THE CATALYSTS

...in pursuit of Good Governance

SUPREME AUDIT INSTITUTION OF INDIA

लोकहितार्थ सत्यनिष्ठा

Dedicated to Truth in Public Interest

Comptroller and Auditor General of India

2023

वसुधैव कुटुम्बकम्

ONE EARTH • ONE FAMILY • ONE FUTURE

सत्यमेव जयते

A Compendium of New Initiatives and Good Practices in the CAG's Institution

SUPREME AUDIT INSTITUTION OF INDIA

लोकहितार्थ सत्यनिष्ठा

Dedicated to Truth in Public Interest

2023

Girish Chandra Murmu
भारत के नियंत्रक एवं महालेखापरीक्षक
COMPTROLLER & AUDITOR GENERAL OF INDIA

सत्यमेव जयते

Foreword

I am happy to present the third edition of the Compendium of New Initiatives and Good Practices, "The Catalysts – in pursuit of Good Governance".

The Compendium was envisioned to be a knowledge management tool with the twin objectives of informing our external and internal stakeholders of the innovative and good practices followed in the CAG organization and to encourage the internal stakeholders to emulate the good practices in their respective offices so that the practices do not remain one-off occurrences.

It gives me utmost satisfaction to note that some of the good practices shared in the earlier compendiums, like use of drone technology, use of Geographic Information System (GIS), organizing Orientation Programmes for new Members of State Legislatures, use of digital technology for efficient rendering of entitlement functions etc. have found resonance in many offices of the organization. The theme of present Compendium is the use of Information Technology Tools for Audit Planning, Evidence Gathering and Reporting and service delivery. The Compendium, in 5 sections, covers Methodology and process Improvements as well as initiatives undertaken in our multifarious functioning.

In this Compendium, we have showcased several innovative and good practices. It demonstrates the pursuit of and zeal for continuous improvement of our personnel. We hope that the Compendium keeps our stakeholders well informed about our good practices and that it propels our offices to replicate these initiatives.

(Girish Chandra Murmu)
Comptroller & Auditor General of India

Office of the Comptroller & Auditor General of India
9, Deen Dayal Upadhyaya Marg, New Delhi - 110124
Tel. No. : +91 11 23235797 • Fax : +91 11 23233618 • e-mail : cag@cag.gov.in

Table of Contents

01

Technology Tools for Audit Planning, Evidence Gathering and Reporting

02

Strides in Audit Methodology and Impactful Audits

03

Initiatives for Capacity Building

04

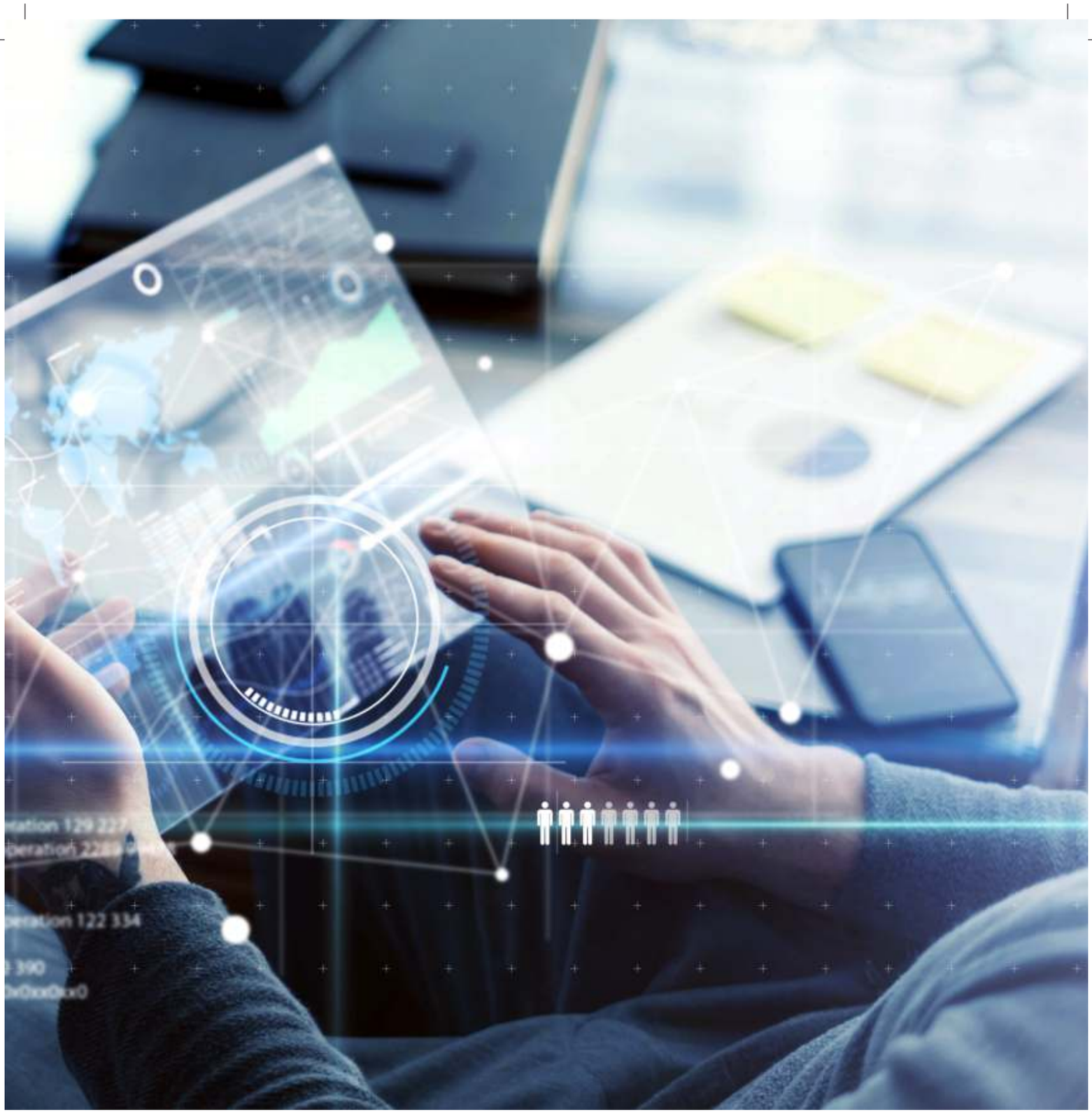
Improving Stakeholder Engagement

05

Business Process Improvements


MEDIA
WORLD
BUSINESS
NETWORK SEARCH

Technology Tools for Audit
Planning, Evidence Gathering and Reporting



Leveraging technology aids in improving audit planning, evidence gathering and in deriving better insights. We have adopted new technologies to improve the effectiveness of audit. In this section, we showcase some of the initiatives where offices have used latest technology tools in audit.

Use of Geo-Spatial Analysis

Audit has traditionally depended on the records maintained in the audited entities for audit evidence. With the changing times, we have also embraced new and emerging technologies to provide leads to better channelize audit effort and also to obtain better evidence to support the audit conclusions. One such initiative is the use of geospatial analysis in audits. This has been used in audits in a variety of areas to strengthen audits. Some instances where geospatial analysis has been are presented below.

Rejuvenation and Conservation of Harmu River

Harmu, a tributary of the Subarnarekha River, originates in a small hilly region near Hehal, Ranchi. The river flows for 17.8 KM, of which nearly 58 *per cent* is in urban areas. A project for the rejuvenation and conservation of Harmu River was taken up with the objective of transforming the river into a vibrant water asset with sparkling clean water, increased water intake and carrying capacity, development of riverfront and enhancement of public amenities.

In view of the continuing media coverage about the unsatisfactory condition of the Harmu river, despite the execution of the rejuvenation and conservation works, an Audit was conducted to assess, *inter-alia*, the effectiveness of the project for rejuvenation and conservation of the river.

In this audit, extensive use of Google Earth and associated tools was made as brought out below:

- **Use of timeline feature for verifying previous images of natural drain**

It was noticed that against 14 major inlets (Primary storm water drains, i.e, natural drain) terminating into the Harmu river at different locations, only 6 inlets were mentioned in the Detailed Project Report (DPR). The office used the timeline feature of Google earth and obtained previous years images of inlets as evidence of pre-existing inlets.

- **Use of ruler and timeline option for measuring river width**

The actual cross section of the river surveyed initially was not provided. In the absence of actual cross section, the satellite images of the river prior (November 2004) to rejuvenation work were compared with images after completion (June 2021) of the work.

The comparison revealed that the natural course of the river was reduced substantially (by 18.70 metres) at *Karma chowk* bridge near *Muktidham* through mechanical interventions. Thus, after completion of project, the river became narrower and did not attain its preconstruction width.

Date of image 28 November 2004 before rejuvenation of river (Average width 28 metres)

Date of image 3 June 2021 after rejuvenation of river work was completed (Average width 9.30 metres)

Satellite images of river (Geographical co-ordinates: 23^0 21' 52.15''N and 85^0 18'29.75"E, Karma chowk bridge near Muktidham) showing reduction in width of river (in a stretch of 110 metres) from 28 metres to 9.30 metres

- **Use of timeline option for identifying depletion of green belt from previous images**

To improve the environmental condition of the city, 4,624 saplings (coconut, Gulmohar, Areca Palm, Chatwan etc.) were planted. The survival rate of the trees after 5 years was fixed at not less than 95 per cent. The survival rates of trees/plants were not assessed despite the fact that none of the coconut trees had survived.

Plantation in 2009

Very few trees seen in 2021

Picture - Deforestation between Ganga Nagar and Karamtoli during rejuvenation of Harmu river

Analysis of the plantation works near Harmu river during the last 12 years (October 2009 to June 2021) through satellite images of different stretches was done and gradual decline in green cover over the years on the banks of Harmu river was noticed. An instance of such deforestation between Ganga Nagar (starting point of urban stretch of Harmu River) and Karamtoli chowk in 2009 and 2021 is shown in picture above.

Scan to access the report

Use of Technology in analyzing Mining activities

Bihar

Performance Audit on "Systems and Controls in assessment and collection of mineral receipts" was done by focusing on 14 sampled districts. The methodology included scrutiny of records, analysis of the mining database, physical verification, use of Geographic Information System (GIS) and remote sensing data. For detailed analysis, the Linear Imaging and Self Scanning Sensor (LISS-IV) images were procured by expert agency National Institute of Technology (NIT), Patna from National Remote Sensing Centre (NRSC), Hyderabad for specific periods and locations.

Audit scrutiny including comparison of satellite images, use of Geographic Information System (GIS) and remote sensing data revealed the following:

o Approval of incorrect Geo-coordinates for sand mining

In many cases, riverbed, in the middle of river, vegetation area or agriculture area. Some mining areas were approved near electric tower and bridges which was not allowable. Some figures are illustrated below:-

Baisa sand *ghat* area allowed for mining was in middle of the river.

Bishnupur sand ghat area allowed for mining was in the middle of the river.

o Mining activities seen in satellite images where nil extraction report was submitted by lessees of sand mining lease

Analysis of the satellite images of the three sand ghats where lessees had reported NIL extraction during 2018-20 indicated that the mining operations were carried out in these three sand ghats.

o **Mining of lime-stone carried out but mined area filled with burden material to hide extraction.**

Study of satellite images on Google Earth Pro related to Geo-coordinates of a mining area of 53.378 hectare given in Mining Plan showed that mining activities were carried on outside the area (4.11 hectare) during the year 2009 to 2013 and the area was filled up by reject/overburden material of allotted area in 2018 to 2019. This is supported by the historical Satellite images as given in **Figures below:**

Extraction observed outside the lease area. (April 2013)

The outside excavated area was fully filled using burden material (March 2019).

o **Excess extraction against despatches reported by lessees of sand ghats**

In order to identify the actual extraction by the lessees of sand ghats, the areas of approved sand mining were analyzed using Google Earth Pro. The changes in earth after extraction are shown below:

Images captured for Lahladpur sand ghat for the period February 2018.

Images captured for Lahladpur sand *ghat* for the period April 2018.

The approximate extracted material observed from the satellite images was compared with the despatches of sand as reported by the lessees through the database of e-challans. It was observed that in six sand ghats, on a conservative basis, approximately 4,75,18,362 cubic feet (59 percent) were reported less by the lessees vis-à-vis the approximated extractions in these ghats as observed through Google Earth images.

Scan to access the report

Rajasthan

Audit was conducted using Remote Sensing Data and Geographic Information System to point out the illegal mining area, i.e., difference between the permitted mining area and the actual mined area in the sampled five divisions selected for scrutiny based on number of illegal mining cases and penalty imposed. Within the selected divisions, five Tehsils, were selected for spatial study through satellite images (One Tehsil from each selected division offices). 514 leases out of total 1,762 leases of selected divisions, i.e., 29 *per cent* were test-checked.

Satellite images were used to identify the area of mining which are outside the area of the mining leases in the selected Tehsils. 122 such mining points were noticed near 175 mining leases. Out of these, 25 mining points were physically verified with the representatives of the Department of Mines and Geology (Department).

The changes in the mined area over the years were analysed through remote sensing data and images at different points of time. The images taken with a gap of a few years and the visualization of illegal mining is evident in the latest images. An illustrative satellite image of illegal mining outside the lease area is given here:

Analysis of Satellite Imagery revealed continuous illegal mining in adjoining mining area of Neem Ka Thana.

Green line depicts limits of Lease area. Yellow line depicts illegal mined area.

It was observed from satellite imagery that illegal mining was being done in almost 34 *per cent* of test checked leases. To confirm the results of satellite images, the office carried out Joint Physical Verification (JPV) at the sites, along with the officials of the Department. Global Navigation Satellite System (GNSS) was used to verify the coordinates of the leases

and illegal mining areas. An illustrative satellite image for illegal mining outside the lease area along with a photograph taken at the time of joint physical verification is also given hereunder to prove the illegal mining:

Lease Number 66/1996 (ME Alwar)

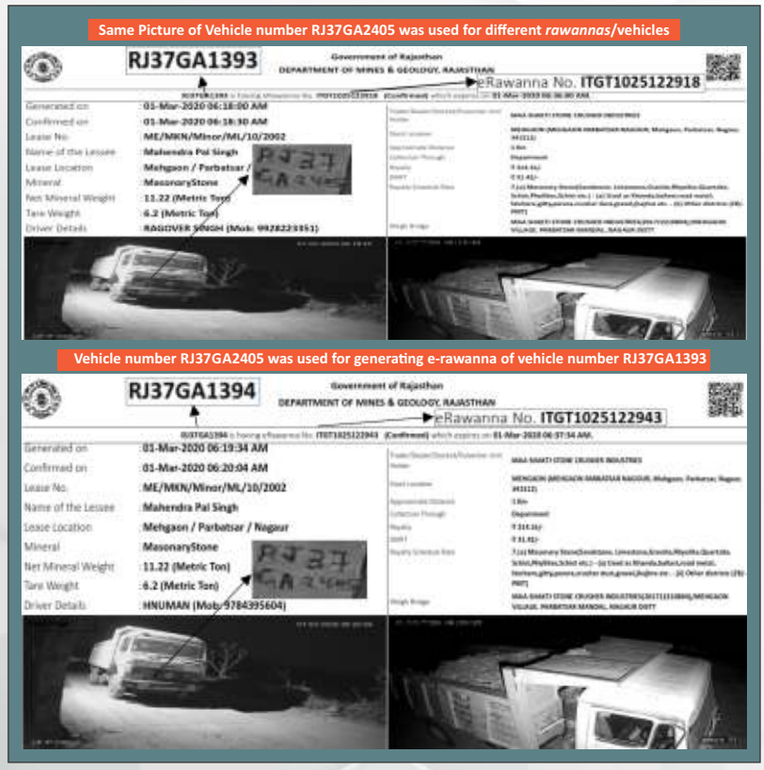

Photograph taken on 16.04.2021

The system to issue e-rawannas (permits) for dispatch of minerals from mining leases was also reviewed with the help of the departmental web-based application Department of Mines and Geology Online Monitoring System (DMGOMS).

From the analysis of data and CCTV images of weighbridges available on the DMGOMS, it was observed that a photograph of one vehicle was used many times for confirmation of e-rawannas (permit for dispatch of mineral) of other vehicles. These cases indicated that e-rawannas were confirmed without the actual weight of the vehicle.

By utilizing the technology, it was possible to point out not only mining outside lease areas but also other irregularities such as:

- misuse of rawannas, i.e., lessees used their rawannas for dispatch of minerals that were not excavated from their legal leases;



The analysis of Satellite images revealed that there was no mining activity at ML number 121/2006 (ME Makrana) during the period July 2014 to June 2021. However, the lessee dispatched 57,568.43 MT mineral through 2,317 e-rawannas from this lease during the period 30 August 2018 to 25 November 2019.

- overlapping of leases, i.e., leases were demarcated by the departmental officials in such a way that area of one lease was overlapped by other lease

Image of leases under the jurisdiction of ME Sikar

- gap areas among the leases, i.e., there were gaps among the allotted leases which leads to illegal mining.

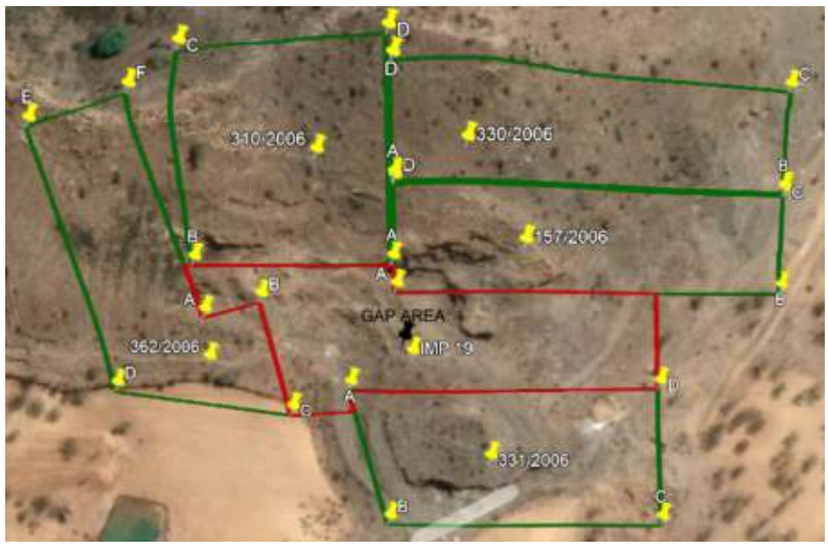


Image of illegal mining in gap area under the jurisdiction of ME Sikar

Green line depicts Lease area. Red line depicts Gap area.

Out of 25 physically test checked mining points, Department was able to complete the survey in 14 and Department confirmed that 13.37 lakh MT mineral was illegally excavated. The cost of this illegally excavated mineral was ₹ 111 crore. Out of this ₹0.50 crore was recovered.

Use of remote sensing and GIS technology as adopted by the audit team and its results are helpful in addressing many issues:

- Identification and Monitoring of illegal mining prone areas with limited manpower.
- Unbiased and transparent system.
- Effective monitoring without extra burden on state exchequer as the technology is available free in the public domain.
- Check on illegal mining activities would also provide safeguard against the adverse environmental effect of illegal mining.

Considering the importance of the system used for checking illegal mining, the Department immediately issued (November 2021) detailed instructions to improve the working of the Department and to use remote sensing and GIS technology to monitor illegal mining.

Scan to access the report

Chhattisgarh

Performance Audit was conducted with the objective of ascertaining whether the Mineral Resources Department has evolved controls and mechanisms for detection and prevention of illegal mining activities in respect of minor minerals.

UAV captured image of illegal quarrying of Murrum mineral at Nava Raipur, District- Raipur.

Satellite images, i.e., the image of the topography of villages: Dhansuli, Nardaha and Akoldih-Khapri, Tahsil-Arang, as well as Nava Raipur and Kumhari sand mines in District- Raipur to study the quarrying activities were used. GPS Co-ordinates w.r.t. allotted mines provided by Director, Geology & Mining (DGM) were given to the consultant (National Institute of Technology, Raipur) for detection and volume calculation of the mined areas outside leased area using Unmanned Aerial Vehicle (UAV). Areas other than those covered by the GPS co-ordinates furnished by the DGM were identified as unauthorized/ illegal mining as these areas were not granted leases by the DGM.

In Kawardha District, pits were observed at 15 sites in the areas other than the sanctioned leases.

