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Minimum Government - Maximum Governance

Best Practices in e-Governance
Part- I

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1. CDAC's MSIPS Portal: Online Solution to M-SIPS Scheme of Government of India

Before the Initiative

M-SIPS (Modified Special Incentive Package Scheme) was announced by the Government in the month of July, 2012 to offset disability and attract investment in Electronic System Design and Manufacturing. Under Digital India and Make in India, the Modified Special Incentive Package Scheme (M-SIPS) was designed to provide financial incentives in order to offset the high upfront cost and thereby attract investments in the electronics manufacturing sector for new as well as expansion projects. The scheme provided subsidy on capital expenditure investments for setting up electronics manufacturing facilities. The incentives are made available for 44 categories / verticals of electronic products and components covering entire electronic manufacturing value chain. MSIPS acquires Project Proposals from users across the globe for an incentive for many categories of electronic products and product components. Categories like raw materials to assemble, test and packaging of the product are included. The Vision of MeitY is to provide transparency, efficiency and accountability in the administration. As a measure towards achieving the vision, it was felt necessary to launch an online portal for processing of applications under the scheme so that much of the industries could make use of the scheme. The entire implementation of the scheme from application submission to disbursals was handled manually. Hence, C-DAC came up with a solution to automate the functionality of the system/scheme.

Absence of any analytical tool was also felt by top management to understand the statistics of the production, incurred investments, employment generation, imports and exports. It was getting hard to forecast and attract the immediate attention to areas that need an action or careful observation for new policy decisions. Earlier, the predictions made were based on assumptions and on sampling data. This made the forecasting and hence targeting more difficult.

Availability of Centralized Monitoring Mechanism to monitor the status of all applications made under MSIPS by Prime Minister's Office for the Secretaries of Ministries was missing. Before launch of MSIPS Portal project, there was no centralized mechanism for monitoring the real

time status of the Applications and the duration of their pendency by the centralized authority. All pendency reported was checked in physical file & respective note sheets to substantiate the validity. This was error prone, time consuming and caused replication of efforts adding to the cost.

Absence of availability of real time Information about the MSIPS scheme and amendments introduced by the Ministry/ departments was also felt and the need to handle such scenarios efficiently was warranted.

Any query or data required at parliament proceedings was collected manually from the desired division/location that involved searching of physical files and data required from them needed lots of effort and time. This being a humongous task the MSIPS scheme was effected for each district of India.

There also was the issue of queuing. Application's age was hard to track and processing of application on 1st come serve basis was next to impossible.

Requests from applicants regarding status of their application was also hard to trace and respond. All this added to admin works and actual disbursement got delayed.

Challenges Faced

a) **Multi Domain Project**. MSIPS scheme implementation involved domain experts from multiple fields. IT team from CDAC required on the fly inputs from different domain experts such as Finances, Taxation, Reporting, and Documentation. This scheme involved personnel from a large number of domains. Experts in Electronic domains were to be on boarded to MSIPS Portal. The provisioned resources to build the portal had to be trained on the working of the scheme. Expertise in Taxation was required to handle transactions such as RTP (Related party transactions). All the applications had to be routed through a verification agency and the entire workflow for Verification Agency had to be incorporated in MSIPS Portal. This involved release of new feature almost every week.

b) **Migration of Offline Records to Online**. Since the scheme was already accepting applications before the launch of MSIPS Portal, there were a large number of records to be digitized and migrated to the portal. The portal handled such processing along with parallel handling of online applications. A different module was to be developed to handle such issue to make sure that the existing tasks did not suffer.

c) Since the scheme involved application fees and was processing Offline payments, the same was to be migrated to Online Payment as well.

d) Reporting of the scheme involved too many dimensions and was causing a high turnaround time for report generation. Reports were standardized with addition of multiple filters to handle all possible dynamic requests. The support team is active enough to provide such with minimal time consumption.

e) Before the launch of the portal, Physical Copies of Documents were being accepted. A module for archiving the same for future processing was added and streamlined.

f) Physical copies of data documents were abundants most of the times, redundant. Such redundancies had to be removed manually before being processed by the system.

g) There is still a lingering issue of excel sheet capturing. Stakeholders are often required to upload excel sheet with very highly complex and dynamic content. As such, the same has been not standardized yet.

Strategy Adopted

Various domain Experts/Stakeholders guided towards solution. Feedback from applicants were incorporated as well.

- A multi device, single window light weight application for multiple stakeholders involved in the processes of MSIPS with capability to deliver service without consuming too much processor power / user's device memory (RAM) /internet bandwidth.
- Responsive GUI which makes it compatible with handheld devices like Mobile, tablets and laptops.
- Secure & Convenient online platform to accept applications for various purposes like filing initial application, follow-Up applications, online process to appraise the applications by enrolled third party agencies, submission of claims and online way to verify the claims by third party agencies.

- Electronic payment system using services of Govt. payment gateway.
- Integrated Communication Model with system generated email notifications and alerts.
- Tracking status of applications at various stages.
- Provision of generating MIS reports from the application related data.
- . Well-equipped interactive dashboards for top management which helps in monitoring the application's lifecycle and taking further policy decisions.
- Configurable workflow
- Efficient archiving and retrieval.
- Document Uploading/Downloading facility with version maintenance.
- Facility to Parse, Verify and Validate the Digital Signature embedded documents.
- API integration with Third Party Applications of MeitY, (https://meity.dashboard.nic.in/)
- Integration with NIC's SSO (Parichay).

Thus, online M-SIPS solution facilitates the ease of doing business which is making India the next big emerging electronic manufacturing destination of the world.

Technologies Used:

The best available in open source software and technology was used to make this portal a state of the art project.

- Spring MVC and Hibernate framework for application development, open source JDK 1.7, Tomcat 7 as application server. Open source technology saves on cost and at the same time a large number of support community members ensures that no technical stoppages are encountered.
- PostgreSQL database version 9.4.
- 3. Tableau Server for Data Visualizations.
- For privacy we have implemented the following technologies:
    a) SSL: We've used secure link to ensure the integrity of the data being transferred from client to server.

b) Hashing (SHA256): To save the password of the users of the system we have implemented the SHA256 algorithm using CryptoJS.
c) AntiSamy filter: AntiSamy is an HTML, CSS and JavaScript filter for Java that sanitizes user input based on a policy file. It is a way to make sure HTML, CSS and JavaScript input strictly follows rules.
d) Role based Access Control: It is an approach to restricting system access to authorized users. Only users which are authentic to the system can access the resources of the system.

Advantages of Using the Technology

- Being light weight, it did not consume too much resources on user machine and data bandwidth usage was reduced. The entire project was crunched to a very small package consuming the minimal disk. It provided powerful configurations, rapid development, and reusable business code, easy to test, flexible mapping, structured portal.
- Java is platform independent industry proven, technology/language, provides exhaustive testing, updating and consistency of delivery. Easy to use, easy to write, compile & debug.
- PostgreSQL help developers to build applications, help administrators to build fault tolerant environment by protecting data integrity. It is compatible with various platforms, Supports multi version concurrency control, has Mature Server-Side Programming Functionality, and provides Log-based and trigger- based replication SSL. It works best in systems which demand the execution of complex queries. It has become an industry standard for open source and is easily scalable to handle huge loads.
- Tableau quickly creates Interactive visualizations, easy to implement, handle large amount of data, provides mobile support and responsive dashboards, powerful computations, quick insights, can use other scripting languages.

Business Process Engineering

MSIPS portal has been developed in such a way that stakeholders based on their roles are made available functionalities as per their workflow requirements were activated

- In the online MSIPS system, interactive dashboards to track multiple data source businesses to monitor and analyze performance. Real- time monitoring reduces the hours of analyzing and long line of communication that previously challenged businesses. This dashboard is an information management tool that visually tracks, analyzes and displays insight of data, metrics and key data points to monitor the applications, for specific process. They are customizable to meet the specific needs of a department and company. The system displays all this data in the form of tables, line charts, bar charts, donut charts and gauges.
- The system is equipped with quantitative data by which predicting the future based on the results of previous data became possible. Thus, it helped in establishing a new business model and taking best managerial decisions

- With centralized monitoring mechanism, it became easy to check the application processing stages.
- Online System gives the provision of generating MIS reports from the application related data.

The System Supports the Following Processes:

- Online Application submission of project proposals.
- Appraisal review of the application so they should be able to view the submitted proposals and assign proposals for review to external experts/agencies and committee members.
- Consultant review of application- After Evaluation consultant can submit the Recommendation to The Nodal Officer.
- Proper project monitoring is there to review the project status periodically to monitor their progress and achievement. Quarterly project progress reports are being utilized under MSIPS scheme to assess the progress of the projects and give further Incentives.
- Earlier, system had provision to accept only Fresh Claims. Now Related Parties Transaction (RPT) claims are also accepted online. The claims are submitted by uploading mandatory documents.
- Follow-up submission of applications.

- There is a provision where Applicants can file several requests such as Request form for Change in investment timeline, Request form for Change in Name, etc.
- The applicants can view and download the application status on their dashboard.
- Notification mails at various stages of application and uploading of Appraisal Reports, will be circulated to concerned authorities as and when the required query to applicant mail will be sent.
- One Pager report which includes all the information of an application status w.r.t. appraisal, claim and sanction.
- Design and Development of Analytical Dashboard-a reporting tool that is used to analyze large volumes of data to allow users to investigate trends, predict outcomes, and discover insights.
- All Advisory Committee (AC) Meeting Minutes and Approval Letters have been uploaded into the system. All old Claims and their Verification Reports have been entered into the system. CDAC ensured the smooth functioning of the required modules for seamless data migration.
- Integration with Third Party Applications such as Automated Performance Smart-board of MeitY and the MSIPS dashboard/data with Electronic Dashboard which MeitY is using for all its portals for different schemes.
- Pdf, Excel, CSV Reports can be generated instantly at the click of a button from the portal itself.

Results Achieved

Since with the launch of MSIPS portal, at individual level applicants are experiencing faster turnaround time regarding their application processing. They can easily track their application. Changes in application status are notified on real time, enabling them to plan better.

As already available in public domain, it has been stated by dignitaries that the electronic manufacturing industry alone can contribute $1 trillion to the Prime Minister's vision of making India a $5 trillion economy by 2025. Since 2014, the number of mobile phone manufacturing units have increased from just two to 250 now and has created close to 600,000 direct jobs. Noida alone has attracted 90-plus handset manufacturing facilities. Highlighting the role of M-

SIPS (Modified Special Incentives Package Scheme), 2016, while the government has disbursed over Rs 1,000 crore in incentives, manufacturing firms have paid Rs 35,000 crore in taxes and contributed to exports worth Rs 47,000 crore.

At national level, all the 741 Districts, across all the States and UTs (36) are covered under the scheme. Direct and indirect employment of more than 2,24,768 persons has been provided under the scheme. Total sales (domestic and exports) from MSIPS units under production are INR 3,27,814 crore which include export of INR 43,720 Crore. Revenue received by Government from units under the scheme is INR 37,248 crore. Thus, M-SIPS has proven to be a hugely successful scheme in terms of developing the electronics manufacturing ecosystem in the country and has yielded significant returns.

Incentives of Rs. 1,045 Crore (approx.) have been disbursed to 83 applicants. Around 300 applications with investment of Rs. 81,085 Crore & committed incentives of Rs. 8,588 Crore has been received. 199 Application have started production. On the progress reporting aspect, around 2,200 QPRs (Quarterly Progress Report) in every quarter since 2018 with domestic production, Export/Import, Employment, Taxes, Sales has been received.

MSIPS (a Make in India initiative) has contributed to attract businesses from around the world to invest and manufacture in India. During its whole tenure, it played important role in fulfilling the purpose of Job Creation, Enforcement to Secondary and Tertiary sector, Boosting national economy, converting India to a self-reliant country and to give the Indian economy global recognition. Indian Electronics Industry can become one of the top performing industries based on its huge potential and big aims towards delivering higher performances. Presently, the size of Indian Electronics Industry is about USD 84bn and is likely to reach $1trillion to India's economy by 2025.The scheme provided a major boost to electronics manufacturing in the country, after it closed for accepting new FreshApplications last year, the government followed it up with schemes such as PLI, EMC, SPECS, EDF. MSIPS generated a huge corpus of valuable data in its tenure about Investments in items of capital expenditure, Taxes paid to government, Excise Duty, GST, Employment generated from the project till date, Sales from the project, Export etc. The data which is generated provided the baseline to government for starting other schemes defined above for further policy decision of country with individual sectors such as mobile, semiconductor manufacturing etc. According to

estimates about 223 applicants invested Rs 23,991 Cr. There are many firms which claimed incentives. Hence, we have tried to analyze with so many year of data available whether a younger or older company has gained profit, weatherthere is a particular sector which needs a boost or any sector whose production impacted the country's economy. Highlighting the role of MSIPS it is said that while the government has disbursed over 1,000 crore in incentives, the manufacturing firms have paid 35K Cr in taxes and contributed to exports worth 47K Cr. Hence, we are trying to analyze from the existing data that what are the steps government should take to increase export and decrease imports. What are the products for which companies have to depend on other countries to import? Can India produce those products?

- Through the data we have analyzed that MSIPS worked really well in terms of India's economy. Now we want to focus on what are the goods that could include to enhance the reach of the scheme in terms of profitability, market share, and economies. We have the analysis of employment generated for each state and for each sector. Currently, Indian Electronics Industry fulfils its 65% of demand from imports and only 35% demand is catered by local market. Fine tuning according to the demand of current market and economy of the country to the scheme may work wonders. So that we can enhance our export rate and decrease the import. In an article dated 25 Feb 2021, US President Joe Biden signed an executive order meant to address a global chip shortage impacting industries ranging from medical supplies to electric vehicles. According to industry estimates, semiconductor market in India (excluding imported PCBA) has increased from INR 68,342 Crore (USD 11Billion) in 2015-16 to INR. 1,31,832 Crore (USD 20.8Billion) in 2018-19. It is expected that in FY19-20, the demand for electronic components (excluding PCBA) has increased by 10% over FY18-19 (Detail study being done currently).Due to China–US trade differences, it may be a very good opportunity for INDIA to work on the production of semiconductors. Through our data we can analyse what the companies who are producing semiconductors and MSIPS can take proposal further for the same development.
- There are 294+ companies approved by MSIPS and we have 1 company under each sector so we will take data of those companies and analyze the situation sector wise.
- Our study will be going to identify the impact of MSIPS on country's economy.

- Direct and indirect employment of 2,24,768 persons has been provided. Total sales (domestic & exports) are Rs. 3,27,814 Cr which include export of Rs. 43,720 Cr. Revenue received by Government is Rs. 37,248Cr. Thus our analysis infers the profitability impact to Indian Government.
- Portal is operational and equipped with AI-ML powered Interactive Dashboards for monitoring the application's lifecycle and progress.

Financial Savings

Manual processing involved high costs. MSIPS portal has resulted in reduction in resources handling manual tasks that reducing the costs.

- It has been observed thus domestic production of electronic items has increased substantially till FY 2019-20. India's share in global electronics manufacturing has grown from 1.3% in 2012 to 3.6% in 2019, as per industry estimates.
- Export of electronic goods has increased.
- Import of electronic goods has decreased. Growth rate of imports of finished goods have declined and the components have grown up indicating setting up of manufacturing units of electronic products in the country. All these have led to financial savings.

With domestic manufacturing of goods, we save on foreign exchanges. The resources/experts working on domestic manufacturing may get opportunities abroad and result in remittances.

Improvement

Stakeholders work 24x7. No waiting time at all. Notification are sent to action takers so as to keep track of tasks.

Accessibility: The portal is available to user 24x7. Interactive dashboards are being used to analyze large volumes of data to allow users to investigate trends, predict outcomes, and discover insights. System also includes Google Charts and impact metrics that summarize complex information into easily digestible information.

SSL enabled and Safe-To-Host Certified. System has been safeguarded against various

Vulnerabilities like Cross Site Scripting (XSS), Cross-Site Request Forgery (CSRF), and SQL Injections.

User can easily access the online system anytime through any hand held device. The system is Perceivable, Operable, Understandable, and Robust.

1. Transparency: e- MSIPS has brought in the much needed transparency. Each stakeholder is provided a different dashboard and information is easily available.
2. Single window resolution: Users can mail to a separate email id for any technical glitches. Administrator responds to the mails and closes the issue upon resolution.
3. Service response time: The online system has reduced the processing time of applications in comparison to manual one.
4. The system has well equipped communication model to send timely notifications & alerts at various stages.

Our team indulges in Empirical research to discuss the advantage of MSIPS in India and how it may boost up our economic growth. Insights are generated to enhance this scheme as MSIPS 2.0. Identified are certain grey areas that need the immediate attention for the smooth implementation and success of this concept. MSIPS is emerging as a better scheme among others by a close observation on the data in terms of profitability, Employment generated, Location covered, the overall economy etc. From the data available on MSIPS Portal we have analyzed following parameters:

- The domestic production scenario of electronic items
- Whether import of electronic items have increased or decreased with time.
- What is the growth rate of imports of finished goods and the components? We are using Empirical research for our project by analyzing the data collected in the MSIPS portal, from proposed investments, investments incurred, employment generated, export/import of line items, etc. In MSIPS we have also designed and developed an Analytical Dashboard-to analyze large volumes of data to allow users to investigate trends, predict outcomes, and discover insights. This dashboard will going to give

required data to analyze the performance of the scheme throughout its tenure in terms of profit earned by governmentthrough this scheme.

Scalability of Project

MSIPS Portal has scaled the project with integration of various In house modules and 3pp Modules as well. MSIPS portal is integrated with NIC's SSO (Parichay). Data are regularly being updated to DARPAN portal (https://meity.dashboard.nic.in). More integration such as integration with Open Government Data (OGD) Platform, PFMS are in the pipeline.

Simplification of Procedure

Since the launch of CDAC's MSIPS Portal, the application process has been very much simplified. The Portal is a single window access system where all the compliance with regards to the scheme can be met.

The portal itself makes available lots of resources to simply the use of the portal. With availability of Audio Video and text based resources on How To comply with the scheme and other FAQ on using the Portal, there exist a minimal friction in use of this portal.

Adaptability

MSIPS Portal can adapt to changing environment with ease. The smooth handling of Application processing under MSIPS scheme and as a repository of Data for decision making makes MSIPS Portal stand apart.

Current process has a few manual task such as verification which in the future may be adapted to eliminate physical verification. Current level of technology and expertise available with MSIPS Portal engineers is well aligned to adapt MSIPS to such changing requirements.

MSIPS Portal has adapted well to the needs of digitally signed documents upload on the portal itself.

MSIPS Portal is well adapted to the changing security requirements as well. Access modes such as Roles based access, token based access are seamlessly integrated in MSIPS Portal where the wrong doers face insurmountable friction in affecting the consistency of data/system state while

providing a smooth way for the authorized to bring about the required changes.

Regular scan are being made on vulnerabilities updates and the same are positively removed from the system.

All of these go side by side with new integration with third parties such as MS, NIC, and OGD etc. MSIPS portal incorporates such changes without making the user suffer down times.

Constant interaction with the stakeholders has made MSIPS Portal Team aware of the changing need, both functional and nonfunctional such can easily be merged with the current state of the system.

Sustainability

While this portal was being conceptualized, sustainability was one of the main factor provided as input to this project of portal development. It may occur that new application stop altogether and notification may be released to stop the incentives. This portal will still survive in one form or other as the data gathered over the period will be a perfect repository for inputs for policy decision making and new scheme launches.

There is also an attempt to keep environment damage to minimum. This portal endeavors to discard the use of physical documents and have achieved the same at many modules. One such is the Verification Fee Module where no physical copies of documents are exchanged between stakeholders.

Since the entire portal is light weight and supports multi devices, this does not add too much on resources requirements such and computing power, power consumption. It leaves behind minimal carbon footprint.

Lessons Learnt

There were many use cases where one learnt that the applicants and other stakeholders were a little impatient with the use of Portal. As such, Notes and Alerts were put in place to ensure that the applicants do not suffer avoidable delays caused by impatience.

Additionally, we are moving towards a system of things that has data at its center. MSIPS Portal has incorporated this importance accorded to data and is working towards enhancing the system so that each and every data point is captured in machine readable format for processing and analysis. This will definitely add to the decision making at Top Management. One believes data as the secret spice in the recipe of Making MGMG.

It has also been noticed that a few applicant are reluctant to meet online compliance with the scheme related requirements right for application submission. As such, the scope could be widened to include a common service center approach. The applicant could approach the CSC that could act as the mediator/agent between the applicant and MSIPS Portal.

Replicability and Response of Stakeholders

Stakeholders are now thorough with the portal and have really up the ante in responding to the needs of applicants. CDAC regularly receives requests for new features to be added to the system. It is gladdening to know that the portal itself is evolving to an ecosystem that is meeting all the need end to end. Top management from MeitY are directly involved with Portal Managers to add value to the system.

And since the entire portal is modularized - as visualized and made right from the conception - it hardly needs time to launch new features in the MSIPS Portal Ecosystem.

Around 20 request are received per month. This turns into many minor features releases in a month.

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2. Passport Seva Programme Expanding E-Governance: Ministry of External Affairs(PSP Division)

The Passport Seva Programme (PSP) is an ambitious Mission ModeProgramme of the Government of India and has emerged as one of the most successful programme delivering passport related services to the citizens in India and Indian Diaspora living outside the country. M/s Tata ConsultancyServices (TCS) is the Service Provider for the PSP.

Passport Seva Programme has effectively delivered to the expectation and vision of Digital India by way of creation of a (i) Digital Ecosystem among all stakeholders and offering passport services to all citizens in ubiquitous manner at their doorsteps (ii) Ensuring smooth governance and ease of services on demand (iii) Digitally empowering the citizens. The citizens can easily apply for their passports and other passport related documents online, upload relevant documents, make the payment online through debit/credit card or SBI net- banking/SBI Challan, schedule an appointment through a user friendly portal and then visit the designated PSK or POPSK. The end-to-end process has been made completely digital and paperless.

Indian passports (together with other travel documents such as Certificate of Identity to Stateless persons, Emergency Certificates for returnees to India, Police Clearance Certificates, Surrender Certificates, Line of Control Travel Permits in the UT of Jammu and Kashmir) are being issued by MEA through the Central Passport Organization (CPO) and its all-India network of 36 Passport Offices, CPV Division (only Diplomatic and Official passports), Andaman and Nicobar Islands Administration. MEA has undertaken several steps to bring about quantitative and qualitative improvements in the delivery of passport services to the citizens not only in India but also abroad since May, 2014. These have enabled to ensure thatpassports are delivered to the citizens in a timely, transparent, more accessible, reliable manner and in a comfortable environment through streamlined processes and committed, trained and motivated workforce. Several steps have been taken to simplify the procedure for getting passports by the general public. These involve simplification of the passport

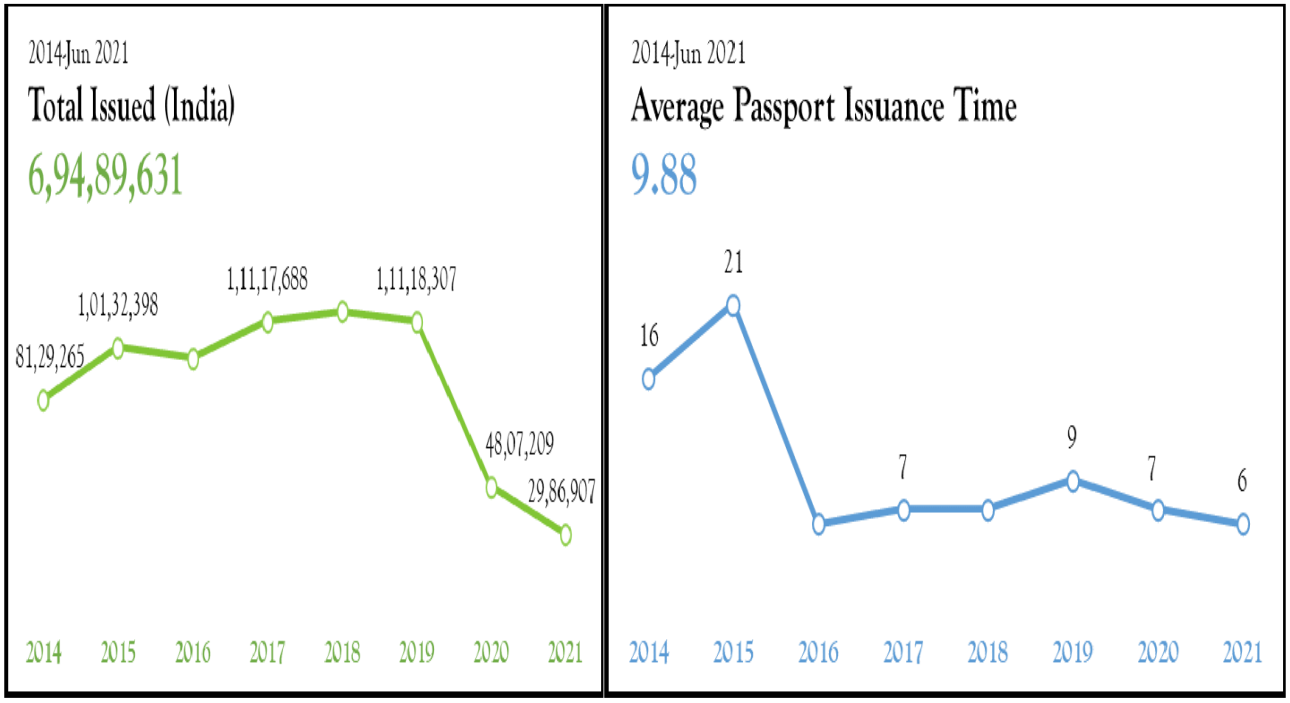
rules and outreach to the people in the delivery of passport related services. The objective of the Ministry has been to cater to the demand for passports and to reach out to the people located far away from the Passport Offices.

Great Outreach Effort - MEA has opened 16 new Passport Seva Kendras (PSK) which includes all the States in the North East of India. Since May 2014 there are 93 PSK functioning in the country after addition of 16 newPSKs. In order to take the passport services to the doorsteps of the citizens, MEA in association with the Department of Posts announced an innovative initiative on 24 January, 2017 to open Passport Seva Kendras at the Head Post Office (HPO) Post Offices (PO) in the country called ' Post office passport Seva Kedra' (POPSK). The objective was to enhance citizen experience and for better governance in delivery of Passport and related services . There are 428 POPSKs functioning across the country as on date, bringing the total of Passport Seva Kendras (PSKs) to 521 out of which 442 have been setup since May 2014. MEA and DOP are working together to open POPSK in every Lok Sabha been Constituency where there is no PSK/ POPSK to ensure that there is at least one PSK/POPSK available in every Lok Sabha Constituency. In process, 489 Lok Sabha Constituencies have been covered till date and work is under process to take further to the remaining 54 Lok Sabha Constituencies to strengthen the reach of our services among the populace. Indian Diaspora out side the docuntry is availing passport services through more than 190 India Missions/ Post abroad.

mPassport Police App- The Ministry has launched recently mPassport Police App in the 2016 for expediting the submission of Police Verification Report (PVR) from respective States/ UTs. As on date 19 States/ UTs covering 334 Police District and 7142 Thanas have been integrated with the mPAssport Police App. Passport from anywhere scheme and mPAssport Police App in Android/ iOS platform was launched in July' 2016 to provide ease of submission of application at any PSK/POPSK across the country irrespective of residential jurisdiction. The Ministry recently intigrated with DigiLocker system of Meity, Government of India , in order to facilitate paperless documentation process in Passport issuance system. ' All Women PSK' at Delhi and Cochin was inaugurated during the international Women Day on 8th March, 2021.

More than 8.50 crores passports have been issued from the PSP system as on date. PSP has imbibed

the word 'Seva' as contained in the 'Passport Seva Project'. India ranks 3rd in issuing Passports worldwide, issuing around 1.24 Crores[1.11 (India) + 0.13 (Missions)] annually and registering a growth of approx. 29%, since 2014. The passport issuance services continued even during the COVID period, while observing due protocols. The Project also provides a multi-lingual national call centre, SMS facility, e-mail-based helpdesk to help citizens obtain the passport service-related information & receive updates about their passport applications. The Passport issuance time has improved considerably as stated below



The end-to-end process is enabled by the underlying robust IT and digital infrastructure. Passport Seva Program (PSP) has gone the digital way, setting anexample of a true digital enterprise (barring a few areas). Some of the remarkable digital take away points of Passport Seva are:

- Anytime, anywhere access.
- Process transparency and accountability.
- Governance to e-governance to m-governance.
- Technology to its business value by leveraging the digital platform.

As part of complete overhauling of the IT and digital infrastructures following activities were undertaken by the Ministry:

- Software design, development/procurement/customization, installation, data digitization & migration, training & documentation for services/functions.
- Establishment of Passport Seva Kendras (PSKs), Post Office Passport Seva Kendras (POPSKs), Data Centre (DC), Disaster Recovery Centre (DRC), Central Passport Printing Facility (CPPF) and Passport Call Centre (PCC), Network Operation Centre (NOC), Security Operation Centre (SOC).
- Assessment, procurement and establishment of IT Infrastructure at PSKs, DC, DRC, CPPF and PCC.
- Upgrading of Passport Back Offices (PBOs) with respect to IT infrastructure.
- Operations and maintenance of entire Passport Seva System environment (service delivery, software & hardware warranty and maintenance support) for six years from the date of going live. The operations and maintenance shall include IT infrastructure maintenancesupport at all the PBOs.
- Design & execution of change management, training & communication strategy for successful implementation and operation.
- Sourcing of personnel for the operation and management of the Passport Seva system.
- Obtaining ISO (9001, 27001, 20000) certifications for the Passport Seva system.
- Continuously striving to achieve the 'metrics of success' of the project.

Improved Services

The Ministry has continuously evolved and improved the Passport service delivery system to the citizens and taken major steps to ease the documentationprocess, policy improvements, leveraging of technology etc. and thus faster delivery of Passports services. To enhance the service efficiency, changesrelated to augmentation of the Passport issuance system and other infrastructure has always been the top priority of the Ministry. A close monitoring and closure of citizens feedback and grievances received through various channel such as passport portal, call centre, email help desk, CPGRAMS and social media platform like Twitter and Facebook has helped Ministry achieve the

citizen satisfaction index to the tune of 98.5%. The Project has been awarded with twenty four (24) awards, including the National e-Governance Gold award in 2014-15 for outstanding performance in Citizen Centric Service Delivery and has also been shortlisted for the DARPG awards 2019-20 in the innovation and universal expansion category.

Way Ahead

Recognizing the need to continually improve the quality of G2C services via IT and digital media, the Project is embarking on PSP V2.0 for technology upgrade and enhanced customer satisfaction, with the use of biometrics, AI technology and the issuance of e-Passports. The attributes of being responsive, caring, considerate, and transparent are the mantra of PSP. The golden words "Passport - Sudhaar, Vistaar aur Aapke Dwar" is our guiding star for the years ahead. It aptly summarizes what we are doing today and what we intend to do tomorrow.

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3. ICT initiatives of Department of Telecommunication towards Fight against Covid-19

Introduction

The relationship between humans and digital technologies has been deepened extensively in the past decades, but Covid-19 pandemic has emerged as a unique challenge for leveraging Next Gen technologies in curbing the crisis. To contain the spread of Covid-19 pandemic, countries across the globe have enforced various strict-measures like lockdown, isolating and keeping positive cases under quarantine in institutional set-up and war scale contact tracing along with testing of suspected cases. In order to monitor people under quarantine, various Govts across the globe have been using multiple tech-based solutions like wrist-bands, GPS-based monitoring apps, CCTV surveillance, monitoring through drone-cameras and AI-based facial recognition systems etc. ICT initiatives of DoT comprises of 6 National level projects, which have played a key role in the fight against covid-19; starting from technology driven contact tracing and hotspot prediction, enforcing and monitoring of quarantine using geo fencing; tracking migrants labourers for providing food and making stay arrangements, targeted broadcasting SMSs to the citizens, providing tele-consultation to citizens having feature phones and tracking real time oxygen transportation across the country.

ICT initiatives, During First & Second Wave of Covid-19

i. Technology driven Contact tracing has been done for more than 1.65 crore targets, which played a key role in hotspot prediction
ii. Real time Quarantine enforcement, management and monitoring has been done for more than 33.60 targets across 18 State/UTs, More than 20.50 crore real time alerts generated as soon as quarantine geo fence is breached
iii. More than 65 Lakh migrants have been tracked for providing them timely help
iv. More than 344 crore SMSs have been broadcasted in 17 regional languages across 25 States and Union Territories

v. Provided tele-consultation and medical assistance to more than 3 lakhs citizens using feature phones by IVRS Aarogya Setu Project

vi. Tracked more than 32000 trucks and trains carrying medical oxygen during second wave of covid-19

The ICT initiatives of DoT have ensured safety of more than 100 crore Indian citizens of 25 States/UT Govts, especially the weaker sections and played the role of a digital warrior in the fight against covid-19, thereby proving the mettle of our country in the field of technology.

