

# **COP30 and Fiscal Policy Analysis for Climate Adaptation in an Emerging Economy, India**

No. 434

August-2025

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### **Abstract**

Against the backdrop of the 30th United Nations Climate Change Conference (COP30), this paper analyzes the fiscal commitments in an emerging economy, India towards the National Adaptation Communication, contributing to the requirement of measuring progress on the Global Goal of Adaptation (GGA). Utilizing the Public Financial Management (PFM) tools, we examine the fiscal commitments across sectors related to key components of adaptation in the Detailed Demand for Grants. Our analysis reveals that public expenditure on adaptation in India, particularly in climate-resilient infrastructure, disaster management, and climate risk financing, has gained momentum and exhibits an upward trend at the Union Government level. However, budget credibility analysis through fiscal marksmanship and PEFA scores indicates that forest conservation-related spending requires relatively more fiscal commitments at the Union level, due to significant deviations between Budget Estimates and Actual Spending. The relatively lower spending on forests at the national level is consistent with the principle of subsidiarity, which suggests that spending on forests is optimal at the level of subnational governments. Ecological fiscal transfers to subnational governments, facilitated through tax transfers by the Finance Commissions that incorporate net forest cover, address this requirement within the general government framework, and the 16th Finance Commission is expected to retain the climate change criterion in unconditional fiscal transfers in India.

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The 30th United Nations Climate Change Conference, known as COP30, is scheduled to take place in the Amazon region, in the city of Belem in northern Brazil, from Monday 10 November to Friday 21 November 2025. The COP30 is expected to focus in Belém (CISL, 2025)<sup>2</sup> on the areas including (i) Mitigation and renewable energy to transition away from fossil fuels, (ii) Adaptation framework for measuring progress on the Global Goal on Adaptation (GGA), (iii) Finance - ‘scaling up climate finance’ to get from \$300bn to \$1.3trn, (iv) Nature – forging a greater connection between the UNCBD (biodiversity) and UNFCCC (climate) COPs, highlighting the importance of biodiversity, halting and reversing deforestation, regenerative agriculture and nature-based solutions, (v) Indigenous peoples and local communities, (vi) ‘Nationally Determined Contribution (NDC) 2035 emissions reduction targets and (vii) bilateral/multilateral agreements on a potential new global treaty on tracing critical minerals supply chains.

Against the backdrop of COP30 in Brazil, this paper articulates the National Adaptation Framework of an emerging country India, contributing to the requirement of measuring progress on the Global Goal of Adaptation (GGA). The macroeconomic impacts of climate change are higher than before, due to geo-political uncertainties, disruptions in trade, higher shipping costs<sup>3</sup>. The World Bank's Global Supply Chain Stress Index (GSCSI) which measures the magnitude of container shipping disruptions affecting global supply chains highlighted the impact of climate change related stress which caused port stress, disruptions in maritime and shipping and the delayed consignments<sup>4</sup>. Amidst these uncertainties, India plans to achieve a net-zero target by 2070, reducing emissions intensity of GDP by 45% by 2030 from 2005 levels, mobilizing resources for climate finance by achieving 50% of the energy by non-fossil fuel energy resources by 2030.

The greening of fiscal policy is significant to achieve climate change commitments. This paper analyses the fiscal commitments against the backdrop of National Action Plan on Climate Change. Using Public Financial Management (PFM) practices, we review the quantum of the financial resources in India for integrating climate change commitments across sectoral Ministries in India. The paper is organized into 5 sections. Section 2 conducts a public expenditure review of the Union government for the Budget 2024-25 to identify financial allocations aimed for adaptation in India. We categorize the direct or indirect expenditures on adaptation into eight priority sectors and further analyze variations in public spending over the years and in each priority sector as well. Section 3 examines the budget credibility through a Fiscal Marksmanship analysis and Section presents the Public Expenditure and Financial Assessment (PEFA). Section 5 concludes.

<sup>2</sup> <https://www.cisl.cam.ac.uk/cop-climate-change-conference/cop30-belem-brazil-10-21-november-2025>

<sup>3</sup> UNCTAD rapid assessment, ‘Impact to Global Trade of disruption of shipping routes in the Red Sea, Black Sea and Panama Canal’, [https://unctad.org/system/files/official-document/sgsinf2024d2\\_en.pdf](https://unctad.org/system/files/official-document/sgsinf2024d2_en.pdf).

<sup>4</sup> World Bank Group. (2025, April 8). Global Supply Chain Stress Index [Video]. World Bank. <https://www.worldbank.org/en/data/interactive/2025/04/08/global-supply-chain-stress-index>

## 1. Integrating Climate Change into Macro-fiscal Framework

Climate Change related risks have the capacity to trigger macroeconomic stability and fiscal policy framework. The climate change is increasing the uncertainties.<sup>5</sup> Envisioning India in this context, places it in a challenging position to achieve the goals of higher economic growth and sustainable development together. A recent study<sup>6</sup> quantifies the impact of climate change on GDP predicting 1-degree Celsius rise in temperature reduces global GDP by 12 percent. In this context, driving economic growth through sustainable practices shall pave the way for India's rising population, their growing needs and limited land capacity. Envisioning India in the next 25 years marking the centenary to India's independence, the government has put forward climate change as top most priority to achieve sustainable development. The objective of 'Just transition' from fossil-fuels to renewable energy, is looked at as Lifestyle of Environment (LiFE) by building sustainable practices and responsible choices as an individual as well as for the Nationally Determined Goals.

A fiscal policy without considering the risks of climate change will have bias in its revenue projections (UNDP, 2021). As a result, governments shall either opt for budget cuts or be in debt owing to the fiscal implications of the same at the macro-level. At the micro-level, the fiscal implications enter a vicious cycle affecting the marginalized the most by reducing access to key essential services. Hence, at the national level, for the government, in order to accelerate the progress in addressing such challenges, such risks should be well taken into consideration and translated into the budget document. Integrating climate change into budgeting anchors accountability on the part of the government for environmental stewardship (Petrie, M., & Petrie, M., 2021). Petrie, M., & Petrie, M. (2021) advocate that mainstreaming climate change through Greening Fiscal policy aims at not overlooking economic and social objectives but to ensure that environmental considerations are transparently incorporated into the budgeting framework at the national level for a country. In this context, Budgeting remains a critical tool that presents the government commitments and actions to achieve the goals that are nationally and internationally determined (UNICEF, 2022). In the present scenario, it is critical to address the environmental goals of the country through a climate responsive budgeting framework.

The Brundtland commission of 1987 forwarded the idea of regular reportage of impact of budgets on the environmental sustainability. But the idea of climate budgeting has developed keen interest since 2010. Climate Change Public Expenditure and Institutional Review Sourcebook by World Bank in 2014<sup>7</sup> provides a review on Budget planning, expenditure management, and budget classification. Petrie, M., & Petrie, M. (2021) provide this comprehensive review about the evolution of Climate Budgeting. Essentially, Climate budgeting is an exercise that runs parallel to the government budget but comes as a separate climate budget document. This implies tagging expenditures that are beneficial for the environment or could be expenditure on adaptation for climate change. So far, many countries have sorted to climate budgeting

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<sup>5</sup> Economic Survey 2023-24.

<sup>6</sup> Bilal, A., & Känzig, D. R. (2024). The Macroeconomic Impact of Climate Change: Global vs. Local Temperature (No. w32450). National Bureau of Economic Research, <https://tinyurl.com/bddr29yt>.

<sup>7</sup> In the references as World Bank. (2014a). Climate change public expenditure and institutional review sourcebook.

first being in the world is Nepal. In India, Odisha and Gujarat have introduced climate budget. However, Climate related expenditures are cross-cutting in nature. Building a national framework aligns the national objectives at the union and state government levels. Conceptualizing climate budget at the national level brings together a strong enforcement channel and envisages as a torch bearers to do the same.