Satellite image showing pit outside the approved co-ordinates (*khasra* no. 1960, area- 0.971 hectare, village-Nardaha, Tahsil- Arang, District- Raipur, lease period- 25.09.2002 to 24.09.2032) Photo dated: April 2021, Source: *Google Earth Pro*

Satellite image of sanctioned and unauthorised pits (Photo dated: May 2020), *Source: Google Earth Pro*

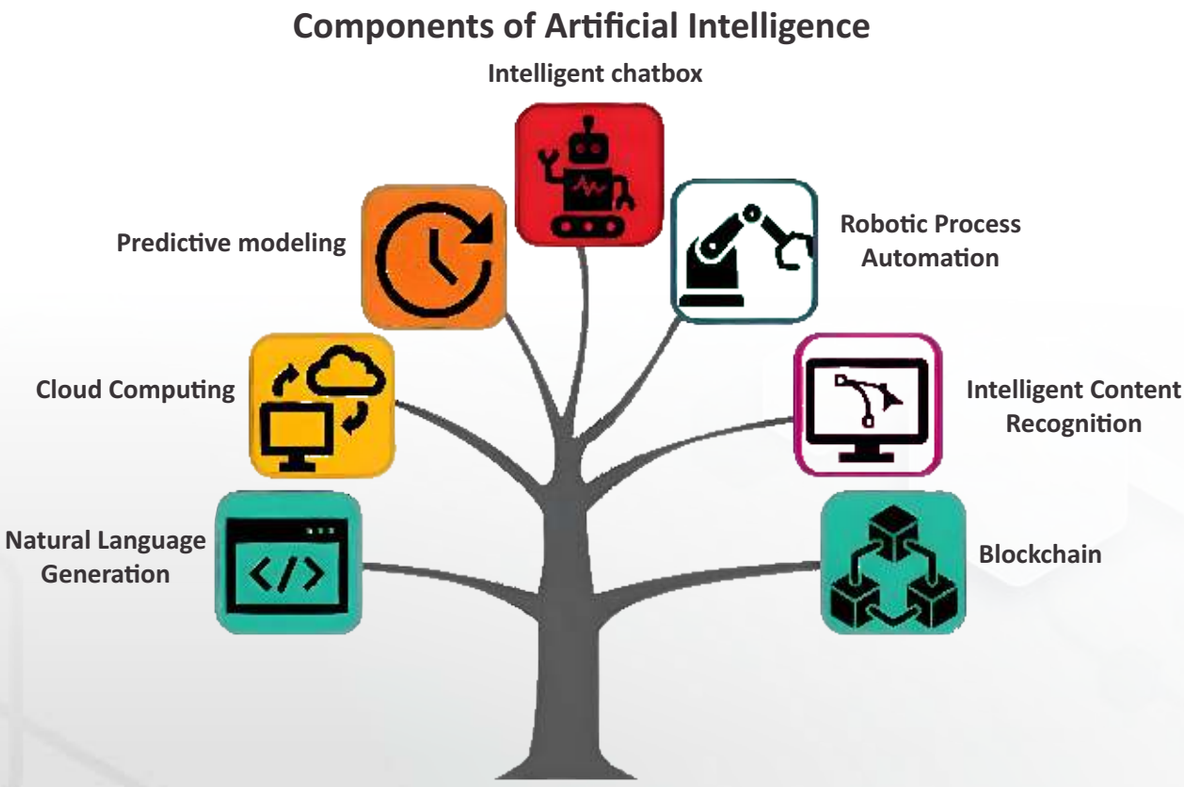
Yellow – sanctioned leases

Red - unauthorised pits

Scan to access the report

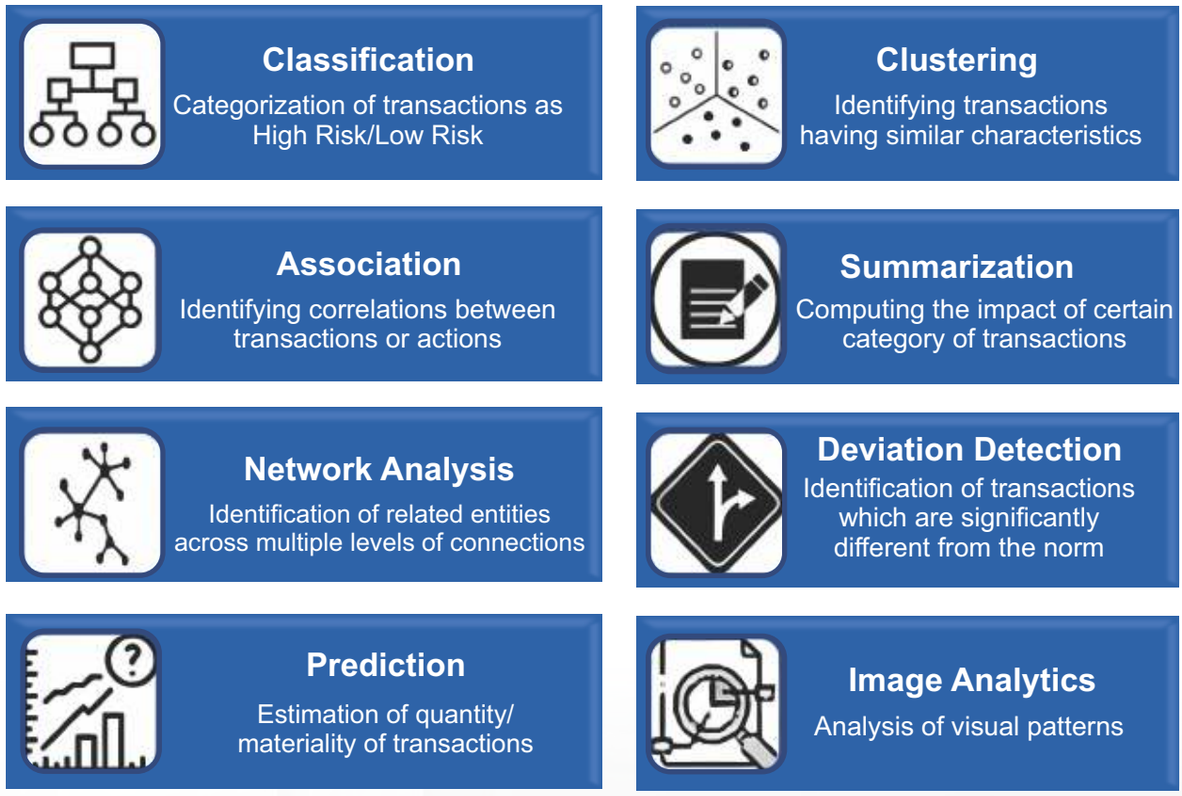
Use of Artificial Intelligence

Artificial Intelligence (AI) has been making significant advances in recent years and is being increasingly utilized in various areas, including auditing. The implementation of AI in the audit process can improve the efficiency and effectiveness of auditing.



AI has the potential to revolutionize the way audit is performed by enabling removal of repetitive tasks in the process, analysis of large volumes of data aiding in-depth understanding of the business operation, improved possibility of detecting high-risk transactions through full population testing improving accuracy, reducing manual effort, and increasing efficiency. With the ability to process large amounts of data for predictive analysis, AI can be applied to various areas within audit, such as risk assessment, fraud

detection and continuous auditing. Artificial Intelligence techniques can be used for various analysis on high volume transactions during audit as shown in diagram below:



Some of the AI techniques implemented recently during the data analytics projects are mentioned below:

1. Analysing Government Procurement System using Graph Theory

Government procurement is done through the E-Tender Portal wherein the bidders register on the portal for submitting their bids for various tenders. During the audit of the tendering process, the data of the bidders and bids processed under various tenders were analysed and it was noticed that various bidders were bidding in collusion, resulting in practices impairing the transparency of the bidding process. Graph algorithm was used to detect such collusion cases.

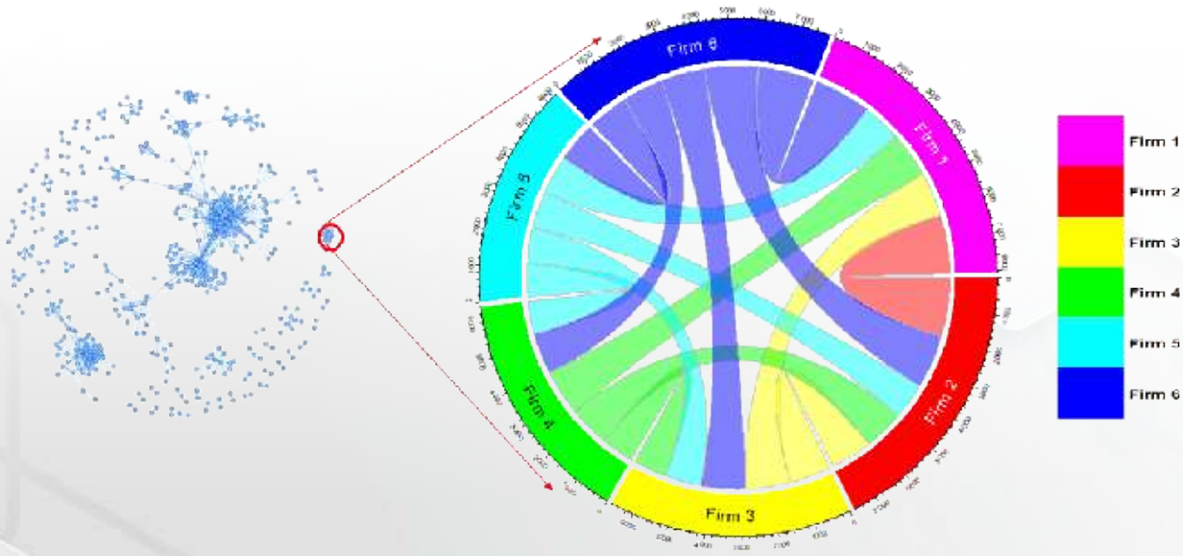
PROBLEM STATEMENT

Code of integrity for Public Procurement stipulates that bidders should not be engaged in any collusion, bid-rigging and anti-competitive acts or any other practice coming under the purview of the Competition Act, 2002 that may impair the transparency, fairness and the progress of the procurement process or to establish bid prices at artificial, non-competitive levels. Data analytics was used to identify any such anti-competitive practices adopted by a network of bidders. One of the challenges to identify network of bidders who may bid in collusion was that data may grow exponentially by forming combinations of bidders.

SOLUTION

The solution adopted was through graph theory which is a branch of mathematics used to model pairwise relation between different objects. A graph in this context is made up of vertices (also called nodes or points) which are connected by edges (also called links or lines). The bid data was, however, available in traditional data format, i.e., in relational tables. An integrated approach was followed in R-programming using 'igraph' package which is a free and open-source collection of network analysis tools. The bid data was converted into graph with nodes and edges. Further, required weights were also allocated to these edges according to the number of tenders in which the bidders have participated together. Plotting this graph object enabled detection of connections between each of the bidders in the procurement system.

Further, as part of case studies to be analysed in detail, we found complete subgraphs in the igraph object. Complete subgraphs are special kind of graphs where every node has a connection or link with every other node.



Network diagram and Chord diagram depicting interconnections within a bidder network

Network Analysis helped in processing huge amounts of data to detect collusion among bidders, which was not possible through traditional data analytics approach.

2. Use of AI in Identifying Circular Trading transactions in Taxation

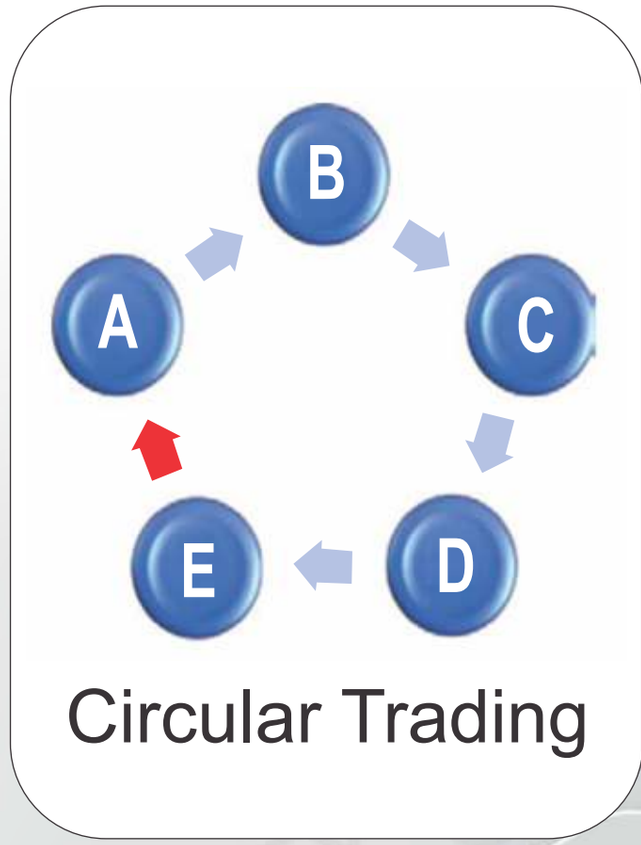
Circular Trading is normally used for creating a flow of fake sales transactions. These fake invoices are used for claiming input tax credit in the taxation which helps the companies to inflate their turnover, obtain larger loans from financial institutions and avail tax credits on every lap of transactions done, causing loss of money to the exchequer.

PROBLEM STATEMENT

Circular trading is normally used to generate fake invoices in transactions amongst multiple parties without actual supply of goods. The mapping shows that this problem requires advanced analysis methods and techniques to detect such cases.

SOLUTION

This problem is addressed by developing an algorithm that detects circular trading transactions to further verify the illegitimate cycles to uncover the suspicious transactions. We used graph theory to develop the algorithm. This time directed graphs were used. Unlike undirected graphs, in directed graphs, every link has a direction associated with it. E.g. A sells good to B does not necessarily means that B sell goods to A. To detect false/fake transactions, cycles in these directed graphs having minimum span (number of nodes) were identified.



Using Artificial Intelligence Algorithms, specific types of circular transactions up to 8 iterations were identified. The model was trained and tested on the selected E-Way Bill data set related to Taxation in India and several circular trading transactions/ patterns were noticed.

Circular Trading needs to be established further by evaluating the type, quantity and value of Goods transacted through circular trading. Using AI, the transactions that are forming circular trading can be flagged as high risk for further field level verification in detail to evaluate the effects of the circular trading, i.e, fraud, excess input tax credit, fake invoices, inflated sales, etc.

Use of Data Analytics

DBT Scheme

Direct Benefit Transfer (DBT) is an initiative of the Government of India (GoI) for transferring cash benefits directly to the beneficiaries of the schemes. The initiative aims at addressing various bottlenecks like multiple layers of authorization, inaccurate targeting of beneficiaries, leakages/ pilferages and duplication of beneficiaries, etc., by carrying out required process re-engineering.

In the Performance Audit on 'Implementation of DBT in the payment of post matric scholarship (PMS) to eligible students, the payment database along with the scheme software was analysed. It was seen that out of 3,12,823 beneficiaries who received PMS, the bank accounts of only 70,953 *(23 per cent)* beneficiaries were seeded with unique biometric identifier in the State. The analysis further revealed the following instances:

(1) Multiple students drawing post matric scholarship (PMS) from the same bank account

- During the period 2017-20, in 9,288 instances, it was noticed that though the bank account numbers and IFSC codes were the same, the names of the beneficiaries were different. In the eight sampled districts, 1,155 such cases, involving payment of ₹3.83 crore were detected. On detailed test-check of records, it was found that, the funds from these bank accounts were transferred to beneficiaries other than those in whose name the bank account was operated. The case studies are given in the box:

Case studies

1. **PMS to one student of the Annapurna ITC Institute, for 2017-18 and 2018-19, was credited to the bank account number, as given by the student in the application form. PMS for another student, for 2019-20, was also credited to the same bank account. On verification, the bank confirmed that the account belonged to yet another person.**
2. **Another student of the Annapurna ITC Institute got PMS for 2017-18, in bank account No. ********992, with IFSC Code SBIN*****47. In the subsequent year (2018-19), the same student got payment in bank account No. ********564, with IFSC Code UTBI*****02. In 2019-20, a different student got PMS for the year 2019-20, in the same bank account (No. ********564, with the same IFSC Code). On verification, it was found that the bank account No. ********564 belonged to another person as shown in the photograph shown below. This is indicative of the non-receipt of PMS by these students.**

(2) The presence of Bank account of majority of students in a particular bank, in the district other than the location of the institute.

During 2020-21, It was noticed that bank accounts of 1,077 beneficiaries were opened in one bank, i.e., Bank of Baroda, Church Compound Branch, Baslasore, which was 130 kms away from the location of the institute and in a different district. In all these cases, the introducers for opening bank account were office bearers of the institute and the mobile phone numbers given in the bank account form were of the institute.

On verification of the records of the institute, it was found that many students had discontinued the course but their applications were being forwarded by the institute and payment was made directly to their bank account. On verification of the records in the bank, it was seen that Rs. 2.36 crore was transferred from the students' bank account to the institute's bank account during 2016-20 on the basis of a mandate form, about which the students were not aware.

Scan to access the report

Property Registration Application

The Registration Department of a State is responsible for the registration of sale documents and other instruments of transfer of rights, which legalize the ownership of a citizen to his property. Given the impact of ownership of immovable property on the socio-economic growth of a household, the functioning of the Registration Department impacts almost every citizen of the state. The Registration Department, Tamil Nadu had implemented an application named STAR (Simple and Transparent Administration of Registration) which was audited. In the course of the audit, the planning was reviewed, the application tested, its public/department interfaces evaluated, data was obtained, restored and analyzed and the service delivery to the citizens assessed.

The data obtained from the Registration Department had 4,488 tables. However, the 'Data Dictionary', which is essential to understand the database, was not furnished.

- The primary objective of STAR 2.0 application is foolproof service delivery through Identity based registration, which is based on the authenticity of both the persons who receive service from the department and the property documents presented for registration. Tools to verify the validity of Aadhar and PAN numbers submitted by the registrants in the application were developed internally. Further, in the absence of access to the land records database, a digital land records were created by digitizing the hard copy of the 'A-register' (which has all the land details) of one village, supplied by the Revenue Department, to enable data analysis. Further, support of the System Integrators was garnered which helped in restoration of data and the understanding of the process flow through the application. Systematic design and conduct of User Acceptance Testing was utilized in Identifying the weak links / control weaknesses in the process chain which were effective inputs in data analysis. Through this exercise, 51 application deficiencies (such as acceptance of any ID proof, multiple mutation of documents etc.) were identified.
- As the office identified a significant systemic loophole in ID verification module, the office developed its in-house Aadhar Validation Tool and PAN validation tool to identify anomalies in ID submission, if any. Further, Audit cross-verified third-party data (Transport Department) for identifying invalid Driving License ID submissions. This exercise helped in identifying the submission of invalid identity cards and fraudulent registrations.

Aadhar Checker Tool & Pan Checker Tool

➢ Aadhar is a 12-digit number, wherein the first 11 digits are random numbers and the 12th digit is the checksum and depends on the previous 11 digits and their order.

Verhoeff algorithm is used to generate the checksum. The Verhoeff algorithm is a checksum algorithm used and developed for error detection by Dutch mathematician Jacobus Verhoeff in 1969. The algorithm detects all single-digit errors e.g. 1234 vs. 1235, and all transposition errors involving two adjacent digits e.g. 1234 vs. 1243. Aadhar uses this algorithm while generating unique identification number of an individual to eliminate these errors while validating these.

- Based on Verhoeff algorithm, the office created a unique tool to calculate and verify this checksum in respect of all Aadhar numbers available in the Registration database for mismatched 12th digit and identified Aadhar numbers incorrectly entered. Aadhar number needs to be entered in the tool and the validity status would be displayed by the tool automatically.

- PAN is a ten-digit alpha-numeric number, wherein the fourth character represents the status of the PAN holder and would be from the group of {P,C,H,A,B,G,J,L,F,T} and none other. The office created a tool to verify all the PAN details available in the Registration database for invalid characters in the fourth digit & incorrect string length.

Impact

The audit approaches adopted in this audit helped in bringing out significant deficiencies in the application in ensuring correctness of personal identity details, which made it vulnerable for impersonation frauds, multiple registration of same document (mutation), registration of Government land parcels by private persons, illegal registration of temple lands etc.,

- **Identification of Impersonation:** 1,55,796 incorrect identity card submissions in the STAR Application were identified.

- **Identification of Multiple Mutation of Documents:** The User Acceptance Testing flagged the significant control weakness of multiple mutation of documents wherein the same document could be used for registering same parcel of land, multiple times.

- **Identification of Government Land Registrations:** Conversion of physical copy of A-register enabled audit to bring out illegal registration of Government lands by private persons through an application loophole which enables a registrant to enter any government survey number while registering.

- **Identification of Temple Land Registrations:** The office identified another significant weakness of the application wherein it allowed registration of lands owned by temples without verification with temple authorities. Audit unearthed cases of illegal registration of temple lands.

Scan to access the report

Evaluating E-Procurements

Performance Audit on the Construction and maintenance of Roads by the State Highways Department, Tamil Nadu was conducted covering the period 2016-21. This included a thorough examination of the e-procurement system for awarding contracts through e-tenders, which was implemented with effect from August 2019. During the period from August 2019 – August 2021, the Highways department invited 2,819 tenders worth ₹17,303.53 crores through the e-procurement system, for which 8,771 bids were received from 862 contractors.

The e-procurement data of the Highways department is available in PostgreSQL. The entire data dump was obtained for in-depth analysis. By employing ***Python programming***, a significant amount of data was analyzed, leading to unique audit findings.

PostgreSQL queries were executed on the data dump obtained from the Highways Department to retrieve the desired information, and the results were exported to MS Excel. Python programming language was utilized to search for any indications of cartel formation. To determine the presence of such collusion, a range of percentages from 100 down to 40 was utilized as thresholds for flagging these suspicious bid patterns.

The results obtained through this method helped in narrowing down possible cartels which were further analyzed and verified with the documents uploaded in the portal. An automated approach to downloading documents using Python was adopted which not only saved significant manual effort but also ensured the completion of the task within the given time constraints. Some of the findings are illustrated below:

Illustration I:

A group of four contractors, participated together in 70% of their works. Manual verification of the documents uploaded revealed that these contractors had participated in a total of 63 works. Remarkably, all 63 contracts were awarded to this group of contractors.