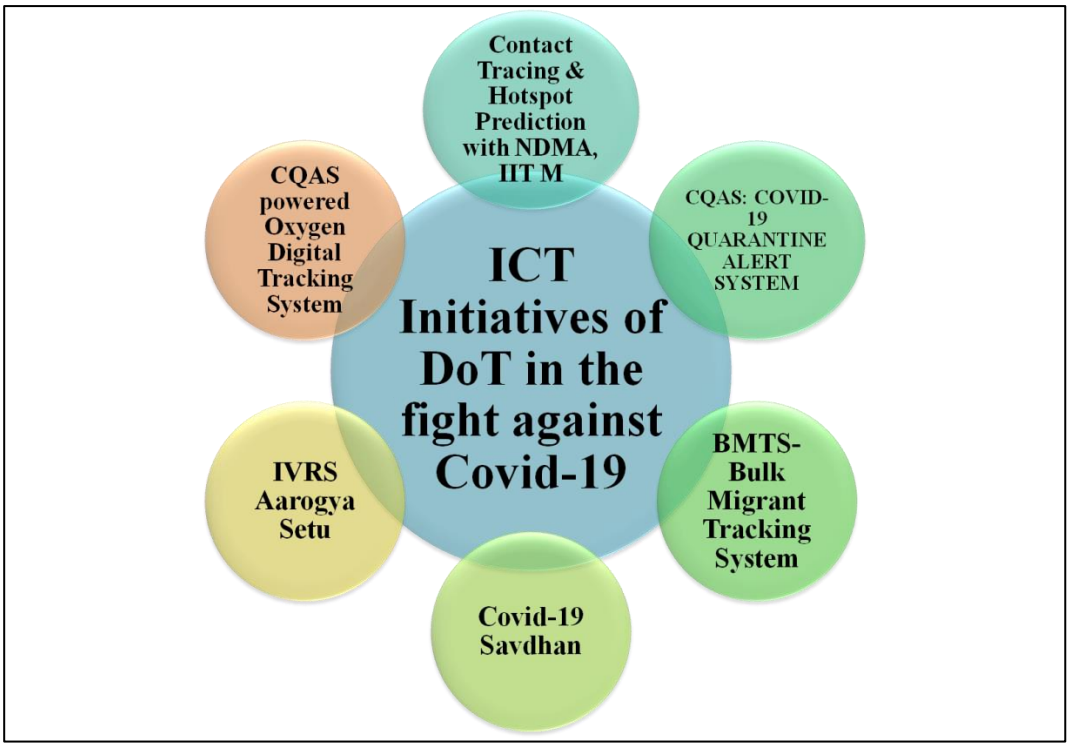

Fig1. ICT initiatives of DoT towards fight against Covid-19

The timelines of launching of different projects under ICT Initiatives of DoT are as follows:

S. No.	Name of Project under ICT Initiatives of DoT	Date of launch of Project	Is the project still functional as on 30th Sept 2021
1	Contact Tracing and Hotspot prediction using telecom network data	20th March 2020	YES
2	Covid-19 Quarantine Alert System (CQAS)	29th March, 2020	YES
3	Bulk Migrants Tracking System	6th April 2020	April – June 2020
4	Covid Saavdhan Targeted SMSs Broadcasting System	4th April 2020	YES
5	IVRS Aarogya Setu Project	12th April 2020	April – August 2020
6	CQAS powered Oxygen Digital Tracking System (ODTS)	1st May 2021	YES

Situation before the Initiative

i. There was no existing system for extracting **contact tracing information**. So, a centralized, tech –enabled system was designed for extracting the demographic movement related information from telecom network data. The data was further shared with NDMA and IIT Madras. Based on the above data, IIT Madras has developed a Predictive Modelling platform which is able to forecast the likely places, upto sub-post office level, of COVID-19 spread in advance. This Predictive Modelling platform has been integrated with Aarogya Setu and Special Surveillance Support (S3) platform.

ii. The State/UT Govts, District Administrations and Municipal Corporations were designing their GPS APPs based solutions for monitoring quarantine – which were highly dependent on the end user for allowing location access. Such APPs were working only for smartphones and catering to a limited number of mobile devices. There was no solution if the end user switched OFF the mobile device. No centralized solution was available with the Central Govt./State/UT Govts for detecting and plotting the quarantine breach behaviour and data analytics for the patients under quarantine/isolation. Manual movement of police personnel and covid warrior

volunteers was required for checking and monitoring the quarantine for the covid-19 positive persons. So, a comprehensive solution **Covid-19 Quarantine Alert System (CQAS)** was designed by DoT and CDOT with the support of Telecom Service Providers (TSPs). CQAS is an indigenous and innovative solution, leveraging Big Data Analytics and GIS mapping platform for real time quarantine monitoring of Covid-19 positive patients and suspected cases who have been advised to stay in quarantine by authorities. It is a comprehensive solution which works not only for smartphones but also for feature phones, for effective monitoring, management and enforcement of the quarantine geo-fence, a virtual boundary. CQAS tracks the breach of geo-fence when the confirmed or potential Covid-19 positive person(s) move away from his/her quarantined location and automatically triggers SMS/email alerts to the authorized Government agency.

iii. Migrants were reaching to different villages & districts of Bihar, Madhya Pradesh, Haryana and Odisha in large numbers from Metros and other states of the country. State Governments were trying to implement containment policies for all such incoming migrants to check the spread of Corona virus and trying to provide food and shelter to the incoming migrants to the best of their capabilities. But State Governments were finding it very difficult to locate such migrants. For helping the State Govts, DoT designed an innovative solution- **Bulk Migrant Tracking System (BMTS),** which provided them timely help for tracking the incoming migrants.

iv. Providing information to the citizens was of paramount importance during covid -19. There was no system in place for **broadcasting SMSs in a targeted manner**, **in a targeted area**. So, **Covid Savdhan platform** was designed with a vision to share information in a targeted area. It was difficult to provide useful and important information to public timely due to limited human resources.

v. Aarogya Setu APP works for smartphones only. The State Govt. of Tamilnadu, DoT and CDOT designed IVRS Aarogya Setu Project for providing tele-consultation and medical assistance to the citizens of Tamilnadu state.

vi. During the second wave of covid-19, when the country was **facing crisis related to medical oxygen supply**, there was no centralized system in place for tracking transportation and supply of medical oxygen. DoT, MORTH, MEITY and NDMA designed Oxygen Digital Tracking System for tracking supply of medical oxygen across the country. The existing

CQAS system of DoT was leveraged and upgraded for real time monitoring and tracking of oxygen carrying trucks and trains.

Challenges Faced

a) **Limitation of GPS based APPs and CQAS- a solution beyond APPs**:

i. In India, there are approximately 50 crores smart-phone users and there are 117 crores telecom subscribers as per latest network status reports of DoT December 2019. Also 64 crores users access broadband using mobile and dongle devices. For tech enabled monitoring of patients under quarantine, authorities have used GPS based APPs. There are three basic drawbacks of these APPs. These apps-based solutions work only for smart-phones. Non-smart phone users especially daily-wage-earners are the ones who are most prone to covid-19 due to their potential proximity to other individuals to earn for their livelihood, shelter and food.

ii. Secondly, smart-phone users are using different social media platforms and they are aware of the fact that they must stay at home and follow government led initiatives & precautionary measures, whereas the persons using feature phones have limited digital literacy.

iii. Thirdly, considering the requirement of real time checking of the geo fence, the user intervention should be kept to zero while these apps are heavily dependent on the end user for enabling the location and sometimes uploading the pictures, which may lead to concealment of information.

So, for overcoming drawbacks of GPS enabled solutions, a comprehensive solution was designed which works not only for smartphones but also for feature phones for effective monitoring, management, and enforcement of the quarantine and that too without user intervention.

b) Technology Driven Contact Tracing and Hotspot Prediction, Bulk Migrant Tracking System:

There was no exiting mechanism of contact tracing. Extracting the meaningful information from the voluminous telecom data was a serious challenge as the data size was in Terabytes.

So, a centralized system was put in place, with proper controls for ensuring privacy and security of metadata. This tech driven solution not only provided a robust mechanism for contact tracing but also enabled hotspot prediction in coordination with NDMA and IIT Madras. The voluminous telecom data was also analyzed using BMTS project for locating the migrants. Data Extraction, Data Filtering and providing actionable information to the State Govts and other stakeholders was done by DoT in a very short span of time.

c) Targeted delivery of SMSs and Citizen Awareness:

Usually the information is broadcasted at State/UT level and in some cases; it is done in selective areas in the cases of Disaster Management. So, Covid-19 Savdhan was designed as a centralized SMSs delivery system which was accurate even in a location being served by one Mobile Tower, at a given latitude/longitude or area under a PIN code. This targeted information dissemination played a key role in sharing health advisories, e-pass related information, nearby test centres related information, quarantine centre information and law and order instructions.

d) CQAS Powered Oxygen Digital Tracking System (ODTS):

Tracking real time medical oxygen transportation across the country, providing alerts to the authorities as soon as an oxygen truck enters their State/UT so that they could take pro-active decisions for distribution of oxygen to the hospitals, was of paramount importance. Since all the trucks were not having GPS devices installed, CQAS system was leveraged for extracting the information from telecom network and the real time truck movement was monitored.

Strategy Adopted

All the projects were conceptualized, designed, developed and implemented totally IN-HOUSE by expert teams of DoT and C-DoT officers.

i. CQAS: Strict enforcement of quarantine was prime requirement to contain spread of Covid-19. Problem statement was to design an automated system of detecting breach of quarantine geo fence for one billion mobile subscribers having smart as well as feature phones. CQAS

caters both type of phones- smart phones and feature phones. Stakeholder consultation was done with all telecom service providers, MHA and NDMA. CQAS uses highly scalable architecture based on Python with GUI based analytics, traversal graphs and Pi charts for easier visualization. Geographical Information System (GIS) Mapping was enabled for all States/UTs.

ii. CQAS utilized following technology: Location Based Services of telecom network, Big Data Analytics, Geographic Information System (GIS) Mapping, Selenium based web browser automation.

iii. CQAS creates a virtual geo-fence around quarantine location; detects any breach of geo-fence. Targets being provisioned in CQAS are duly approved by Home Secretary of States/UT under Section 5(2) of Indian Telegraph Act 1885 and section(2) of Epidemic Diseases Act 1897.Geo-fence around quarantine location for each target is locked in CQAS during quarantine period. Alerts are sent to designated email ids of States/UT. No intervention or consent of end user is required. The Information Flow is as follows: State/UT/Districts (list of targets duly approved by Home Secy. -> DoT(field units) -> Target provisioning in CQAS -> Big Data Analytics for calculation of geo-fence -> Alert generation to States -> Display of breaches in NDMA GIS portal.

iv. BMTS- Big Data Analytics was used to track simultaneously 120 crore mobile subscribers in BMTS project. High end servers with open source like Ubuntu, XRDP, Anaconda and Big Data libraries were employed to mine data. Software codes were developed in python to operate on raw data pulled from TSPs. Telecom data is one of the Big Data sources worldwide which cannot be handled in normal RDBMS systems. Use of Big Data Analytics empowered the developers to get insights into the tracking data to churn the migration details across Indian Peninsula.

v. COVID SAVDHAN: The project was designed and implemented by DoT and C-DoT for sending area specific SMS alerts having location specific information contents, based on pin code using Common Alerting Protocol (CAP) based alert dissemination in targeted area. CAP is adopted by International Telecommunication Union (ITU-T) as Recommendation X.1303 for Emergency Communication in 2006.

vi. Contact Tracing- Mobile data has become an important tool for contact tracing and vulnerability analysis. Mobile number/telephone number of called party /calling party, serving

cell ID, date and time of call event of confirmed cases are the essential parameters for contact tracing. This metadata can be analyzed in an automated manner to generate the list of probable persons who have come in close contact with positive cases.

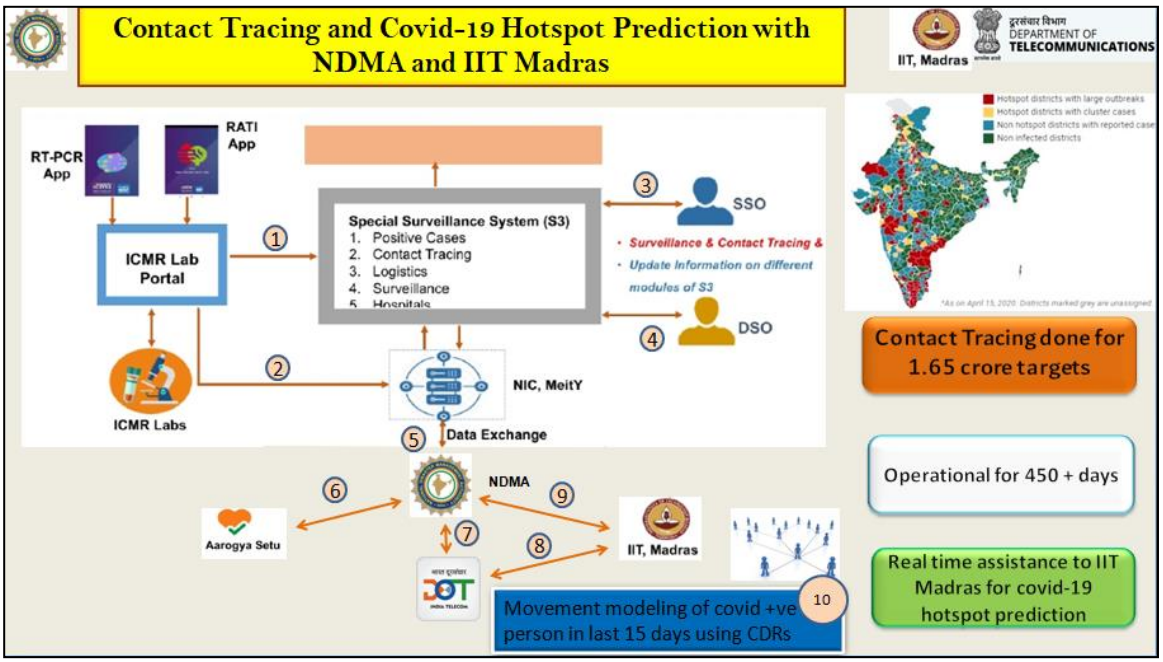

Fig2. Tech enabled contact tracing and hotspot prediction

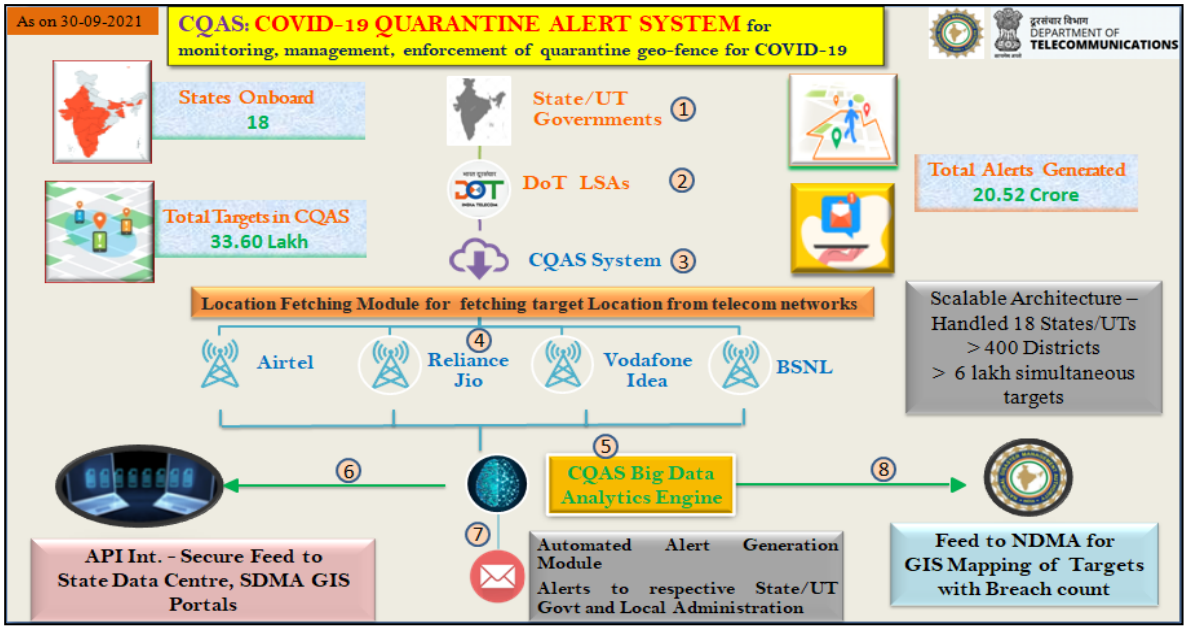

Fig3. Architecture of Covid-19 Quarantine Alert System (CQAS)

State wise and TSP wise Summary of targets provisioned in DoT's COVID-19 Quarantine Alert System (CQAS)									
S.No.	State/UT	Dated: 30-09-2021 at 07:00 hours				Total Active targets provisioned in CQAS as on date	Number of targets which have completed their quarantine monitoring period in CQAS and de-provisioned from CQAS	Total targets served by CQAS for the State till date	Total Quarantine Geo fence breach alerts generated till date
		Airtel	Vodafone Idea	RJIL	BSNL				
1	Andhra Pradesh	0	0	0	0	0	182452	182452	24732981
2	Bihar	0	0	0	0	0	2693	2693	374168
3	Telangana	0	0	0	0	0	13171	13171	2415429
4	West Bengal	0	0	0	0	0	16902	16902	1333758
5	Punjab	105	47	74	14	240	326002	326242	11213663
6	Rajasthan	0	0	0	0	0	1211320	1211320	82265966
7	Delhi	0	0	0	0	0	122766	122766	2863022
8	Haryana	0	0	0	0	0	40217	40217	1253222
9	Madhya Pradesh	0	0	0	0	0	220800	220800	952611
10	Karnataka	0	0	0	0	0	885108	885108	61364428
11	Meghalaya	0	0	0	0	0	20069	20069	2470594
12	Chhattisgarh	0	0	0	0	0	664	664	43672
13	Maharashtra	0	0	0	0	0	10360	10360	510549
14	Nagaland	0	0	0	0	0	1580	1580	367745
15	Gujarat	0	0	0	0	0	18364	18364	908215
16	Tamilnadu	0	0	0	0	0	167989	167989	6159301
17	Kerala	183	366	156	192	897	107467	108364	5447778
18	Puducherry	0	0	0	0	0	12258	12258	475983
Total targets:		288	413	230	206	1137	3360182	3361319	205153085
Cumulative Total targets served by CQAS till date:						3361319			

Fig4.State wise targets provisioning summary report and geo fence breaches detected by CQAS

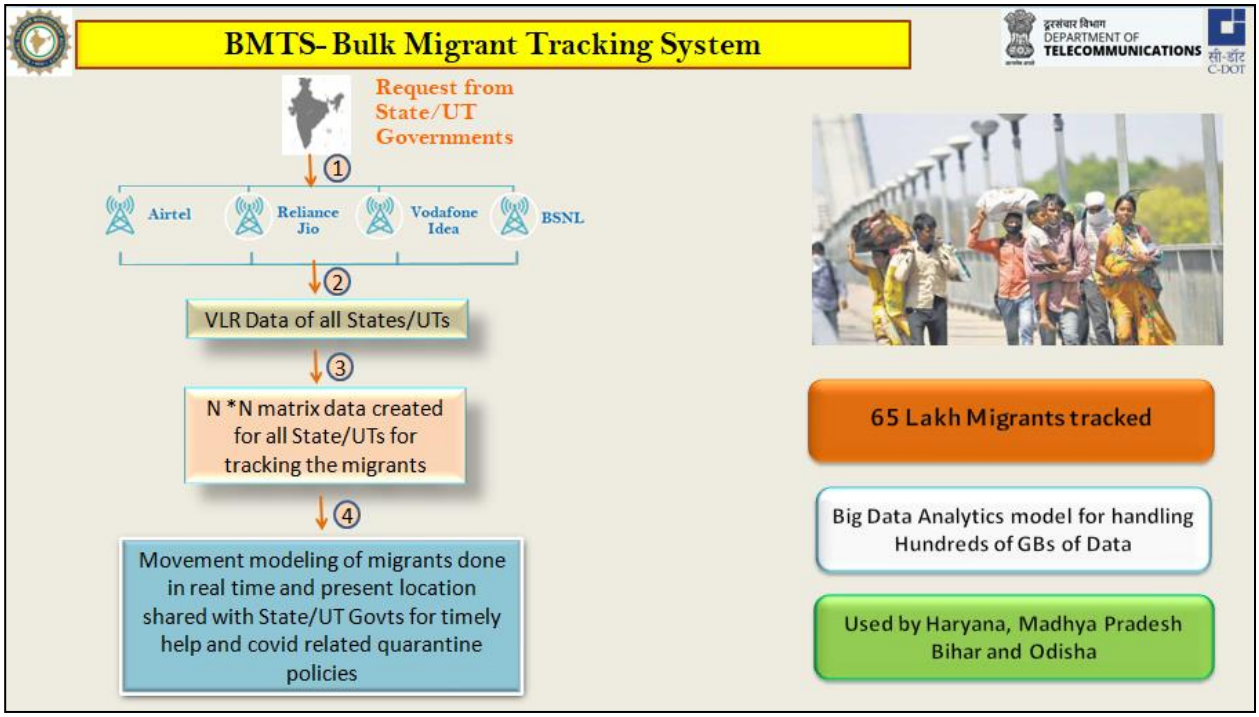

Fig5.Bulk Migrant Tracking System (BMTS)

Business Process Engineering

All the projects involved innovative steps in their implementation for ensuring uninterrupted and reliable operations. Some of the major innovations are as follows:

i. Complete end-to-end, Big Data Analytics Engine was designed by CQAS team for fetching the real time location of the targets using Location Based Services Algorithms in Telecom networks which is independent of type of phone (Smart or feature) or irrespective of GPS enabled feature in phone, making it comprehensive and inclusive solution.

ii. CQAS is having 4 modules: *Target Numbers Segregation Module, Target Location fetching Module, Big Data Analytics Module* and *Automated Alert Generation Module*. The targets are segregated operator wise by deep-diving the Mobile Number Portability Database of India and added to the respective operator file. The real time location of the target is fetched from the respective telecom networks, periodically over a secure network with due protection of data. This data fetching is done through automated processes without any user dependency, which is then analyzed by CQAS in its Big Data Analytics Module, following which the alerts

related to geo-fence breaches are generated by Automated Alert Generation Module and sent to the state administration and district authorities for ground level enforcement of quarantine

iii. CQAS is handling both smart-phone and feature phone users of all Telecom Service Providers (TSPs) - Airtel, BSNL, Reliance Jio and Vodafone Idea, whereas the GPS based APPs can handle only smart phones. CQAS uses the Location Based Services (LBS) of telecom networks for fetching the location of the targets.

iv. API integration of CQAS was done with NDMA Covid-19 Portal. CQAS is plotting the quarantine geo-fence breach alerts on NDMA and SDMA GIS Portals with multi-feature layered map. This multi-feature layered map shows the present location of the target, the quarantine location, total breach count and repeated offender count for easier visualization by the higher authorities which in turn helps to make informed decisions related to lockdown and declaring quarantine zones.

v. CQAS does not require human intervention of keeping the GPS Location always ON for the mobile device. It provides an edge over GPS based solutions which are dependent on human behavior and works only for smart phones. CQAS is capable of sending alerts for switched OFF/ unreachable mobile phones as well.

vi. End-to-end secure connectivity between all the TSPs across all states of India to a centralized system was designed for secure data transfer.

vii. An automated alert generation module was designed to send alerts only to pre-designated email IDs of the State/UT Govts Nodal Officers, District Nodal Officers.

viii. Statistical modeling has been done to avoid any glitch or discrepancy in data related to location of the targets due to environmental disturbances affecting wireless telecom networks for filtering such erroneous results and generating results with more than 99% confidence every time.

ix. CQAS is customizable and capable of sharing the results every 15 minutes to 55 minutes for the targets breaching Quarantine Geo-fence.

x. CQAS has been designed using modular and scalable architecture; it takes less than 1 minute to integrate any new State or District in CQAS hence provide higher robustness.

xi. CQAS is housed in a secure and militarized environment with Intrusion Protection System (IPS) in place. No external IP can contact the CQAS application due to whitelisting of only authorized IPs at the firewall.

xii. The targets are automatically de-provisioned at 23:59 hours of the last day of the period as per timeline provided by State Govt. to put target under CQAS system. The data is automatically purged for the target from CQAS once the target has been de-provisioned from CQAS.

xiii. Due precautions have been taken in processing of Personally Identifiable Information (PII) in the data handled in reference to containment of COVID-19, so that it is stored, processed, and analyzed in a secure environment.

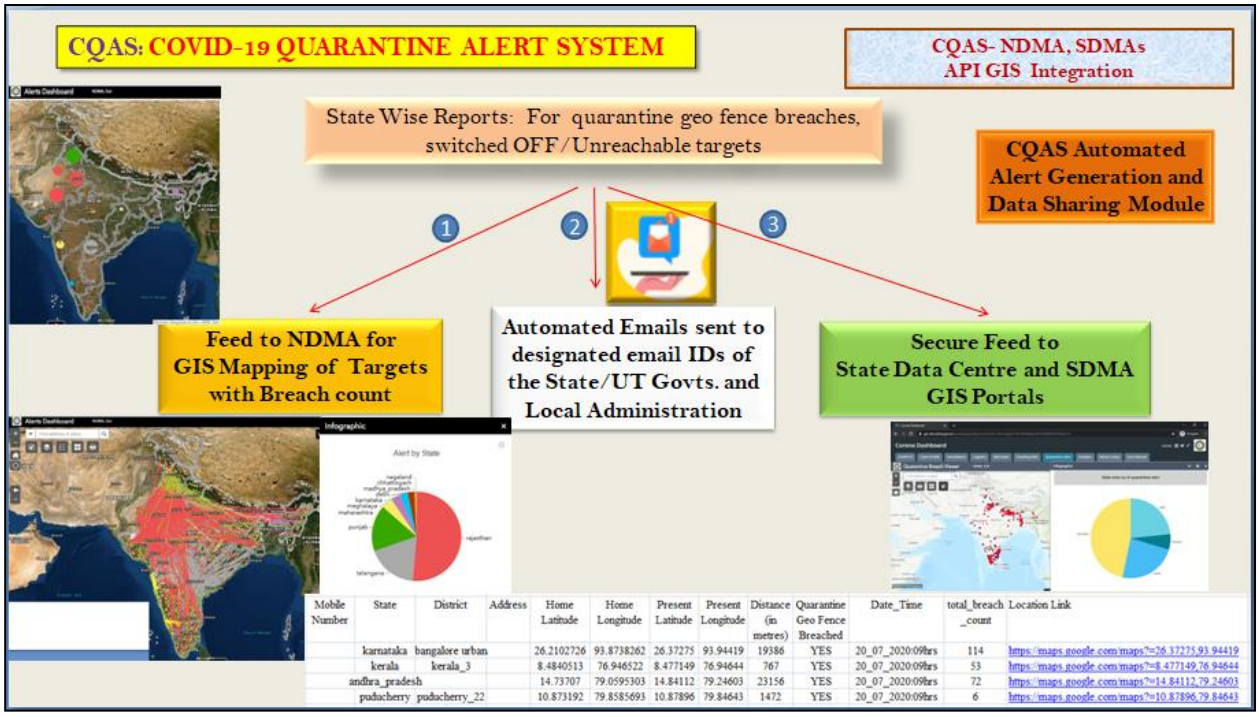

Fig6. Integration of CQAS with NDMA GIS Portal, State Data Centres and SDMA Portals

Fig.7 Covid Savdhan Portal – Targeted SMS delivery System

दूरसंचार विभाग
DEPARTMENT OF
TELECOMMUNICATIONS

COVID-19 Sāvdhān

सी-डॉट
C-DOT

Date	State	Message
09/04/2020	Uttarakhand	घर पर रहो और सुरक्षित रहो उत्तराखंड राज्य आपदा प्रबंधन प्राधिकरण
10/04/2020	Andhra Pradesh	ఢిల్లీ వెళ్లొచ్చిన వారెవరైనా కలసిన వారు 08632271492,104 కాల్ చేయండి
11/04/2020	Sikkim	BE AT HOME AND BE SAFE
11/04/2020	Tamilnadu	விழித்திரு! விலகி இரு! வீட்டில் இரு ! - TNDRRA
11/04/2020	Goa	During Lockdown please use social media responsibly. Verify content before believing or forwarding. Discard fake news and malicious messages. Goa Police.
12/04/2020	Haryana	All religious and social gatherings are banned upto 14.4.20 by Govt. Legal action shall be taken under DM Act and 188 IPC against violators-Yamunanagar Police
12/04/2020	Haryana	दिनांक 11.3 को 8.30 AM पर जो बस ISBT दिल्ली से चलकर यमुनानगर आई इस बस HR58A-9541 मे एक कोरोना सन्करमित व्यक्ति ने भी सफ़र किया था. इस बस मे सफ़र करने वाले व्यक्ति १०० नम्बर पर सूचना दें य.नगर पुलिस
12/04/2020	Uttarakhand	चंपावत की सम्मानित जनता से अनुरोध है कि कोरोना से लड़ने में सहयोग करें, घर पर रहें सुरक्षित रहें।
12/04/2020	Maharashtra	Kindly be at Home and follow the Government guidelines - Stay home, Stay safe Municipal Corporation,Thane
12/04/2020	Maharashtra	A Corona-positive patient has been found in your area. You should not leave your home. Stay home,Stay safe - Office of District Magistrate, Kolhapur
12/04/2020	Maharashtra	Kindly be at Home and follow the Government guidelines. Stay home, Stay safe - Office of District Magistrate, Amravati
12/04/2020	Maharashtra	घरी रहा ,सुरक्षित रहा – तहसीलदार, जामखेड .Kindly be at Home and follow the Government guidelines. Stay home, Stay safe - Office of Tehsil Magistrate, Jamkhed
13/04/2020	Haryana	A Corona affected person travelled in Haryana Roadways Bus HR58A-9541 which started at 8.30AM from Delhi to Yamunanagar on 11 March . Persons who travelled by this bus HR58A-9541 ,Delhi ISBT to Yamunanagar on 11 March should inform on number 100. Yamunanagar Police.

