



Volume 1, Issue 1
November 2025

MANTHAN: JOURNAL OF PUBLIC SECTOR AUDITING AND ACCOUNTING OF SAI INDIA



Journal of the Indian Audit & Accounts Department

**Published by
National Academy of Audit & Accounts
Shimla**



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Foreword

Comptroller and Auditor General of India



It gives me great pleasure to introduce the inaugural issue of *Manthan*: Journal of Public Sector Auditing and Accounting of Supreme Audit Institution of India. This journal is a significant step in the intellectual journey of the Indian Audit and Accounts Department, reflecting our continued commitment to advancing research, scholarship, and professional discourse in the fields of public sector auditing and accounting.

The Indian Audit and Accounts Department has always played a central role in strengthening the accountability architecture of the nation. In order to remain relevant and effective in a rapidly changing digital governance and economic landscape, it is essential that our Department not only practices excellence in audit but also contributes to the body of knowledge that underpins it. *Manthan* is envisioned as a platform where research, innovation, and academic rigour converge to strengthen our institutional capacity and broaden our impact.

The challenges before us are profound. Public resources today are deployed in increasingly complex ways—through digital platforms, public-private partnerships and welfare architectures that demand innovative oversight. To meet these challenges, we must embrace new methodologies: data-driven audits, risk-based frameworks, application of artificial intelligence, sustainability approaches for integrating environmental, social and economic goals and international best practices in accountability. Similarly, we are uniquely positioned to add significant value to the stakeholders through a meaningful analysis of the accounts of the State Governments that we maintain and various programmes of Union and State Governments.

The journal, by design, will reflect not only the intellectual contributions of officials of the Department but also of scholars, practitioners, and policymakers across India and abroad in times to come. As we launch the first issue of the journal from the National Academy of Audit of Accounts, Shimla, I wish to commend the Deputy Comptroller and Auditor General (HR, IR, Coordination & Legal), the Director General of National Academy of Audit and Accounts, the editorial board, reviewers, all contributors and members of the journal team for their dedication to this initiative. Their efforts have laid the foundation of what I believe will become a landmark publication in the years to come.

It is my earnest hope that *Manthan* will emerge as a vibrant forum for knowledge creation and dissemination, inspiring officers of the Department and scholars alike to pursue excellence in research and practice. May it help us collectively chart the course of auditing and accounting in ways that strengthen democratic governance and public trust.

A handwritten signature in black ink, appearing to read 'K. Sanjay Murthy'.

K. Sanjay Murthy
Comptroller & Auditor General of India

Message

Deputy Comptroller and Auditor General (HR, IR, Coordination & Legal)



It is with great pride that we present the Journal of Public Sector Auditing and Accounting of Supreme Audit Institution of India, in its new avatar, being published now by the National Academy of Audit and Accounts, Shimla. This journal is conceived to foster research, innovation, and academic rigour in our core domains of auditing and accounting.

I take this opportunity to express my deep gratitude to the Hon'ble Comptroller and Auditor General of India for his vision and encouragement. His emphasis on enhancing the research orientation of the Department and building expertise through training and academic work has been the guiding principle behind this initiative.

The journal will serve as a platform for disseminating new ideas, methodologies, and insights, covering areas such as performance audits, financial reporting reforms, data analytics in audits, climate and sustainability auditing, and global developments in public financial management. Each issue will provide our officers and external scholars the opportunity to contribute meaningfully to the discourse on accountability.

The first issue of *Manthan* is the result of a collaborative effort marked by peer review, external participation, and academic discipline. It exemplifies what our Department can achieve when scholarship and professional experience converge.

I warmly congratulate the Director General of the National Academy of Audit and Accounts, the editorial board, the reviewers, all contributors and members of the journal team for their commitment to bringing out this issue with quality control measures like a double-blind peer-review process and a two-stage review process. I am confident that *Manthan* will, in the years ahead, grow into a journal of repute, reflecting the intellectual strength of the Indian Audit and Accounts Department and contributing to the global body of knowledge in public audit and accounting.

A handwritten signature in blue ink, consisting of stylized initials and a long horizontal stroke.

Subramanian Krishnan Sangaran
Deputy C&AG (HR, IR, Coordination & Legal)

Desk of the Editor in Chief

Director General of National Academy of Audit and Accounts



It is with a deep sense of fulfilment and responsibility that I write this foreword for the inaugural issue of *Manthan*, the academic journal of the Indian Audit and Accounts Department, being published by the National Academy of Audit and Accounts, Shimla. The Academy, as the apex training institute of the Indian Audit and Accounts Department, has always been committed to building capacity, fostering intellectual inquiry, and shaping the professional ethos of our officers.

With the launch of *Manthan*, we seek to extend this mission into the realm of academic publishing. This initiative has been nurtured through a process of collective effort and collaboration. The adoption of double-blind peer review, the engagement of distinguished external experts as members of the editorial board, and the careful editorial oversight reflect our resolve to uphold the highest academic standards.

The name *Manthan*—symbolizing a process of rigorous churning to yield valuable insights—aptly captures the spirit in which this journal has been conceived. I wish to express my sincere gratitude to the Hon'ble Comptroller and Auditor General of India for his vision and support, and to the Deputy Comptroller and Auditor General (HR, IR, Coordination & Legal) for his guidance and encouragement throughout this endeavour.

I also extend my heartfelt thanks to the authors, reviewers, editorial board members, and the journal team at National Academy of Audit and Accounts, Shimla, whose contributions have made this journal a timely reality. Looking ahead, our aspiration is to secure ISSN registration and to seek recognition in international indexing platforms. These milestones will ensure that *Manthan* is positioned among the respected scholarly publications, thereby enriching global discourse on public sector auditing and accounting.

We hope that this journal will serve not only as a platform for the Departmental officers but also as a bridge to the wider academic and professional community. May *Manthan* grow with each issue, becoming a source of knowledge, reflection, and innovation for all those committed to strengthening public accountability.

S. Alok

S. Alok

Editor-in-Chief and Director General, National Academy of Audit and Accounts



ARTICLE 1

Natural Resource Accounting – Concept, Endeavour in its Implementation and Advantages to be Harnessed in Audit

Sudipta Biswas*

Received : 25 April 2025

Accepted : 12 November 2025

Abstract

This article highlights the initiative of the Government Accounting Standards Advisory Board (GASAB) in implementing Natural Resource Accounting (NRA) in India. It also endeavours to highlight the tables designed by GASAB and the datasets captured, and goes on to analyse the importance of these key datasets in policy framing and also their vital utility in Audit, like audit of mining receipts, Goods and Services Tax (GST) and Income Tax Audit.

Keywords

NRA, GASAB, Asset Accounts, Mineral and Energy Resources and Water Resources.

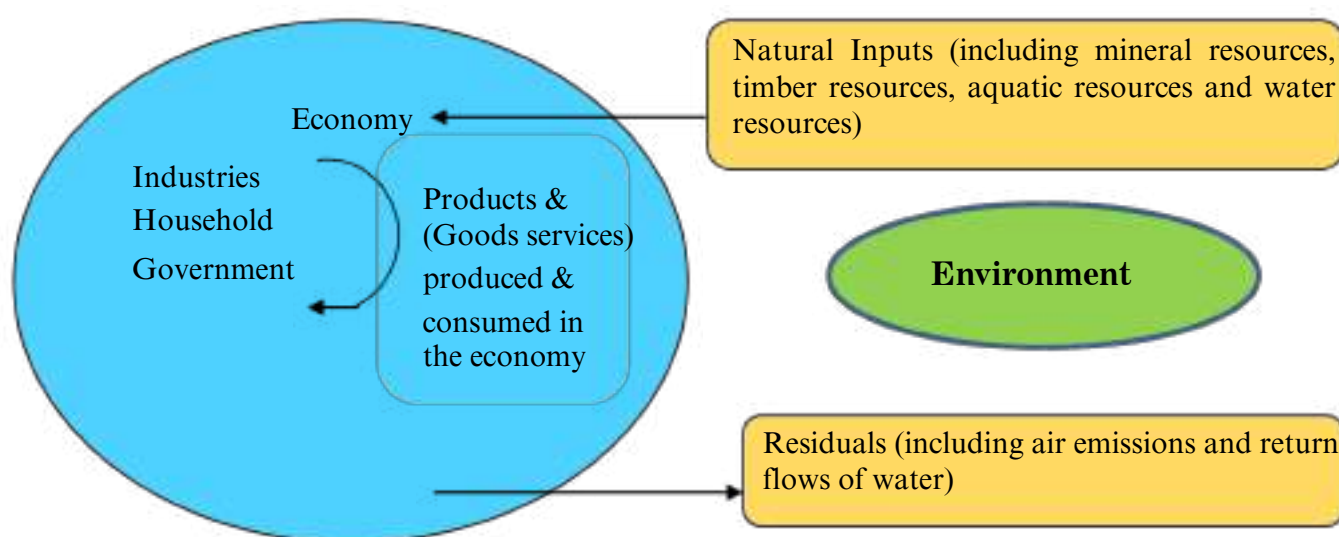
1.1 Introduction

Natural resources play a vital role in the sustainable economic development of any country and are crucial for their inbuilt value of inter-generational equity and sustenance. The rampant over-exploitation of these resources in recent times has resulted in a harmful impact on the environment, giving rise to extreme weather conditions, and issues like climate change and global warming have become a matter of discussion and deliberation around the Globe. Besides, such indiscriminate use of finite and often scarce resources or non-renewable resources has cast doubts on their availability for future generations.

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Conventional accounting captures data for measuring the economic activity only, and such economic indices do not take into account the environmental inputs and expenditure spent on mitigating environmental degradation, so that these can be reduced from the Gross Domestic Product (or commonly known as GDP) to arrive at the Green GDP as elaborated in Figure 1.1 below.

Figure 1.1 : Concept of NRA

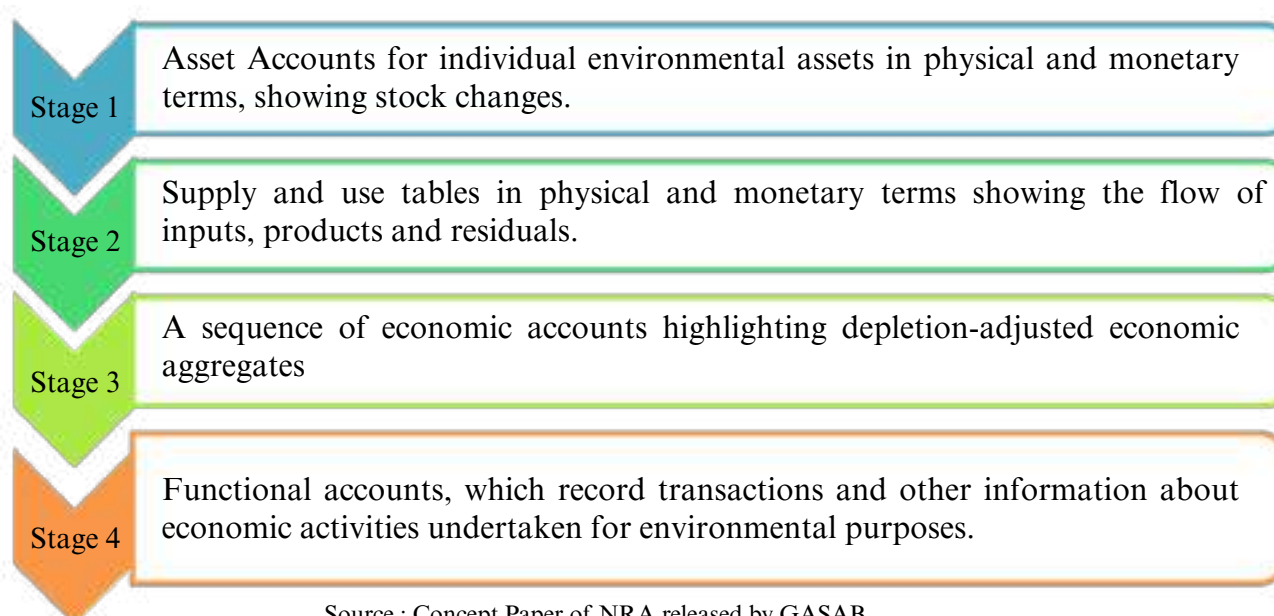


Source : Concept Paper of NRA released by GASAB

The idea is to quantify the environmental inputs of the economic development and expenditure incurred on mitigating environmental degradation due to exploitations and other activities, and embed these inputs and output-related costs while arriving at the economic parameters or the GDP to arrive at the Green GDP.

In order to overcome this shortcoming and to capture the intimate interplay between the various components of the natural environment and the economic progress of a country, the concept of NRA has emerged. It is based on the concept 'measurement of a resource leads to its better management'. The four types of accounts and tables which the System of Environmental-Economic Accounting – Central Framework (SEEA-CF) comprise of, was released in the year 2012, and has been depicted in Figure 1.2. It eases our understanding as to how the environmental-economic factors are first measured and then taken into consideration for arriving at the Green-GDP.

Figure 1.2 : Four stage implementation process of NRA



Source : Concept Paper of NRA released by GASAB

The International Organisation of Supreme Audit Organisations (INTOSAI) Working Group of Environmental Auditing (WGEA) had recommended (2010) that in countries where NRA had not been developed, the Supreme Audit Institutions needed to assist the countries in developing the framework of NRA.

Further, under the Constitution of India, C&AG of India has been given a constitutional mandate to render advice on the accounting principles, formats, standard operating procedures and guidelines for the preparation of accounts.

Simultaneous to the efforts of the UN, different developed and some developing nations attempted to draw up their environmental accounts, in which countries like Australia, Canada, France, Germany, Netherlands, Norway, UK are the frontrunners. Some of these are briefly discussed in the Table 1.1 in the following page.

In line with the suggestions of the INTOSAI Working Group, Constitutional provisions enabling the C&AG of India to render advice on forms of accounts and guidance to States on maintenance of accounts and the international experiences, the GASAB had conceptualised, initiated and implemented NRA in India. This was a challenging project as, till 2019, the country lacked a verifiable framework for the implementation of NRA, even after seven years of SEEA-CF coming into force (2012). The steps taken by GASAB towards implementing NRA in India are highlighted in Sections 1.2 to 1.10.



Table 1.1: Compendium of Asset Accounts for the year ended March 2021

Country	International experience in Natural Resource Accounting Resources involved	Time series	Level at which A/cs prepared	Periodicity	Remarks
Types of A/cs					
Australia	Mineral & Energy Resources/ Water Resources	1995-2016	National	Annual	· Follows SEEA domestic/industry water data · Self extracted water data · Expenditure on distribution
Physical & monetary accounts					
Canada	Mineral & Energy Resources	1961 - 2017	National and Provincial	Annual	· Follows SEEA · Figures added to National Balance Sheet
Physical & monetary accounts					
Netherlands	Only energy (natural gas and oil accounts)	1990-2017	National	Annual	· Follows SEEA · Government revenue parameter for monetary accounts
Physical & monetary accounts					
United Kingdom	Energy (natural gas and oil) accounts Timber and fish account	1989-2016 Monetary accounts from 2011	National	Annual	· Follows SEEA
Physical & monetary accounts					
Philippines	Only energy (select) and mineral (select) accounts		National	Annual	· Selected mineral (gold, copper, chromium and nickel) and energy (coal, oil & natural gas) accounts
Physical accounts for energy resources and both physical and monetary accounts for mineral resources					



1.2 The Concept Paper

The SEEA-CF, which is the latest internationally accepted framework of the United Nations accepted by member countries, allows flexibility in the implementation of the four-stage strategy and enables scope for embedding country-specific needs. Inspired by this, GASAB prepared a Concept Paper (July 2020) and designed a comprehensive three-term plan commencing with accounting of the finite non-renewable resources and then gradually moving towards attaining other stages of the SEEA framework, converging with the SDGs target of 2030.

The Paper also outlined the issues and challenges and the suggested ways and means to overcome them. The Paper also included tentative tables designed to capture the inputs for preparation of the Asset Accounts on various targeted resources. The importance of the private sector was also stressed in a dedicated chapter.

1.3 The Tables

Taking cue from the enabling provisions of SEEA-CF to craft the implementation process as per the country-specific needs and to enable capturing data for evidence-based decision making as well as effective auditing, GASAB designed six tables and also helped the States in filling these tables through regular monthly meetings and guidelines. The work on preparation of the Asset Accounts in the States commenced with joint efforts of the Accountants General Offices and the State Government, with the formation of State NRA Cells. Till 2019, the Ministry of Statistics and Programme Implementation had attempted to compile Asset Accounts in the shape of EnviStats, but the compilation was limited to only the stock of major minerals as appeared on the website of the Indian Bureau of Mines, that too up to 2015. While it lacked up-to-date information, it also lacked the information on minor minerals, which were under the mandate of the State Governments and the most vital aspect of NRA, i.e. compiling the stock and flow for the period of account. Thus, the effort of GASAB was a pathbreaking one as it implemented the essence of SEEA-CF into easy-to-fill-in tables to compile the stock and flow of resources.

1.4 The Compendium of Asset Accounts

GASAB's initiatives resulted in the achievement of the ambitious target of preparing the first-ever Asset Accounts on Mineral and Energy Resources in all 28 States and Union Territory of Jammu & Kashmir for the year 2020-21, released in October 2022.

The subsequent Asset Accounts for 2021-22 were also released in November 2024. These documents aim at compiling the stock, additions and extractions, providing a comprehensive view of resource availability and their usage.



In view of the SEEA framework allowing development of country specific needs, GASAB designed additional tables to capture details of sustainability of resources, bifurcation of resource-usage between Government and private, comparisons between the royalties and market prices, stock and flow of riverine resources, data on illegal mining, segregations of extraction, grade-wise production, production losses, dispatches and closing stock with run of mines and produced resources and percentage share of renewable energy generation vis-à-vis total energy requirements of the country.

1.5 Benefits of NRA

The Asset Accounts are designed to aid in evidence based decision-making and good governance by providing the following for the policy makers.

1.5.1 General

- Helping with datasets with assurance of two-stage validation – first by the administrative departments and second through a limited test check by the C&AG Field Audit Offices;
- Insights into gaps and non-compliances as brought out by limited test checks by above Audit Offices, helping the administrative ministries in plugging the loopholes and improving the systems and processes to make them fool-proof;
- Implementation of NRA in compliance with the requirements of the SEEA Framework to meet the commitment made under SDGs and monitor progress on declarations under COP 26;
- Tracking stock and flow of resources, along with their values at a glance; and
- Provide pace of exploitation to bring out the sustainability of resources - in years.

1.5.2 Mineral & Energy Resources

- Providing co-relation between the physical volumes and monetary values;
- Easing the assessment and review of royalties through comparisons between revenue vis-à-vis market value/export value;
- Enabling assessment of revenue streams for the future;
- Enabling identification of alternate resources (economic as well as energy); and
- Monitoring mining activities.

1.5.3 Water Resources

- Information on water availability, demand and usage across sectors to bring out areas of imbalance or overuse; and
- Comprehensive picture of India's water needs, challenges, and resources by integrating data from different sectors and regions.



1.6 Harnessing the Inputs Generated by NRA in Effective Auditing

On one hand, GASAB under the aegis of CAG of India has helped the country in attaining the prestigious tag of a country developing environmental accounts; on the other, the designs of the main as well as ancillary tables have rendered capturing invaluable datasets for the Audit Offices to be used in effective auditing of mineral and other resources of the country. Some instances of how the datasets being generated as part of NRA initiatives could be used in auditing are discussed in the following paragraphs.

1.7 360 Degrees Profiling of Mineral Extraction and Use

The Government of India has effected an amendment in the Mineral Conservation Development Rules in 2011 requiring all miners, transporters, stockists, end users, exporters, etc. to get registered, have a unique registration number and provide monthly reports on extraction, productions, dispatch, sale, transportation, use and exports to the Indian Bureau of Mines (IBM) as well as the State Governments.