The National Mission for Green India, National Action Plan for Climate change are various policies designed to meet these objectives in a phased manner. However, with limited resources and increasing population, meeting land use requirements for mitigation activities shall increase land-use conflicts in the country.<sup>8</sup> Hence, both Adaptation and Mitigation remain two critical pillars for climate action. While there has been a targeted regime for achieving mitigation goals by India, there appears to be no specific goal for adaptation (Climate Action Tracker, 2022). Climate Change is a public good. With Climate change related losses rising at an unprecedented scale due to uncertain events such as floods, heat waves, cyclones, and their respective intensity, there is a growing pressure on the government to take cognizance of climate related risks and their implications in the national budgeting (UNDP, 2021). With limited public capacity, there has been a growing need on increasing resources to finance both mitigation and adaptation. There have been continuous efforts to raise resources both internally and externally from developed countries, International Institutions and Banks in the form of green bonds etc. However, most of the present external sources are plugged in for developing the renewable energy sources in India and have mitigation bias. In that case, adaptation is left for the country to be channelized through public resources internally.

Hence, in the next section, we do a preliminary analysis of the expenditure budget of the Union Government of India for the budget 2024-25 specifically looking for allocations earmarked for adaptation measures for climate change. It should be noted that expenditures identified for adaptation activities are ex-ante. The paper doesn't look upon the delivery of the adaptation related expenditures

## 2. Integration Climate Change into Fiscal Policy - An Analysis

The Adaptation Gap Report, 2022, published by United Nations Environment Program, reveals that although adaptation measures are funded internationally through Green Climate fund, Global Environment Facility, Least Developed Countries fund, Adaptation Fund and Special Climate Change Fund. But adaptation finance gap is 5-10 times higher in the developing countries and continues to enlarge. Even the external funding rate is lower for the developing countries and is dedicated for a specific purpose. Majority of the adaptive measures are taken up to reduce the vulnerability, increase adaptive capacity<sup>9</sup> and build resilience to shocks resulting from climate change. Such measures shall then include risk-reduction for specific hazards, capacity-building, governance mechanism etc. addressing the root cause of vulnerability (UNEP, 2022). Chasing the UNFCCC requirements and Nationally Determined Contributions

<sup>8</sup> Kiesecker, J., Baruch-Mordo, S., Heiner, M., Negandhi, D., Oakleaf, J., Kennedy, C., & Chauhan, P. (2019). Renewable energy and land use in India: a vision to facilitate sustainable development. *Sustainability*, 12(1), 281.

<sup>9</sup> The ability of systems, institutions, humans, and other organisms to adjust to potential damage, to take advantage of opportunities or to respond to consequences (IPCC, 2022).

(NDC) into National Planning has become more challenging and crucial after 2020. Even though the governments may try to find external source of funding for mitigation purposes, the demand for climate actions from national public funding has been crucial (World Bank, 2014b).

In this paper, we use the expenditure budget of the Union government for the year 2024-25 and examine the expenditure allocations dedicated for the purpose of adaptation<sup>10</sup> from 102 demand for grants and 56 ministries. With this perspective, we categorize these allocations dedicated for adaptation for climate change under eight priorities which are, i) Crop Improvement and Research, ii) Drought Proofing and Flood Control, iii) Forest Conservation, iv) Poverty Alleviation and Livelihood Preservation, v) Rural Education, vi) Infrastructure, vii) Health, viii) Risk Financing and Disaster Management. All these parameters help us identify the allocations that help prevent the risks of climate change either through risk management, research or capacity building etc. We then unpack allocations into these heads and then analyze the overall allocations. This is a preliminary analysis where we have not disaggregated adaptation measures in terms of share of their contribution.

## 2.1 Crop Improvement and Research (CIR)

The Climate Transparency Report 2022 reports that the rising temperatures in India, in the range of 1-4 degree Celsius, can reduce rice production by 10-30% and maize production by 25-70%. Hence, adapting strategies that reduce the exposure of excessive heat and warming need to be sorted. Here in, we include those programs that help build better mechanisms for crop research and improvement. Other expenditure heads include institutional mechanism and their role as capacity-builders. The component, Crop improvement and research includes expenditure allocations dedicated to the improvement of crops, and expenditure allocations for the purpose of research that can further enhance the crop improvement and build strategies for resilient farming. These expenditures are incurred by the Ministry of Agriculture and Farmers Welfare, Department of Atomic Energy, Ayush, Ministry of Chemicals and Fertilisers, Ministry of Commerce and Industry, Ministry of Consumer Affairs, Food and Public Distribution, Ministry of Fisheries, Animal Husbandry and Dairying, Ministry of Cooperation, Ministry of Education, Finance, Home Affairs and Textiles. Overall, most of the adaptation expenditures towards crop research span across Ministry of Agriculture and Ministry of Chemicals and Fertilizers in the budget 2024-25.

## 2.2 Drought Proofing and Flood Control (DPFC)

Droughts over the years have intensified. The Climate Tracker (2022) reports that around 33% of the areas in India are drought prone out of which 50% of them are chronic droughts. Even more, expected damage from floods shall increase with the rising temperatures. Measures for drought proofing and flood control come from the expenditure allocations made by the Ministry of Earth Sciences, Electronics and Information Technology, Fisheries, Animal Husbandry and Dairying, Home Affairs, Jal Shakti, Rural Development and Space. The expenditure allocations from these ministries are presented in Table 2. These allocations include expenditures on river

<sup>10</sup> Adaptation measures are those programs that could reduce the economic value of expected losses (UNDP 2022). IPCC (2022) defines adaptation as a process of adjustment to the existing or expected climate change and moderate harm from these climatic effects.



conservation plans, watershed development programs and expenditures on building technologies for effective weather forecast and awareness. The Budget estimates for the year 2024-25 has marked increased allocations for Ministry of Jal Shakti as compared to the revised estimates for the year 2023-24. However, Department of Space allocations utilised for the satellite systems shows lower allocations in the budget 2024-25 vis-à-vis the RE 2023-24 (Table2).

### 2.3 Forest Conservation

Forests hold an important position while identifying adaptation strategies to curb climate change. It is seen as a crucial element in carbon sequestration for the country. As per the State of Forests Report, 2023<sup>11</sup>, Forest and Tree Cover holds approximately 25% of the total geographical area of the country. Looking at the adaptation expenditures for forest conservation, we observe that around 70% of the allocations for forest conservations are from Ministry of Environment, Forests and Climate Change. Other relevant allocations for adaptation measures are from Ministry of Home Affairs, Mines and Science and Technology. These expenditures largely include expenditure on surveillance, research and survey organizations. More details on their respective share is in Table 3.

### 2.4 Poverty Alleviation and Livelihood Preservation (PALP)

PALP remains a vital segment for the overall development of the country. Expenditures on PALP shape the economy in terms of social infrastructure like clean fuel, housing, drinking water, health, roads and sanitation. The government has been making continuous efforts with the large livelihood schemes and poverty alleviation programs. Around 50% of the allocations for PALPE expenditures are by Ministry of Rural Development in the BE 2024-25. Followed by Ministry of Agriculture and Farmers Welfare, Consumer Affairs, Food and Public Distribution, Tribal Affairs, Micro, Small and Medium Enterprises, Minority Affairs, Women and Child Development, Housing and Urban Affairs and Labour and Employment (see Table 4). The major initiatives include Mahatma Gandhi National Rural Employment Guarantee programme, National Livelihood Mission, PM Vanbandhu Kalyan Yojna, social assistance to the marginalised etc.