To further support the audit process, detailed information about contractors and firms was downloaded from the Ministry of Corporate Affairs website. These additional sources of information strengthened the audit's thoroughness and completeness, providing a comprehensive understanding of the contractor’s backgrounds and activities.

Illustration II:

The data relating to the award of e-tenders & the registration status of contractors obtained was cross-verified with the master data of companies available on the website of the Ministry of Corporate Affairs, Government of India to ascertain the details related to Directors & Partners of the Firm/Company. Such cross-verification revealed ***cartel formation among family members and Business partners***.

Two associated entities participated together in six tenders. One of these entities was awarded three contracts valuing Rs. 16.32 crores, and one tender valuing Rs. 5.42 crores was awarded to other associated entity.

Illustration III:

Use of same supporting documents in EMD submissions

The analysis of bid data pertaining to the submission of Earnest Money Deposits (EMDs) revealed a consistent pattern of the same supporting documents being uploaded in multiple scenarios.

This pattern was observed in three distinct situations:

1. *when the same contractor submitted the same EMD for multiple works;*
2. *when different contractors submitted the same EMD for the same work; and*
3. *when different contractors submitted the same EMD for different works.*

This consistent usage of the same supporting document for EMDs across these scenarios strongly indicated collusion among contractors. It suggested a deliberate effort to manipulate the bidding process and gain an unfair advantage.

Same EMD Document uploaded by different contractors for different works


Indian Bank
Deposit Receipt
0080666
DIVISIONAL ENGINEER HIGHWAYS I/C AND M JVANIYAMBADI ACCOUNT II NATARAJAN
INR 3,60,000/-
5.45%
04/07/2020
04/07/2021
INR 3,80,025/-
RUPEES THREE LAKHS SIXTY ONLY
SELF

EMD document no - 0080666
Contractor Name - Natarajan R
Work ID - 2020_HWAY_166493_1


Indian Bank
Deposit Receipt
0080666
DIVISIONAL ENGINEER HIGHWAYS I/C AND M JVANIYAMBADI ACCOUNT II NATARAJAN
INR 3,60,000/-
5.45%
04/07/2020
04/07/2021
INR 3,80,025/-
RUPEES THREE LAKHS SIXTY ONLY
SELF

EMD document no - 0080666
Contractor Name - Mani P
Work ID - 2020_HWAY_166488_1

Common IP Addresses and use of Department Systems

The database captured and recorded the IP addresses of both the contractors' systems and the systems belonging to officials of the Highways department. A comparison of the IP addresses used by contractors for bid submissions and those of department officials revealed that the *contractors utilized the computer systems of the Highways department*.

In response to 214 tender notices, 289 bids were filed by 87 contractors using 57 computer systems belonging to department officials. Among these bids, 71 were awarded contracts based on submitting the lowest rates. Similarly in 907 tenders, 2091 bids were submitted by 528 contractors using the same computer systems (475 systems) and out of the same, 490 bids were awarded contracts to L1.

A toolkit was prepared which incorporates the audit methodology that was utilized to derive the audit findings presented in the report.

Another noteworthy finding was the registration of bidders in the e-tendering portal as both partnership firms and proprietorships. By registering as different entity types, these bidders could potentially submit multiple bids for the same tender, manipulating the system and compromising the objective of fair competition.

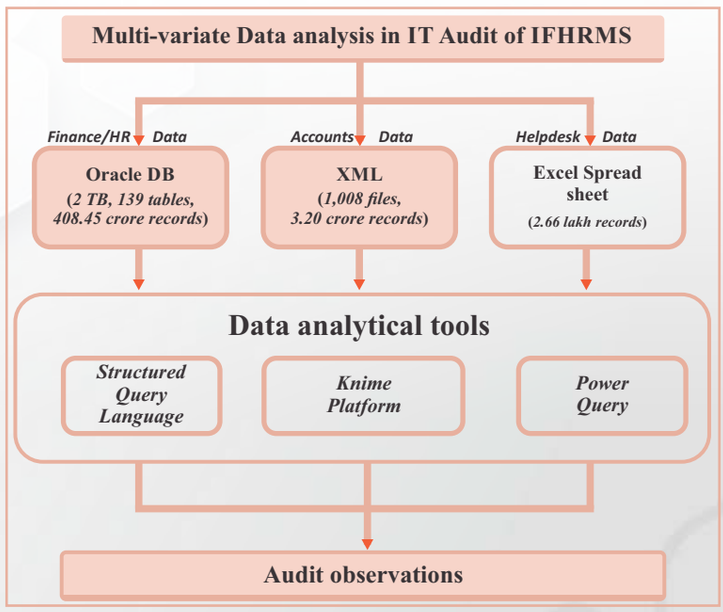
Scan to access the report

Analysis of Integrated Financial Management Systems

1. IFHRMS in Tamil Nadu:

The Government of Tamil Nadu (GoTN) implemented Integrated Financial and Human Resource Management System (IFHRMS) to optimise and manage the State finances with the help of technology. The system aims to improve the quality and availability of information for public financial management, budgeting, treasury operations, accounting, auditing, etc.

Considering the importance of IFHRMS in rendering data to Government on a real time basis, Performance Audit was taken up with focus on functioning of IFHRMS modules, based on the data for the financial year 2021-22, as IFHRMS went live from January 2021. In that process, *different types of voluminous data sets such as Oracle database, XML data files and data stored in spreadsheets needed to be analysed using different data analytical tools* as shown below:



The office had to use multiple data analytic tools as different types of data sets were to be analyzed, to arrive at meaningful audit conclusions. To achieve that, different methodologies were adopted as discussed below:

✓ IFHRMS uses Oracle **DB, a fully scalable relational database architecture**, known for online transaction processing and data warehousing to store, manage and process data. To analyze such a massive database of 2 TB with 408.45 crore records stored in 139 tables, **SQL** was used to access records from different tables with one single command.

- ✓ Accounts data (1,008 files containing 3.20 crore records for the year 2021-22) provided in XML format (eXtensible Markup Language – used to define, store and share data over a network) was converted as MS Access database using Visual Basic script.
- ✓ The MS Access database was analysed using 'Knime' software, to create visual data flows. Then analytical steps were selectively executed and the output was reviewed in interactive view, with the ability to filter, convert, and combine data sets.
- ✓ The major advantage of Knime was that visual data flows could be shared and used again for analysis of new data sets, thus reducing the effort and increase the efficiency while maintaining uniformity.
- ✓ Apart from the above, 2.66 lakh complaints raised by users, provided in excel format, was analysed using inbuilt features of MS Excel such as filters and pivot tables to identify recurring issues in the software.
- ✓ A complete User Acceptance Testing of core modules of IFHRMS in real-time environment was conducted with deliberate wrong inputs to assess how a mission critical software that handles entire transactions of a State ensures that bills are processed correctly in line with business rules of the Government.

Though the data size was huge, audit team examined the data and results were saved as MS Excel Sheets for communicating to the auditee entities. The exceptions, errors and discrepancies noticed during data analysis were corroborated with the manual records during field visit, which formed the backbone for the Audit product. The audit observations backed up with data was well received by the Department, which took many corrective actions based on the audit observations within the audit cycle itself.

Key audit findings

- Audit of IFHRMS backed up by data analysis brought out substantial errors in core areas like budget operations, accounts compilation, bill processing, pension management and human resources management modules of the system.
- Budget operation module, in violation of budget manual provisions, allowed transfer of funds between Grants, incurring of expenditure without budget provision and withdrawal of entire budget allocation after expenditure had been incurred.
- Accounts are not compiled in real time and required manual intervention due to booking of expenditure under wrong heads of account and receipts being handled by old software.
- Bill processing module, that handles the entire Government disbursement, allowed double payment for same claim, could not process bills within stipulated timeline and allowed presentation of bills online without soft copies of supporting documents.
- Pension management system allowed creation of multiple pensioner IDs for the same pensioner leading to double pension payment and had inaccuracies in pensioner database that delayed sanction of additional pension to eligible pensioners.
- Automatic updation of employee's e-Service Record did not take place as all service

regulations were not mapped and there were no validation controls to ensure that employee status, increment, leave details and date of retirement were correctly captured in the system. Hence dependence on physical Service Records continued.

- A mission-critical system such as IFHRMS did not have robust security measures like biometric access, machine-based access rights and protection of user credentials.
- The complaints raised by the IFHRMS users were not analysed to resolve the recurring system issues.

Impact

GoTN started taking corrective actions in IFHRMS during the audit cycle itself based on audit observations.

Accounts compilation

Based on the observation, GoTN had identified incorrect Heads of Accounts (HoA) and disabled them in IFHRMS master database. Action was taken to incorporate business rules to prevent wrong booking of deduct refunds and assured that business rules relating to incorrect classification of cash remittance would be incorporated in IFHRMS at the earliest.

Bill processing

GoTN has :

- provided check box for certificate of receipt of goods by respective officials before initiating payment.
- rectified bugs in automatic TDS calculation while making contract payments.
- updated IFHRMS to handle one bill at a time by one DDO to prevent generation of duplicate bill/token numbers.
- rectified bugs in transferring the pending work notifications of one employee to another employee in case of the incumbent employee gets transferred.

Pension

- Steps were taken promptly to recover the duplicate pension payment made to pensioners and an amount of ₹13.50 lakh was recovered.
- Additional pension was sanctioned to the six out of the seven eligible pensioners mentioned in the Audit Report and details were called for in respect of the other pensioner for verification and sanction of additional pension.
- The Government further assured to undertake a one-time State-wide exercise to ensure that correct Date of Birth was captured in the pensioner database so that additional pension would be sanctioned to eligible pensioners without any delay.

Human Resource

- Provision to auto calculate the date of retirement has been provided to avoid manual entry of retirement date, which had led to errors in date of retirement as noticed by audit in respect of 14,077 employees.
- Provision of control to restrict the maximum number of EL to 240 days for employees.

Scan to access the report

2. IFMS in Karnataka :

In 2009, Government of Karnataka decided to build an Integrated Financial Management System (IFMS) for the State, called Khajane II (K2) by replacing the existing treasury application Khajane I (K1). Since its roll out in 2015, K2 has become one of the largest business applications for the State Government catering to the critical payment functions of Government Departments. Through K2, Departments of the State Government process more than 3 lakh vouchers and 70 lakh challans every year.

IT Audit of K2 was undertaken to understand whether K2's control environment is robust enough to safeguard the financial assets of the Government. This needed a comprehensive understanding of both the technology aspect as well as the functional aspect of K2. The Department's dependence on the System Integrator for technical aspects of K2 implementation coupled with insufficient project documentation and proprietary IFMS framework posed a challenge.

In order to stay ahead of the challenges presented by the assignment, the following initiatives were taken:

1. Overcoming the challenge of the complexity of the IFMS

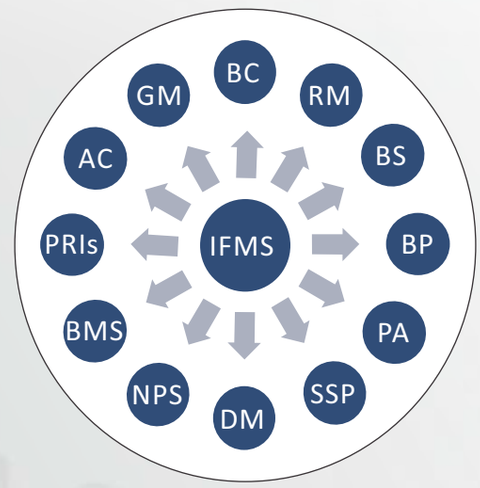
IFMS systems are inherently complex IT implementations aimed at reforming the public financial management and present a challenge in terms of data volumes and participating entities, with nuances created by an extended implementation phase. Given the scale, the implementation becomes complex and audit of such systems becomes more challenging requiring complete understanding.

K2 utilizes Karnataka State Wide Area Network (KSWAN) for connecting various offices of the State Government. The central data centre was developed and deployed along with a business continuity site.

The following were the 24 modules of the Application implemented in two phases:

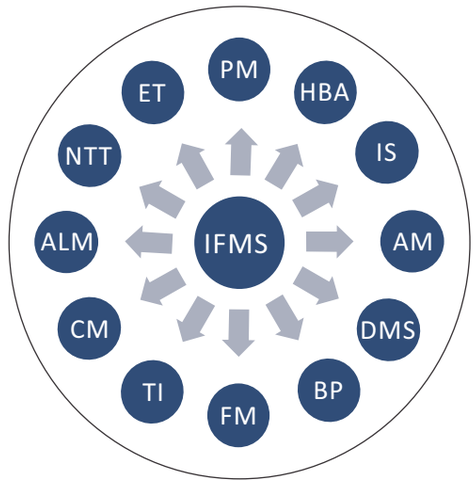
<u>Phase-I</u>

1. BC-Budget Control
2. RM-Receipts Module
3. BS-Bill Submission
4. BP-Bill Processing
5. PA- Payment Authorization
6. SSP-Social Security Pension
7. DM-Deposits Module
8. NPS-New Pension Scheme
9. BMS-Beneficiary Management System
10. PRI-Panchayat Raj Institutions
11. AC-Accounts Compilation
12. GM-General Module



Phase-II

1. PM-Pension Module
2. HBA-House Building Advance
3. IS-Inventory and Strong Room
4. AM-Audit Monitoring
5. DMS-Document Management System
6. Budget Preparation
7. FM- Fiscal Management
8. Treasury Inspection
9. Cash Management
10. ALM-Asset Liability Management
11. NTT-Non-Treasury Transactions
12. ET-Expenditure Tracking



The entire audit was undertaken in-house by building a core team with expertise in IT audit.

2. Broadening of knowledge base

The Audit team successfully dealt with the technical complexity of the Project by broadening their knowledge base with the help of various online training programs and brainstorming with peers.

3. Insightful audit observations

The audit findings covering application security vulnerabilities such as susceptibility of the billing process to tampering, breach of password and network access restrictions have shown the need for heightened security consciousness both among developers as well as the Government. The testing for vulnerabilities to guard against complacency was insightful.

Some of the important findings were:

➢ **Editing of Bills after finalization**

Bills once finalized should not be available for editing by a subordinate officer. It was seen that a caseworker could re-open a previously submitted / passed / accounted bill and reprocess. These vulnerabilities exposed the system to the risk of manipulation of bills, unauthorized access and manipulation of Form 62B. The office also demonstrated these vulnerabilities to the department. These vulnerabilities were demonstrated to the department by showing that bill amounts could be tampered.

➢ **Ineffective network restrictions proved through custom chrome browser extension developed by audit – an innovative method.**

Treasury users in the K2 application have a restriction to work only through KSWAN. An innovative method was adopted for proving that this restriction was ineffective and treasury users' activities could be carried out outside the KSWAN network. An in-house developed chrome browser extension was used

which bypasses user account control and exposed the weakness in the server-side restriction.

➢ **Password compromise**

K2 uses Jasper-soft server for generating reports. Audit analysis of use of Jasper server showed that it was installed with default administrator login credentials. Poor server hardening of Jasper Server, which exposed these credentials recorded within the server for accessing the database, was demonstrated to the Department.

➢ **Weaknesses in digital signature implementation**

It was noticed that Digital Signature Certificate (DSC) implementation, a crucial aspect of authorization and non-repudiation in K2 application, was deficient as components of voucher data such as recipients, sub-voucher information were kept outside the coverage of the digital signature. Instances of transactions without digital signatures which impacted the overall reliability of the digital signature process, were also noticed.

➢ **Bill cycle time analysis**

A Bill created in K2 proceeds through multiple levels before its payment. The bill processed at each stage was comprehensively analyzed and delays at various stages were highlighted. The need for bringing out a code of practice prescribing the timelines to ensure speedy processing and prompt payment of bills, was emphasised.

➢ **Double payments - GPF final bills submitted more than once**

The K2 did not distinguish the nature of GPF Final settlement bills in the application, raising the risk of double payment in GPF Final settlement bills.

The processing of double payment on a single GPF Final settlement bill in the application was demonstrated to the Department using this vulnerability.

➢ **Salary payment after retirements**

Payment of salaries to the employees even after their retirement/death in the K2 application by analysing the bills data was noticed. The non-implementation of validation controls even though the employee data on retirement was available in the application was highlighted.

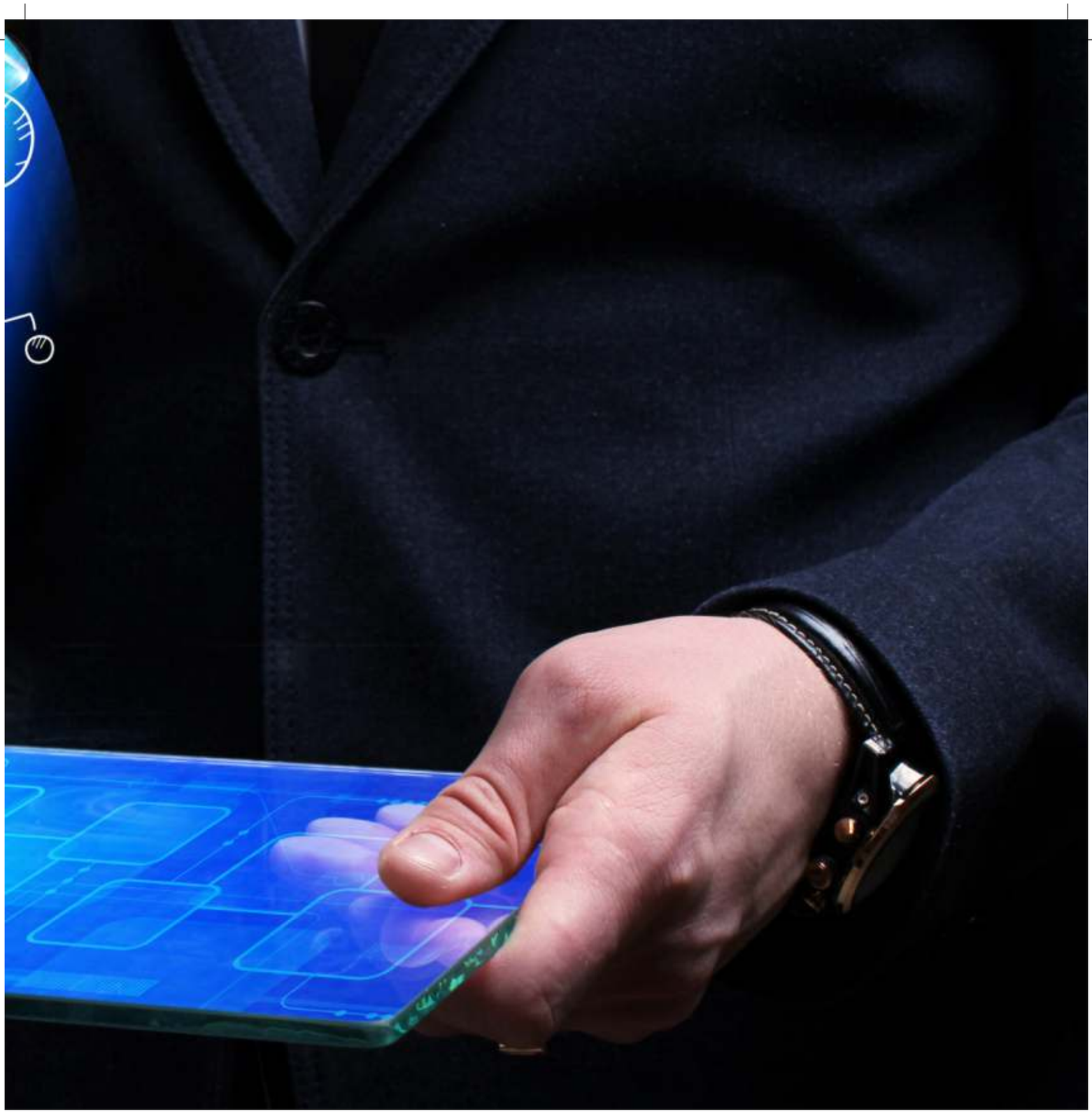
➢ **Double payments on refunds**

It was noticed that duplicate token numbers were generated in the K2 for a single bill corresponding to a refund order. These two tokens were processed separately and two payments were made for the same refund order.

The findings in respect of IT Project Management, Contract Management, General IT Governance, Strategic Control, and Security Controls for Critical Information Systems, Digital Signature implementation, use of Data analytics in Audit etc. offer learnings for exercising a strategic control over IT projects by the senior management implementing any IT project in the public sector.

Scan to access the report

Strides in audit methodology and impactful audits



Audit is conducted in the CAG Institution according to the internationally accepted standards and practices, CAG (DPC) Act, Regulations issued under the Act and manuals. Audit methodology is continually evolving in the increasing digital audit universe and is carried out with the use of Audit software(s), Data Analytics and Artificial Intelligence capabilities for gathering and analysing evidence.

This section showcases instances of advances in audit approach adopted by a few Offices and their impact.