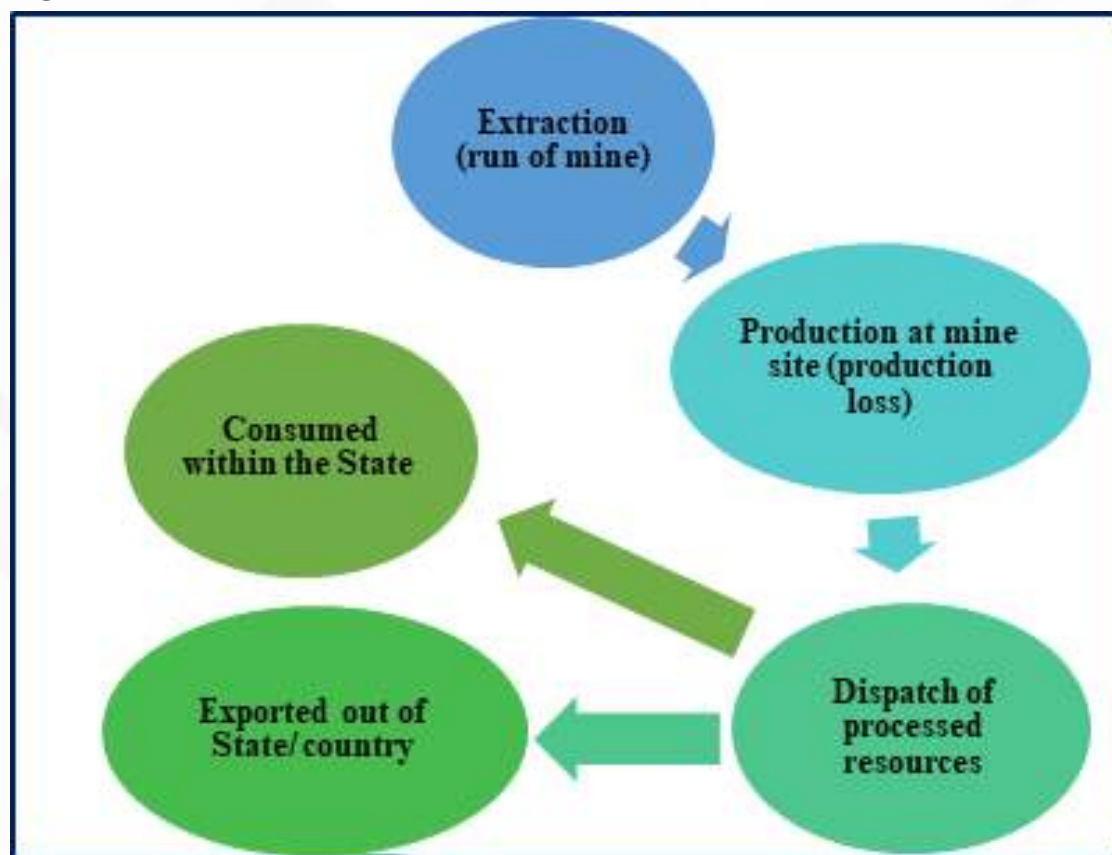
GASAB had designed the tables to capture this data. Effective implementation of a system of generating Asset Accounts on Mineral and Energy Resources in the States would aid in evidence-based good governance through a 360-degree profiling of the mineral resources from extractions till their final usage/export, as depicted in Figure 1.3. Also, through the tables, movement of minerals and levy of royalties and other taxes and duties, including GST, could be analysed by the audit teams.

1.8 Assessment of Mineral Royalties

For major minerals, royalties are calculated on an ad valorem basis on the average sale price, which is based on the grades of minerals. Again, as per the system, rates of royalties are notified by the Government of India, while the States levy and collect them. This makes it imperative to have the details of the production of grade-wise minerals and their dispatch. The Indian Bureau of Mines (IBM) has a well-defined system of month-on-month reporting, which captures comprehensive data on extraction, production, production loss, dispatch, average sale price, etc.

Collecting the datasets compiled from the monthly reports of lessees to the IBM by the State Audit offices through the Audit offices having jurisdiction over IBM would enable more effective auditing, enabling cross verification of royalty payable based on data on grade-wise productions, dispatch and average sale price, and royalties actually paid.

Figure 1.3: Movement of minerals from mine-head till destination



At present, disclosure of the average sale price (ASP) of minerals, based on which royalty is calculated, is made by the lessees, and there is no scope for independent verification of these figures. More importantly, these figures are mainly reported to IBM while the State Governments are the more interested parties as their machineries have to ascertain the royalty payable based on the correct disclosure of ASP. This is another area of potential interest to audit.

1.9 Addressing Illegal Mining

GASAB had designed a specific table for capturing the details of illegal mining detected and finalised by the State Governments. These data could provide the starting lead to the Audit teams, and then the datasets available with the IBM and the State Governments on resource sale/use by lessees, stockists, traders, end-users/exporters could be resorted to for further scrutiny of illegal mining. Some other areas which could provide vital leads for audit are:

- The inspection reports of the inspection wings of IBM, which are mandated to inspect each mine every five years. The volume of extraction found is tallied with the quantity reported, and any excess is charged with penalties. These inspection reports could be collected through the Audit Office having jurisdiction over IBM by the State Audit Offices and cross-verified during the audit of mining departments.

- The Government of India had laid down a system of raising red flags based on the inputs from satellite imageries which monitor extractions outside 500 meters of the designated mining area.
- These red flags are posted State-wise on the website of IBM/Ministry of Mines, which could be cross-verified in audit through joint inspections with the Officers of the mining department as per the existing protocol of our department.
- The mines and other areas could be independently examined through satellite data with the help of the National Remote Sensing Centre (NRSC), Indian Institute of Science (IISc) and cross-verified with the mining reported and royalties paid.
- Similarly, supply and use of resources could be cross-verified with the end-users, exporters, and user agencies to ascertain unauthorised mining and non-realisation of royalties. These datasets are being captured by IBM monthly and annually which can be obtained and analysed for audit. Figure 1.4 below shows the methodology which could be adopted for the purpose.

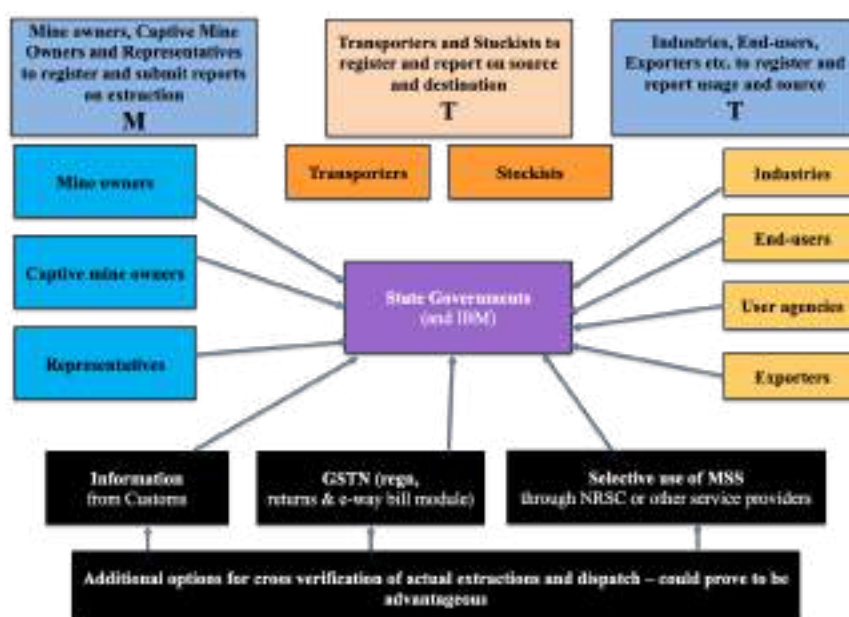


Figure 1.4: : Cross verification Concept Mapping Supply and Use of Mineral Resources

1.10 Usage of NRA Data by Other Audit Wings

While the State mining Audit teams remain the primary beneficiaries of the NRA data being captured through the Asset Accounting method led by GASAB, other receipt audits, such as GST audits or Income Tax audits, can also harness the benefits of the data generated through NRA.



Conclusion

The unique endeavour of GASAB in applying the international frameworks into country specific need based informative tables not only listed India among countries preparing their Asset Accounts periodically, but are also intended to aid in evidence-based good governance. These datasets could be leveraged by the Audit Wings for providing assurance on collection of mining receipts as well as use them in auditing the mining, GST and income tax turnover declarations and tax discharge.

Data Availability

No new data has been introduced.

Ethics Statement

This document meets the ethical guidelines and legal requirements of the country.

Funding

Not applicable

Conflict of Interest

None

Acknowledgements

GASAB.

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ARTICLE 2

Revisiting India's GDP Revisions: Methodological Changes and the Debate on Manufacturing Growth

Akash Chaudhary*

Received : 12 May 2025

Accepted : 12 November 2025

Abstract

The revision of India's GDP series with a new base year sparked considerable debate within academic, policy, and media circles. While base year revisions typically yield marginal changes in the absolute size of GDP and growth rates, the latest revision exhibited a distinctive pattern. The overall GDP size in the base year declined marginally, yet the growth rates for subsequent years, especially for 2013–14, increased significantly. This article analyses the methodological and data-related changes in the new series and explores the basis of the controversy. It highlights key sectors, the incorporation of new data sources, and expert critiques, ultimately arguing that while methodological improvements have occurred, comparability issues and data quality concerns persist.

Keywords

Financial Audit, State Government Accounts, General and Social Sector (GSS), Economic Sector (ES), Voucher Sampling, Audit Objections, Risk-Based Auditing and Audit Management Group (AMG).

2.1 Introduction: Understanding the Controversy

Revisions to GDP estimates are a routine statistical exercise intended to reflect changes in the structure of the economy and to improve accuracy using updated methodologies and datasets. Typically, such revisions lead to slight increases in the absolute size of GDP without significantly altering growth trajectories. However, the new GDP series based on the 2011–12 base year deviated from this norm. The revised series showed a marginal decline in the base year GDP size but significantly higher growth rates in subsequent years. For instance, the GDP growth for 2013–14 jumped from 4.8% in the old series to 6.2% in the new series. Manufacturing growth also recorded a substantial improvement.

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This has led to concerns, especially since macroeconomic indicators such as credit growth, investment, and exports have not reflected similar buoyancy. This mismatch has raised questions about the underlying assumptions and data sources used in the revised estimates.

2.2 Key Methodological Changes

Several notable changes were introduced in the new series. These changes not only impacted the size and growth estimates of GDP but also altered the sectoral contributions significantly. The most important modifications for our analysis of growth changes in the manufacturing and trade sector are as follows:

2.2.1 Use of MCA-21 Data for Corporate Sector

The old series relied on the Reserve Bank of India's (RBI) sample studies of approximately 2,500 companies. In contrast, the new series leveraged data from the Ministry of Corporate Affairs' (MCA) MCA-21 database, encompassing over 5.2 lakh non-financial companies. This larger, digital dataset allowed for more comprehensive coverage but introduced new challenges regarding data quality, completeness, and consistency.

2.2.2 Effective Labour Input Method for Informal Sector

The old labour input (LI) method assumed equal productivity across different worker categories. The revised series adopted the Effective Labour Input method, which assigns productivity-based weights to various categories of workers. The weights were based on the data from establishments covered in the NSS 67th round Survey on unincorporated Enterprises, 2010-11 (Table 2.1)

Table 2.1: Different Weights to Different Workers: 67th Round

Activity	Owner	Hired	Helper
Trade & Repairs	0.66	1.00	0.28
Hotels & Restaurants	0.63	1.00	0.35
Transport	0.33	1.00	0.38
Communication	0.32	1.00	0.37
Real estate & professional services	0.76	1.00	0.16
Education	1.29	1.00	0.44
Health	0.73	1.00	0.25
Other services	1.09	1.00	0.00

Source: Rajakumar and Shetty (2015)



2.2.3 Revised Estimates for the Trade Sector

Value addition in the unorganised trade sector was re-estimated using updated data from the 67th Round (2010–11) of the NSSO's employment survey, instead of relying on outdated 1999–2000 data as in the old series. The old series imputed employment growth of 2.8% annually for the unorganised trade sector between 1999–2000 and 2004–05, which significantly overstated its contribution. The new series reported a much lower annual employment growth of 0.8% for the period 2004–05 to 2011–12.

Additionally, sales tax data was incorporated into the new estimates. As a result, the gross value added (GVA) from trade and repair services fell by nearly 39.4%, and the trade sector's share in GDP declined from 15.9% to 9.7%.

2.2.4 Establishment to Enterprise based

Moreover, the new series shifted from the concept of 'establishment' to 'enterprise'. This change allowed the Central Statistics Office (CSO) to account for activities—such as marketing, logistics, and finance—conducted at head offices, particularly in large firms like Reliance. Consequently, manufacturing value added increased sharply due to this broader scope.

2.3 Implications of the Revisions

The changes in data sources and methodologies caused significant shifts in sectoral shares and absolute GDP values (Table 2.2 and Table 2.3). In the base year 2011–12:

- The absolute GDP in the new series was 2.2% lower than the old series.
- Industrial sector GDP was 18% higher in the new series.
- Services sector GDP was 14.2% lower, with trade-related activities showing a 31.5% decline.
- The industry's share in GDP rose from 27.2% to 33.1%, while the services share dropped from 54.8% to 48.6%.

These changes call into question the comparability between the old and new series. Although the methodologies are more refined, they result in a structural break, making it difficult to draw continuous time-series conclusions about growth patterns.

2.4 Expert Critiques and Concerns

Numerous experts have critiqued the assumptions and practices followed in constructing the new series. Major concerns stand out with regard to the use of the MCA-21 database:

2.4.1. Blow-Up Factors for Non-Reporting Firms

The CSO assumed that non-reporting firms contribute positively to GDP and used a blow-up factor based on paid-up capital to adjust for these firms. Critics, including former Chief Statistician Pronab Sen, argue that such assumptions lack empirical justification and could lead to overestimation.

Table 2.2: GVA at FC by Economic Activity at Current Prices (%)

Industry	2011-12	2012-13	2013-14
1. Agriculture	103.7	105.2	102.4
2. Industry	118.2	119.4	123.2
Mining & quarrying	116.5	127.3	133.4
Manufacturing	118.8	124.0	132.5
Electricity Gas, etc	149.2	139.3	121.0
Construction	111.6	104.9	105.6
3. Services	85.8	87.0	89.4
Trade, hotels, transport, etc	68.5	71.5	77.5
Finance, real estate, etc.	109.3	109.8	105.1
Public administration, etc	88.6	86.4	89.0
GVA at Factor Cost	97.8	98.7	100.1

Source: Rajakumar and Shetty (2015)

Table 2.3: Contribution of Economic Activities in GVA (%)

Sectors	Old series 2004-05	New series 2011-12
Agriculture & Allied	17.9	18.4
Industry	27.2	33.1
Mining & quarrying	2.7	3.2
Manufacturing	14.7	18.1
Electricity	1.6	2.4
Construction	8.2	9.4
Services	54.8	48.6
Trade & Repair services	15.9	9.7
Hotels & restaurants	1.5	1.1
Transport, storage & com	7.3	6.5
Financial Services	5.7	5.9
Rent Estate, public dwell	10.7	12.9
Public admin & defence	5.9	6.0
Other Services	7.8	6.5
Total GVA	100.0	100.0

Source: Rajakumar and Shetty (2015)

2.4.2 Data Quality of Corporate Returns

Experts caution that the financial returns filed by companies under MCA-21 may contain inaccuracies or inconsistencies. Without proper validation or cross-verification, using this data directly in national accounts can undermine the reliability of GDP estimates. According to the key findings of the Technical Report from the NSS 74th round survey, 16.4% of the companies registered with the MCA were either untraceable or had ceased operations, while 21.4% were found to be misclassified during field verification.



There are concerns about the proper classification of economic activities and their geographic locations within the MCA-21 database. This raises doubts about the accuracy of sector-wise and state-wise GDP figures, complicating regional economic planning.

2.4.3 Misclassification of Firms and Activities

Economist Rajeswari Sengupta has argued that the use of the Wholesale Price Index (WPI) as a deflator for the service sectors is flawed. The WPI does not capture service price changes accurately. Replacing it with sector-specific or double-deflation techniques could alter real GDP growth estimates substantially.

2.4.4 Informal Sector Estimates and the Demonetisation Puzzle

Another major critique is the treatment of the informal manufacturing sector. The assumption that its growth rate mirrors that of the formal sector is considered unrealistic. This likely led to an overestimation of growth and explains why the adverse effects of demonetisation were not captured adequately in official statistics. Research by G.C. Manna (NCAER) and others revealed large discrepancies between growth trends in the formal and informal sectors.

2.5 Conclusion: Moving Toward Better Measurement

The new GDP series incorporates methodological advances and broader data coverage, reflecting ‘best available advice’ at the time. However, it has led to a break in comparability with the previous series. The elevated growth rates in the new series could partly be due to methodology and not necessarily real economic acceleration.

While the new methods represent progress, issues regarding data quality, sectoral classification, and assumptions—especially for the informal sector—remain. It is evident that India is still transitioning toward full adoption of the international standards outlined in the System of National Accounts (SNA) 2008.

Going forward, a robust debate on statistical assumptions and regular improvements in data collection—especially in unorganised sectors—will be crucial. CSO must prioritise the validity, timeliness, and consistency of national statistics to ensure that future GDP revisions offer not only precision but also credibility. Transparent documentation and wider consultations with academic experts can strengthen the integrity of India’s national accounts system.



Data Availability

There are no new data associated with this article.

Ethics Statement

This research met the ethical guidelines and legal requirements of the country in which it was performed.

Funding

Not applicable

Conflict of Interest

Not applicable

Acknowledgments

IA&AS Officers providing guidance in the field.

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ARTICLE 3

Lack of Uniformity among States in Collection of Royalty on Minor Minerals

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Received : 9 May 2025

Accepted : 12 November 2025

Abstract

The Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act, 1957) is the key act for regulating the mineral sector in the country. Under the MMDR Act, 1957, minerals of the country are broadly classified into two groups: the major and minor minerals. Under the federal structure, States have the power to levy royalties on minor minerals. Using these powers, some States abysmally reduced the royalty rates of some of the important minerals, which were relisted from major to minor minerals in 2015. This, while enabling the lessees in these States windfall gains, also led to distortion in the royalty rates/resultant sale values of minerals as they reach the industries and also disturbed the level playing field amongst the lessees of minerals and suppliers in mineral-rich states. Most crucially, these defeated the overall notion of moving towards - one nation – one market - uniform tax and pricing.

Keywords

MMDR Act, 1957; Major Minerals; Minor Minerals; Goods and Services Tax (GST): Monthly reports under The Mines and Minerals (Regulation and Development) Act (1957); National mineral inventory and Indian Bureau of Mines (IBM).

3.1 Introduction

The Mines and Minerals (Development and Regulation) Act, 1957, as amended from time to time, is an umbrella Act for the regulation of the mineral sector in the country. All subsequent Rules enacted by the Central Government or States are governed by the MMDR Act. The Act gives enormous powers to the Union Government to control, monitor and manage mineral resources across the country, including classifying minerals as major and minor and also the scope for deciding the royalty rates. Again, under the federal structure, the Constitution of India empowers the States to tax mineral rights as enumerated in the State List and the Union Government has regulatory power to oversee it. Besides, the State are empower-

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-ed to collect royalties on the dispatch of all minerals, both major and minor, from mines within their territory. These complex Centre-State relationships, when it comes to managing the most vital backbone of economic progress, needs to be streamlined to ensure continuous dialogue and decisions in the national interest. The Ministry of Mines, having overall jurisdiction on the mineral management in the country, could consider a coordination system similar to the lines of GST wherein the GST Council represents the States. More so, because minerals are the backbone of our industries and thus, like GST, there is a need that the value of minerals, including royalties, is kept within a range. On the other hand, it shall also be ensured that a fixed range of pricing of minerals is there when it reaches the industries.

The Goods and Services Tax system in the country with overall control with the CBIC and GST council representing the States is a unique arrangement ensuring Centre-State coordination in GST related affairs.