### 2.5 Rural Education (RE)

Like forests, Education also serves as a critical agent for an individual to make informed decisions while understanding the climate risks and challenges. Public Awareness about climate change through education and campaigns is the assigned responsibility to the Parties of the convention given by UNFCC<sup>12</sup>. Around 80% of the expenditures are allocations from Ministry of Education, followed by Ministry of Social Justice and Empowerment, Minority affairs, Panchayati Raj, Agriculture and Farmers Welfare. The initiatives include National Education Mission, Education Empowerment programs for Minorities and Scheduled Castes, PM YASASVI and drug reduction campaigns (see table 5).

<sup>11</sup> <https://fsi.nic.in/forest-report-2023>

<sup>12</sup> <https://www.un.org/en/climatechange/climate-solutions/education-key-addressing-climate-change>

## 2.6 Infrastructure (INFRA)

Building Infrastructure has been at the forefront of the government's fiscal policy agenda. Central Road and Infrastructure fund (CRIF) established in 2000s<sup>13</sup> aims to use the cess proceeds from Roads to be utilized in building necessary infrastructure for state/UT roads and facilitate developments and maintenance. Similarly, Agriculture infrastructure fund announced in 2020 aims to provide necessary infrastructure at the post-harvest level and community farm assets and other financing needs of the farmers<sup>14</sup>. Most of the expenditure allocations are financed with these two funding arrangements. More than 60% of these infrastructure committed expenditures are by Ministry of Roads, Transport and Highways. These include expenditures on road works, NHAI, Tourism, health research, housing, and development of north-eastern region. The other relevant Ministries are Rural Development, Agriculture and Farmers Welfare, Ministry of Development of North Eastern Region Finance, Fisheries, Animal Husbandry and Dairying, Food Processing Industries, Health and Family welfare, Home Affairs, Housing and Urban Affairs, Information and Broadcasting, Micro, Small and medium enterprises, New and Renewable Energy, Planning, Power, Railways, Textiles, Tourism (see table 6).

## 2.7 Health

Climate change risks are closely related to Health impediments. COVID-19 imposed critical challenge for the economy to cater to health needs of the country and yet take control of climate challenges. Hence, expenditures on Health Research and Mindful consumption awareness can help alter's individual take on handling the climate change challenges and build community to further prevent its implications arising from time to time. The expenditures on health are cross-cutting and include initiatives such as Jal Jeevan Mission, Swachh Bharat Mission, DBT for LPG, central government health scheme etc. Ministry of Education, Health and Family welfare, Home Affairs, Housing and Urban Affairs, Jal Shakti, Petroleum and Natural Gas (see table 7) are contributing to this sector.

## 2.8 Risk Financing and Disaster Management (RFDM)

Majority of the allocations under this head includes crop insurance schemes, assistance for state disaster response fund and management. Line ministries are Ministry of Agriculture and Farmers Welfare, Finance, Health and Family welfare, Home Affairs (see table 8). For the Budget year 2024-25, 63% allocations are from Ministry of Agriculture and Farmer Welfare followed by allocations by Ministry of Finance against transfer to states under State Disaster Response Fund (SDRF).

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<sup>13</sup> <https://www.pib.gov.in/Pressreleaseshare.aspx?PRID=1909906>

<sup>14</sup> <https://agriinfra.dac.gov.in/Home>



**Table 1: Ministry wise allocation (as a % of TE) on Crop Improvement and Research**

Demand No.	Ministry	Department	Actual 2022-23			BE 2023-24			RE 2023-24			BE 2024-25		
			Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total
D-1	MINISTRY OF AGRICULTURE AND FARMERS WELFARE	Department of Agriculture and Farmers Welfare	3.68	0.00	3.65	7.36	0.00	7.30	6.00	0.00	5.97	8.18	0.00	8.12
D-2	MINISTRY OF AGRICULTURE AND FARMERS WELFARE	Department of Agricultural Research and Education	2.98	0.00	2.95	4.35	0.00	4.32	4.29	0.00	4.27	4.78	0.00	4.75
D-3	DEPARTMENT OF ATOMIC ENERGY	Atomic energy	0.00	98.98	0.46	0.00	97.71	0.77	0.00	97.18	0.47	0.00	93.22	0.63
D-4	MINISTRY OF AYUSH	Ministry of Ayush	0.22	0.00	0.22	0.60	0.00	0.60	0.38	0.00	0.38	0.63	0.00	0.63
D-6	MINISTRY OF CHEMICALS AND FERTILISERS	Department of Fertilisers	91.54	0.00	90.84	84.55	0.01	83.88	86.56	0.02	86.14	82.63	0.01	82.08
D-10	MINISTRY OF COMMERCE AND INDUSTRY	Department of Commerce	0.28	0.00	0.28	0.36	0.00	0.36	0.33	0.00	0.33	0.73	0.00	0.73
D-15	MINISTRY OF CONSUMER AFFAIRS, FOOD AND PUBLIC DISTRIBUTION	Department of Food and Public Distribution	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D-16	MINISTRY OF COOPERATION	Ministry of Cooperation	0.14	0.00	0.14	0.00	0.00	0.00	0.14	0.00	0.14	0.00	0.00	0.00
D-26	MINISTRY OF EDUCATION	Department of Higher Education	0.80	0.00	0.79	1.11	0.00	1.11	1.13	0.00	1.13	1.26	0.00	1.25
D-30	MINISTRY OF FINANCE	Department of Economic Affairs	0.05	0.00	0.05	0.07	0.00	0.07	0.06	0.00	0.06	0.07	0.00	0.07
D-32	MINISTRY OF FINANCE	Department of Financial Services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D-44	MINISTRY OF FISHERIES, ANIMAL HUSBANDRY AND DAIRYING	Department of Animal Husbandry and Dairying	0.30	0.08	0.30	1.15	0.20	1.14	0.70	0.32	0.70	1.25	2.68	1.26
D-52	MINISTRY OF HOME AFFAIRS	Ministry of Home Affairs (Andaman and Nicobar Islands)	0.00	0.58	0.00	0.01	0.97	0.01	0.01	0.81	0.01	0.01	0.97	0.02
D-54	MINISTRY OF HOME AFFAIRS	Ministry of Home Affairs (Dadra and Nagar Haveli and Daman and Diu)	0.00	0.22	0.00	0.00	1.00	0.01	0.00	1.54	0.01	0.00	3.06	0.02
D-56	MINISTRY OF HOME AFFAIRS	Ministry of Home Affairs (Lakshadweep)	0.00	0.13	0.00	0.00	0.11	0.00	0.00	0.12	0.00	0.00	0.06	0.00
D-98	MINISTRY OF TEXTILES	Ministry of Textiles	0.32	0.00	0.32	0.44	0.00	0.44	0.40	0.00	0.40	0.45	0.00	0.45