Fig. 8 SMSs broadcasted by State/UT Govts utilizing Covid Savdhan Portal

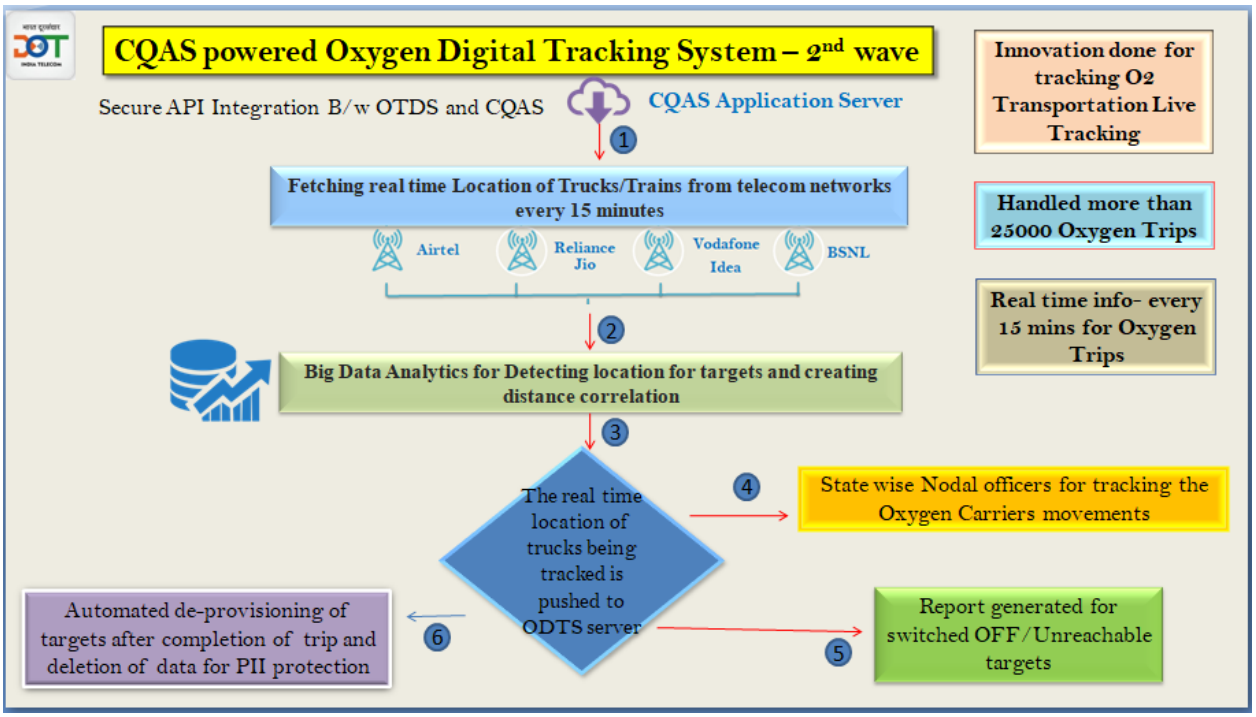

Fig.9 CQAS Powered Oxygen Digital Tracking System (ODTS)

Results Achieved and Improvement in Efficiency

i. The ICT initiatives of DoT have enabled technology driven contact tracing, managing and monitoring quarantine of potential or covid positive cases through CQAS, sharing information through Covid Savdhan, tracking and helping bulk migrants through BMTS and assisting people using feature phones for tele-consultation through IVRS Aarogya Setu Platform. The ICT initiatives have ensured safety of more than 100 crore Indian citizens of 25 States/UT Govts, especially the weaker sections

ii. So far, CQAS has been used by 18 States and Union Territories Govts. Currently two states (Punjab and Kerala) are actively using it. The states that made use of CQAS are: Bihar, Haryana, Punjab, Rajasthan, Delhi, Andhra Pradesh, Telangana, West Bengal, Madhya Pradesh, Karnataka, Maharashtra, Chhattisgarh, Meghalaya and Nagaland. As on 30th Sept 2021, CQAS had assisted in monitoring **33.60 targets and generated alerts for 20.52 crore geo-fencing breaches.**

iii. CQAS is helping the State governments, Local administration, and Police for ground level enforcement of quarantine. It is proving to be a tech-savvy solution to monitor the quarantine

breaches in containment zones and hotspot areas, thereby effectively utilizing the human resources in the fight against covid-19 pandemic.

iv. CQAS has helped in containment of pandemic across 475 Districts of India, catering to more than 80 crores Indian Citizens. CQAS reduced the requirement of man power for monitoring each patient manually, by providing tech enabled solution. CQAS has increased efficiency of State Govts/Local administration/Police approx. by 80 times, helping ground level enforcement of quarantine. Local Administrations have issued warnings, imposed fines, and lodged FIRs against repeated offenders creating deterrence for breach of Covid related protocol.

v. CQAS has been made an integral component of SOPs formulated by more than 10 State Govts for handling Covid-19.

vi. Using CQAS ODTS, till date more than 32000 tankers/vehicles/containers carrying medical oxygen to different parts of the country have been tracked in real time, at an average of 200 oxygen tankers/vehicles/containers per day. The peak load handled was monitoring of 700 – 800 trucks on daily basis during the month of May 2021.

vii. Using Covid Savdhan platform, more than 344 crore SMSs have been broadcasted in 17 regional languages across 25 States and Union Territories. The messages were related to essential supplies details, e-pass related information, hot spot health advisories, test lab information and real time alerts for containment zones for a dedicated area apart from the disaster alert messages in times of cyclones in coastal areas etc.

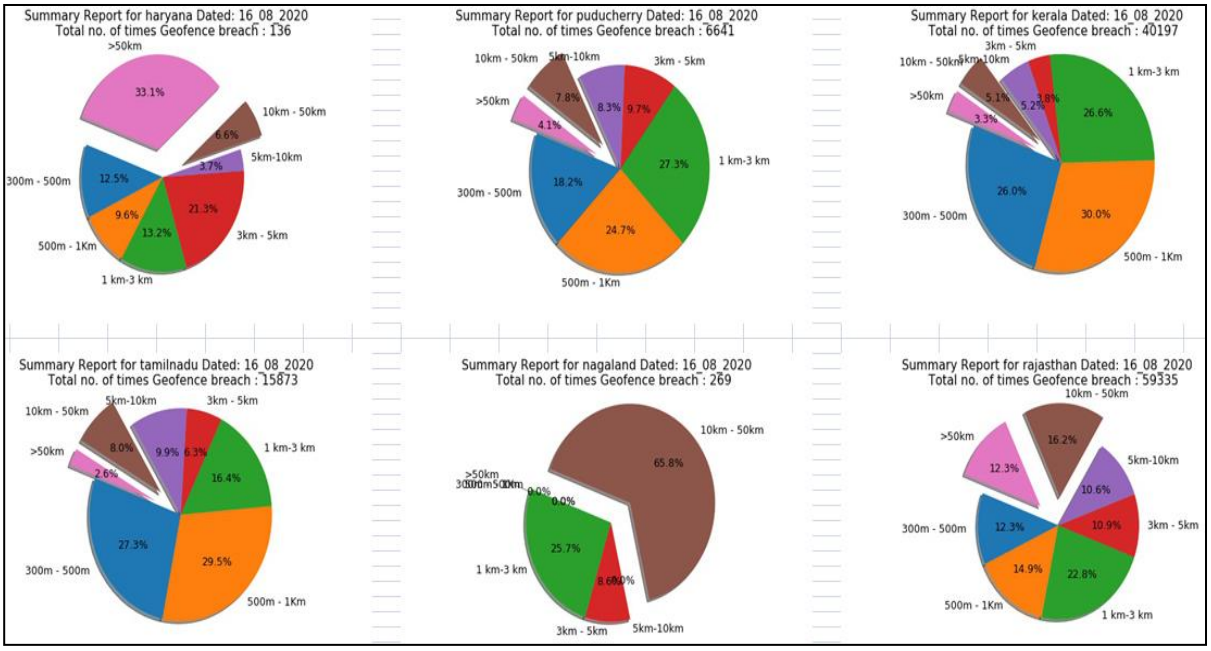

Fig.10 Pie Chart showing CQAS - Distance wise Breach Analysis Report for each State/UT

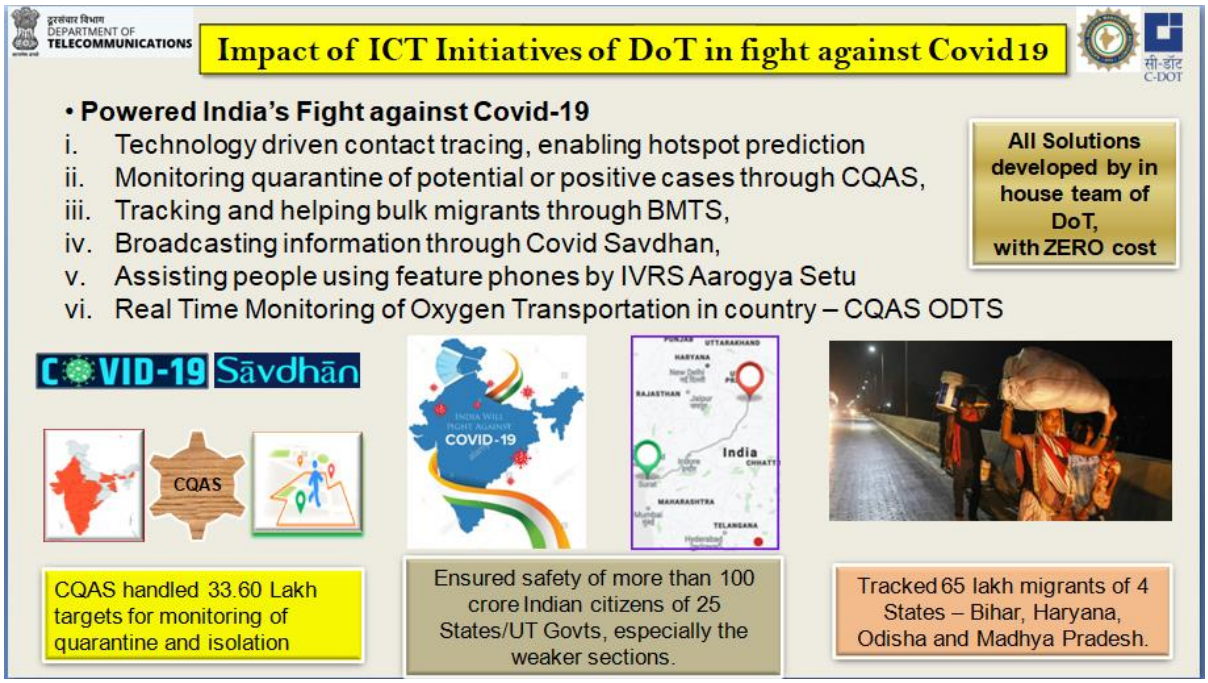

Fig.11 Impact of ICT Initiatives of DoT in the fight against covid-19

Financial Savings

All the 6 projects under DoT ICT Initiatives have been designed in house and with **ZERO cost**. Further, all the solutions were made available to all States/UT Govts **free of cost**. All the projects were conceptualized, designed, developed and implemented totally IN-HOUSE by expert teams of DoT and C-DoT officers.

Scalability of the Project

All the systems have been designed using modular and highly scalable architecture and the systems have been used by many State/UT Govts. The ICT initiatives of DoT have ensured safety of more than 100 crore Indian citizens of 25 States/UT Govts, especially the weaker sections and played the role of a digital warrior in the fight against covid-19, thereby proving the mettle of our country in the field of technology.

i. Contact tracing has been done for more than 1.65 crore targets, which played a key role in hotspot prediction
ii. Real time Quarantine enforcement, management and monitoring has been done for more than 33.60 targets across 18 State/UTs covering more than 400 Districts, More than 20.50 crore real time alerts generated as soon as quarantine geo fence is breached.
iii. More than 65 Lakh migrants of 4 States – Bihar, Madhya Pradesh, Odisha and Haryana have been tracked for providing them timely help
iv. More than 344 crore SMSs have been broadcasted in 17 regional languages across 25 States and Union Territories
v. Provided tele consultation and medical assistance to more than 3 lakhs citizens using feature phones by IVRS Aarogya Setu Project
vi. Tracked more than 32000 trucks and trains carrying medical oxygen to different part s of the country during second wave of covid-19

Simplification of Procedure

i. A very simplified approach was adopted for all the projects. Under the provisions of Section 5(2) of Indian Telegraph Act 1885 and Section (2) of The Epidemic Diseases Act 1897, the Union Home Secretary/State Home Secretary was the approving authority.

ii. The approved requests for targets provisioning in CQAS and BMTS Project were sent by the State/UT Govts to designated Nodal Officers of DoT LSA units, which are the field units of DoT.

iii. The DoT LSA units after verification and cleansing of data sent the request to national Nodal Officer of CQAS and BMTS.

iv. The targets provisioning, information sharing with the designated email IDs of State/UT Govts, integrating the data with NDMA GIS, SDMA GIS Portals and plotting the real time data on State Govt. Dashboards was done by the National Nodal Officer and team. The complete process was automated for information sharing in a secure and robust manner.

v. For ODTS project, the approval has been accorded by Union Home Secretary. There is no paper work involved. The system automatically starts tracking an oxygen carrying truck as soon as the truck leaves the oxygen power plant. The tracking is done till the truck reaches its destination. Thereafter, the data is purged from the system.

vi. For Covid Savdhan, Nodal Officers have been designated at DoT LSA field offices and in State/UT Govt. The State/UTs Govts share the content of SMS, the date of broadcasting and the PIN code or latitude/longitude of the area where the broadcasting is to be done.

Adaptability and Sustainability

i. Every day, the data backup is kept for quarantine breaches only and deleted at 23:59 hours. The respective State/UT input files are updated as per requests received from State/UT Governments. The backup is taken while provisioning new data at 10 PM daily. The system can start without any loss of data. So far, CQAS has provided 100% availability since its inception dated 29.03.2020.

ii. Before launching CQAS was designed to support 10 lakh targets in 30 minutes which was twice the number of targets for which real time location can be fetched from telecom networks. The peak load handled by CQAS was approx 5 lakh targets in the month of June 2020. Since inception till date CQAS has been running in 24*7 mode without 100% uptime, thus making it highly efficient and elastic vertically. The modular approach of CQAS for adding any number of Districts, Sub Divisions and Zones makes the system scalable in horizontal direction. Moreover, parallel threading, forking of events during email generation and keeping the big data

analytics engine active only during the computations, providing sleep intervals to big data analytics engine after periodic execution has ensured efficient and effective use of resources.

iii. The complete CQAS is portable & plug and play model which can be easily ported to any machine having Python environment. No special hardware is required for porting CQAS on any system.

iv. CQAS has been designed using modular and scalable architecture; it takes less than 1 minute to integrate any new State or District in CQAS. Modular structure for State, District and Zones – the user needs to update the target input list and the designated email IDs.

Lessons Learnt

i. Presently the accuracy of Location Based System (LBS) in telecom networks in approx 25 to 300 metres in dense urban and urban areas and it becomes approx. 250 metres or more in rural areas and more than 1 kilometer in remote areas.

ii. Prior to CQAS, the state owned PSUs BSNL and MTNL were not having any LBS. After DoT directives, BSNL has deployed LBS but that too only in 30% network. Presently, the total capacity of LBS of all TSPs taken together is approx. 5 lakhs targets every hour.

iii. The indigenous and innovative solution CQAS may be further standardized as a solution for tackling any disaster or emergency.

iv. Considering the critical roles played by LBS, DoT and NDMA should come together and deploy the LBS system in all telecom networks for using it during disasters or in strategic operations.

v. The broad areas where CQAS may be adopted by India are as follows:

a) During any disaster or emergency situation, for real time tracking whether all the affected persons of the area have been safely evacuated to another place, beyond the expected impact of the disaster.

b) During any pandemic, whether the persons of any given area are following the quarantine or isolation guidelines or not.

c) For tracking demographic movement and suspected geographical area which can be affected by the pandemic in future course due to this movement.

d) India's single emergency number 112 can be integrated with CQAS and leverage this system for getting the location of the party which is making any emergency call to Police, Ambulance or Fire so that the first responders' team get the location where to reach.

e) During Amarnath yatra, Mansarovar yatra the pilgrims may get themselves registered on a centralized portal and once the yatra begins, the pilgrims may be tracked for safety reasons and in case of any unforeseen circumstances in those remote areas.

Replicability and Responses of Stakeholders

i. The initiatives related to CQAS, BMTS were of highest secrecy and information was shared only with designated authorities of State/UT Govts.

ii. On monthly basis, approx. 100 emails were exchanged between State/UT Govts and CQAS team for sharing feedback about the ground level enforcement of quarantine management and monitoring.

iii. The close and highest level of coordination among different stake holders of Central Govt. like MHA, NDMA, DoT and Ministry of Health and Family Welfare and different arms of State Govt. like health department, Local Administration, Surveillance officer and Law enforcement agencies for pin pointing the offenders and taking immediate action also played a key role in enforcement and monitoring of quarantine guidelines in true spirit.

iv. The secure, robust architectures of the initiatives helped protection of Personally Identifiable Information (PII) of citizens. The data is automatically purged from CQAS after the completion of quarantine period of the person. The data and alerts information is shared only with the designated authorities of the State/UT Govts.

v. The scalable architectures of all the projects enabled processing of Terabytes of data extracted from the telecom networks.

vi. CQAS has been used by 18 State/UTs, handling 33.50 lakh targets and generating more than 18.34 crore quarantine breach alerts. It helped in containment of pandemic across 475 Districts of India, catering to more than 80 crores Indian Citizens. This technology solution increased efficiency of State Govts/Local administration/Police approx. by 80 times, helping ground level enforcement of quarantine. Local Administrations have issued warnings, imposed fines, and lodged FIRs against repeated offenders.

vii. CQAS has been made an integral component of SOPs formulated by more than 10 State Govts for handling Covid-19. CQAS has been appreciated by Govt. of India on multiple international forums. NDMA appreciated usability of CQAS and requested all States/UTs in April 2020 to use CQAS for covid-19 quarantine management.

viii. Government of Bihar, Haryana, Madhya Pradesh & Odisha found the information about migrants, provided through BMTS, very helpful in efficient management of Covid-19. The data provided was distributed to District Administration for health check and ensuring quarantine of individual migrants.

ix. Covid Savdhaan was utilized by 25 States to send more than 3.3 billion messages in 17 languages, hence utilized widely without any financial implication for the States.

x. CQAS has been awarded as the Best Emergency Response Project of the Year 2020 by EC Council – CISO MAG in July 2020.

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4. Development of E-waste Based Microwave Absorbing Materials for EM Shielding and Stealth Applications

Introduction

Due to the large market of electronics, a huge amount of electronic waste (E-waste) is generated every year. The projected values of this large E-waste published by United Nations Universityare as shown in Fig. 1. The majority of the E-waste comes from the mobile phones and consumer electronics each having a share of 34% and 19%, respectively [1]. In order to deal with the large E-waste pollution, the E-waste (Management) Amendment Rules, 2017, were published by the Government of India by the Ministry of Environment, Forest and Climate Change in the Gazette of India stating the requirement of E-waste management by the producers of the electrical and electronic equipment as an extended producer responsibility. The rules also state that the Central Pollution Control Board (CPCB) may conduct random sampling to monitor the reduction of hazardous substances in the EEE placed in the market. However, the E-waste management is still ineffective in India due to lack of technical expertise, awareness and market information.

At the same time, the microwave absorbing materials (MAMs) have great demand in civil as well as stealth applications. Ultra-Wideband (2 to 18 GHz) MAMs in particular are extensively used for RADAR, and applications such as camouflage nets and RCS reduction of planes for which stealth is of utmost importance. The MAMs are also required for civil applications such as reduction in electromagnetic (EM) pollution from mobile communication devices,electromagnetic interference shielding, radomes, etc. In the age of high electromagnetic (EM) pollution, the conventional MAMs such as Salisbury screen, Jauman absorber, coating of magnetic materials such as Fe_3O_4, $NiFe_2O_4$, $BaFe_{12}O_{19}$, $ZnFe_2O_4$, and $CoFe_2O_4$, and coating of dielectric materials such as ZnO and SiC, have limited practicability due to the narrow bandwidth, low dielectric or magnetic losses, thermal stability, high density, poor flexibility and coating thickness. Significant efforts are being made by different research groups to overcome these limitations to serve various kinds of applications of MAMs. Till date, the majority of microwave absorbers prepared by the researchers for broadband

application are thick sheets (> 3 mm) and are made up of ferrite materials. The thickness of the layers is to be minimized, keepingthe performance intact. Another technique of multi-layering for enhanced microwave absorption is widely used but this also suffers with thick coating and have low strength. With the incessant growth of the EM pollution and advanced engineering requirement in military stealth applications, the need of high performing MAMs is indispensable. Considering the different applications of MAMs in civil and defence sector, there is vital need of cost effective synthesis and fabrication of effective microwave absorbers using low cost raw materials and less complex fabrication techniques. Thereby, the aim of the proposal is to provide an alternative option to develop MAMs using E-waste having the properties defined by the end user. Considerable amount of resources, such as materials, time, manpower, cost, etc., will be saved if such a technique is developed.

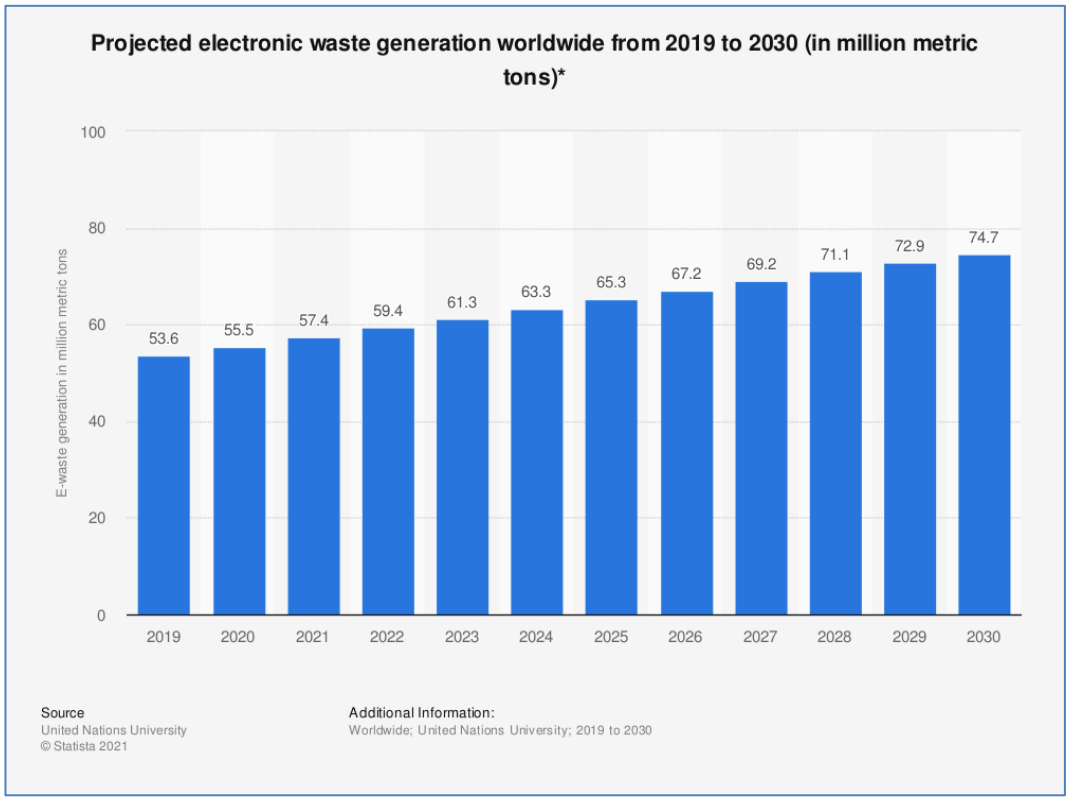


Fig. 1. Projected electronic waste generation worldwide from 2019 to 2030 (in million metric tons)

Situation before the Initiative

A multidimensional research is going on across the world for the development of MAMs. After initialwidespread use of Salisbury screens and Jaumann absorbers, a significant amount of work has been carried out in studying the microwave absorption characteristics of organic and inorganic materials, polymers, nano composites, meta-surfaces and meta materials. The microwave absorption behavior of grading honeycomb composites, frequency selective surfaces (FSS) impregnated absorbers, graphene structures, different shapes of materials and doping elements has been studied. A large number of research papers are available on alternative, cheap, and renewable resources for the synthesis of MAMs such as coconut shell and coir, industrial fly ash, cellulose nano fiber, Waste cotton-derived magnetic porous carbon, rice husk, commercial cement, slag of copper production, sugarcane bagasse , biomass derived reduced graphene oxide and eggshell membrane .

However, irrespective of a large database of materials, the limits of the MAMs are undeniable and still significant effort is given in realizing RAMs using magnetic materials, carbon materials, metallic nano composites and alloys and met materials . For ultra-wide bandwidth, use of meta materials and FSS has been most recently presented with encouraging results. Materials giving good absorption in lower frequency (800 MHz to 2 GHz) are yet in the initial phases of research and require much attention for serving various applications. In summary, the effective absorption properties in the materials are largely achieved by the quarter-wavelength cancellation theory, good impedance matching, intense conductive loss, multiple reflections and scatterings, dielectric loss, magnetic loss, and microwave plasma loss . The detailed and recent review on the subject matter is also present in the literature.

There is a large number of parallel literature available for the sustainable recycling of electronic waste generated from printed circuit boards, mobile phones, desktop and laptop computers .The physical and chemical recycling of PCBs to address rapidly growing disposal problem of E-waste has been reviewed in detail in. The human health risk evaluation by assessing the air pollution caused by illegal e-waste burning has also been recently carried out. A large literature is also available for progress of recycling technologies physical and chemical recyclingtechniques for metals and nonmetals extraction from E-waste for various applications, micro to macro scale E-waste management techniques, and biotechnological techniques for metal extraction from waste PCBs. Also, the PI has shown that the

recycling of the disassembled waste printed circuit boards has given promising results for the development of cost-effective broadband radar wave absorber.

A comprehensive review of works carried out by Indian scientists in the project area reveals that scientists in institutes such as IISc Bangalore and IIT Kanpur have significant amount of work in the domain. The Materials Engineering group at IISc Bangalore typically works on the polymeric blends based MAMs. The group have synthesized MAMs operating at X-band frequencies for various applications such as RCS reduction and stealth technology. Significant work is shown using magnetic materials, MWNTs , CNTs , and graphene layers . The researchers have also demonstrated novel materials extracted from chicken feather fibers. The researchers have demonstrated considerable novel concepts and implementations, however, the approach remains that of trial and error method. The materials are typically chosen based on restricted analytical investigation. Various other researchers from different premier institutes such as IIT Kharagpur, IIT Madras, IIT Dhanbad, IIT Delhi, JNU and CSIR-National Metallurgical Laboratory have also investigated the MAMs. However, developments of marketable products or prototypes for stealth or civil applications are yet to be demonstrated. After the comprehensive literature survey, it is clear that the rapid growth of E-waste can be managed by a viable option of fabricating RAMs from the matter extracted from E-waste.

Challenges and Limitations

1. The principle of absorption mechanism in E-waste based materials is still has to be explored and is a challenging task due to unknown methods of E-waste collection techniques.
2. The synthesis techniques, characterization, and optimization of novel EM wave absorbing materials using E-waste are yet to be formalized.

3. Limited studies are available on the effect of homogeneous & heterogeneous milling, dry & wet milling, particle size, ball size effect & metallic powder effect on EM wave absorption.
4. Inadequate resources are available on the analytical approaches to fabricate angular and polarization independent FSS absorbing structures.
5. Unavailability of studies on sandwich structures made up of E-waste based host material for controlling the absorption bandwidth and frequency.
6. No design technique is available for the development of Radar Absorbing Structure (RAS) for radomes (RCS reduction) operating in 2-18 GHz frequency range.

Research Strategy

- Simplification of procedure

The synthesis method is summarised in Fig. 2. The prepared sample will further be characterized before the fabrication of the coating paint.

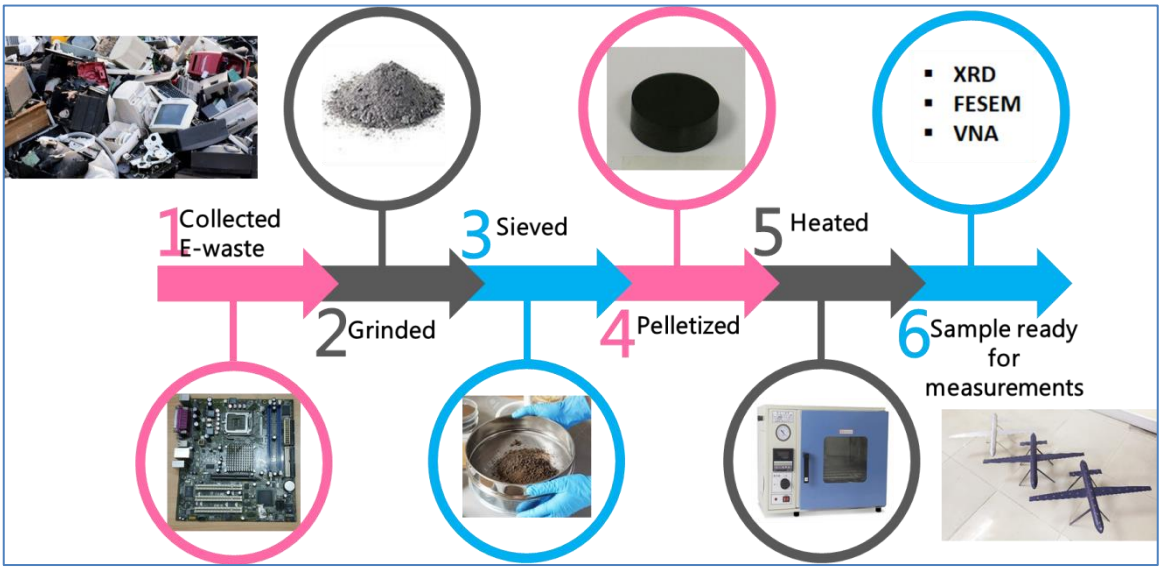


Fig. 2. Process flow diagram of the MAM synthesis process

- **Sustainability**

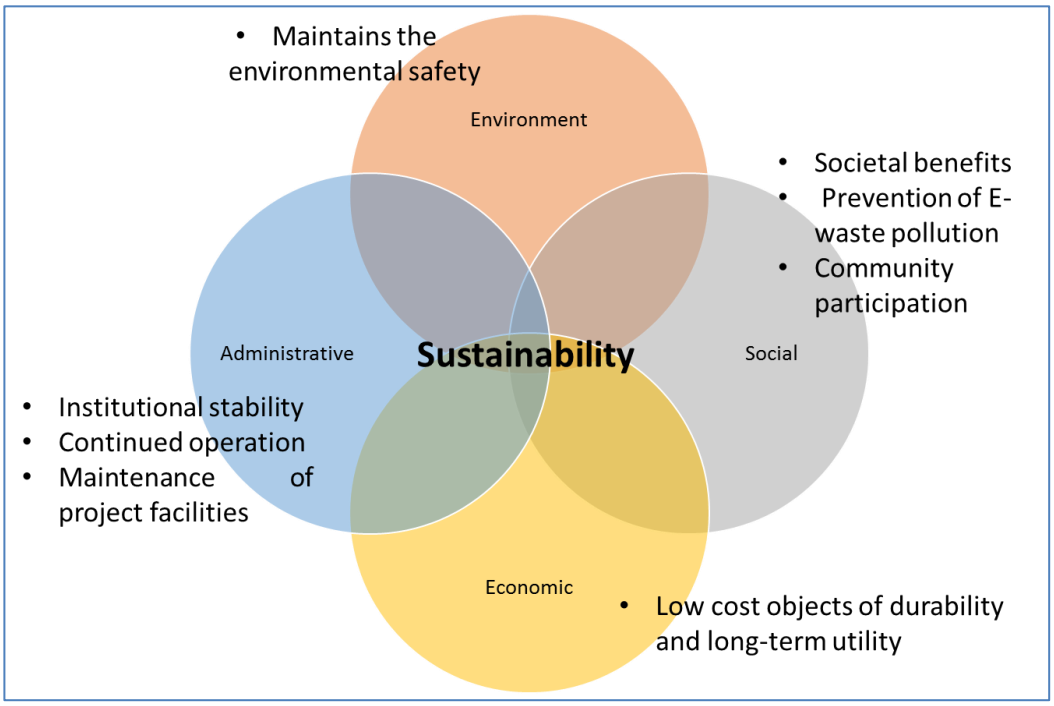


Fig. 3. Sustainability of the project: major elements

The proposed project is highly sustainable and its features are diagrammatically shown inFig. 3.

- **Scalability of the project**

The strategy and research methods discussed above work equally well on the small and large quantities of materials. However, more studies are required to optimize the synthesis method specifically for large scale synthesis.

- **Replicability**

Once all the studies regarding the synthesis, characterization and optimization of MAM is finalised, the replicability of the product will be a major achievement for industrial applications.

Few Results and their Discussion

We have published some critical results in [71] for MAM synthesised from waste computer printed circuit boards (PCBs). The proposed material is used for the absorption of microwaves owing to its easy handling & availability, optimum density, and affordability. The electrical properties (i.e., permittivity and permeability) are measured using transmission line technique for frequency from 2 to 18 GHz. The important results are shown in Fig. 4. The study also considered the role of appropriate amount of copper, graphite, and titanium dioxide in E-waste to attain wideband microwave absorption in theE-waste based MAM.

