



A Study on Green Economy of Bihar Government and Its Impact on the People

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Abstract

The Government of Bihar has embarked on a groundbreaking journey towards sustainability by spearheading a comprehensive Green Economy initiative. This forward-thinking endeavor represents a paradigm shift in the state's approach to economic development, prioritizing environmental preservation and social well-being alongside economic growth. The foundation of Bihar's Green Economy initiative lies in fostering renewable energy sources. The government has launched ambitious programs to harness solar and wind energy, reducing the state's carbon footprint and contributing to India's renewable energy goals. These efforts not only enhance energy security but also create employment opportunities in the burgeoning green technology sector. Bihar is promoting organic farming practices, reducing chemical pesticide usage, and adopting eco-friendly techniques. This not only ensures food security but also safeguards the health of farmers and consumers while preserving the environment. Furthermore, the government is investing in green infrastructure, improving public transportation, and rejuvenating urban spaces to reduce pollution and enhance the quality of life for its citizens. Inclusivity is a cornerstone of Bihar's Green Economy initiative, as it prioritizes the welfare of marginalized communities. Through skill development and employment generation in the green sector, the government is fostering social equity and economic resilience. Bihar not only bolsters its economic prospects but also ensures a healthier, more prosperous future for its people.

Keywords: Green Economy, sustainable development, skill development.

1. Introduction

Green Economy- It is low carbon, resource efficient and socially inclusive economy. Here the growth in income and employment are driven by investments in such activities, infrastructure and assets that allow reduced carbon emissions and pollution, enhanced energy, resource efficiency and prevention of loss of biodiversity and ecosystem services. The global environment and sustainable development movement has grown in recent years. Governments and organizations worldwide are working for transition to a greener, more sustainable economy as climate change impacts become more apparent. The state of Bihar is no exception. Bihar has moved towards a green economy under its visionary administration, balancing economic development with environmental protection and social inclusion. The Bihar government's comprehensive environmental protection and sustainable development efforts demonstrate its commitment to a green economy. The state understands that economic expansion should not

harm the environment or its population. The state has invested heavily in solar power, using its plentiful sunshine to generate sustainable energy. Solar parks and rooftop installations around the state reduce carbon emissions and provide energy availability, especially in rural regions. Since Bihar is mostly agriculture-based economy, the government has promoted organic farming. Bihar is conserving soil health and generating healthier, more sustainable food by minimizing chemical inputs and boosting natural farming. This project has helped the environment and many farmers' lives. Bihar's green economy also requires efficient waste management. The government has implemented innovative trash disposal and recycling methods to reduce urbanization's environmental effect. Segregated garbage collection and composting have reduced landfill waste and pollution. The Bihar government values its biodiversity and natural assets. Protected areas and wildlife sanctuaries preserve endangered

animals and their habitats. This conserves wildlife and boosts ecotourism, funding local people. Sustainable construction and green architecture are used in state infrastructure development. Bihar is demonstrating responsible urban development by using energy-efficient architecture, green areas, and eco-friendly materials. This lowers carbon emissions and improves citizens' lives. To prepare youngsters for the green economy, the government has created skill development initiatives. Training in renewable energy, organic farming, and sustainable building has produced new jobs and trained future workers. Public awareness and education are also key to Bihar's green economic program.

2. Literature Review

Michael (1991) states that various environment concerns can be solved by making use of conscious economic policy. He also sees the present contradictions in capitalism as a genuine ray of hope for the much-needed greener change in the economy. Krishnan N.R. (2022) explains that Nature protects if protected. He believes that it is very important to harness nature wisely. He states that hands off approach to environment with do no good but harnessing it wisely will do. Acar and Yeldan (2020) Handbook of Green Economics speaks about sustainability transition and how to handle natural capital within the context of green economy. Proceedings of International Research conference on "Green Economy- A Necessity for Sustainable Future", UBSIRC-2022, Volume 2, ISBN: 978-1-68576-301-5 editor Dr. Asha Bhatia.

