

ISSN 0976-495X (Print)
2321-5763 (Online)

www.anvpublication.org



RESEARCH ARTICLE

Green Growth: Indian Railways thrust towards Economic Growth and Environmental Protection

Shahid Ali^{1*}, Dr. Asif Iqbal Fazili²

^{1*}Research Scholar, School of Business Studies, Islamic University of Science and Technology, Awantipora, J&K, India

² Sr. Asst. Professor, School of Business Studies, Islamic University of Science and Technology, Awantipora, J&K, India

*Corresponding Author E-mail: dihah7692@yahoo.com

ABSTRACT:

The advanced development paradigm - Green Growth is maintaining the sustainability of economic growth while at the same time ensuring environmental sustainability. In India, Green Growth represents an extraordinary challenge and opportunity for the railway sector like Indian Railways, especially in economic growth and environmental protection. Indian Railways is a key driver of economic growth in India besides it enhances energy security; helps mitigate climate change impact, relieves congestion, improves air quality and enhances quality of life. The present paper highlights the Green role of Indian Railways by acting as an essential instrument in all the Avoid/Shift/Improve (ASI) lines of action leading to the Economic growth and Environment protection in India.

KEY WORDS: Indian Railway, Green Growth and ASI strategy.

1. INTRODUCTION:

India is emerging as the one of the fastest growing economies in the world. India's GNP for 2014-15 was 105.27 trillion with an annual growth rate of 7.4% (13,14). The share of services sector is the largest in total GDP of India at 57% (in 2013) and includes various sectors like transportation, communication, banking, health, etc. Modes of transport include air, rail, road, water, cable, pipeline and space. In last 64 years, Route kilometers have grown by 23 %, freight carried by 1344 % and passenger kilometers by 1642 % (11). Further, Government of India in August, 2014 has permitted Foreign Direct Investment in construction, maintenance and operation of the identified areas in Indian Railways.

This depicts the role of Indian Railways in contributing to the sustainability of economy. An Energy sustainability initiative is among the eleven major thrust areas of Action Plan (2015-19), Railway Budget 2015-16. Sustainable mobility strengthens the improvement in individual health along with a cleaner and healthier environment. On railway land, 69.13 lakh saplings were planted for 2013-14. Energy (at least 10%) is used from solar power and wind power as predicted by Indian Railways. Composite sleepers of polyethylene (HDPE) with reinforcing fibers are being used as a substitute to wooden sleepers. For India to achieve development objectives, its economy should continue to grow. But for a country like India, where development is an imperative, environmental consequences can be substantial as it will place serious constraints on natural resources such as land, water, minerals, and fossil fuels, driving up energy and commodity prices. The extent to which its economy will "grow green" will depend on its ability to reduce the quantity of resources required over

time to support economic growth that leads to enhancement of social equity and job creation. Green growth plays an important role in balancing these priorities. Greening of the transport sector in India would seek a holistic strategy that involves planned interventions in order to make a decisive shift to green transport, interventions, and massive investments are required in the coming decades in the form of modal shifts actions, specific infrastructure development and up gradation works, fuel and system efficiency improvements, and mobility management.

1.1 Indian Railways:

Indian Railways (IR) is an Indian state-owned enterprise, owned and operated by the Government of India through the Ministry of Railways. It is one of the world's largest railway networks comprising 89,919 km of Running track over a route of 65,808 km and 7,112 stations. As for rolling stock, IR holds over 2, 45,267 Freight Wagons, 66,392 Passenger Coaches and 10, 499 Locomotives (43 steam, 5,633 diesel and 4,823 electric locomotives) (6).

1.2 Green Growth:

There exist a lot of definitions for Green Growth. Some definitions are explained on the ground of different philosophical, analytical and operational perspectives (2, 7). Few important definitions are stated below: Growth is the growth that emphasizes environmentally sustainable economic progress to foster low carbon, socially inclusive development (15). Green Growth is the GDP growth that preserves aggregate natural capital (1). Green Growth is the growth that fostering economic growth and development, while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies (9). Green Growth is the growth that is efficient in its use of natural resources, clean in that it minimizes pollution and environmental impacts, and resilient in that it accounts for natural hazards and the role of environmental management and natural capital in preventing physical disasters (17). Green Growth is the new revolutionary development paradigm that sustains economic growth while at the same time ensuring climatic and environmental sustainability. It focuses on addressing the root causes of these challenges while ensuring the creation of the necessary channels for resource distribution and access to basic commodities for the impoverished (4).

1. Objectives:

1.1 To study the Green role of Indian Railways by acting as an essential instrument in all the Avoid/Shift/Improve (ASI) lines of action leading to the Economic growth and Environment protection in India.

1.2 To offer important suggestions and conclusions to improve the Economic Growth and Environmental protection by Indian Railways.