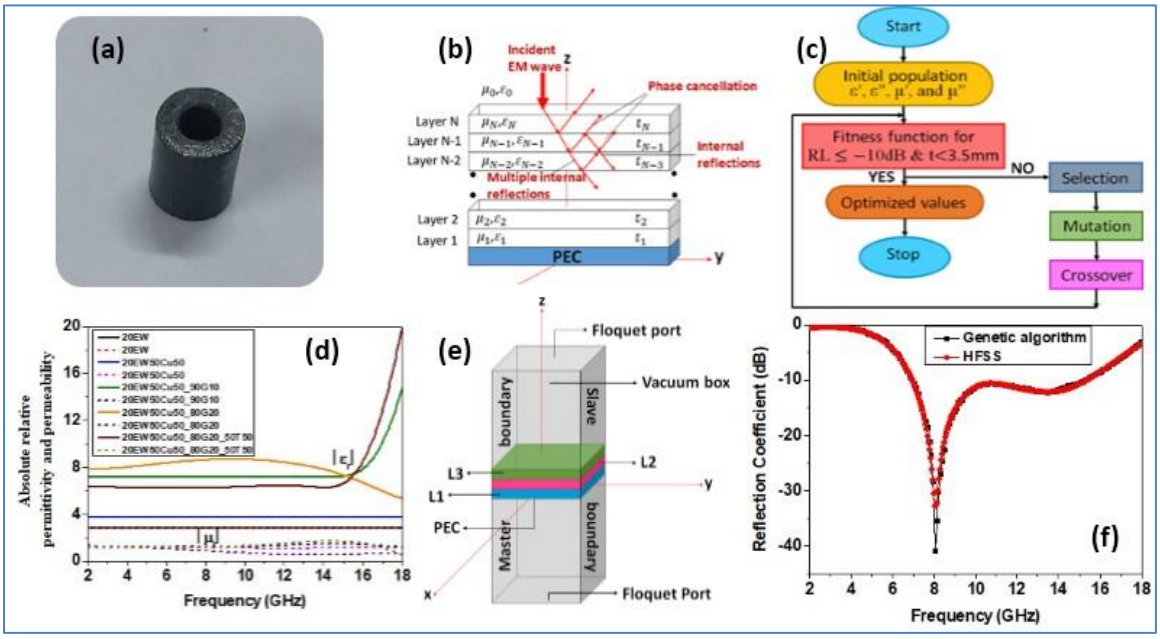
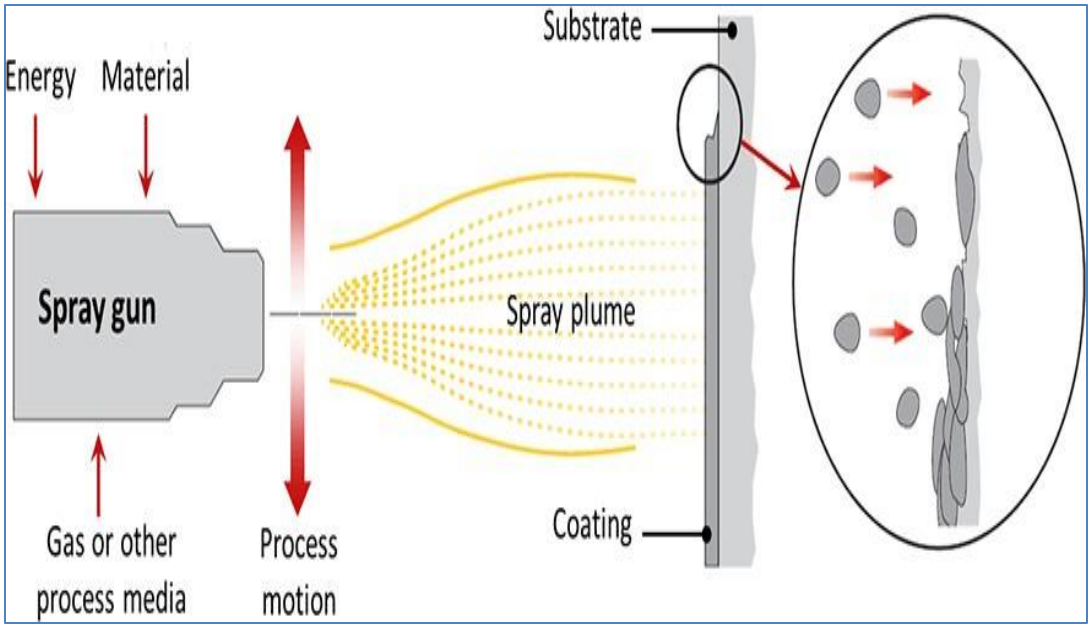
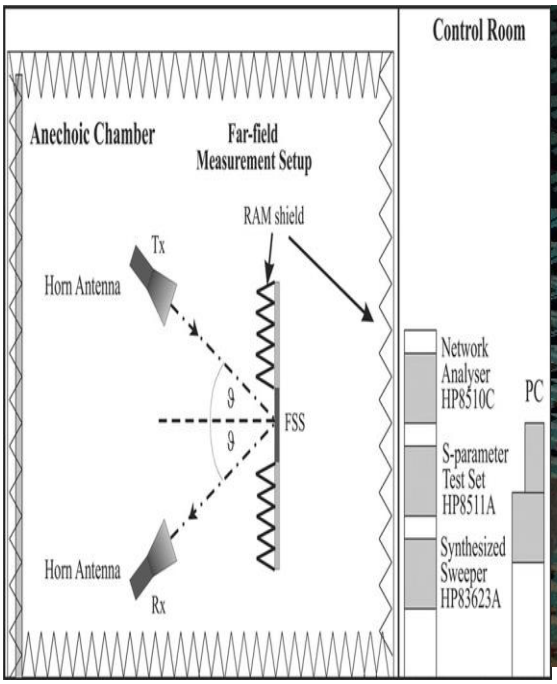


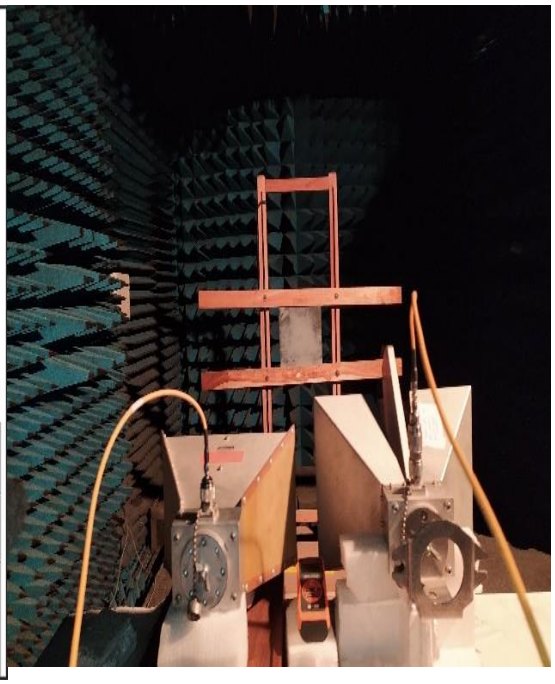
Fig. 4. Characterization results of previously developed E-waste based MAM (a) Material, (b) multilayering approaches, (c) optimization, (d) dielectric characterization, (e) HFSS simulationand (f) comparison with analytical approaches.

Further, this material is used for microwave characterizations where the material is coated on the perfect electrical conductor in the form of paint and microwave absorption is studied in the anechoic chamber. The characterization steps are shown in Fig. 5.

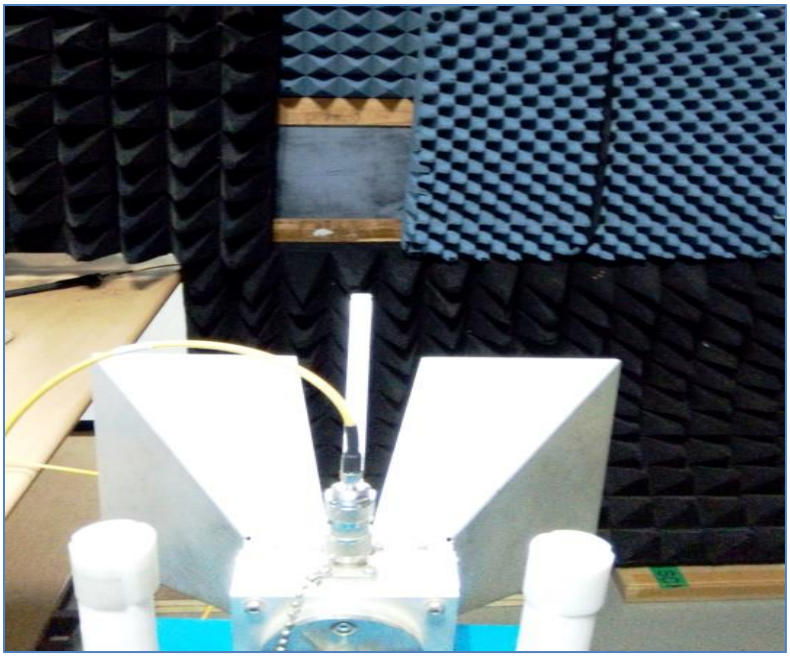

Substrate
Energy
Material
Spray gun
Spray plume
Gas or other
process media
Process
motion
Coating

(a)


Control Room
Anechoic Chamber
Far-field
Measurement Setup
RAM shield
Tx
Horn Antenna
ϑ
ϑ
FSS
Horn Antenna
Rx
Network
Analyser
HP8510C
PC
S-parameter
Test Set
HP8511A
Synthesized
Sweeper
HP83623A



(b) (c)



(d)

Fig. 5. Microwave characterization (a) Coating technique on the surface of any prototype and (b) bistatic measurement setup and existing free space measurement system (c) bistatic and (d) monostatic setup

The major performance parameters are discussed below:

- **Efficiency**

  With this initiative, we have achieved a reflection loss of -32.8 dB at 8 GHz frequency and wide bandwidth from 6.92 to 15.39 GHz with the layer thickness of 3.2 mm. Compared to the cost of the other existing methods, this material is far more efficient.

- **Productivity**

  Instead of using costly host materials for bulk synthesis of MAMs, the proposed method is a promising option wherein very cheap E-waste is used for the development.

- Response of the stakeholders

  The various stakeholder of the project include industry partners, PhD scholars, host institute and funding agencies. The response from the industry partners is overwhelming due to low cost, PhD scholars are involved in the development process with insightful studies being carried out, and the host institute (IITR) is generating revenue through sponsored research and industrial consultancy.

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5. Virtual Courts for Traffic Challans: e-Courts Project of e-Committee, Supreme Court of India & Department of Justice

Virtual Courts for Traffic Challans is a complete online adjudication process which is 100% process re-engineered paperless, contactless digital innovation under the e-courts project of e-Committee, Supreme Court of India & Departmentt of Justice. The record collection of an online fine of Rs 160 Crores(as 12th July 2021) during Pandemic through the Virtual Courts for traffic offences speaks for itself the success story of this digital initiative. The concept aims to reduce footfalls in the courts by eliminating the physical presence of violators or advocates in the court. It has saved judicial time and resources. It is integrated with other Court websites like VAHAN for RC records, SARADHI and IRDA, PUC. It has also reduced the time of disposal of traffic cases from around 6 to 12 months to 3 hrs to one day.

e-Committee, Supreme Court of India has implemented the novel concept of virtual courts under the e-Courts project developed and based on Open Source Technology-PHP-PostgreSQL. The traffic violations are captured by CCTV camera. Virtual courts are managed by the Judge sitting in a virtual mode whose jurisdiction can be extended to the entire state. The Virtual Court is now manned by one judge or two judges instead of many judges handling traffic Challan cases, thereby saving a lot of judicial time. The judge of the Virtual Court can access the Virtual Court application from anywhere, view the cases and adjudicate the cases online as Virtual Court establishment is created on Cloud facility on pay.ecourts.gov.in to Plead Guilty and Pay the Fine Online is also available, thus making the complete online adjudication.

The Virtual courts, as of 12.07.2021, is implemented in 10 states across the country. 75.88 lakh challans have been received through the Virtual courts, and proceedings are done in 72.94 lakh challans and fine paid in 14.71 lakh cases registering a record collection of an online fine of Rs. 160 crores during the pandemic.

Need for Virtual courts

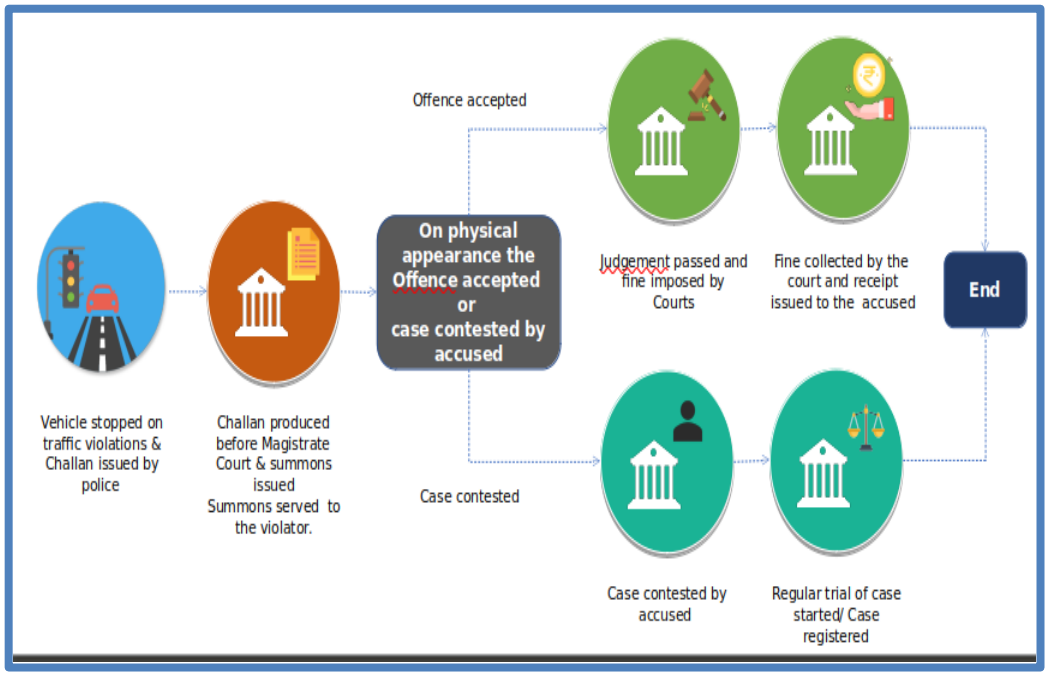
Every court was handling a huge number of Traffic Challan Cases. The police would book the person violating the traffic rules, and that case will be sent to the court, where the court would take it on file and impose the fine. The violator had to visit the court, wait and pay the fine. This process took nearly two to three days, and even for a small, petty traffic offence, the ordinary citizen/litigant had to spend two or three days. Further, the overwhelming number of Traffic Challan cases also put a burden on the courts, especially in Metros, big cities and big towns. Hence, more judges were spending judicial time handling the simple Traffic Challan cases. The need to reduce the time spent by the ordinary litigant for Traffic Challan cases and save the Judicial time of the Judges, which can be diverted for handling more complex cases, was also felt. Hence, the above reasons prompted conceptualising this project of Virtual Courts.

Virtual Courts - Process Re-Engineering

The Virtual Courts is a 100% process re-engineered e-Courts project of the e-committee, the Supreme Court of India & Department of Justice. Earlier, the vehicles were stopped manually by the Police. The Police issued the Challans for violation of traffic rules, and the said challans were produced before the Magistrate Court. Summons were then served to the violator who was required to physically appear before the Court. The Judge would pronounce the fine amount, and

the Violator would pay the same. Further, the person charged with a traffic challan had to visit the court and spend a day or two to pay the fine.

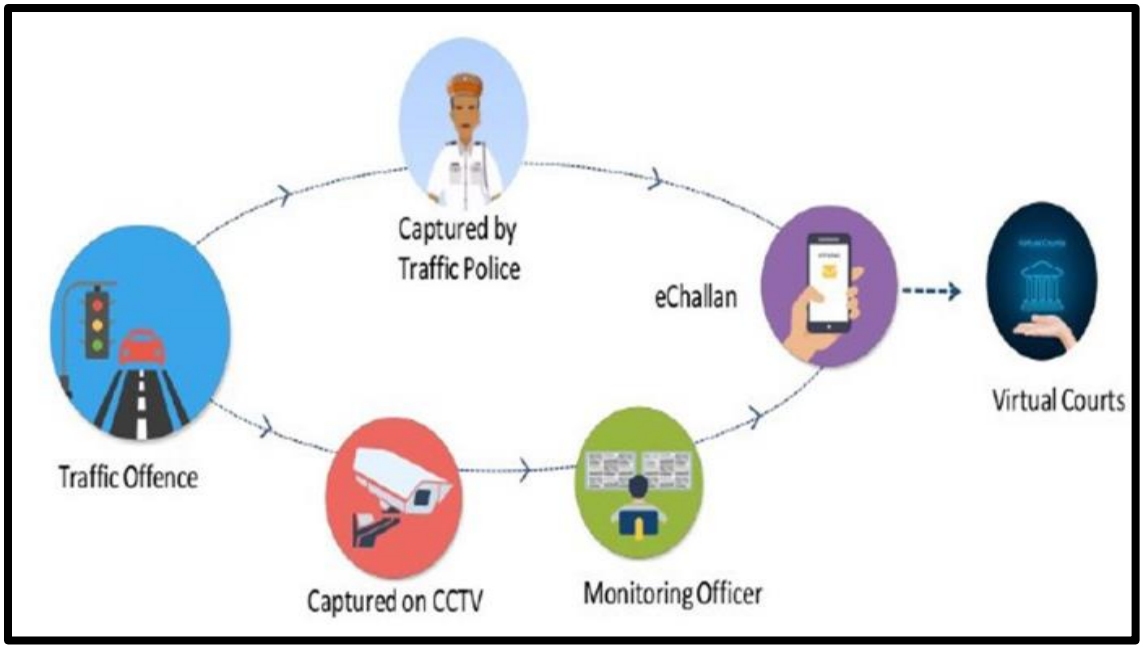
Process Flow before Process Re-engineering



- Traffic offenders booked by the Traffic Police on road.
- The traffic police write the manual challan.
- The manual challan is forwarded to the concerned court physically.
- The Court receives the challan and takes cognizance of the offence, and issues summons.
- Summons served on the traffic offender by police.
- Traffic offender appears before the Court and pays the fine/or contests the case.
- The vehicle is also forwarded to the court.
- If the violator pays a fine, the receipt is manually prepared and issued to the violator.

- The collected fine amount is physically remitted to the Government Account at Treasuries by the court Staff.
- Manual Account books are being maintained for the collected fine amount. And Manual receipts issued as Acknowledgement.

Process Flow after Process Re-engineering



- The Traffic violation is captured through a CCTV camera, or the traffic police intercept the violator, and e-Challan is generated using a handheld device or system.
- The e-Challan is forwarded to the virtual Court electronically.
- The Virtual Court Judge generates e-summon. It is sent to the violator by fetching vehicle registration details from the integrated Parivahan portal.
- The e-challan is sent through SMS to the registered phone number of the offender as integrated with the PariVahan website.
- The summon is digitally served to the violator without the traffic police travelling to serve the summons.

- The traffic offender chooses to pay the fine online in case of pleading guilty, and this happens without his travel to the court to pay the fine.
- The violator has three choices (i) to plead guilty and pay the fine online without coming to court (ii) The violator can also choose to contest the case, where it will be forwarded to the regular Court with intimation to the violator (iii) If the engine number or Chasis number is wrong, then the violator can also choose to inform the same.

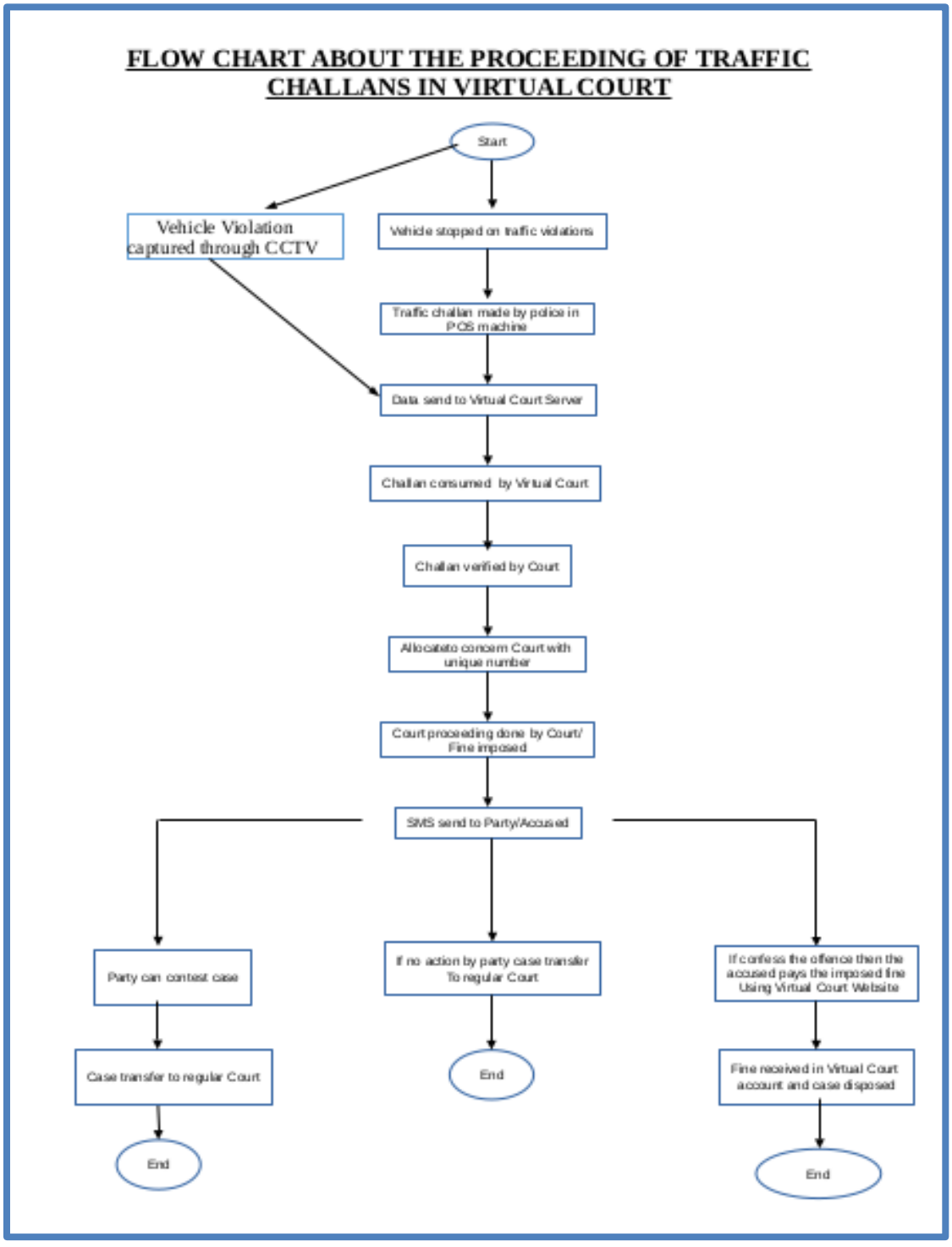
- With virtual courts, a lesser number of Judges (a single judge or two Judges) are handling a more extensive jurisdiction which more than 20 to 30 judges earlier handled.
- The Virtual Courts eliminate the physical presence of the offender/violator in the court, thereby saving the workforce time of the violator also. The manual stages of Traffic Challan cases, along with the present entirely digitally automated process reengineered steps along with the outcome and output, is tabulated hereunder:

Digital Process Re-engineering of Virtual courts		
Manual (Earlier Position)	**Automated/Re-engineered (Now in Virtual courts)**	**OUTCOME & OUTPUT**
Manual Filing of Cases	*Cases are electronically received*	• *Delay of receipt curbed* • *Error in feeding data eliminated.*
The huge volume of case papers received	*Cases are received online*	• *Resulting in 100% Paperless*
More number of courts were dealing with the huge volume of cases	*Only one or more Court is required*	• *Judicial time of Judges saved* • *Human resources saved.* • *Time for disposal of cases saved* • *The saved Judicial time of the Judges can be used for other valuable Judicial work*
Location of Court of the court/ Judge required	*Location of court/Judge doesn't matter*	• *Digital Jurisdiction* • *Virtual Location* • *Time-saving court proceeding* • *Saving of papers and ink* • *Saving of fuel* • *Green initiative*
The presence of Judge was required in the Court	*It can be managed by a single judge whose jurisdiction can be extended to the entire state*	
Adjudication could be done only in courts during office hours on working days.	*The adjudication from anywhere and anytime made possible*	
More staff was required for court proceedings.	*Requirement of Staff is eliminated leading to saving Human resources.*	
Manual Calculation of fine	*Fine is automatically calculated based on the violation & relevant section.*	• *Complete automation*

Digital Process Re-engineering of Virtual courts		
Manual (Earlier Position)	**Automated/Re-engineered (Now in Virtual courts)**	**OUTCOME & OUTPUT**
Many Violators presence was required in the Court due to the huge Traffic caseload every day. And they spent full day in the Court.	*No physical presence in the Court Minimizing the footfalls in the Court*	• *Physical presence completely curbed*
Printed order was required for closure of the case	*Acknowledgement confirming the payment of fine signifies closure of the case, which is an electronic document.*	• *Moved to paperless acknowledgement.* • *It is a paperless green initiative.*
The printed order was kept safely and presented to the police station to get back the confiscated documents.	*Order/Acknowledgement can be presented electronically for getting confiscated documents back.*	• *Paperless Order/Judgements* • *Again a paperless green initiative*
The time required for closure of case was about six months to 1 year	*The case can be closed in 1 day/same-day on receipt of e-Challan in the Court.*	• *Time for disposal reduced to 1 day/few hours from 6 months to 1 year*
Tracking and reconciliation of fines was cumbersome for the court staff	*Monitoring and reconciliation of fines is fast and readily available*	• *Automated and digital mode for reconciliation.* • *Time-saving* • *Increased productivity*
The offence list used by the traffic/RTO department had to be communicated to the courts	*The offence that is notified for traffic violations by the traffic/RTO department is always in sync with the virtual court software.*	• *Offence list digitized* • *Automated & digitized* • *Time-saving*
Delay in the realization of fine and collection of revenue.	*Fine is instantly realized and huge revenue is collected transparent* ly.	• *Time-saving increased productivity.* • *More than 150 crore fine paid instantly and realized through online mode.*

Online Adjudication Process flow of Virtual Courts

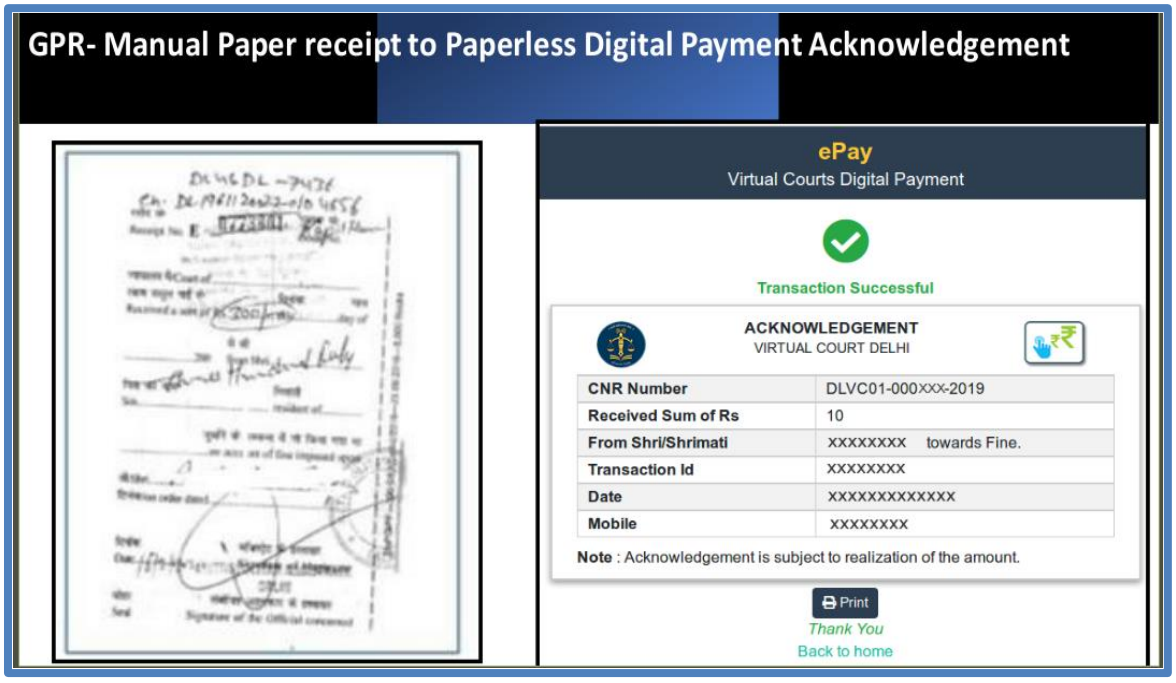
Under Virtual Courts, the Traffic violations are captured through CCTV cameras and by the duty Traffic Police on the road. They generate the eChallan by fetching the details of the vehicles registration numbers from the Motor Vehicle Registration Department.



The eChallan is generated and sent through SMS to the registered owner of the vehicle. Once the offender receives the SMS, he goes to the Public Portal of the Virtual Court, and there he has three options- 1) to pay the fine; 2) Request to contest the case, and 3) Seek corrections if the vehicle number and chassis number are incorrect.

If the violator admits and pays the fine, he will get an e- receipt. And when the violator chooses to contest the case, it is transferred to the regular Courts with the message about the Court to which the case has been transferred.

The Virtual court is integrated with payment gateways of the Respective States, and once the payment is made, it is reflected as the paid status to the court. Further paper receipts were issued earlier on payment of fine, and now digital acknowledgement is issued; earlier manual registers were maintained, and now a digital register of files is maintained.

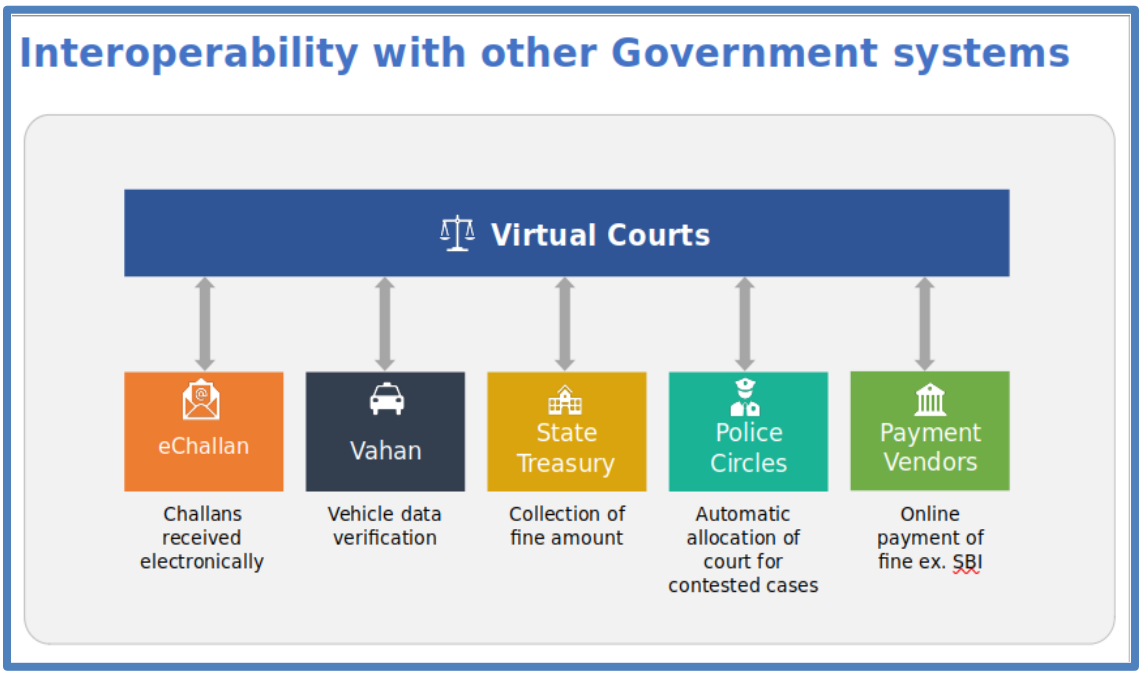


The application is secured and hosted by the State of Art National Data Centre of the National Informatics Centre, Delhi.

Integration with Various Departments

For Vehicle Information the vehicle data is obtained from the Parivahan website (Ministry of Road Transport and Highways)

Payment information: E-payment portal as existing in the respective States is linked with Virtual courts whereby the data flow regarding the payment is made.



Impact on the lives of the Litigants

- **Eliminated the Physical travel of litigants:**

  People can pay their challans online without physically travelling to the court, and it has saved the long trip by the litigant from distant places to the court.

- **Productive Man-hours of Litigants saved:**

  Virtual courts have saved the daily labourer/commercial drivers manhours as they pay online need and need not come to courts for paying their challans.

