

BIHAR GREEN BUDGET DASHBOARD



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MARCH 2025

1. Introduction:

A Green Budget is a financial planning framework that integrates environmental priorities into the budgeting process. It is designed to ensure that government spending not only meets traditional fiscal goals but also advances sustainability and environmental protection. Here are some key points that explain the concept:

■ Integration of Environmental Goals:

A Green Budget incorporates environmental considerations—such as reducing pollution, promoting renewable energy, and enhancing conservation—into budget planning. This means that when funds are allocated, the environmental impact of these expenditures is also taken into account.

■ Focus on Sustainable Development:

It emphasizes spending that supports sustainable development. For instance, investments in green infrastructure, energy efficiency projects, and environmental research become central components of the budget, ensuring that economic growth does not come at the cost of environmental degradation.

■ Transparency and Accountability:

By clearly outlining how much is spent on green initiatives, a Green Budget enhances transparency. It allows both government officials and the public to monitor environmental investments, ensuring accountability in the use of public funds.

■ Policy Alignment:

This approach aligns fiscal policy with broader environmental and climate goals. For example, for a state like Bihar, implementing a Green Budget can help align government spending with state-level commitments to sustainable development and environmental conservation.

■ Data-Driven Decision Making:

The process involves collecting and analyzing detailed budget data—such as the Annual Green Budget (AGB), Revised Green Budget Estimate (RGBE), Budget Estimate (BE), and Green Budget Estimate (GBE)—to understand spending patterns over multiple fiscal years. This data-driven approach helps in identifying trends, assessing the effectiveness of green investments, and planning future projects.

The Green Budget project is an innovative initiative aimed at enhancing transparency and informed decision-making in government financial planning, specifically focusing on environmental research and sustainability. This project consolidates budgetary data from multiple fiscal years and various government departments, providing a comprehensive view of how resources are allocated to green initiatives. By integrating data from different budget types—such as Annual Green Budget (AGB), Revised Green Budget Estimate (RGBE), Budget Estimate (BE), and Green Budget Estimate (GBE)—the project creates an interactive dashboard that presents key metrics and trends in an easily accessible format.

For Bihar government officials, this dashboard serves as a powerful tool to track environmental investments, evaluate scheme performance, and align budgetary priorities with the state's sustainability goals. It offers both a high-level summary and detailed insights into the financial commitments towards green projects, facilitating better policy decisions and strategic planning.

■ **Green budget in Bihar:**

Green budget has been initiated in the year 20-21 in Bihar. The objectives for green budget is, to provide environmental protection and awareness as well. Since decades, the need to address environmental challenges has grown rapidly. Government wants climate-resilient development strategies. Green budget aims to track and enhance public expenditure on activities that contribute to climate resilience, environmental protection, biodiversity conservation, and the transition to a green economy. The Green Budget seeks to identify, track, and prioritize public expenditures that have a direct or indirect impact on the environment and climate resilience.

By adopting a Green Budgeting framework, Bihar aims to:

- Enhance transparency and accountability in environmental spending;
- Promote cross-sectoral coordination for sustainability;
- Mobilize resources for green growth and climate resilience;
- Support evidence-based policymaking and performance tracking of green initiatives.

Through this proposal, a sample of **Green Budget Dashboard** is developed and through this development, visually track and communication is possible to show case Bihar's environmental-related expenditures, outcomes, and policy progress.

2. Attributes and Data Collected

The Green Budget project incorporates a comprehensive dataset that spans multiple fiscal years (20-21, 22-23, 23-24), designed to provide detailed insights into government spending on green initiatives. The dataset for the Green Budget project is both rich and multifaceted, providing insights into environmental financial planning across different fiscal years. It not only captures numerical budget allocations but also qualitative information such as scheme names and departmental responsibilities. Below is an overview of the data included and a deeper look at its attributes with some examples derived from the provided values. Below is a breakdown of the key attributes included in the dataset and a description of the types of data for each:

- **Budget_code:**
 - **Type:** Text/String
 - **Description:** This attribute serves as a unique identifier for each scheme. It contains a series of numbers (and sometimes characters) that uniquely distinguishes one scheme from another. This code is essential for tracking and referencing schemes across different records and fiscal years.
 - **Example:** A code such as "42-2505021010201" uniquely distinguishes the National Rural Employment Guarantee Scheme (MNREGS) entry.
- **Scheme_Name:**
 - **Type:** Text/String
 - **Description:** This column contains the name or title of the scheme. It provides a clear label for each project or initiative, making it easier for officials to identify and differentiate among the various programs being implemented.
 - **Example:** "National Rural Employment Guarantee Scheme (MNREGS)" appears repeatedly, emphasizing its importance in rural development initiatives.

- **AGB/21-22 (Annual Green Budget for 2021-22):**
 - **Type:** Numeric (Decimal/Whole Number)
 - **Description:** Represents the Annual Green Budget for the fiscal year 2021-22. It reflects the total funds allocated under the green budget for that year. This value is used to measure annual financial commitments towards environmental projects.
 - **Example:** A value like 174586.5501 indicates a substantial fund allocation for the respective scheme.
- **RGBE/22-23 (Revised Green Budget Estimate for 2022-23):**
 - **Type:** Numeric (Decimal/Whole Number)
 - **Description:** This attribute records the Revised Green Budget Estimate for the fiscal year 2022-23. It indicates any adjustments made to the initial budget allocation, providing insights into mid-course corrections or updated projections for green initiatives.
 - **Example:** A value of 143000.00 demonstrates how the original allocation was recalibrated, potentially due to changing priorities or additional insights.
- **BE/23-24 (Budget Estimate for 2023-24):**
 - **Type:** Numeric (Decimal/Whole Number)
 - **Description:** Contains the Budget Estimate for the fiscal year 2023-24. This figure represents the preliminary financial projection for the upcoming fiscal period, setting the stage for planned environmental investments.
 - **Example:** An amount like 338200.00 gives a forward-looking perspective on the funding for green projects.
- **GBE/23-24 (Green Budget Estimate for 2023-24):**
 - **Type:** Numeric (Decimal/Whole Number)
 - **Description:** This attribute indicates the estimated funds specifically earmarked as part of the Green Budget for 2023-24. It highlights the state's targeted commitment towards environmental spending within the overall budget estimate.
 - **Example:** A value such as 253650.00 illustrates the targeted commitment towards environmentally focused spending.
- **Category:**
 - **Type:** Text/String
 - **Description:** This column categorizes each scheme based on its green budget classification. For instance, entries might include labels such as "Category 'C' - Green Budget Estimate 75-50% (High)". The category helps in grouping schemes by their relative green investment potential and can be further analyzed by extracting specific elements (like the category letter).
 - **Example:** The category entry "Category 'C' - Green Budget Estimate 75-50% (High)" provides a quick reference to the priority or intensity level of the scheme's green budget.

- **Department:**
 - **Type:** Text/String
 - **Description:** Identifies the government department responsible for the scheme. This attribute is crucial for filtering and analyzing data, as it enables the dashboard to display how different departments contribute to the state's environmental initiatives.
 - **Example:** "Rural Development" and "Animal and Fisheries Resources" indicate which sectors are driving green initiatives.
- **sdg (Sustainable Development Goal):**
 - **Type:** Text/String
 - **Description:** This attribute links each scheme to a relevant Sustainable Development Goal (e.g., sdg-6, sdg-8, sdg-15). It demonstrates how each initiative contributes to broader sustainable development objectives, providing context on environmental impact and policy alignment.
 - **Example:** Values like "sdg-6", "sdg-8", or "sdg-15" connect the schemes to health, economic, or environmental goals respectively.
- **Objective:**
 - **Type:** Text/String
 - **Description:** Captures the primary objective of the scheme. Although some entries might be marked as "N/A" if no specific objective is provided, this attribute generally offers insights into the intended outcomes of the initiative, be it environmental preservation, community development, or another goal.
 - **Example:** While some records have "N/A" (indicating no specified objective), others would typically describe goals such as improving rural employment or enhancing fisheries resources.