3.2 Examples of Contention

Some examples of fragmented coordination between the Centre and States, and also States acting as disparate silo when deciding on the royalty of nationally important minerals – thus highlighting the need for more effective coordination and closer collaborations between the Centre and the States are discussed below:

The Ministry of Mines notified (10 February 2015) 31 minerals as minor minerals which were hitherto under the category of major minerals [1]. Prior to their re-classification as minor minerals from major minerals, the above 31 minerals attracted royalty collections at ad-valorem rates ranging between 4 and 20 per cent of the average sale price. Ad-valorem pricing is a system of collecting royalties at a prescribed percentage of the prevailing value of minerals. But for some instances of suppression of sale prices by the lessees, this mechanism ensures that the States continue to get their fair share of royalties at the prescribed percentage of the dynamic value, which increases or decreases as per the market demand and supply. This system largely does away with the need for periodic review of royalty rates to match them with the prevalent market rates.

However, an analysis of four major mineral-rich States vis-à-vis a sample of minerals out of the 31 minerals re-listed as minor minerals by the Central Government in 2015 would indicate that using the powers conferred under the Constitution of India and the MMDR Act, which enabled the States to decide on the rates of royalties for the minor minerals, two sampled States abysmally reduced the rates of royalties, converting them into flat rates instead of dynamic ad-valorem rates prevalent hitherto, as shown

[1] (i) Agate; (ii) Ball Clay; (iii) Barytes; (iv) Calcareous Sand; (v) Calcite; (vi) Chalk; (vii) China Clay; (viii) Clay (Others); (ix) Corundum; (x) Diaspore; (xi) Dolomite; (xii) Dunite or pyroxenite; (xiii) Felsite; (xiv) Feldspar; (xv) Fireclay; (xvi) Fuchsite Quartzite; (xvii) Gypsum; (xviii) Jasper; (xix) Kaolin; (xx) Laterite; (xxi) Limekankar; (xxii) Mica; (xxiii) Ochre; (xxiv) Pyrophyllite; (xxv) Quartz; (xxvi) Quartzite; (xxvii) Sand (Others); (xxviii) Shale; (xxix) Silica Sand; (xxx) Slate; and (xxxi) Steatite or Talc or Soapstone.

**Table 3.1 Variations between States in fixing royalties on Minor Minerals**

Name of mineral	Royalty before February 2015	Royalty fixed after classification as Minor Mineral			
		Odisha	Karnataka	Gujarat	Jharkhand
Agate	10% of sale price	12% of sale price	₹300/ton	₹100/ton	12% of sale price
Ball Clay	10% of sale price	8/12% of sale price	₹80-600/ton	₹60/ton	
Barytes	5.5% of sale price	6.5% of sale price	₹200-400/ton	₹45/ton	6.5% of sale price
Calcite	15% of sale price	15% of sale price	₹80/ton	₹60/ton	15% of sale price
Felspar	12% of sale price	15% of sale price	₹100/ton	₹40/ton	15% of sale price
Fire clay	12% of sale price	12% of sale price	₹80-600/ton	₹45/ton	12% of sale price
Gypsum	20% of sale price	12% of sale price	₹150/ton	₹45/ton	20% of sale price

in Table 3.1. Thus, Odisha and Jharkhand continued with the ad-valorem system (levied on these minerals by the Central Government when these were major minerals) even after the minerals were notified as minor minerals. However, States like Karnataka and Gujarat changed the mechanism for the levy of royalties from the erstwhile ad-valorem system to a flat rate basis. The result is as follows:

Considering the market prices of one of the sampled minerals, namely barytes, during 2022, as available on the website, i.e. ₹5,225 to ₹6,691 per ton, averaging ₹5,958 per ton, the rates of royalties at ad-valorem rates levied in Odisha and Jharkhand would be ₹387 per ton @ 6.5 per cent. Against this, while Karnataka has fixed the flat rate of royalty ranging between ₹200 and ₹400, Gujarat has further lowered it and fixed it at ₹45 per ton. Thus, the miners/resellers of the minerals in the States of Gujarat and Karnataka will have an edge in getting windfall gains as well as pricing it differently for sale to industries when compared to the miners/resellers of States like Jharkhand and Odisha and other States where royalties are charged on ad-valorem rates on similar minerals. This will amount to a distortion in prices of the minerals and defeat the purpose of uniform floor rates across the country on which the GST mechanism hinges. Also, Gujarat and Karnataka will be losing on revenues due to the change to fixed rates instead of ad-valorem pricing, which would be dynamic and ensure that a share of the prevalent market prices is shared with the State Governments by the miners, which is the basic premise of the royalty mechanism.

More importantly, owing to the reduced prices being offered by the lessees/suppliers of the minerals from these States on the said minerals, the industries may tilt towards the suppliers from these States, thus, disadvantaging the suppliers of other States using ad-valorem system of levy on one hand and putting additional ecological pressure on the former States due to possible excessive mining to meet the hiked demand.

Another important area needing attention is the collection and collation of data regarding the availability, extraction, production, dispatch and use/export of minor minerals. The Indian Bureau of Mines (IBM) under the Ministry of Mines obtains monthly and annual reports from the lessees of major minerals across the country. The reports provide information about the lease and lessee details, extraction/production/dispatch of minerals with their grades, volume and invoice values, along with the recipient. Similarly, the stockists, traders, end-users and exporters are also required to mandatorily submit monthly and annual reports to the IBM showing the receipt and further sale/use/export of major minerals with details of minerals, their grades, volume, value and the recipients/sellers. This is a fool-proof mechanism provided under the MMDR Act, which enables a scope for end-to-end mapping of the major minerals from the mine head till the end-use/export out of the territory. The Figure 3.1 attempts to bring out the system more emphatically:

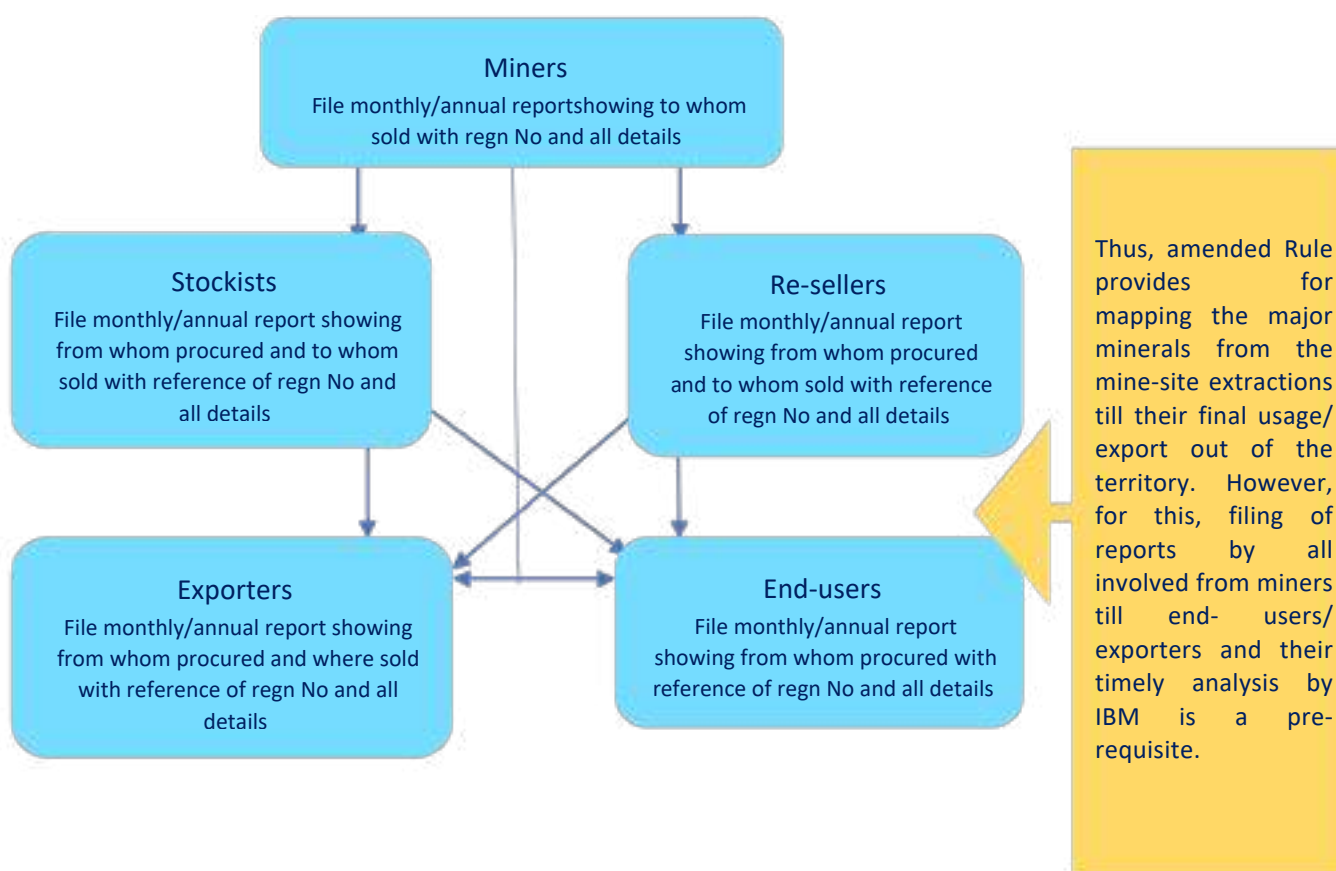


Figure 3.1 Mapping of Major Minerals from Mine-Head till the End-use



However, though the minor minerals are equally strategic for the nation, a similar system of collection and collation of data regarding their availability, extraction, production, dispatch with volume, grades, value, etc, is largely missing, though some of the States are claiming to have a system of collecting and collating the data. Since the commencement of implementation of National Resource Accounting (NRA) initiatives, the Government Accounting Standards Advisory Board (GASAB) has been impressing upon the States to implement a similar reporting methodology like that available for the major minerals under the MMDR Act as discussed above, and though there are States which have agreed to do so in principle, the situation is still not very encouraging on the ground. Even though the States have started collecting and collating the data, these are largely scattered, consolidated in different formats and platforms, thus defeating any endeavour of compiling a national database on a real-time basis.

Status of implementation of NRA in States is available on the website of GASAB (www.gasab.gov.in).

3.3 Conclusion

As the major as well as minor minerals are all national wealth and are placed under different categories only to provide States more say on the mineral management within their territory, the overall mandate and responsibility for control and management of these resources rests with the Central Government. There is a need for mandating a uniform method of setting royalties and reporting mechanism for minor minerals similar to those available for major minerals. A collation at the national level to provide a real-time dataset for major as well as minor minerals in the country in the shape of a national mineral Asset Accounts, as endeavoured by the GASAB, for helping policy decisions by the Legislatures and Executives and information to the public at large, would be useful.

Data Availability

No new data has been introduced.

Ethics Statement

This document meets the ethical guidelines and legal requirements of the country.

Funding

Not applicable

Conflict of Interest

None

Acknowledgements

None



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ARTICLE 4

Passenger and Public Safety in the Indian Railways System: An Analysis of Unaccounted Railway-Related Deaths in India

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Received : 2 June 2025

Accepted : 12 November 2025

Abstract

There have been significant technological advancements in Indian Railways during the past couple of decades, accompanied by a substantial increase in both passenger and goods traffic. The number of accidents has been generally declining over the years, even though there has been an increase in serious accidents involving an increased number of deaths and casualties in the recent past. Despite the significant media attention railway accidents attract, statistically, trains remain one of the safest modes of travel when statistics accepted and reported by Indian Railways in isolated incidents of railway accidents are considered. Indian Railways marked history by zero accident deaths from operational reasons in 2019-20 and 2020-21. However, the actual railway-related deaths numbered in tens of thousands every year, as per the National Crime Record Bureau (NCRB) statistics on railway-related accident deaths. This study attempts to explore the stark contrast between official accident statistics reported by Indian Railways and those published by the NCRB and the reasons for such disparity. Tens of thousands of lives lost each year due to falls, trespassing, and being run over are routinely dismissed as instances of public negligence and law and order issues, where the railway disclaims any responsibility.

The loss of precious lives is not examined as systemic failures, and no preventive actions are taken. This study aims to make a case for broadening the audit scope of the Supreme Audit Institution to include this under-examined area where thousands of lives are lost annually.

Keywords

Indian Railways, Railway Accident, Accident Deaths, Traffic Accident Consequential train accidents, Train related deaths, National Crime record Bureau (NCRB) and Commissioner of Railway Safety.

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4.1 Introduction

The Indian Railways is one of the world's largest railways. It functions as a single system with around 68,000 route km of track, More than 21,000 trains ply carrying millions of passengers besides hauling millions of tonnes of freight every day, traversing across the length and breadth of the country (C&AG of India Report No 22 of 2022).

There has been a significant increase in traffic and technological advancement in railways during the past couple of decades. Conversion of meter gauge to broad gauge, doubling of important routes, massive electrification, conversion to safer LHB (Linke-Hofmann-Busch, of German origin) coaches, which are technologically superior with features like Anti-climbing arrangement, introduction of new Vande Bharat Trains, recent capital investment in railway amenities changing the look and feel of railway stations, etc., are contributing to changing the face of Indian Railways (Indian Railways, Annual Report, 2023-24). The production units of Indian Railways are not producing old Integral Coach Factory (ICF) coaches anymore, and trains operating with conventional ICF coaches are getting replaced by safer LHB coaches.

Safety in railway operations is critically important as it directly impacts human lives, economic stability, and public trust in one of the world's largest railway networks, which carries billions of passengers annually. Accidents tarnish the image of the organization and question the safe working procedures of railways.

4.2 Railway Safety And Consequential Railway Accidents

The Indian Railways accident manual defines that accident is an occurrence in the course of working of railway which does or may affect the safety of the Railway, its engine, rolling stock, permanent way and works, fixed installations, passengers or railway servant or which affect the safety of others, or which does or may cause delay to train or loss to the Railway (Indian Railways Accident Manual 2012, Page 18).

The Indian Railways has witnessed a declining trend of consequential accidents over the past couple of decades from around 473 in 2000-01 to 40 in 2023-24 as shown below (Figure 4.1).

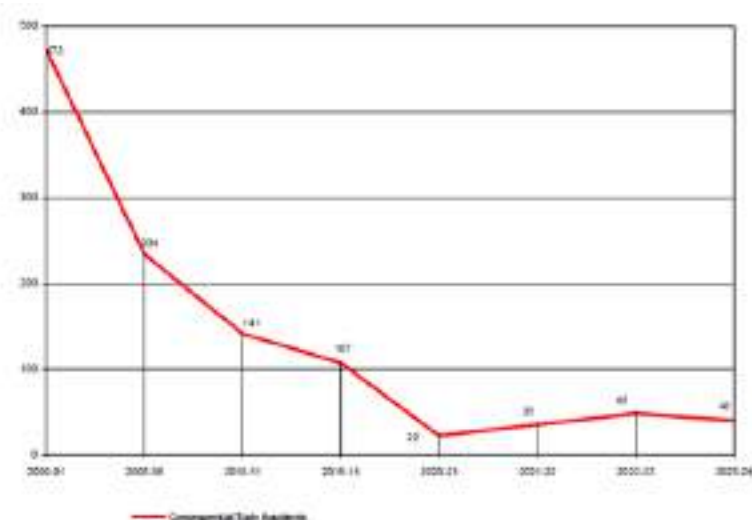


Figure 4.1 Accidents in Indian Railways
Source: Annual Report 2023-24, 55



Technological advancements have helped railways to reduce the number of accidents. Despite the decline in statistics of number of accidents, there has been an increase in very serious consequential accidents and spike in accident death and injuries in the recent past including one of the deadliest accidents in the history of Railways which happened in Balasore of Orissa which took lives of more than 300 people and injured more than 600 (The Times of India, 30-Sep 2024; The Hindu, 1-Aug- 2024). Every serious railway accident is followed by an enquiry by the Commission of Railway Safety. The Commission of Railway Safety (CRS) is responsible for inquiring into major accidents involving casualties and submitting reports, and providing advisory recommendations to improve safety (Commissioner of Railway Safety). The CRS is a government body headed by the Chief Commissioner of Railway Safety (CCRS), functioning under the Ministry of Civil Aviation, ensuring independence from the Railway Administration. The CCRS is assisted by various Deputy Commissioners of Railway Safety (Dy CRS) and Commissioners of Railway Safety (CRS) with different jurisdictions of one or more zonal railways (Commissioner of Railway Safety, Organizational Tree).

The Comptroller and Auditor General of India released a report in 2022 titled “Derailments in Indian Railways”, which audited the safety measures and shortcomings related to consequential accidents (primarily derailments) in Indian Railways from April 2017 to March 2021. C&AG recommended various measures to improve train safety, such as adherence to enquiry timelines, strengthened monitoring mechanism, effective utilization of Rashtriya Rail Sanraksha Kosh’ (RRSK) Funds, etc. (C&AG of India, Performance Audit Report No 22 of 2022 on Derailments in IR 2022, Page-10).

4.3 How Safe Are Railways? A Statistical View

Despite the significant media attention railway accidents attract, trains remain one of the safest modes of travel. They are operated professionally by trained employees who strictly adhere to operational rules. Unlike road vehicle drivers, whose behavioural errors often contribute to accidents, railway employees are accountable for safe operation with stringent checks and balances, which ensure all safety rules are complied with. The safe and stable design of conically profiled rail wheels having a self-centring mechanism while moving over the iron rails prevents the train from derailment, even when a considerable disrupting force, sliding away, is applied (Rail Profile) Every accident, including minor incidents with no casualties or property damage (Indicative Accidents), is thoroughly investigated. Measures are implemented to prevent future occurrences, including updates to safety protocols and modifications to operational equipment.

The statistics of Railway Accident deaths shown in Table 4.1 corroborate the above fact, as the numbers are very meagre when compared to the total traffic accident deaths in India published by the National Crime Record Bureau (NCRB). As per NCRB, there were 1.94 lakh traffic accident deaths in India in 2022 (NCRB Report on Accidents and Suicides in India, 2022).

**Table 4.1 Statistics on Railway Accident Deaths [1]**

YEAR	Number of Consequential Train Accidents	Number of Passengers Killed	Number of Railway Personnel Killed	Others Killed due to other than operational failures	Total Accidental Deaths as per Railway Claim
2014-15	131	118	6	168	292
2015-16	106	40	2	80	122
2016-17	103	195	3	40	238
2017-18	72	29	2	27	58
2018-19	59	16	1	20	37
2019-20	54	0	4	1	5
2020-21	21	0	1	3	4
2021-22	34	9	3	5	17
2022-23	48	1	-	3	4
2023-24	40	322	-	9	331
TOTAL	668	730	22	356	1108

As per the latest report on traffic accidents published by the NCRB in 2022, the average accident death per 100 KM of National Highway is 45, whereas the same is 23 on State Highways. The average deaths per 100 Route Kilometre of the Indian Railways stand at a mere 0.005 deaths for the same year (National Crime Records Bureau, Accidental Deaths & Suicides in India 2022) The number of train accidents per million train kilometres for the year 2023-24 is also meagre at 0.03 (Indian Railways, Annual Report 2023-24, page 17). These statistics prove that railway travel is much safer compared to National Highways.

The Indian Railways, first time in history, recorded zero accident deaths from consequential rail accidents in 2019-20 and continued to mark zero deaths in 2020-21 also (Commissioner of Railway Safety, Annual Reports). This essay does not enquire into the issue of the consequential accidents which are dealt with by the Railways with the utmost seriousness. But it tries to address the issue of railway-related deaths outside the statistics of Indian Railways and for which the Railways has no monitoring system in place.

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4.4 The Overlooked Reality: NCRB Statistics On Railway-Related Fatalities

The statistics on railway-related accident deaths published by the NCRB gives us a very different picture of the safety of railway passengers. A comparison of statistics of railway-related deaths by NCRB with the statistics of railways shows an alarming disparity. While a mere 1108 accident deaths are reported by Indian Railways during the last 10 years up to 2023-24 (the period up to the Annual report of CCRS published), the NCRB reports 2,44,047 deaths for a similar 10-year period as detailed in Table 4.2. This is a whopping 220-fold figure that Railways claims.