Centralised Information Technology Billing System an Assessment-Uttar Pradesh

State Power Distribution Utilities of Uttar Pradesh, commonly known as DISCOMs, use Centralised Information Technology Billing System being implemented by the Uttar Pradesh Power Corporation Limited (Company). The Company has two IT-based revenue billing systems, viz., Energy Distribution and Service Management System (EDSMS) (commonly known as R-APDRP billing system) implemented (June 2015) under Re-structured Accelerated Power Development and Reforms Programme (R-APDRP) in 168 selected towns of Uttar Pradesh and mPower (commonly known as non R-APDRP billing system) implemented (September 2017) in Non R-APDRP areas of the State.

The performance audit of IT-based revenue billing system was conducted to examine whether the process of development and acquisition of IT system was transparent, economic and competitive; whether business rules were properly mapped and all required functionalities were provided in the IT application; and whether the implementation of the IT system led to achievement of organisational objectives. This audit was quite innovative and challenging as:

- Data size of FY 2018-19 in terms of memory was nearly 1.5 TB. The billing data were having 32.18 crore records, on which Data Analysis was performed. Division wise data (371 divisions) of each month were combined to ensure data integrity, in such a way data in 96 sheets were created.

- Audit utilised **Computer Assisted Audit Techniques, Tableau and Microsoft Excel tools and created various data models for extensive data analytics** through which the electronic billing data for the period April 2018 to March 2019 were analysed.

Some of the prominent audit findings were:

- ✓ Company did not formulate and adopt essential IT policies with respect to Human Resource responsible for managing IT activities, Document Retention, IT Security, Business Continuity and Disaster Recovery Plan.

- ✓ The Company failed to complete/update the baseline data of consumers, electrical assets and automated metering in R-APDRP System. Hence, the Company could not utilise GIS-based Consumer Indexing & Assets Mapping module, Assets Management module, Network Analysis module, Meter Data Acquisition System and Energy Audit module.

- ✓ In the Non R-APDRP billing system, there is no automated system of energy accounting, auditing and generation of AT&C loss report. Furthermore, the Company made incorrect certification/ declarations to Power Finance Corporation in respect of completion of IT Project.As a result, the system-generated AT&C loss report was highly erratic, defeating the primary objective of automated calculation of AT&C losses without human intervention.

- ✓ The Company also did not ensure validation checks for various data inputs. Confidentiality in the IT system was compromised as the Company failed to restrict the log on sessions and also to disable login IDs of deceased/ transferred/retired employees on time.

- ✓ It also failed to ensure genuineness/reasonableness of the rates of Original Equipment Manufacturers charged by AMC/ATS vendor and did not carry out annual maintenance of IT assets in a prudent manner.

- ✓ Company also failed to comply with the decision of the Board regarding installation of prepaid meters for Government consumers as out of 69,794 such consumers, prepaid meters had been installed only for 39 consumers. The continued and increasing level of commercial losses of the Company/DISCOMs is a testimony of the inadequacy/failure in controls of the entities.

As a result of audit, 8 recommendations have been made. Out of **8 recommendations** made in the Report, 7 **have been accepted** by the State Government which will go a long way to improve the reliability and performance of the IT systems used for billing and will improve the revenue collections of the company.

Scan to access the report

INDIAN RAILWAYS – Analysing the Derailments

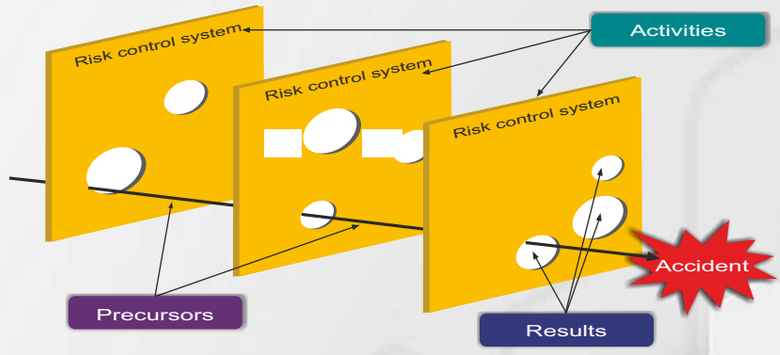
The Indian Railways (IR) is one of the world's largest railways. It functions as a vertically integrated organization providing Passenger and Freight services. It is a single system which consists of 67,956 route km of track that traverse the country. More than 21,648 trains ply on IR carrying about 22.15 million passengers and hauling nearly 3.32 million tonnes of freight every day.

Accidents tarnish image and question safe and sound working procedures of IR. Accidents occur on account of acts of omission or commission, evasion of rules, unsafe practices etc. Out of various categories of accidents, most serious consequences are witnessed in collisions, derailments, fire in running trains and level crossings accidents etc. Derailments are off-loading of wheel or wheels causing detention or damage to rolling stock/permanent way. As per IR, a derailment may be sudden or gradual due to failure of one or more of factors related to track, train operations, Mechanical/ Rolling Stock and Signal and Telecommunication.

The focus of the audit done was to ascertain whether measures to prevent derailments and collisions were clearly laid down and implemented by the Ministry of Railways (MoR). Timely conducting of investigations on derailments/collisions and implementation of the preventive recommendations were the other areas of Audit. Emphasis was also laid on the deployment of funds as per the guidelines of Rashtriya Rail Sanraksha Kosh (RRSK).

The 'Swiss cheese model' was used for analysis of causes of accidents. The model recognizes that accidents happen when the different levels of preventive checks fail simultaneously. This is akin to the holes in a cheese. The slices of cheese represent the barriers or risk controls systems that are put in place. The holes in the cheese represent the weaknesses in those defences. Should the holes align (i.e. should failures occur simultaneously), an accident could occur. Following figure is a pictorial representation of this model.

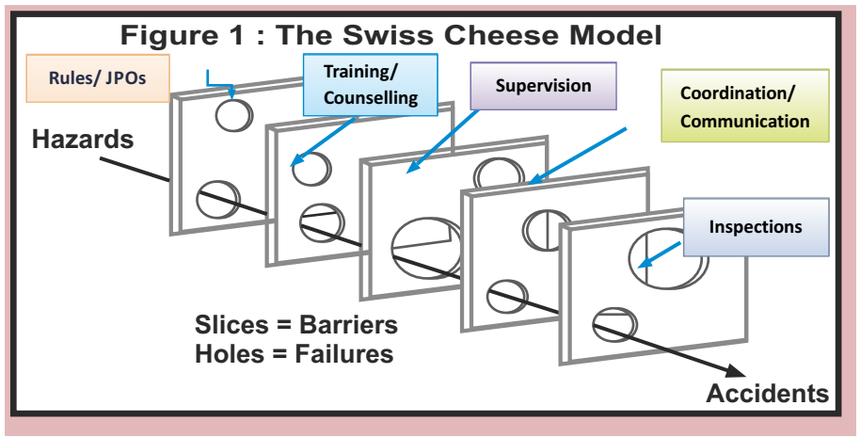
Swiss cheese model of accident causation



The said module was adopted for analyzing the simultaneous failures of various control measures that had led to the accidents. This module was applied and illustrated through examples in the report after analysis of the accident reports collected from various zonal railways.

The causes of derailments on IR were analyzed in accordance with the 'Swiss Cheese Model'. From the review of the derailment cases, the cascading factors of series of failures have been identified which includes (i) Rules and Joint Procedure Orders (JPOs); (ii) Training/Counselling of staff; (iii) Supervision of operations; (iv) Coordination and communication between staff of different departments and (v) Scheduled Inspections, in the IR System. These could be considered as the layers of 'Swiss Cheese Slices' or 'defense barriers' for prevention of accidents as depicted in figure below:

Figure 1 : The Swiss Cheese Model



Based on the results of the accident investigations, several factors that lead to the derailments were obtained. These factors translated into 'Swiss Cheese Model' and a straight line was drawn to connect one factor of each layer to obtain a conclusion. From the above figure, it can be concluded that most of the derailments occurred due to simultaneous failures of each of the five barriers.

It was also observed that Rashtriya Rail Sanraksha Kosh (RRSK) was created in 2017-18 and guidelines (July 2017) for 'Operation of RRSK' were issued by the MoR. The mandate of RRSK is to finance critical safety-related works of renewal, replacement and augmentation of assets. The audit pointed out that Priority-I works from RRSK showed a declining trend. The allotment of funds for track renewals declined and the funds allocated to track renewal works were not fully utilized. Further, there were incorrect bookings in RRSK.

Based on the audit findings, the Audit recommended important measures to prevent occurrence of accidents in Indian Railways, viz., (i) timely completion and finalization of accident inquiries; (ii) timely implementation of maintenance activities by adopting fully mechanized methods of track maintenance and improved technologies; (iii) the 'guiding principles for deployment of RRSK funds' must be followed to avoid fund constraints in the area of Priority-I works; and (iv) 'Detailed Outcome Framework' may be prepared for each item of safety work as per the indicative outcomes to gauge whether the benefits derived out of the RRSK funds are in conformity with the objectives behind the creation of the Fund.

Thus, the audit Report brought out the deficiencies on the part of Railways in respect of various aspects related to the Derailments in Indian railways' which can be used to strengthen the system to avoid the occurrence of similar incidents in Indian railways.

Scan to access the report

Land Records Management - Data-led approach- Tamil Nadu

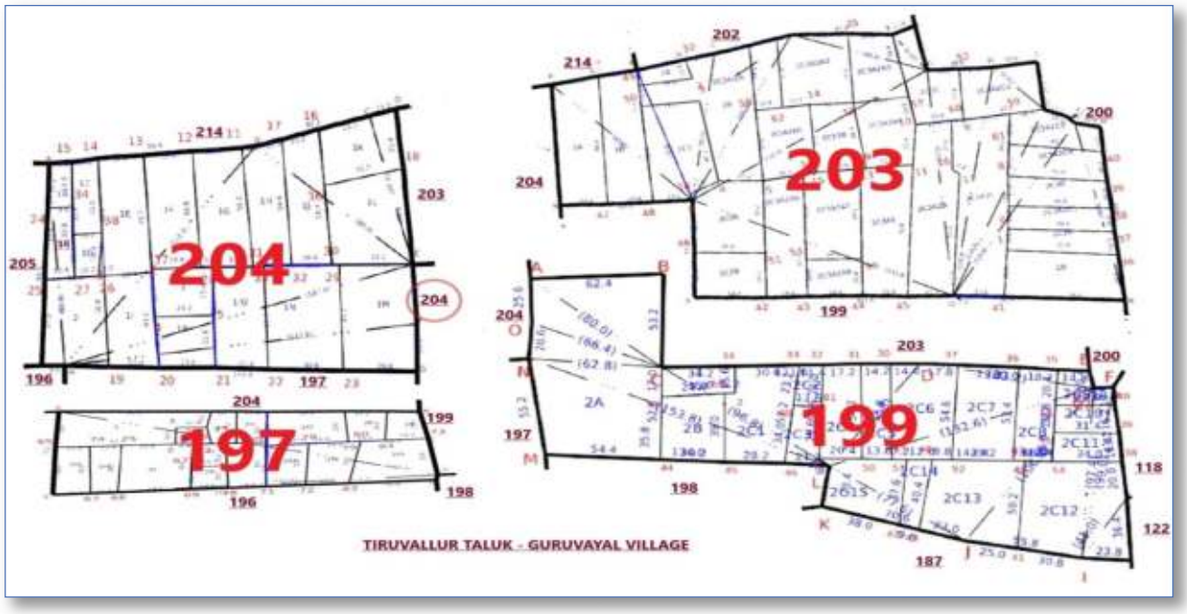
Land is an important natural resource of every country. In 2008, Government of India (GoI) launched the National Land Records Modernisation Programme (NLRMP) with the objective of digitising all land records, to improve their quality and to make them more accessible. In 2016, NLRMP was revamped as the Digital India Land Records Modernisation Programme (DILRMP). It is being implemented as a centrally sponsored scheme with cent per cent GoI funding with effect from 1 April 2016. DILRMP seeks to (a) usher in a system of updated land records; (b) automate mutation; (c) integrate textual and spatial records; (d) interconnect Revenue records and Registration records; and (e) establish conclusive land titles and title-guarantee.

This Performance Audit was conducted to assess (1) the achievement of computerisation in ensuring a conclusive land-titling with title guarantee; (2) the effective use of data by Revenue and Registration Departments; and (3) the efficacy of the system in place for ensuring data security, capacity building, monitoring; etc.

Analysis of databases (23.25 lakh sub-divisional land records and 5.61 lakh title transfer applications) was possible only due to early planning during the manual checking stage itself. Field offices of the department provided smaller datasets pertaining to their jurisdiction. The SQL queries were deployed and trained on those datasets in the preliminary stage. As soon as the larger complete datasets were provided, similar queries were deployed. The exceptions, errors, discrepancies and delay in service delivery noticed during data analysis were corroborated with the manual records during field visit in respect of all the sampled Taluks. All the query outputs were supported by the manual documents, which formed the backbone for the entire report. Few advanced querying techniques were:

- **Advance querying** syntax like 'Generate series' to bring out missing survey numbers. A survey number is an alphanumeric unique code for every land parcel and has certain conventions in assigning it. 'Generate series' syntax helped in series generation based on the rules/conventions in assigning survey numbers and then comparing this series with the actual survey number assigned by the Department to bring out missing survey numbers

- **Spatial Data Analysis:** Digitisation of Land Records involved digitisation of both textual and spatial land records. A digitised spatial land record is given below:



- To ensure conclusive titling, the spatial land records has to depict the correct size of land and the adjacent land parcels.
- In the above example, it is observed that one of the adjacent field details of Survey field 204 is denoted as 204 (circled) which is not correct as the Survey number of the field measurement sketch (FMS) itself cannot be one of its adjacent field number. On placing the adjacent fields of Survey field 204 beside each other, it was noticed that the number circled in the diagram above should be 199 instead of 204. The sketch of Survey field 199 placed in the diagram above also confirms this observation.

Some observations

- In 61 *per cent* of the sampled villages, there were significant differences in the total land area of the village, between the manual and computerised A-Register.
- Lack of validation controls in the application software resulted in errors and discrepancies in capture of old survey numbers and assigning Sub- division numbers as per notation rules.
- Continued erroneous classification of 3.22 lakh private land parcels as Government land in the computerised land records has put the land owners to hardship.
- Multiple *patta* numbers assigned to a single land owner in a village and redundant *patta* numbers hampered the workflow processing of online *patta* transfers.
- Computerisation of Field Measurement Sketches (FMS) is far from complete. Delivery of services to citizen was impacted, as 6.25 out of 23.25 lakh Sub-divisional

records in the A-Register had no corresponding entries in the FMS database. FMS data also had errors in land area when compared to computerised A-Register.

- As of March 2021, 1.42 crore computerised and validated Natham land records were not brought on-line even after four years and also had deficiencies. The e-Adangal Project, taken up in 2017, was not fully implemented.
- In the sampled taluks, delays in approving, rejecting and processing of on-line patta transfer applications, which did not involve Sub-division, were 43 *per cent*, 79 *per cent* and 60 *per cent* respectively. Similarly, delays in approving, rejecting and processing of on-line patta transfer applications, which involved Sub-division, were 53 *per cent*, 93 *per cent* and 73 *per cent* respectively.

Impact:

The audit observations brought out of advanced data analysis were accepted by the Government during the Exit Conference and **NIC was instructed to adopt the querying methodology adopted by audit to rectify the system deficiencies.**

Two Government orders were issued to initiate special drive for comparison of data with original manuscript and cleansing the data.

Scan to access the report

Assessment of Redressal of Crime against Women- Rajasthan

Rajasthan was among the top four states in the country with the highest number of registered crimes against women during 2010-16; fifth during 2017-18 and second during 2019 as per statistics of the National Crime Records Bureau. Crime rate against women in Rajasthan was consistently higher than all India average and the neighbouring states during this period. The Indian Constitution in its preamble, fundamental rights, fundamental duties and directive principles not only grants equality to women but also empowers the State to adopt measures of positive discrimination in favour of women for obviating the social, economic and political disadvantages faced by them.

Performance Audit on 'Prevention, Protection and Redressal of Crime against Women in Rajasthan' was conducted to assess the effectiveness of the measures taken or to be taken and efficacy of redressal mechanism as prescribed under various acts and special local laws for protection of women. Performance Audit assessed the status of crimes committed against women in Rajasthan and examined the remedial action taken by the five departments, i.e., Social Justice and Empowerment Department, Women Empowerment Directorate, Department for Child Rights, Home Department and Law and Legal Department and two commissions, i.e., Rajasthan State Commission for Women and Rajasthan State Commission for Protection of Child Rights to address the prevalent matters.

It was observed that :

i) The Women Empowerment Directorate, Social Justice & Empowerment Department and Department for Child Rights were responsible for prevention of crime and protection of women from domestic violence, sexual harassment at workplaces, child marriage, witch hunting and practice of dowry and protection of girls from sexual offences. However, efforts are required to create awareness amongst the public and train and sensitize the workforce. Absence of state level integrated action plans for protection and development of women, shortage of key grass root level implementing personnel, non-identification of vulnerable areas, lack of basic facilities and security lapses in rehabilitation homes hampered the effective enforcement of the various statutes/acts/policies.

ii) The Police Department was responsible for registration and timely investigation of women related crimes. However, issues such as insignificant number of cases registered under Special and Local Laws (SLLs) as compared to the Indian Penal Code (IPC), higher number of cases registered through alternate means like court intervention instead of directly through the police stations, shortage of investigative units, slackness in collecting, forwarding, and examining of samples related to

sensitive crimes such as rape etc., pointed towards inadequate and inefficient working of police department in the area of women related crimes.

iii) Legal Services Authorities were responsible for creating legal awareness, providing legal aid and ensuring timely disbursal of compensation to victims. However, shortage of key personnel, lack of updated training material and delays in decision making by the Authorities deprived the victims of effective legal assistance and due compensation.

The findings of the Performance Audit on 'Prevention, Protection and Redressal of Crime against Women in Rajasthan' pointed out the fact that the efforts made by the main stakeholders were ineffective in tackling this huge social problem. Thus, there was an urgent need for the Government of Rajasthan to draw up an integrated strategic action plan in consultation with all stakeholders to prevent the problem of increasing crime against women in Rajasthan.

IMPACT

Acting upon the audit recommendation, the State Government finalized and implemented the **new 'Rajasthan State Policy for Women 2021**' in April 2021 (replacing Rajasthan State Policy for Women, 1996 and Rajasthan State Policy for Girl Child, 2013) and Women Empowerment Directorate was notified as the nodal department for developing consolidated and integrated action plan for implementation of Rajasthan State Policy for women. Contribution of Office through the said Performance Audit was acknowledged in the preamble of the policy.

Scan to access the report

Management of Heritage Sites, Archives and Museums — Madhya Pradesh

Madhya Pradesh is endowed with a rich archaeological heritage and beautiful monuments, ranging from pre-historic Rock Shelters, Caves, Temples, Palaces and Forts. Some of the prominent examples include Bhimbetka and Bagh Caves, Sanchi Stupa, Khajuraho and Orchha Temples, Hindola Mahal and Jahaz Mahal etc. Directorate of Archaeology, Archives and Museums under the Department of Culture, Madhya Pradesh holds the responsibility of overall management of the monuments.

Audit on 'Management of Heritage Sites, Archives and Museums' was selected and conducted with a view to ascertain adequacy and effectiveness of Department's efforts in identification, protection and preservation of Heritage Sites as well as management of Museums and Archives.

Some of the innovative steps taken were:

i) Report holistically highlights the gaps in procedures related to planning, excavation, conservation and protection of heritage sites and touches upon the issues related to Archives and Museums as well;

ii) For better coverage of monuments, these were categorized as religious buildings, mahal, rock arts, bawris, tombs etc. For this, an elaborate Sampling Methodology was created. Further, monument specific checklists were also prepared;

iii) Extensive research and trainings were done to develop the necessary domain perspective;

iv) Joint Physical Inspection of the Monuments and artefacts were carried out by Audit, along with the officials of the Department. Photos of Artefacts, Archives, Buildings, Museums and Monuments were captured by Audit during site visits and from Department records and used in the Report;

v) A new methodology was used wherein unprotected monuments, which otherwise satisfy all relevant criteria for being included in the State Protection List but were still out of State's protection umbrella, were identified;

Monuments that could not be protected

Ginnorgarh Fort, Raisen

Jaam Gate, Mau, Indore

Instances of encroachments and irregular constructions in and around Monuments

Cafeteria was in operation in Mahraja Pratap Ki Chatri at Khajuraho

School was operating within the premises of Garhi, Gurh, Rewa

vi) Audit also revealed an acute shortage of staff across all cadres, more so in the technical cadres, which impacted adversely the performance and output of the Organisation. There was shortage of attendants/ caretakers, absence of protection wall/ fencing, instances of encroachments and irregular constructions in and around Monuments, lack of cleanliness in the Monuments which were indicative of insufficient security and maintenance of the Monuments which led to cascading adverse impact on some of these Monuments.

Impact

The Department accepted our recommendations and highly appreciated the contents of this Report. Department also commended the approach and efforts made by Audit in highlighting the critical issues. In fact, all the issues brought out by Audit were noted by the Department and remedial actions were assured.

Scan to access the report

Goods and Services Tax

Goods and Services Tax (GST) is a tax on supply of goods or services or both except taxes on the supply of alcoholic liquor for human consumption. GST came into effect from 1 July 2017. The roll out of GST has been a landmark achievement of the Government with respect to unifying multiple central and state taxes with the objectives of reducing tax cascading, ushering in a common market for goods and services and bringing in a simplified, self-regulating and non-intrusive tax compliance regime. This is intended to make the transfer of goods and services seamless and will make the country an economic union.

