questions are raised.

The population impact approach contributes to an understanding of local and global impacts from cities.

The population Growth approach does help us to understand some local impacts of cities. Population perspectives involve biological realities, and thus help us to see that cities are fundamentally biological systems that depend on their bioregions, and that they each have a metabolic process involving energy, water and materials going through a city and ending up as waste. By concentrating people and production, cities concentrate demands for fresh water and other natural resources and inevitably concentrate waste generation. As populations grow, this can, and often does, have strong local ecological impacts. Commentators who emphasize population in their analysis of cities are generally making a plea to consider the ecological base of a city. Cities, from this perspective, are seen as an ecological system just a short step away from collapse. However, there are many aspects of cities that are not explained by this simple biological model. It does not explain why people are attracted to cities, or how economies of scale and density can actually lead to better urban services that manage natural resources and wastes or public transport. The population impact model of cities also fails to explain the global impact of cities. It does not explain why a city like Sholapur in India, with one million people but with very low average consumption and little resource-intensive production, has far less global impact than similar sized cities like Portland in the USA or Perth in Australia, although it has considerable local ecological impact. Sholapur does not have the waste controls of Perth and Portland, and these cities have also moderated their local ecological impact by importing most of the goods they consume so that the ecological impact of their production is not apparent

III. ECOLOGICAL FOOTPRINT

A more sophisticated analysis of the impact of cities has been developed by Rees into a methodology that can calculate a city's Ecological Footprint. This is based on an ecological understanding of how a city extracts food, water, energy and land from a bioregion (and beyond) and requires ecosystem services to absorb its wastes. The total resource use of city is figured relative to its population, and the resulting calculation allows a per capita footprint of land to be compared to that of other cities. These comparisons are useful for obtaining a sense of how much a city should be trying to reduce its full ecological impact, both global and local.

Can the Ecological Footprint approach contribute to an understanding of the difference between local and global impact?

The large sections of the urban population in low- and middle-income nations have virtually no impact on the global environment. They use almost no non-renewable resources and few renewable resources, generate almost no waste or greenhouse gases, and use no products whose production has high ecological impacts or generates hazardous wastes. Many people in these nations make a living recycling, and thus contribute to reducing resource flows, and have very little local impact. They may live in settlements that offend the sensibilities of wealthy people and sometimes they have serious environmental health problems. But this is not the same as having an environmental impact – either global or local.

What can Ecological Footprint analysis show?

The Ecological Footprint calculation converts all resource consumption into a land print. The calculation is largely artificial in that it relates energy consumption to the amount of land that would be needed to grow the equivalent in fuel crops. However, an indication of the relative amount of the earth consumed by a city is a useful input into policy development as a broad perspective on global impact. Increasingly, it is being used as an indicator of impact, although it has been critiqued by McManus and Haughton who state: *“the approach in effect decontextualizes place and the diversity and wonderment of nature, by suggesting that the problems, even if not solutions, are essentially reducible to a common metric.”* Because the indicator of ecological impact is a composite number, it cannot easily be used to suggest what can be done to reduce this impact. One of the important linkages that is not often drawn is between Ecological Footprint, urban density and transport energy. There is a clear increase in car use as a city sprawls. In other words, if a city has a policy to reduce the land it consumes, then it will reduce its car use. This is a policy-relevant relationship. In terms of the Ecological Footprint model, the transport priorities of a city shape its land use. Similarly, efficiencies in land use patterns can increase the efficiency of water use and waste management because dense land use is less water intensive and economies of scale and density make recycling easier. Although such linkages can be made, they rarely are when Ecological Footprint analyses are done. Ecological Footprint analysis does not easily lead to this kind of policy insight; rather, it frames policy almost entirely in terms of the reduction of population or consumption.

Is Ecological Footprint a policy-relevant concept?

The Ecological Footprint model is used largely as a symbolic parameter representing the problem of resource consumption. Analysis from this perspective can help a city frame a variety of policies to begin reducing global ecological impact. However, it does little else. It is still mostly a negative measure of the impact of cities rather than a more positive measure of cities should do. In policy debates, the issues of how to deal with resource consumption are reduced to a range of policies for transport, housing, water, energy, waste, biodiversity and, in particular, planning policies about density. Ecological Footprint analysis establishes a baseline and a sense of global responsibility (both important steps), but does not suggest how we can go further in policy debates to actually reduce the footprint.