Source: Author's Calculation

**Table 2:** Ministry wise allocation (as a % of TE) on Drought Proofing and Flood Control

Demand no	Ministry	Department	Actual 2022-23			BE 2023-24			RE 2023-24			BE 2024-25		
			Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total
D-24	MINISTRY OF EARTH SCIENCES	Ministry of Earth Sciences	5.15	1.99	4.34	5.41	9.38	6.26	5.58	8.24	6.08	3.88	8.89	4.77
D-27	MINISTRY OF ELECTRONICS AND INFORMATION TECHNOLOGY	Ministry of Electronics and Information Technology	0.00	0.00	0.00	0.17	0.00	0.13	0.14	0.00	0.11	0.07	0.00	0.06
D-43	MINISTRY OF FISHERIES, ANIMAL HUSBANDRY AND DAIRYING	Department of Fisheries	7.75	0.00	5.88	7.81	0.00	6.14	7.30	0.00	5.91	8.28	0.00	6.82
D-52	MINISTRY OF HOME AFFAIRS	Ministry of Home Affairs (Andaman and Nicobar Islands)	0.25	1.20	0.46	0.27	0.99	0.42	0.36	1.28	0.53	0.25	1.21	0.42
D-56	MINISTRY OF HOME AFFAIRS	Ministry of Home Affairs (Lakshadweep)	0.16	0.91	0.32	0.05	0.87	0.23	0.07	0.91	0.23	0.06	0.69	0.17
D-58	MINISTRY OF HOME AFFAIRS	Transfers to Jammu and Kashmir	6.59	0.00	5.00	1.92	0.00	1.51	2.39	0.00	1.93	1.73	0.00	1.43
D-59	MINISTRY OF HOME AFFAIRS	Transfers to Puducherry	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D-62	MINISTRY OF JAL SHAKTI	Department of Water Resources, River Development and Ganga Rejuvenation	41.24	0.28	33.50	55.18	0.29	43.39	48.19	0.43	39.11	54.17	0.36	44.64
D-88	MINISTRY OF RURAL DEVELOPMENT	Department of Land Resources	4.86	0.00	3.68	8.47	0.00	6.65	8.35	0.00	6.76	8.68	0.00	7.14
D-95	DEPARTMENT OF SPACE	Department of Space	34.00	95.62	46.82	20.72	88.48	35.27	27.64	89.13	39.33	22.88	88.85	34.56

Source: Author's Calculation

**Table 3:** Ministry wise allocation (as a % of TE) on Forest Conservation

Demand no	Ministry	Department	Actual 2022-23			BE 2023-24			RE 2023-24			BE 2024-25		
			Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total
D-28	Ministry of Environment, Forests and Climate Change	Ministry of Environment, Forests and Climate Change	67.96	42.77	66.89	71.45	47.66	69.67	71.65	25.61	69.30	69.95	36.33	69.24
D-30	Ministry of Finance	Department of Economic Affairs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D-52	Ministry of Home Affairs	Ministry of Home Affairs (Andaman and Nicobar Islands)	0.18	19.08	0.98	0.20	12.66	1.13	0.26	42.71	2.42	0.24	15.86	0.96
D-53	Ministry of Home Affairs	Chandigarh	0.96	1.87	1.00	1.02	0.87	1.01	1.01	1.51	1.04	0.96	1.54	0.96
D-54	Ministry of Home Affairs	Ministry of Home Affairs (Dadra and Nagar Haveli and Daman and Diu)	0.86	5.98	1.08	0.64	5.80	1.02	0.75	8.22	1.13	0.74	10.63	1.17
D-55	Ministry of Home Affairs	Ministry of Home Affairs (Ladakh)	0.06	0.04	0.06	0.09	0.06	0.09	0.05	0.07	0.05	0.05	0.13	0.06
D-56	Ministry of Home Affairs	Ministry of Home Affairs (Lakshadweep)	0.03	0.51	0.05	0.05	0.09	0.05	0.04	0.04	0.04	0.04	0.18	0.04
D-69	Ministry of Mines	Ministry of Mines	29.95	0.00	28.68	26.56	0.00	24.57	26.24	0.00	24.90	28.03	0.00	25.93
D-91	Ministry of Science and Technology	Department of Scientific and Industrial Research	0.00	29.74	1.26	0.00	32.86	2.46	0.00	21.84	1.11	0.00	35.33	1.64

Source: Author's Calculation

**Table 4:** Ministry wise allocation (as a % of TE) on Poverty Alleviation and Livelihood Preservation (PALP)

Demand no.	Ministry	Department	Actual 2022-23			BE 2023-24			RE 2023-24			BE 2024-25		
			Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total
D-1	MINISTRY OF AGRICULTURE AND FARMERS WELFARE	Department of Agriculture and Farmers Welfare	12.3	0.0	12.2	15.9	0.0	15.9	14.4	0.0	14.4	27.9	NA	27.9
D-15	MINISTRY OF CONSUMER AFFAIRS, FOOD AND PUBLIC DISTRIBUTION	Department of Food and Public Distribution	59.1	0.0	59.1	54.2	0.0	54.2	52.8	0.0	52.7	3.3	NA	3.3
D-14	MINISTRY OF CONSUMER AFFAIRS, FOOD AND PUBLIC DISTRIBUTION	Department of Consumer Affairs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.7	NA	4.7
D-60	MINISTRY OF HOUSING AND URBAN AFFAIRS	Ministry of Housing and Urban Affairs	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.1	NA	0.1
D-64	MINISTRY OF LABOUR AND EMPLOYMENT	Ministry of Labour and Employment	1.0	0.0	1.0	0.6	0.0	0.6	0.3	0.0	0.3	0.1	NA	0.1
D-68	MINISTRY OF MICRO, SMALL AND MEDIUM ENTERPRISES	Ministry of Micro, Small and Medium Enterprises	4.5	0.0	4.5	4.6	0.0	4.6	4.4	0.0	4.4	7.9	NA	7.9
D-70	MINISTRY OF MINORITY AFFAIRS	MINISTRY OF MINORITY AFFAIRS	0.0	100.0	0.1	0.1	100.0	0.2	0.1	100.0	0.1	0.2	NA	0.2
D-87	MINISTRY OF RURAL DEVELOPMENT	Department of Rural Development	21.5	0.0	21.5	22.2	0.0	22.2	26.3	0.0	26.3	51.5	NA	51.5
D-93	MINISTRY OF SOCIAL JUSTICE AND EMPOWERMENT	Department of Social Justice and Empowerment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	NA	0.0
D-100	MINISTRY OF TRIBAL AFFAIRS	MINISTRY OF TRIBAL AFFAIRS	0.8	0.0	0.8	1.1	0.0	1.1	0.8	0.0	0.8	2.0	NA	2.0
D-101	MINISTRY OF WOMEN AND CHILD DEVELOPMENT	Ministry of Women and Child Development	0.7	0.0	0.7	1.2	0.0	1.2	0.9	0.0	0.9	2.2	NA	2.2

Source: Author's Calculation

**Table 5: Ministry wise allocation Ministry wise allocation (as a % of TE) on Rural Education**

Demand no	Ministry	Department	Actual 2022-23			BE 2023-24			RE 2023-24			BE 2024-25		
			Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total
D-1	MINISTRY OF AGRICULTURE AND FARMERS WELFARE	Department of Agriculture and Farmers Welfare	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01
D-25	MINISTRY OF EDUCATION	Department of School Education and Literacy	83.54	0.00	83.54	78.83	0.00	78.83	80.20	0.00	80.20	78.87	0.00	78.86
D-70	MINISTRY OF MINORITY AFFAIRS	Ministry Of Minority Affairs	0.88	0.00	0.88	3.36	0.00	3.36	3.54	0.00	3.54	3.45	0.00	3.45
D-72	MINISTRY OF PANCHAYATI RAJ	Ministry of Panchayati Raj	1.39	0.00	1.39	1.30	100.00	1.31	1.52	100.00	1.53	1.47	100.00	1.47
D-92	MINISTRY OF SKILL DEVELOPMENT AND ENTREPRENEURSHIP	Ministry Of Skill Development And Entrepreneurship	2.04	100.00	2.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D-93	MINISTRY OF SOCIAL JUSTICE AND EMPOWERMENT	Department of Social Justice and Empowerment	12.14	0.00	12.14	16.50	0.00	16.50	14.73	0.00	14.73	16.21	0.00	16.21
D-100	MINISTRY OF TRIBAL AFFAIRS	Ministry Of Tribal Affairs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: Author's Calculation