Audit of GST was undertaken as certain features originally envisaged such as system validated Input Tax Credit through "invoice matching" were not implemented, complexity of mechanism of filing returns and instances of ineligible Input tax credits and refunds of large amounts were in public domain. These were examined from a system perspective to make suitable recommendations.

This report brings out the status of implementation of the simplified GST return mechanism, compliance verification functions such as scrutiny of returns, internal audit and anti-evasion activities, and recovery of arrears etc. It also has observations on reliability of GST data maintained by Goods and Services Tax Network and contains observations relating to significant data inconsistencies noticed during GST data analysis. Processing of Refund claims discusses the systemic and compliance issues in respect of processing of refund claims under GST and Transitional Credits under GST contains findings which were noticed during the examination of records pertaining to transitional credits.

Impact

- ✓ As a result of compliance audit findings, an amount of Rs. 845.49 crore was accepted by the Government and further recovery of Rs. 122.47 crore was made.
- ✓ Based on the important recommendations in the report, systematic changes had been implemented by the Ministry/Board which would further result in safeguarding Government revenue.
- ➢ The Ministry came up with Standard Operating Procedures (SOP) for scrutiny of returns for the years 2017-18 and 2018-19.
- ➢ CBIC has rolled out the Automated Return Scrutiny Module (ARSM) for GST returns in the ACES-GST backend application for Central Tax Officers in May 2023. This module will enable the officers to carry out scrutiny of GST returns of Centre Administered Taxpayers selected on the basis of data analytics and risks identified by the System.

- The refund of unutilised ITC had been restricted to the ITC available in GSTR-2A of the relevant period from 31 March 2020.
- Aadhar authentication had been made mandatory for filing of GST refund claims for all taxpayers with effect from 1 January 2022.
- CGST Rules, 2017 had been amended with effect from 24 September 2021 to provide for refund to be disbursed in the same bank account, which is in the name and PAN of the applicant and on which registration has been obtained.
- System of assigning risk score to various GST refund applications filed on portal based on various risk parameters has been initiated by DGARM since July 2022.
- Board has issued letter dated 29 July 2022 to field formations, whereby field formations are requested to conduct detailed verification of risky refund claims before sanctioning them.
- Further, detailed guidelines regarding the procedure relating to processing of refund claims and the review and post audit of refund orders have been issued to CBIC officers vide Instruction dated 14 June 2022.

The implementation of the recommendations made will go a long way in improving the quality of data in GSTN network, simplify the process of filing returns, make the system of scrutiny more effective and would safeguard the revenues of GoI by having effective controls on Input tax credits and processing of refunds.

Scan to access the report

Outcomes in Higher Education – Uttar Pradesh

Higher education significantly contributes towards sustainable livelihoods and economic development of the nation. In Uttar Pradesh, there are 18 State Public Universities, 170 government degree colleges, 331 non-government aided colleges, 6,682 self-financed private colleges affiliated to these Universities and 27 Private Universities under the administrative control of Higher Education Department. During 2019-20, 90.61 lakh students were enrolled in these Colleges.

Strategic Framework of Twelfth Five Year Plan (FYP) and the Output Outcomes Budget 2018-19 of Government of India have identified four main areas of focus in Higher Education that need attention. These are Access, Equity, Quality and Governance. Outcomes of these areas have been defined as: (i) expanded availability of Higher Education Institutions; (ii) narrowing of group inequalities in access to higher education; and (iii) improving teaching and research across all institutions. The objectives for the Audit of Outcomes in Higher Education in Uttar Pradesh were to assess whether:

- ✓ equitable and affordable access to higher education was ensured for all;
- ✓ good quality higher education was ensured through effective teaching, learning and examination processes and high quality research;
- ✓ there was employability and progression of students to higher studies; and
- ✓ governance and management of higher education system was adequate, efficient and effective.

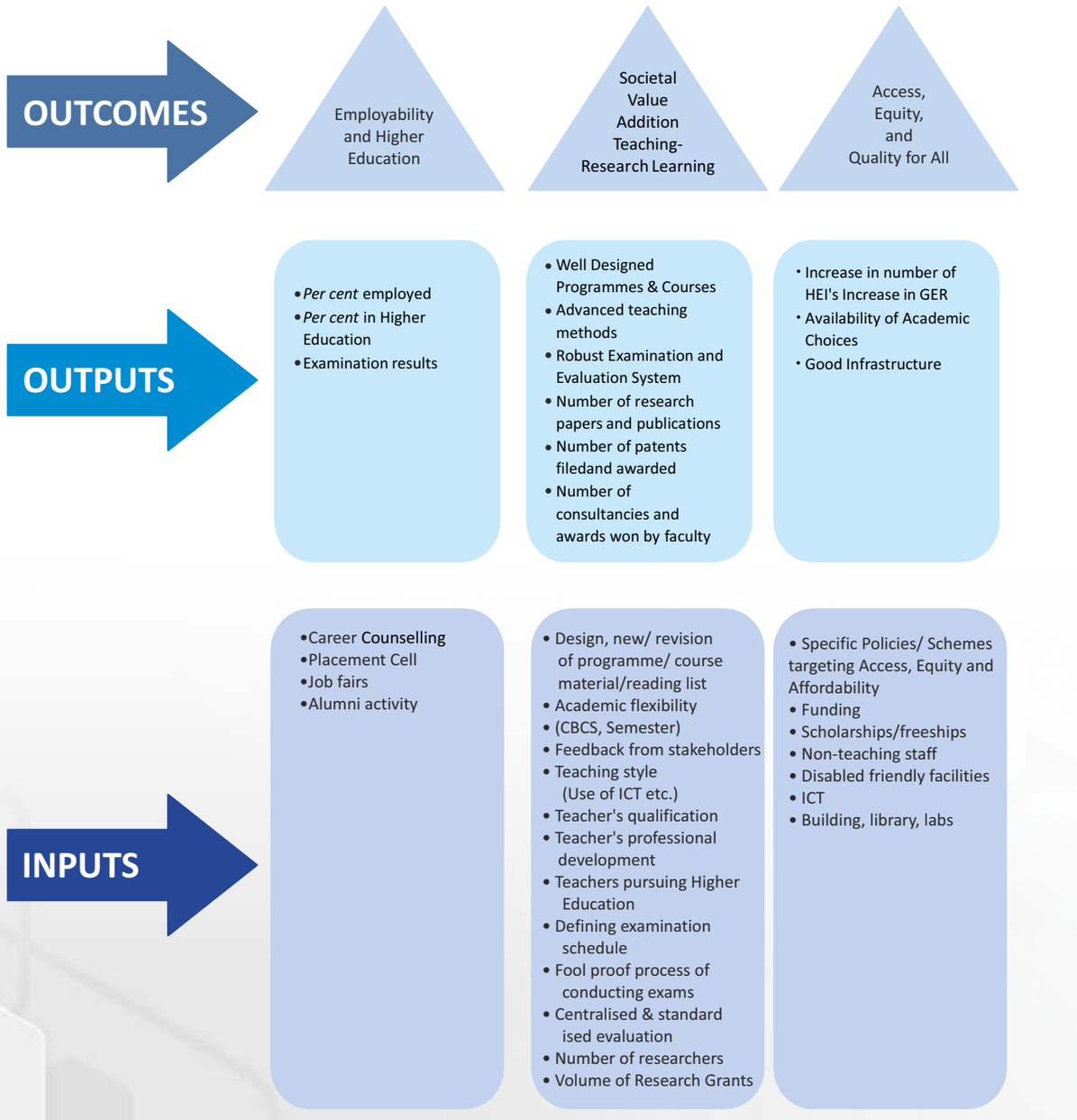
In the Performance Audit of Outcomes in Higher Education which was carried out, two Universities – Mahatma Gandhi Kashi Vidyapith, Varanasi (MGKV) and University of Lucknow (UoL), along with 10 colleges affiliated with these Universities were selected for detailed examination. The access and equity in higher education along with quality of higher education in the State were assessed. Governance and management issues which are critical for improving all these factors were also assessed. The audit findings were:

- The enrolment level showed a regular decline from 94.88 lakh students in 2015-16 to 90.61 lakh students in 2019-20. The average enrolment per college reduced from 1,830 students in 2015-16 to 1,261 students in 2019-20.
- During 2014-20, the average percentage of programs having focus on employability in MGKV and UoL was only 21 per cent and 10 per cent respectively.

- As against the prescribed ratio of 20:1, the Student Teacher Ratio in government colleges during 2019-20 was 49:1.
- Results of different courses were delayed up to 273 days in MGKV during 2014-15 to 2019-20 (except during 2018-19) and up to 175 days in UoL during 2017-20.
- Research projects in MGKV and UoL were completed with delays up to 1,463 days. Some were prematurely closed without any project outcomes. Patents awarded and consultancy given was nil in test checked Universities.
- Data of students going for higher education either outside the University or colleges or pursuing the higher education in same University during 2014-20 was not maintained.
- Governing Bodies in Universities were not functioning effectively due to vacant seats of members and lack of requisite meetings.
- Out of 28 test-checked Self-Financed Colleges in MGKV, 18 did not fulfil 4 to 29 per cent of criteria for affiliation. The inspection of affiliated colleges was not done. There was extension of temporary affiliation to colleges not having adequate infrastructure.
- MGKV and UoL were not self sufficient to meet out their expenditure out of revenue earned by them and were dependent on government grants.

Scan to access the report

Diagrammatic representation of relation between outcomes of higher education and their related inputs and outputs



Initiatives for Capacity Building

Capacity building is a systematic process to improve employees' knowledge, skills, values, attitude, motivation and capabilities necessary to perform well at work. Capacity building affects organizational performance.

CAG of India is a knowledge-based institution, whose assets are its people, processes and practices. Therefore, Capacity Building to systematically update the skills and knowledge of its people is an institutional imperative.

In this section, we showcase the initiatives undertaken to address the Capacity Building.

Strengthening Local Governance

The Panchayati Raj Institutions (PRIs) and Urban Local Bodies (ULBs) were granted constitutional status as the third tier of India's federal democracy through the 73rd & 74th Constitutional Amendment acts. Strengthening of the accountability framework in Local Governments has assumed great significance in view of the huge quantum of funds flowing to the Local Governments (LGs) through Finance Commission Grants and Central and State Schemes and Programmes.

A number of initiatives were taken up in consultation with other key stakeholders to strengthen the accounting and auditing mechanisms, the cornerstones of accountability. **'AuditOnline'** is the online software developed by the Ministry of Panchayati Raj, Government of India and is used by the local fund auditors to capture the results of the audit of PRIs. In collaboration with the Ministry of Panchayati Raj, two significant additions were introduced in the software by **the Local Government Audit Wing** of our department.

- After completion of Financial Audit by the Local Fund Auditors, a Certificate would have to be issued by them expressing their opinion on the Financial Statements. In order to enhance the accountability of auditors while auditing of Local Government (LGs), an Audit Certificate in the format prescribed by CAG has been incorporated in the 'AuditOnline' software.
- An Action Taken Report (ATR) Module has been added to capture details of action taken on audit observations. The module provides status of action taken on audit observations so that the audit report can be displayed in public domain. It provides for Action Taken against observations, addressed or unresolved, to be intimated via ATR and to be placed before Gram Sabhas / Mandal Sabhas / Zila Sabhas.

These two measures enhance the accountability of both the primary auditors and the LGs audited.

After discussions with Ministries of Finance, Housing and Urban Affairs and Panchayati Raj, a set of online courses, pitched at the required level of knowledge and skills for maintaining the accounts of different categories of LGs, are being developed in partnership with ICAI. The participants/ students would be required to clear an online examination and get certified. The objective is to create a pool of certified accountants whose services could be used by LGs.

In order to have a wide stakeholder consultation on the initiative, an All India Conference, "GRAM: Strengthening of accounting at grass roots" chaired by the Comptroller and Auditor General of India (CAG), was organized on 1 September 2023. Secretaries to Government of

India, Member Audit Advisory Board, representatives from ICAI, senior functionaries from the State Governments and Accountants General of States participated in the Conference. During the Conference, a presentation was made highlighting the problems currently faced due to non-accounting or wrong accounting in Local Government and how the proposed certification course can help to mitigate the same, by skilling people in preparing/keeping accounts at the grassroots level.

An **International Centre for Local Governance** is coming up at Rajkot, Gujarat. It will serve as a Centre of Excellence for capacity building of Local Government Auditors, national and international. It will also act as a knowledge centre and think tank addressing governance issues at grass roots level across nations.

As the functioning of Local Governments is different from the Central and State Governments with dependence for functions, funds and functionaries on the two higher tiers, their audit also requires a modified approach. Recognising that the governance challenges at the grassroots may be unique to contiguous geographic areas, audit of LGs has been focused around districts.

District Centric Audit (DCA) of LGs involves audit of all the three tiers of PRIs and ULBs, culminating in a consolidated District Centric Inspection Report (DCIR). The main focus of these DCAs will be function based audit. The objective of such audit is to assess how well the Local Governments are discharging the functions which have been devolved as per provisions of the 73rd and the 74th amendments to the Constitution and State Legislations. The effectiveness of discharge of the devolved functions would be assessed by the levels of service delivery by LGs and to the extent the local populace was actually benefited by the services rendered. This paradigm of local audit is dynamic and evolving and the initial framework and guidance are being modified and updated through consultations with stakeholders and feedback from audit teams.

The responsibility of providing Technical Guidance and Support (TGS) to the primary auditors of Local Governments, i.e., Local Fund Auditors (LFAs) has been entrusted to the CAG in most of the States through legislations or executive orders. A 'TGS Practice Guide' containing comprehensive guidelines for conduct of TGS by the Field Audit Offices (FAOs) was issued. It clearly delineates the planning, execution and reporting activities under TGS with detailed instructions for the actual procedures to be followed. The format of Annual Technical Inspection Report (ATIR) capturing the TGS activities performed by the FAOs has been redrawn and included in the TGS Practice Guide.

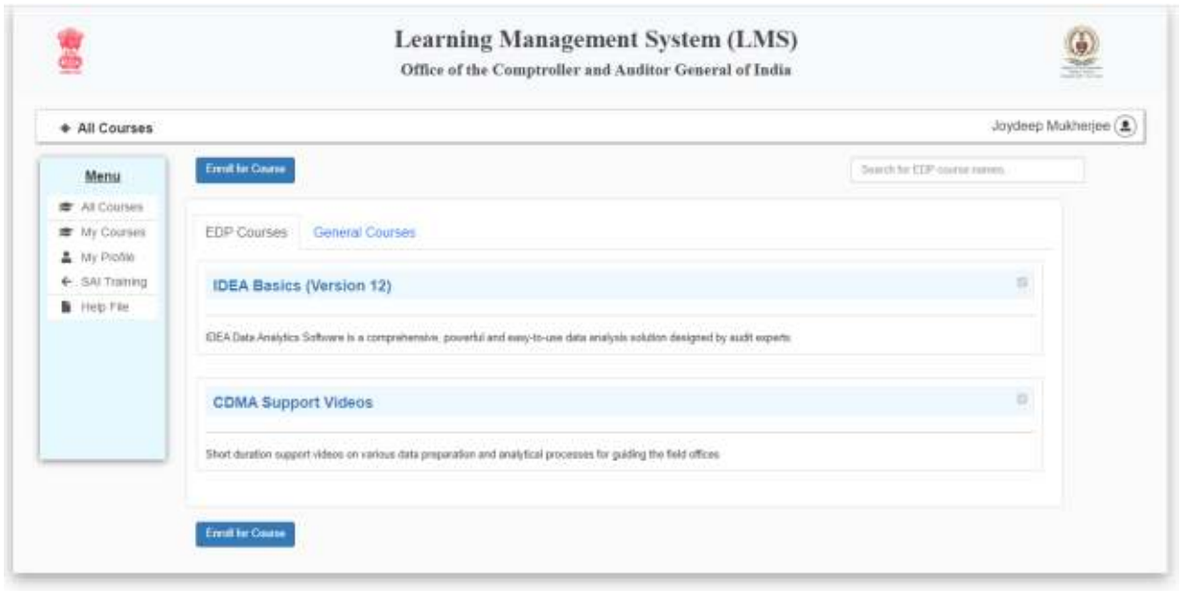
Capacity Building in SAI India through Learning Management System

In the dynamic and complex world of auditing, continuous training is not a luxury but a necessity. The evolving regulatory environment, technological advancements, complex financial instruments and the need for fraud detection and industry-specific knowledge - all underscore the importance of ongoing education for auditors. Training equips auditors with the knowledge and skills required to maintain the integrity of financial reporting, protect the interests of stakeholders and uphold the credibility of the auditing profession. Accordingly, Supreme Audit Institution (SAI) India also has the role to keep its officials updated with new technology and frameworks.

The Indian Audit & Accounts Department (IA&AD) is a knowledge based and human resource driven organisation which has approximately 41,700 employees. During 2021-22, it was supported by 137 field offices (132 offices spread across India and five offices located abroad). Three National Training Institutes and 12 Regional training Institutes/ Centres provide the capacity building support to this organisation. Providing the mandatory trainings to all the staff members who are geographically distant, have limited mobility or face time constraints to participate, is itself a challenging task. This lack of accessibility hinders the reach and effectiveness of the training programs.

A Learning Management System (LMS) is an online platform designed to facilitate the administration, delivery, tracking and management of educational content and training programs. The LMS for SAI India developed by Knowledge & Capacity Building (K&CB) Wing, provides the institutional mechanism for self-learning, thereby allowing employees to choose courses of their interest.

Integration of the LMS with SAI Training portal was also planned to provide access to all users registered on SAI Training portal seamlessly as well as to enrich MIS generated content for senior management.



Home page of the Learning Management System

The system enables trainees to keep track of their progress in the enrolled courses and provides certification upon course completion. Management is also able to track/ analyse staff interest and participation on a real-time basis. Even when conventional access to avenues for professional development is restricted, the LMS ensures that capacity building within the department is not hindered. The LMS also helps K&CB Wing to deliver training on relevant and trending topics to the entire department.

The LMS presently has 5 courses (2 General and 3 EDP). The process of populating the LMS with more courses is already underway with the Regional Capacity Building and Knowledge Institutes/ Centers (RCBKI/Cs) developing courses on their respective Knowledge Centre topics for hosting on the LMS. As on date, there have been 10,042 enrolments and 7,962 course completions by 7,744 employees of the department. It is expected that the learnings through the LMS will contribute towards improving the overall effectiveness of capacity building across the department.

Admin dashboard of the LMS

Going further in this direction, the department has embarked on the path of development of e-Learning Modules (eLMs). Considering the high costs of development and maintenance of eLMs quoted by outside agencies, the Research Wing, International Centre for Information Systems and Audit (iCISA) took the task of in-house development of e-learning modules.

Development of an e-learning module typically involves several stages and roles to ensure a well-designed and effective learning experience. One of the challenges faced in the development of eLMs is overcoming the set mind-set and encourage employees to embrace new learning formats, making collaboration, effective communication and a clear understanding of the learning objectives crucial to the development process.

The department's needs in terms of general training programmes which could be delivered through eLMs mode were considered based on most prominent and general problems perceived by the officers at iCISA and interaction with the Staff wing at the Headquarters. The eLMs offer increased user-friendliness through incorporation of multi-media elements, flexibility, accessibility, cost and time efficiency, consistency, scalability, engagement and tracking capabilities, resulting in improved training outcomes and skill development within the department and in conjunction with the LMS, allowed the department to leverage technology for effective and impactful training experiences.

IMPROVING STAKEHOLDER ENGAGEMENT

The spirit of stakeholder engagement is to create value for all our stakeholders by proactively engaging with them. Strong and effective stakeholder engagement is the cornerstone of a successful organization. Effective engagement helps to translate stakeholder needs into organisational goals, creates the basis for effective strategy development, provides better value addition.

In this section, we showcase few initiatives towards improving the engagement with our Stakeholders.

International Engagements

The Supreme Audit Institution (SAI) of India plays an important role in the international public sector audit community. CAG of India is a member of the Governing Board of both the International Organization of Supreme Audit Institutions (INTOSAI) and Asian Organization of Supreme Audit Institutions (ASOSAI). CAG of India chairs the Knowledge Sharing Committee (KSC), which is one of the four main committees of INTOSAI, the Working Group on Information Technology Audit (WGITA) and the Compliance Audit Sub-committee. CAG of India is also the external auditor of World Health Organization (WHO), Food and Agriculture Organization(FAO), International Atomic Energy Agency (IAEA) and Organization of Prevention of Chemical Weapons (OPCW). CAG of India has been also designated as external auditor of International Labour Organization (ILO) for the period 2024-2027. Further, SAI India is a member of several other multilateral forums and has strong bilateral relationship with several other SAIs. The important multilateral engagements conducted in the recent period are briefly elaborated in the ensuing paragraphs.

- **SAI 20 Engagements:** The CAG of India took over the chairmanship of SAI20, with India's assumption of the G20 presidency on 1 December 2023. SAI India hosted the SAI20 Senior Officials Meeting from 13 - 15 March 2023 in Guwahati, Assam. Deliberations were held on the two priority themes, i.e, "Responsible Artificial Intelligence" and "Blue Economy". The meeting served as an encouraging precursor to the SAI20 Summit and its relevance to promoting transparency, accountability and good governance across G20.