3. What is a Dashboard?

A dashboard is a visual representation of key information, designed to provide quick insights into complex data. It combines multiple data sources into one easy-to-read interface, allowing users to monitor, analyze, and make informed decisions without having to sift through raw data. Here are some essential points about dashboards:

- **Centralized View:**

A dashboard consolidates various metrics and data points into a single view. For government officials, this means being able to see important indicators like budget allocations, spending trends, and performance of environmental initiatives at a glance.
- **Interactive and Dynamic:**

Modern dashboards are interactive. They allow users to filter data (for example, by Department or fiscal year), drill down into details, and customize the view to answer specific questions. This dynamic interaction enables a more nuanced understanding of the data.
- **Real-Time Monitoring:**

Dashboards can display real-time or near real-time data, which is especially useful for

tracking budget utilization and project performance. This immediate feedback helps in timely decision-making and resource allocation.

- **Data Visualization:**

By employing charts, graphs, tables, and other visual elements, dashboards transform raw numbers into intuitive visuals. This makes trends and patterns easier to recognize, which is crucial when monitoring complex financial data like green budgets.

- **Ease of Communication:**

A well-designed dashboard communicates the state of affairs effectively, making it easier for stakeholders—such as government officials in Bihar—to understand the status of various projects and to communicate findings to other decision-makers.

4. How the Dashboard and Green Budget Can Help the Government of Bihar

The integration of a Green Budget with an interactive dashboard provides Bihar's government with a strategic tool for enhancing financial planning, policy-making, and accountability.

Here are several key ways this combination can make a significant impact:

- **Enhanced Transparency and Accountability:**

The dashboard consolidates budgetary data from multiple fiscal years and departments into one accessible interface. This transparency ensures that all stakeholders, including government officials and the public, can easily monitor how funds are allocated and spent on green initiatives. Improved accountability helps build trust and ensures that resources are used efficiently.

- **Informed Decision-Making:**

With real-time or near real-time insights into the financial commitments towards environmental projects, decision-makers can quickly identify trends and adjust policies accordingly. The detailed breakdown of budget allocations—across different schemes, departments, and fiscal years—enables policymakers to assess which initiatives are delivering results and where additional investments might be needed.

- **Effective Resource Allocation:**

The dashboard's ability to filter data by department and fiscal year allows officials to pinpoint areas with high environmental impact or urgent funding needs. This targeted approach to resource allocation ensures that investments are directed towards projects that align with Bihar's sustainability goals, maximizing both economic and environmental returns.

- **Monitoring Policy Impact:**

By linking budget allocations to specific Sustainable Development Goals (sdg) and departmental initiatives, the dashboard facilitates a better understanding of how financial commitments translate into real-world environmental improvements. This feedback loop helps in evaluating the effectiveness of current policies and in shaping future strategies for sustainable development.

- **Strategic Planning for Sustainable Development:**

The Green Budget framework, supported by detailed data visualization, empowers the

government to plan long-term environmental strategies. It provides a clear picture of the fiscal commitment to green initiatives, enabling Bihar to set measurable targets and track progress over time. Such strategic planning is crucial for aligning budget priorities with broader climate change mitigation and sustainable development goals.

- **Optimized Performance Tracking:**

The dashboard enables continuous monitoring of key performance indicators (KPIs) related to green spending. This ongoing performance tracking helps in identifying areas where projects may be underperforming or overperforming, allowing for timely interventions to optimize outcomes.

5. How the Dashboard was developed?

The development of the Green Budget dashboard was a multi-step process that combined careful data preparation, insightful data modelling, and thoughtful visual design. Here's an overview of the steps involved:

5.1 Data Import and Initial Setup

- **Data Collection:**

The project started with gathering the Green Budget data in an Excel file that contained multiple fiscal years (20-21, 22-23, 23-24) and a variety of attributes such as Budget_code, Scheme_Name, various budget figures (AGB, RGBE, BE, GBE), Category, Department, SDG, and Objective.

