



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Understanding The Economics If Green Infrastructure: Benefits And Application

Dr. Pratima Chamling Rai

Assistant Professor,

Department of Economics,

Balurghat College, Dakshin Dinajpur Balurghat, India

Abstract

Over the past few years, a growing understanding has emerged that a healthy environment underpins the well-being and prosperity of all our communities, urban and rural. Successful regions require a healthy presence of green infrastructure for sustainable economic development. There is no doubt that both national and global authorities have discussed the transition to green and inclusive economies for a long time. Several global announcements have been made recently by India, including the 2030 Global Development Agenda and the Paris Agreement. Furthermore, as many developing countries in Asia, Africa, South America and East Europe become emerging countries, there is a certainty that urbanization will be chaotic and outside the control of local governments. Many cases have shown that strategies aimed at reducing urban poverty are associated with high budgets and do not prioritize sustainability. The public's concern about sustainability and the environment has shifted from niche to mainstream in recent years, placing new demands on economic policymakers. Making a strong economic case for environmental improvements has been a key challenge for policymakers and practitioners. To the extent that this paper attempts to comprehend the concept of Green Infrastructure and its benefits and also recognizes its economic value and incorporates it as a framework for the development of economic policies and strategies that will enhance a sustainable economy.

Index Terms: Green Infrastructure, Economic Development, Sustainability, Environment.

I. INTRODUCTION

India has experienced rapid growth over the past decade, which has led to increased job opportunities and a higher standard of living. The country's remarkable growth, however, has been restricted by a deteriorating environment and dwindling natural resources, which have forced it to take significant steps towards decarbonizing and achieving a green economy. In terms of the global sustainable development agenda, 'green' concepts like Green Infrastructure are being increasingly discussed on a large scale along with the economic benefits they provide. Over the past few years, sustainability and environmental concerns have moved from the niche to the mainstream, creating a new set of demands for economic policymakers. Local authorities and policymakers are under pressure to secure jobs and attract investment. At the same time, environmental concerns and economic security are becoming increasingly prominent and often conflicting. In order to build a strong economic case for environmental improvements, policymakers and economic development practitioners have faced a number of challenges. It is important to make clear what impact they will have on jobs, health, and economic strength in areas suffering from poverty and social problems.

Throughout Asia, Africa, South America, and East Europe, countries that have transitioned from developing to emerging countries will experience chaotic urbanization, outside of local government's control. Economic policymakers face new demands as sustainability and environmental concerns move from a niche to a mainstream concern in recent years. Several studies have shown that strategies to alleviate urban poverty tend to have high budgets and generally disregard sustainability. It has been challenging for policymakers and economic development practitioners to build a strong economic case for environmental improvements.

II. OBJECTIVES OF THE STUDY

The proposed study is primarily concerned with Economics of Green Infrastructure. The main objectives of the study are:

1. To understand the role of Green Infrastructure plays throughout our everyday lives. (increase awareness of the value of the natural economy)
2. To focuses on the need for Sustainable Development which will secure long-term economic growth thereby making the economy resilient to future risks. (promote and facilitate Green Infrastructure and Natural Tourism)

III. METHODOLOGY OF THE STUDY

The proposed study is descriptive one which is mainly built upon the information collected from the secondary database related to the Economics of Green Infrastructure. The research study thus draws upon several sources of data, mostly secondary data supported by economic and statistical information contained in official reports and records, journals and other literature sources where the observations are backed by necessary data which ultimately leads to final conclusion.

IV. STATUS OF INDIA AS A GREEN ECONOMY

Environmental degradation costs India \$80 billion per year or 5.7% of its GDP (Bholane, 2020). Despite the rapid economic growth of the past decade, India has suffered from severe air and water pollution. India, for example, is experiencing a rapid rate of urbanization, which is a global phenomenon. According to a United Nations report, 60% of the global population will live in urban areas by 2030. Asia currently has 90% of the world's rural population. The region is experiencing an exponential increase in urbanization, and by 2050 the rate is expected to reach 56%. By tapping the opportunities offered by urbanization, mainly driven by a growing population and accelerated industrialization, emerging countries like India can transform their economies. In spite of this, urbanization is contributing to drastic changes in the climate.