SAI India hosted the SAI20 Summit from 12 - 14 June 2023 in Goa. In line with the guiding principle, Vasudhaiva Kutumbkam, or "One Earth, One Family, and One Future", SAI India selected Blue Economy and Responsible Artificial Intelligence as the priority themes for SAI20. The SAI20 Summit saw participation of around 85 national and international delegates from G20 member SAIs, Guest SAIs, international and national organizations and the G20 Secretariat. The SAI20 communique agreed during the SAI20 Summit, seeks to demonstrate joint SAI20 commitment to the public, governments, parliaments and other stakeholders in G20 member states. During the Summit, two compendiums on Blue Economy and Responsible AI, which had contributions and experiences shared by the SAI20 members and other SAIs, were presented.

- **Shanghai Cooperation Organization (SCO):** Under the broad umbrella of India's SCO Chairmanship, the CAG of India assumed the Chairmanship of SCO SAIs. SCO is the world's largest regional organization in geographic scope and population. The member countries of SCO include China, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Uzbekistan, India and Pakistan. We hosted the 6th SCO SAI Heads Meeting from 6-7 February 2023 in Lucknow, Uttar Pradesh on the theme "Integrating Emerging Technologies in Audit", with Artificial Intelligence and Cyber Security, as the two sub-themes of the meeting.

The members emphasized that audit of the advanced technologies, such as Artificial Intelligence, used by governments and public sector undertakings, was essential for promoting good governance and for catalysing social and economic development. Further, they underlined the need for equipping Supreme Audit Institutions in use of pioneering technologies for efficient and effective audits.

- **ASOSAI Governing Board:** The 59th ASOSAI Governing Board meeting was held from 19-21 September, 2023 in Busan, Korea. CAG of India presented SAI India reports on ASOSAI Journal, ASOSAI Working Group on IT Audit and Data Analytics chaired by SAI India, preparation for the 16th ASOSAI Assembly, INTOSAI Working Group on IT Audit (WGITA) and INTOSAI Knowledge Sharing Committee (KSC). **SAI India will be hosting the 16th ASOSAI Assembly in 2024 and will hold the Chairmanship of ASOSAI from 2024-2027**.

- **32nd annual meeting and seminar of INTOSAI Working Group on IT Audit (WGITA) and the 15th KSC meeting:** These meetings were hosted by the Supreme Audit Institution of the United Arab Emirates in Abu Dhabi, UAE from 2-4 October 2023. The CAG of India, as the Chair of the INTOSAI Working Group on IT Audit (WGITA) and INTOSAI Knowledge Sharing Committee (KSC), inaugurated the respective meetings and chaired the discussions.

- **External Auditor of International Labour Organisation (ILO):** CAG of India has been appointed as the external auditor of the International Labour Organisation (ILO) for the period 2024-2027 on 22 February 2023. This is the first time CAG of India has assumed the role of External Auditor for ILO. ILO is a United Nations agency with the mandate to advance social and economic justice by setting international labour standards. ILO shortlisted three Supreme Audit Institutions (India, Canada and United Kingdom) for technical presentations. A three-member team of SAI India headed by Ms. Parveen Mehta, Deputy CAG (HR, IR & Coord.) presented SAI India's strengths, approach and skill set and the vast experience of auditing international organisations to the selection panel of ILO on 23 January 2023. On the merit of technical expertise and vast audit experience, CAG of India was appointed as the External Auditor of ILO for the period 2024-2027.

- **Partnership with INTOSAI Development Initiative (IDI) and SAI Belize:** The Global SAI Accountability Initiative (GSAI), led by IDI, aims to strengthen and maintain the capacity of SAIs and identifies SAIs in challenging environments and provides support to strengthen their capacities and performance. SAI India has been selected to be the main partner to provide technical support to SAI Belize under this initiative. A team of Officers, led by Shri R.G. Viswanathan, DAI (Commercial), visited Belize in August 2023 and carried out needs assessment to identify capacity development requirements for SAI Belize under GSAI.

- **External Auditor of World Health Organization (WHO):** In the 76th World Health Assembly (WHA) held from 21-30 May 2023 at Geneva, CAG of India was re-appointed as the external auditor of the World Health Organization (WHO) and its hosted entities, namely, International Agency for Research on Cancer (IARC), International Computing Centre (UNICC), Staff Health Insurance (SHI), Joint United Nations Programme on HIV/AIDS (UNAIDS) and UNITAID, for the term 2024-2027. CAG's present term as External Auditor of WHO and its hosted entities is from 2020 to 2023.

Town Hall Meetings - Interactions with Stakeholders

A responsive administration would have to not only create awareness amongst the stakeholders but also go further and establish a two-way communications channel to seek suggestions/views/ grievances of employees/associations etc.

The Headquarters' office gets inputs from the Head of Office of the field formations and also through the Staff Associations. Headquarters' office interactions are with the All-India level associations and hence, issues with a largely pan-India flavour only are brought to the notice of the Headquarters' Office. Headquarters office is often not in the know of important but local issues. Further, the need for closer interaction of the Headquarters' office administration with the stakeholders in field offices was felt, to enable the Headquarters' office to appreciate the challenges and ground realities in the field offices and lead to more informed decision-making and policy formulation.

To achieve the above objectives, it was decided to organize Town Hall meetings at field stations across the country.

Town Hall Meeting conducted at Raipur on 12 September 2023

The field station for conducting Town Hall Meeting is selected and all the offices in that location are informed well in advance to participate in the event, with one office in the station being designated the coordinating office. A specific email id, created for the purpose of the Town Hall meeting is widely circulated through the co-ordinating office amongst the employees and recognized associations of all the offices in the selected field station. Questions/ comments/ suggestions are solicited from the employees as well as recognized associations through email. Upon receipt of these suggestions/grievances, the issues, which ideally have broader perspective, are selected for discussion in the meeting. Field office administrations are also requested to send their suggestions relating to administrative matters. A team headed by Deputy CAG (HR, IR & Co-ord)/ Additional Deputy CAG (Staff) accompanied by Director General (Staff), Assistant CAG (Non-Gazetted) and Officers from the Staff Wing at Headquarters' office visit the field station for the Town Hall Meetings. A presentation, incorporating the selected issues, is made in the course of the Town Hall Meeting.

Town Hall Meeting progress at Agartala

Issues across different facets of administration are discussed in the meeting and the issues raised/ suggestions made during the meeting are followed up at Headquarters' office through action taken reports.

Outcome & Impact

Town Meetings have been held at Bengaluru, Raipur, Agartala and Patna. Issues/ grievances/ suggestions of the stakeholders received during these meetings were duly examined. Some issues where action has already been taken include:

- enhancement of charge allowance from Rs.2500/- to Rs.4500/- for entrustment of charge as SAO;
- removal of age limit for nomination of training at IIMs;
- organizing induction training to promoted supervisors;
- field inspection by DG (HQ) to resolve office infrastructure related issues of field offices;
- review of the existing Sports Quota Recruitment policy by a committee comprising of veteran sports persons from various disciplines in IA&AD and senior officers to attract best talent.

Town Hall Meeting at Bengaluru

The impact of the Town Hall meetings is far and wide and has gone a long way in strengthening the relationship with staff as well as improving communication with the field offices.

Strides in Natural Resource Accounting

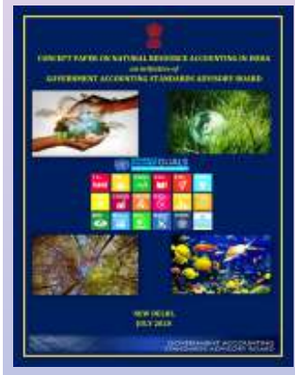
The Government Accounting Standards Advisory Board (GASAB) under the CAG of India is working proactively to aid the Government in the efforts in the nascent field of Natural Resource Accounting (NRA) an area of international importance.

Sustainable development – use for present generations without compromising the future

India is a signatory to the United Nations General Assembly (September 2015) resolution titled ´Transforming our World: the 2030 Agenda for Sustainable Development'. This made it imperative that it develop a robust system of NRA to help manage its natural resources. To address this, CAG of India decided to step in. The CAG's institution, being a member of the INTOSAI (International Organisation of Supreme Audit Institutions), is uniquely positioned to play a critical role in the implementation of environmental accounting, as it has both the knowledge and capacity to use international best practices as well as institutional reach with its presence in all the states, where its mandate includes both audit and accounting.

Taking cue from the Working Group on Environmental Auditing (WGEA)'s suggestions in its report – 'Environment Accounting – current status and options for SAIs', GASAB not only handheld the country and its States but also led it from the front by playing a crucial role in implementing NRA in the country. Till date, GASAB has come out with four publications on NRA.

Papers released by GASAB till date on NRA



Concept Paper (7/20)

Booklet on templates (10/21)

Guidelines/SOPs for filling the templates and way forward (6/22)

Compendium of Asset Accounts in States on Mineral and Energy Resources (10/22)

Despite being an unchartered territory, GASAB not only led the 28 States and UTs of Jammu & Kashmir and Ladakh to prepare their first ever Asset Accounts on Mineral and Energy Resources consisting of 107 minerals but also laid down a comprehensive system of data generation at the lowest level of departmental formation and their compilation at the Directorate level.

The efforts resulted in smooth compilation of Asset Accounts for the year 2021-22 with all the States and UTs of Jammu & Kashmir and Ladakh completing compilation of their second Asset Accounts on Mineral and Energy Resources, which are now being validated and verified before being finalised.

During the year 2022-23, GASAB has taken the following initiatives as a catalyst for helping the States/UTs in further streamlining their resource management.

Accounting of Water Resources: After successfully handholding the States/UTs to build their Asset Accounts on Mineral and Energy Resources, GASAB prioritised Water Resources as the second major resource with the following actions:

- Tentative tables of Water Accounts were developed and circulated to all States and UTs;
- Concerned ministry/departments and agencies were roped in for expansion of the Consultative Committee for consensus among various stakeholders on Asset Account tables and information gathering;
- States and UTs participation is encouraging and information from all States and UTs are forthcoming;

Assisting in proper assessment of royalties and other dues

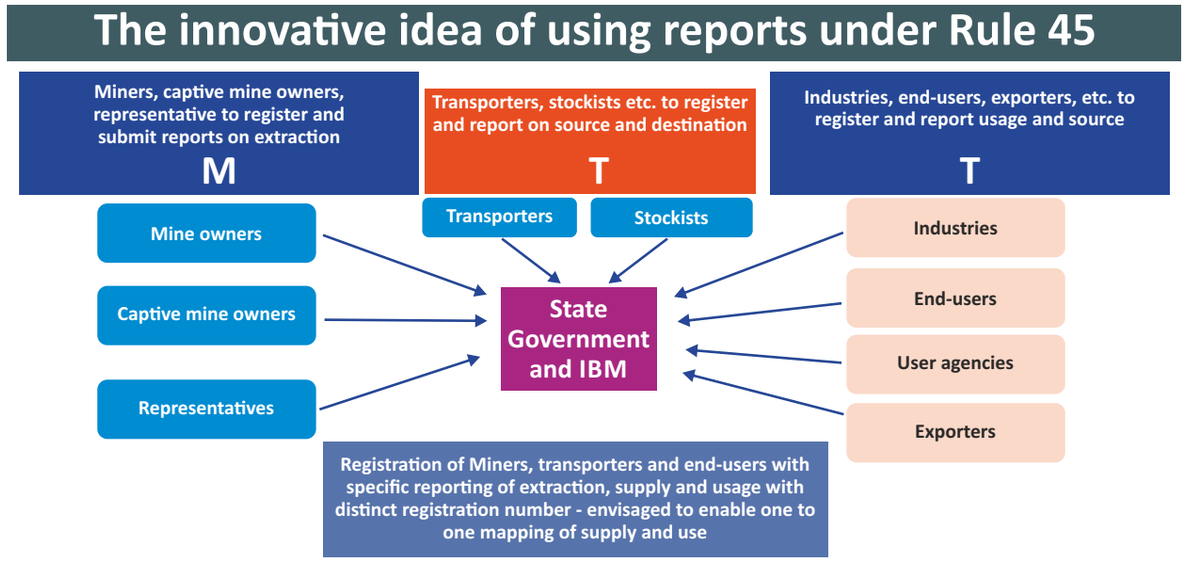
Royalties on major minerals are levied as an advalorem of the average sale prices based on the quality/grades of the resources produced by the lessees. Thus, it is imperative that the assessment of royalties are carried out based on grade-wise mineral productions and their average sale prices. While the Indian Bureau of Mines (IBM) captures the production of major minerals, grade-wise monthly, yet, most of the States/UTs barring a few, are not getting copies of these returns. This is fraught with the risk of wrong assessment of royalties on mineral production which was highlighted in the Compendium for 2020-21.

The cross verification of data of IBM and the State Governments was attempted for the first time under initiatives of GASAB which will have tremendous revenue ramifications and proper accounting of resources.

GASAB had impressed upon the State Governments/UT authorities to comply with the statutory provisions under the Mines and Minerals (Regulation and Development) Act, 1957 and Rules made thereunder. GASAB had also initiated a study of mapping the grade-wise mineral productions reported by the lessees to the IBM with the royalty realisations in States. For this, the database of all major minerals produced in the country for the three-year period ended March 2022 and mine-wise production of minerals and revenue payments were called for from the IBM and the States/UTs respectively. Response received from three States revealed wide variations having revenue implications. The variations point towards the need for streamlining the processes in the States/UTs to capture the detailed production of minerals that too grade-wise, for proper assessment of royalties due. **GASAB is also guiding the States/UTs in onboarding the minor minerals into the mineral monitoring mechanism for effective control on their productions and assessment of revenues due**

Mapping the supply and use of resources: Rule 45 (1-12) of Mineral Concession Development Rules (MCDR) as amended in 2011 (applicable for major minerals) requires miners, transporters, stockists, end users, exporters etc to get registered and furnish monthly/quarterly returns. The reports/returns consist of valuable dataset regarding the grade-wise productions, costs involved, sale prices, details of sale/purchase etc.

GASAB has envisaged mapping the reports/returns mandated under Rule 45 (1-12) of the MCDR as depicted through the block diagram below.



The above initiative has the potential to largely map the end-use of resources vis-à-vis the extractions/productions reported by the end-users and the miners respectively. This is being actively followed up with the States/UTs.

Mapping mining and GST databases: As per the system in place under the GST laws, no vehicle can move with taxable goods from one place to another without filling data into the e-way bill module of GST and printing the form. This dataset of GST has the potential of immense use for the mining departments in States/UTs to ensure control and monitoring on the dispatches of mineral and energy resources throughout their territory.

GASAB is now working towards mapping the datasets maintained by the mining departments and the GST authorities in States which would help the States and UTs to largely detect all extractions/productions and dispatches of invaluable and finite mineral resources and monitor their movement, thereby ensuring due revenues for the States exchequer besides curbing illegal mining.

Thus, GASAB, with their unique initiative had not only assisted in implementing NRA in the country but had replicated the suggestive steps of INTOSAI in assisting the country in implementing NRA, thereby helping the policy makers in evidence based decision making. The account-sets are also used in audit for value addition and assessing the effectiveness of environmental policies and programs for compliance and determining Government's compliance with the reporting requirements of international conventions.

The endeavour of GASAB attained new heights with the Hon'ble Minister of Parliamentary Affairs, Coal and Mines Shri Pralhad Joshi, while releasing the Compendium on Asset Accounts on the occasion of Azadi ka Amrit Mahotsav, stating that this endeavour of CAG will assist the Nation to make evidence based decision making- a reality.

When everyone is included, everyone wins

The above quote by Jesse Jackson best describes the philosophy and rationale behind the efforts undertaken for improving interaction with our stakeholders. The audit process involves various stakeholders playing different roles, which are equally important.

Audit efforts are directed towards improving functioning of the executive departments and other bodies, which can be better achieved with active responses to audit observations from the audited departments. Legislative Committees discuss and analyse the results of audit, obtain the response of the executive departments thereupon and make suitable recommendations for improvement in governance. Civil Society organisations working in specified fields are crucial repositories of information in their domains, embodying a different viewpoint, thereby enhancing the horizons of Governmental understanding.

The Audit offices have to be alert to changes in Governance systems and this requires continuous updation of knowledge and skills on part of the officials. Continuous engagement with stakeholders plays an important role in such updation.

The established systems of stakeholder engagement and interaction were adversely affected due to the COVID pandemic, leading to the increasing numbers of pending paras and Action Taken Reports/Action Taken Notes (ATRs/ATNs). This raised the need for strong proactive action to arrest and reverse the declining trend. In order to improve the stakeholders' engagement in the audit process, several initiatives have been taken which have yielded significant results.

About the Initiative

A two-pronged strategy of escalating the matter at the highest level through letters and meetings in a timely manner and rigorous follow-up at the Group Officer level was adopted. Firstly, meetings were held with the Legislative Committees and Principal Secretaries across Departments to put across the audit concerns which require immediate attention. Next, the Group Officers made extensive efforts to visit the teams during their monthly supervisions and discuss with the audited units to expedite replies and conduct Audit Committee Meetings (ACMs)/ sub-committee level meetings to bridge the gap. A coordination cell was created in August 2022 to enable consolidation of the data and files of common matters, issuing of uniform correspondence to all stakeholders and disseminating the responses to the concerned wings.

Efforts were made to understand the concerns of the audited units and exploring viable solutions, thereby enhancing the confidence among the audited departments.

Outcome & Impact:

As a result of the efforts made by the office, the concerns of Audit have been appropriately flagged at the higher levels in the audited entities. The deliberations and final decisions of the meeting held at the Apex level had been highly beneficial in increasing the responsiveness of audited units and Departments in multiple areas like nomination of nodal officer for settlement of paras, ensuring entrustment of audit of eligible Autonomous Bodies to the Accountant General (AG) Offices, ensuring access to the IT system (read only) to the audit teams.

As a result of the efforts taken, the number of ACMs / bilateral meetings held as well as the paras, IRs and ATNs settled during 2022-23 has shown a quantum improvement. Similarly, position of submission of pending accounts has also improved during the year. Further, the Land & Land Reform and Refugee Relief & Rehabilitation (L&LR and RR&R) Department gave access to the data of *e-Bhuchitra*, and *Banglarbhumi* applications for District Centred Audit on Computerisation of Land Records. Moreover, access for data related to *e-procurement* from Finance Department was also received promptly.

Procedural Innovation

Performance Audit (PA) is an independent assessment or examination of the extent to which an organisation, programme or scheme operates economically, efficiently and effectively, which requires regular and informed communication with the audited department at different phases of audit. As per present practice, interactions with the Government at the Secretary level are envisaged twice, namely, Entry Conference (before commencement of audit) and Exit Conference (on conclusion of audit).

Innovation in the practices: A Mid-term Conference

The findings, conclusions and recommendations are submitted to the apex level at the end of audit for conduct of exit conference and finalization of the report. In this context, practically, it was observed that responses from the apex level are not received in time leading to constraint in the optimisation of exit conference.

While holding entry and exit conferences are time-tested practices, holding Secretary level meeting when field audit is in progress was felt desirable as it would provide an opportunity to discuss the extent of work done, the audit findings noticed till then, challenges encountered during audit process and feedback of the auditee. Mid-term conference was conducted in two audits namely, PA on Implementation of 73rd Constitutional Amendment Act and PA on Supply Chain Management in Public Distribution System in Karnataka, with encouraging results.

The Mid-term conferences in the above two audits were conducted during December 2022 and January 2023 respectively. The discussions were very effective and helped in timely completion and finalization of PAs. A brief outcome of the Mid-term conferences is given below highlighting the impact of the initiative:

A. PA on Implementation of 73rd Constitutional Amendment Act

The Mid-term conference provided a platform for reaching a crucial agreement on the methodology for Audit analysis of Voucher Level Computerisation (VLC) data to ascertain the extent of functional and fund devolutions in the State. The conference paved way for reaching to a consensus on the audit conclusions and recommendations, based on the audit analysis, regarding transfer of functions from the State to District Sector within a specified time frame.

B. Performance Audit on Supply Chain Management in PDS in Karnataka

The Mid-term conference held on 4 January 2023 with the Secretary, Department of Food and Civil Supplies enabled Audit to inform the department about the progress of audit and helped in sharing the interim results and audit findings and obtaining feedback on supply chain optimization models from the department.

Impact of the innovation

This holding of Mid-term conference provided another platform for sharing audit concerns as well as conclusions at a higher level and arriving at mutally acceptable solutions thereby resulting in more focussed audit efforts and meaningful audit resutls enabling fruitful and focussed discussions during exit conferences.

Improving Communication with Stakeholders

Taking note of the non-receipt of the replies to the Inspection Reports in respect of the Union Territory of Puducherry and also the fact that the meetings of the Public Accounts Committee had not been conducted regularly resulting in the audit reports of the previous seven years not having been discussed, the following initiatives were taken, namely:

1. Orientation programme for the PAC members;

2. Audit sensitization programme for all DDOs at Puducherry and Karaikal separately

The orientation programme for PAC members was conducted for the first time in Puducherry and addressed by the Chief Minister of Puducherry. The Audit sensitization programme for all DDOs was addressed by the Hon'ble Lt. Governor of Puducherry. The Member of Parliament from Puducherry was also invited to participate in the panel discussion. The programmes were designed to emphasise the importance of audit and the participation of the Hon'ble Governor and Chief Minister of Puducherry helped in setting the tone at the top.