Table 4.2: Fatalities from Rail Accidents in India (2013-22)

Year*	Other Rail Accidents	Level Cross Accidents	Total
2013	27,765	1,318	29,083
2014	25,006	2,575	27,581
2015	26,066	2,65	28,716
2016	22,97	3,133	26,103
2017	23,959	1,534	25,493
2018	24,545	1,507	26,052
2019	24,619	1,762	26,381
2020	11,968	1,185	13,153
2021	16,431	1,807	18,238
2022	20,792	2,455	23,247
TOTAL	224,121	19,926	244,047

Source: National Crime Record Bureau, Accidents and Suicides in India 2017.
and National Crime Record Bureau, Accidental Deaths & Suicides in India 2022.

4.5 Why Disparity?

The significant disparity between the railway-related accident death statistics reported by the Indian Railways (1,108 deaths over the last 10 years from 2014-15 to 2023-24) and the NCRB (2,44,047 deaths over the 10 years from 2013 to 2022) stems from differences in definitions, methodologies on how Indian Railways identifies Accidents.

Indian Railways primarily reports "consequential train accidents," which include incidents like collisions, derailments, fires, level-crossing accidents, and other events that result in significant damage to railway property, disruption of rail traffic, or loss of life/injury to passengers (Indian Railways Accident Manual 2012, page 20). These statistics typically focus on the deaths of passengers or railway staff directly involved in train accidents. Deaths caused by falling off trains, trespassing, or suicides are excluded from these figures unless they occur during a consequential accident.



4.6 Accidents: The Indian Railways Perspective

For statistical purposes, accidents have been classified in categories from “A” to “R”, excluding “I” and “O”. There are different types of accidents, such as consequential accidents, indicative accidents, equipment failure and unusual incidents. The broad classification is as detailed in Table 4.3 (Indian Railways Accident Manual 2012, Pages 27-31).

The Railways Accident manual defines serious accidents as an accident to a train carrying passengers which is attended with loss of life or with grievous hurt to a passenger or passengers in the train, or with serious damage to railway property of the value exceeding ₹2 crore and any other accident which, in the opinion of the Commissioner of Railway Safety requires the holding of an inquiry by the Commissioner of Railway Safety (Indian Railways Accident Manual 2012, page 19). However, the cases of injuries or deaths of passengers or the public while trespassing on the track are considered mere carelessness on their part and need not be investigated by CRS. The accidents involving death or injury to a railway servant in a similar way are also not considered accidents to be investigated. These cases are considered by railways as mere law and order cases outside their ambit.

Thus, the railway-related accidents we read daily in the newspaper are those mere “unusual incidents” as far as the Indian Railways is concerned. The Indian Railways considers the same as mere law and order issues and categorically excludes all these thousands of deaths every year from the responsibility and statistics of the railways. While high-profile accidents like Balasore derailment, which took around 300 lives, appear on headlines for weeks, more than 600 daily deaths are relegated to a one-column mention on the regional pages of newspapers or in the obituary section, fading into oblivion.

Unfortunately, many of these deaths are caused by the non-awareness of public at large on the functioning of trains. There have been numerous incidents where unaware passengers, having boarded the wrong train, attempt to deboard after it has started moving, only to slip and fall between the train and the platform. Passengers waiting for other trains are sometimes caught off guard and fatally struck by these fast-moving trains. The lack of basic amenities such as water and tea on board has also led passengers to get off at intermediate stations, where halts may last only for one to two minutes. In their attempt to reboard moving trains, many have met with fatal accidents. While the newly produced LHB coaches have advanced safety features preventing derailments and, in the case of derailment, preventing injuries and casualties, the trains have no automatic doors despite being designed to achieve a speed of 160 Km/h. Furthermore, unfenced railway tracks that pass through densely populated cities and villages while trains continue to speed at 130 km/h to 160 km/h pose a serious and constant danger to the public. These limitations and causes of thousands of deaths are never systematically studied, and hence, no preventive measures are taken. No serious investigation into the root causes of such many avoidable deaths is made, without which there is a huge chance of an increase in train-related fatalities as tracks are being moderni-

sed and train speed is increasing. According to NCRB report, the leading causes of train-related deaths are people falling from trains and being run over (National Crime Record Bureau, Accidental Deaths & Suicides in India 2022, page 12).

Table 4.3: Classification of Railway Accidents in India

Type of Accident	Accident Code	Accident Type
CONSEQUENTIAL TRAIN ACCIDENTS		
<i>Consequential train accidents include train accidents having serious repercussion in terms of loss of human life, human injury, loss to railway property or interruption to rail traffic. Train accident under following classification will be termed as consequential train accidents.</i>	A	Collision
	B	Fire
	C	Level Crossing
	D	Derailment
	E	Miscellaneous
OTHER ACCIDENTS		
Other train accidents: All other accidents which are not covered under the definitions of consequential train accidents are to be treated as “other train accidents”. Indicative Accidents, Equipment Failure and Unusual incidents are Other train accidents.		
Yard Accidents: All accidents that take place in a yard and does not involve a train are termed as Yard Accidents.		
1. Indicative Accidents: In real term they are not accidents but are serious potential hazards and include ‘F’, ‘G’ and ‘H’. Indicative accidents reveals out serious human error/equipment failure though didn’t end up in loss of railway property or casualties as prevented.	F	Averted Collision
	G	Breach of Block Rule
	H	Signal Passing at danger(Red)
2. Equipment Failure: These include all failure of railway equipment. Equipment failure may become reasons for consequential accidents.	J	Rolling Stock
	K	Permanent Way
	L	Overhead Wire
	M	Signaling and telecommunication equipment
3. Unusual incidents: These include cases related to law and order but not resulting into train accidents and other incidents under classification ‘N’, ‘P’, ‘Q’ and ‘R’.	N	Train Wrecking or Sabotage to a train
	P	Casualties
	Q	Other Incidents
	R	Miscellaneous

Despite this, Indian Railways disclaims the responsibility and categorizes these fatalities as the result of passenger negligence or failure to follow rules. When we take NCRB Statistics on railway-related fatalities into account, the safety of railway passengers falls drastically, as shown in Figure 4.2 below.

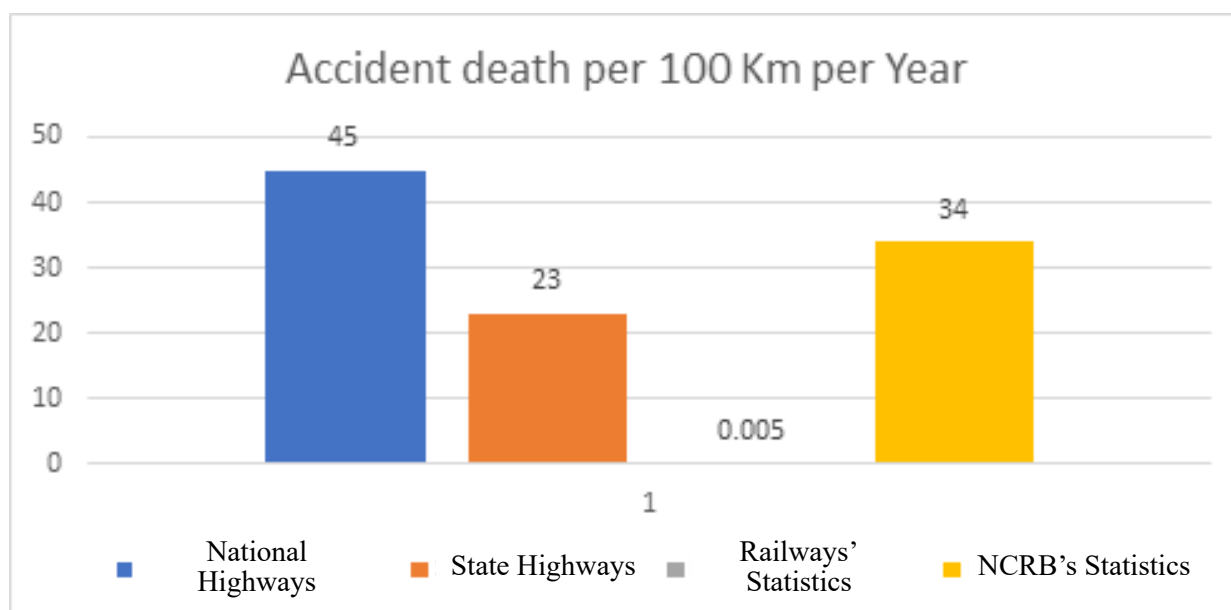


Figure 4.2 Deaths per 100 KM/year in Indian Railways vis-a-vis Highways

As shown above, inclusion of NCRB statistics makes railways less safe than travelling on State Highway [2].

4.7 Conclusion and Role of Supreme Audit Institution

Indian Railways is the lifeline of this vast country, providing cheap and safe transportation and has made commendable achievements in modernisation and reduction of accidents over the years. However, a vast and troubling segment of railway-related fatalities remains unaddressed. The stark disparity between the deaths reported by Indian Railways and those recorded by the National Crime Records Bureau reveals a critical gap in safety accountability and transparency. Tens of thousands of lives lost each year due to falls, trespassing, and being run over are routinely dismissed as instances of public negligence, rather than being examined as systemic failures that demand preventive action.

The C&AG of India, being the Supreme Audit institution, can initiate performance audits that go beyond operational accidents and examine deaths caused by falls, trespassing, and run-over cases. These deaths, though not currently categorized under "consequential accidents," represent a significant public safety

[2] While NCRB reports statistics of accident deaths per 100Km on National and State Highways, there are no such statistics for Railways. The figure 34 is arrived at by dividing the total railway-related accident deaths by the total Route Km of Indian Railways in 100s.



failure, especially when basic measures such as fencing, warnings for non-stopping trains, and passenger awareness mechanisms are inadequate. C&AG had commented in audit reports on flaws in utilization of Rashtriya Rail Sanraksha Kosh' (RRSK) Fund. The scope of RRSK may be expanded to include the safety of passengers and the public.

The Indian Railways' primary responsibility is running trains with safety and punctuality, and it has inherent limitations in enforcing law and order and safety rules for the public at large. Collaboration among the Railways, the Government of India and State Governments is imperative to have a comprehensive oversight and a commitment to prevent all railway-related fatalities and transform the organization into a truly safe, accountable, and humane transport system for the nation.

Data Availability

No new data introduced

Ethics Statement

No violation declared

Funding

Not applicable

Conflict of Interest

None

Acknowledgements

None

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ARTICLE 5

Devolution Beyond Declarations: A Critical Review of Functional Transfer under the Performance Audit of the Implementation on 73rd Constitutional Amendment in Karnataka

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Dhirendra Kumar Shrivastava**

Received : 12 May 2025

Accepted : 12 November 2025

Abstract

This study critically examines the extent and effectiveness of functional devolution to Panchayati Raj Institutions (PRIs) in Karnataka as mandated under the 73rd Constitutional Amendment Act, 1992. The primary objective is to assess whether the transfer of functions, funds, and functionaries to the three-tier PRIs has translated into meaningful decentralization at the grassroots level. The article is based on a performance audit by the CAG of India in Karnataka using a document-based review and quantitative analysis of functional devolution indicators. It uniquely leveraged Voucher Level Compilation (VLC) data to trace fund flows to PRIs, supported by Budget Link Documents. Mid-term consultations with the State Government and review by the Headquarters ensured methodological rigour and transparency.

The audit revealed that while the State has made statutory provisions for functional devolution, actual implementation remains limited and fragmented. Key findings include partial and uneven transfer of functions across departments, lack of clarity in activity mapping, inadequate deployment of staff to PRIs and weak institutional mechanisms for monitoring and accountability. Instances of duplication, underutilization of funds, and centralization tendencies were also observed. The study concludes that the promise of the 73rd Amendment remains unfulfilled in practice due to systemic and administrative constraints. Strengthening institutional mechanisms, ensuring clear functional jurisdiction, and enhancing the capacity and autonomy of PRIs are essential to realize the goals of democratic decentralization.

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Keywords

73rd Constitutional Amendment, Panchayati Raj Institutions, Functional Devolution, Performance Audit, Karnataka, Decentralization and Rural Governance.

5.1 Introduction

Karnataka was among the first states to institutionalize the mandate of the 73rd Constitutional Amendment Act (CAA) through the Karnataka Panchayat Raj Act, 1993, signalling a progressive stance toward grassroots democracy. On paper, the State devolved functions, funds, and functionaries to Panchayati Raj Institutions (PRIs) across three tiers. However, the real test lay not in legislative compliance but in the actual transfer of governance responsibilities from the State to local bodies — as envisaged in the Eleventh Schedule of the Constitution.

5.1.1 Necessity for Functional Devolution

Functional devolution is essential for strengthening service delivery and deepening democratic participation at the grassroots. The transfer of responsibilities to PRIs directly affects the efficiency and accountability of core services such as health care, water supply, and elementary education. When PRIs are empowered with clear functions, adequate funds, and trained functionaries, local governments are better positioned to respond to citizens' needs in a timely and inclusive manner. This aligns with the vision of the 73rd Constitutional Amendment as well as with Sustainable Development Goal (SDG) 16.7, which emphasizes responsive, inclusive, participatory, and representative decision-making at all levels.

Considering the significance, a performance audit conducted by the Comptroller and Auditor General (CAG) of India examined whether the devolution of the 29 functions to the PRIs had meaningfully taken place in the State of Karnataka. This article delves into the extent, authenticity, and innovation of this devolution process in Karnataka.

The field audit, designed and led by the authors, sought to go beyond formal compliance to assess the real empowerment of local governments.

5.1.2 Comparative Angle

Karnataka presents an important case study in this regard. Despite being one of India's most economically and administratively advanced states, significant gaps remain in the actual transfer of functions, funds, and functionaries to PRIs. These shortcomings highlight that even relatively well-governed states struggle to implement the spirit of decentralization in practice. The Karnataka experience, therefore, offers valuable insights into the broader systemic challenges of functional devolution across India, where overlapping jurisdiction, fragmented accountability, and weak institutional mechanisms continue to constrain the effectiveness of local self-governance.



5.2 Devolution of Functions: Unpacking the Audit Lens

While the State notified that all 29 functions under the Eleventh Schedule were “devolved,” the audit sought to verify actual implementation. The audit moved beyond checklists and declarations by innovating a Functionality Framework, built on four measurable indicators:

1. Transfer of Budgetary Allocation
2. Transfer of Functionaries
3. Operational Guidelines/Rules
4. Implementation Autonomy

In evaluating the 'Transfer of Budgetary Allocation,' the audit closely examined the financial routing mechanisms by analysing the Head of Account structure of Government Accounting System (six tier 15-digit classification). Under the Karnataka local self- government, the Rural Development and Panchayat Raj (RDPR) Department is allocated scheme-wise funds through Minor Heads 196 (Grama Panchayats), 197 (Taluk Panchayats), and 198 (Zilla Panchayats).

The rest of the transactions under minor head other than 196, 197 and 198 are carried out by the State Sector. This approach allowed for a more nuanced and institutional assessment of fiscal devolution, connecting intent with traceable financial implementation which revealed that the devolved functions are not exclusive to PRIs and largely executed by State Sectors.

This four-fold matrix was applied to all 29 functions including high-stakes sectors such as health, education, agriculture, and water supply.

5.2.1 Audit Model and Feedback

In a marked departure from traditional audit methodologies that rely heavily on departmental disclosures and self-reported data, this performance audit extensively leveraged the Voucher Level Compilation (VLC) data — a granular, system-generated dataset from the Government’s accounting system. By mining VLC data, audit was able to independently trace fund flows down to the scheme and PRI level, using actual expenditure entries linked to Major and Minor Heads. To complement this analysis, the Budget Link Document for the three-tier government was also examined to contextualize allocations across Grama, Taluk, and Zilla Panchayats. This combined approach not only strengthened objectivity but also enabled quantitative validation of the claimed devolution. It stands out as a classic example of applying accounting knowledge for performance auditing, where the audit team harnessed the structure and integrity of the treasury accounting system to draw systemic insights and uncover gaps that would have remained obscured under conventional audit models.



Beyond the standard Entry and Exit Conferences, a Mid-term Conference was convened with the State Government, specifically to discuss and seek feedback on the audit matrix. Further, in this case, being the beneficiary, the PRIs with all three tiers-Gram Panchayats, Taluka Panchayats and Zilla Panchayats were surveyed to establish the credibility of the audit models. This unique engagement promoted transparency and facilitated early alignment on key audit criteria. The proposed model was also reviewed in consultation with the Southern Region (SR) Wing of the CAG Office, ensuring both methodological rigour and audit integrity. Further, relevant benchmarks were drawn from sister states within India, where devolution frameworks and activity mapping practices had been comparatively better articulated.

5.2.2 Audit Findings: Devolution Gaps and Grey Zones

While the State government had formally declared the devolution of all 29 functions listed in the Eleventh Schedule of the Constitution to Panchayati Raj Institutions (PRIs), the audit revealed significant inconsistencies in actual implementation. These gaps highlight that true decentralization requires more than a policy notification — it demands institutional restructuring, fiscal realignment, and administrative clarity. The audit's detailed examination uncovered four major thematic concerns:

- **Partial Transfers:** More than 25 per cent of functions were not financially backed up. Further, the audit observed that most of the functions were implemented by the State Sector. Significant sectors like Agriculture, Public Health, Village Industries, Drinking water, Animal Husbandry, Social Forestry, etc, saw only symbolic transfer of functions (Figure 5.1).
- **Overlapping Jurisdiction:** In many instances, departmental (State Government) control was retained with a limited role for PRIs, leading to dual accountability and administrative confusion. For instance, while the responsibility for rural water supply was formally assigned to PRIs, the State Department continued to manage the sector, including the implementation of flagship programmes such as *Jal Jeevan Mission*. This dual control limited the functional autonomy of PRIs and reduced their accountability to local communities.
- **Lack of Institutional Autonomy:** PRIs had limited control over planning, staffing, and execution, even for functions nominally devolved to them.
- **Mismatch in Budgetary Authority:** Several schemes were routed through PRIs for implementation, but funds, functionaries and decision rights remained with the line departments.

Figure 5.1: Devolution of Functions to PRIs vis-a-vis the State

	PRI	State
Poverty Alleviation Programme	98	2
Education including Primary Education	88	12
Women & Child Development	81	19
Family Welfare	72	28
Welfare of the Weaker Sections	38	62
Health and Sanitization, including Hospitals	32	68
Drinking Water	30	70
Animal Husbandry, Dairying, Poultry	28	72
Social Welfare including welfare of the Roads, Culverts, Bridges, Ferries	26	74
Social Forestry & Farm Forestry	25	75
Fisheries	16	84
Cultural Activities	13	87
Village Industries	13	87
Land Reforms	13	87
Soil Conservation	12	88
Minor Irrigation	9	91
Agriculture	6	94



In essence, while Karnataka made early strides by adopting the 73rd Amendment through legislation in 1993, the audit highlights that the real empowerment of PRIs remains incomplete in the State. Without structural reforms to clarify jurisdiction, transfer decision-making power, and link finances with functional responsibilities, PRIs will continue to operate as dependent entities and as agency functions - constrained in delivering responsive and accountable governance.

5.3 Funds and Functionaries: The Incomplete Triangle

While the article primarily focuses on functional devolution, the audit's insights into funds and personnel are also found to be crucial:

- **Devolution of Funds:** Despite State Finance Commission recommendations, PRIs continued to receive untied grants with minimal linkage to the actual functions transferred. Budgeting was input-based, not function-based.
- **Devolution of Functionaries:** A major gap identified was the non-transfer of staff and non-delegation of appointment powers of the majority of the staff to the PRIs. In most cases, PRIs were left to implement schemes without exclusive administrative control over their personnel. They often had to depend on departmental staff posted on deputation, which diluted institutional accountability and weakened the responsiveness of local governance structures. The inability to appoint, discipline, or evaluate staff directly has significantly impaired the functional autonomy of PRIs and hindered effective service delivery. A key constraint identified in the audit was the limited institutional capacity of PRIs in the absence of staff devolution. Training efforts were irregular and generic, failing to meet sector-specific needs. To address these issues, the audit recommended creating exclusive PRI cadres, providing regular need-based training and strengthening State Institute of Rural Development (SIRD) and District Training Centres for sustained capacity-building.