**Table 6:** Ministry wise allocation Ministry wise allocation (as a % of TE) on Infrastructure

Demand no	Ministry	Department	Actual 2022-23			BE 2023-24			RE 2023-24			BE 2024-25		
			Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total
D-1	MINISTRY OF AGRICULTURE AND FARMERS WELFARE	Department of Agriculture and Farmers Welfare	0.11	0.00	0.04	0.34	0.00	0.12	0.53	0.00	0.15	0.45	0.00	0.14
D-23	MINISTRY OF DEVELOPMENT OF NORTH EASTERN REGION	Ministry of Development of North Eastern Region	0.27	0.12	0.18	0.69	1.43	1.18	0.88	1.41	1.26	0.91	1.30	1.18
D-32	MINISTRY OF FINANCE	Department of Financial Services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D-44	MINISTRY OF FISHERIES, ANIMAL HUSBANDRY AND DAIRYING	Department of Animal Husbandry and Dairying	0.17	0.00	0.07	0.23	0.00	0.08	0.30	0.00	0.09	0.28	0.00	0.09
D-45	MINISTRY OF FOOD PROCESSING INDUSTRIES	Ministry of Food Processing Industries	0.63	0.00	0.24	1.07	0.00	0.37	1.36	0.00	0.39	1.22	0.00	0.38
D-45	MINISTRY OF HEALTH AND FAMILY WELFARE	Department of Health and Family Welfare	5.39	0.02	2.11	5.04	0.04	1.76	7.17	0.01	2.07	5.52	0.09	1.79
D-46	MINISTRY OF HEALTH AND FAMILY WELFARE	Department of Health Research	0.20	0.00	0.08	0.33	0.00	0.11	0.41	0.00	0.12	0.27	0.00	0.09
D-51	MINISTRY OF HOME AFFAIRS	Police	2.29	1.50	1.81	2.57	1.15	1.64	2.78	1.02	1.53	2.94	1.22	1.76
D-60	MINISTRY OF HOUSING AND URBAN AFFAIRS	Ministry Of Housing And Urban Affairs	32.76	0.00	12.74	28.27	0.00	9.71	31.09	0.00	8.92	30.74	0.00	9.60
D-61	MINISTRY OF INFORMATION AND BROADCASTING	Ministry Of Information And Broadcasting	0.12	0.00	0.05	0.41	0.00	0.14	0.42	0.00	0.12	0.38	0.00	0.12
D-68	MINISTRY OF MICRO, SMALL AND MEDIUM ENTERPRISES	Ministry of Micro, Small and Medium Enterprises	0.21	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D-71	MINISTRY OF NEW AND RENEWABLE ENERGY	Ministry Of New And Renewable Energy	0.99	0.00	0.39	1.37	0.00	0.47	0.97	0.00	0.28	1.13	0.00	0.35
D-77	MINISTRY OF PLANNING	Ministry Of Planning	0.37	0.00	0.14	0.30	0.00	0.10	0.10	0.00	0.03	0.33	0.00	0.10
D-79	MINISTRY OF POWER	Ministry of Power	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D-85	MINISTRY OF RAILWAYS	Ministry of Railways	0.00	0.00	0.00	0.00	4.34	2.85	0.00	3.90	2.78	0.00	3.78	2.60
D-86	MINISTRY OF ROAD TRANSPORT & HIGHWAYS	Ministry of Road Transport and Highways	8.03	98.36	63.24	7.81	93.04	63.76	10.06	93.66	69.68	4.05	93.60	65.65
D-87	MINISTRY OF RURAL DEVELOPMENT	Department of Rural Development	48.28	0.00	18.77	50.54	0.00	17.36	43.15	0.00	12.37	50.38	0.00	15.73
D-98	MINISTRY OF TEXTILES	Ministry of Textiles	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D-99	MINISTRY OF TOURISM	Ministry Of Tourism	0.18	0.00	0.07	1.03	0.00	0.35	0.79	0.00	0.23	1.39	0.00	0.44

Source: Author's Calculation



**Table 7: Ministry wise allocation Ministry wise allocation (as a % of TE) on Health**

Demand no	Ministry	Department	Actual 2022-23			BE 2023-24			RE 2023-24			BE 2024-25		
			Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total
D-25	MINISTRY OF EDUCATION	Department of School Education and Literacy	11.58	0.00	11.55	9.29	0.00	9.26	7.74	0.00	7.72	8.77	0.00	8.74
D-46	MINISTRY OF HEALTH AND FAMILY WELFARE	Department of Health and Family Welfare	26.70	9.12	26.65	24.57	19.46	24.56	22.77	11.74	22.74	25.62	8.63	25.57
D-47	MINISTRY OF HEALTH AND FAMILY WELFARE	Department of Health Research	0.07	0.00	0.07	0.07	0.00	0.07	0.07	0.00	0.07	0.10	0.00	0.10
D-52	MINISTRY OF HOME AFFAIRS	Ministry of Home Affairs (Andaman and Nicobar Islands)	0.07	9.19	0.10	0.08	7.43	0.10	0.06	7.71	0.08	0.06	6.00	0.08
D-53	MINISTRY OF HOME AFFAIRS	Chandigarh	0.00	21.33	0.05	0.00	16.20	0.06	0.00	24.08	0.07	0.00	21.75	0.07
D-54	MINISTRY OF HOME AFFAIRS	Ministry of Home Affairs (Dadra and Nagar Haveli and Daman and Diu)	0.01	57.35	0.16	0.01	45.21	0.17	0.01	54.57	0.16	0.01	46.00	0.15
D-55	MINISTRY OF HOME AFFAIRS	Ministry of Home Affairs (Ladakh)	0.00	0.61	0.00	0.00	0.05	0.00	0.05	0.01	0.05	0.05	0.07	0.05
D-56	MINISTRY OF HOME AFFAIRS	Ministry of Home Affairs (Lakshadweep)	0.02	2.41	0.03	0.03	11.65	0.07	0.03	1.88	0.03	0.02	17.56	0.08
D-60	MINISTRY OF HOUSING AND URBAN AFFAIRS	Ministry Of Housing And Urban Affairs	1.76	0.00	1.75	4.00	0.00	3.99	1.98	0.00	1.97	3.52	0.00	3.51
D-63	MINISTRY OF JAL SHAKTI	Department of Drinking Water and Sanitation	54.45	0.00	54.31	61.80	0.00	61.59	59.59	0.00	59.43	54.40	0.00	54.23
D-76	MINISTRY OF PETROLEUM AND NATURAL GAS	Ministry of Petroleum and Natural Gas	5.34	0.00	5.32	0.14	0.00	0.14	7.71	0.00	7.69	7.45	0.00	7.43