After the above initiatives, PAC meetings were conducted during December 2022 and April 2023. Replies were received for pending audit observations leading to settlement of nearly 640 pending paras. Improvements were also noticed in the receipt of Explanatory Notes (EN) from the Departments.

Engagement with beneficiaries: Ex-servicemen Contributory Health Scheme

Realising the immense benefits of citizen engagement, a proactive engagement with the beneficiaries was undertaken at the planning stage for Performance Audit on "Ex-servicemen Contributory Health Scheme" (ECHS). The ECHS caters for medicare facilities to 52.48 lakh ex-servicemen beneficiaries residing in far flung and geographically scattered areas. ECHS has the daunting task of reaching out to the remotest corners of India- from Jammu and Kashmir through Kerala to Andaman and Nicobar Islands; and from Gujarat to all the North-Eastern states. As such, the issues of accessibility, coverage and quality of services across the length and breadth of India; and patient satisfaction in view of these challenges become very important.

During the planning stage of the Performance Audit, the major challenge was to reach out to the beneficiaries from all across the country in order to understand their problems and concerns in receiving the medical facilities. The focus areas and the planning of audit with audit questions needed to be as realistic as possible. To reach out to the beneficiaries, SAI-beneficiary engagement was undertaken which included innovative means like interaction with regional level representatives of ex-servicemen; becoming observer in advisory committee meeting; and issue of questionnaire through the Zila Sainik Boards. Besides, the Command Audit Offices were directed to obtain minutes of past advisory meetings/conclave meetings and details of complaints/grievances of the beneficiaries.

The collection of feedback from various sources and through a well thought out citizen engagement strategy bolstered the planning process and enriched the focus areas/ audit planning.

The initiative helped in :

(i) achieving an effective communication with stakeholders;

(ii) gathering feedback and capturing the concerns of beneficiaries at the planning stage and enriching the audit questions to enhance the effectiveness of audit;

(iii) demonstrating SAI's relevance to citizens;

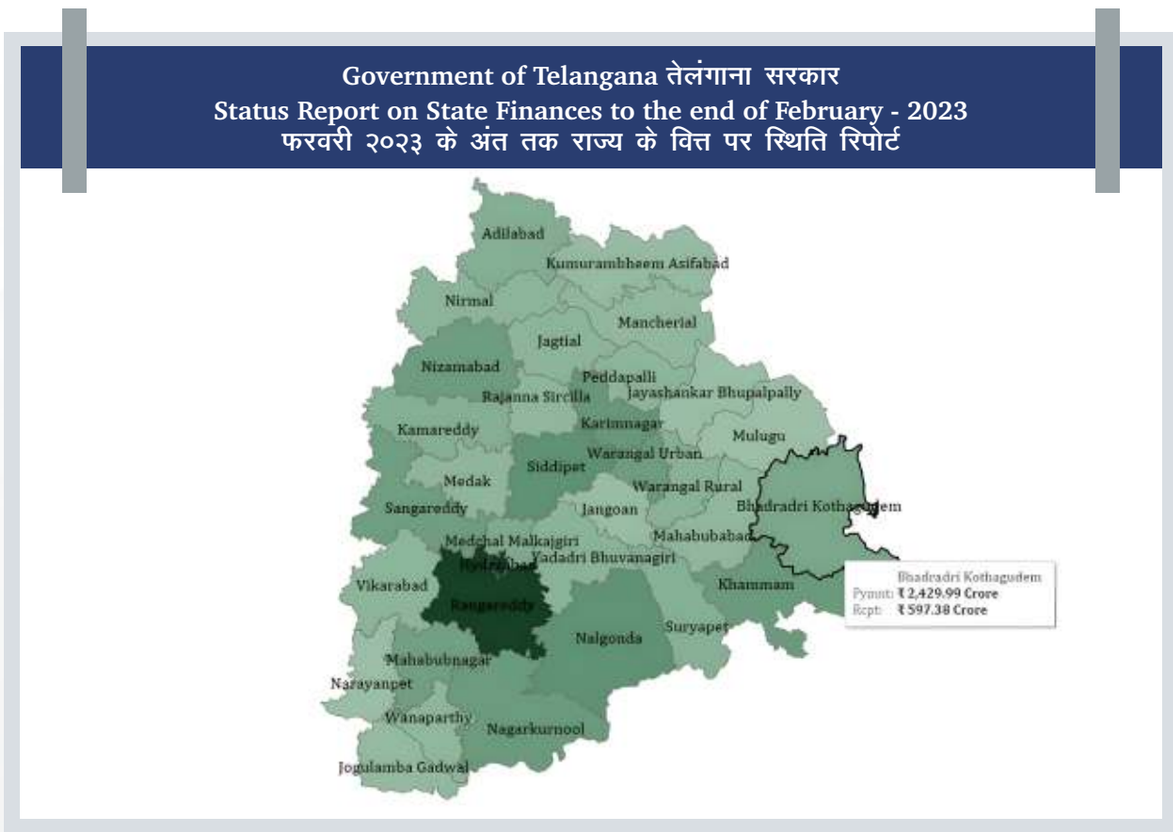
(iv) inclusive and participatory audit process leading to empowerment of citizens; and

(v) effecting likely impact in supporting beneficial change as the recommendations would be better aligned with the problems faced by the beneficiaries.

Interactive Dashboard- Effective Communication with Stakeholders

The Monthly Key Indicators (MKI) depict the macro-level summary of the Government's receipts and expenditure by Sector, as well as the financial position of the State at the end of the month. This depiction was being done in a ***tabular form***. For better visualisation of data, the process for development of a Dashboard was initiated in September 2021. After successful completion of pilot run, the Dashboard was finalised and uploaded on the office website from September 2022 onwards.

The MKI Dashboard opens with a dynamic map of State of Telangana, which allows the viewer to get a snapshot of the monthly financial activity of any selected District in Telangana.

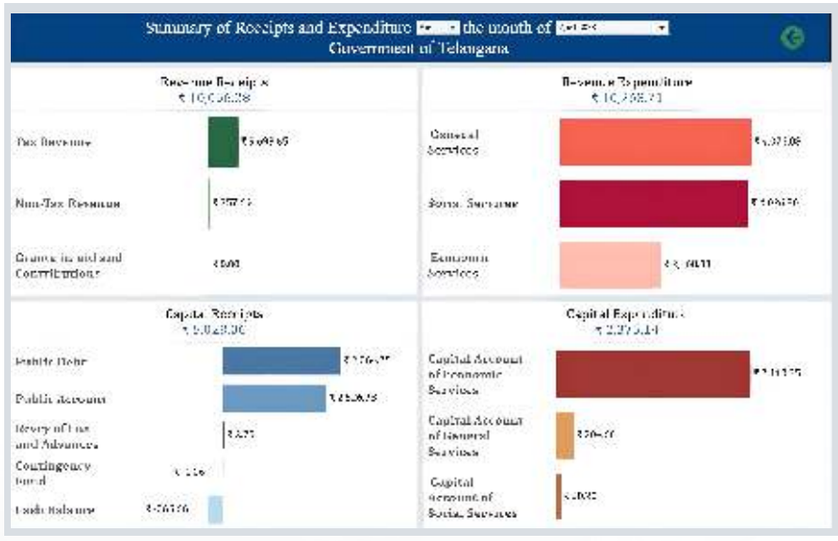


Cover page of MKI Dashboard

The MKI dashboard offers several attractive and easy to understand analytical features, some of which are explained below.

1. Information at a Glance

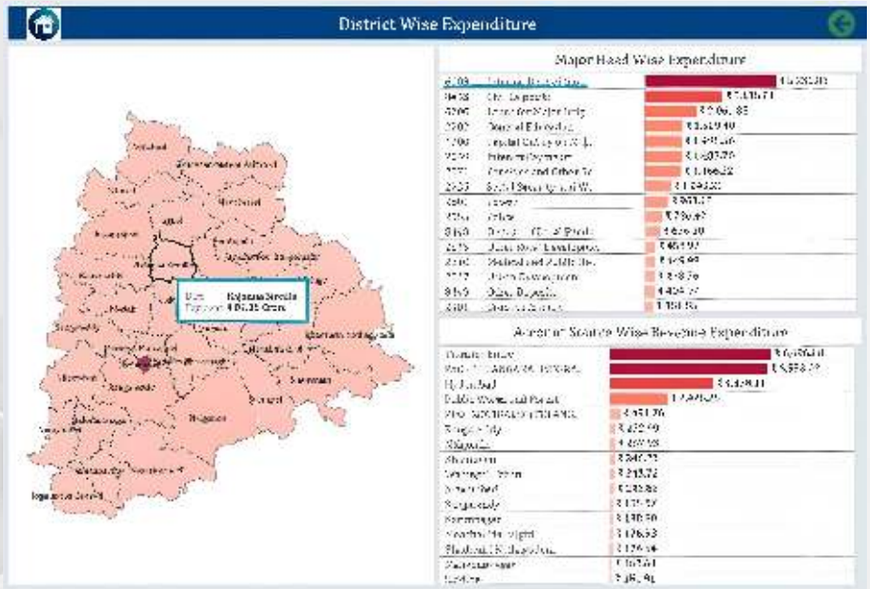
Various components of State Government's Receipts and Payment transactions such as Revenue Receipts, Revenue Expenditure, Capital Receipts, Capital Expenditure, Public Debt and Public Account etc., during a specific month and up to the end of the depicted month, is showcased in the form of Bar charts, Pie charts, Bubble charts, Maps etc. This graphical representation of data is more effective in understanding and comparing data as compared to the tabular version of depiction of MKI.



Summary of Receipts and Expenditure

2. Geospatial Analysis

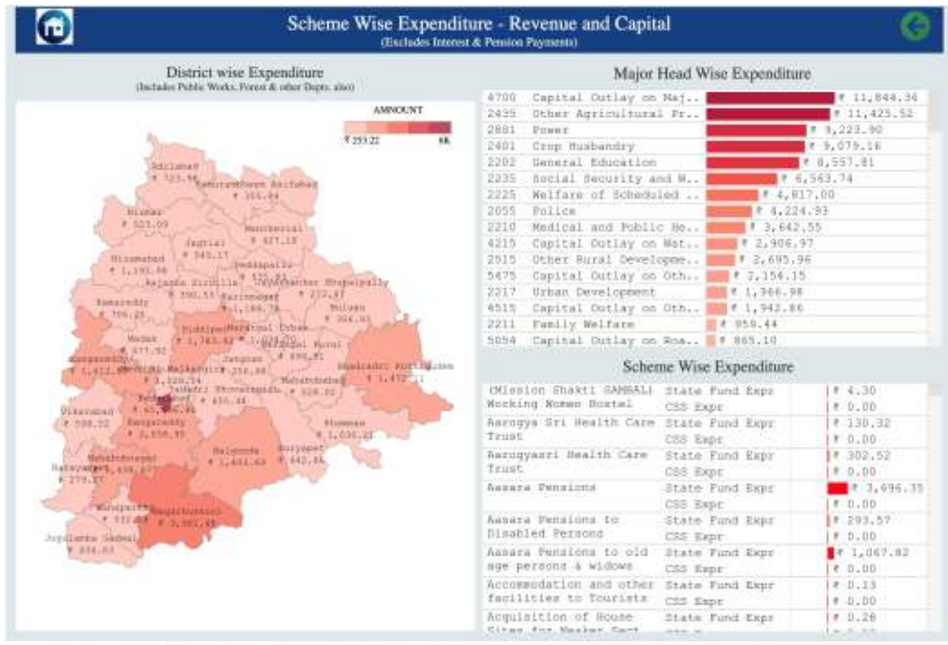
The Dashboard enables visual display of district-wise data in a concise manner. The map is interactive and enables selection of specific district's information. When a particular district is selected on the map, the dashboard dynamically updates to show the Major Head-wise details specific to that district.



District wise Expenditure

3. Heat Maps for Quantum Analysis

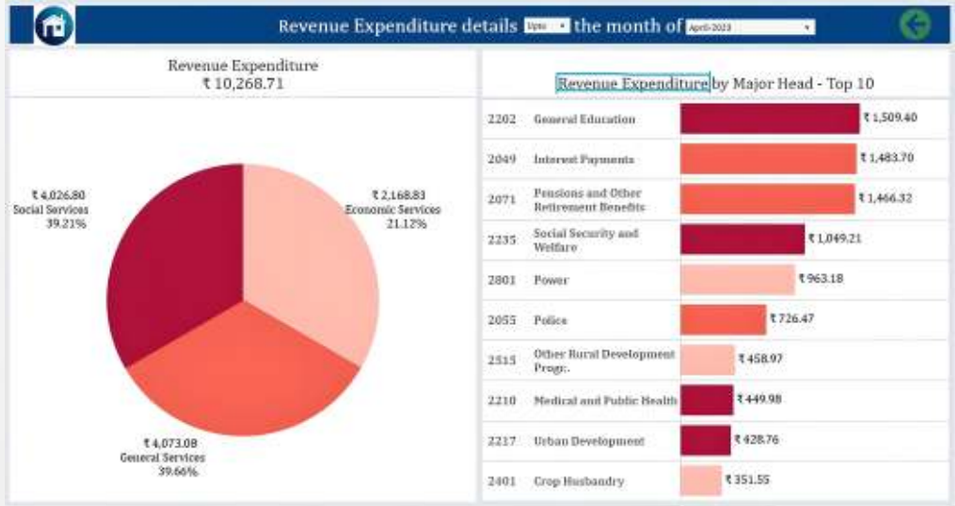
Heat maps use different shades/intensity of a particular colour to highlight variations in figures. This feature has been made use of to highlight the variations in receipt and expenditure figures among different districts or major heads. To ensure consistency, easier understanding and interpretation of data across the charts, standard colour codes have been employed for different components of receipts and expenditure.



Heat map for Quantum Analysis

4. Interactive Maps with drilldown feature

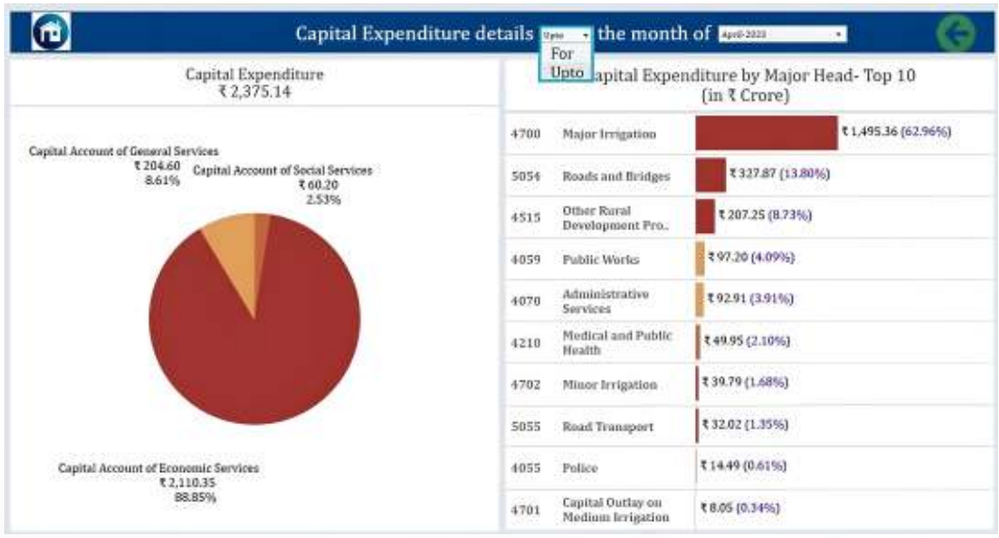
All charts and maps have been made interactive with drill down facility to view the related data down the hierarchy. By selecting a particular sector, the Major Head-wise expenditure of that sector can be viewed. This provides an intuitive way to visualize and explore receipt and expenditure data and also aids in investigating specific areas of interest to gain a deeper understanding of the financial landscape.



Interactive Map- Revenue Expenditure MH wise

5. Simultaneous visualization of monthly and progressive data

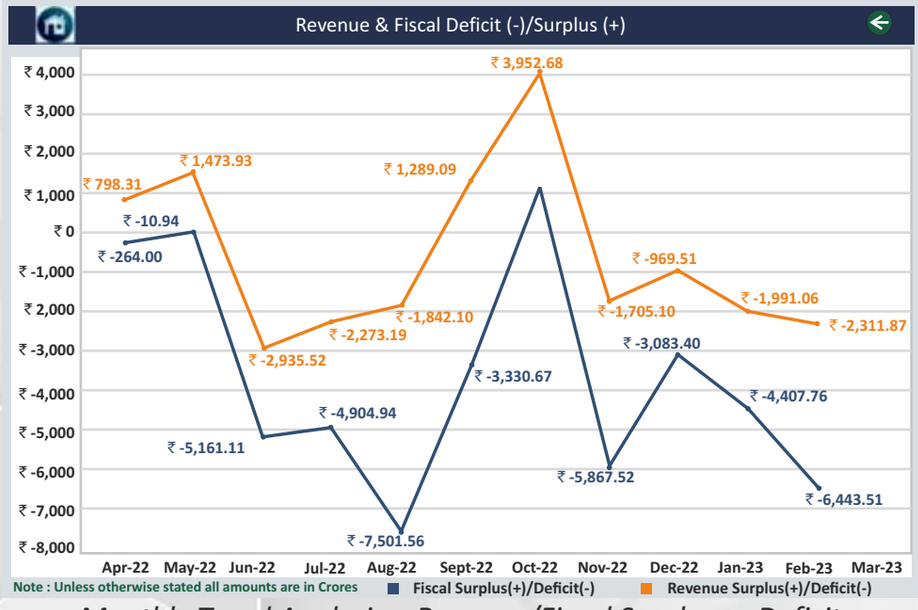
This feature enables the viewer to visualize both monthly and progressive figures for the selected components (Revenue Sector, Capital Sector, District-wise, Major Head-wise etc.) and further analyse the trends and changes over time. By selecting the month, the complete details for the selected month are displayed. In the progressive view, the charts depict data for all the previous months leading up to the selected month.



Monthly and Progressive Data- Capital Expenditure MH wise

6. Trend Analysis

Trend charts have been provided for various indicators such as Revenue and Fiscal Surplus/Deficit, Tax Revenue, Committed Expenditure and Net Borrowings of the State. The financial health and stability of the Government over time can be judged by analyzing these trends.



Monthly Trend Analysis – Revenue/Fiscal Surplus or Deficit

VLC Dashboard and Data-repository Project (VDDP)

Voucher-level Computerization (VLC) refers to the process of using computer systems to manage and record financial transactions at the level of individual vouchers or receipts. VLC software is used in Accountant General (Accounts & Entitlements) {AG(A&E)} offices for compilation of accounts of State. Analytics tools like Tableau, PowerBI and even Excel have been used by many A&E offices and Audit offices in the past to analyse the VLC data.

One such initiative using Tableau had been undertaken based on the VLC data of AG (A&E), Assam. This was primarily designed for certifying the annual financial statements and for use in preparation of the Annual audit plan. An unique feature of the initiative was that the Dashboard integrated the data of Finance and Appropriation Accounts seamlessly within one application – recognizing that the difference is only between the gross and net expenditure of the same set of transactions, though at different levels of granularity.

It was decided to use this application as the base for a pan-India analytics initiative, based on the VLC data, but catering to both Accounts and Audit offices. A Project Development Team was constituted in November 2022 under chairmanship of the PAG (A&E) Assam.

The primary challenge faced by the team was to extract data in a standard format, as the underlying data structures of the source database – VLC, are different across the States. The Project Development Team, with close co-ordination and with the constant guidance and support of Headquarters ensured that the data extraction programs were written and deployed for each of the 28 States in a time-bound manner. Recognising that there were five primary variants of VLC design[1], Team Leads were identified for each of the five VLC design variants. The Team Leads helped each other in modifying the Assam code to meet the data extraction requirement for their version of VLC database. The code once tested in the lead State for each zone was then provided to other states of that zone for further customisation for the State specific variation in Chart of Accounts.

The Standard Dashboard was then made to run against the data extracted for each State enabling the immediate availability of Dashboards across all States. The initial extract was for data from FY 2015-16 to 2021-22. The Team Leads worked with the technical resource in each State and provided assistance in leading to the stage where the Dashboard figures were in agreement with the printed accounts of FY 2021-22. This gave the assurance that the data extraction programs and the dashboard was correct and could be safely used for deriving assurance for the accounts of FY 2022-23.

[1] Based on the vendor who had developed the VLC application for the State. The five vendors were: AFF, HCL, MECON, NIIT, TCS

The VLC Dashboard and Data-repository Project (VDDP) is a first of a kind project of IA&AD which has enabled the creation of a uniform data structure dataset (the repository) and a uniform set of Dashboards capable of presenting the information related to Finance and Appropriation Accounts of each State within a single application. The data required for the Dashboards is extracted from the VLC database of each State using meticulously written programs (PL/SQL Code running into thousands of lines) such that there is an exact agreement with the core Financial Statements of the State. It is this achievement of 100% agreement with the Financial Statements and the seamless integration of Finance and Appropriation Accounts within a single application that makes this Dashboard application and the underlying data of great value for both Accounts and Audit offices.