3. Objectives of this respective study

- To know the concept of Green Economy.
- To know about the possible areas of Green Economy. [1]
- To understand the vision and mission of Bihar Government in this respect and understand its impact on the life of its people.

3.1 Environmental Status of Bihar

The population of Bihar, India, is over 104 million individuals, which is a significant figure. Furthermore, the state's pollution levels are very high. The population density in the area is very high, with 1,102 individuals residing inside each square kilometer. This figure significantly exceeds the

national average of 382 people per square kilometer. The state has a prominent geographical location among the Indo-Gangetic plains and spans a total area of 94,164 square kilometers, accounting for about 2.86 percent of India's overall landmass. Similarly, the average annual temperature in the region spans from a cool 20°C to a somewhat warmer 28°C. The overall area of green spaces in Bihar, including both forested and non-forested areas, amounts to a substantial 13,331 square kilometers. Consequently, an extra area of 6,454 square kilometers is encompassed by trees outside the officially designated forest zone. The present extent of vegetation cover in the state is significantly limited, accounting for about 14.16 percent of the total land area spanning 94,164 square kilometers. On the contrary, Bihar's ranking in terms of SDG performance stood at 52. However, the state has exhibited advancements in various significant domains, such as improved accessibility to clean water and sanitation (rising from 81 in 2019 to 91 in 2020), enhanced availability of affordable and clean energy (rising from 62 in 2019 to 78 in 2020), and betterment in health and well-being (rising from 44 in 2019 to 66 in 2020). Although some goals have been achieved, others, such as climate action (declining from a score of 43 in 2019 to 16 in 2020) and industry, innovation, and infrastructure (falling from 47 in 2019 to 24 in 2020), have seen less progress. He believes that it is very important to harness nature wisely. He states that hands off approach to environment with do no good but harnessing it wisely will do. Acar and Yeldan (2020) Handbook of Green Economics speaks about



Figure 1 Work identification and implementation framework

(Some efforts and initiatives taken by Govt. of Bihar)

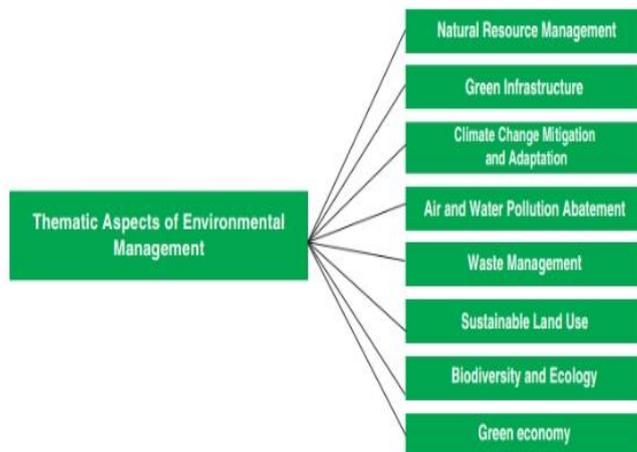


Figure 2 Thematic aspects of the green budget
(Source: Govt. Of Bihar Finance Dept. Green Budget 2022-23)

3.2 Department of Environment, Forest and Climate Change

The department looks after the conservation of flora and fauna of Bihar, prevents and controls pollution, takes care of wilderness and aids in sustainable development. The flagship program launched under this are-

- Jal-Jeevan-Hariyali Abhiyan
- Pollution Control
- Eco-Tourism and Park Development
- Wildlife Habitat Development
- Wildlife Conservation

Urban Development and Housing Department

This department helps in inclusive planning and development of cities and towns which converts them into more economically vibrant and sustainable ones with its efforts. [2]

- Solid and Liquid Waste Management (Saat Nischay-2)
- Moksha Dham Nirman (Saat Nischay-2)
- Construction of Drainage, Sewerage, and Other Sanitation Project
- Mukhya Mantri Shahri Nali-Gali Pakkikaran Nishchaya Yojana
- Smart City Mission