- **Digital Archive for Public:**

  The virtual court acts as an archive to check the status of challans before buying the vehicle. The public can check the status of pending challan on the virtual court web portal and help them avoid vehicles involved in accidents and crimes.

- **Technological Transparency**

  The Virtual court has ruled out touting and corruption.

- **User-friendly updation by Common Citizen:**

  The Virtual court also gives the option to update the mobile number by validation through the VAHAN database, i.e. entering the engine number and the chassis number.

- **Payment authentication:**

  The Virtual courts respect citizens' privacy as the challan can be paid or contested only after validation through OTP received on their registered mobile number.

- **Digital Acknowledgement**

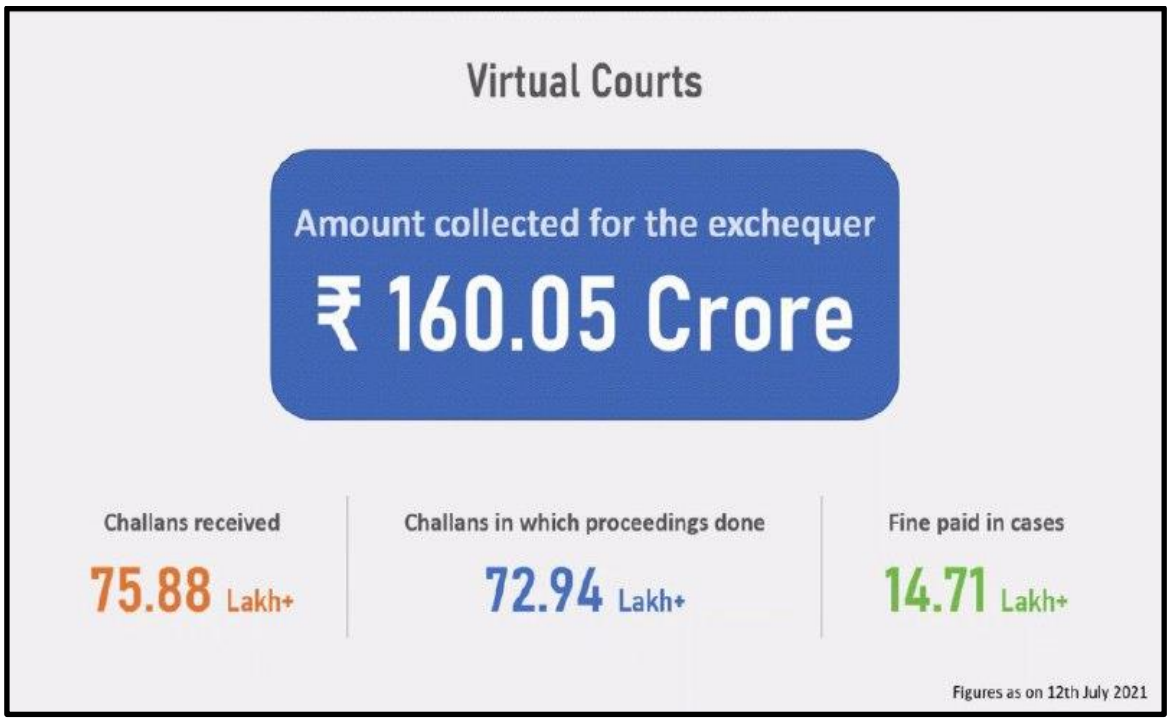
  Digital fine receipts can be preserved for future records.

Digital Transformation & e-Governance.

- The challan generation is wholly digitised & generated through the Challan application developed by the NIC. The Traffic police officer uses the handheld device to generate the challan. The devices have internet connectivity and are connected to databases like VAHAN (RC records), SARATHI (DL), IRDA (Insurance), PUCC (Pollution), Fitness, Permit etc.
- The violator is informed electronically by an SMS about the traffic challan.
- The metadata of the challan is shared by the Traffic Police in digital form with virtual traffic court completely in a paperless manner, thereby eliminating paper filing of challan by traffic police.
- The Virtual Court (presided by an officer in the rank of Metropolitan Magistrate) conducts the proceedings as per section 208 of the Motor Vehicles Act, 1988 electronically. It issues digital summons to the accused, proposing the fine amount paid online without visiting the court. The process eliminates the maintenance of any paper file in the court.
- A digital acknowledgement slip is generated for the violator's record on payment. The violator may also print the acknowledgement slip later and retrieve it from the virtual court records. It eliminates the process of issuance of paper fine receipts manually prepared earlier.
- Upon payment of the fine, the digital fine register is automatically generated and reconciled with the electronic bank statement by the court staff. The process eliminates the requirement of maintaining the fine register in paper book form.
- The online payments received in the bank accounts are mapped to the state treasury as per the respective State Government's directives. Thereby eliminating the need to handle cash and deposit it in the treasury.
- The dashboard of Virtual court gives an option to data mining by providing fields like payments received, challan pending and not paid, challans contested etc. The robust

database may be used for research and analysis to understand the trend of violations, punishments and policymaking.

- The conviction data is automatically made available to the Traffic Police and RTO in compliance with Section 210 Motor Vehicles Act, 1988. The authorities may initiate proper action against habitual offenders or severe offences as per law.



Conclusion

Using the Virtual Courts, any litigant charged with petty Traffic offences like driving without a driving license, Vehicle Insurance, or violating Traffic Lights, etc., can now log into the Virtual court portal and pay the fine immediately or choose to contest. 75.88 lakh challans received through the Virtual courts and proceedings done in 72.94 lakh challans and fine paid in 14.71 lakh cases and a record collection of an online fine of Rs 160 crores during the pandemic proves that Virtual Court is a citizen-centric Process re-engineered project into a complete online adjudication and 100% Paperless eco friendly and go green initiative of the ecourts Project

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6. e-Marg: For Maintenance of Rural Roads, Madhya Pradesh

Connecting the Unconnected

Pradhan Mantri Gram Sadak Yojana was launched after five decades of Independence to connect the 1,78,184 unconnected habitations in the country. Over the last two decades this program has connected 99% of eligible habitations, with construction of more than 6,72,000 kilometers of rural roads, and is touted as one of the largest infrastructure programs in the world. The gargantuan effort involves an expenditure of more than Rs. 3,32,000 lac cr, with high multiplier effect on the rural economy. Preserving these investments and maintaining the assets so created is of paramount national interest. PMGSY roads are the lifeline for delivery of most other welfare schemes. The research has shown that PMGSY roads have ensured better produce price for the farmers, improve health and education outcomes, and have encouraged shift to non-farm livelihoods.

Rural roads is a state subject. However, in PMGSY, the cost of construction is shared between the Centre and the State, maintenance of these roads is responsibility of the states. Maintaining old roads are most often than not accorded the same importance as sanctioning of new roads, and states faced with competing demands are unable to provide adequately for maintenance, with some states being an exception. Maintenance of roads is not only a function of funding but also governance and systems perspective issue. Most states even with meagre budgets are unable to spend the same for want of proper systems. Loss of this national asset on account of above is a serious issue which needs attention at all levels, for making available adequate funds, a system to ensure proper service standards for citizens and a fool proof system of maintenance.

Why Maintenance is Problematic

Even with detailed operation guidelines for maintenance within guarantee period, states are at sea when it comes to ensuring service standard as well as payment to the contractor vis a vis original construction. For comparison during construction, the bills raised by the contractor are based on the quantity of material used to build the road and the bills are large in amount and low in number. Further, during construction supervisory checking is based on design and quality. Following the same method of payments for maintenance of roads is not optimal for multiple

reasons. Primarily, maintenance is a low-ticket-high-volume activity wherein bills are submitted frequently but are generally of smaller amounts as compared to construction. Bills are to be submitted every month and cleared every 6 months. Over a period of 5 years of maintenance, this means processing of 60 bills and 10 payment vouchers.

Maintenance works such as filling potholes or clearing shrubs from the shoulder of the road are routine activities, which need to be repeated at short-intervals continuously. Further, these are low-ticket activities as compared to bills which would have been raised during the construction of the same road. Verifying the work such as the quantum of material used to fill potholes, patchwork, shrub clearance is a tedious and challenging task. For example, the contractor may have cleared the shrubs but if it is verified months later, the shrubs may have re-appeared. Were there in fact 5 potholes which were filled? What was the size of the patches? How much quantity of material and labour was involved? There are additional potholes identified during site-visit, did they appear after the maintenance activity was completed?

The high administrative burden makes it difficult for both the contractor and administrator to be rewarded for good work and punished for poor performance. Given these problems, even if adequate funds are available with many states to maintain the roads, they go unutilized. Even the monitoring maintenance activity at such a large scale is difficult without a proper IT system. If majority of the processes are offline, there is little transparency or accountability.

To summarize, the issues that plagued rural road maintenance before the reform were as follows:

- Lumping up of maintenance activities till the end of the 5 year contract defeats the purpose of routine maintenance.
- Difficulty in monitoring or verifying the actual work done months/years ago in case of delayed payments.
- Administrative burden on state capacity to get small maintenance bills inspected and processed manually and routinely.
- Manual bill generation and submission by contractors.
- Manual verification of bills by district officers.
- Mismanaged payments to contractors, often not in a timely manner.

- No control / record on frequency of Bill submission or date of bill submission to make it eligible for payment.
- No uniform frequency of inspections by engineers, mostly done after contractor submit the bill and no evidence based system to prove that roads in the period maintained as per standards.
- Absence of a system to keep records of past inspections done and tracking of future inspections.
- No evidence of poor or good maintenance of roads and no marking system existed, thus no transparency and accountability leading to disputes and court cases.

Performance Based Maintenance contracts

Key to our reform is Performance Based Maintenance Contracts, supplemented by an end-to-end workflow based ERP system named, e-MARG. Essentially, PBMC means that contractors would no longer be paid for the amount of labour or quantity utilized in fixing the road i.e. the inputs but instead they will be paid on the basis of their performance or output. The contractor could have disproportionately spent money in repairs or could have not spent anything in upkeep, he or she would get a fixed amount based on the end result or the performance of the road at the time of its routine inspection. The condition of the road would be judged on fixed parameters and marks would be awarded out of 100. If the road scores less than 80, the contractor would not get anything for that period. The contractor is paid an amount prorated overt the score ranging between 80 and 100. For example, one of the metrics is the condition of the surface i.e. the absence or presence of potholes or cracks at the time of inspection. Here, it doesn't matter if the contractor filled all the potholes or there were no potholes to begin with, the road will be scored based on the condition of the road at the time of the inspection i.e. the outcomes. While this change in contract may appear innocuous, when supplemented with an IT system (web and mobile) it is able to address most of our problems. Most importantly, the PBMC contract aims to incentivize the contractor to build a high performing road from the very start so that the consequent payments for maintenance are minimal. If the road is designed and built well, potholes will be naturally less and hence the contractor would get the full amount set aside for maintenance while having invested little at time of maintenance.

The administrative risk and burden for the state actors is solved by means of the IT system. The payment is auto-calculated by the system based on the performance marks provided by the district engineer. The performance is, inturn, linked to the bi-monthly routine inspections conducted by the same engineer with the help of a mobile app which instructs the engineer to take geo-tagged pictures at system generated chainages, to bring in total transparency. This makes sure the pictures clicked are representative of the road and not cherry-picked. It's easy to prove the road was performing from photographs as against proving measurements. The contractor is able to automatically generate and submit bills on an IT system and the engineer can tag his or her inspection within the bill period. The scores are aggregated and the system generates the payable amount which is sent as a voucher to the accounting officer who is also on the IT system. As the voucher is automatically generated based on the scores which in turn is backed by the photographs so there is limited back and forth between the engineer and the accounts officer. Once the voucher is approved it is sent to the Bank (also on the system) for a digital payment. The administrative burden is drastically reduced to make routine payments an appealing exercise.

Processes Re-engineered

Pre	Post
Some states were still following BoQ because in difficulty of following PBMC without an IT system.	All states have switched to PBMC and are using eMarg.
Bills prepared by contractor were based on material and labour quantities	Monthly bill amount is fixed. Deductions, if any are based on the performance evaluation.
Paper bills are submitted with no clear record of date of submission or acceptance leading to dispute.	Bills are submitted digitally with a click of a button.
Routine inspection of roads was erratic and not recorded or triggered by submission of bills.	Bi-monthly routine inspections through mobile app and geo-tagged photographs. Engineers get notification to conduct

	inspections from time to time and its unlinked to submission of bills by contractors.
Payments based on verification of the inputs involved (labour and material) and cross-checking with official statement of rates	Payments based on 100 mark performance evaluation metric (outcomes)
Manual preparation of vouchers	System based preparation of vouchers with automatic calculation of taxes and other amounts
Payment through cheques	Direct payment into contractors bank account
Aggregate financial monitoring at state and centre	Process level and road-level monitoring at centre, state and district level allowing identification of process based delays.

Monitoring & Evaluation

Earlier, the monitoring for maintenance at the central level was limited to only provisioning of maintenance cost as part of the project cost. With increasing awareness for necessity for a good maintenance regime PMGSY III acted as a catalyst to put in place a monitoring system for actual budgeting of yearly maintenance funds. And with the advent of e-Marg, both the centre and state teams are able to monitor the performance of maintenance, with responsibility defined with time stamping at each level, accountability has also been fixed at each level. It brings complete transparency and accountability. Having the necessary disaggregated data along with individual-based logins allows for better monitoring and management.

Results Achieved

After April, 2020 all the states have been onboarded on e-Marg, which is being utilized by 1,375 engineers from all districts and 12,526 contractors all over India to perform inspections, generate and approve single click bills and make payments. As of now 56,344 no. of roads having 2,06,479 km length spread across the country are covered on e-Marg. As on 1st September, 2021, 6,87,999 no. of bills have been submitted and a total amount of Rs. 781.87 crores have

been released as maintenance related payments through e-Marg. Even during the COVID related lockdowns, we were able to process 30% more maintenance payments in the FY20-21 than the year before. This is the true testament of a digitally enabled system reforming traditional governance. The system was originally started by Madhya Pradesh Rural Roads Development Authority and now scaled nationally. The state-based origin of the IT system also ensured that the requirements of the state and districts were easily absorbed in the system which is difficult to do when softwares are designed centrally. With the digitization of processes, it not only became easier for the frontline engineers to complete the work, but it also enabled transparency and accountability.

Scalability

Maintenance of assets is a global problem in public sector. The problems faced in maintenance of rural roads are not unique. Maintenance of other public works can face similar problems. Moving to an outcome based system supported by an IT system which reduces the administrative burdens can be beneficial. Now various states are interested in deploying e-MARG for maintenance of roads apart from PMGSY roads. But conceptually, this can be scaled across the domain of roads as well by appropriately modifying the performance rubric.

Conclusion

PMGSY forms the backbone of rural India and maintaining these assets over the long-term is of paramount national interest. While, spending the money set aside for maintenance is important, it is also important to ensure adequate budgets are set aside at the higher level. Definitely, being able to spend the allocated amounts efficiently will act as an impetus in getting higher financial allocations. Maintenance of assets built with tax-payer money is critical problem and a daunting challenge. Policy and e-governance based process re-engineering should be used to make it an easy and appealing exercise for both government and the private sector.

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7. Geo-Tagging & Monitoring of NEC funded Projects/Schemes in NE region using Geospatial Technology and Tools

The projects sanctioned by Government of India for the North Eastern Region, under different schemes needs to be monitored regularly for assessing or certifying the goals and objectives defined therein and tracking progresses for its timely completion. About 40% of the important project lies in the complex hilly terrain of the region with very limited physical connectivity. The conventional monitoring approach does not work well in the North Eastern Region due to multiple factors. The earlier application relies on traditional MIS based database with no proper geo-locations for the project sites making the system unfit for physical tracking and monitoring. Further absence of geo-analytical tools made the system difficult to analyse and retrieve useful information. The previous monitoring mechanism, therefore depended on multiple physical site visits that led to high incurring cost and therefore results in low return of investment. The inability to quantify the progress can also delay the approval of utilization certificates submitted and non-completion of projects on time.

To resolve all these problems and inefficiencies, we have innovatively harmonized the ICT and geospatial technology and tools and then adopted it for effective project monitoring and real time tracking of progress. To perform this, we have focused on new hybrid multi-pronged approach of monitoring by leveraging three authentic data capturing technologies of Mobile, Drone and Satellites Imaging and their proper co-registrations to track quantifiable change in the progress of activities on the ground. Then an integrated and scalable geospatial web based dashboard is built to ingest all these multi-sourced live data, their interactive map visualization and perform on-click relational geo-analytics and display the results. All these has resulted in effective monitoring and tracking of each projects in the region.

Introduction

Effective project monitoring is a way of measuring whether the work is being done as per intended plan so as to ensure timely completion of the project. The existing monitoring system of other government departments relies mainly on MIS based data and primarily focuses on

financial management and reporting. Most of them rely on one kind of data with no association of geo-locations of these projects. Therefore, it lacks physical monitoring mechanisms and visual verification. Third party engaged in the earlier system was not equipped with IT-enabled space technology tools and services for the purpose of monitoring activity. The application developed by the centre is based on cutting-edge geospatial web and mobile technologies and employs a combination of satellite, drone and mobile app technologies. The current system therefore has brought revolution and digital transformation in the monitoring activity. All delivery of data and services are made using spatial dashboard and mobile apps developed in-house, using state-of-art technology and platform for seamless delivery of services to the monitoring authority. The high precision location-aware mobile app has greatly assisted in precise identification of the location of the large number of projects operated by different sectors and subsequently monitoring those using a single window integrate dashboard platform [10]. As a result of the efficiency in quality service delivery, ensures timely completion of projects in a transparent manner, minimizes cost and administrative burden.

For ease of governance and to bring more transparency, the entire platform therefore, had to be transformed into a geo-aware platform considering the user-friendliness of operation, accessibility and visibility of project location maps coupled with lots of analytical capabilities in a spatial domain. Our newer platform has brought digital transformation via effective process re-engineering by adopting multi-pronged approaches and deliverables such as [a] Precise Geo-tagging and Geo-monitoring of all project sites in NER. [b] Geospatial/map-based interactive dashboard to monitor and assess the real-time status on each project. [c] A progressive mobile app for precise geotagging and collection of relevant information on the project from the site. [d] E-Monitoring of projects in near real-time using a multi-pronged approach and [e] Application of AI/DL technique for automation in the evaluation process of few major project constructions.

Each process has some specific standards and guidelines on the management and monitoring of the project sites and interlinked with the associated processes. The status of a specific project site via Mobile Application or other sources of input feeds like satellite/UAV (drone) images/videos are directly reflected into the Dashboard Analytics Platform after verification in the spatial MIS. The platform has supported cost saving via automatic management and monitoring of a huge

number of projects thereby avoiding physical or limited site visits which is laborious, time consuming and costly. Figure 1 shows the number of projects locations considered for geotagging and geo-monitoring in the region.

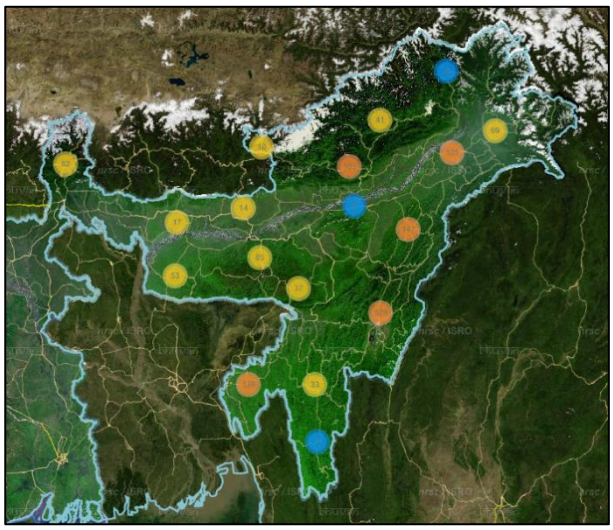

Figure 1: Locations of Projects in NER for geo-tagging and geo-monitoring

With the launch of the Geo-Tagging, and Monitoring application, it has been observed the speedy implementation of the projects including the project sites located at remotest corner of the region, facilitated proper utilization and funds, and timely submission of utilization certificate (UC) for the overall growth of the region. This has therefore ensured timely completion of many important developmental projects and benefits availed by the people. Also, this system allows the concerned authority to study the gap areas and plan many new projects/schemes which can further benefit the people in the area. The multi-source data from satellite, mobile and drone delivers high quality geo-tagged data with precise positional information which are used to detect changes in the objects/features and therefore, enable the concerned authority to track quantifiable change in the infrastructural projects as and when needed.

Materials and Methods

The details of the project locations and their relevant attributes were collected, standardized and transformed into geospatial database. The high precision mobile App aided with GAGAN/NaViC technology for enhanced positional accuracy was designed and developed to geotag each project sites. Further, the App is used to collect field photographs at quarterly

interval to track the project progress. The Mobile App is also used to capture the status of facilities inside the building and progress monitored. Figure 2 shows the location-aware mobile app and how it's being used to capture on-site photographs of the project site along with detail attributes.

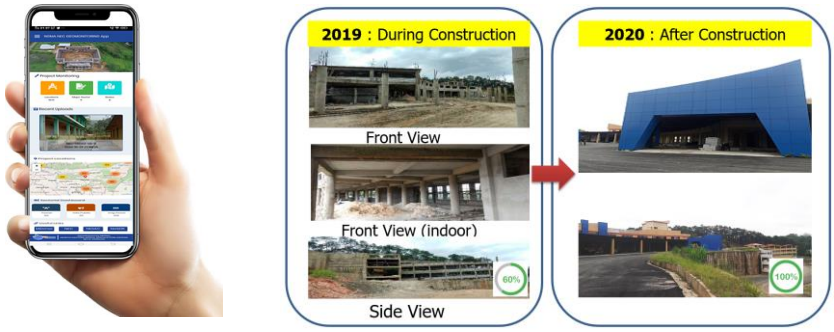

Figure 2: Mobile App for on-site Geotagging

The image feeds coming in from geo-tag mobile app can also be used to assess the quality of the road constructions and track its progress. The Figure 3 shows the progress of one such project in the state of Meghalaya. As indicated in the figure, the colour depicts status on each segments of the road. We can thus easily quantify the progress based on the total length of the road sanctioned under the project. We can further verify the progress using geotagged photos from the Mobile App.

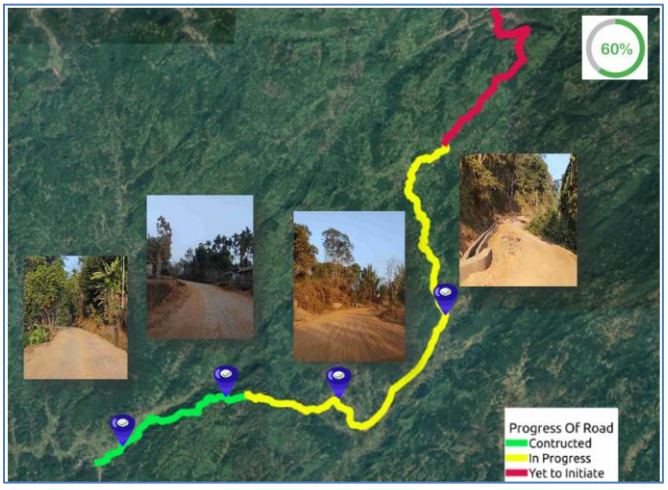

Figure 3: Monitoring of road construction

Even during the lockdowns, the mobile app has immensely helped in tracking the progress and close monitoring of project sites for establishment of critical COVID Care Establishment. The

Figure 4 shows, how the images captured by the App for establishment of critical ICU beds across 34 projects sites in Assam can be seen on our dashboard along with its location supplemented by the satellite images.

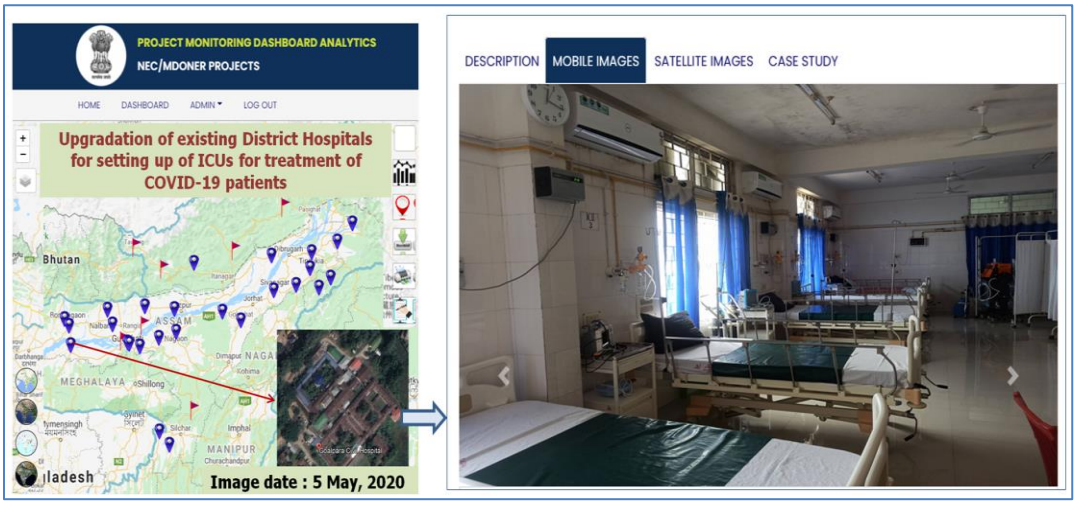

Figure 4: Project Status showing receiving of ICU machines in Goalpara District Hospital, Assam

The satellite imagery is used for monitoring of large infrastructure based projects located at remote areas of North East. We use time-series satellite imageries to capture and monitor projects on the ground. Such aerial imageries captured from satellite are also found to be useful for many of the project sites with difficult and complex terrain and difficult to reach areas. Figure 5 shows the time series satellite images to track the progress of construction of RCC bridge over barak river located in Silchar, Assam.

Figure 5: Use of time series satellite imagery for tracking of projects

For small to medium infrastructural projects, we are also using drone imaging and videos for monitoring the changes. Drone Imaging can help in quantification of the progress both at

horizontally and vertically . It can capture objects as small as 4cm on the ground by using an appropriate sensor and lower flight altitude. With these kind of imaging and its output both in 2D/3D, we can, therefore, track the progress by measuring the size and shape of the structures in the entire project area . The Figure 6.1 shows, how we can selectively inspect every part of construction areas and how the drone images captured during different time periods could be used to quantify the progress percentages.

Figure 6.1: High Resolution aerial 2D/3D View of Large Construction area: Measure size and shape of structure

Figure 6.2: Structural Change measurement

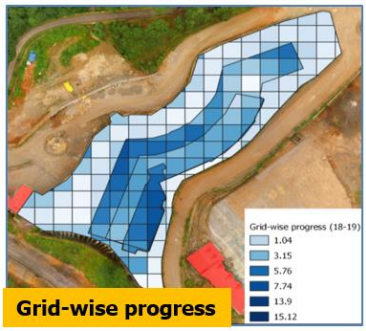

Figure 6.3: Grid-wise progress

We can even interactively measure the size in terms of length, area, height or volume for every structures from 3D model generated from the drone images . Figure 6.2 shows the vertical structural changes and we can even measure its height as well. We can observe new structures that has come up in 2019 image. We can also check the structural progress grid-wise as indicated in Figure 6.3. The grid with dark blue colour has undergone more progress as compare to rest of the area. Such information are essential in assessing proper monitoring of the project progress.

We are also adopting some of the latest technology such as IoT based AI/Machine Learning specially for automated monitoring of the road and quality of the road being constructed . The AI model is previously trained for pothole detections by using many such images. Then we use the model implemented on IoT Devices and positioned it on top a vehicle to automatically detect the potholes along its path and even count the number of such potholes along the way (Figure 7)

Figure 7: IoT based AI model for automatic pothole detection

All these multi-sourced data inputs finally goes to a single window Management & Monitoring Dashboard where the concerned authority can see in an integrated manner to see the live project status, interact with the data, visualize, query or generate reports for instant decision making. The dashboard can display both 2D and 3D images corresponding to each projects with detail attributes. The Figure 8 shows the dashboard with analytical tools. The blue and red placemarks indicated precise geotagged project locations along with the data feeds coming captured from mobile, satellite and the drone.

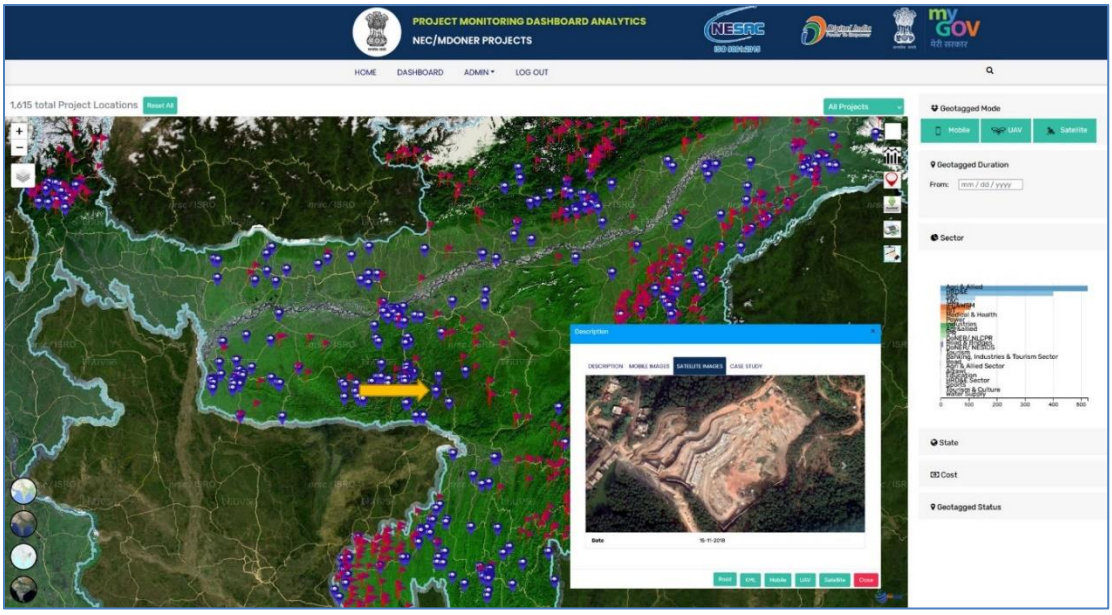

Figure 8: Integrated Dashboard for Management and Monitoring

The entire application is hosted from NESAC's central hosting server with due security auditing. Every modification to the application is subjected to a series of security assessments.

Conclusion

The traditional way of monitoring is costly and ineffective lacking transparency. Through our integrated and scalable dashboard decked with location aware map intelligence, we are providing smarter way of monitoring for ease of governance. The application has therefore, brought complete digital transparency that helps in reduction in duplicity of work and made project administration more easy and manageable. Our application also emphasises the concept of minimum government and maximum governance and development by its ability to monitor and track large numbers of project sites with a single window dashboard application. We have adopted complete end-to-end digital workflow and automated entire monitoring and evaluation mechanisms. We used cost effective platform for tracking and analysing the progress. Our application is now able to monitor effectively all the 1600+ project sites in NER which are sanctioned under 17 sectoral heads. This also includes some of the major projects sanctioned by Ministry of DoNER. This application has led to complete transparency on the project allocations by optimizing the earlier complex processes and effective service delivery of the data pertaining to project sites. The information derived from this application can help the funding agency for

giving proper and timely advice which can help in speedy implementation of the projects and UC submissions. The system also allows for proper gap analysis so that new developmental projects or activities can be plan for overall growth of the region and socio-economic status of the people.

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8. Kerala Police- an Innovative Policing Paradigm in Handling COVID-19

Introduction

The Kerala Government has been recognised and acclaimed for its adept handling in treating and containing the spread of coronavirus in the State. The so called "Kerala Model" is now a matter of research and study. The efficacy of the Health wing of the State, the capabilities of the Doctors, Medical infrastructure facilities, Educational and social consciousness are cited as reasons, in this success story. Similarly the timely lockdown is stated to be the main reason that helped the State in containment. The role of Kerala Police, the law and order arm of the Government, has been tremendous, not only in maintaining order in the Society, but its foray into a variety of unknown areas, to bolster the efforts of the State Government.

From day one, the Kerala Police has been playing a very active and frontline role in handling this Pandemic, and mandated with vanegated tasks which were traditionally and conventionally outside the purview of the traditional policing. The Lockdown brought Police to the forefront of the efforts of the Government, to control the spread of the disease and later they tasked with multifarious roles of containment and public service/ assistance. The work of the Social media cell is noteworthy in this regard, with regards to the digital initiatives not only as a means of awareness, education but also as a means of containment and service delivery to citizens.