Source: Author's Calculation

**Table 8: Ministry wise allocation Ministry wise allocation (as a % of TE) on Risk Financing and Disaster Management**

Demand No.	Ministry	Department	Actual 2022-23			BE 2023-24			RE 2023-24			BE 2024-25		
			Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total
D-1	MINISTRY OF AGRICULTURE AND FARMERS WELFARE	Department of Agriculture and Farmers Welfare	65.59	0.00	65.43	59.22	0.00	59.04	62.45	0.00	62.31	63.85	0.00	63.63
D-32	MINISTRY OF FINANCE	Department of Financial Services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D-42	MINISTRY OF FINANCE	Transfers to States	33.29	0.00	33.21	39.54	0.00	39.42	36.44	0.00	36.36	35.27	0.00	35.15
D-45	MINISTRY OF HEALTH AND FAMILY WELFARE	Department of Health and Family Welfare	0.11	18.41	0.15	0.12	27.13	0.21	0.10	15.97	0.13	0.08	24.30	0.16
D-49	MINISTRY OF HOME AFFAIRS	Ministry of Home Affairs	0.40	80.29	0.58	0.59	72.79	0.81	0.42	83.87	0.61	0.25	75.64	0.51
D-52	MINISTRY OF HOME AFFAIRS	Ministry of Home Affairs (Andaman and Nicobar Islands)	0.00	1.31	0.00	0.00	0.09	0.00	0.00	0.16	0.00	0.00	0.05	0.00
D-54	MINISTRY OF HOME AFFAIRS	Ministry of Home Affairs (Dadra and Nagar Haveli and Daman and Diu)	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D-55	MINISTRY OF HOME AFFAIRS	Ministry of Home Affairs (Ladakh)	0.04	0.00	0.04	0.04	0.00	0.04	0.03	0.00	0.03	0.03	0.00	0.03
D-56	MINISTRY OF HOME AFFAIRS	Ministry of Home Affairs (Lakshadweep)	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
D-57	MINISTRY OF HOME AFFAIRS	Ministry of Home Affairs (Transfers to Delhi)	0.00	0.00	0.00	0.02	0.00	0.02	0.03	0.00	0.03	0.03	0.00	0.03
D-58	MINISTRY OF HOME AFFAIRS	Transfers to Jammu and Kashmir	0.57	0.00	0.57	0.45	0.00	0.45	0.52	0.00	0.52	0.48	0.00	0.48
D-59	MINISTRY OF HOME AFFAIRS	Transfers to Puducherry	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01

Source: Author's Calculation

## Comparative Analysis of the 8 Priority sectors

All of the listed priority sectors are critical areas to exercise adaptation practices. Collectively taking all the expenditures together, we in this section, analyse the percentage allocation to each sector over the years<sup>15</sup> Actuals 2022-23, BE and RE 2023-24 and BE 2024-25 in Table 9. Clearly, over the years under consideration, Infrastructure has been at the forefront in terms of percentage expenditures over total expenditures on all 8 sectors. This is followed by Poverty alleviation programs taking around 19 % of the total expenditures and Crop improvement and research (18%) in the BE 2024-25. Considering the lowest expenditures among all, expenditures on forest conservation remain the lowest. The ratio over the years have not seen much improvement.

The pictorial description of the Table 9 is presented in fig. 1 below. The figure portrays that the Poverty alleviation and livelihood preservation have had highest allocations of 36% approximately followed by Infrastructure projects (26%) in the Actuals of 2022-23. Health being at the fourth place after allocations on Crop Improvement and Research. Clearly, Expenditures on Poverty alleviation remained an important objective for the government which increasingly became more critical during the Covid-19 crises and its impacts that hovered for almost two years. RFDM and RE allocations were around 4%, 2% on DPFC and less than 1 % on FC in 2022-23.

Looking at the allocations for the year 2023-24, the revised estimates showcase that highest allocations are for poverty alleviation and livelihood preservation programs followed by Infrastructure. Percentage allocations for health have seen a rise in the RE 2023-24 of around 10%. However, the other sectors such as CIR allocations see a decline. FC, RFDM, DPFC hover around almost the same allocations as 2022-23. Herein, we observe that the India's growing focus to 'build back better' is showcased in these estimates of two years. The government unfettered goal to revive the economy from Covid-19 induced crises through increasing investment growth particularly through infrastructure investment is well reflected. However there are some deviations in the Budget estimates and revised estimates for 2023-24. A closer look at the deviations are covered in the next section through fiscal marksmanship analysis followed by a PEFA assessment of these deviations.

Coming back at the estimates for the year 2024-25, Infrastructure development remains the top priority sectors in the government's agenda. Around 37% of the total expenditures are dedicated to the infrastructure development initiatives. Over the years, PALP expenditure allocations have been on the decline while more importance is on Disaster Management initiatives, health, drought proofing and flood control and rural education. Forest conservation allocations largely have remained less than one percent over the years under consideration. Although, climate change interventions for adaptation are cross-cutting, still, we can't stress the importance of the forests conservation in the long-run.

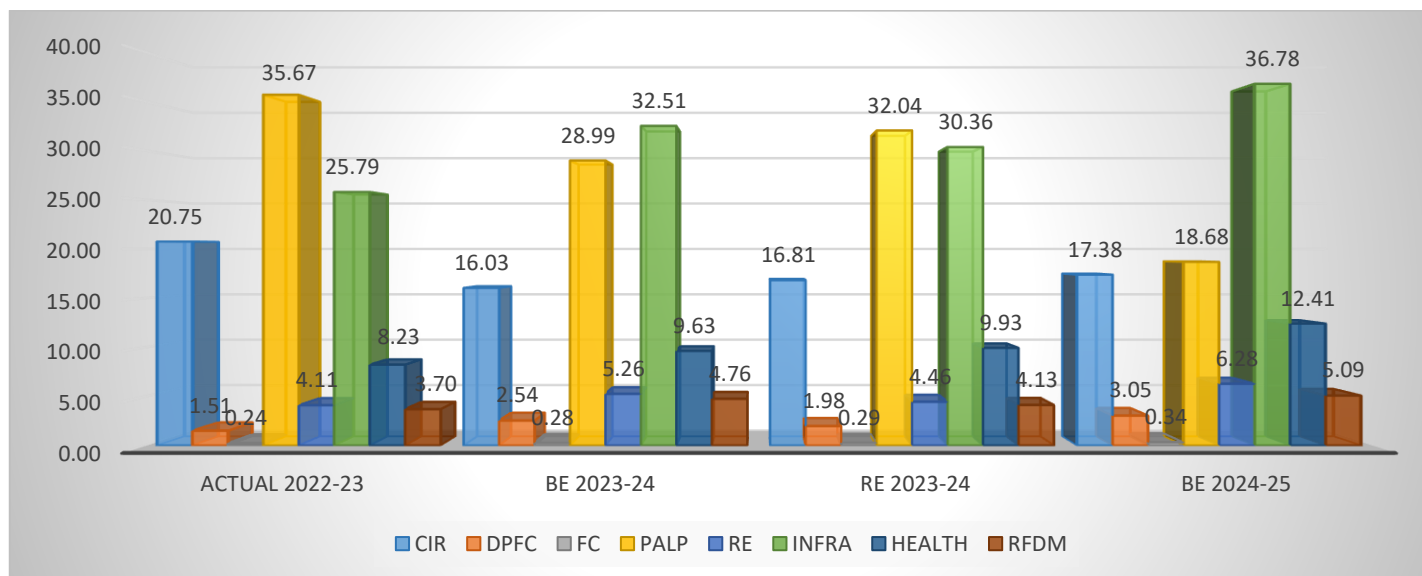
<sup>15</sup> The analysis is open-ended. It is to be noted here that Government introduces new schemes, rename the existing or merge few schemes for better monitoring and execution. However, there could be a case where allocations under one theme is higher for a particular year and could have no allocations for the next year due to some specific emergency episodes in that respective year. Few examples could be Covid-19 concerning rehabilitation services for livelihoods, cyclones or droughts etc.