5.4 Audit Innovation: Beyond Compliance to Outcome Orientation

The Functionality Assessment Framework represents a landmark innovation in public audit. It moved from procedural audit to performance-based assessment, gauging not just whether functions were transferred, but how well they were being performed at the local level.

For instance:

- In Agriculture, though the function was listed as devolved, PRIs had no control over extension officers, rendering the transfer ineffective.
- In Water and Sanitation, Gram Panchayats were expected to manage schemes but lacked technical staff and fund utilization rights.

This evidence-based matrix was instructed by the then CAG of India to be shared as a model with other audit institutions for replication.



5.5 Conclusion: Devolution as a Democratic Imperative

Three decades since the 73rd Constitutional Amendment, Karnataka's decentralization journey reflects both pioneering intent and implementation inertia. The audit revealed that devolution on paper does not equate to decentralization in practice. The symbolic transfer of subjects without matching authority, finance, and staffing only reinforces dependency rather than enabling governance.

The challenge ahead is not merely to list functions as “transferred,” but to institutionalize local self-governance through:

- Function-based budgeting,
- Exclusive administrative cadres for PRIs,
- Autonomous planning and implementation powers.

Audit's innovative framework and focus on actual outcomes provide a credible roadmap for transforming PRIs from executing arms into engines of grassroots democracy.

Audit observed that weak functional devolution has had a direct adverse impact on citizens. In many cases, devolved functions continued to be implemented by State Departments rather than PRIs, which meant that citizens, when faced with service gaps or grievances, were compelled to approach multiple line departments instead of their Gram Panchayats. This undermined the vision of PRIs as the first point of contact for local governance. For example, in the case of Direct Benefit Transfer (DBT) schemes, audit findings showed that beneficiaries often did not receive entitlements due to fragmented responsibilities spread across different departments. With PRIs lacking both authority and accountability, citizens had no choice but to navigate department-specific procedures, weakening accessibility, delaying redressal, and preventing Gram Panchayats from emerging as a single-window contact for rural service delivery.

5.6 Recommendations

Audit proposed a set of short and medium-term reforms to strengthen functional devolution and empower PRIs. In the short term, activity mapping should be updated periodically, and minor heads of expenditure—such as those already devolved in the case of libraries, where technical expertise is not required—may be transferred to Gram Panchayats to expand their functional autonomy. Fund-tracking dashboards can be introduced to enhance transparency and accountability. In the medium to long term, reforms should include the creation of an exclusive PRI cadre, as well as systematic capacity-building to equip PRIs with technical expertise in areas such as engineering, finance, and service delivery. This phased approach would ensure that PRIs progressively evolve into robust, self-sufficient institutions of local governance. It also called for enhanced fiscal and operational autonomy for local bodies and the institutionalization of transparency mechanisms such as social audits and public disclosures to ensure accountable and effective grassroots governance by making Gram Panchayats the front mechanism to interact with the rural citizen.



Data Availability

There are no new data associated with this article.

Ethics Statement

All necessary ethical and research integrity principles have been duly adhered to.

Funding

No external funding has been availed.

Conflict of Interest

There is no conflict of interest.

Acknowledgments

Not stated.

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ARTICLE 6

Departmental Balances and Fiscal Mismanagement in Government Accounts: The Case of Punjab Divisions

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Received : 25 May 2025

Accepted : 12 November 2025

Abstract

This article examines the persistent fiscal anomaly in the Government of Punjab wherein substantial departmental funds, particularly in the Public Works divisions, are retained outside the treasury system and parked under Major Head 8671—Departmental Balances. Drawing on data from Finance Accounts and the State Finances Audit Report (2022–23), it highlights that over ₹1,250 crore is held in such accounts, with ₹548 crore under the Public Works Department (PWD) alone. This practice not only contravenes codal provisions but also erodes fiscal transparency, legislative oversight, and the state's cash management capacity.

The paper situates this anomaly in the context of Punjab's widening debt crisis and growing concerns about fiscal sustainability. It underscores the fiscal opportunity cost in terms of avoidable debt servicing and potentially foregone interest income. The article calls for a multifaceted reform approach—enhanced treasury integration, regular reconciliation with departments, capacity building, and leveraging digital platforms like SNA-SPARSH—to restore fiscal discipline and strengthen Punjab's public finance architecture.

Keywords

Government accounts, Public Works Divisions, Punjab, Departmental Balances, Cash management and Fiscal Governance.

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6.1 Introduction: Departmental Balances as a Governance Issue

The retention of funds in divisional bank accounts by Public Works and other departments in Punjab is not a mere accounting oddity but a structural issue in public financial management. Such balances distort the state's cash position, impair cash planning, increase dependence on market borrowings, and weaken legislative oversight.

In a recent General Accounts (GA) Wing meeting chaired by the Deputy Comptroller and Auditor General (DAI-GA), these concerns were flagged as undermining fiscal governance. The absence of timely remittance into the treasury diminishes the state's capacity to plan expenditure, meet debt obligations efficiently, and comply with fiscal responsibility norms.

6.2 Background: Colonial Legacy of Departmental Balances

Departmental balances under Major Head 8671 have their origins in colonial-era Public Works Department (PWD) accounting practices. The system allowed local divisions to retain funds for operational flexibility, reflecting the administrative priorities of the time. However, despite post-independence financial reforms, these practices have persisted, resulting in large sums lying outside active treasury control.

Divisions frequently receive funds on behalf of Panchayati Raj Institutions (PRIs), contractors, and other non-governmental entities. Instead of depositing these amounts into the state treasury under 8443-108 – Public Works Deposits, they are often retained in divisional bank accounts and booked under 8671-101 – Departmental Balances – Civil. Consequently, these balances remain outside the state's active cash management framework.

6.3. Department-Wise Trend Analysis of Balances

As per Notes to Finance Accounts (NTFA) 2023–24, departmental balances under Major Head 8671 amount to ₹1,253.85 Crore, of which the PWD accounts for over ₹548 Crore (43%). Department-wise details of the amount lying in Bank Accounts being operated by Divisional Officers are shown in Table 6.1. Figure 6.1 further shows the Departmental Balances with PWD and in the Bank. The rising trend in such balances highlights the persistence of the issue and its worsening implications for fiscal planning.

Table 6.1 Trend of Departmental Balances (₹ crore)

Name of Department	Number of Divisional Officers operating Bank Accounts	Amount lying in Bank Accounts (₹ in crore)
Public Works (Building and Roads Divisions)	69	548.10
Rural Development and Panchayats (Panchayati Raj Divisions)	16	204.72
Water Resources	39	421.67
Water Supply and Sanitation	53	79.36
TOTAL	177	1,253.85

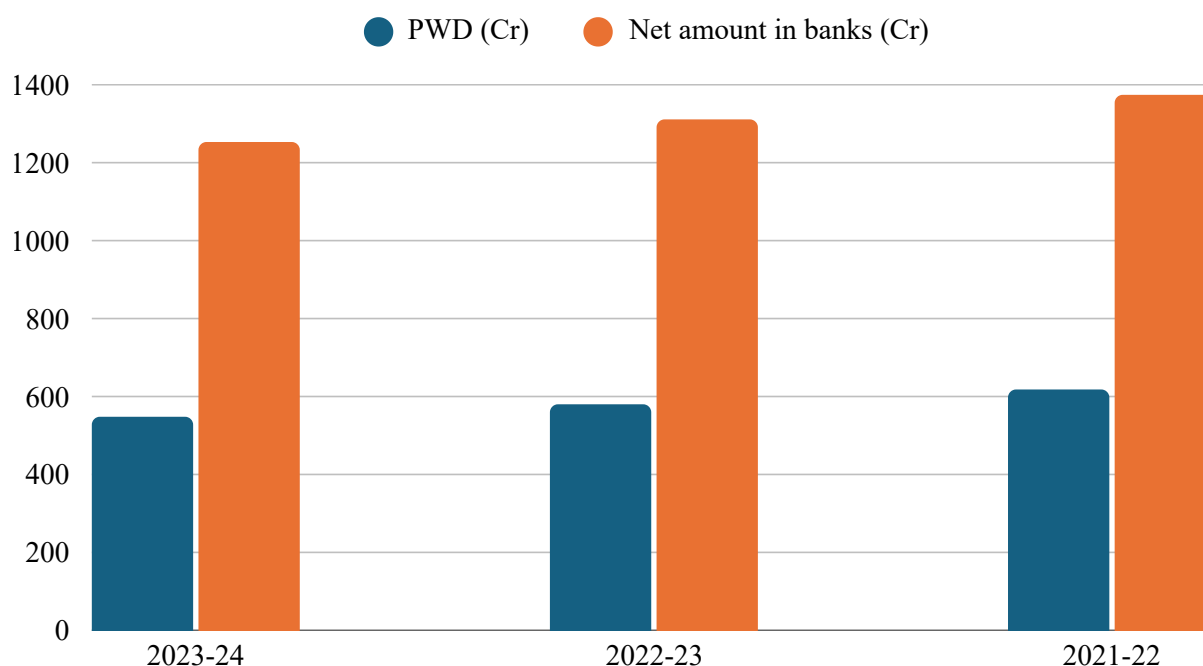


Figure 6.1 Trend of Departmental Balances (₹ crore) in PWD and Bank

6.4 Fiscal and Legal Implications

The continued retention of balances outside the treasury system contravenes codal provisions, erodes legislative oversight, and weakens the credibility of budgetary reporting. If deposited into the treasury, these funds could significantly improve Punjab's cash position, reduce market borrowings, and support more accurate fiscal forecasting.

At a conservative 7% annual interest rate, ₹1,253 crore could yield ₹87 crore—funds equivalent to financing hundreds of rural schools or hospital beds. This foregone return becomes even more concerning given Punjab's rising debt-GSDP ratio and its obligations under the FRBM Act. Idle balances, thus, not only carry an opportunity cost but also undermine fiscal responsibility and debt sustainability.



6.5 The Alternate Perspective: Understanding the Trust Deficit

Departmental officers argue that these funds are not truly "outside" government accounts, as they are booked under Head 8671 in the Public Account. They cite contractor security deposits and unspent works funds as the primary components, emphasizing operational risks if funds are remitted into the treasury and delayed.

This reflects an institutional trust deficit; divisions perceive treasury processes as slow or prone to diversion. Building confidence through timely fund release, improved payment systems, and digital transparency is, therefore, essential for sustainable reform.

6.6 The Way Forward: A Roadmap for Reform

6.6.1 Short-Term (by March 2025):

- Ensure compliance with the Finance Department directive to remit unspent balances by 31 March.
- Institutionalize monthly reconciliation between divisional and treasury accounts.

6.6.2 Medium-Term:

- Build the capacity of divisional officers on treasury rules and the benefits of timely remittance.
- Strengthen integration of the Non-Treasury (NT) module with divisional workflows.

6.6.3 Long-Term:

- Fully leverage SNA-SPARSH for real-time traceability and automation.
- Build institutional trust through the timely release and utilization of funds.
- Embed cash management reforms into the broader Public Financial Management (PFM) framework for sustainability.

Comparative lessons can be drawn from Kerala's real-time treasury integration and Karnataka's improved cash forecasting models, both of which have significantly reduced idle balances. Globally, IMF and World Bank guidelines advocate for Treasury Single Accounts (TSA) and daily reconciliation as best practices to optimize cash management.

6.7 Conclusion

The problem of departmental balances is both a financial and governance challenge. Addressing it demands coordinated policy reforms, technological modernization, and behavioural change among stakeholders. Better cash management is not only about efficiency but also about democratic legitimacy and fiscal federalism. Strengthening fiscal governance in Punjab would set an example for other states grappling with similar challenges.



Data Availability

The study is based on publicly available data. All data used in this research are accessible from open sources and properly cited within the article. I confirm that data sharing adheres to principles of privacy and confidentiality, especially for studies involving human subjects.

Conflict of Interest

The author declares no conflict of interest.

Ethics Statement

No violation declared

Funding

The author received no financial support for the research, authorship, or publication of this article.

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ARTICLE 7

Indian Accounting Standards: India's Leap Towards Global Accounting Practices

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Received : 03 June 2025

Accepted : 12 November 2025

Abstract

This Article brings out an overview of the global accounting scenario and explores India's transition from the conventional accounting standards known as Indian Generally Accepted Accounting Principles (Indian-GAAP) to the Indian Accounting Standards (Ind AS) introduced during the financial year 2016-17. It covers an overview of introduction to Ind AS, significant changes introduced in financial reporting after the introduction of Ind AS, an overview of Public Sector Undertakings (PSUs) in Karnataka, challenges faced during this transition, basic provisions of Ind AS and significant issues observed during the supplementary audit process.

Adopting a qualitative approach, the article is based on information collated from the reports of the Comptroller and Auditor General of India (CAG), annual reports of PSUs, financial statements of PSUs and other sources available on the public domain. Supplementary insights were gathered through a review of relevant literature on the Institute of Chartered Accountants of India (ICAI) website to evaluate the depth, challenges, and strategies behind the transition process. The adoption of Ind AS offers distinct advantages such as uniformity in reporting, improved comparability, and enhanced financial clarity. However, the first-time adoption in a few companies posed initial hurdles and complexities in applying fair value measurements such as revaluations, prior period re-statements, etc. The transition from Indian GAAP to Ind AS has been a major milestone for Indian companies, especially PSUs, introducing greater transparency and comparability. While challenges such as fair valuation complexities and capacity building were significant, proactive strategies like early training and technical support helped overcome them.

Keywords

Indian Accounting Standards, retrospective re-statement, opening balance sheet, fair valuation, first time adoption of Ind AS, restructuring, impact.

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7.1 Introduction: An Overview of Global Accounting Practices

Accounting practices across the world have gradually evolved from country-specific systems into a more harmonised global framework. Traditionally, each nation followed its own Generally Accepted Accounting Principles (GAAP), developed in line with domestic laws, business environments, and regulatory priorities. While this approach ensured compliance with local requirements, it created challenges of inconsistency, lack of comparability, and reduced transparency for global investors and multinational corporations.

The drive towards globalisation, cross-border trade, and international capital flows gave rise to the need for uniform accounting standards. To address this, the International Accounting Standards Committee (IASC) was formed in 1973, which later evolved into the International Accounting Standards Board (IASB) in 2001. The IASB issues the International Financial Reporting Standards (IFRS), now widely regarded as the benchmark for global accounting practices. IFRS emphasises principle-based reporting, fair value measurement, and transparent disclosures, ensuring that financial statements are relevant, reliable, comparable, and understandable across jurisdictions.

Over time, many countries, including the European Union, Australia, Canada, and several Asian and African nations, have either adopted IFRS fully or transitioned to their local standards on similar lines to IFRS. The United States of America (USA) follows standards issued by the Financial Accounting Standards Board (FASB).

The International Public Sector Accounting Standards Board (IPSASB) develops accounting standards for public sector entities referred to as International Public Sector Accounting Standards (IPSAS), which cover both the cash basis and accrual basis of accounting. The accrual IPSAS standards are based on IFRS and also deal with public sector-specific financial reporting issues that are not dealt within IFRS. The UN entities and Specialised Agencies of the UN, like the World Health Organisation (WHO) and Food and Agriculture Organisation (FAO), have adopted IPSAS to enhance the transparency, comparability, and accountability of their financial reporting in accordance with internationally recognized public sector accounting standards.

Today, global accounting practices reflect a balance between uniformity and flexibility. While IFRS is the dominant global framework, some countries retain modifications to accommodate domestic legal, economic, or regulatory needs. Nonetheless, the overarching trend is towards greater uniformity and comparability, thereby enabling investors, regulators, and businesses to operate with confidence in an interconnected world.



7.2 The Accounting and Audit Scenario for Government Companies in India

The mandate of CAG to audit Government Companies under the Companies Act is derived from Section 19(1) of the CAG (DPC) Act, 1971. As per Section 143(6) read with Section 139 of the Companies Act, 2013, the CAG appoints statutory auditors, performs supplementary audit of the financial statements of Government Companies and reports upon such audit reports.

The Institute of Chartered Accountants of India (ICAI) is the standard-setting body in India. Recognising the need to harmonise the diverse accounting policies and practices in India, the Accounting Standards Board (ASB) was constituted on 21st April 1977. Section 133 of the Companies Act 2013 makes it mandatory for Companies to comply with Accounting Standards (AS) issued by the ICAI, and Section 143 mandates the auditor of companies to report non-compliance.

With increased globalisation of Indian Companies, a need was felt to align the financial reporting framework of the country with the global standards, due to which a new set of AS called Indian Accounting Standards (Ind AS) were introduced from 1st April 2016. This was a progressive leap forward in the accounting landscape. Ind AS is largely based on the International Financial Reporting Standards (IFRS)/International Accounting Standards (IAS)(older standards which IFRS replaced in 2001). This includes certain modifications to address India-specific legal and economic environments, thereby enabling Indian companies to meet both domestic regulatory requirements and expectations of the international investors. Ind AS follows a numbering system aligned with corresponding IFRS/IAS standards (e.g., Ind AS 101 with IFRS 1, Ind AS 1 with IAS 1).

7.3 Roadmap for Implementation of Ind AS

The Ministry of Corporate Affairs issued the Companies (Indian Accounting Standards) Rules, 2015 vide Notification of the Ministry of Corporate Affairs dated 16th February, 2015 and a roadmap in this regard, thereby paving the path for a phased implementation of Ind AS commencing from the financial year 2016-17 as depicted in Figure 7.1 below.



Figure 7.1 Phase-wise Implementation of Ind AS

Source: ICAI Publication: Indian Accounting Standards- An Overview of Indian Accounting Standards



As per the roadmap, subsidiaries and associates of these companies were also required to adopt Ind AS. Companies were also encouraged to voluntarily adopt Ind AS since 2015-16, but reversion to Indian GAAP was not permitted thereafter. Entities outside the aforesaid prescribed thresholds continued with the existing AS which are now referred to as Indian GAAP. Although Ind-AS adoption was planned for banking and insurance sectors, its implementation remains deferred.

7.4 Significant Changes Introduced under Ind AS

- a. **Other Comprehensive Income (OCI):** A separate section was introduced in the Statement of Profit and Loss after 'profit after tax' which records unrealised gains/losses such as revaluation surplus (Ind AS 16), actuarial gains/losses (Ind AS 19), changes in the fair value of equities/derivatives (Ind AS 109), foreign currency translation differences (Ind AS 21), etc.
- b. **Recognition of fair value:** Emphasis has been made on fair value measurement over historical cost in critical areas like financial instruments (Ind AS 109), property, plant and equipment (Ind AS 16), business combinations (Ind AS 103), leases (Ind AS 116), investment property (Ind AS 40), etc.
- c. **Retrospective re-statement:** As per Ind AS 8 on Accounting Policies, Changes in Accounting Estimates and Errors, any change in accounting policy is required to be done retrospectively by making changes in the balances of the earlier years, as far as practicable. Similarly, all prior period errors are required to be corrected in the year of occurrence by recasting the balances of the earlier years, unlike the corresponding AS 5 which required either a disclosure or a separate depiction in these cases.
- d. **Opening Balance Sheet:** Ind AS 101 on First-time Adoption of Indian Accounting Standards mandates the preparation of an opening Balance Sheet at the transition date, by adding a third column in the Balance Sheet to reflect balances as per Ind AS. For instance, companies transitioning to Ind AS in the financial year 2016-17 had to recast their opening balances as of 1st April 2015 by de-recognising non-compliant assets and liabilities and recognising those that met the Ind AS requirements, recast the comparative figures for 2015-16 and then adopt Ind AS in 2016-17. Various exemptions for first time adoption of Ind AS like deemed cost, first time adoption of policies were introduced.
- e. **Statement of Changes in Equity:** A new financial statement as per Ind AS was introduced to reconcile equity and other equity components across opening and closing reporting periods.
- f. **Financial Instruments:** The financial instruments were classified into three categories (i) amortised cost (ii) fair value through other comprehensive income, and (iii) fair value through profit or loss. This classification was made depending on whether the assets were held for generating contractual flows only, or to sell, or for both. There was also a requirement to make a provision for expected future losses using the expected credit loss (ECL) model even if there was no actual default as on the reporting date.



g. **Property, Plant and Equipment (PPE):** Standard on PPE introduced the concepts of component accounting, liability for decommissioning costs based on net present value, option to choose either the cost or the revaluation model, disclosure of restrictions in title, if any, etc.