3.3 Rural Development

The Jeevika (BRLPS) mission is a flagship program which is aided by World Bank. It has specifically transformed the lives of rural women leading them

towards empowerment in the form of Self-Help Groups. To facilitate economic growth, the roads have been built and connected with the main stream under PMGSY. The rural youth are being empowered under Deen Dayal Upadhyay Gramin Kaushalya Yojana to help take up employment opportunities. A substantial amount of budget is spent on toilet construction and awareness campaigns in the rural areas. A 10.6% of expenditure on this sector in 2023-24 is a clear sign of dedication of Bihar government's commitment towards rural development. [3]

3.4 Energy (Green Energy)

The government of Bihar has been able to provide clean and reliable energy to the consumers. Development of any state is directly linked to the energy consumption in most cases as it is required for any development work and better standard of living. From 280kWh in 2017-18 to 329 kWh in 2021-22 it has been a growth of 17.5 %. There was a significant improvement in the projected peak demand for power in Bihar from 4965 MW in 2017-18 to 7093 MW in 2022-23 which is a growth of 42.8% in five years. In the power sector as well, the capacity shows an escalating data every year.

3.5 Education

If the breakdown of allocations is seen, the government has consistently escalated the budget every year in education. From 16.5 %, 22.2% and 22.2% in the fiscal year 2022-23, 2023-24 and 2024-25 respectively, several initiatives have been taken to strengthen the education system in the Bihar. The Mukhyamantri Balak Cycle yojana, Poshak yojana, providing scholarship for marginalized students, Bihar Knowledge center, Bihar Student Credit Card scheme etc. have attracted allocations from the education budget.

3.6 Transport Department

This department implements and enforces statutory provisions of transport in the state.

3.6.1 Bihar Clean Fuel Scheme

Effective from March 31, 2022, the use of diesel three-wheelers inside the Patna municipal corporation, Danapur Municipal Council, Phulwari Sharif Municipal Council, and Khagaul Municipal Council would be prohibited. This measure has been implemented as a means to mitigate vehicular



pollution within the Patna Urban Area. The diesel buses in the city bus fleet are now undergoing a conversion process to use compressed natural gas (CNG) as their primary fuel source. Additionally, the Bihar State Road Transport Corporation is procuring new buses that are specifically designed to operate on CNG. [4]

3.6.2 Electric Bus Transportation

Since the commencement of the 2020-21 fiscal year, the Bihar State Road Transport Corporation (BSRTC) has effectively executed the FAME-II project, including the deployment of 25 electric buses within the metropolitan landscape of Patna.

3.6.3 Restriction on 15+ Years Old Government and Commercial Vehicles

The emission of gases and particulate matter from automobiles and trucks contributes to air pollution. Prohibition has been implemented on the operation of all cars that have reached a lifespan of 15 years or more inside the state. [8]

3.6.4 Establish Pollution Under Control Centers

The Motor Vehicle Act permits the establishment of supplementary pollution control infrastructure, which will play a crucial role in combating vehicular emissions. In order to commence proceedings, it is now within the purview of District Transport Officers to provide permits for pollution control centers. Currently, the state is host to a total of 1123 operational pollution control facilities.

3.7 Agriculture

Bihar was the first state in India to introduce a comprehensive green budget in 2020-21. The government introduced many programs to enable sustainable growth with farmer's welfare. Climate Resilient agricultural Program helps small and marginal farmers to adapt to changes in climatic conditions. The organic farming was accentuated by helping farmers produce natural fertilizers, insecticides and pesticides. The Agricultural Road maps of five years help achieve food security and growth in farmers' income. Bihar government in collaboration with the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), has established Centre of Excellence for Millet in Gaya aiming to produce 20000 kg of millet seeds in 2024-

25. Apart from this various sustainable and innovative practices were made possible because of investment in agriculture. Bihar's emphasis on organic farming has not only improved the sustainability of agricultural practices but also enhanced the health and well-being of its citizens. The shift away from chemical inputs and towards natural farming methods has not only preserved soil health but has also increased the income of farmers while providing healthier food options to the population. Efficient waste management practices have contributed to a cleaner environment, reduced pollution, and a more sustainable urban landscape.