Implementation of Lockdown- Legal, Effective & Complete

The Police response to a pandemic was not enlisted in the SOPs (Standard Operating Procedures) which the Police falls back, in times of crisis. Faced with a totally new problem, with no past experience, the rank and file fell into the grind to ensure that the instructions of lockdown are implemented in letter and spirit. But what made Kerala Police different is the manner in which the lockdown was ensured. Through purely legal means, high voltage awareness campaigns and seeking the cooperation of the citizens, the police implemented a near total lockdown ensuring the complete full stop to the spread of the virus in the State.

Curbs on Fake News/Panic Messages

The implementation of the lockdown norms was the easy part. The police ventured into a variety of functions and roles traditionally done by the other wings of the Government. Building social awareness against the spread of the disease was one major task and negating false news was another. Understanding the impact of social media in a digital State like Kerala, the Social Media Wing of the Police had tightened vigil on social media, from day one. The Police were very quick to identify fake and misleading news and posts and more than 150 cases were registered all across the State in this regard. Arrests of more than 106 persons followed. The Social Media

Cell of the Kerala Police then directed the citizens to check either with the Health department or with the Police, to verify whether any post is a genuine one or not. This gave a deterrent effect on the spread of fake and unverified messages on the social media.

Innovative Digital Media Intervention

The social media Handles of Kerala police in the past few years have become one of the most popular pages in the world, for its witty content and tongue-in-cheek responses. One of the most decorated and awarded Police Force in the area of Digital Technology and Innovations, the Social Media Cell of the Force has played a major role in building up the general image of the Police, and in ensuring the community support for various Initiatives of the police department. With more than 1.8 million followers on Facebook and with a total of more than 2.5 million followers on, Share chat, Twitter, YouTube etc, the awareness campaigns/videos/trolls etc gained international recognition. They proved that Digital Technology can be used very effectively in containing not only the typical law and order problems, but also in effectively handling Pandemics also.

The initial intervention was when the Social Media Cell of Kerala Police came out with highly innovative posts and videos on precautionary steps to be followed to check the spread of the corona virus. One of the top trending videos on social media were the 'corona virus awareness videos' by the Kerala police.

It is in the area of Digital awareness against the Virus, that Kerala Police then caught the imagination of the world, with highly innovative videos/ clips that has earned international attention, particularly in the West and USA. The importance of being different was understood and also the need to be humorous in this panic situation, had to be coupled in all the posts/ videos. One of the top trending videos on social media are the 'corona virus awareness videos' made by the Kerala police. All these are innovative In-house creations of Kerala Police, where all the Actors, Directors and Producers are also police officers.

The video, which gained international attention, due to the special “Hand washing dance”. The hand-washing practice to stem the virus one step further – with a fun dance left fans of social networking sites in splits, and was played prominently by BBC, Fox news and all the major media houses in the world. Since being shared online, the video has garnered over eight lakh views on Facebook, along with 28,000 ‘shares’ and over 2,000 comments praising the initiative. The video of the police dance, which was again developed in-house by State Police Media Centre Kerala, shows cops performing various dance moves to illustrate the right way to wash hands. The clip features six policemen, all wearing face masks, shaking a leg to the hit song Kalakkatha from the film Ayyappanum Koshiyum.

Then came the partially animated video of the Virus, with the message of ”Break the Chain” that was released and immediately became viral globally, garnering around 8 million views on the various social media handles of Kerala Police, apart from being widely shared on Whatsapp. With its witty and creative content, the video caught the imagination of all netizens around the globe, particularly in the COVID times, with a message that we can effectively fight the virus. The video has been dedicated to the health department officials, volunteers, colleagues, mediapersons and the public who bravely fight against the disease. The song 'Kadavulai pole'

from the Mohanlal starrer movie 'Lucifer' directed by Prithviraj, has been chosen as the background song for the video, so as to appeal to the citizens.

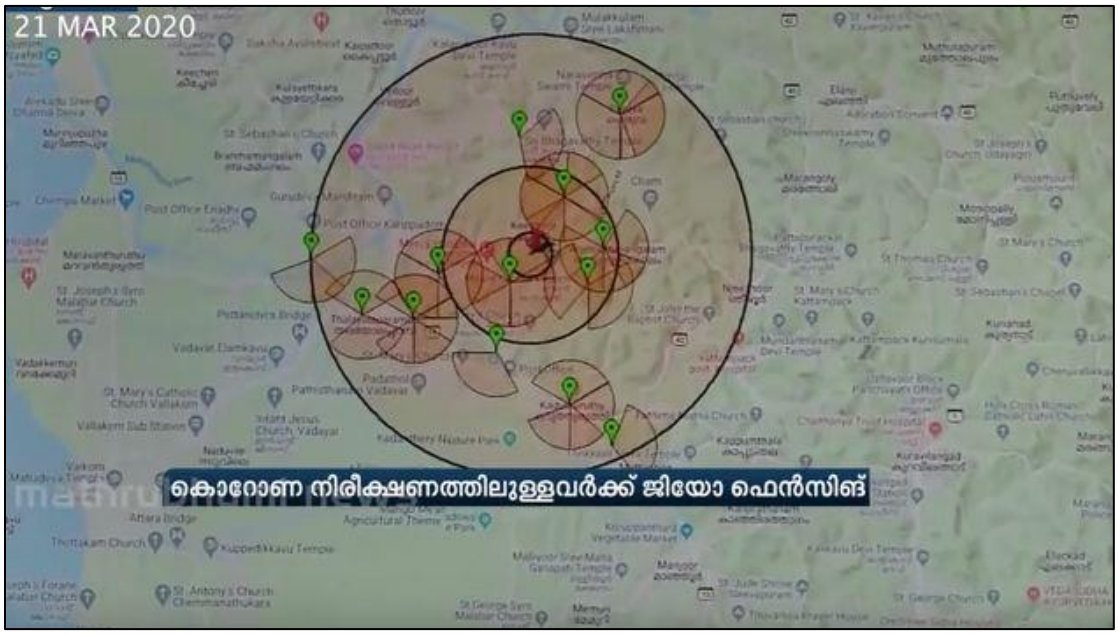
The video where all the roles are played by police officers, directed, produced, edited and scripted by the Social Media Team has further enhanced the reputation of Kerala Police as Pioneers, in using Digital Technology in containing not only the typical law and order problems, but also in effectively handling disasters like floods,

This was followed by a series of campaigns by the social media cell, on precautions to be taken to prevent covid, need to stay home and stay safe, fighting covid together etc and this was done in a highly Innovative fashion using film stars, trolls, songs, humour etc and all these campaigns were viral on the social media. The Social Media Cell of Kerala Police thus became the prime ”Social Media Influencers” of the Globe, in this fight between “Man Vs the Virus”.

bSafe Home Quarantine Solution/ APP

Kerala police, through its cyber cell/ cyberdome, were the first to develop a platform for the surveillance of the movement of high-risk people who have been placed under quarantine to tackle the spread of the novel coronavirus in the state. One of the challenges the administration had been facing was is keeping people in quarantine and this platform or App was the digital

solution for the same. The software tracks the movement of people in quarantine using GPS geofencing technology and was purely a voluntary effort, where the quarantined person downloads the App on to his mobile.



Geofence is a virtual boundary set up around a geographical location. The technology uses Global Positioning System (GPS), Wi-Fi or a person's mobile phone to track their location. Mobile service providers are providing the GPS and mobile tower locations of such a person and the Police Authorities are alerted immediately when the person steps outside the geofenced area. Kottayam District Police was the first to start this platform and then this was spread to the other districts and multiple Apps and solutions are being used on the same parameters.

bSafe E Pass Solution

During the COVID lockdown period, the need for emergency travel arose and connected to that the need for an online pass, for such a travel. An online system for obtaining affidavits and vehicle passes for the public, was developed and put into place by Kerala Police Cyberdome within 48 hours. The public could avail this facility through the link: https://pass.bsafe.kerala.gov.in

There were basically two facilities available under the system in the initial days. 1. **Affidavit for short emergent travel**- To get the affidavit online, in case of emergency, the traveller has to upload his signature after registering his name, address, vehicle number, co-passenger name, destination and destination, date, time and mobile number and after verifying this information at the Police Control Center, the approved affidavit will be sent to the passenger's mobile number. The police affidavit obtained at this link can be viewed and shown to the police Officer checking on the road. 2. **Emergency Pass**- The Emergency Pass was issued online only for persons engaged in emergency duties/ essential services, who do not have ID cards and are engaged in Covid related duties.

The same portal was used later for issuing inter district passes, night curfew passes etc, as the lockdown was eased stage by stage.

E Shopping Platform

Kerala police social media cell launched another unique App called the "shopsapp", a mobile app for essential commodities. Customers can order essential items from nearby shops using this App. The services will be free till Corona-related restrictions are in place. Shops App was developed by Kerala police cyberdome in association with Invent Labs Innovations, a startup. Visit https://www.shopsapp.org

Tele Medicine Platform

Kerala Police has launched a telemedicine mobile application that allows free video consultation with doctors across the state. The mobile application called 'blueTeleMed' can be downloaded for free from Google Playstore. The initiative of the Kerala Police is in cooperation with the Indian Medical Association. While the original idea behind the app was to help out police personnel in the state involved in lockdown duty, its service has now been extended to the general public.

The user friendly app allows people to book an appointment with doctors of their choice in quick steps. After downloading the app, one has to register giving the basic details about the person. Doctors from General Medicine to specialists, along with their districts have been listed. After consulting the patients, the doctors will provide an e-prescription. If necessary, the patients will also be referred to various hospitals. In such cases, patients will also receive e-passes that grant permission to travel to the hospital during the lockdown. This e-pass can be shown to police officials during check-ups on the road.

“The police officials who work during the lockdown do not have a provision to reach out to a hospital. So when a proposal of telemedicine came, we started in coordination with Indian Medical Association and the start-up company blueEHR. It will be very useful for police officers as basic consultation with a doctor can be done very quickly through this,” said Manoj Abraham, Additional Director General of Police.

Drone Usage for Enforcing Lockdown

During the COVID period, Kerala’s skies have been dotted with unmanned aerial vehicles or drones, watching out for social-distancing violations from gatherings to games of beach football. What the police want is not to identify and prosecute the offenders but only to scare them into

rushing back home. So these small drones have been fitted out with sirens and flashing lights so the people below can't miss them even after sunset. Wireless technology has also been allowing the police to bark out instructions over speakers fitted onto the flying machines.

It had all begun with the Kerala police deploying their three high-performance quad copters — drones with four rotors — on lockdown watch. The move worked so well that the police have drafted in private players to build a network of 300 drones that now scan every corner of the state.

The extensive use of drones for surveillance, not only to enforce the lockdown, but also in identifying the production of spurious liquor and sale of drugs, was another noteworthy feature of the police response, which was soon emulated by the other forces. The Police intervention in the colonies housing the migrant labours (Guest Workers) checking on the facilities given to them, tying up on their provisions, encouraging them and keeping them engaged without any violence, was another feather in the cap of Kerala Police in handling this crisis.

COVID Online Hackathaon

Kerala Police Cyberdome also conducted a Online Hackathon “CODE-VID-19” to find IT based innovative solutions that can help Police in the fight against COVID-19. We called upon the tech-community across India to come forward and contribute to this mission. Showcase their Technical skills to Stop-Prevent-Contain the Pandemic. CODE-VID 19 envisaged to find technology based innovative solutions for the Police to effectively contain corona virus for the benefit of society. We got more than 143 new ideas ands entries and 24 selected ones are in the process of implementation

KIDGLOVE- Cyber learning website for children

Kid Glove is an initiative by **Kerala Police** and **ISRA (Information Security Research Association)** a non-profit organisation, to create “Cyber Safety and Security Awareness” among Teachers, Parents and children. It was started in the year 2015, as a part of the annual c0c0n – Cyber Security and Data Privacy conference hosted by Kerala Police and then spread to all schools of Kerala. Considering the scenario of the pandemic Covid 19, and the fact that all the

Schools were ready to start with Digital online classes, the KIDGLOVE programme for the academic year 2020 – 2021 was transformed to an "e-classroom platform" so as to continue our efforts to protect children in cyber space, without any disruption.

Kerala police joined hands with the **"Office of the eSafety Commissioner, Australian Government"** to promote online safety education in the state of Kerala. They have provided all the inputs and resources available with them to Kerala Police to make this platform possible. The kidglove portal incorporates a wide range of online safety programs and resources to empower our children and also the parents, to stay safe from the dangers lurking in the cyberspace. The online portal has been customised and tailored to address the current issues and problems.

Kerala Police is the first Police force in the country, if not the world, to come out with such a comprehensive online "E-Training platform" for the three important stakeholders – Students, parents & teachers.

(1) The new learning portal has all the features for students to register and enroll for the cyber courses "online". The portal has well designed courses on cyber security using various tools, of Robotics, AI, virtual classrooms, live classes etc which the student has to go through. On successful completion of courses, the students will be taking an online test and on clearing the same, they are awarded with course certificates from kidglove, certified by Kerala Police.

(2) The webportal has a dedicated section for teachers also to equip them with good quality cyber content and school tool kits to enable them to understand the latest technology and teach the students, how to tackle the latest cyber issues and threats that affect the students.

(3) The parents section of the ***kidglove.in*** helps the parents to understand the current issues & with the large resources of knowledge base available in the portal, they can address the parenting issues on a cyber-perspective, relating to their children. The role of the Parent is crucial in these times of online classes and digital revolution and so it is very important to equip the parents to handle and guide their children, in the virtual world.

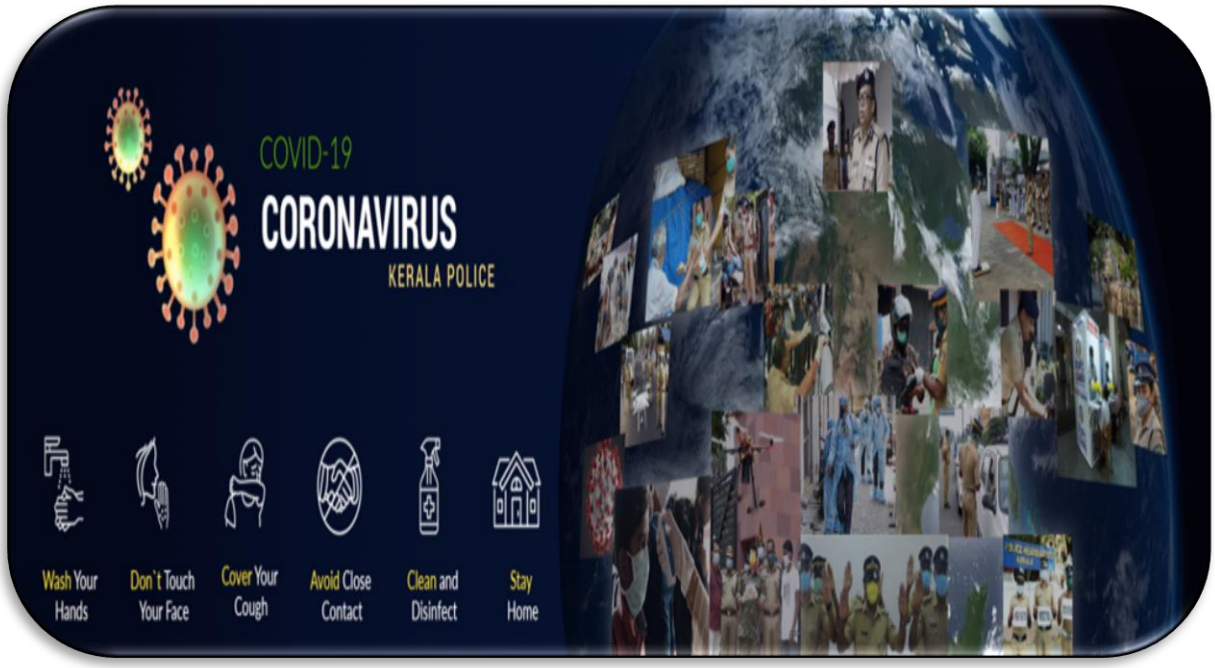
The Portal has been very successful and evoked a good response from students, teachers and the community.

POL-APP - Kerala Police Integrated Police APP

Pol-App, the Integrated mobile app was launched by Kerala Police in wake of the covid pandemic, is cruising itself as a popular app. Within two days of being launched, the number of users who downloaded the app crossed 50,000.
The app is a one-stop solution to availing 27 services rendered by the police at present, and it will be increased to 42 services in the second phase. The app has been designed as a simple app so that even a layman can use it without any confusion. The app can locate the position of the user and can indicate the nearest police station. The app also provides phone numbers and email addresses of all police officers in the force. The app also provides the facility for remitting fees to the treasury for various services, download the copy of first information report and also know the status of passport verification.

The app offers special care for the safety of women and children. The app will allow sending the location of the user to three pre-registered numbers, in case required, and also place an SOS to all these numbers. The app also allows to fix an appointment for women with station house officers. The app allows sending service request to the police emergency response support system, and also allows informing the nearest police station in case the user is travelling outstation after locking the house. The app also allows the user to inform the details of destitute women and children including their photographs, after geo-tagging them. All the social media accounts of the police have been linked to the app, and all information that should essentially be known to the public including traffic rules, will be available in Pol-App. The app also doubles up as a tourist guide, and places of interest and location are available through the app.

Kerala Police- New Website with COVID Response Dashboard



In wake of the covid pandemic and also with a view to make the Kerala Police portal more people friendly, Kerala Police switched to the new CMS Platform for its Website. The new platform has a host of services, facilities and features and is a one stop resource hub for all policing activities. The portal has details of all the police steps during the pandemic, including the facility for issue of Curfew pass during the lockdown. The Service Delivery System of Kerala Police has received appreciation from the people and this website contains information, which helps the Public to ask for legitimate services from the Police.

COVID- 19 – SoP for the Police Department.

Policing, being a law enforcement agency, has to do policing duties to maintain public order. They have to investigate cases also. During such basic policing duties, they may physically "come in contact" with various people and police do not know whether such people are affected persons or are carriers of the virus. The present trying times call for a total re-hauling of the existing methodology and practices, based on which the police department operates, in the public domain. Therefore, it is high-time to draw revised Standard Operating Procedures for every

possible police activity and also generate awareness on the precautions to be taken, while performing their responsibilities, in order to ensure that the stratagem adopted for containing the pandemic is upheld & becomes successful. Kerala Police thus became the first Police Agency in the country to bring out a comprehensive SOP (Standard Operating Procedure) with the following objectives:-

- To raise awareness amongst police personnel in the State, about steps for personal protection, while on duty.
- SOPs to effectively sanitize the physical environment at the police stations and other duty places.
- To understand the appropriate Personal Protective Equipments (PPE) to be worn, whilst discharging routine duties.
- To raise awareness on the method of sterilization and compounds used.
- Dos and don'ts whilst attending to routine duties.

The SOP includes a comprehensive set of instructions for the police officers to discharge their duties effectively and safely. Various innovations required in respect of examining documents/ making an arrest/ talking to a petitioner/ visiting a scene of crime/ using various gadgets etc. have been included in the SOP.

CCSE Cell During COVID 19

Lockdown means restriction inside residences and lack of free movement. This has also led to huge increase in internet activity all around the Globe and increasing use of social media. In short the lockdown has led to increasing digital usage, which in turn has had a totally different impact on cyber crime trends, particularly in relation to pornography and child crimes. Kerala Police CCSE (Countering Child Sexual Exploitation) Team, functioning under Cyberdome started a digital analysis of the virtual trends during the lockdown. The basic trends that can be derived in the behaviour of internet users, due to the lockdown in Kerala are as follows.

1. There is an increased online activity seen from Kerala by those seeking child abuse material on the net, and particularly the darknet. The platform used by Kerala Police to identify such accused looking for CSAM has drastically increased during this period.
2. In the darknet chat rooms also, this demand for CSAM has increased drastically and is clearly evident.
3. A similar trend is found in porn groups operating over whatsapp and Telegram and number of such groups have increased drastically during this period.
4. Social media and gaming sites that are proving to be a lifeline for parents and their children to keep them entertained at home, are being exploited by these criminal elements to get access to children.
5. Use of malwares to activate the webcams of the victim and to steal information of children has also been reported around the globe and in many parts of the country.
6. Many obscene pictures inside household, flats etc have been uploaded in recent times, which clearly shows that most of the pictures have been taken and uploaded in the lockdown period
7. Abuse of children locked up in their homes cannot be ruled out and from the pictures being uploaded such incidents are very likely during this period.

In the lockdown period, we had cases where the devices of children were hacked and pictures were taken using the webcam and passwords stolen and the hacker trying to blackmail the kids.

The CCSE cell of Kerala Police, went into a high tech mode to identify the persons downloading CSAM material from the internet. IP address were collected using specialised software, and action was initiated against such individuals. Also many such groups have been reported to Telegram and removed. Many such groups with names SREYAYUDE, THAVALAM, THANASERTHA, KAMBI FAMILY, MANTHANGA GIRL, were operating with more than 200 odd members each from the State, were all removed after reporting the same to Telegram and action is on to identify the administrators. The CCSE Cell thus managed to keep online crimes against children in check during this period.

Central Police Canteens- Online with Door-to-Door Delivery

The Kerala Central Police Canteens were the first Canteens in India, to go fully digital in 2012, with no cash transactions and all payments being card based or through online transaction. These Canteens are rated as one of the most modern canteens in the country.

In wake of COVID-19 and the lockdown issues, the Kerala Police Canteens have gone one step further and made the Canteens to have door to door delivery facility. During the Pandemic, the police officers find it extremely difficult to avail the services of the canteens and so they have to depend on erratic local shops for their daily needs. In this regard Kerala Police has come out with a Shopping APP, where the Canteens have been enlisted in the App with all the essential grocery items. The Police officer has to download the App on PlayStore at ***ShopsApp***, validate his identity on the App through his official mobile phone number and then the App will be open to him for purchase of Grocery and Essential items, just like any shopping App. He can select the items from the Menu, add it to his cart, make online payments and after confirmation of his orders, the items will be delivered to him either to his Police Station or to his door.

The App is a very big boon to the officers working in the field, who do not have the transport services to come to the Canteen and buy the articles nor do they find the time to do it in the busy time of COVID duties. Kerala Police Canteens have thus shown the way, in making the Canteen goods also available online, to be delivered to the doorsteps of the police families.

Bask in the Mask Campaign

"Bask in the Mask" is another campaign initiated by Kerala Police to ensure the compulsory usage of masks in public places. Launched primarily through the digital forum it exhorts the youth and everyone to necessarily wear masks to protect themselves and to protect others. Coupled with masks of fashion and creative masks and various competitions on masks, this campaign was very successful in creating an awareness on importance of wearing masks, so as to remain safe in the wake of the pandemic.

Innovative Mobile Sanitizer Vehicle

A mobile sanitation vehicle to disinfect police personnel on duty in the wake of the COVID-19 was launched by Kerala Police to sanitize the police personnel at the duty point itself. The bus is a mobile sanitising unit to disinfect the police officers.

The police officials can enter the bus through the back door and disinfectant will be sprayed after which the officer can come out through the front door and all the solutions used are based on limits prescribed by the Health Authorities.

The mobile unit would go to all places where police were deployed and disinfect them as they come into contact with a lot of common people on the road.

Baiju's App Free for Wards of Police Officers During COVID-19

Kerala Police tied up with "BYJU'S, The Learning App" for extending free access to children of Kerala Police Personnel during the School closure due to COVID lockdown. Byju's App agreed to provide "free access" (class 1st to class 12th) to Byju's learning app, till September 30th, 2020 for wards of Kerala Police officers, which includes 2 – 3 weekly online classes. Byju's app has initiated this novel step titled "**Kerala Police Academic Welfare Initiative**" as a part of recognition of Kerala Police for the good work done, during the Covid Pandemic. The initiative proved to be an immense help to the children of Police officers, who are restricted in their homes and their parents also do not find enough time to teach them, as they are busy with Covid related

duties. The scheme is given totally free for the Police department, with the only condition that wards/children of Kerala Police officers only can avail the facility. More than 5000 police families have availed of the scheme and have been granted free access to the App.

Bsafe Fraud Prevention App

BSafe is a platform by Kerala Police Cyberdome available on both android and web application with multiple features. The app comes with features like alerting fraud/spam calls,preventing hoax, blocking the spam calls automatically, provide the user with the option to search or automatically detect numbers from clipboard and giving authentic notifications on various notices of public importance.

The App was very useful in detecting internet fraud cases during the lockdown and the same platform was used for issuing emergency passes and for quarantine control.

The Social Media Cell of the Kerala Police thus stood out with its multifarious digital Initiatives, not only for policing the society and for enforcing covid related restrictions, but also in providing digital solutions to the citizens in even non-traditional areas, earning the goodwill of its citizens.

The war against the virus has not fully ended, but in the midst of this crisis also, Kerala Police has stood out with its unique blend of Community oriented policing, laced with Digital innovations and smooth, sober but firm law enforcement, which has ensured its position as one of the top forces in the country, if not in the world.

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9. mSeva: Punjab

Ground Reality before this Initiative

Punjab is one of the most urbanized states in the country with almost 40% of its population living in the urban areas. In the wake of growing urbanization, the state has been beset with challenges revolving around the delivery of basic citizen services. Except for a few major corporations where some of the services were provided in digital mode, all other ULBs (Urban Local Bodies) still followed the manual processes. Hence, the citizens were forced to stand in long queues to avail basic services from their municipalities.

The processes were inefficient and lacked transparency and accountability. More, over, due to lack of staff, the ULBs were struggling to provide services on time. For example, if we talk about Water & Sewerage billing and collection, there was substantial delay in creation and distribution of bills- Due to shortage of staff the ULBs were able to deliver bills only once a year and therefore, could hardly focus on collections. This directly impacted the revenue generation. Another major challenge that the citizens faced was lack of channels for making payments. The citizens had only a single channel to make payments, that was ULB counters and many times if those counters were closed, the citizen had to return back without paying. Not just this but delay in processing of applications and lack of accountability & mechanism to track the status of their applications also encouraged malpractices. Due to lack of digitization, all the collections were being done through manually printed receipts, called G8. Even though several provisions and laws were put into place to control the frauds happening due to the manual G8 receipts, but it was of no avail.

Another problem in the ULBs was lack of sufficient manpower to cater to the manual processes. The urban population has increased rapidly in the past few years but ULBs capacity has not increased at the same rate. It would not be wrong to say the present day ULBs are highly understaffed & overburdened and due to these capacity constraints many processes such as reconciliation, recovery from defaulter, etc were unable to find required attention.

Considering all the problems highlighted above, in 2012, the Department of Local Government, Punjab conceptualized a project to introduce an e-Governance system across 167 Urban Local Bodies (ULBs) of Punjab. But despite bringing in the best consultants on board and floating multiple RFPs, with estimated cost of around 200 Cr, the department was unable to move forward as none of the system integrator (SI) could be selected due to one constraint or the other.

Strategy Adopted

By 2017 many states in India had already initiated e-Governance projects but even after spending crores of rupees most of those projects could not fare well. One of the primary reasons behind this was complete dependency on the system integrators that these states had on boarded to start the project. Keeping this concern in mind, Department of Local Government, Punjab wanted to take each and every step after careful consideration.

As per the Standish Group Report (2009), "*only 32% of global e-governance projects succeed in delivering on time, on budget and perform adequately with required functions and features*."

In 2017 a Pre-Bid meeting-cum-Industry consultation was organized by wherein several IT companies, both national level and local players participated. Vendors projected the cost of a statewide rollout of the e-Governance project in Punjab to be more than INR 350 crores. Other than this there were 2 major disconnects among the participants and PMIDC. The first was the choice of technology. While the Department of Local Government, Punjab preferred Open-Source Software (OSS) solutions based on the Government of India directives on the subject, most vendors argued in favor of Commercial Off-the-Shelf (COTS) solutions. The Second was the cloud infrastructure : while some vendors pitched for the State Data Centre (SDC), the others pitched for "Cloud." During this meeting one unique and outstanding proposal was proposed by a non-government organization, e-Gov Foundation which vouched a *free and open-source software platform.*

In 2018 after carefully examining each facet of the proposal in line with technology and sustainability, Punjab Municipal Infrastructure Development Company (PMIDC), decided to implement the project in-house by using an open source platform “DIGIT” that e-Governments Foundation (DIGIT) had offered. Platform based approach was adopted as it helps in faster rollouts and once implemented, the platform allows faster scalability and expandability by re-using the common components of the platform. This meant new requirements could be met quickly, and the incremental cost for serving the next ULB or department would be much lower.

PMIDC entered into a strategic partnership with e-Governments Foundation by signing a non commercial MOU. The Intent was that eGov will support by providing advisory support to PMIDC in program design and building its own IT and operations team.

We began with creating the infrastructure to support all ULBs to initiate data migration, such as computers, internet access, and templates for recording or transferring data. As digitization and data validation during data migration was a slow and error-prone process, especially when migrating from a paper-based system, the leadership emphasized developing protocols and a core team that enabled and supported each ULBs to streamline and migrate their data systematically.

The ULBs were given full flexibility and support for procuring the hardware, streamlining existing data, or hiring an external party to help them with data entries. It was strongly believed that by owning their data, the ULBs would develop ownership and accountability for the project reducing the extraneous cost of data migration. Data digitization was owned by ULBs and the PMIDCproject team supported in data validation and Migration.

Team Building

Several MIS experts from sponsored schemes such as AMRUT and SBM-U were on boarded to form a central level IT team within PMIDC. A robust procedure of training and handholding was designed and executed by e-Gov to build the desired skill set within this team. Similarly, as ULBs were understaffed and lacked specialized skills, it was decided that resources who were committed and skilled would be identified and then they would be empowered by providing

adequate training and handholding. These employees will then become the on ground champions who will further train other employees from nearby ULBs. These trainings to the ULBs employees were provided through multiple channels like Class room training , one to one training , Virtual training and YouTube videos .

Green Field First approach

Another key decision that was taken to ensure fast rollout of the platform was the Green field implementation approach. While Implementing applications such as Water & Sewerage Billing and collection and Property Tax collection, it was decided to go for Green field ULBs first. This approach helped us to minimize the resistance to change as the ULBs having an online system had good relationships with existing vendors and resisted state level projects.

The ULBs of Sunam and Longowal were selected for the pilot project implementation, with water and sewerage charges as the first module and MC Zirakpur was selected for the pilot project of property Tax module. These choices were based primarily on the presence of strong connections – local administrators willing to step up for the project, as local leadership's role was crucial for success

in this stage. Following the successful pilot, the first phase scaled the water and sewerage module across 59 ULBs (served by the Punjab Water and Sewerage Board) a parastatal body under the direct jurisdiction of CEO, PMIDC, rapidly scaling up to 90 ULBs within the 100-day target. After aching this huge milestone as a next step other modules such as property tax, trade licenses and public grievance redressal (PGR) were also rolled out in the state.

For public Grievance Redressal blanket rollout approach was adopted so that citizens had the flexibility to lodge their grievances using the channel of their choice - Toll free number, Mobile App or Web Portal. Also, in June 2020 the module was vertically scaled and WhatsApp Chatbot was launched as a new channel for the citizen to lodge and track grievances.

The Double Entry Accounting system based on the National Accounting Manual was also implemented across all ULBs and all other modules of the platform were integrated with this Double Entry Accounting system so that all collections made in the ULBs would automatically flow into their accounting books and reports.

Business Process Reengineering

PMIDC on behalf of the Department of Local Government initiated this project for introducing automation and e-Governance in all the Urban Local Bodies of Punjab. Now in order to enhance the ease of doing business in the state of Punjab and provide ease of living to citizens, there was a need to standardize the practices and procedures across all the ULBs. But as these ULBs are independent government entities the biggest challenge was to bring them all together to agree on uniform processes and adopt them.

*'*e-Governance *is not about translating manual processes but about transforming the processes to suit the needs of the Citizens.'*

Therefore, in order to achieve this standardization of processes and procedures, the existing processes were studied in light of automation, ease of doing business & transparency and then workflow based process were automated and were reduced to 3 level only ie, only those levels were kept where there was any value addition:

Apply - Verify -Inspect -Approve

All non-productive steps in the workflow were removed. Further in case of renewals it was observed that there was no value addition at the Document Verifier level or Inspector Level and the same was also not happening practically on ground. Therefore, for ease of doing business all approvals were done away for Trade License Renewals. Now citizens can get their license renewed after paying the fee. Process for Public Grievance Redressal has been improved not only from Citizen Side by providing them multiple channels but also from Employees side. Every employee has been provided with an employee App on which grievances are routed and employees can interact with the complainant and resolve the same from the field. Results Achieved

Project was started to help ULBs to become self-sufficient through better revenue realization and better visibility into expenditure to create self-financing citizen centric urban governanceand enable citizens to access the municipal services anywhere anytime.
As a part of the "Digital Citizen Services First" approach, we introduced and implemented acomprehensive stack of municipal services.