- **Importing Data into Power BI:**

The Excel file was imported into Power BI Desktop using the “Get Data” option. This allowed the data to be loaded into the Power BI model for further manipulation and visualization.

5.2 Data Transformation and Preparation

- **Cleaning and Transforming Data in Power Query:**

In the Power Query Editor, several transformations were applied to ensure the data was analysis-ready:

- **Extracting Key Information:**

The Category column was cleaned to extract the core category letter (e.g., A, B, C) to simplify analysis.

- **Unpivoting Budget Columns:**

Since budget data was spread across multiple columns (e.g., AGB/21-22, RGBE/22-23, BE/23-24, GBE/23-24), these columns were unpivoted. This transformation reshaped the data so that “Budget Type” and “Year” became separate fields, making it easier to aggregate and analyze budget allocations.

- **Splitting Combined Fields:**

The combined field containing both the budget type and year (e.g., “AGB/21-22”) was split into two separate columns—one for the Budget Type (AGB, RGBE, etc.) and one for the Year (21-22, 22-23, etc.).

5.3 Data Modeling and Measure Creation

- **Creating Measures:**

To enhance the dashboard's analytical power, measures were created using DAX. For example:

- A measure to calculate the distinct count of schemes per department.
- Another measure to concatenate and display unique category letters as a horizontal list.
- Aggregated sums for budget amounts were computed to enable comparisons across years and budget types.

- **Setting Up Relationships:**

Since the dataset was integrated into a single table (or related tables), relationships and filtering interactions were defined so that slicers (such as Department filters) could dynamically affect all visuals on the dashboard.

5.4 Building the Visualizations

- **Creating Interactive Slicers:**

A drop-down slicer for the Department field was added, ensuring that users could filter data across the entire dashboard by selecting specific government departments.

- **Designing Cards and Tables:**

- **Cards:**

Cards were used to display key metrics such as the total number of schemes and the distinct green budget categories.

- **Tables:**

A table visual was implemented to show detailed information, including Scheme_Name, Budget_code, and the budget figures (AGB, RGBE, BE, GBE).

- **Developing the Bar Chart:**

The dashboard features a bar chart that visualizes the sum total of individual budget types per year:

- **X-Axis:** Represents the fiscal Year.
- **Legend:** Differentiates the Budget Type (AGB, RGBE, BE, GBE).
- **Y-Axis:** Shows the Sum of BudgetAmount.

This visualization allows government officials to easily compare budget allocations by type across different years.

5.5 Formatting and Finalization

- **Customizing Visuals:**

Formatting options such as colors, titles, and data labels were adjusted to ensure clarity and ease of interpretation. The overall layout was designed to be intuitive for government officials, enabling quick insight into green budget trends and allocations.

- **Testing Interactivity:**

Extensive testing was carried out to confirm that all visuals responded correctly to

slicer selections. This ensured that when a department was selected, all related metrics, tables, and charts updated in harmony.

- **Deployment:**

Finally, after validation and feedback, the dashboard was saved and made ready for presentation to Bihar government officials as a strategic tool for environmental budget planning.