3.8 Tourism

In order to effectively enhance the promotion of eco-tourism inside the state, the department has established a dedicated division specifically focused on this endeavor. The notable eco-tourism attractions in Rajgir include the expansive 480-acre zoo-safari and the sprawling 250-acre nature-safari. The establishment of the state's first safari park is seen as a significant development. The State Government of Bihar's Urban Development and Housing Department has formulated a program aimed at transferring the custodianship of 133 parks to local municipalities.

3.8.1 Wildlife Habitat Development

For the successful implementation of this government-supported initiative, three essential components are necessary: Firstly, it is essential to prioritize the provision of shelter for individuals, ensuring that they have a secure and stable living environment. Secondly, it is crucial to engage in efforts aimed at the preservation and protection of animals, safeguarding their habitats and ecosystems. Lastly, it is of utmost importance to undertake measures to rescue and save endangered species that face the imminent threat of extinction. Efforts are being made to safeguard the existence of the endangered Garuda avian species inside the Gangetic region of the Bhagalpur district. [5]

3.8.2 Wildlife Conservation

When it comes to animal conservation and awareness, Bihar has shown a significant commitment without any financial constraints. A tiger reserve has been established, along with a designated dolphin habitat in the Ganges River, a



wildlife sanctuary catering to six distinct animal species, and a bird sanctuary accommodating five different species. Furthermore, Additionally, one community reserve and two conservation areas have been created by them. The state of Bihar is now undertaking commendable endeavors to save its rich biodiversity. Kanwar Lake Bird Sanctuary (Kanwar Tal), Kusheshwar Bird Sanctuary, and Salim Ali Jubba Sahni Lake Bird Sanctuary (Barela Tal) are considered to be among the most prominent wetland areas within the region.

3.8.3 Development of Natural Forests

No alterations will be made to the undisturbed woodland landscape. The adverse impacts of climate change were effectively tackled in the fiscal year 2022-23 with the implementation of a project that included the planting of 73.84 lakh seedlings. In the next fiscal year 2022-23, objective was to actively engage in the process of planting 60 lakh saplings, with the aim of facilitating the growth and

development of lush forests. The next fiscal year, 2023-24, has been designated for an intensive period of agricultural cultivation. [7]

4. Research Methodology

Secondary data was used for the purpose of research. The data was procured from Bihar Government's website, Government departments and budget and Economic survey of the last five years from now that is 2025. A detailed analysis of the same was carried out through correlation method. [6]

5. Analysis

A correlation between five key department and expenditures made on it by Bihar Government in subsequent years was taken. Education, Energy, Agriculture, Urban Development & Housing and Rural Development and its impact on the per capita income of the state is examined from year- 202-23, 2023-24, and 2024-25 to know the impact on the lives of its people

Table 1 Department-wise Green Budget Summary in Bihar from 2022-25

Department	2022-23 Green Budget Actual	2023-24 Green Budget Estimate	2023-24 Green Budget Revised Estimate	2024-25 Budget Estimate	2024-25 Green Budget Estimate
Agriculture	569.89	968.50	663.45	1211.95	643.74
Animal and Fisheries Resources	138.11	179.18	187.42	312.89	182.32
Building Construction	112.74	73.88	89.10	1115.00	156.75
Education	9.97	16.21	46.39	1173.02	35.29
Energy	42.50	70.00	70.00	270.00	270.00
Environment, Forest, and Climate Change	518.75	773.84	811.65	853.03	853.03
Health	0.77	5.00	5.00	3.50	3.50
Industries	1.21	1.75	2.19	501.53	343.55
Information and Public Relations	4.11	4.10	4.10	81.13	4.06