7.5 Overview of Ind AS transitions in PSUs in Karnataka and its impact

As per the CAG Report of the Government of Karnataka: Report number 1 of 2025, as on 31st March 2023, there were 121 Government/Government-controlled Companies (SPSEs) in Karnataka out of which 33 came under the purview of Ind AS as described in Figure 7.2 below.

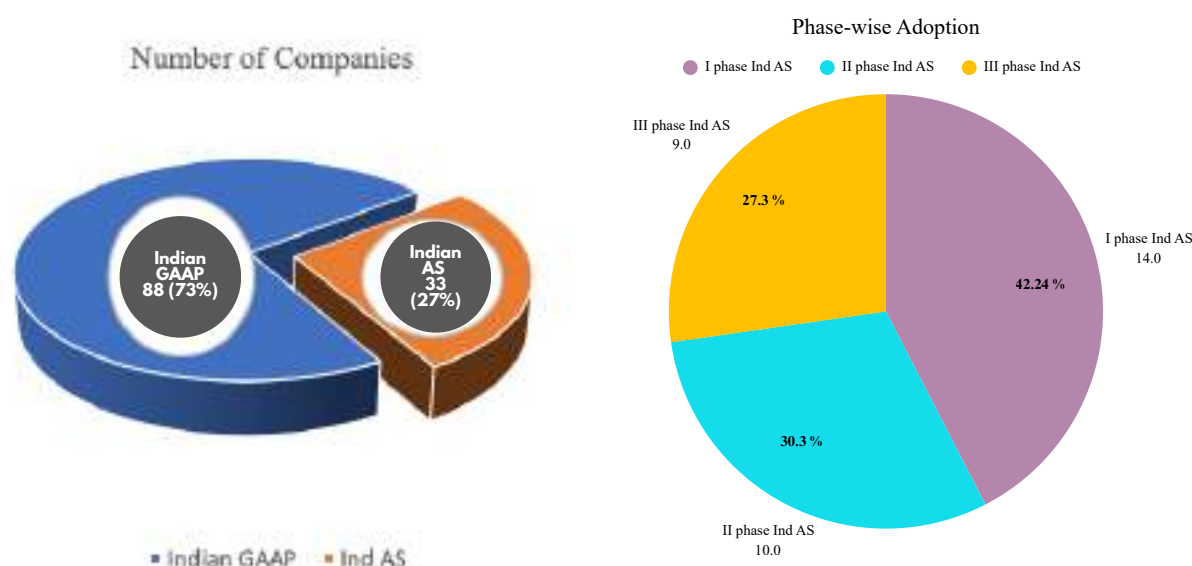


Figure 7.2: Bifurcation of Companies into AS and Ind AS and Statistics of Phase-wise Adoption of Ind AS Companies

Source: Facts and figures from CAG Report: Government of Karnataka-Report number 1 of 2025

7.6 Impact of the implementation of Ind AS

An analysis was made in some of the major PSUs to assess the impact of Ind AS, which revealed the following trends:

- Impact on Assets and Liabilities:** 14 test checked State Public Sector Enterprises (SPSEs) experienced changes in the asset and liability values after transitioning to Ind AS. Six recorded an increase of ₹2,728.23 crore, six recorded a decrease of ₹921.07 crore, while the impact was minimal in two. The changes were mainly due to changes in policy for accounting of government grants, changes in policy for deferred tax, fair valuation, etc.
- Impact on financial results:** The impact of the adoption of Ind AS on profits after tax (PAT) was insignificant in one SPSE, and nil in two SPSEs, while the remaining 17 SPSEs reported a net impact of a decrease in Profit after tax by ₹ 9,614.05 crore. The changes were mainly due to adjustments for prior period errors/omissions, deferred tax recognition, revaluation of post-employment benefits, etc.



7.7 A Few Challenges Faced and How They were Overcome

7.7.1 Preparedness for Ind AS

- a. Recognising the magnitude of change, the Office of the Principal Accountant General (Audit)-II (PAG- Audit II) proactively conducted workshops in collaboration with ICAI experts as early as March 2016, i.e., a year ahead of the implementation deadline. This strategic preparation ensured that audit teams were technically equipped and confident enough to take on Ind AS audits.
- b. Dedicated teams were deputed for Ind AS audits in the first year of transition. Some of the challenges faced by these first-timer teams were in areas such as (i) analysing the Opening Balance Sheets (Ind AS 101) (ii) ensuring correctness of the recognitions, de-recognitions made and accounting policies adopted to align with Ind AS (iii) tracking retrospective re-statements (Ind AS 8) (iv) navigating first-time adoption exemptions (Ind AS 101) (v) assessing the correctness of fair valuations made (Ind AS 16) (vi) ensuring compliance to consolidation requirements under Ind AS 110, 111, 112, and 28 in the Consolidated Financial Statements (vii) difficulty in obtaining data in instances where the preparation of Ind AS financial statements were outsourced (viii) sector specific issues in implementation of Ind AS in power sector companies like capitalisation of assets, tariff related issues involving truing up of revenue, assets held for repair for prolonged period, assessing the impairment, etc. However, through diligent efforts and in-depth engagement with statutory auditors and the management, the teams effectively navigated the initial challenges of Ind AS implementation.
- c. This proactive approach led to substantial value addition in the very first year, including revisions to accounts, issuance of comments, and amendments to the reports of the Statutory Auditor. Building on these learnings, the teams continued to make notable progress in the subsequent years. Significant non-compliances in Ind AS were observed and special memos were issued to the Statutory Auditors as per the Standard Operating Procedure for adjudging the performance of the Statutory Auditors of Government Companies for failure to report on such non-compliances.
- d. After completion of the certification season, the teams also facilitated peer learning by conducting structured knowledge-sharing sessions on analysis of Opening Balance Sheets and Other Comprehensive Income, assessing fair value, drafting and assessing the impact of Ind AS transactions, thereby institutionalizing best practices across audit teams within the office and across India through experience-sharing sessions.
- e. Multiple in-house trainings were held as an ongoing capacity building exercise, to keep abreast of subsequent revisions made to Schedule III of the Companies Act for Ind AS financial statements, radical amendments in AS to align with Ind AS, introduction of new Ind AS over the years such as Ind AS 115 for revenue, Ind AS 116 for leases, etc., thereby ensuring continuous capacity building of the field and headquarters staff.



7.7.2 Restructuring of Audit Offices

In May 2020, the Audit Offices underwent a major restructuring, wherein PSUs were reorganised into different clusters and allocated across various Audit Management Groups (AMGs) of the Office. This scenario posed challenges in ensuring uniform interpretation of Ind AS/AS, coordinating certification timelines, and consistent dissemination of amendments across AMGs. To address these challenges, Office of the PAG (Audit)-II, Karnataka, Bengaluru, took a strategic step by establishing a Technical Support Cell (TSC) as a centralized nodal unit for certification audits. Key contributions of the TSC included; (i) Development of an online repository of reference materials for certifications; (ii) Time-schedule meetings with the management and the statutory auditors to ensure timeliness in submission of accounts, assessment of the preparedness of the companies for Ind AS, and discussion on persistent issues; (iii) Workshops on Ind AS and related amendments. The creation of the TSC significantly enhanced the efficiency, technical accuracy, and effective coordination of certification audits in a decentralized operational structure.

7.8 Few Interesting Issues observed during Ind AS Audits

- i. **Ind AS 16- Property, Plant and Equipment:** A company had partially accounted for the revaluation of its thermal stations to the tune of ₹ 1193 crore and had excluded ₹ 888 crore towards hydel stations. The contention of the company that the land did not have any marketable value and was submerged, due to which it was not revalued, was inconsistent with the land valuation reports, which had already taken into cognizance the submergence. Comments were issued.
- ii. **Ind AS 23- Borrowing Cost:** As per Ind AS 23, the capitalisation of borrowing costs is required to cease during extended periods in which it had suspended active development of a qualifying asset. A company capitalised interest of ₹ 2.14 crore, though the work was suspended during 2020-22, instead of charging it off to expenditure. Comments were issued.
- iii. **Ind AS 114- Regulatory Deferral Accounts:** A power sector company neither recognized the deferred regulatory balances under the previous GAAP nor opted for Ind AS 114 during the transition to Ind AS in 2016-17. However, in 2019-20, it recognised ₹ 543.84 crore as its regulatory income and formulated an accounting policy by belatedly adopting Ind AS 114. Post-transition adoption of Ind AS 114 just for recognition of regulatory income in a selected year was not in order and reflected inconsistency in accounting procedures. The company revised the accounts at the instance of audit and reversed this income.
- iv. **Ind AS 36- Impairment of Assets:** As per Ind AS 36, an entity is required to assess, at each reporting date, whether there is any indication that an asset may be impaired. Such indicators include accumulated losses, erosion in net worth, etc. If such indications exist, the entity must estimate the recoverable amount of the asset or cash-generating unit (CGU) and provide for



the impairment loss. This Standard is also applicable to companies which are subsidiaries, joint ventures, and associates of the holding companies, which should be tested for impairment annually, irrespective of whether there is any indication of impairment. In one case, failure to carry out impairment testing despite the existence of impairment indicators raised significant concerns regarding the appropriateness of the carrying amount of these investments, amounting to ₹ 2,654.25 crore and consequent non-compliance to Ind AS 36. Comments were issued.

v. **Ind AS 106- Exploration for and Evaluation of Mineral Resources:** The company paid ₹ 38 crore towards retention of the mining lease rights, which qualified as a mining and exploration asset in line with Ind AS 106. However, this amount was treated as an expense in non-compliance to Ind AS 106 and the stated accounting policy of the company. The statutory auditor revised the audit report.

vi. **Ind AS 8- Accounting Policies, Changes in Accounting Estimates and Errors:** The company charged off ₹12.37 crore to employee benefit expenses to rectify an error related to 2019-20, instead of retrospectively re-stating it in the year in which the error occurred. The company stated that the same was not an error and was on account of a change in actuarial estimates, whereas the error had crept in due to incorrect data provided to the actuary. The company revised the Accounts.

7.9 Conclusion

The transition from Indian GAAP to Indian Accounting Standards (Ind AS) has been a transformative journey for Indian companies, particularly Public Sector Undertakings (PSUs). This shift has posed significant challenges ranging from technical complexities in fair valuation and retrospective restatements to operational hurdles in capacity building and restructuring audit frameworks. Looking ahead, navigating the evolving landscape of Ind AS and emerging financial reporting complexities will require a holistic approach, with sustained focus on continuous learning, technological integration, collaborative capacity building, and knowledge sharing that would go a long way in enhancing the quality of audit products of certification audits.

Data Availability

There is no new data associated with this article.

Ethics Statement

This Article meets the ethical guidelines and legal requirements of the country in which it was performed.

Funding

Not applicable



Conflict of Interest

None

Acknowledgments

I thank the Technical Support Cell of the Office of the Principal Accountant General (Audit)-II for sharing valuable insights on the challenges faced during transition from the phase of Accounting Standards to Indian Accounting Standards.

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ARTICLE 8

The Wrong and Excessive Use of Minor Head 800 in Government Accounting: A Threat to Fiscal Transparency

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Received : 11 June 2025

Accepted : 12 November 2025

Abstract

The recurrent and indiscriminate use of Minor Head 800 – ‘Other Receipts’ and ‘Other Expenditure’ – by State Governments has led to increasing opacity in public accounts, as revealed in the State Finances Audit Reports (SFARs) of various States issued by the Comptroller and Auditor General (CAG) of India. This article analyzes data from the CAG reports of Telangana, Uttar Pradesh, and Madhya Pradesh, highlighting trends, systemic issues, and risks that emerge from such practices. The findings underscore the urgent need for strict adherence to budget classification norms and proactive monitoring mechanisms to preserve accountability and to ensure a transparent depiction of government finances.

Keywords

Minor Head 800, Government Accounting, Fiscal Transparency, Public Financial Management, State Finances Audit Report, Misclassification of Expenditure, Comptroller and Auditor General of India and Indian Government Accounting Standards.

8.1 Introduction

The Government Accounting system in India follows a well-structured classification prescribed in the List of Major and Minor Heads of Accounts issued by the Ministry of Finance. Transactions are recorded under Major Heads (representing functions of government, such as Education, Health, or Roads), which are further divided into Sub-Major Heads, Minor Heads, Sub-Heads, Detailed Heads, and Object Heads to capture the nature, purpose, and object of expenditure or receipts in a systematic manner. This multi-tiered coding ensures comparability across departments and facilitates fiscal transparency and accountability.

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Within this structure, Minor Head 800—designated as a residual category for both receipts and expenditures when no specific head is available—is intended to be used rarely and only under exceptional circumstances. However, evidence from recent State Finances Audit Reports (SFARs) points towards its widespread and excessive use, raising critical concerns regarding fiscal discipline and the integrity of public financial reporting.

8.2. Overview of Findings from Selected States

8.2.1 Telangana

The SFAR for Telangana reveals a disturbing trend: out of ₹7,904 crore booked under Minor Head 800 (Other Receipts) in 2022–23, a staggering ₹6,560 crore—constituting over 83% of the total receipts, under this head was classified under heads with no descriptive detail beyond “Other Receipts/ Other items.” Notably, ₹5,796 crore of this amount was recorded in March alone—₹5,562 crore of which was booked by PAO Hyderabad Urban—primarily due to lapsing of deposits that should have been treated as a reduction of expenditure instead of revenue income. Instead of adjusting these lapsed balances as a reduction of expenditure—which would correctly reflect that the money was not actually utilized—they were transferred to the Consolidated Fund and shown as revenue receipts. This accounting treatment artificially inflated the government’s revenue position, while simultaneously concealing the underutilization of funds originally earmarked for specific purposes.

On the expenditure side, ₹1,719 crore was classified under Minor Head 800 across nine major heads, with many descriptions remaining as “Other Expenditure.” Alarming, ₹74 crore under relief for natural calamities lacked specific detailing, eroding the purpose of program-based budgeting (Table 8.1).

Table 8.1 Use of Minor Head 800 with relatable Sub-Head despite the availability of a specific Minor Head

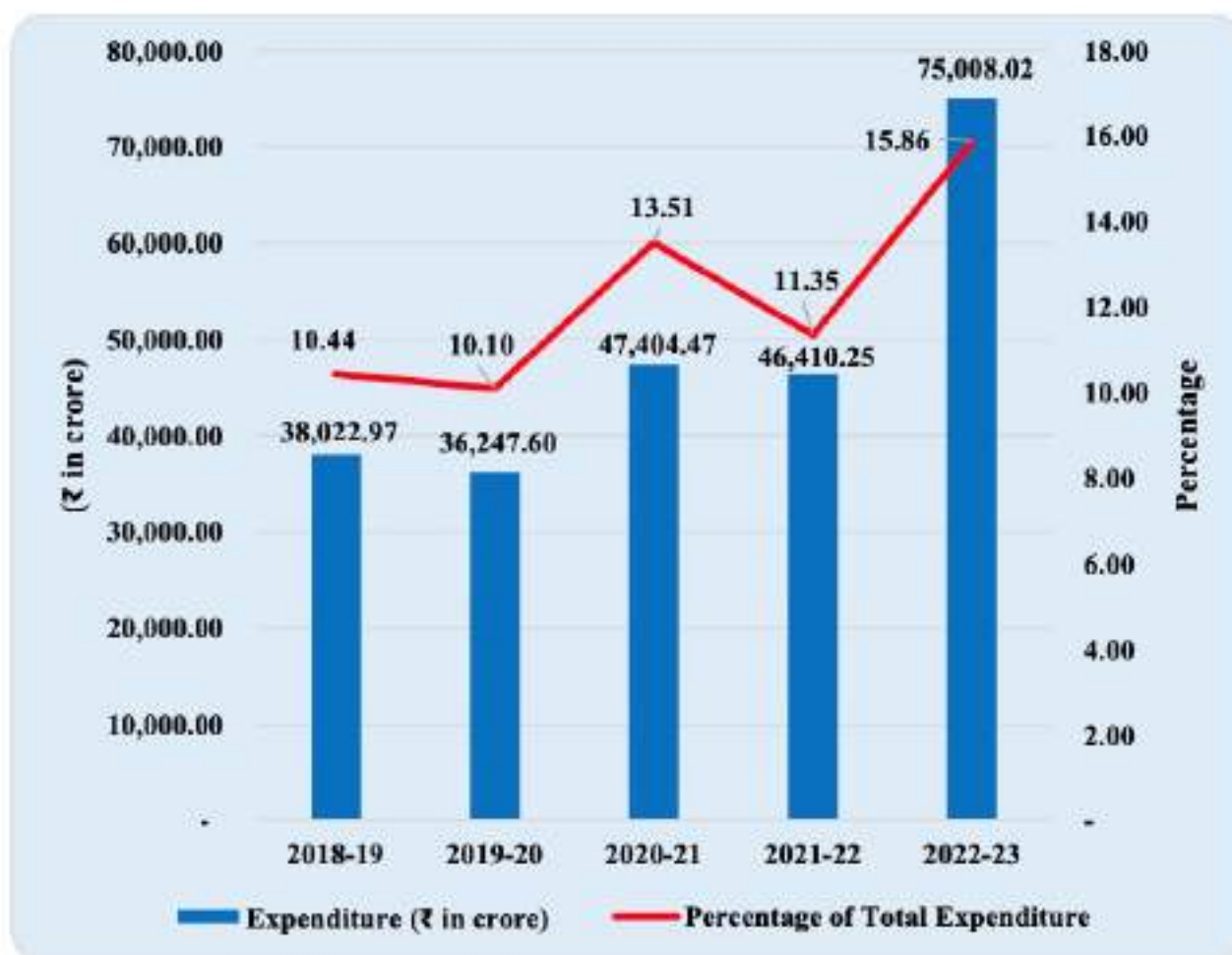
SL No.	Classification under Minor Head – 800	Description of Sub-Head used	Related specific Minor Head to be used	Description of related specific Minor Head Available	Amount (₹ in Lakh)
Receipts					
1	0070-60-800-25	Receipts under Right to Information Act, 2005	0070-60-118	Receipts under Right to Information Act, 2005	1.33
2	0202-04-800-01	Receipts of the Department of Archaeology	0202-04-101	Archives and Museums	53.71

Source: Finance Accounts

8.2.2 Uttar Pradesh

Uttar Pradesh's SFAR for 2022–23 reveals ₹7,327.58 crore in revenue receipts booked under Minor Head 800 across 53 major heads—constituting 1.76% of total revenue receipts. Several major heads, including Power (₹964.52 crore), Non-Conventional Energy (₹293.35 crore), and Urban Development (₹175.80 crore), recorded 100% of their receipts under Minor Head 800.

Figure 8.1 Operation of Minor Head 800 - Other Expenditure during 2018-23



Source: Finance Accounts of respective years

Even more concerning is the expenditure trend: numerous major heads such as Civil Aviation, Taxes on Sales, and Telecommunications reported 100% of their total expenditure under Minor Head 800. In aggregate, 25 grants reported more than 5% of their total expenditure under the omnibus Object Head '42 – Other Expenditure,' with some reaching over 70%, thereby compromising budget transparency and rendering audit oversight difficult.

8.2.3 Madhya Pradesh

Madhya Pradesh's accounts exhibit ₹9,366.41 crore in receipts and ₹36,879.90 crore in expenditure classified under Minor Head 800 in FY 2022–23, accounting for 4.59% and 15.09% respectively of total receipts and expenditure. Audit scrutiny found that even where specific minor heads existed (e.g., for sports stadia, women's welfare, and rural roads), funds were still booked under Minor Head 800. This included critical schemes like Mukhyamantri Gram Sadak Yojana and Mukhyamantri Kisan Kalyan Yojana, which had no detailed subclassification (Table 8.3).