Conclusion to the Ecological Footprint discussion

Ecological Footprint analysis does highlight the problem of urban systems and their environmental impacts based on resource consumption. This is an important concept. However, it doesn't suggest policy-level responses and hence runs the risk of being discredited if it is used too much. Policy is largely about what cities need to do – not what they should try to stop doing. Unless there are policies that can help cities to reduce their Ecological Footprint, then this awareness can become simply a tool for anti urbanism, as with the population impact model. Although it addresses the need to tackle the over-consumption of resources, the Ecological Footprint approach does not go

in a direction that can tap the opportunities created by the growth of cities. This requires a much more pro-urban assessment process.

IV. SUSTAINABILITY ASSESSMENT

Environmental assessment developed out of the need in the 1970s for project assessment, and it has hardly ever been applied to the incremental processes associated with city development. These more policy-relevant aspects of government have begun to be assessed more rigorously by strategic environmental assessment and, more recently, by sustainability assessment. The objective of sustainability assessment is to achieve a simultaneous consideration of social, economic and environmental issues and to achieve a “net benefit” outcome in each area, with minimal trade-offs. Sustainability assessment allows urban development to be assessed based on a range of criteria that address all the impact issues, but it is not inherently anti-people or anti-urban. It is an integrative tool that brings together environmental and human issues. It has a much more positive agenda than the other models discussed – it encourages a much more pro urban process and has the potential to drive an integrated policy agenda. The sustainability model grew from the need to resolve the tension between ecologists, who saw most development as essentially negative, and those working for social justice, who saw development as crucial to meeting human needs. The sustainable development approach was created as a new kind of development that would allow present and future generations to benefit economically, socially and environmentally.

Applying the objective of sustainability at the level of cities has been a somewhat less obvious approach than at the national level, although wherever it has taken place obvious policy outcomes become quite clear from this framing of the issues. For cities, I have defined sustainability as “*reducing Ecological Footprint while simultaneously improving quality of life within the capacity constraints of the city.*” This definition is now being used in Australian settlements. The definition is positive about cities and their opportunities, while at the same time promoting an agenda to reduce the impact of cities. Sustainability assessment can allow for a range of criteria to be used from the social, economic and environmental areas, while simultaneously seeking to find synergies between these factors. Urban growth can thus be taken as an opportunity to create solutions to the environmental impact of cities, with the recognition that cities can also provide a more positive opportunity for human development. Integrated policy approaches can be created with attention to sustainability, and many cities around the world are now using sustainability as the basis of their strategic planning.

Can sustainability assessment help cities to reduce their negative global and local impact?

Sustainability assessment enables us to understand and act upon both the local and global impact of cities. By applying the sustainability criteria a city can address both sets of issues: the “natural resources” criterion promotes attention to global and local resource issues at every step of development, while the “environment” criterion calls for the same approach to include all the global and local impacts. The other criteria enable the questions of “livability” to be addressed at the same time – and the synergies between them to be found. By having an integrated set of goals guiding development, it is possible to reverse the historic trend whereby inevitably, Ecological Footprint has been growing along with improvements in quality of life. The first signs of this decoupling can now be detected – Australian urban data,

for example, are showing that it is the wealthy and educated who are using less energy and water, recycling more, eating less junk food and living in places where they can use public transport and walk more.

Can sustainability assessment bring a positive role to city growth?

Sustainability assessment does not shrink from addressing the ecological problems raised by the population impact or Ecological Footprint models. However, the difference is that the fundamental role of cities – to enable human livability and opportunity to be improved – is facilitated in simultaneous and synergistic ways. It can help with both global and local issues in a way that allows decisions to be made responsibly and with a net benefit legacy.

Sustainability measures for Hyderabad development

OVERALL GOAL: To reduce the city's Ecological Footprint (water, energy, land, materials, waste) and enhance the environment while simultaneously improving quality of life (health, housing, employment, community) within the capacity constraints of the city and bioregion.

The measures are:

1. NATURAL RESOURCES

Water: Manage total water cycle to keep water extraction levels within sustainable yields.

Land: Minimize urban footprint and disruption.