5.6 Snapshots (for few selected options):

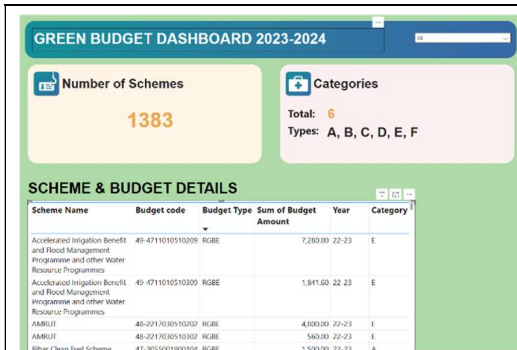


Fig 1 Dashboard Page

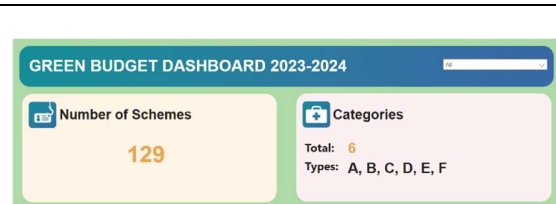


Fig 2 Number of Schemes and Categories Cards

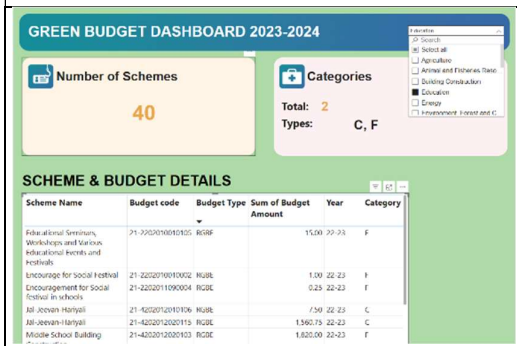


Fig 3 Department Filtering option. When Department selected as “Education”, then total schemes showing as 40 and Categories: 2 [C, F]

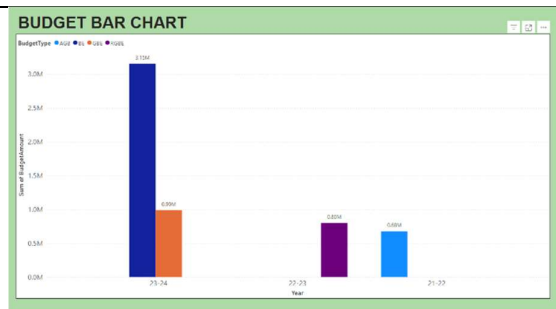


Fig 4 Corresponding Bar Charts for budgets of all the department. Here BE(Budget Estimate) is the highest @3.15M, followed by GBE(Green Budget Estimate) @0.99M, RGBE(Revised Green Budget Estimate) @0.80M, and AGB(Annual Green Budget) @0.68M

Scheme Name	Budget_code	BudgetType	Sum of BudgetAmount	Year	Category
Blue Revolution, Integrated Development and Management of Fisheries	02-2405001010219	AGB	464.43	21-22	D
Blue Revolution, Integrated Development and Management of Fisheries	02-2405001010219	BE	3,971.33	23-24	D
Blue Revolution, Integrated Development and Management of Fisheries	02-2405001010219	GBE	1,191.40	23-24	D
Blue Revolution, Integrated Development and Management of Fisheries	02-2405001010219	RGBE	7,480.71	22-23	D
Blue Revolution, Integrated Development and Management of Fisheries	02-2405001010319	AGB	310.86	21-22	D
Blue Revolution, Integrated Development and Management of Fisheries	02-2405001010319	BE	1,498.90	23-24	D
Blue Revolution, Integrated Development and Management of Fisheries	02-2405001010319	GBE	449.67	23-24	D
Blue Revolution, Integrated Development and Management of Fisheries	02-2405001010319	RGBE	697.18	22-23	D
Chief Minister Pond Statistics Development Assistance to	02-2405007890101	AGB	0.00	21-22	C
Total			71,948.56		

Fig 5 Corresponding Table showing same Scheme Names attached with multiple Budget Types, Budget Code, Budget Type, Sum of Budget Amount, Year and Category

LIST OF SCHEMES ASSOCIATED:		9
Scheme Name		
Subsidies to Bihar Bal Bhavan		
Primary School Building Construction		
Mukhya Mantri Bihar Darshan Yojana		
Middle School Student Tour		
Middle School Building Construction		
Jal-Jeevan-Hariyali		
Encouragement for Social festival in schools		
Encourage for Social Festival		
Educational Seminars, Workshops and Various Educational Events and Festivals		

Fig 6 This table shows all the unique schemes associated with a particular Department. Eg, When selected Department: "Education" then this table is displaying all the unique schemes associated with it and also the count

Table 1, Snapshots of the Green Budget Dashboard