Table 8.2: Amount (In ₹ crore) Booked under Minor Head 800 - Other Receipts and Other Expenditure

Particulars	Receipts		Expenditure	
	Amount (₹ in crore)	Heads of Account	Amount (₹ in crore)	Heads of Account
100 per cent	727.42	0047, 0059, 0211, 0220, 0235, 0404, 0408, 0702, 0801, 0852, 1452	2,289.10	2250, 2705, 2852, 4401, 4408, 4705, 4853, 5475
Between 75 per cent and 99 per cent	2,372.26	0217, 0401, 0435, 0515, 0700, 0802	15,016.40	2217, 2702, 4700, 4701, 4875
Between 50 per cent and 74 per cent	95.47	0210	1,570.28	2075, 2851, 3454, 4406
Less than 50 per cent	6,171.26	Other Major Heads	18,004.12	Other Major Heads
Total	9,366.41		36,879.90	

Source: Finance Accounts 2022-23

Table 8.3: Booking under Minor Head 800 instead of Valid Minor Head

Name of the Scheme	Expenditure booked under Minor Head 800- Other expenditure	Major Head	(₹ in crore)
			Minor head to be used as per List of Major and Minor Heads
6693-Mukhya Mantri kanya Abhibhavak Yojna	10.05	2235-Social Security and Welfare	104-Welfare of aged, infirm and destitute
5159-Khel Akadmiyon ki sthapna	23.68	4202- Capital Outlay on Education, Sports, Art and Culture	101-Youth Hostels or 102- Sports Stadia
6703-Khel stadium evam khel adhosanrachna	10.00		102- Sports Stadia
0654-Mukhya Mantri Gram Sadak Yojana	384.00	4515- Capital Outlay on other Rural Development Programmes	103- Rural Development
7352-Prashashkiya bhavano ka Nirman	52.86	4055- Capital Outlay on Police	207- State Police or 211-Police Housing
6345-Mukhya Mantri Kisan Kalyan Yojana	1,671.00	2401- Crop Husbandary	115- Scheme of small /Marginal farmers and agricultural labour
5722-Establishment of Call Centre	13.00	2053- District Administration	094-Other Establishment
2087- Acharya Vidyasagar Gau Samvardhan Yojana	3.20	2403-Animal Husbandary	102- Cattle and Buffalo Development
Total	2,167.79		

Source: VLC data compiled by O/o the PrAG (A&E-I), Madhya Pradesh, Gwalior



8.3 Risks and Implications

The overuse of Minor Head 800 undermines the core principles of government accounting:

- **Erosion of Transparency:** Classification under generic heads prevents the identification of the nature, source, and purpose of transactions. This distorts policy analysis and weakens fiscal accountability.
- **Impacts on Planning and Oversight:** Misclassification hinders accurate assessment of departmental performance, program effectiveness, and allocative efficiency. It also inhibits the Legislature and Public Accounts Committee (PAC) from exercising effective oversight. This lack of clarity prevents meaningful scrutiny of whether funds were spent for their intended purposes, reduces the ability of PAC to hold departments accountable, and ultimately weakens the Legislature's power of the purse—a cornerstone of democratic financial control.
- **Masking of Lapses:** Booking lapses of unspent balances into revenue receipts, as seen in Telangana, artificially inflates revenue and conceals underutilization or inefficiencies in expenditure.
- **Undermining Indian Government Accounting Standards (IGAS):** In Uttar Pradesh and Madhya Pradesh, failure to adhere to IGAS-1 (on guarantees), IGAS-2 (on grants in-aid), and IGAS-3 (on loans and advances) was noted, compounding the problem of fiscal opacity.

8.4 Conclusion

The routine and often unjustified use of Minor Head 800 by State Governments is more than a technical anomaly—it is a serious threat to transparency, accountability, and democratic oversight. Though the analysis is done for three states, i.e, Uttar Pradesh, Madhya Pradesh and Telangana, the same misuse of minor head 800 is a common practice among other state governments also in India, as highlighted in individual SFARs of those states.

A transparent public accounting system is not merely an administrative necessity—it is a cornerstone of good governance.

8.5 Recommendations

- **Strict Enforcement of Budget Classification Norms:** Ministries and departments must be compelled to use specific minor heads as defined in the List of Major and Minor Heads (LMMH). Erroneous use of Minor Head 800 must attract strict action.
- **Timely Reconciliation and Reclassification:** Treasuries and Pay and Accounts Offices (PAOs) must ensure end-of-year reconciliation, particularly of lapses and Personal Deposit account balances, to prevent inappropriate revenue recognition.



- **Legislative and PAC Vigilance:** The Public Accounts Committee (PAC) should review the extent of Minor Head 800 usage in every budget session. Departments reporting a significant proportion of their total expenditure under this head may be summoned to justify. To ensure measurability, the PAC's annual report may include a dedicated section on the use of Minor Head 800.
 - **Capacity Building in Budget Preparation:** Training budget officers and financial controllers on correct classification practices and the implications of misuse can go a long way in improving the quality of reporting.
-

Data Availability

There are no new data associated with this article.

Ethics Statement

This research met the ethical guidelines and legal requirements of the country in which it was performed.

Conflict of Interest

Not applicable

Funding

Not applicable

Acknowledgments

Acknowledged the IA&AS officers, who worked as mentors, for their thought-provoking insights on the subject matter of this article.

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ARTICLE 9

A Comparative Study of Commercial and Government Accounting System

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Received : 07 June 2025

Accepted : 12 November 2025

Abstract

The commercial accounting system is as old as commerce and business itself. Similarly, government accounting is also as old as the State. However, with the development of the company form of organization, there was a separation of ownership and management of the business. This accelerated the development of the theory of commercial accounting, which eventually developed into a separate field of academic discipline and an independent profession. With the shift from monarchy to democracy, there have been ample changes in the political and administrative system of the state. Here also, there has been separation of ownership (with citizens), supervision (with elected representatives) and management (with elected government) in a State. Hence, there is a need for accelerated development of the theory, academic discipline and profession of government accounting and auditing. The methodology suggested in this paper is to compare the study of commercial (corporate) and government accounting systems. This comparative study will help both systems adopt good practices from each other. The government accounting system can develop its theory and eventually develop itself into a separate academic discipline and a profession. As an illustration, a model of General Purpose Financial Statements for a State government has been given.

Keywords

Commercial Accounting, Government Accounting, Profit Making Entity, Not-for-profit Entity, State, Separation of Ownership and Management and General Purpose Financial Statement.

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9.1 Introduction

The accounting system of any entity depends upon the nature and type of the entity concerned. Entities can broadly be divided into two types on the basis of their objectives, viz., profit-making and not-for-profit entities. Not-for-profit entities can be of two types, viz., State (or government) and non-government organizations. A state is an entity which has its own specified territory, citizens, government to perform legislative, judicial and executive functions, and sovereignty over its land and people (Weber, 1919). A nongovernment organization is a not-for-profit organization like a state, and it may have ownership over certain land, but unlike a state, its membership is voluntary, it does not have sovereign powers over its land and members and no coercive power to impose taxes.

9.2 Differences between State and Commercial Enterprise

A commercial enterprise and a State have many differences in their objectives, structure and functions as enumerated below:

- (i) The government of a State is a sovereign entity, but the commercial enterprise is not.
- (ii) The State represented by its government is a perpetual entity and cannot be wound up. In contrast, a commercial enterprise, though assumed as a going concern for accounting purposes, is not perpetual, and it can be wound up.
- (iii) The government has coercive power to raise its resources through taxes, but commercial enterprise does not have coercive power to raise its resources. The customers of commercial enterprises voluntarily purchase their goods or services by paying their market price (Drucker, 1954).
- (iv) The commercial enterprises have a profit motive as their objective (Samuelson et al., 2010), but the government is not a profit-making organization. Its motives are the security and development of the State and citizens' welfare with equity.
- (v) For commercial enterprises, an increase in profit is a measure of their performance (Drucker, 1954), but for a government, profit is not a measure of its performance (Laski, 1925). For the government, efficiency, economy, and effectiveness (Heywood, 2013) in the implementation of its policies and programs are the measures of its performance.
- (vi) Commercial enterprises are micro entities as the impact of their activities is limited to those who deal with them (Samuelson et al., 2010). However, the government of the State is a macro entity in the national economy (Heywood, 2013). The impact of government policies and programs is on all the citizens of the country, or the residents of the province concerned.



9.3 Differences between their Accounting Systems

As a consequence of the above mentioned differences, there are significant differences between commercial and government accounting systems, if government accounts are prepared on an accrual basis, which is the case in most of countries. The differences in their accounting systems are: -

(i) As the government is not a profit-making enterprise, there is no Profit and Loss Statement in government accounting in the same sense as in commercial accounting (Jones, 2000). There may be a statement of excess or deficit of revenue receipts over revenue expenditures in government accounting.

(ii) As the government is not a profit-making enterprise, there is no income concept in government accounting as there is in commercial accounting (Adams, 2018). Thus, there is no revenue recognition concept in government accounting. Taxes accrued and due are not shown as receivable in accounts, as these may be disputed in court, or these may be waived off by the government.

(iii) Government accounts are made on a cash basis, as there is no concept of income recognition in government accounting. However, commercial accounts are made on an accrual basis because of the concept of income recognition and the corresponding matching principle for the expenses incurred to earn that income during the period of accounting (Jones, 2000; Chan, 2003).

(iv) The concept of asset valuation and thus, depreciation accounting, is not present in government accounting (Jones, 2000), but these are essential concepts in commercial accounting to depict a true and fair view of a commercial enterprise's net profits, financial position and to declare dividends out of its net profits (Anthony et al., 2003).

(v) The concept of inventory valuation is not important for a government (Jones, 2000) but it is very important for a commercial enterprise to show a true and fair view of the results of transactions (that is, the profit or loss) for the period and its financial position at the end of the period (Anthony et al., 2010).

(vi) The concept of equity or capital fund is not there in government accounting (Adams, 2018; Jones, 2000), but it is very important in commercial accounting, to evaluate the financial stability and improvement in valuation of a commercial enterprise over the period (Horngren et al., 2002; Anthony et al., 2010).

(vii) As the government is a perpetual entity, there is no need for the going concern assumption in government accounting (International Public Sector Accounting Standard Board, IPSAS 1). However, for commercial accounting, the going concern assumption is very important for consistency in the financial reporting of the results and the financial position of business enterprises over the periods (Horngren et al., 2002; International Accounting Standards Board, IAS 1).



9.4 Similarities between State and Commercial Organisations

There are certain similarities between the two organizations.

(i) Similar Functions of Accounting Systems for both the Entities

For both types of entities, accounting systems have dual functions, viz., (a) record keeping of their transactions and (b) the financial and economic analysis of data provided by their accounting statements for performance evaluation and decision-making.

(ii) Separation of Ownership and Management

The commercial accounting and auditing developed fast (Hendriksen et al., 1992), as a result of the separation of ownership (with shareholders) and management of business enterprises after the industrial revolution (Scott, 2015). Similarly, the government accounting and auditing system needs to be developed quickly as the government has also evolved from a monarchy to a democracy. In a democracy, there is the separation of ownership of the state, which is with the citizens who delegate the oversight responsibilities to their elected representatives in the legislature (Flynn, 2012) and the management responsibilities of the state, which are with the citizens' representative executive government (Musgrave, 1959; Smoke, 2001). In a monarchy, ownership and management of the State were with the king or queen (Schumpeter, 1918). An advanced arrangement of government accounting and auditing was not there in the affairs of the State under a monarchy. These are very important in a democracy.

9.5 Mutual Exchange of good practices between the Government and the Commercial Accounting System

To improve both systems, adapting and using the good practices of each other can be done by both systems.

9.5.1 What Commercial Accounting and Auditing may gain from the Government System

(i) Commercial accounting and auditing system can gain from the government accounting, auditing, and accountability system. The primary responsibility of a commercial enterprise is towards its shareholders. However, the accountability of commercial enterprises is also towards the public at large because a business organization is important not only for its investors (shareholders) but also for its customers, who are the general public. Further, business enterprises also use natural and human resources, as well as the environment.

Green budgeting (Organisation for Economic Co-operation and Development, 2020) and accounting (Rubenstein, 1992), environment accounting (Gray et al., 1993) and auditing (International Chamber of Commerce, 1991) and corporate social responsibility (European Commission, 2001; Ministry of Corporate Affairs, 2013) are such practices being adopted by commercial organisations from government and social systems.



(ii) Commercial auditing can also take something from government auditing in respect of independence in the appointment of auditors (Levitt, 1998; Satyam Committee Report, 2009; Brydan, 2019), just like the independence of government auditors from the executive.

(iii) Issues such as Human Resource (HR) Accounting and Environment and Carbon Cost Recognition and Accounting are of common interest for commercial enterprises and the government. Both these areas pose the problems of measurement, internalization of externalities in decision-making, and standardisation of their disclosures in financial statements. Unlike physical assets, employees can resign or retire. This makes the capitalization of expenditure on human capital in the balance sheet problematic. There are negative externalities for the environment and carbon cost, and positive externalities for human capital cost. Both issues are very important for both commercial enterprise and government. Initially, efforts can be made to make standards for non-monetised quantitative reporting of these issues as additional information in financial statements. Gradually, efforts can be made to develop methods to assess turnover cost, training investment, employee productivity indices and enforceable carbon pricing in the Environment, Social and Governance (ESG) Reporting framework (Kharola et. al., 2025).

9.5.2 What Government Accounting and Auditing may gain from the Commercial System

The government accounting and auditing system can take a lot from the commercial accounting and auditing system through a comparative study. Some of these areas are as below:

(i) Commercial accounting has a well-developed accounting theory that guides an accountant to prepare financial statements for its owners and the public. However, government accounting does not have a well-developed established theory (Mautz, 1988) as it is a new discipline that evolved especially after the spread of democracy. With the use of a comparative study with commercial accounting, a theory of Government accounting can be developed.

(ii) Commercial accounting and auditing is a well-developed academic discipline being taught in colleges and universities (Watts, 1986). However, government accounting and auditing as a discipline of study has not yet been developed enough (Carlin, 2005; Chan, 2003) and, therefore, is not being taught in colleges and universities in India. Through a comparative study, government accounting and auditing may also be developed as a separate discipline for academic study.

(iii) Commercial accounting and auditing is a well-developed profession at national and international levels (Willmott, 1986). At the national level, there are institutes like the ICAI, and the ICMAI to train, develop and regulate financial accounting and auditing and cost and management accounting and auditing professions in India. However, government accounting and auditing as a profession has not yet been developed (Chan, 2006).



There are Supreme Audit Institutions (SAI), like the Comptroller and Auditor General of India, in each country to guide government accounting and perform government auditing. There are government officials of the SAI, who perform government auditing. But these officials do not independently guide and bring awareness among the public, media, and the people's representatives, about the government's financial and economic transactions, evaluate them, and analyse their impact on the development of the country's economy and people's well-being. The independent profession of government accounting and auditing can work for its development as an academic discipline and a profession, to be taught at colleges and universities and practised as a profession. These professionals can independently comment upon the government's accounting, auditing, financial policies, financial management and performance and inform the people and their representatives about the impact of the government's plans, programs and activities. The Chartered Institute of Public Finance and Accountancy of the United Kingdom is the only professional body involved exclusively in Public Finance (Jones, et al., 2010).

(iv) The General Purpose Financial Statements (GPFS) of commercial enterprises are well developed in the form of Balance Sheet, Profit and Loss Statement and Cash Flow Statement. However, GPFS are not well-developed in government accounting (Chan, 2003). A statement showing the results of financial transactions of the government during the year, that is, revenue deficit or surplus, like a profit and loss statement in commercial accounting, is not well developed in government accounting. A comparative study may be used to develop such statements. An effort has been made in this paper to develop such statements for a government.

An Illustration: General Purpose Financial Statements for Government

After comparing the formats of Statements 1 and 2 of State Finance Accounts with GPFS of corporate entities as given in Schedule 3 of the Indian Companies Act and AS 3 of ICAI, it is found that the necessary groupings of head of accounts are not there in Statements 1 and 2 of State Finance Accounts. If we borrow the groupings and format from corporate accounts for GPFS, there is going to be an improvement in the presentation of GPFS of governments, as given in the illustration in the Annexures 1, 2 and 3. [The data and the heads of accounts used to prepare these model GPFS for a government are taken from Statements 1 and 2 of the Finance Accounts of the Government of Chhattisgarh for the year 2023-24 (the Comptroller and Auditor General of India, 2024)].

v) The 'segment reporting' and the 'responsibility accounting' are well- developed concepts being practiced in financial and management accounting in commercial sector (International Accounting Standard Board, IFRS 8) but not developed in government accounting, though these may be useful in government sector for decision-making and control (Chan, 1987; Chan, 2003; Organisation for Economic Co-operation and Development, 2017 ; Government Accounting Reforms Committee, CAG & CGA, 2010).



vi) Even though the government accounts are prepared on a cash basis, the recognized and contingent liabilities are disclosed in its financial statements. For example, interest on GPF is credited in the employee's GPF account and debited in the interest account every year. Similarly, other liabilities can also be evaluated and disclosed in financial statements on the principle of conservatism, just like in commercial accounts. Therefore, the actuarial valuation of state-guaranteed future pension entitlements earned to date can be recognized in the financial statements of the government and can be funded through regular contributions to the pension redemption fund (IPSASB, IPSAS-49). Similarly, efforts can be made to evolve legally enforceable obligations for remediation of contamination, cost to restore ecosystems, and regular contribution to climate-related mitigation fund on the lines of the disaster management fund (IPSASB, IPSAS-19).

The Government Accounting Standard Advisory Board (GASAB) of the C&AG of India has issued a guidance note on Accounting for Fixed Assets. This recommends the preparation of a fixed assets register by all government entities on a pro forma basis. If this is done by all the departments, the problems of losing sight of government assets, their loss, deterioration and non-maintenance may be effectively tackled. GASAB has started bringing out annual Natural Resources Accounts for Minerals from the year 2021-22 and Water Resources Accounts from 2022-23. These efforts will help in the judicious use of natural resources and their conservation for future generations (GASAB, Guidance Note).

GASAB, through the Government of India, has issued Indian Government Accounting Standards on Guarantees (IGAS-I) given by the Central or State governments. This has also issued a draft for disclosure of Public Debt and other liabilities of Governments (IGAS-10). These standards are intended to disclose in the financial statements, the cost of repayment of today's debt financing and debt-fueled growth. Efforts can be made to develop models to calculate the present value of future contractual interest and principal payments under current debt stock (GASAB, IGAS-1, IGAS-10; European Commission, 2019).

9.6 Conclusion

A comparative study of the government accounting and auditing system with the commercial accounting and auditing system can be used to improve upon both systems, and to achieve the above-mentioned objectives. Especially in respect of the government accounting and auditing system, a separate theory, an academic discipline of study and an independent profession can be developed.



Data Availability

No new data has been introduced.

Ethics Statement

This document meets the ethical guidelines and legal requirements of the country.

Funding

Not applicable

Conflict of Interest

None

Acknowledgments

I acknowledge with gratitude the general support of Shri Kalyan Ram, Shri Suman Kumar, Shri Abhishek Ranjan Chunnu, Shri AVN Pantlu, Shri Wasim Baksh, Dr. Roopendra Singh and Shri Niraj Kumar Jha by providing general comments, referencing and typing of this paper.