It is urban areas that are responsible for the increasing levels of pollution in the air, water, and soil. Urban sprawl, excessive carbon dioxide emissions from cars, and groundwater depletion caused by overdevelopment and mismanagement are only a few of the negative effects of overurbanization. The growing population of large Indian cities not only burdens the infrastructure and management of energy, water, and transportation, but also has damaging impact on the climate and the environment.

Environmental health risks are a concern in India, where 1.3 billion people live in poor conditions. Several indicators are taken into account when ranking countries in the 2020 Environmental Performance Index, including waste management, air quality, biodiversity, fisheries, ecosystem services, and climate change. Among the top six largest economies, India ranked 169 out of 180 countries, indicating it lags in green growth. In terms of some of the indicators, India ranked 179 out of 139 for Air Quality, 139 for Sanitation & Drinking Water, 103 for Waste Management, 149 for Biodiversity & Habitat, 36 for Fisheries, and 106 for Climate Change. This is shown in the table below:

Countries	Environmental Performance Score	Rank (out of 180 countries)	GDP Rank
United Kingdom	81.3	4	5
Germany	77.2	10	4
Japan	75.1	12	3
United States	69.3	24	1
China	37.3	120	2
India	27.6	169	6

Source: Wendling, Z. A., Emerson, J. W., de Sherbinin, A., Esty, D. C., et al. (2020), 2020 Environmental Performance Index, New Haven, CT: Yale Center for Environmental Law & Policy. Indicators are weighed on a 0–100 scale, from worst to best performance.

India's economy has been growing at an unprecedented rate. It is currently the sixth largest by GDP globally and the third largest in Asia. Despite COVID-19, IMF estimates that global GDP will grow 6.0% in 2021 and 4.9% in 2022, driven by macroeconomic recovery. In April-June 2021, India's GDP grew 20.1% annually to approx 32.38 lakh crore, compared to 32.38 lakh crore a year earlier. The World Bank indicates an increase of 8.3% and 7.5% in the next two years. The Indian economy must continue to grow in order for it to achieve its development goals. Growth may have huge environmental consequences, however, as it will severely deplete natural resources, such as minerals, water, and fossil fuels, which will increase fuel, energy, and raw material prices. In order for green growth to take hold in India, it will need to become less dependent on the resources needed to sustain economic growth, thereby improving social equity and creating jobs. Green growth can play a vital role in balancing these priorities. The two main obstacles to national policy making, public debt and fiscal deficits, may impede technological changes necessary to achieve green growth. Trade balance will also play a major role in macroeconomic policies. Therefore, it is important to maximize the benefits of green growth interventions across key sectors, such as energy, trade, and income.

V. UNDERSTANDING GREEN INFRASTRUCTURE

Green Infrastructure (GI) may initially seem like a concept associated with infrastructure that is defined as "the substructure or underlying foundation, particularly the basic installations and facilities that support a community's ongoing survival and growth" (Benedict & McMahon, 2002), but it is actually an alternative form of infrastructure that produces economic, social, and, most importantly, environmental benefits (Kingma, 2012).

In our cities and towns, GI is a network of designed and natural vegetation that conserves natural ecosystem functions and values and provides associated benefits to human populations (Benedict, & McMahon, 2002). As a result, public parks, recreation areas, remnant vegetation, residential gardens and street trees are all included in the plan as well as innovative and emerging new urban greening technologies such as green roofs and green walls (Bosomworth, Trundle, and McEvoy, 2013).

The concept of green infrastructure refers to the design and development of a series of interrelated green assets, each of which has a unique identity and features and can serve a variety of purposes, to some degree. Investing in Green Infrastructure should be strategically planned at a spatial scale that recognizes the interdependencies and transference that exist across and between administrative and political boundaries in order to maximize its benefits.

VI. ELEMENTS OF GREEN INFRASTRUCTURE

In addition to defining its elements, GI also has two basic categories; namely, natural elements, and human-made elements, including open urban spaces planned in advance, and engineering products, such as technologies that mimic natural processes to improve environmental quality and provide utility services. The natural elements include natural vegetation found in urbanized areas, woodland, street trees, wetlands, natural water courses, and any other forms of nature found in the environment. Urban open spaces, parks, and private gardens are human-made elements of GI, alongside hard landscape, artificial watercourses, trails, green roofs, green walls, permeable pavements, and any other products that enable natural elements to perform environmental and social roles.