There are nine separate Dashboards within the Tableau Dashboard application which showcase different aspects of both Finance and Appropriation Accounts. The Dashboard presents data to the lowest level of accounting granularity (Detailed Head/ Object Head) aggregated at monthly level, with data from FY 2015-16 onwards. This enables drill-down of any accounts entry to the lowest accounting classification, while seeing both the monthly trend, and the annual trend since FY 2015-16.

Benefits from the initiative

- Availability of data in a standard format (the repository) as well as a Standard set of dashboards ensures that Accounting data can be understood in the same manner across India. Despite there being State specific variations, a common terminology has evolved, leading to the learnings of Accounting in one State being easily translated to another State.

- The project has led to a better understanding of the variations in Chart of Accounts across the States. While the Functional Classification – from Major Head to Minor Head, is the same across India, the levels below minor head show wide variation across the States. These are still amenable to a common structure, the existence of three different hierarchies is required – (1) Functional Classification (2) Scheme Classification and (3) Economic Classification, with the latter two hierarchies having varying structures and levels across the States.

- With the Dashboard providing access to granular data of the lowest level of accounting, aggregated at monthly level, and covering the period from 2015-16 it is easy to derive assurance on Accounts and have a deep understanding of the Finances of the State in a short time.

Business Process Improvements

Business or functional process is the foundation of an organization. They define how certain tasks are carried out. Process improvement through incremental changes enables organizations to improve the quality of output, better products or services delivery. It makes an organization efficient by eliminating redundant efforts/processes, reducing the cost of operations and ensuring compliance with rules and regulations.

The Institution of CAG of India constantly strives to improve its processes. The technological developments in the government departments as well as within our institution in recent years have provided opportunities for improving the business processes.

In this section, we have highlighted the initiatives undertaken in the recent years. Various offices took initiative for effective use of technology in improving their processes. Although some of them are of incremental nature, yet these bear great impact. Few others traverse into unchartered territory.

Digitisation of Accounting

The treasuries submit their monthly accounts along with supporting vouchers and sub-vouchers physically and compilation of accounts is done by State Accountant General (Accounts & Entitlement) Offices. The outbreak of COVID pandemic had necessitated social distancing and avoidance of physical contact. Movement of vouchers from Drawing & Disbursing Officers (DDOs) to treasuries and further movement to the office had become difficult. Since Treasuries were not able to send vouchers, the monthly compilation of Accounts got affected. Hence, a new Initiative was undertaken.

By 2021, Odisha had an Integrated Financial Management System (IFMS). This was mainly focussed on e-disbursements and e-receipts. However, DDOs were continuing to send physical vouchers to Treasuries. All sub-vouchers and supporting documents were still only in physical format. Unless sanction orders, beneficiary list, sub vouchers, pay order, other supporting documents etc are available in digital copy, it was not possible to shift to a completely paperless environment.

In the above backdrop, the office initiated a proposal to the State Government to consider shifting to a completely paperless environment. The office led the project by coming out with the Functional requirement, Project Implementation Plan, User Acceptance Testing and designing new formats for digital environment.

From April 2023, end to end financial management has become completely paperless in Odisha. Physical vouchers, which were in existence for decades, have been replaced with e-vouchers. All the processes in financial management like budget preparation, sanction, bill preparation, disbursement, voucher, accounting, storage etc are currently only through electronic medium.

This has been achieved by a joint effort of the Accountant General and the State Government. While the State Government played the lead role in the initial modules of IFMS, for the e-voucher part, Office of the AG (A&E), Odisha led the project.

The new process is as shown below.

1. E-Sanctions are issued in IFMS by competent Authorities.

2. DDO prepares bills in online bill module. They have to tag an e-sanction while preparing the bill. While tagging sanction, details get auto populated.

3. DDO uploads sub-vouchers while preparing the bill. The sub vouchers, beneficiary list, supporting document etc. are digitally signed and forwarded to treasury.

4. After verifying the compliances, treasury passes the bill and generates pay order, which is digitally signed by the Treasury Officer and uploaded in IFMS.

5. Once treasury accounts is closed, AG downloads the accounts data in text files through IFMS login and digitally signed e-vouchers (pdf) from IFMS through Middle Ware (MW) Server.

6. Dual method of receiving data from IFMS was adopted. Data can be either downloaded through MW Server or also through IFMS login.

7. One Network Storage Device of 32 TB is placed in the Voucher Level Computerisation (VLC) Network. **All e-vouchers are stored in this device with the AG**. Thus, AG continues to be the custodian of e-vouchers.

8. All front-end Users of VLC and Audit can access the New Accounting System (NAS) to verify the vouchers through VLC LAN.

Benefits from the Initiative

- It paves the way to shift to real time (T+1 day) transmission of vouchers to AG office. Better checking of vouchers is also ensured. Currently vouchers are sent in two lists. This can be shifted to weekly and then to daily (T+1) mode. This will facilitate Accounts to be closed faster and make them more relevant and useful.

- Vouchers were stored physically in large rooms earlier. After shifting to e-voucher, all it takes now is a 32 TB Storage device (size of a bread Toaster!) to store 10-year records.

- With this project, we stopped the **3Ps, i.e., Paper, Printing & Physical movement**. This is a big step towards a sustainable work pace.

- There was scope for missing vouchers. However, in the prevailing scenario, there is no scope of missing e-voucher. With electronic storage, there is no loss and easy retrieval.

All the Sub-Vouchers of Bills are scanned and Uploaded by the DDOs. Making the State agree to this demand and onboarding, 7000 plus DDOs to scan and upload all sub-vouchers is a great achievement. Not only are all bills digitally signed but even the subcomponents like sub vouchers, beneficiary list, sanctions and supporting documents are digitally signed by all DDOs. Without digital signature, system does not process the bills. This has been achieved only at the sole insistence of AG that without this we will not accept any voucher. To overcome the initial resistance and resolve issues, the Office convened a Treasury Officers (TO) Conference *(10th & 11th November 2022)* and held regional level workshops to motivate the Treasury Officers *(169 Treasuries/Sub treasuries)* and sensitise them. Getting all the DDOs *(7,600 DDOs)* to scan, upload and digitally sign the huge number of sub vouchers is a significant achievement.

Streamlining General Provident Fund Function

Meghalaya

e-GPF Final Payment Authority

The General Provident Fund (GPF) Final Payment Authorities to all the GPF Accounts holders are issued on their retirement or to the nominee of the deceased GPF subscribers. Till October 2022, the Office of the Accountant General (A&E), Meghalaya was issuing ink-signed handwritten GPF Final Payment Authorities (GFPA). The Authority was being sent to the GPF Subscribers/DDOs/Treasury Officers by post.

An application was developed to generate digitally signed GFPA from the data imported from the e-GPF Server. Separate API (Application Programming Interface) was also developed to import the subscriber data from e-GPF Server located at National Informatics Centre (NIC), Shillong to GFPA Server and also to export the digitally signed e-GPF Final Payment Authority data back to e-GPF Server. Data is exported as a database in the Binary Large Object (BLOB) format having metadata link of all the addresses mentioned in the e-GPF Final Payment Authority. The database contains only that information as reflected in the e-GPF Final Payment Authority. SMS is also sent to the GPF Subscriber on uploading of the GPF Final Payment Authority data to the Server.

The State Government was informed that from 24 October 2022, digitally signed e-GPF Final Payment Authority will be issued, which will be available in e-GPF portal. The availability of digitally signed e-GPF Final Payment Authority online has resolved several issues like delay in receipt of final payment authority, postal delays, unnecessary travel from far-flung areas of the hilly state of Meghalaya to the capital city of Shillong for collection of GPF Authority or for submission of documents etc. The GPF Subscribers/DDOs/TOs can now view and download the authority anytime. Thus, the service is brought to the stakeholders at the click of a button.

Kerala

GPF Authorisation

Several initiatives to streamline the process of GPF authorisation taken by office of the Accountant General (A&E), Kerala are:

1. New module has been developed in collaboration with the state HR application to call back residual balance authorizations, which have become invalid or expired after one year from the date of issue.

2. End-to-end digitization in GPF application processing including the call back system through web service was achieved. Thus, all functions in respect of a GPF application including admission, Non-Refundable Advances (NRA), Conversion and Closure are done entirely in a digital environment.

3. Linking of the final payment authorization with the digitally signed authorizations sent to state HR application has been introduced. Thus, as and when an authorization is encashed at Treasury, the encashment details are now available for viewing in the office.

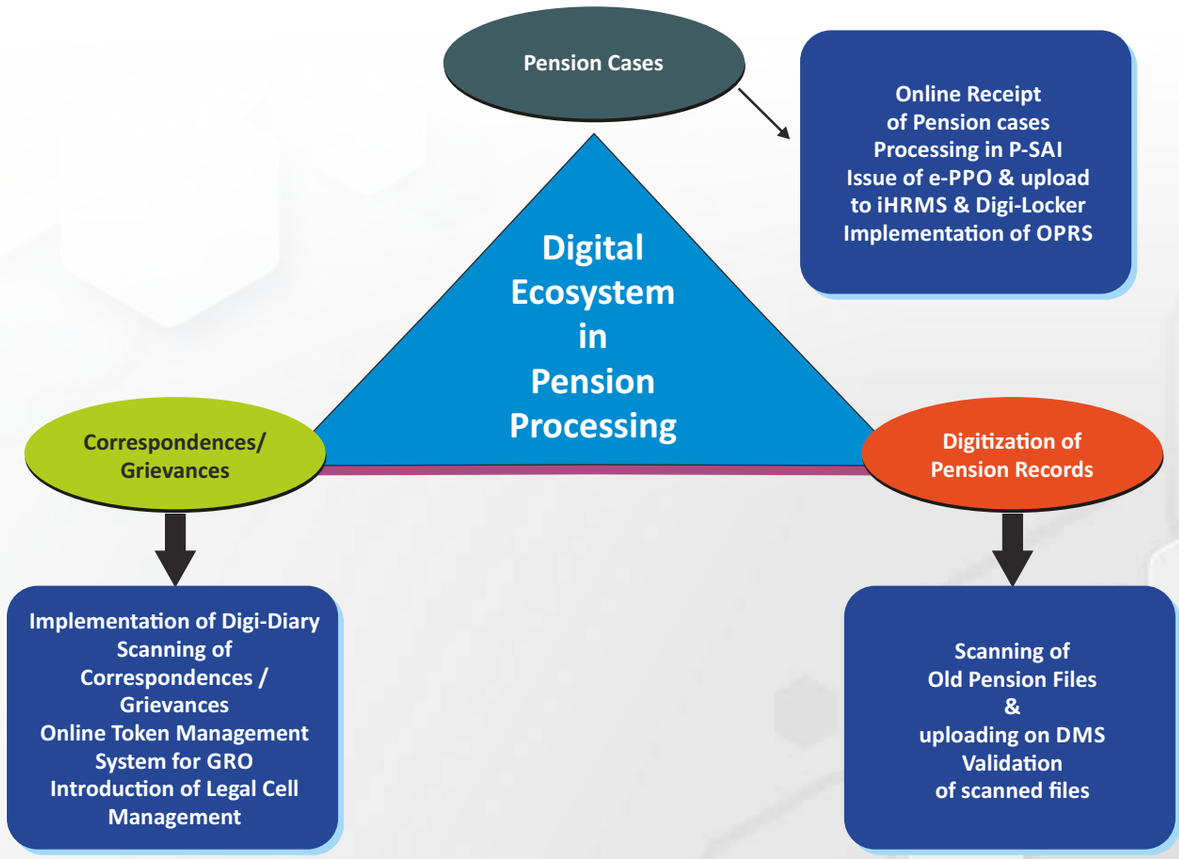
4. New system of online module for Intra-department and Inter-department transactions has been introduced wherein the challan transactions in respect of GPF are done through a web-based module.

Digitisation of Pension Function

Punjab

Fully Digital Ecosystem of Pension Processing

Online receipt of Pension Cases by integration of Pension-System Automation Initiative (P-SAI) System and State Government's Integrated Human Resource Management System (iHRMS) system has enabled the office to facilitate an end-to-end digitalization of Pension processing System. All the requisite three pillars of Pension processing System are working in the office as mentioned below:-



The fully digitised system offers the following benefits:

- The Pensioner/Family Pensioner can submit his/her Pension Application online in iHRMS by uploading scanned document, joint photographs and signatures.
- The Pension Sanctioning Authority can send digitally signed e-applications for pension after verifying application of pensioners, accord requisite sanction and upload scanned pension papers and service book in iHRMS.
- A&E office receives '.xml' and '.pdf' file on Intermediate(IM) server to fetch data in P-SAI system for diarizing and processing the case in P-SAI, thereby eliminating manual data entry
- Receipt of information digitally has standardized the data format and reduced the number of cases that are objected to and sent back for lack of requisite information.
- Digitisation of Pension Records has reduced the requirement of Storage space as Pension records are of permanent nature and kept for a very long period.
- It has eliminated chances of misplacement of document and resultant delays
- There has been substantial reduction in postal expenses and elimination of wrong delivery of pension documents.
- It has contributed to the goal of becoming a paperless office.

The Office has also taken the following other initiatives to strengthen pension processing:

- Online pension revision system (OPRS) for processing Non-SAI cases has been successfully implemented on 13 September 2022. Data from d-base EDP application (Pre-SAI data) has been transferred to OPRS for smooth processing of pension revision cases and reducing man-hours spent in formation of calculation sheet, correction in change in rate etc. manually.
- The office provides instant status of the pension cases through SMS on registered mobile numbers of the pensioners.
- More than 3.5 lacs old pension files have been digitized. The digitized records are being stored in a Document Management System (DMS). Besides document retrieval, there is an inbuilt search facility, which makes it easy to retrieve information and thus, assists in a more time bound service delivery, while also reducing the requirement in terms of man power and hours spent in physical document retrieval.
- End-to-end digitization of pension processing system has enabled to provide timely, accurate and high quality service relating to Pension function.

Digitisation of Gazetted Entitlement Function

Meghalaya

e-Payslip & Document Uploading Module

Gazetted Entitlement Management System (GEMS) application was designed and developed by NIC, Kerala and is in use since May 2020 after modifying the codes according to the procedure/ rules applicable to the employees of the Government of Meghalaya. Earlier, the Office was issuing manually signed pay slip to the Gazetted Officers generated through the GEMS application and the same was collected personally or sent by post. Therefore, a module was developed through in-house expertise for preparing the digitally signed e-Pay slip in the GEMS application in PDF format.

To implement the project, the following initiatives were taken:

- In GEMS software, a separate module was developed to facilitate/push the digitally signed e-Pay slip as a database in the Binary Large Object (BLOB) format having metadata link of all the addresses mentioned in the e-Payslip database. The BLOB database was to contain only that information as reflected in the e-Payslip.
- An Application Processing Interface (API) was developed in the local server to (1) transmit the BLOB file from GEMS Server to the e-Payslip server; (2) create login credential data of Gazetted Officer, Treasury Officer (TO) and Drawing and Disbursing Officer (DDO) and; (3) create data of copy of e-pay slip for the TO and DDO.
- SMS notification is sent to the TO, DDO and the Gazetted Officer about issue of the digitally signed e-Pay slip.
- A dashboard has also been prepared for the administrator of the A.G Office, both in the API and the e-Payslip portal to view number of pay slips prepared and uploaded, number of login credentials created and notified and number of pending notifications. The e-payslip portal also has a facility to retain an audit trail.

The application was launched on 1 December 2021. The availability of digitally signed e-Pay slip online has resolved issues like delay in receipt of pay slip, postal delays, unnecessary travel from far-flung areas to Shillong etc. The Gazetted officers can now view and download their pay slip anytime, thus, bringing the service delivery at the click of a button for the

stakeholders. Further, all the e-Pay slips can be archived in the Beneficiary account, so that the beneficiary can refer to his/her e-Pay slip for any reference or comparison.

Kerala

GEMS Application

The processing of gazetted entitlement claims by the Office of the Accountant General (Accounts & Entitlements), Kerala has been entirely computerized through the use of an application called GEMS. As a result, changes in rules, procedures and reforms in entitlement processing caused by Government policy/reforms necessitated appropriate changes in GEMS. Thus, the office had to process the changes in entitlement functioning by developing appropriate software solutions for the same in an urgent manner within limited time. Such modifications or reforms was made possible through the dedicated efforts of the domain experts of the office in interaction with NIC as briefly enumerated below:

- In tune with IFMS implementation in Kerala, the office implemented online processing of events involved in the authorization of entitlement claims of the State Gazetted cadre such as Promotion, Transfer, Leave etc. This was achieved by integrating with the State HR (SPARK) and the office data by providing the users with a simultaneous comparison of the data as per the State HR and our system before commencement of processing. This enabled confirmation of the accuracy of the data and instant detection of errors. In case of error detection, either reversion of cases to SPARK and/or correction at user level by re-mapping, as the case warranted, was resorted to. Simultaneously, the accuracy of data is also checked by opening and verifying the scanned input with the incoming data. The implementation of this solution significantly reduced the time taken for processing the entitlement functions by reducing errors and related complications.

- The Government orders for promotions or transfers usually covered many State Government employees. This necessitated the filing of these orders after printing in the personal files of each employee, wasting time and resources. The office took the initiative and modified the software, enabling automatic uploading of the scanned copy of the promotion/transfers of each employee in their respective electronic files. This paperless solution reduced the need for manual efforts in processing and optimized the use of resources.

Monitoring Accounts Finalisation of Central Autonomous Bodies

There are **472** Central Autonomous Bodies (CABs) under various Ministries/ Departments of Government of India (GoI) out of which **392** CABs are under the jurisdiction of Report Central Wing (RC Wing) of the Department whose financial audit is mandatorily conducted every year u/s 19 (2) and 20 (1) of C&AG's DPC Act. As per General Financial Rules 2017, all the CABs have to submit every year their approved/authenticated accounts to CAG (field audit offices) by 30th June for audit and Separate Audit Reports (SARs) as the results of financial audit are to be communicated to the CABs by 31st October for laying before Parliament by 31st December.

C&AG is the sole auditor for the certification of the accounts of Autonomous Bodies. The certification of accounts and issue of SARs need to be completed in a time bound manner as prescribed in GFR 2017 as well as timeline prescribed by the Parliamentary Committee-Committee on Papers Laid on the Table of the Parliament (COPLOT). It was, however, observed over the years that due to the following constraints and considerable delays in audit of the accounts of CABs and issuance of SARs for laying before Parliament:

- Reasons for many CABs not submitting their accounts on time were (a) delay in approval of accounts (by Board of Governors//Executive Council/General Council); (b) non-availability of skilled manpower for preparation/compilation of accounts; (c) prevalence of decentralized/Offline accounting system and; (d) delay in entrustment of audit to C&AG

- Poor planning, irregular monitoring, manual/offline preparation of Draft SARs, postal delays, acute shortage of skilled manpower etc. resulted in delays at the field audit offices

The RC Wing has taken various innovative and conducive steps to streamline the process of certification and issuing of SARs expeditiously and to improve the quality of SARs. These steps are as follows:

1. Shifted 100 percent to One IAAD One System (OIOS) by August 2022 and since then all the SARs are being processed and approved only through OIOS.

2. A dashboard/database with information updated on real time basis (daily basis) by all field offices is being regularly monitored at Headquarters.

3. Regular weekly meetings on the status/progress of SARs are being conducted by RC Wing and necessary instructions are issued to field offices from time to time.

4. Workshops with Secretaries/Directors of various Ministries were held (April 2022 and May 2023) for timely furnishing of accounts of CABs and for improving the quality of SARs.

5. Regular meetings were also held with all financial heads/Registrar of CABs.

6. As a result of the efforts of RC Wing, Regional Training Institute, Mumbai (being knowledge centre) has been conducting training courses on certification of accounts of CABs for the staff of field audit offices and CABs.

In view of the above efforts, a significant improvement has been observed in the issuance of SARs for 2021-22 as shown in **Table** below:

Sl. No	Particulars	Year 2020-21 (All CABs) (as on 31.12.21)	Year 2021-22 (All CABs) (as on 31.12.22)	Year 2021-22 (Under RC) (as on 30.06.23)
1.	No. of Central Autonomous Bodies	470	472	392
2.	No. of accounts received on or before 30 June	72 (15%)	192 (41%)	163 (42%)
3.	No. of accounts received after 30th June	325 (69%)	254 (54%)	223 (57%)
4.	No. of accounts yet to be received	73 (16%)	26 (6%)	6 (23%)
5.	Accounts audited and SAR issued by CAG	232 (58%)	379 (85%)	378 (98%)

As per the time frame for certification of accounts prescribed in GFR 2017, 123 days has been given to C&AG for certification of accounts of CABs. Due to proactive measures taken by AB wing for certification of accounts for the financial year 2021-22, certification and issue of final SAR to the CABs/Ministries has been completed in 95 days (approx.).

Editorial Team:

Mr. Ram Mohan Johri

Mr. K. S. Subramanian

Ms. Kavita Prasad

Mr. V. M. V. Nawal Kishore

Mr. Raj Kamal Ranjan

Mr. Karan Vohra

We request your valuable feedback at
dgsmu@cag.gov.in

Designed & Printed by :
Censer Advertising Pvt. Ltd., Rohini, New Delhi

सत्यमेव जयते

Comptroller and Auditor General of India

http://www.cag.gov.in