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1. Statement of Financial Position

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Annexure-2

2. Statement of Revenue Receipts, Expenditure and Revenue Surplus /Deficit

Revenue Expenditure	Reference (Sr.No.) Notes to Finance Accounts	2023-24	2022-23	Revenue Receipts	Reference (Sr.No.) Notes to Finance Accounts	2023-24	2022-23
I State Expenditure				I Own Revenue			
A. Committed Expenditure				A. Tax Revenue			
(i) Salaries	--	27,669.25	24,967.33	(i) Own Tax Revenue	--	77,268.10	65,480.57
(ii) Pension and other Retirement Benefits	--	9,111.82	7,661.46	(ii) Share of Union Taxes/Duties	--	38,786.22	33,122.31
(iii) Interest Payment and Servicing of Debt	--	7,213.34	6,782.08	B. Non-Tax Revenue	--	38,481.88	32,358.26
(iv) Subsidy	--	10,796.88	8,306.28	(i) Interest	--	15,147.97	15,248.24
B. Other Expenditure				(ii) Others	--	175.16	200.75
(i) General Services	--	18,880.01	16,266.97		--	14,972.81	15,047.49
(ii) Social Services	--	3,439.14	4,763.85				
(iii) Economic Services	--	4,469.15	4,103.30				
(iv) Grant-in- Aid	--	48,188.96	25,734.73				
(v) Others	--	2,554.85	1,823.43				
II Compensation and Assignments to Local Bodies and Panchayat Raj Institutions	--	1,297.57	1,142.57	II Grants-in-Aid from Central Government	--	11,092.13	13,148.33
III Revenue Surplus		0	8,592.11	III Revenue Deficit		11,232.76	0
Total		1,14,740.96	93,877.14	Total		1,14,740.96	93,877.14

Annexure-3
3. Cash Flow Statement
(Statement of Fiscal Deficit and the Sources of Financing of Fiscal Deficit)
(in crore)

Sl. No.	Parameters	2023-24	2022-23
(A) Sources of Fiscal Deficit			
I	Cash flow from Revenue Activities		
i	Revenue Surplus (+)/ Deficit (-)	-11,232.76	8,592.11
II	Cash flow from Investing Activities		
i	Net Capital Expenditure	-15,413.92	-13,314.70
a	Capital Expenditure	15418.93	13,320.30
b	Miscellaneous Capital Receipts	5.01	5.60
ii	Net Loans and Advances disbursed	-286.35	31.38
a	Disbursement of Loans and Advances	311.96	85.86
b	Recovery of Loan & Advances	25.61	117.24
	Fiscal Deficit	-26,933.03	-4,691.21
(B) Financing of Fiscal Deficit			
III	Cash flow from Financing Activities		
A	Consolidated Fund		
1	6003 -Internal Debt (net)	26,385.33	-2,431.78
a	Internal Debt Receipt	50258.44	6,938.61
b	Internal Debt Repayment	23873.11	9370.39
2	6004 - Loans from Government of India (net)	3,551.43	3,469.80
a	Loans from <u>GoI</u> Receipt	3791.28	3,700.13
b	Loans from <u>GoI</u> Repayment	239.85	230.33
B	Public Account		
1	Small Savings, PF etc.	1521.73	1,306.48
2	Reserve Fund	766.01	-181.39
3	Deposits and Advances	258.33	360.77
4	Suspense and Miscellaneous	-5504.71	2,955.88
5	Remittances	-52.85	37.56
C	Contingency Fund (net)	-13.47	0.00
	Overall Deficit	26,911.80	5,517.32
D	Increase (-)/Decrease (+) in Cash Balance	21.23	-826.11
a	Opening General CB	215.63	-610.48
b	Closing General CB	194.4	215.63
	Gross Fiscal Deficit	26,933.03	4,691.21



ARTICLE 10

Analysing Expenditure Vouchers of Indian Railways using AI/ML for Anomaly and Fraud Detection

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Received : 01 June 2025

Accepted : 12 November 2025

Abstract

The article highlights the scope for analysing the railway expenditure using Natural Language Processing (NLP) and Artificial intelligence (AI) reasoning on bill descriptions of vouchers to identify anomalies such as misclassification, duplicate payments, non-compliance and possible fraud. The method is used to convert the bill description into an embedding to capture its semantic meaning and then analyse the allocations to understand the common patterns and deviations. When the training dataset is labelled and a model is developed, the model should be able to identify the anomalies in test data. Using the reasoning of the GPT models [1], the system should identify common patterns in allocations associated with bill descriptions and be able to detect anomalies even if the data is not labelled. Use of AI/Machine Learning (ML) in auditing has potential for a full population voucher audit and early anomaly detection in railway expenditure.

Keywords

Artificial Intelligence, Machine Learning, Natural Language Processing, Voucher Audit, Anomaly Detection, Audit Assurance and Indian Railways.

10.1 Introduction

Railway Audit Wing of CAG Office is responsible for ensuring financial propriety in the functioning of the Indian Railways (IR). The Integrated Payroll and Accounting System (IPAS) of IR, developed by CRIS [2] processes various types of bills, both for employees and contractors and maintains expenses for railways. The primary output of IPAS is the generation of accounting vouchers, which form the basis of railway financial records and statements.

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[1]GPT is Generative Pre-Trained Transformer, is a family of AI models built by OpenAI. GPT gives AI applications the ability to interpret data and reason.

[2] Center for Railway Information Systems is an organisation under Ministry of Railways for development and maintenance of Railway IT systems.



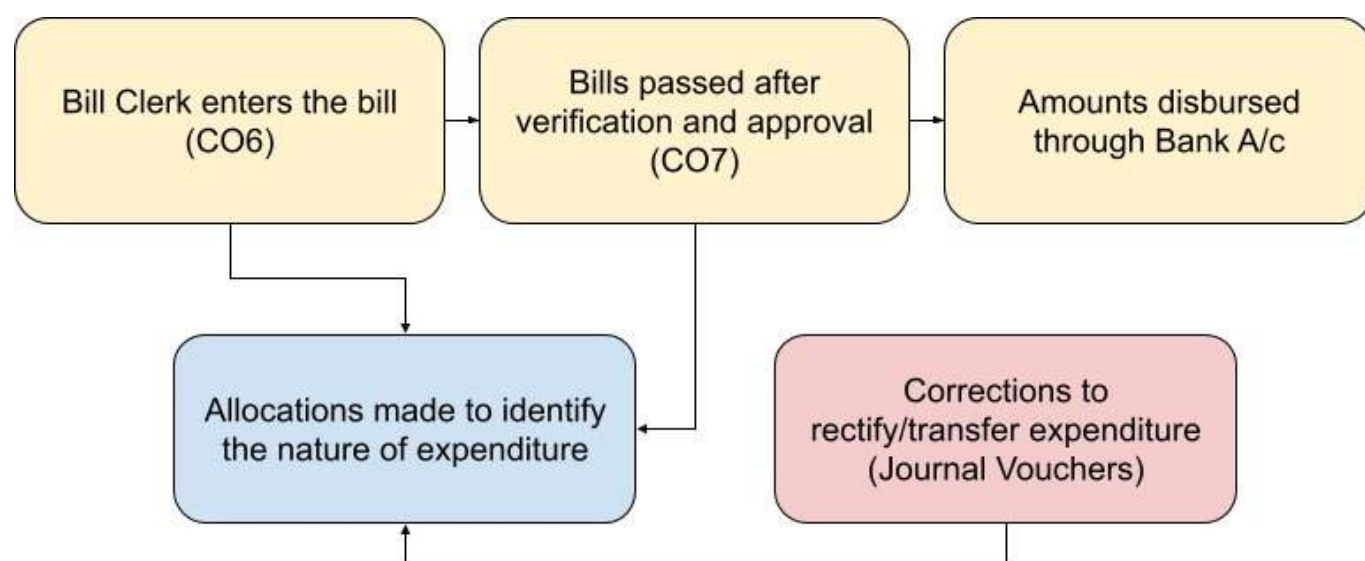
The Railway Audit Wing of CAG has the mandate of auditing the railway expenditure as per the norms and extent of checks prescribed by SMI [3] for different kinds of vouchers such as Contractor Bills, Supplier Bills, Journal Vouchers, etc., The vouchers generated in a month are extracted from IPAS by respective sections of railway audit offices, for selection (judgmental or random) and audit.

10.2 Bill Passing

CO6 [4] vouchers are bills entered in the IPAS application by railway executives' departments. for verification and passing by the Accounts department. These vouchers contain data such as party name and code, bill description, amount, deductions, bank account number and others. Along with this, each passed CO6 voucher also has an allocation code for all affected heads of accounts. The allocation code uniquely identifies the nature and object of expenditure and forms an important identifier to detect misclassification and mistakes in railway accounting. The Accounts department of the Railways, upon verification and subject to the availability of funds, passes the bills for payment through banks (Figure 10.1).

The Journal Vouchers contain information affecting the heads of accounts, for rectification/modification, along with the narration describing the reasons thereof. Journal vouchers are also used for the adjustment of expenditure between divisions in a railway zone or between different railway zones.

Figure 10.1: Flow of bill passing in IPAS



10.3 Data Volume

In the South Central Railway Zone, the number of CO6 and JV entries in IPAS in a financial year is approximately around 2.2 lakh, and the corresponding allocation entries are around 10 - 12.5 lakh. The volume of voucher data being generated in the IPAS application, if effectively put to use in audit, will emerge as a cornerstone in enhancing the impact of audit findings.

[3] Secret Memorandum of Instructions

[4] Cash Order and the number 6 indicates the stage of bill passing.



The Bill Description and Narration fields in CO6 and JV tables are natural language text entries made by the bill entering clerks and are important in understanding the details of expenditure vis-à-vis the primary objective (allocation) of such expenditure.

10.4 Integrated Applications in Indian Railways

IPAS is also integrated with some other railway IT applications, like IRWCMS (Indian Railway Works Contracts Management System), CMS (Crew Management System), etc. Integration provides additional information to the bill passing authorities, like agreement details, security deposit, and performance guarantee to be collected, special conditions, etc., through IRWCMS. The CMS application, which records crew login and logout times, provides information about overtime hours for the calculation of overtime allowance during payroll generation.

10.5 Traditional Audit

Traditional audit practices, though fundamental, face significant limitations in data-intensive environments, reducing the overall efficiency and coverage of the audit process. Audit that is rule-based and manual with limited sample size and subjective in voucher selection, etc., is both time-consuming and voucher dependent, and can pose a serious risk that irregularities in unselected vouchers remain undetected. These methods also cannot handle the large volumes of data being generated in IPAS daily.

10.6 Fragmented Approach

For hundreds of bills passed in IPAS during a month, the sample selection reduces the scope of audit to a few individual vouchers. Audit of these individual voucher(s), if not audited holistically, presents a fragmented view and is hard to consolidate across divisions, zones or financial years. The potential audit risk in the sample of vouchers selected can be identified only if the auditors are experienced and have vast domain experience. For better understanding, consider the following scenarios:

I - In Works Contracts, the contractor submits the bills as and when a percentage of the work is completed. These bills are called Contract On-Account bills. When a particular on-account bill is selected for audit, the bill is audited in isolation for compliance, collection of taxes and levies, etc.

The auditor is deprived of the information about all the previously passed bills (audited or not audited) for the same work to check if the current bill is duplicated or overpayment is being made or if the bill contains the correct bank details or if the supplies mentioned are actual or not.

In South Central Railway, a fraud of ₹ 2.2 crore was found where fake medical bills were generated and passed in IPAS without there being any real supply of medicines.



II – Price Variation Bills (under Price Variation Clause- PVC) are passed against contractor on-account bills to adjust for inflation for the cost of raw materials in long gestation projects (works contracts). When a PVC bill is selected for audit, it is also required to check all the on-account bills on which the PVC claim is being made. This is time consuming and resource-oriented and sometimes the old on-account bills may not be available. Lack of complete information can result in faulty audit assurance in the audit of such bills.

A fraud of ₹ 6.33 crore was noticed in North Frontier Railway while reviewing the amount of PVC bills; there was tampering of the figures in on-account bill. The inflated on-account bills resulted in excess payment.

Apart from these, understanding the semantics of the bill descriptions/narrations of vouchers, which is critical to audit, is resource oriented and a constraint in traditional audit.

10.7 Role of Semantics in Audit

Audit tools like IDEA aid auditors greatly in identifying duplicate records, trends and patterns, data analytics, etc. but does not offer the flexibility to develop custom applications specific to domain data. Also, traditional search enabled by these tools can analyse and identify anomalies in expenditure, only if specific keywords are known to audit. These are fast and accurate but fail to understand the semantic meaning, when different words are used in bills or vouchers.

10.7.1 Understanding Semantics of Voucher Descriptions

Semantics refers to the analysis of word meanings, understand relations between them and go beyond treating the words as just keywords.

Descriptions available in vouchers (bills) are primary to identify the nature of the expenditure. These are natural language text entered by the bill clerks, and similar expenditures may have different ‘words’ used to mean the same. From the data extracted from IPAS, expenditure incurred due to a decree passed by courts, which is of the nature of charged expenditure commonly contained the words as given in Table 10.1.

Table 10.1 Words used to describe expenditure incurred on court decree found in IPAS

- arbitration award
- OA (Original Appeal)
- LAC (Land acquisition case)
- decree award
- court award
- compensation claim

Semantic search performed on any word from the above table, would give search results matching all other words with inherent same meaning available in the dataset. A similar output from traditional search would require auditors to identify all the available keywords which is laborious and time consuming.

Analysing the inherent meaning (semantic) of textual descriptions available in vouchers is critical in understanding the nature of expenditure and help to detect possible anomalies like misclassifications in expenditure, duplicate bill passing, fraud detection, etc.

10.7.2 Natural Language Processing

Natural Language Processing (NLP) is a field of Artificial Intelligence that uses machine learning concepts to make computers read and understand the human language. NLP can perform a wide range of tasks – text classification, pattern recognition, sentiment analysis, etc.

NLP and semantics in audit (voucher descriptions) for pattern recognition can enable audit to process large volumes of data and provide meaningful insights for anomalies, risk assessment and data-driven audit assurance. NLP also has the ability to learn from the continuously generated data to understand, analyse and reveal any hidden patterns in ‘bill description’, ‘amount’, ‘allocation codes’ for improving audit efficiency and effectiveness.

Models trained on historical data can also monitor the expenditure real time, by identifying any deviation from the learned patterns and thus help auditors. The algorithms not only learn from the primary data – bill descriptions, allocation codes but from also other data available like IP address, device information, time of transactions etc.



10.7.3 System Development

A prototype unsupervised (these algorithms discover patterns without the need for human intervention) AI/ML system is under development with the aim to help auditors in:

- detecting misclassification in allocation of expenditure using semantic similarity;
- detecting duplicate expenditure or bill payments; and
- detecting outliers in expenditure for possible fraud.

10.7.4 Data processing

The expenditure of railways is primarily available in three tables (CO6, JV and Allocation). The CO6 table records the expenditure, which contains the bill amount and bill description, among other information. The classification (object of expenditure) is recorded in the Allocation table which contains information such as Debit/Credit, Voted/Charged and the Allocation code (Structure in Table 11.2). The JV table is used to adjust the expenditure made.

When a bill is passed, it is presumed that all allocation codes are entered correctly by the railway executive, and as such, the data is not labelled.

Data available from IPAS is processed to create a combined dataset containing ‘description’ and ‘allocation code’ from two different datasets (CO6 table and JV table). Other metadata like party name, transaction amount, and whether the expenditure is voted or charged, is also added to the dataset.

10.7.5 Create embeddings

The semantic meaning of each bill description, narration, allocation, amount, etc., of CO6 and JV tables is captured using dense vector embeddings using Hugging Face Transformer model. Dense vectors are mathematical objects that represent data in AI/ML. The dense vectors can describe subtle relations and nuances that exist between data and help identify semantic similarities. For the financial years 2023-24 and 2024-25, dense vector embeddings are created for around 2.5 million CO6/JV records.

Table 10.2 Structure for bill passing in IPAS system of Indian Railways

CO6 Table						JV Table				Allocation Table					
CO6 Number	CO6 Date	Bill Type	Bill Amount	Party Name	Bill Description	JV Number	JV Date	JV Type	Year Month TC No	Narration	Reference Number	Voted/Charged	Debit/Credit	Amount Allocation	Allocation Description
09010125002156	04-08-2025	GEM Bill	62517	Santosh Kumar	Hiring of vehicle	090132416032	05-06-2025	Capital	202506 ...	TPI Bill Payment of SCR for the month of OCT-2024 having amount 1196.2 for 0901	09010125002156	V	D	62517	Refund of revenue collected
09010125002157	04-08-2025	Pay Order	9575	Florist Pvt Ltd	Purchase of flower bouquets for official functions	090132416065	07-01-2025	Revenue	202501 ...	Rectification of work ID, Expenditure booked under PH-1700, CO7 09010424700010	09010125002156	V	C	62517	Cheque Paid
09010125002158	04-08-2025	Vehicle Bills	52500	Infra Developers	Pooled vehicle for SDGM Office						09010125002158	V	C	50341	Cheque Paid
09010125002159	04-08-2025	Vehicle Bills	51922	K Nagaraj	hiring of vehicle by cxc ST						09010125002158	V	C	159	Other Sundry Receipt
											09010125002158	V	C	1000	Income Tax
											09010125002158	V	C	500	TDS GST
											09010125002158	V	C	500	TDS GST
											09010125002158	V	D	52500	Transfer to Division

Foreign Key relation from CO6 Table and JV Table to Allocation Table of Reference Number of

Foreign Key relation from CO6 Table and JV Table to Reference Number of Allocation Table



10.7.6 Index in Elasticsearch

The CO6, JV and Allocation table data and dense vectors are then stored in Elasticsearch along with other required metadata. Elasticsearch is preferred for its advantage of semantic and vector similarity search, and its “more like this” (MLT) query feature.

10.7.7 Retrieval System

LangChain [5] was integrated into the model as a semantic retrieval layer on Elasticsearch to perform fast semantic queries over millions of vectorised transactions. Langchain facilitates the integration of Large Language Models (LLMs) with external data source and help build applications that respond to user queries based on context.

It provides tools and structures to build and implement RAG pipelines. Retrieval Augmented Generation(RAG) is a technique to improve the LLM responses by extracting information from a custom or domain-specific knowledge base. Such results obtained from RAG will be more relevant, context-aware and accurate.

From the Langchain retriever, the system uses semantic similarity queries to detect inconsistencies in the data, as detailed:

10.7.7.1 Duplicates: If a near identical match exists with the same bill description, or narration, amount and allocation code, a duplicate entry will be flagged to provide insight to the auditor for further examination.

10.7.7.2 Outlier detection: If no similar record exists within a given description, narration, bill amount and allocation code, a possible unusual entry or outlier is flagged by the system for further audit.

10.7.7.3 Misclassification detection: For a given bill description, narration and allocation code, if most similar records belong to another allocation code, the system will flag a possible misclassification.

These checks are performed using the `similarity_search_with_score` method available in Langchain, and the available data is batch scanned through periodic job scheduling using Celery or as and when new expenditure data of the Railway audit is made available.

10.7.7.4 Reasoning: After obtaining the top n records from the retrieval system, reasoning is done using a GPT model like GPT-4, GPT-4 of OpenAI to explain why a transaction could be an anomaly by summarising similar records and highlighting deviations and to provide justification to the auditors.

[5] LangChain is a popular framework for working with AI, Vectors, and embeddings. It is used to simplify building a variety of AI applications. Elasticsearch can be used with LangChain in three ways: to store and retrieve documents from Elasticsearch, with the help of an LLM like OpenAI, to transform a user's query into a query + filter to retrieve relevant documents from Elasticsearch and for the most flexible way to retrieve documents from Elasticsearch (Source: <https://www.elastic.co/search-labs/integrations/langchain>, accessed 28 September 2025).



10.8 Conclusion

As data generated in IPAS continues to grow and become more complex, traditional audit practices show limitations in effective audit assurance. AI/ML offers a more effective tool to aid auditors in processing large and interconnected datasets, identifying patterns and detecting anomalies.

Data Availability

There is no new data associated with this article.

Ethics Statement

This research, idea and concept met the ethical guidelines and legal requirements of the country in which it was performed.

Funding

The idea and concept is the original work of the author and there was no funding of any kind or form.

Conflict of Interest

None declared

Acknowledgement

None declared

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Acknowledgement for Reviewers

We extend our sincere gratitude to all the anonymous peer reviewers for their invaluable contributions to this journal. Your expertise, meticulous attention to detail, and constructive feedback were instrumental in maintaining the high standards of scholarly integrity and quality. We deeply appreciate your dedication and commitment to the peer-review process.



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**Published by the
National Academy of Audit and Accounts (NAAA)
Chaura Maidan, Shimla, HP-171004**

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