VII. ECONOMIC DEVELOPMENT IMPACT OF GREEN INFRASTRUCTURE

Economic development can be facilitated by GI, especially when compared to conventional urban development methods. Well-designed GI enhances the economic appeal of commercial precincts, increases residential property values, and improves tourism and economic regeneration opportunities (Ely, & Pitman, 2012). The monetary value of the benefits provided by GI, and the amenity or replacement value of the green asset, can also be calculated. There have been many examples that have demonstrated the economic benefits of GI through its elements; GI elements, particularly natural elements are available for a reasonable price since they are the local natural components of urbanized areas.

VIII. THE ROLE OF GREEN INFRASTRUCTURE

Economic prosperity and stability can be achieved through green infrastructure, with the priority of maximizing the natural environment's contribution to the regional economy and quality of life. However, this contribution does not happen by itself. Growing reliance on green infrastructure in the economy can lead to more sustainable and high-quality economic growth, as well as more sustainable communities when well-managed, proportionate amounts are invested.

As a result, green infrastructure contributes to the regional economy in a variety of ways. It improves the quality of life in towns and cities. It encourages investment or stimulates economic activity, or it can raise property values. Biodiversity or climate change mitigation and adaptation may be the focus in rural settings, as well as tourism and agriculture. Quality and management of green infrastructure will determine the value of its benefits. Regeneration and development must maintain harmony with regional, national and global environments, and it is becoming increasingly difficult to ignore the need for economically and environmentally sustainable approaches.

IX. GREEN INFRASTRUCTURE AND ECOSYSTEM SERVICES

As a society, we have historically had little knowledge about how the natural environment affects our everyday lives. In recent years, however, communities and businesses have recognized the value of the natural environment, its direct and indirect benefits, and the services it provides as public debates have grown concerning climate change, or the need for alternative forms of energy as fossil fuels continue to diminish.

Ecosystem services include regulating the climate by absorbing CO₂ from the atmosphere, diffusing pollutants, and improving water quality by filtering. In Green Infrastructure, the natural environment is conserved and enhanced along with the ecosystem services that it provides, while also providing greater socio-economic

benefits through improvements and investments in climate control, pollution attenuation, water purification, flood control, and soil formation, among other things. Human social and economic activity would not be possible without them.

X. GREEN INFRASTRUCTURE AND THE ENVIRONMENTAL ECONOMY

Recent years have seen a rise in the understanding and documentation of the economic benefits of creating Green Infrastructure and improving local and regional environmental quality. Economic activity relies heavily on the environment, which provides a wide range of goods and services essential to it. Through improved environmental management systems that reduce business costs, the environment can help to improve the performance and competitiveness of other sectors. Investing in and preserving environmental assets is a powerful way to bring people and investment into a region, and improving the environment is a key component of many economic and community regeneration initiatives.

XI. THE ECONOMIC BENEFITS OF GREEN INFRASTRUCTURE

Through integrating green infrastructure into mainstream economic planning and promoting the role of assets such as regional parks as economic assets, it aims to 'develop the economic benefit of the region's natural environment through better alignment of environmental activities and economic gain'. The Regional Economic Strategy identifies green infrastructure as one of the three major strategic drivers for any region:

- Through promoting enterprises, including social enterprises, and collaborating with companies to invest in product, process, market, management, ICT and sustainable production, we can improve productivity and grow the market, increasing the individual gross value added (GVA). Individuals can develop higher level skills through our collaboration;
- The expansion of the size and capabilities of the workforce, as well as the encouragement of a variety of economic activities in places that are most deprived;
- A sustainable growth model that invests in the region's environment, culture, and infrastructure, tackles deprivation, values diversity and social inclusion, and acknowledges the social and environmental implications of economic growth.



Figure 1: The economic benefits of Green Infrastructure [Source: EDUTECH, 2008]

XII. DISCUSSION

Increasingly, countries in Asia, Africa, South America and East Europe are becoming emerging countries, which means there will be more chaotic urbanization outside the control of local governments. The current strategies for dealing with urban poverty areas have disadvantages due to their high budgets and neglect of sustainability, as many cases have demonstrated. As a result, these disadvantages clarify the gap between the theoretical framework and the actual implemented plans, and they represent the weaknesses that face the actual plans during and after implementation. According to the study, new economic sustainable tools for dealing with urban poverty are needed that meet the priorities of emerging countries. Through its social, environmental, and economic development impacts, GI can act as a development approach for improving urban life in urban poverty areas. As a new economic sustainable methodology, traditional solutions based on physical aspects of the built environment need to be planned through GI urban design. In light of GI's advantages as a development approach, communities should use GI as a framework for economic sustainable development.