**Table 9:** Expenditure allocations under 8 priority sectors (as a % of TE on Adaptation)

No.	Code	Components	Actual 2022-23			BE 2023-24			RE 2023-24			BE 2024-25		
			Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total	Revenue	Capital	Total
1	CIR	Crop Improvement and Research	24.61	0.59	20.75	20.42	0.57	16.03	21.50	0.37	16.81	23.34	0.45	17.38
2	DPFC	Drought Proofing and Flood Control	1.37	2.05	1.51	2.56	2.47	2.54	2.07	1.70	1.98	3.39	2.07	3.05
3	FC	Forest Conservation	0.27	0.06	0.24	0.33	0.09	0.28	0.35	0.07	0.29	0.43	0.06	0.34
4	PALP	Poverty Alleviation and Livelihood Preservation	42.62	0.07	35.67	37.20	0.02	28.99	41.16	0.02	32.04	25.26	0.00	18.68
5	RE	Rural Education	4.91	0.00	4.11	6.75	0.00	5.26	5.72	0.00	4.46	8.49	0.00	6.28
6	INFRA	Infrastructure	11.99	97.04	25.79	14.33	96.63	32.51	11.19	97.68	30.36	15.52	97.20	36.78
7	HEALTH	Health	9.82	0.13	8.23	12.31	0.15	9.63	12.73	0.12	9.93	16.72	0.15	12.41
8	RFDM	Risk Financing and Disaster Management	4.41	0.05	3.70	6.10	0.07	4.76	5.29	0.04	4.13	6.85	0.07	5.09

Source: Author's Calculation

**Figure 1:** %age allocations for 8 priority sectors in the Budget of 2024-25



*Source:* Author's calculation

### 3. Fiscal Marksmanship Analysis

In this section, we conduct the fiscal marksmanship analyses of the expenditure allocations for the line ministries. The fiscal marksmanship of the 8 priority sectors is presented in Table 10.

Partitioning the budget forecasting errors to understand the sources of error –whether it is random error or not – is based on Theil’s estimations. Theil’s inequality coefficient (U) is used to analyze the measure of accuracy of the budget forecasts. Theil’s inequality coefficient is based on the mean square prediction error. The forecast error of Theil (1958) is defined as:

$$U_1 = \frac{\sqrt{\frac{1}{n} \sum (P_t - A_t)^2}}{\sqrt{\frac{1}{n} \sum P_t^2} + \sqrt{\frac{1}{n} \sum A_t^2}} \quad (1)$$

where

$U_1$  = inequality coefficient

$P_t$  = Predicted value

$A_t$  = Actual value

$n$  = the number of years

This inequality coefficient ranges from zero to one. When  $P_t = A_t$  for all observations (a perfect forecast),  $U_1$  equals zero.

The mean square prediction error ( $U_1$ ) has been decomposed in order to indicate systematic and random sources of error. The systematic component is further divided into the proportion of the total forecast error due to bias and the proportion of total forecast error attributable to unequal variation. The derivation of equation 4 is given in detail in Davis (1980).

$$1 = \frac{(\bar{P} - \bar{A})^2}{\frac{1}{n} \sum (P_t - A_t)^2} + \frac{(Sp - Sa)^2}{\frac{1}{n} \sum (P_t - A_t)^2} + \frac{2(1-r)Sp.Sa}{\frac{1}{n} \sum (P_t - A_t)^2} \quad (2)$$

In equation (2),  $\bar{P}$  and  $\bar{A}$  are mean predicted and mean actual changes respectively;  $Sp$  and  $Sa$  are the standard deviations of predicted and actual values respectively; and  $r$  is the coefficient of correlation between predicted and actual values.

The first expression of RHS of equation (2) is the proportion of the total forecast error due to bias. It represents a measure of proportion of error due to over prediction or under prediction of the average value. The second expression of the RHS of equation (2) is the proportion of total forecast error attributable to unequal variation. In other words, it measures the proportion of error due to over prediction or under prediction of the variance of the values. The third expression on the RHS of the equation (2) measures the proportion of forecasting error due to random variation. The first two sources of error are systematic. Presumably they can be reduced by the improved forecasting techniques; while the random



component is beyond the controller of the forecaster (Intriligator, 1978; Pindyck and Rubenfield, 1998; Theil, 1966).

The data of two out of the six schemes, namely, POCSO and SV was not sufficient to find the Theils'  $U$ , so have been dropped. For the remaining four, extent as well as components of error have been calculated in the chapter. The value of  $U_1$  for different schemes is given in table 3.5.  $U_1$  takes on value between 0 and 1. Hence, it can be inferred based on data from Table 3.5 that the extent of errors is quite low. The value of  $U_1$  was highest for ICPS. For the schemes JJF and BSSY,  $U_1$  is 0 which indicates perfect forecast.

**Table 10: Fiscal Marksmanship Analysis of the Eight Priority Sectors**

			Amount (In Rs. Crores)		FM ratio
No.	Code	Components	BE 2023-24	RE 2023-24	BE/RE
			Total	Total	Total
1	CIR	Crop Improvement and Research	208742.11	219281.12	0.95
2	DPFC	Drought Proofing and Flood Control	33086.16	25883.58	1.28
3	FC	Forest Conservation	3589.44	3726.12	0.96
4	PALP	Poverty Alleviation and Livelihood Preservation	377443.89	417944.4	0.90
5	RE	Rural Education	68517.61	58107.14	1.18
6	INFRA	Infrastructure	423319.36	395968.81	1.07
7	HEALTH	Health	125336.3	129568.5	0.97
8	RFDM	Risk Financing and Disaster Management	62035.26	53831.8	1.15
		Total	1302070.13	1304311.47	1.00

*Source:* Author's Calculation

With the available BE and RE estimates for the year 2023-24, we estimate the Fiscal Marksmanship ratio and found that out of eight priority sectors, expenditure allocations for four of them have FM ratio of less than 1. These are CIR, FC, PALP, and Health. This means that the revised expenditures are more than the projected expenditure allocations indicating there is an underestimation of expenditures. Overall, the Marksmanship ratio of total expenditure allocations on all eight components have a ratio of 1. On the other hand, DPFC, RE, INFRA, RFDM have ratios greater than 1 implying that there is overestimation of resources. These resources could have been put otherwise on more productive use (Chakraborty, Chakraborty, & Shrestha, 2020).

#### 4. Public Expenditure and Financial Accountability (PEFA) Analysis

As much as the role of budgeting is crucial in incorporating the government's fiscal priorities, equally critical is to assess the budget credibility. Fiscal Marksmanship indeed is a useful tool to assess the deviation in the budgetary announcement and actual allocations. However, it is quite imperative to deep dive into these deviations to assess these errors. And secondly, how much of it can be controlled for better accuracy. PEFA in this regard, seems to be an interesting tool which stands on seven pillars of PFM system with 31 indicators. On the onset, we use the first pillar of budget credibility and use the aggregate expenditure outturn as an indicator to test in our case. A score of 'A' is given if the Actuals expenditures outturn lies between 95% and 105% of the Budgeted expenditure. A score of 'B' is allotted when the actual expenditure outturn lies between 90-110% of the approved budgeted expenditures. A score of 'C' is given if it is within 85-115% while score of 'D' is given if performance is less than required for a C score (PEFA (2018)). In other words, Budget credibility is tested based on the score A to D, wherein 5% variation is marked as score A while a 10% variation is allotted score 'B'. Similarly, 15% variation is allotted a score of 'C' and anything more than that is given a score of 'D' (Table 11).

**Table 11: PEFA Scores**

Score	Minimum requirement for scores
A	Aggregate expenditure outturn falls between 95-105% of the approved budget expenditures in at least 2 of the 3 years of assessment.
B	Aggregate expenditure outturn falls between 90-110% of the approved budget expenditures in at least 2 of the 3 years of assessment.
C	Aggregate expenditure outturn falls between 85-115% of the approved budget expenditures in at least 2 of the 3 years of assessment.
D	Performance is less than required for a C score.