2. Green Growth: Avoid/Shift/Improve strategy in Indian Railways:

The Indian Railways play a critical role in the context of Green Growth. It acts as a core driver of the Economic growth but on the contrary it is suppressing the protection of the environment due to the emissions, energy consumption, harmful effects on ecosystems, etc. and the society due to the accidents and congestion. Also, the energy intensity of the land transport has adverse association with the health effects (16). The forthcoming predictions of the mobility indicators correlated with economic growth, increase of disposable income, population and urbanization show that the Indian Railways is one of the most strategic sectors for Green Growth. To apply the green growth approach in the transport sector (Indian Railways in this study) means to promote a transition from the current transport system to green transport, defined as a transport system that supports environmental economic and social sustainability (9). Practically, the Green transport approach for Indian Railways points towards the action and investments that follows an Avoid/Shift/Improve (ASI) strategy, i.e. reduce the mobility demand and pursue accessibility, shifting on more sustainable modes of transport i.e., Indian railways and improving the efficiency of trains. That is also in line with the strategies classified into avoiding unnecessary travel demand (Avoid), shifting transport modes to the lower carbon ones (Shift) and improving energy efficiency and emission intensity of transport (Improve) (5). Indian railways largely depend on the fossil fuels, which has social impacts, and causes environmental and economic un sustainability. To overcome this situation, Indian Railways need to adopt a genuine and operative Green Railway system in order to ensure that the mobility of people and goods becomes socially inclusive, and uses resources efficiently, with the lowest environmental impact. Working on such a system, a consistent, thorough, and complete intervention strategy should be followed by the Indian Railways, consisting of three main dimensions:

1. Indian Railways must promote accessibility and reduce the need for mobility (Avoid / Reduce)
2. Indian Railways must use more sustainable modes of transport (Shift)
3. Indian Railways must technologically enhance all vehicles, ensuring higher efficiency, with lower emissions (Improve).

This strategy is also known as A/S/I (Avoid, Shift and Improve) strategy that is validated by EEA and UNEP.

Table 1: Conceptual framework of Indian Railways with A/S/I lines of action

Avoid/Reduce	Shift	Improve
Reduce/Avoid transport demand	Modal shift towards less polluting modes	Improvement on efficiency of mode and vehicle
Efficiency of the Indian Railway system	Efficiency of the train trip	Efficiency of vehicles (Rolling stock)

The Avoid/Reduce strategy points at the reduction of the transport demand without any interference to the economic growth, limiting exchanges or the free circulation of passengers and goods. Pertinently, Indian Railways is progressing in reducing the passenger transport demand by placing the railway station corridors and hubs close to main urban functions. Also, Indian Railways is moving forward in reducing freight transport demand by opening new routes that would reduce the travel distance of goods, efficiency actions designed to reduce the movement of rolling stock, such as the increase of load factors, efficient packaging design, reduction of empty trips, larger vehicles and optimization of logistic chains. The Shift strategy focuses on the reduction of the impacts of passenger and freight mobility by supporting those transport modes with lower specific impact by the use of more sustainable modes which offer a comparable travel performance. Indian Railways falls under those modes of transportation with a lower impact and more efficient in specific segments of the transport market and maintains its market share by exploiting its competitive advantage. Indian Railways competitive advantage from the internalization of external costs i.e., having the lowest specific external costs (per passenger and per freight tons) is gaining a bright scope in the Shift paradigm. Indian Railways transportation has a number of favorable characteristics as compared to road transportation. It is six times more energy-efficient than road and four times more economical. The social costs in terms of environment damage or degradation are significantly lower in rail. Rail construction costs are approximately six times lower than road for comparable levels of traffic. It is the only major transport mode capable of using any form of primary energy (10). The Improve strategy is focused on the improvement of the efficiency of vehicles (Rolling stock). In cases where Indian Railways fails to opt for the Avoid/Shift strategy, the rolling stock has to be continuously more efficient, more secure and generate less emission. Technological innovation in the field of engines, fuels and on other vehicle components leads to the improvement of the efficiency of rolling stock. Transportation sector being among the largest source of atmospheric emissions, Indian Railways intervene by reducing emissions and specific consumption of traditional engines (fuel economy), by using alternative fuels or biofuels and through the electrification of vehicles (Rolling stock). Further, Indian Railways has taken desperate measures to improve the efficiency of vehicles (Rolling stock) such as the reduction of weights, the improvement of aerodynamics, the reduction of friction, etc.

3. Research Methodology:

3.1 Research Design:

This study is a Cross-Sectional study as it was carried out once and represents a snapshot of one point in time.

3.2 Area of Research:

The study is carried out on Indian Railways as it acts as the main contributor to the Green Growth in India.

3.3 Sources of Data and Analysis:

For the academic background of the Study, Secondary data is used to analyze the data in perspective of Green growth by Indian Railways through previously available information in the form of Articles, Journals, Editorials, Research Papers and Books.