Understanding GI's values will enable communities to decide where, when, and to what extent to incorporate GI practices into future development, planning, and redevelopment. GI has not been experimented enough in emerging countries as an urban development approach, and the data available is based on the experience of developed countries, notably the United States, the UK, and Australia. GI planning faces the next challenge: developing concrete mechanisms to ensure GI is central to the planning process (Mell, 2008).

The discussion of green infrastructure has moved from ecology to economics in recent years. Rather than just supporting wildlife and the environment, resources like the countryside, coast, wetlands, urban parks, street trees, and their ecosystems are regarded as important for sustainable economic growth. Green infrastructure can

contribute to the success of other economic sectors, offering an improved environment, jobs, sustainable enterprises, social benefits, cost savings, and economic security. As a result, healthcare costs will be reduced, employee productivity will be improved, and climate change adaptation will be improved. This article emphasizes that green infrastructure is dynamic - it must be strategically planned for, invested in, and managed at local and regional levels in order to serve as a foundation for a prosperous and sustainable economic future. Coordination, cooperation, and coordination across political and sectoral boundaries are necessary for this management to be effective.

Green Infrastructure is fundamental to meeting these goals, and as vital as all the other forms of infrastructure. It can underpin local economies and help increase GVA, just as it can create healthier, more cohesive, sustainable communities. However, as vital as the natural environment is to our communities, if it is poorly planned, piecemeal or badly managed, it will fail to deliver against its huge potential, and the benefits that Green Infrastructure can deliver will not be realized. For Green Infrastructure to be truly of value it requires co-ordination and co-operation across political and administrative boundaries. Quality also matters if Green Infrastructure is to deliver significant returns. Investing in, managing, and planning it strategically must take place at local, regional, and urban levels. In short, Green Infrastructure needs to be planned, developed and managed just like all other forms of infrastructure, if society is to thrive and prosper.

Numerous reports establish a clear link between planning, managing, and investing in Green Infrastructure and generating economic benefit for localities, districts, sub-regions, and regions. According to the EDUTECH (2008) report, "Green Infrastructure is the region's life support system - the natural environment components and green and blue spaces situated within and between the region's cities, towns, and villages, which provide social, economic, and environmental benefits".

XIII. CONCLUSION

Developing robust economic cases for green infrastructure through research and testing send a clear message. Planning, managing and investing in green infrastructure offers a lot of benefits and presents opportunities that need to be capitalized on. As a region, improving the quality of the environment, promoting natural green areas, attracting investment, and developing its image as a green, healthy place to live, work, invest, vacation and study have economic benefits. Climate change, resource shortages, and biodiversity loss are becoming increasingly pressing issues on a global scale. Policymakers and economic development practitioners have a number of practical tools at their disposal to grasp these opportunities. Designed specifically for planning authorities, it aims to inform the preparation of local development frameworks. In spite of the fact that this is still an evolving field, it is clear that economic bodies must recognize green infrastructure's economic value and incorporate it into their development strategies and policy. As environmental and social issues become more interconnected, it is imperative that these organizations start using the green infrastructure framework to incorporate economic considerations into their plans as well.

A healthy environment underpins the well-being and prosperity of all our communities, urban and rural, and is crucial for sustainable economic development in successful regions. India must therefore prepare a path to economic recovery in order to combat climate change's adverse effects and promote inclusive and sustainable development in the long run. It is imperative for the country to invest in sectors that will contribute to the transition to a green economy and reduce social health risks.