Minor Water Resources	466.12	784.58	799.43	785.00	785.00
Panchayati Raj	2306.37	0.00	2330.49	5733.86	4110.03
Public Health Engineering	21.00	50.00	50.00	50.00	50.00
Road Construction	11.16	47.99	56.33	1379.00	9.74
Rural Development	2476.84	4742.66	5004.79	8142.71	4383.88
Rural Works	137.58	325.04	400.08	4778.13	149.28
Sugarcane Industries	14.45	100.00	100.00	37.60	37.60
Tourism	19.53	26.99	26.99	162.00	35.25
Transport	5.24	66.55	66.55	131.00	102.00
Urban Development and Housing	574.61	1132.22	5393.28	3408.10	1118.30
Water Resources	558.61	552.29	686.31	3232.63	550.09
Total	7989.58	9920.77	16793.54	33362.08	13823.39

(Source: Department of Finance, Government of Bihar)

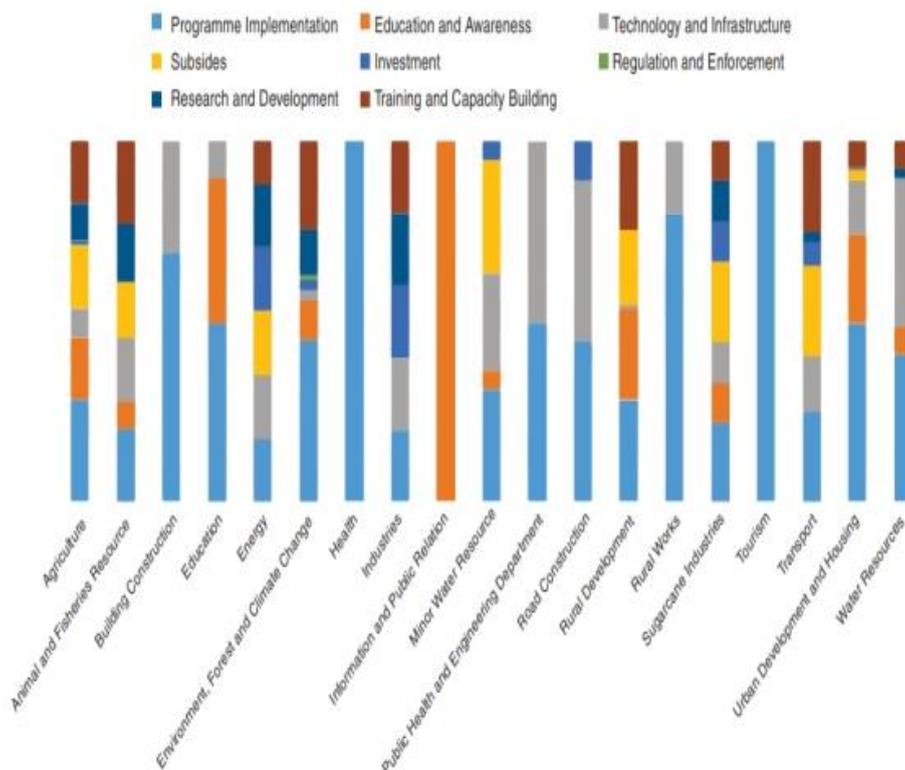


Figure 2 Illustration of Green Budget Activities Source: Green Budget; Govt. of Bihar 2022-23



Table 2 Budget Allocation of Bihar Government On Five Departments in The Mentioned Years

Year Sectors	Expenditure In (2022-23)	Expenditure In (2023-24)	Expenditure In (2024-25)
Education	9.97	46.39	35.29
Energy	42.50	70.00	270
Agriculture	569.89	663.45	643.74
Tourism	19.53	26.99	35.25
Transport	5.24	66.55	102

Now, taking each department independently and analyzing it with per capita income in that year of the state

year	2022-23	2023-24	2024-25
Per capita income	59000	66000	75000
Education	9.97	46.39	35.29

Pearson Correlation coefficient between Per Capita Income and Education=0.624

Year	2022-23	2023-24	2024-25
Per capita income	59000	66000	75000
Energy	42.50	70	270

Pearson Correlation coefficient between Per capita Income and Energy = 0.943

Year	2022-23	2023-24	2024-25
Per capita income	59000	66000	75000
Agriculture	569.89	663.45	643.74