We conduct this analysis for the year 2023-24 for which the Budget estimates and the revised estimates are available in the budget of 2024-25. (See table 11)

**Table 12:** PEFA Analysis of the eight priority sectors for the year 2023-24

Components	% Deviation			PEFA Score		
	Revenue	Capital	Total	Revenue	Capital	Total
<b>Crop Improvement and Research</b>	5.37	35.25	5.05	A	D	A
<b>Drought Proofing and Flood Control</b>	19.31	30.77	21.77	D	D	C
<b>Forest Conservation</b>	6.50	29.48	3.81	B	D	A
<b>Poverty Alleviation and Livelihood Preservation</b>	10.73	0.00	10.73	C	A	B
<b>Rural Education</b>	15.19	0.00	15.19	C	A	C
<b>Infrastructure</b>	21.89	1.61	6.46	D	A	B
<b>Health</b>	3.45	17.15	3.38	A	C	A
<b>Risk Financing and Disaster Management</b>	13.15	35.70	13.22	C	D	C
<b>Total</b>	0.07	0.52	0.17	A	A	A

Source: Author's Calculation

The PEFA analysis observes that on the total expenditure allocations, for all the eight sectors, variations are between 15%. Out of which, CIR, FC, Health, have variations below 5%, while PALP and INFRA have less than 10% variations. Rural Education (RE), DPFC and RFDM report more than 15% deviations from the budget estimates. On the revenue side, DPFC and INFRA score a 'D' with more than 15 % deviations. PALP, RE and RFDM score a 'C' which means that the deviations of the revised (in our case) allocations are more than 10 and less than 15% from the budget estimates. On the capital expenditure allocations, CIR, DPFC, FC and RFDM have a score 'D' indicating deviation of more than 15% while PALP, RE, INFRA have less than 5% deviations from the budget estimates and score an 'A'.

Adaptation to climate change cuts across different sectors and must not be observed in isolation. India's third national communication to the G-20 convention on climate change emphasises on building Adaptation strategy to achieve low carbon growth for India<sup>16</sup>. Although Adaptation related expenditures have seen a rise, there is a need for continuous innovation in designing policies that make the best use of the available resources.

Against this backdrop, this paper outlines the landscape of adaptation financing in India across the eight priority sectors, highlighting government programs and disaggregated spending patterns. Clearly, Post –Covid -19 have been the phase of reinvigorating the economy through higher allocations for Poverty alleviation and livelihood programs for its citizens. While simultaneously keeping Infrastructure development at the forefront over the period of study. Along these lines, Expenditures on

<sup>16</sup> <https://moef.gov.in/uploads/2024/01/India-TNC-IAC-revised.pdf>

Disaster Management, risk financing have also gained momentum and seen an upward trend in expenditures.

However, expenditures on forest conservations remain the lowest across the period of study. According to FAO (2020) report, India remains the tenth largest forested country in the world. It is true that forests create cost disability for the states that contain it, but it also serves as a source of livelihoods for many. As important is to maintain these forests, equally relevant is to increase the density of the forest cover for a high carbon sequestration. However, over the year's forest cover have been destroyed for more agricultural land for farming and meeting the increasing food requirements of the country<sup>17</sup>. Herein, the role of afforestation programs through CAMPA and National Adaptation fund need attention in terms of utilization which is however beyond the scope of this paper. We also, in this exercise, assess the budget credibility of each component through PEFA and Fiscal Marksmanship framework for the eight priority sectors. While the next convention for climate action is due in 2025, there is a rising concern over the availability of funds for the developing countries to meet there climate related goals. Hence, in this context, this study remains relevant in understanding the prevailing adaptation expenditures at the central level for each sector paving way to design policies that mobilizes resources available for continuous practice in the long run. Also, a template for climate responsive budgeting is attempted in the paper that has policy contributions to make the climate responsive budgeting matrices sustainable and comparative across the states.

## 5. Conclusion

The paper analyses the fiscal commitments in India towards the National Adaptation Communication. Using the Public Financial management (PFM) tools, against the backdrop of the 30th United Nations Climate Change Conference, (COP30), we analyse the fiscal commitments across sectors related to the significant components of Adaptation in the Detail Demand for Grants. The analysis showed that public expenditure on adaptation in India related to climate resilient infrastructure, disaster management and climate risk financing have gained momentum and seen an upward trend in the spending. However, the budget credibility analysis through fiscal marksmanship analysis and the PEFA scores further showed that forest conservation related spending requires relative more fiscal commitments at the Union level. The ecological fiscal transfers to subnational governments through the tax transfers by the Finance Commissions incorporating net forest cover takes care of this requirement, within the general government framework.

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<sup>17</sup> <https://doi.org/10.4060/ca8642en>

## References

- Bilal, A., & Känzig, D. R. 2024. The Macroeconomic Impact of Climate Change: Global vs. Local Temperature (No.w32450). National Bureau of Economic Research, <https://tinyurl.com/bddr29yt>.
- Chakraborty, Lekha, Pinaki Chakraborty and Ruzel Shrestha, 2020. “Budget Credibility of Subnational Governments: Analyzing the Fiscal Forecasting Errors of 28 States in India” Levy Economics Institute Working Paper No. 964. New York.
- Climate Action Tracker, 2022. Climate Action Tracker Country Assessments. India profile. <https://www.climate-transparency.org/wp-content/uploads/2022/10/CT2022-India-Web.pdf>
- Economic Survey, 2023-24.
- IPCC, 2022. Annex II: Glossary [Möller, V., R. van Diemen, J.B.R. Matthews, C. Méndez, S. Semenov, J.S. Fuglestedt, A. Reisinger (eds.)]. in: Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA, pp: 2897–2930, doi:10.1017/9781009325844.029.
- Jena, P. R., & Sikdar, S., 2019. Budget Credibility in India: Assessment through PEFA Framework. National Institute of Public Finance and Policy. WP No. 284.
- Kiesecker, J., Baruch-Mordo, S., Heiner, M., Negandhi, D., Oakleaf, J., Kennedy, C., & Chauhan, P., 2019. Renewable energy and land use in India: a vision to facilitate sustainable development. Sustainability, 12(1): 281.
- PEFA, 2018. PEFA Handbook. Volume II: PEFA Assessment Fieldguide (second edition). PEFA Secretariat. Washington DC. December. Read at: Volume II: PEFA Assessment Fieldguide (Second Edition) Public Expenditure and Financial Accountability (PEFA)
- Petrie, M., & Petrie, M., 2021. Mainstreaming Environmental Stewardship in Government Strategy and Policy. Environmental Governance and Greening Fiscal Policy: Government Accountability for Environmental Stewardship, 43-60.

- Petrie, M., & Petrie, M., 2021. The evolution of green budgeting. *Environmental Governance and Greening Fiscal Policy: Government Accountability for Environmental Stewardship*, 61-108.
- PIB, 2022. G-20 and India's Presidency. Press Information Bureau, Ministry of External Affairs. December 9, 2022.  
<https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1882356>
- The State of World's Forests, 2020 <https://doi.org/10.4060/ca8642en>
- India State of Forest Report, 2023. Volume 1. Ministry of Environment, Forest & Climate Change.
- UNCTAD, rapid assessment, 'Impact to Global Trade of disruption of shipping routes in the Red Sea, Black Sea and Panama Canal', [https://unctad.org/system/files/official-document/osginf2024d2\\_en.pdf](https://unctad.org/system/files/official-document/osginf2024d2_en.pdf).
- UNDP, 2021. Budgeting for Climate Change. A Guidance note for Governments to integrate Climate Change into Budgeting. Budgeting for Climate Change: A Guidance Note for Governments to Integrate Climate Change into Budgeting United Nations Development Programme ([undp.org](http://undp.org))
- UNEP, 2022. Too Little, Too Slow: Climate adaptation failure puts world at risk. Adaptation Gap Report.
- UNICEF, 2022. Budgets for Climate, Sustainability and Social Inclusion: A Rapid Review of Approaches and tools. Budgets for climate, sustainability, and social inclusion UNICEF.
- World Bank, 2014a. Climate change public expenditure and institutional review sourcebook.
- World Bank, 2014b. Moving towards Climate Budgeting. Policy Note



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