Energy/greenhouse: Use energy efficiently and reduce greenhouse gases.

Materials: Use appropriate materials and recycle waste.

Waste: Minimize, reduce and recycle waste.

2. ENVIRONMENTAL PROTECTIONS

Biodiversity and ecosystem function: Preserve core biodiversity values and enhance natural ecosystem of the bioregion with corridors and natural areas retained.

Coastal protection: Protect and enhance the character of the coast and access to it, and ensure coastal hazards are recognized and avoided.

Air quality: Improve air quality.

Water quality: Maintain and improve waterway health.

Agricultural land: Ensure important agricultural land is conserved.

3. PLACES OF HIGH QUALITY

Parks: Preserve open space corridors and ensure local parks are provided.

Heritage: Protect and enhance regionally significant cultural landscapes and places, including places of relevance to indigenous people.

Sense of place: Protect and enhance the character and identity of the area.

Scenic places: Protect and enhance scenic areas.

Community facilities: Provide land for community facilities in a way that coordinates state and local government efforts.

Amenity and design quality: Ensure amenity of streets and buildings, and design that provides high-quality urban spaces with minimal traffic conflicts.

Walk ability: Provide easy accessibility for walking and cycling in local areas.

4. HOUSING DIVERSITY

Housing types: Ensure there is a range of housing types available for the full demographic spectrum of the city.

Housing choice: Provide housing choice for households on a range of income across the region.

Housing quality: Manage the quality of housing to ensure it is sustainable and livable.

Housing adaptability: Ensure that land and housing are available that can be adapted to an ageing population.

Housing quantity: Manage the quantity of housing to allow demand to be met.

5. JOBS ECONOMY

Offices: Provide quality office space in centers and along corridors serviced by quality public transport.

Infrastructure: Provide all necessary employment-related infrastructures, especially communications networks.

Land: Ensure employment-related land is provided in appropriately-zoned areas.

Cluster links: Facilitate interactions between R&D and employment centers in relevant clusters.

Training: Ensure skills are available in appropriate regions for employment support and job creation.

6. ACCESSES

Public transport infrastructure: Ensure all knowledge-intensive centers and corridors have quality public transport at their core.

Road network: Maintain and extend the road network where appropriate.

Local access: Facilitate short trips by sustainable modes for local accessibility.

Density and mix: Create appropriate zonings and opportunities for density and mix of uses in centers and corridors to reduce car dependence and create efficient land use.

7. QUALITIES AND EQUITY IN SERVICES

Quality services: Require the provision of high-quality services in health, education, security and community development.

Equitable services: Ensure that services are provided equitably across the GMR.

8. GOVERNANCE

Planning governance: Ensure that appropriate institutional support with local government is available for the implementation and review of plans in new land release areas, complex redevelopment areas and centers/corridors/regions across the GMR.

Funding mechanisms: Create funding opportunities for each of the planning functions required to deliver the metropolitan strategy.

Transparent and engaging processes: Ensure each planning step is transparent and, where complex issues are involved, create community engagement processes.

V. CONCLUSION

The problem with the population impact and Ecological Footprint approaches is not that they treat the environment as unimportant – on the contrary. But these approaches are largely policy free, as they do not include a positive human element. Any policy based on the population impact model would have to have as its main intention to lower the number of people in the world. Most people would not explicitly support such a policy, yet a perception of an excess of people could be exploited by xenophobes to promote racism or even genocide. This becomes even more obvious in cities, where anti-population politics can easily become associated with a resistance to change, which can drive away investment, and become socially regressive.

The marginalizing of deeper environmental issues such as resource use (especially oil depletion) and the sidelining of attachment to an area, will occur if the focus is just on the size of the population. Rather than assisting with the environmental impact of cities, an anti-population perspective can harm the environment through inadequate city policies. With the Ecological Footprint approach, the situation is better in terms of understanding global impacts but it is just as weak in terms of supporting positive policies that enable cities to solve their local and global problems.

A sustainability assessment approach to cities takes environmental impact seriously, and gives it mainstream consideration while simultaneously asserting the value of social and economic progress. Thus the positive aspects of cities can be merged into a net benefit approach, where the enduring value of environmental improvement, social gain and economic enhancement can be seen as a joint legacy for the future.

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