Pearson Correlation coefficient between Per capita Income and Agriculture = 0.70 (not significant)

Year	2022-23	2023-24	2024-25
Per capita income	59000	66000	75000
Tourism	19.53	26.99	36.25

Pearson Correlation coefficient between Per Capita Income and Tourism= 1.00
p-value is 0.006 means even if the sample size is small, this correlation is significant.

year	2022-23	2023-24	2024-25
Per capita income	59000	66000	75000
Transport	5.24	66.55	102

Pearson Correlation coefficient between Per Capita Income and Transport= 0.97



Conclusion

As per the census of 2011, Bihar's Literacy rate was 68.80 % which was less than the national average of 72.98%. In the same line both primary and higher education are being taken care of in budget. Although 0.624 correlation coefficient exhibits a slightly positive direction suggesting that with the rise in education the per capita income is also supposed to grow, there are chances of other factors like creation of job opportunities, economic policies, regional differences between the districts, personal background etc. that can matter. Hence causation seems to be absent. The energy and per capita income are strongly associated as the correlation coefficient is 0.943. this means that with higher income the energy consumption increases. Developing economy which Bihar is will tend to use more energy. This move of Government will help increase the standards of living, more money in hand to buy machines and appliances that depends upon energy consumption, more industrial usage which in turn provides employment in the state and gravitating towards more energy intensive technologies. With growth in per capita income, factors such as urbanization, industrialization and technological advancements become evident. Bihar primarily being agrarian economy, it is undeniably a strong economic driver where higher agricultural output means income increase. This leads the state into better and stable food security, boosting rural income. However, the analysis does not prove causation which means that other factors like government policies, infrastructure, demand of market and technology use may affect the correlation. The government should try to reduce dependence on it and pay more attention towards industrial and tertiary sector development to boost economy. There are proportional and direct relations between Tourism expenditure and per capita income without any exception. Increases tourism in service sector leads to job creation along with inviting foreign exchange earnings. Hence the government must keep on making investments in creating infrastructure (airports, roads, hotels, attractions etc.) Transport is the lifeline of any economy. A strong positive correlation between transport and per capita concludes that Bihar Government is on the right path

in developing connectivity, road infrastructure and strengthening public transport. An efficient transport means lower cost, better and easy facilitation of trade and market boosting economic activities and income levels. It is evident that efficient transport of any state will attract more business and investment with more chances of employment creation. It also attracts skilled labor. But this could a bidirectional effect as well. A higher income group could also demand better connectivity and transport. The multifaceted approach undertaken by Bihar's government underscores the comprehensive nature of its efforts. From renewable energy adoption to organic farming, waste management, biodiversity conservation, sustainable infrastructure, skill development, and public awareness campaigns, Bihar's green economy initiative covers a wide spectrum of activities aimed at fostering a harmonious relationship between economic growth and ecological well-being along with sustainable development. One of the most noteworthy aspects of this initiative is the state's commitment to renewable energy. Bihar's investment in solar power generation and the widespread adoption of solar technologies have not only reduced its carbon footprint but also increased energy accessibility, particularly in rural areas. This has far-reaching implications for energy security and the reduction of greenhouse gas emissions, aligning Bihar with global efforts to combat climate change and facilitate skill development while keeping sustainable development its priority.

Suggestions

Bihar has already initiated the green budget. All the efforts made by the government are worth appreciating. However, some points to be taken care of while implementing a green budget is that a continuous monitoring system for tracking the progress of same should be established. Taking help of third-party audit of important green projects can help know the status of progress. This also helps ensure accountability and transparency both. This research in the very beginning depicts a model which clearly states how people's participation is most important in implementation of such initiatives. For this awareness should be created at early stage from



schools and colleges by integrating the curriculum with sustainable development, climatic change, waste management and organic farming. Awareness at such early level will help the government launch and implement these policies with larger public cooperation and ease. Also, there should more training programs for skill development of youths in areas like sustainable development, renewable energy and organic farming. this will help them to align the per capita income of people along with green initiatives by the state.

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