With an effort to make Municipal Services More Responsive to Citizen Needs, Punjab focusedon

I. **Interactive platform for service delivery:** The m-Sewa provides a feature rich and easy- to-use interface for ULB employees with appropriate, and configurable, workflow and rules.
II. **Impact on effort, time and cost incurred by user**: The m-Sewa has enabled citizens to avail services from the comfort of their home through online mode. Application has been integrated with POS platform and door step delivery of services is provided to the citizens through the same.
III. **Multiple channels for Grievance Redressal**: Citizens can file a complaint through mobile, web, helpline, ULB counter and WhatsApp Chatbot. Filed complaints are completed with an automated workflow with active feedback/notifications to Citizens.Last mile employees can resolve the grievance

assigned to them from the field itself. M-Sewa also enables citizens to rate the quality of service provided by ULBs.

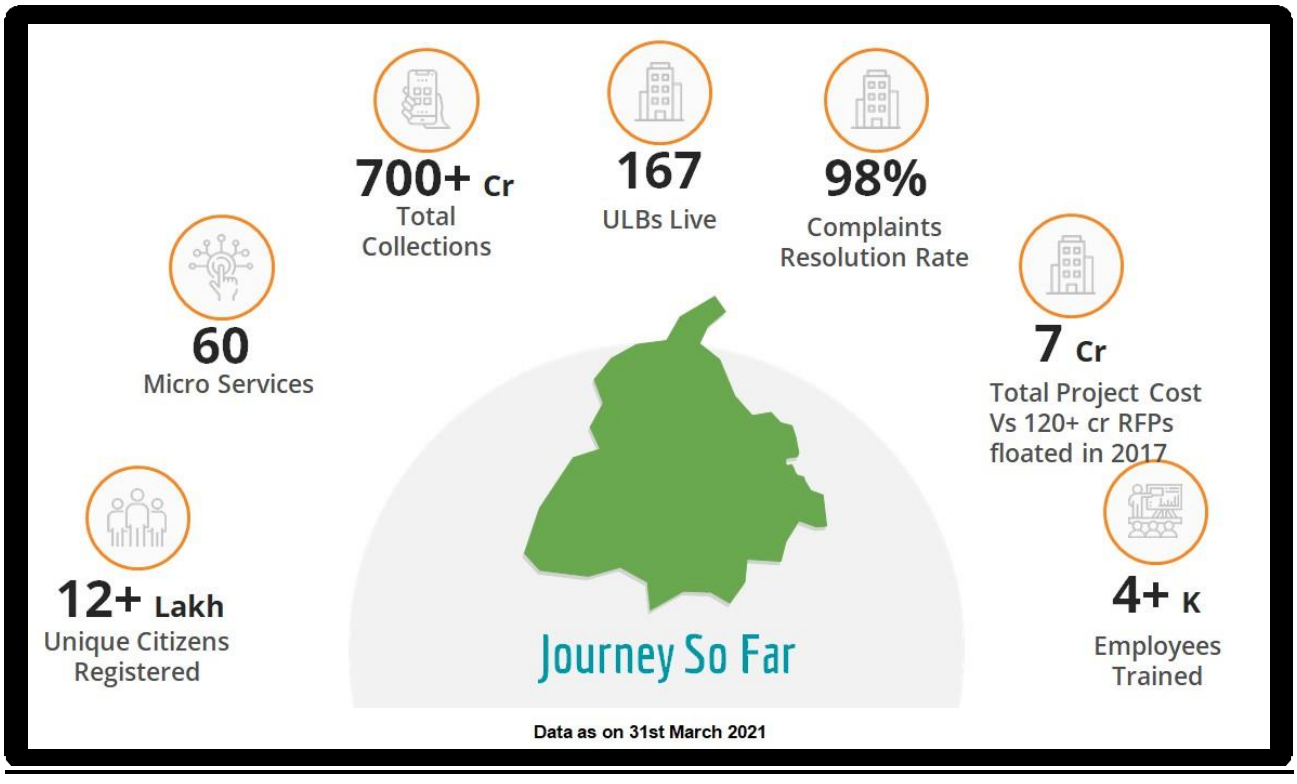
IV. **Audit Trails:** Rich logs of all transactions are maintained which resolve the record tampering issues.

V. **Accessibility & Service delivery channels**: m-Sewa services are delivered through mobile, web interface, Sewa Kendra & ULB counter, ULB and State helpline. Paymentfor the services can be made through various channels like BBPS, Pay TM, Online payment gateway and WhatsApp.

VI. **Status Tracking:** Citizens can track redressal of their complaints and progress of their request for Trade License and other certificates. State and ULB administrators can alsotrack service levels and revenue collections across different services.

All this effort put in by the team has started to pay off and helping is to achieve the objectives.

Key Impact Indicators of our Work



A. Financial Saving

Before 2018 when the project was conceptualized, the estimated cost of the project was 120-150 Cr. However, as happens in many big IT projects, the department could not go beyond preparation of specifications and RFPs. In 2018, PMIDC decided to build its own capacity and implement this project. With Pro- Bono technical help from eGov Foundation (eGov) , PMIDC has not only implemented a full stack of municipal services through Open Source Platform but has also built its capacities to build further on it to cater to the ever changing needs of urban people. T**he total incurred cost on this state level project is not more than 7 Cr including the cost incurred by eGov Foundation.**

B. Improved Revenue Collection

Before the implementation of mSeva, the process of paying bills was not only discouraging for citizens but was also complicated for the employees . Employees had to maintain handwritten records in the voluminous registers and had to go through all the records to identify and track the defaulters or pending payments, which was again a time-consuming and tiring process. With introduction of mSeva tasks for creating reports, generating bills, or tracking payments, have been automated, freeing up employees from some of their most cumbersome work. As a result making payments have been made simpler, thus no of payments have been rising resulting into significant increase in ULBs revenue collection.

Till 31st March 2020, more than 700 Cr has been collected through the mSeva system. There has been considerable improvement in the revenue collection from 2019-20 to 20-21

A. 82% Increase of Revenue for Trade License
B. 18% Increase in Property Tax
C. 32% increase in Miscellaneous collection

(Despite complete lockdown in quarter 1 of FY 20-21 due to COVID, there has been an increase in the total collects for the last year only because citizens had an option to pay for theservices online without stepping out of their homes)

C. Reduction in Complaint Closure Time

As compared to 2018 there has been a 21% increase in resolution of complaints within the defined SLA. If the same is compared with before the implementation of the mSeva Platform, then the increase is almost up by100%. One of the biggest reasons behind this is the fact thatnow the head of the ULBs can see the real time status of the complaints on their dashboards. **Our complaint resolution rate is 98% as per the data of 31st March, 2021.**

Besides the benefits mentioned above, there are many non-quantifiable improvements that mSeva platform has brought in the lives of citizens and employees.

1. **Efficiency**: Implementation of the mSeva platform has increased the efficiency of the ULBs and their employees in providing better services to the citizens. The pivotal reasons behind this are -
    a. Faster execution, because of end-to-end automation.
    b. Simplification of Processes and Procedures
    c. Reduced Paperwork
    d. More Transparency

2. **Transparency**: The project has brought a fair degree of transparency in the working of the ULBs. Citizens have easy access to reliable information at each and every step of service delivery, through SMS, emails and timelines on their web portals.

3. **Accessibility** – Now the services are easily accessible by all types of citizens. They can avail the service any time and from anywhere through multiple channels such as website, mobile app, WhatsApp, Paytm, BBPS etc.. Applications of mSeva are integrated with state- run Sewa Kendra's also. Those citizens who are not tech savvy to user online methods can visit nearby sewa kendras and avail these services.
4. **Record keeping** – Citizens do not have to bother to keep records of all payments, their certificates and receipts. Simply by logging into their portals in mSeva, they can find all

their documents, receipts and transactional history.

5. **Quick Renewal** – Citizens do not have to submit all the necessary documents again in case of renewals as they are automatically picked from their last application in the system.
6. **Reduction in waiting time**: There are no longer long queues in which citizen has to wait to pay their bills. This can be done from any application which is integrated with BBPS. Along with this, BPR has been done for each service and unnecessary steps have been reduced from the system and every stakeholder has their login to approve/reject the file. Officers now can use this application on mobile also as mobile app for the same are also available and it becomes easy for them as most of the time senior officers are available on field.
7. **Reduction in operational Cost**: Reduced paper loads to cost saving , Less Manpower required , Reduction in bill distribution and collection cost as collections are being done by POS terminals or simply by sending bills to citizens via SMS along with an online payment link.

8. **Saving of time and Energy** – Doorstep Delivery of Services was introduced in some ULBs and this proved to be a great feature of mSeva. Designated officers visited citizens' door steps and provided them these services Applications on the mSeva Platform have been integrated with BBPS, Paytm, Payment Gateways, and Sewa Kendra. This has helped citizens save a lot of time and money because now they do not have to come to the ULB offices and pay by standing in long queues. Doorstep collection is another great feature that has been introduced after the implementation of this program, in which ULBs reach citizen’s door step with POS terminals for collection.

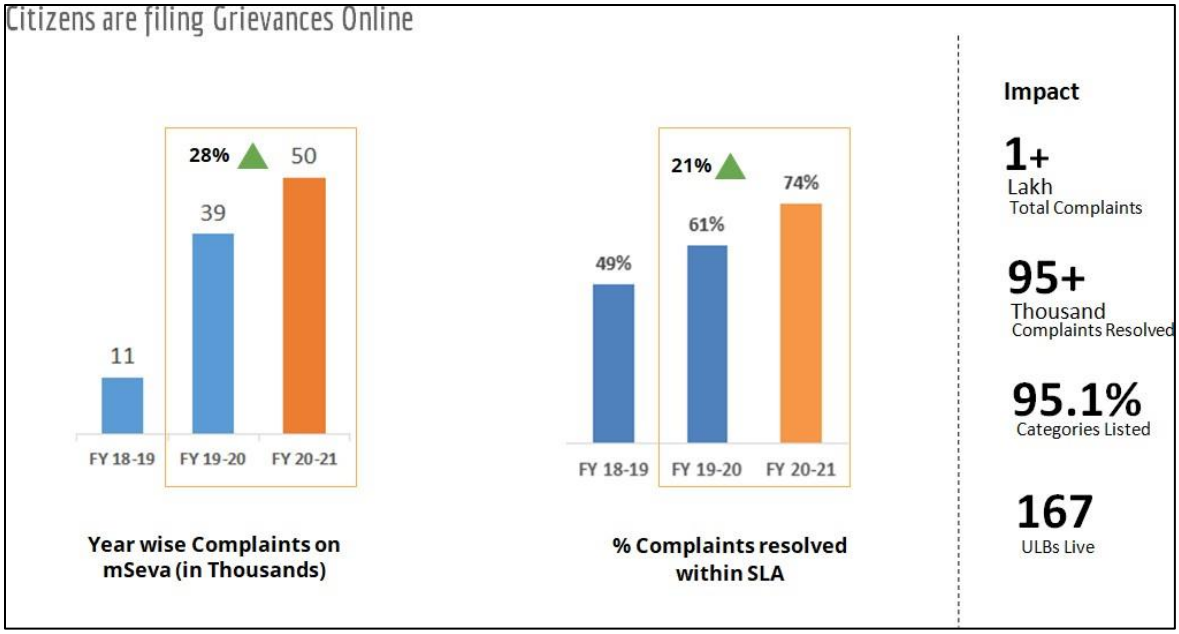
9. **Scalability of the Project:** Interoperability is an essential principle on which the DIGIT platform is built. It has standards and avoids dependence on specific platforms or software frameworks that may become a barrier to the participation of any actor in the ecosystem. In addition, the components of the platform are loosely coupled using open interfaces (APIs). All the APIs used in the platform are open source. Few of the APIs canbe accessed without authorization for eg- registration of stakeholders, view status of

bills, download receipts, while a few can be accessed only after proper authentication.

In 90 days of span we had on boarded 100 ULB's live and thousands of unique users has come on system. Day by day as more ULB's come onboard citizen data as well revenue is increased. Also in the property tax system we have developed an option of creation of demand now due to that adoption of the system is being increased. System is also integrated with the GIS platform and due to that monitoring becomes easy for officers now they can track collection of all ULB's from one place.

10. Sustainability of the project:

a. A self-sustainable deployment model: This is a very unique project where the latest technology is available at zero cost. State has their in-house development team to run this project on its own, without any System Integrators.
b. Project has been well adopted at the state and ULB level. The dashboards developed under the project have become integral part of regular monitoring process and more and more ULBs are adopting the applications.
c. ULBs support: All on-boarded ULBs are addressed for their major policies. So ULBs are adopting this project with complete buy-in and have a planned roadmap ahead of them towards complete adoption.
d. Citizen support: The application provides a direct benefit to citizens in terms of easy accessibility & transparency. So ULBs are getting a lot of support from citizens in terms of technology adoption.
e. Infrastructure: State has procured public cloud, SMS and Payment gateways to support the project



Other Key Highlights

- WhatsApp as a Channel: WhatsApp which is the most widely used application has been leveraged. Citizens can raise complaints from WhatsApp. Delivery of bills and receipts on WhatsApp is under process and will be launched soon for the citizens.
- Integration with Finance Module: Receipts and payments flow directly into the Finance system, thus bringing efficiency and transparency into working.
- GIS integration: Systems like property Tax have been integrated with GIS. Through GISdashboard officers and can monitor the progress of the ULBs.
- Integration with Digit locker is in progress where citizens can keep their licenses safe.
- UPI enabled QR Code integrated with the BBPS system has been implemented. Thiswill increase digital transactions in the ULBs.
- Payments via WhatsApp has also been launched in coming months wherein payment will be accepted through WhatsApp pay also.
- Following are the services delivered through mSeva:

  a. Property Tax – Assessment & Payment
  b. Apply Water / Sewerage Connections

c. W&S Billing & collection
d. Apply and Issuance of Trade License
e. Miscellaneous/Universal Collection
f. Apply and Issuance of Fire NOC
g. Street Vendor Registration
h. Pet License
i. Double Entry Accounting System
j. GIS application
k. Public Grievance Redressal

- All these applications were implemented by the state team without paying a hefty amount of money to any system implementers, which helped the state and the ULBs tosave huge amounts of money.
- The above-mentioned applications helped in the following:
    a. Complete Automations: The entire workflow for employees and the citizens havebeen automated, including calculations and receipt generation.
    b. Reduction in operational Cost: Cost saving due to the reduced paperwork, Less Manpower requirement, Reduction in bill distribution and collection cost as collectionis being done by POS terminals.
    c. Improved Productivity: Productivity of the employees has increased with automation of various processes. Now the ULBs are able to focus on issues likeimproving collection and quality of services

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10. Smart Ganna Kisan: An Initiative of Sugar Industry & Cane Development Department, U.P.

Objective

India is leading producer of sugarcane and sugar in the world and almost half of the national production of sugarcane comes from Uttar Pradesh. The sugarcane is mainly grown in **44** District of the State, covering an area of around **2.79** million hectare. There are **120** operational sugar mills in the State. About **4.5** Million farmers are involved in the cultivation of sugarcane and it is the main source of their livelihood. The sugar mills purchase sugarcane worth **Rs.35000** crore approximately each year and sugar manufacturing is the largest Industry in the State.

The Data of Cane Area, Yield, Sugarcane Production, Cane Crushing, Sugar Recovery and Sugar Production of last 08 Years

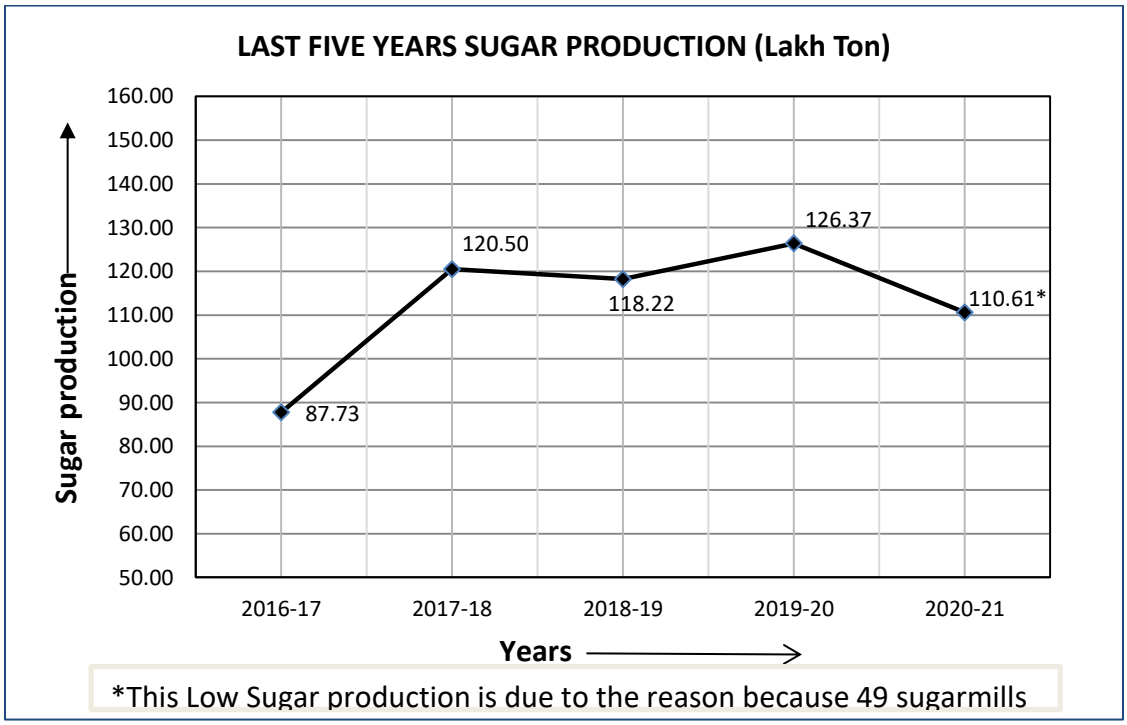
S. N	Items	Units	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
1	**Sugarcane Area**	Lakh Hec	23.60	21.32	20.52	20.54	22.99	27.94	26.79	27.40
2	**Average Yield**	Ton/Hec	62.74	65.15	66.47	72.38	79.19	80.50	81.10	81.50*
3	**Sugarcane Production**	Lakh Ton	1480.93	1389.02	1364.12	1486.57	1820.75	2249.20	2172.53	2232.82*
4	**Cane Crush**	Lakh Ton	701.17	744.54	645.66	827.16	1111.90	1031.67	1118.02	1027.00*
5	**Sugar production**	Lakh Ton	64.95	71.01	68.55	87.73	120.50	118.22	126.37	110.61*
6	**Sugar Recovery (With B-Heavy/ Without B-Heavy)**	(%)	9.26	9.54	10.62	10.61	10.84	11.46/ 11.49	11.30/ 11.73	10.77/ 11.47*

***Tentative**

The sugarcane farmers are organized into 167 sugarcane grower Cooperative Societies. Each Society has an elected Board of Directions which decides all the issue relating to the interest of their members. The growers Cooperative represent the farmers, in their dealings with the sugar mill.

The Cane Commissioner is responsible for the development, efficient marketing, sale and payment of sugarcane of the **4.5** million cane growers. The Cane Commissioner has the statutory powers to regulate the sale purchase of sugarcane with respect to both the sugars mill as well as the farmers. The Cane Commissioner issue cane *satta* policy every year, which decide how the sugarcane of cane growers will be purchased by sugar mills.

About **23** years ago the *purchi* issuance work was allocated to sugars mills from Cane Development Societies. In year 2014, sugar cane information system was implemented by the then Cane Commissioner and each sugar mill was designated as an independent delivery centre. An I.T. based cane purchase system was started.



Problems being Faced by Different Stakeholders:-

A Problems of farmers:-

I. *Lack of transparency*:- The lack of transparency led to resentment and corruption. Due to adoption of corrupt procurement the small farmers was deprived of income accruing from cane supply to the sugar mills.

II. *Exploitation by middleman*:- The information of various activities of cane marketing chain like number of supply ticket, weight of sugarcane supply, payment made etc., were not available to the farmer. Due to one or another reason, the cane mafia became dominant and the farmers were facing many problems and harassment.

III. *Reduced weight due to staleness in sugarcane***:-** The farmers were subjected to arbitrary weight and content policy. In absence of reliable, instantaneous communication with sugar mill about *purchi*, the farmers were forced to harvest the sugarcane regularly. Each delay of **24** hour in supply time may lead to **1-4%** reduction in weight of sugarcane causing huge financial losses to the cane farmers.

a. *Lower income because of small area under sugarcane*:-Sugarcane is the main cash crop in U.P. and it gives substantially more income per hectare in comparison to other crops like Rice and Wheat. Due to problems in cane supply to sugar mills, the area under sugarcane has been reduced considerably in the State.

IV. *Wasteful expenditure on travel:-* Due to absence of information in public domain, the farmers have to travel **25-50**K.M. to sugar mills for at least **10-12** times a year. Each visit used to cost around **Rs.200** per trip along with consuming the entire day.

B. Problems faced by sugar mills-

I. *Loss of income due to stale sugarcane***:-** The fresh sugarcane has high sugar content, which quickly reduces with time. The delay of every **24** hours after harvesting of sugarcane may reduce sugar recovery to around **0.5%** which causes huge losses to sugar mills.

II. *Lower utilisation of installed capacity*:- The sugar mills should run for a period of **150-180** days in a year for optimum production of sugar and profit thereof. Due to absence of proper cane supply system the farmers use to divert their sugarcane to the jaggery producer on lower prices. Thus, the sugar mills and farmers were both increasing huge financial losses.

III. *Problems faced by Cane Department***:-** Due to adoption of corrupt practices by sugar mills in procurement of cane, the problem of low end orders were being faced at many places and the resentment increased among farmers. The situation was causing financial losses to the farmers and there was a sense of anger and resentment towards the sugarcane department.

The main objective of implementation of SGK (Smart Ganna Kisan) was to make a uniform and equitable cane supply from each and every cane grower across the State and issuance of purchies strictly as per Satta Niti issued by Cane Commissioner U.P. every year. The S.G.K. is designed to provide complete transparency in all the interactions between the sugarcane farmers, Cane Development Societies and the sugar mills, eliminating the middlemen problems faced by **4.4** million farmers and **120** sugar mills putting up a reliable, robust and cost effective communication system between all the stakeholders. The communication system used in S.G.K.can easily be used by the farmers and they could avail the updated information. This sharing of information was to lead to considerable financial gains to both the sugarcane growers and sugar mills.

The growers would gain from higher supply to sugar mill, greater area under sugarcane, higher rate of supply and freedom from the hassel of paper work. On the other hand, the sugars mill would benefit from higher sugar recovery from fresh sugarcane, better capacity utilization and unnecessary paper work along with getting rid of *purchi* distribution. The Cane Development Society would benefit by winning the confidence of grower's member and providing digital solution to their working problems.

The strategy was adopted in such manner as to make the objective clearly understandable. The commitment was unwavering and implementation was perfect. The human aspect of project was as important as the technological one. Accordingly, the training of staff, regular review, audit, standard of performance and social audit were the pillars of implementation. The

communications system used was such that the and users i.e. the farmers could use it easily and get the information in real time.

I. **Centralized system of cane purchase:-** Previously each sugar mill was acting as an independent delivery centres. Now in S.G.K., the whole of State is being catered to through one delivery centre to ensure uniformity in cane purchase across the State and implementing the *satta* policy.

II. **Development module under** S.G.K.**:-** The development and implement of S.G.K. solution include following software modules.

Module no 1:- Pre -calendaring activities.

Module no 2:- Agriculture management.

Module no 3:- Farmer C.R.M.

Module no 4:- Subsidy and purchase and store.

Module no 5:- Financial accounting.

A. Data Acquisition System:-

The system architecture is designed to capture the cane survey and weighment data in real time and upload it on a website. H.H.C. equipped with G.P.R.S. are being used for cane survey and cane weighment. This H.H.C. communicates to Central data bank in real time so that data is correctly recorded.

System Architecture

Data Acquisition - HHCs equipped with GPS

Central Database

Website **caneup.in** **SMS** **Enquiry Terminals**

B. Data Dissemination Systems:-

i **Website: -** The website of S.G.K. **''www.caneup.in''** is **s**tandardised by modules finalized by cane department and it is the gateway that opens to the **167** Cane Development Societies. The farmers and officers of Cane Department at each and every level can access the data of any farmer. During the current year, **5.68** crore hits have been achieved on website coming to a total **17.66** crore grower hits.

C. ''E-Ganna app'':-

For convenience of the farmers **''E-Ganna app''** has been developed. By downloading **''E-Ganna app''** from Google Play Store, farmers can see the data of their own or other farmers on his mobile phone. Till date **45.20** lakh farmers have downloaded the **''E-Ganna app' '**and they have hit it **86.49** crore times, which shows the popularity of the App and assure the transparency in the system.

i. **S.M.S. *purchi*:-** In place of hard copy only S.M.S. *purchi* through assured S.M.S. is being sent to the farmers to make sure that the *purchi* reaches to the real farmers only and in real time.

D- Data Correction and revalidation:-

i **Updation of Mobile Number:-** Farmers can update their mobile number by using **''E-gannaapp''** or through Cane Development Societies. This process facilitates the farmers in updating their mobile number. Correction of data on the request of farmers is done by one level higher officers after getting approval from two level higher officers. Every correction is made after undertaking thorough checking and scrutiny of the complaint.

ii **Monitoring:-**The monitoring of the S.G.K. is being done at headquarter level officers on weekly basis by a team of officers constituted by Cane Commissioner. Any process change is allowed by Cane Commissioner only after recommendation of S.G.K. review Committee.

2. Introducing and implementation and innovative/scheme/ project to meet stakeholders requirement:-

The Cane Commissioner has the statuary powers to regulate the sale and purchase of sugarcane with respect to sugar mills as well as farmers. The stakeholders were the sugarcane grower represented by the **167** Cooperative Development Societies, the **120** sugar mill and officials of Cane Department.

The problems and its solution were recognized by the office of Cane Commissioner. These were discussed with all the stakeholders. The farmers representative put forward the demand that the *purchi* issuance work should be given back to Cane Development Societies. They sought the computerization of the society and centralized system of *purchi* issuance. The stakeholder insists that whole data related to cane marketing should be available on public domain, so that anyone can see the data of any farmer of the State. Though initially the sugar mills showed resistance to these changes but the Cane Commissioner decided to go ahead with implementation.

The process architecture was designed to capture all the transaction in real time and upload it on a central website. All the Cane Development Societies were equipped with computers, line

printer and internet lease line and extensive training was given to Staff. Each cane society was designed as an information delivery centre. Thus, through the centralized website the information was to be delivered through **167** gateway of Cane Development Societies. So the huge task was divided into smaller integrated parts, confined to a small Geographical area to ensure that all the stakeholders could easily contribute to the solution.

3. Bringing perceptible improvements in process / systems and building institution:-

The main objective was to provide the farmers with real time access to all the transactions between the sugarcane farmers, Cane Development Societies and sugar mills. The strategy adopted in S.G.K. was such that I.T. could penetrate into all layers of society and the rich and the poor would benefit equally from it. The information was available through website, **''E-Ganna App''** and through inquiry centres opened at each and every Cane Development Society and sugar mill. Stakeholder's consultations, trainings, regular review, setting of standard of performance and grievance Redressal mechanism and social audit were the pillars of process engineering in implementation of S.G.K.

i. **Stakeholders consultation:-** The stakeholders viz, the cane growers through the Cane Development Society, the sugar mills and the officials were consulted right from the beginning. It was ensured that all the stakeholders benefit from S.G.K.

ii. **Centralized implementation:-** All the modules of S.G.K. were devised and developed by a reputed I.T. Company, Amity Software System Limited and each Cane Development Society was designed as an in independent delivery centre.

iii. **Training of I.T. personel:-** To communicate with the different stakeholders, the I.T. personnel of Cane Society were given extensive training at every district headquarter.

iv. **E-Ganna App:-** Keeping in view the popularity of mobile app, an **''E-Ganna App''** was developed, through which all the farmers can access the data of any farmer on their mobile phone.

v. **Grievance Redressal Mechanism:-** Two toll free call centres, one on toll free number **1800-121-3203** at Lucknow and other on toll free number **1800-103-5823** at Noida were established. These toll free numbers are working **24×7** and resolving the problems of farmers immediately along with taking feedback about the system. A grievance Redressal

mechanism has been launched on the website **''www.caneup.in''** which directs the complaint to the concerned officers and after taking feedback about the resolving of complaint, the farmer is also informed.

Third party assessment: - The working of S.G.K. has been evaluated and audited by third party to avoid any ommission and commission.

4. Approach and methodology adopted to bring innovation Selection of vendor and development of S.G.K.:-

As the cane societies were not well equipped for running a I.T. project, it was decided to develop and implement S.G.K. through a reputed I.T. firm/company having experience of developing software of Cane management.

E-tender was floated on E-tender portal of Government of Uttar Pradesh by U.P. Cooperative Cane Union Federation Limited, which is the Apex body of the Cane Union Societies. After technical and financial bidding M/s Amity software Systems Limited Noida was selected to develop and run the S.G.K. and some modules as per requirements of the department. All modules developed need to be e accessible / monitored / controlled/ incorporated at **5** levels; Cane Commissioner level, Deputy Cane Commissioner level, District Cane Officer level, Council and Society level before developing all the modules it was discussed in detail with Cane Development Societies, Cane Development Council, District Cane Officers, Deputy Cane Commissioner and Headquarter Officials. Studying all the requirements, current scenario, other parameters all the smallest details were covered, for example modules were designed and developed as per requirement of each Society /Council- Society/Council elections (Management Committee, H.R module, biometric integrations, taxes of employee, P.F., E.P.F. records, ACP, leave policies etc.) Account Management (Budget, balance, sheet, cashbook, ledger, balancing) loan taken by societies on behalf of farmers, cash credit of farmers, interest subsidy, Farmers Machinery Bank Modules etc., were developed with keeping in mind, each and every details need of the society/councils.

Strengthening of Cane Development Societies and Cane Development Councils:-

As the Cane Development Societies and councils were not computerized and lacking manpower of I.T. related personals, so all the Cane Development Societies and councils were equipped with computers, line printers and internet lease line. In A-Grade, B-Grade, C-Grade, D-Grade Societies respectively four, three, two and one computer were installed. The Amity software Systems Limited provided one computer programmer at each district level as well as range level.

Constitution of I.T. Cell at Headquarter:-

An I.T. cell was developed at headquarter level by arranging expert staff from Outsourcing. An I.T. team was deployed by M/s Amity system Software Limited at Lucknow for resolving the problems of Cane Development Society and Cane Development Council during implementation of different modules developed in S.G.K.

Training of Society and Councils Personals:-

To communicate effectively the staffs of Cane development society and Councils were given extensive training at all the district headquarters.

Setting of Standards:-

To ensure the quality of information, uniform high standard of performance were set for website, dashboard, query system, complaint Redressal and S.M.S. system etc.

Performance Review:-

The performance review of S.G.K. was carried out by the office of Sugarcane Commissioner. A committee of senior official of headquarter and other related officers were constituted. It reviewed the performance at weekly interval. Each problem was identified and hosted on website/ Whats App group. In the succeeding week, the review included the solution of previously identified problems. The regular monitoring ensured that all the components of S.G.K. were complying with the standards and parameters.

Facilitating the Farmers:-

Though the farmers could use a website of S.G.K. **''www.caneup.in''** to see their own data as well as other farmers, but still to facilitate them further, an **''E-ganna App''** was also developed, which could be downloaded on Google Play Store and through which farmers could see their information along with other farmers of the State. Two Toll-Free Call Centres were established on toll free number one **1800-121-3203** at Lucknow and other toll free number **1800-103-5823** at Noida. These toll free numbers are working 24×7 and resolving the problems of farmers immediately and talking feedback about S.G.K.

Service Level Agreement:-

The vendor signed a S.L.A. with the Cane Union Federation to ensure adherence to standard. Below par performance attracted penel provision of S.L.A.

Making Paper Free Environment:-

To ensure the information reach to the real farmer, the mobile numbers of all **45** lakhs farmers were updated and supply tickets and other information are being made available to the farmers through S.M.S. only.