4. Suggestions:

1. Indian Railways need to follow the ASI strategy's reformation of the structure of taxes and charges with a view to pricing negative environmental externalities of transport like carbon tax, eco-taxation and subsidies for greener transport.
2. Travel demand is determined by the spatial arrangement of the various land uses or activities. Accordingly, Indian Railways can take steps towards integrated land-use and transport planning in order to reduce the need to travel and lead to reduction in associated costs.
3. To make ASI strategy fully functional, Indian Railways must improve the features like smart land use, innovation policies, ensuring technology transfer, technology access and institutions capacity strengthening.
4. Indian Railways up gradation in terms of fuel quality and fuel efficiency can promote cleaner fuel by reducing sulphur content and can lead to significant reduction in emissions.
5. For Fuel injection system, Indian Railways must use the Common Rail Direct Injection (CRDI) which can lead to the reduction in fuel consumption, reduction of the engine combustion generated noise and reduction of emissions to very low levels.

5. CONCLUSION:

The present study is an attempt in identifying the various aspects of Green Growth issues, opportunities and challenges in the railway sector which in turn determine the Indian Railways contribution towards Economic growth and Environmental protection. The study highlights the applicability and significance of Avoid/Shift/Improve strategy in Indian Railways in the transition towards green transport i.e., Indian Railways

act as an essential instrument in all the Avoid/Shift/Improve (ASI) lines of action. The core business of the Indian Railways – to transport passengers and freight – is completely in line with the objectives and actions of green transport. Thus, Indian Railways is a prime mode of choice to promote Green Growth in India. For future research some core vital topics like Modal shift to Indian Railways, Creating Green jobs by Indian Railways need a thorough study to achieve the other objectives of the Green Growth that are in line with the objectives of the Indian Railways.

REFERENCES:

1. Bowen A. and Hepburn C. Green growth: an assessment. Oxford Review of Economic Policy. 2014; 30(3):407-422.
2. Bowen A. Green growth. In Handbook of Sustainable Development, Edited by Atkinson G., Dietz S., Neumayer E. and Agarwala M. Cheltenham, UK, Edward Elgar. 2014; 2nd ed. Ch. 15.
3. GGGI and TERI. Green Growth and Sustainable Development in India - Towards the 2030 Development Agenda. Global Green Growth Institute (GGGI) and TERI (The Energy and Resources Institute), 2015.
4. GGGI. Green Growth in Motion – Sharing Korea's Experience. Global Green Growth Institute (GGGI), 2011.
5. Hayashi Y., Mai X. and Kato H. The role of rail transport for sustainable urban transport. In Transport moving to climate intelligence: new chances for controlling climate impacts of transport after the economic crisis, Edited by Rothengatter W., Hayashi Y. and Schade, W. New York. 2011; pp. 161-174.
6. Indianrailways.gov.in, (2015). Indian Railways Official Website. [online] Available at: http://indianrailways.gov.in/railwayboard/uploads/directorate/stat_econ/IRSP_2013-14/pdf/Statistical_Summary/Summary%20Sheet_Eng.pdf [Accessed at 08 Feb. 2017].
7. Jacobs M. Green Growth. In The Handbook of Global Climate and Environment Policy, Edited by R. Falkner. Oxford, Wiley-Blackwell. 2013; Ch. 12, pp. 197-214.
8. McKinnon A., Browne M., Whiteing A. and Piecyk M. Green Logistics: Improving the Environmental Sustainability of Logistics (3rd ed). Replika, New Delhi. 2015.
9. OECD. Towards Green Growth. Organization for Economic Cooperation and Development (OECD). Paris, 2011.
10. Pib.nic.in, (2015). Press Information Bureau Official Website. [online] Available at: <http://pib.nic.in/feature/fe0199/f1101991.html> [Accessed at 15 Jan. 2017].
11. Prabhu, S.P. (2015). Indian Railways – Lifeline of the Nation (A White Paper). Volume 1. [pdf] India: GoI Ministry of Railways. Available at http://www.indianrailways.gov.in/railwayboard/uploads/directorate/finance_budget/Budget_2015-16/White_Paper-_English.pdf [Accessed at 17 Jan. 2017].
12. Su Mi Dahlgaard Park. The SAGE encyclopedia of quality and the service economy. SAGE Publications, Inc, Thousand Oaks. 2015.
13. Subramanian, A. (2015). Economic Survey 2014-15. Volume 1. [pdf] India: GoI Department of Economic Affairs. Available at <http://indiabudget.nic.in/es2014-15/echapter-vol1.pdf> [Accessed at 30 Jan. 2017].
14. Subramanian, A. (2015). Economic Survey 2014-15. Volume 2. [pdf] India: GoI Department of Economic Affairs. Available at <http://indiabudget.nic.in/es2014-15/echapter-vol2.pdf> [Accessed at 31 Jan. 2017].
15. UNESCAP/ADB/UNEP. Green Growth, Resources and Resilience. Environmental Sustainability in Asia and the Pacific. United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), Asian Development Bank (ADB) and United Nations Environment Programme (UNEP). Bangkok, 2012.
16. Woodcock J., Banister D., Roberts I., Prentice A. and Edwards P., Energy and transport. The Lancet 370. 2007; 1078-1088.
17. World Bank. Inclusive Green Growth: The Pathway to Sustainable Development. World Bank, 2012.