Emerging countries like India should grasp the opportunities presented by the Green Infrastructure agenda in order to reap the economic benefits. We need to demonstrate the two main ways in which our natural resources can be valued, used, managed, and operated within the confines of our planet. To first ensure that the Region receives maximum sustainable economic benefits through the planning, management, and enhancement of its Green Infrastructure: enhance the quality of place, create the best possible environment for domestic and foreign investment, and to develop the Region into a green and healthy region that attracts tourists, entrepreneurs, investors, and skilled workers. As a second step, we will address the global issue of climate change on a regional level by utilizing Green Infrastructure as a platform to provide a range of adaptation

services aimed at ensuring our urban and rural areas remain economically viable and habitable, as weather patterns change. Moreover, we want to provide more carbon capture and storage, as well as raw materials for renewable energy production. Nevertheless, an international framework of best practices, rules, and actors can assist and inform these national pathways. The green technology market is already dominated by countries such as Japan, South Korea, China and Germany, and India shouldn't be the perennial buyer. The conclusion is that for India to achieve sustainable development, it is necessary to change its policy in order to implement green reforms.

REFERENCES

- [1] Basiago, A.D. 1999. Economic, social, and environmental sustainability in development theory and urban planning practice, *The Environmentalist* 19, pp.145-161, Kluwer Academic Publishers, Boston. Manufactured in the Netherlands
- [2] Khaled Ahmed Elewa, A. 2014. Using the Green Infrastructure as an Economic Sustainable Tool for Improving Urban Life in Emerging Countries Urban Poverty Areas Greater Cairo Case Study, *European Journal of Sustainable Development*, Vol 3(4), pp.241-252, ISSN: 2239-5938
- [3] Benedict, M.A., & McMahon, E.T. 2002. Green Infrastructure: Smart Conservation for the 21st Century. *Renewable Resources Journal*, 20(3), 12-17.
- [4] Bosomworth, K. Trundle, A. & McEvoy, D. 2013. Responding to the Urban Heat Island: A Policy and Institutional Analysis, final report.
- [5] Sovacool, B. K. 2014. Environmental Issues, Climate Changes, and Energy Security in Developing Asia, ADB Economics Working Paper Series, No. 399, © 2014 by Asian Development Bank, ISSN 1655-5252, Publication Stock No. WPS146535
- [6] Will Williams, Dr. 2008. The Economic Value of Green Infrastructure, Northwest Regional Development Agency, www.nwda.co.uk
- [7] ECOTEC. 2008. The economic benefits of Green Infrastructure: Developing key tests for evaluating the benefits of Green Infrastructure.
- [8] Ely, M. & Pitman, S. 2012. Green Infrastructure, Life support for human habitats, The compelling evidence for incorporating nature into urban environments
- [9] Nicolaisen, J., Dean, A. and Hoeller, P. 1991. Economics and the Environment : A Survey of Issues and policy, OECD Economic Studies No. 16.
- [10] Kigma, K. 2012. Urban Poverty and Green Infrastructure, Ohio University, Retrieved from <http://kylekingma.files.wordpress.com/2012/02/gi-and-poverty.pdf>
- [11] Bholane, K.P. 2020. Green Economy in the Context of India, V i d y w a r t, Peer Reviewed Research Journal, Issue 34-01, MAH MUL/03051/2012 ISSN: 2319 9318, May 2020
- [12] Marzio Galeotti. 2003. Economic Development and Environmental Protection, Social Science Research Network Electronic Paper Collection: http://papers.ssrn.com/abstract_id=XXXXXX
- [13] Mell, IC. 2008. Green Infrastructure: concept and planning, FORUM International Ejournal for Postgraduate Studies in Architecture, Planning and Landscape. issue8 (1) pp69-80
- [14] Condrea, P. & Bostan, I. 2008. Environmental Issues from an Economic Perspective, *Environmental Engineering and Management Journal*, November/December 2008, Vol.7, No.6, 843-849 <http://omicron.ch.tuiasi.ro/EEMJ/>
- [15] Reich, S. 2011. Managing Stormwater in Redevelopment and Greenfield Development Projects Using Green Infrastructure © ECONorthwest 2011, www.econw.com
- [16] Everett, T., Ishwaran, M., Paolo Ansaloni, G. & Rubin, A. 2010. Economic Growth and the Environment, Defra Evidence and Analysis Series, Paper 2
- [17] Z.A., Wendling, Z.A., Emerson, J. W., de Sherbinin, A. & D. C. Esty, D.C. 2020. Environmental Performance Index 2020, *Global Metrics for the Environment: Ranking Country Performance on Sustainability Issues*, New Haven, CT: Yale Center for Environmental Law & Policy.