It is notable that **27.4** lakh farmers have downloaded the **''E-Ganna App''** and the **''www.caneup.in''** website of S.G.K. was hit 5.68 crore times by farmers and they saw **17.66** crore information of themselves and other farmers. Every farmer is satisfied with the current system.

5. Impact / Benefit Initiative

The Cane Commissioner office has been responsible for the design of the system making the services free to the farmers. The farmers save annually Rs.7,303 crore with the implementations of S.G.K., while sugar mills save annually Rs.4,252 crore which come to total benefit of the Rs.11,555 crore benefit. The cost benefit ratio is 1:2,045 which is an enormous return on the investment.

Cost-Benefit Analysis

- Cost of the System - **5.65 crore**
- Cost Benefit - **11,555 crore**
- CB Ratio : 5.65 ÷ 11,555 = **1 : 2,045**

6. Effectiveness and popularity of S.G.K.

It is evident from the data given in following table that the rural farmers have adopted this digital initiative-

S.N.	ERP Website/ E-Ganna app	Data
1	Hits on www.caneup.inwebsite	**.568 crore times**
2	Statistics were viewed by the Sugarcane farmers on website	**17.66 crore times**
3	E-Ganna mobile app download	**45.20 Cane farmers**
4	Hits on E-Ganna mobile app	**86.49Crore times**
5	In the last 03years, fake, landless and double cane bonds which were closed	**63.3Lakh**
6	Total issued Ganna purchie to farmers	**78,695,484**
7	Issued Ganna purchie to small farmers	**31,73,435**

Key Benefit: - The Key Benefits to the Farmers

i. **Complete transparency:-** As now all the data is on public domain and easily accessible through website or **''E-Ganna app''** it ensures complete transparency, and farmers are interacting freely.

ii. **Elimination of middlemen:-** There is complete sharing of information between the farmers, the Cane Development Societies and the sugar mills which has helped in elimination of middlemen by putting different checks and balance. Working on the

general information received from the public, around **3.89** lakh fake bonds, double bonds and bonds of dead persons have been closed during last two years.

iii. **Establishment of rule of law in society:-** The S.G.K. has established the faith of farmers in cane marketing system and around **10.67** lakh farmers have registered themselves as new members in Cane Development Societies for supply of sugar cane.

iv. **Increased supply of sugarcane to the mills:-** The implementation of S.G.K. have increased the supply of sugarcane to the mills resulting in an additional income of Rs. 2,262 crore to the farmers. This saving is on account of lesser diversion to Jaggery units which gave a lower price.

v. **Increase in an area under sugarcane:-** the S.G.K. has facilitated the farmers to increase the area under sugarcane, leading to an increase in income of Rs.1,180 crore. This is because farmer income from sugarcane cultivation is more than that of from the alternative crops.

vi. **Higher weight on sugarcane supply:-** Timely information of supply tickets through S.M.S. has reduced the harvest supply time by around **48** hours and the farmers have gained Rs.2,751crore due to the higher weight of sugarcane supplied on time.

Farmers save around Rs.7,303 crore annual due to the implementation of S.G.K.

i. **Saving in unnecessary travel:-** The number of trips a farmers make to a sugar mill to market his produce has been reduced to almost zero. This resulted in saving of Rs.405 crore.

Benefit to the Sugar Mill:

1. **Supply of fresh sugarcane:-** The harvest to supply time has been reduced by around **48** hours, which resulted in to the increase in sugar recovery by around **0.8%**. The additional sugar so made is worth of Rs.3,330 crore.

2. **Increase in sugarcane supply:-** The S.G.K. helped the sugar mill to procure more sugarcane, leading to an additional production of sugar with a higher income of Rs.1,122 crore.

3. **Benefit to the Cane Department: -** The key benefits to the department are eradication of cane Mafia, transformation in the attitude towards E-Governance and increase in use of I.C.T. in rural areas. The great success of this project is the assured cane supply of the poor farmers standing last in the queue. The under-privileged farmers at lower end of the literacy spectrum and social strata are getting timely and accurate information and reaping due benefit from sugarcane crop, deprived earlier by the sugar mills.

Environmental Benefit: - Prior to S.G.K. the paper *purchi* were sent to the growers. The S.G.K. has gone a way forward in the concept of paperless transactions. By making of millions of paperless transactions, the S.G.K. has been able to reduce carbon foot prints and save our precious natural resources. The paper saved through S.M.S. *purchi* is worth **20,000**Kg , thus sparing thousands of trees from being cut and fallen per annum. This initiative supports the campaign for clean and green planet.

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11. Telangana State Mana Isuka Vahanam ("My Sand Vehicle")

1. Situation before the Initiative

Illegal Sand mining and sand trafficking has been creating lot of environmental hazards in the recent past. Sand is an essential material for construction industry of all sizes and types. If the sand is not available in the market easily, the construction industry will suffer. Further, if there is no proper regulation it leads to river basin erosion and other environmental hazards. Hence, Government has to ensure the balance by regulating the sand flow at reasonable prices.

Manual system of sand regulation has many flaws as such inefficiency, corruption and untimely payment to the stakeholders leading to poor service delivery.

In order to put an end to this and to enhance efficiency in sand transactions, effectiveness in control, transparency in operations, accountability at all levels, sustainability in the long run and convenience to all the stakeholders, Government of Telangana in technical consultancy with Centre for Good Governance (CGG) has initiated an innovative e-Governance Solution called, 'Mana Isuka Vahanam' (My Sand Vehicle in English).

2. Challenges faced

After studying AS-IS processes, CGG conducted a gap analysis and eventually proposed areas of improvements at the level of District Sand Management Societies based on the challenges and pain areas.

Major challenges identified are highlighted below:

a. Illegal mining and transportation of sand by unauthorized tractors
b. Resistance from tractor drivers/owners to upgrade to an automated allotment system as they were comfortable with the manual system.
c. Citizens were getting services with enormous delays and the system was completely opaque for them. No mechanism for citizens to track the status of their booking in real time.

d. Involvement of middleman resulting into huge inconveniences & transaction cost to all the stakeholders.
e. Tractor owners required to physically visit offices for tractor registration and trip closure
f. Bias in trip allocation to tractors resulted in unfair practices and corruption.
g. Manual interventions, physical touch points and interferences were prevalent at each stage of Sand supply chain.
h. Manual reconciliation of revenue earnings for the sand management societies was a difficult task and auditing was cumbersome.
i. Information was available in silos and was recorded on paper at district level; this was easy to manipulate. Unavailability of Single Source of Truth at the State level.
j. No real time information availability or MIS reports with the relevant officials for monitoring, tracking or decision making .
k. No grievance redressal mechanism available for customers and tractor owner.

3. Strategy Adopted

3.1 Conducted a Baseline Study and Extensive Stakeholders Meetings

As a **first step**, CGG performed a baseline study of sand supply in Peddapalli District to understand its pros and cons and gather requirements for implementing an end-to-end sand procurement and delivery management system scalable to the state / national level.

Next, Stakeholders at all levels (including village and town dwellers being the most important stakeholder) were extensively engaged during the entire project development life cycle with clearly defined roles and responsibilities.

Stakeholders included officials from Dept. of Mines & Geology and District Sand Management Societies, tractor owners and rural citizens / construction contractors interested in sand procurement.

- CGG team understood the existing processes (AS-IS), challenges, stakeholder concerns, data collection methodology etc. through discussions. This helped in defining the requirements for the proposed e-Governance Solution (TO-BE) and identifying areas of Process Re-engineering.

- Required services were identified based on finalized TO-BE processes; Wireframes prototypes were designed and demonstrated to stakeholders for confirmation and to proceed with the Development of solution.

3.2 Identification of Key Issues

Some of the key problems identified by MIV team are listed below:

- **Poor network connectivity**: Many of the sand reaches and villages covered under TS-MIV application are in remote areas with limited cellular and data connectivity leading to problems in receiving OTP, trip closure through SMS etc.
- **Low literacy levels**: Some tractor drivers and rural customers have no / low levels of literacy making it challenging to reach out to such stakeholders through text-messaging
- **Non-familiarity with the technology**: Lot of the tractor drivers and customers do not own / use smart phones and hence cannot access TS-MIV application.
- **Reluctance to change**: In some of the districts, Sand Management Societies and CGG field team were facing resistance from tractor drivers to upgrade to an automated allotment system as they were comfortable with the manual system. Tractor drivers were educated about the benefits of the new system.
- **High cancellations**: Some of the districts were facing high levels of cancellation during the initial implementation phase. CGG team had performed data analysis to identify tractors with high cancellation share and blocked them temporarily. This had significantly improved the delivery share and delivery time for customer as only serious / genuine tractor drivers were receiving allotments.

3.3 Roll out/implementation model

As a part of Software Development Life Cycle by following CMMI L3, ISO 9001:2015 & ISO27001:2013 quality standards, following stages were involved in project implementation:

- **Finalization of TO-BE processes** for TS-MIV project after considering all the challenges and pain areas in the current set up and firming up of functionalities required for e-Governance Solution

- **Development of prototypes**: Based on the finalised TO-BE processes, required services were identified; prototypes were designed and demonstrated to the stakeholders for confirmation
- **Quality Assurance Testing & Audits**: TS-MIV has undergone through thorough QA testing and audits at CGG level and thereafter its acceptance from the District Sand Management Societies.
- **Implementation of the system**: Web and mobile based TS-MIV systems were developed and demonstrated to the Collectors and other relevant officials. Modifications or improvements were suggested which were addressed for the effective use of TS-MIV

3.4 Process Flow of the Application

TS-MIV is a long-term end-to-end solution towards an automated Sand Management System for the District Sand Management Societies by automating the activities right from the registration of tractors to its approval and the related file management through automated workflow processes. The system facilitates ***building databases of all the stakeholders*** along with the applied processes and generates online Dashboards, MIS Reports, and Tableau Reports which can be drilled down to the granular levels.

Entire value chain in the sand procurement and delivery to the customer doorstep through the TS-MIV application involves the following processes:

- **Tractor Registration**
    a. Tractor owners are registered in the system online through payment gateway and relevant document upload
    b. AD, Mines approves tractor registration & authorize tractors for sand allocation. Only authorised tractors can transport Sand in the districts.
- **Sand Booking**
    a. Customer registers into the web or mobile application through a mobile number
b. Customer can book sand by entering details & making online payments in a hassle-free manner
c. Customers get estimated time of sand delivery and can track the same

- **Tractor Allocation**
  a. Tractor trip allocation is automated based on ***'First-In First-Out'*** principle to provide equal opportunity to all tractor operators. This ensures equal opportunity to all the enrolled tractors owners in the Districts to transport the Sand and removes bias present in the manual system.
  b. Tractor owner can either accept or reject allotment; to accept an allotment he would give a missed call to pre-specified number
- **Sand Loading and delivery**
  a. Sand is loaded into the tractor for its delivery to the customer
  b. Sand Reach Officer uploads a geo-tagged picture of the sand loaded vehicle
  c. Customer then receives vehicle details along with an OTP to be shared with tractor driver for delivery confirmation
  d. Tractor driver delivers sand at customer doorstep and submits OTP for trip closure
  e. At the end of trip, driver receives an SMS confirming sand and amount earned from the trip

(For pictorial representation of the Process Flow of the TSMIV application, please refer to Figure 1, Figure 2 and Figure 3)

Figure 1: TSMIV - Process flow to book sand by customer

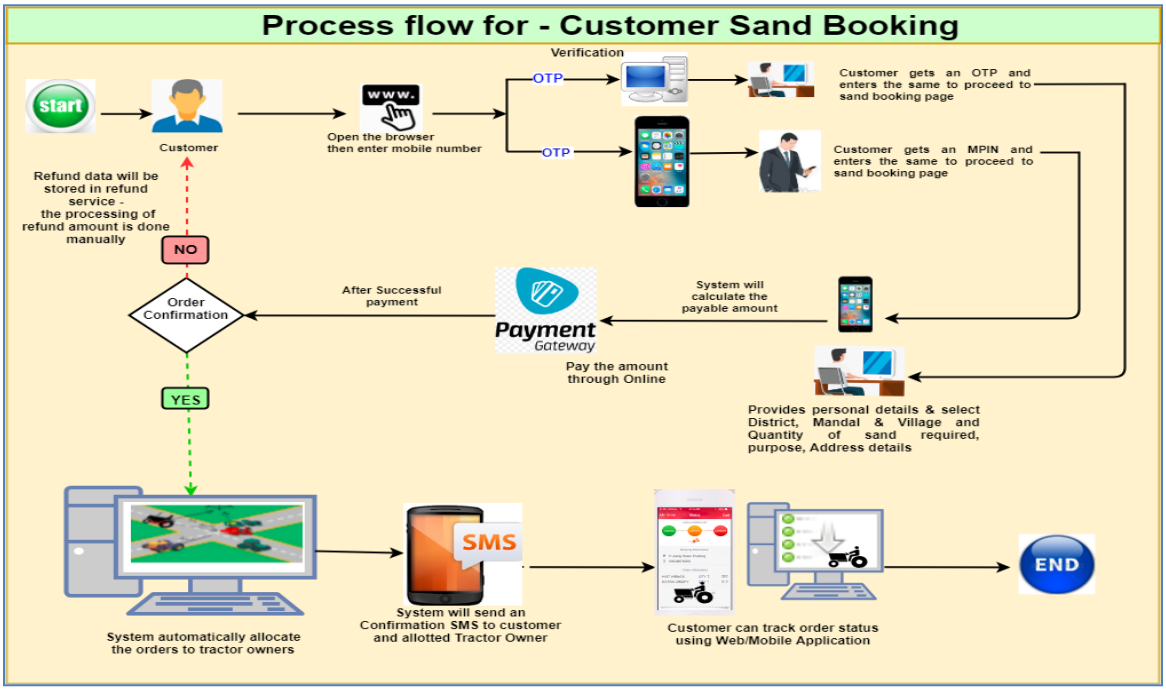


Figure 2: TSMIV - Process Flow for Sand Delivery

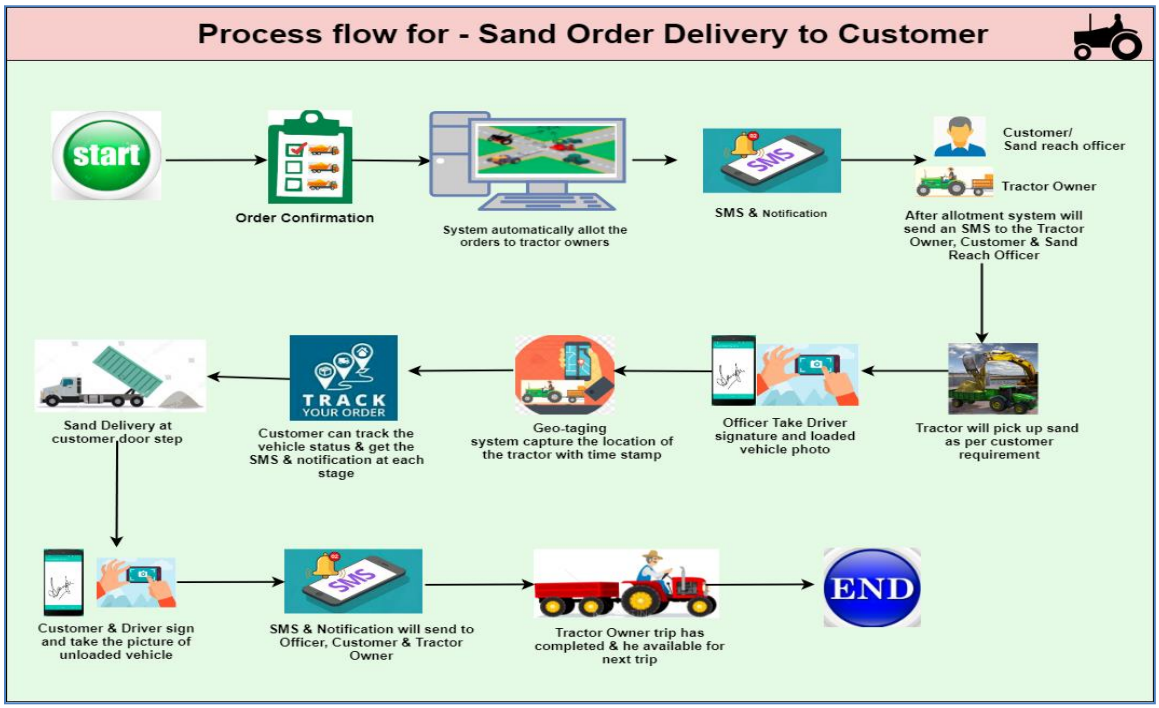
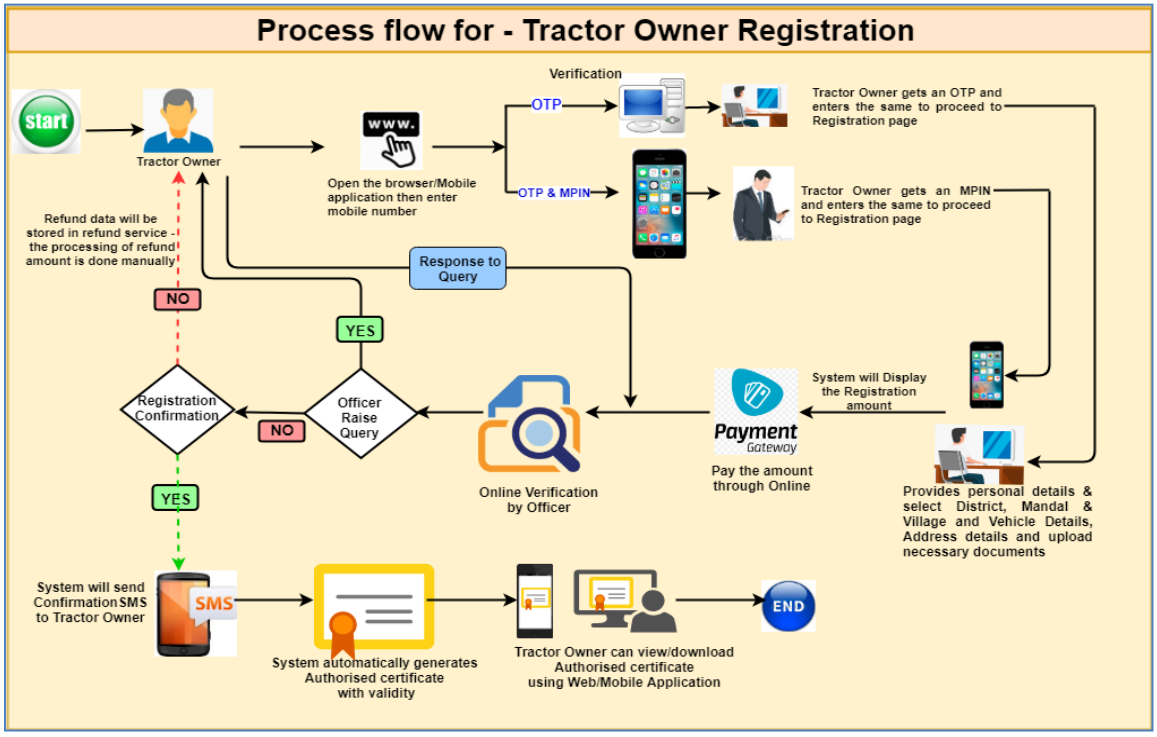


Figure 3: TSMIV - Process Flow for Tractor Owners

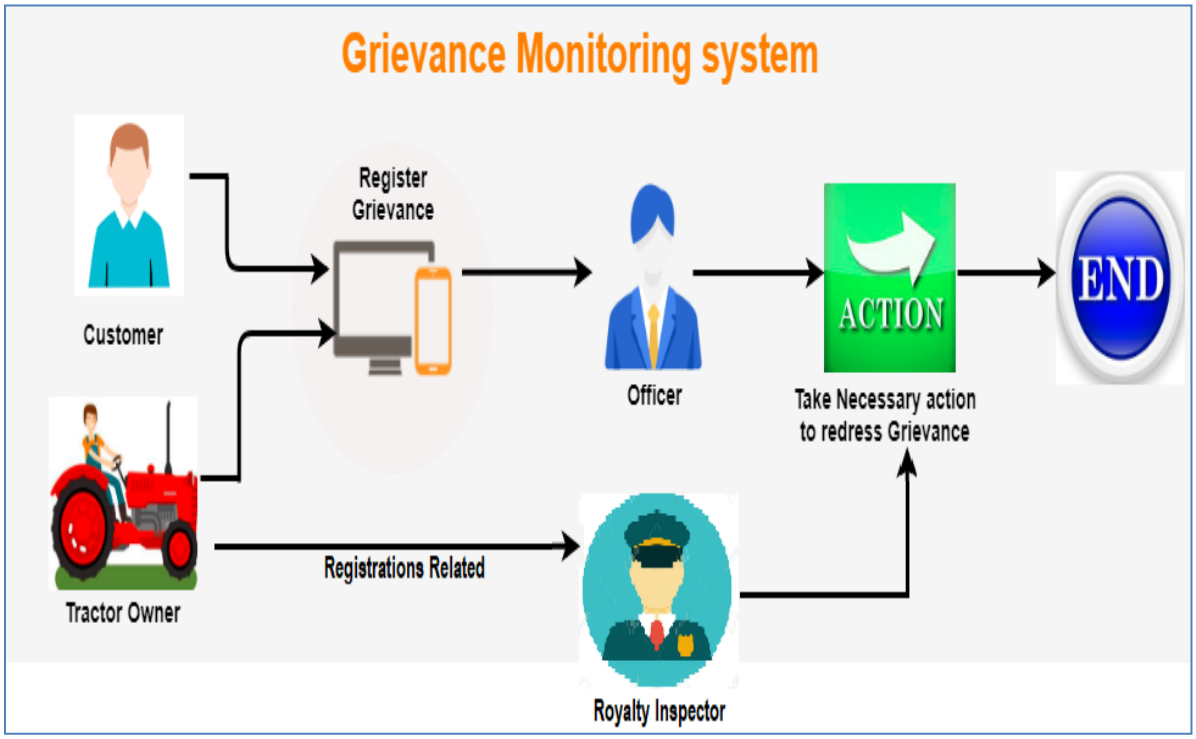


- **Grievances Redressal System**

  a. Grievances can be filed directly in the TS-MIV by the customer & tractor owners.

  b. The District Sand Management Society addresses the grievances online and inform to the Customers & the Stakeholders.

Figure 4: TSMIV - Grievance Monitoring System



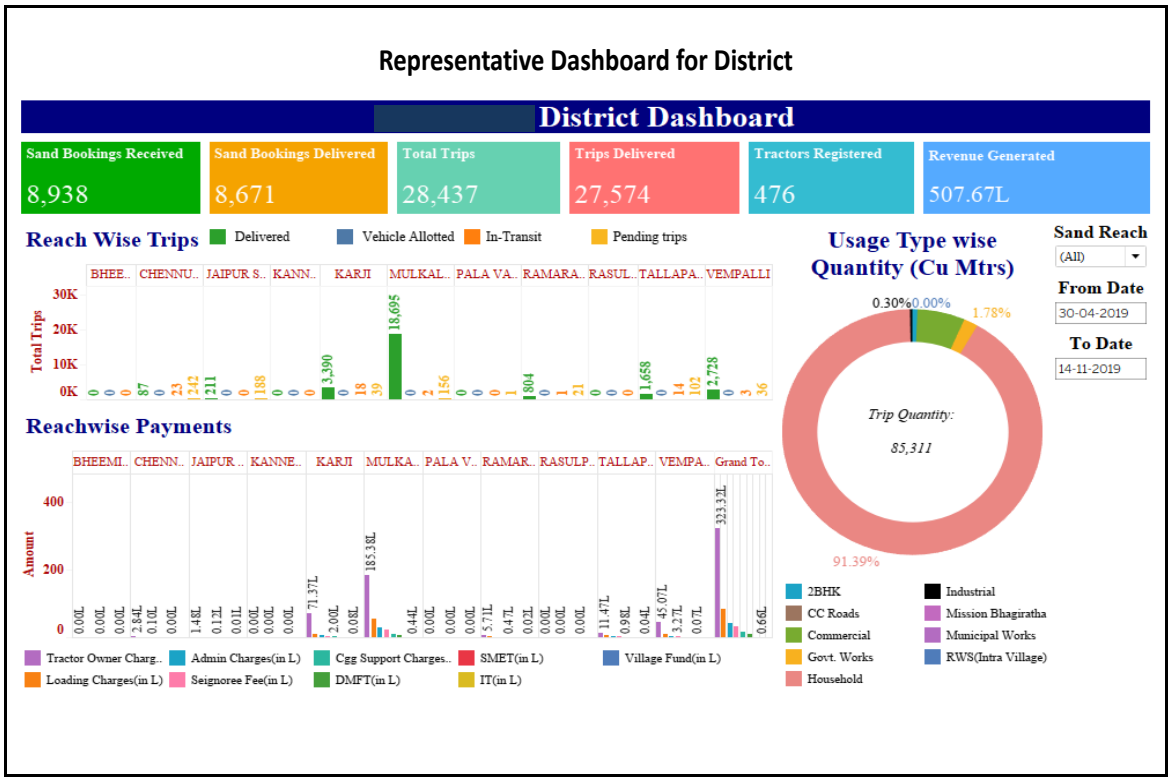
- **Decision Support System:**

  a. Dashboards, MIS reports and GIS parameters are available in TS-MIV for the real time monitoring and quick decision making by the Collectors and District Sand Management officials to monitor the working, grievances and the revenues from time to time.

  b. Speedy decision-making system is enabled through Dashboards, MIS Reports and Tableau Reports available for all the stakeholders including Department of Mines and Geology, District officials based on real time information.

  c. This also helps in the monitoring of the revenue generated from each district.

Figure 5: TSMIV: Representative Dashboard for District



3.5 Capacity Building and Awareness & Communication Approach

- Prior to implementation, awareness was created at individual and organization level on the TS-MIV applications usage through rigorous brainstorming sessions conducted by CGG with District Sand Management Societies
- TS-MIV system was demonstrated to the Collectors and relevant officials from District Sand Management Society and Dept. of Mines & Geology
- Trainings and workshops were conducted for all users of the application, including tractor owners, Sand Reach officers, AD Mines and other officials of District Sand Management Societies.
- CGG deployed a Project officer at AD Mines office (3-4 days for each district) for training and handholding support at district during the initial phase of operation to ensure smooth transition from manual system to an automated one

- CGG provides training to the stake holders whenever new processes are developed/existing processes are modified and share them the workflow documents/manuals.
- CGG conducts workshops to Collectors whenever required through physical presence and also Online-meetings.
- Video user manual, Document Manuals & FAQs are prepared for all the services and are available in the Portal
- A test/demo URL is provided to the user department to get acquainted with the system

3.6 Feedback Mechanism

Feedback is being used in the TS-MIV Application from all stakeholders from time to time in person, through email / SMS / WhatsApp / Online Meetings/physical meetings with the Collectors and Phone Calls. The same is being incorporated to improve TS-MIV Application from inception till date.

TS-MIV Help desk is set up in CGG to handle customer / tractor owner queries and concerns; 11,000 grievances have been received and addressed till date.

4. Bussiness Process Re-engineering

Older system of sand allocation and delivery was manual having a lot of loopholes. It was prone to system inefficiencies and corruption.

CGG team came to have understanding about the existing processes (AS-IS), challenges and stakeholder concerns through discussions and meetings. This helped in identifying areas of process re-engineering and understanding the requirements for the proposed Solution (TO-BE).

Following table shows the differences between the older system and MIV:

Table 1: TSMIV v/s Old System

Service	Older System	MIV
Tractor Registration	System was susceptible to corruption as the tractor owners could circumvent registering the tractor and still get allocations by bribing the officials	Tractor registration process and trip allocations (upon successful registration) is completely online with no manual intervention and no scope for corruption or favouritism
Customer Sand Booking	Previously, the customer had to visit the District Sand Management office and make payment manually to book sand; the process was quite tedious and left ample scope for corruption and black marketing	Customers can book sand online by making a payment for the same from the comfort of their homes; customers can also track the status of their order within the application and file grievances (if any) online
Trip Allocation	Previous system of allocation was prone to manipulation by officials who could preferentially allocate trips to certain drivers.	Trip is automatically allocated to available tractors on a FIFO (First In First Out) mechanism through an algorithm with no scope of manual intervention. Additionally, the algorithm also ensures that all drivers get trips of all possible trip distances for equitable income for drivers
Grievance Mechanism	Citizens / tractor owners had to approach AD Mines office to register their grievances and redressal would take a long time	Stakeholders can file their grievances within the application itself. This would be addressed immediately or escalated to the concerned officials.
MIS and Reporting	No Reporting available; data shared manually by officials	Dynamic Tableau dashboards customized for the relevant user

5. Results Achieved (end of Aug-2021)

Table 2: TSMIV: Important Indicators

Number of sand reach districts served	11 out of 13 sand producing Districts
Number of Sand reaches under operations	145
Cycle time (booking to Delivery)	Reduced to 1 day from 5 days
Total revenue generated	Rs. 404 Crore
Total trips delivered	14,88,567
Volume of sand delivered	44,39,283 cum
No. of Citizen Bookings Delivered	4,65,119
Number of tractors registered	11,992
District with highest revenue generation	Nalgonda

6. Financial Savings

This solution has been effective in not only curbing illegal sand trafficking and environmental degradation but has also almost doubled up the revenue of the Government from sand allotments due to the transparency in the system.

Till date approx. Rs. 404 crores of sand has been procured through TS-MIV system.

The outcomes are immense in terms of effective delivery of transparent services provided by the Government to all the Stakeholders of the ecosystem by giving them the user experience at par with the private online market services at the grass root level and in building the institution through accountability.

The customers are also benefitted enormously on account of transparent sand price regulated by the govt, relieving them from the exorbitant charges by middlemen and sand mafia. Moreover, the ease of accessibility of government services has resulted into more than 95% reduction in transaction cost of sand procurement for citizens.

TS-MIV application provides fair employment to Tractor Owners and Sand Reach Workers. Till date, nearly 12,000 tractors are registered in the system.

7. Improvement in Efficiency/Productivity/Reduction in Waiting Time

TS-MIV is a highly efficient system for sand procurement and has resulted in enormous savings of time and money for the stakeholders involved.

System is Contactless, Paperless and Cashless as per Digital India guidelines.

Citizens can book sand through TS-MIV in a single click and get it delivered at their doorstep. They are no longer required to visit AD Mines office physically for sand booking. Average time for making the complete transaction has reduced from about 8 hours (previous manual system) to about 10 minutes.

Multiple services provided by TS-MIV, including Online sand booking, FIFO based tractor allotment, Re-allocation of customer cancelled tractors, Activation and Deactivation of the tractors based on tractor availability has led to significant productivity gains, evident in the reduction of Cycle time of sand procurement for end customer from 5 days to 1 day.

Tractor owners also find it convenient to get their tractors registered in MIV eco-system through online document uploads / verification and fee payment, sparing them the hassles of registering tractor through a manual process replete with corruption and delays. Average turnaround time for closure of issues has also come down from 8 hours to about 5 minutes.

8. Scalability and Replicability

TS-MIV application, now operational for more than two years, is designed and developed based on the latest Technology Platforms with scalability to ensure the business continuity. New districts and sand reaches in existing districts can be added with minimal efforts.

MIV has been implemented in 11 out of 13 sand producing Districts in Telangana with remaining two districts (Nizamabad and Nagarkurnool) in pipeline.
TS-MIV leverages innovations in technology and processes such as AIML, Data Analytics GIS, Latest Security features, DevOps etc. for continuously improving user experience, thereby making it easily scalable and replicable.

Sand is basic construction ingredient and TS-MIV can be replicated across all states in the country. TS-MIV system can also be replicated for other construction materials like Stone Chips, Bricks etc. MeitY, GoI can consider under the Rapid Replication scheme

The TS-MIV application is developed in open-source Java based technologies (for web app) and Android (for Mobile app); database is built on Postgre SQL. The Server makes it easily configurable and compatible with other technology platforms. TS-MIV Application is integrated with Payment Gateways, SMS Gateways, AIML Chatbots through APIs. It is also compatible with GIS and Vehicle Tracking System (VTS).

9. Simplification of Procedure

TS-MIV, an e-Governance Solution is a State-wide Web & Mobile based application, providing cutting edge solution for an effective, transparent and efficient sand procurement and delivery management in the State.

It is implemented in 11 out of 13 Sand Producing districts in Telangana with remaining 2 districts in pipeline for implementation.

TS-MIV has improved the following aspects of sand procurement and delivery ecosystem:

- **User Convenience** on the lines of any private online marketplace like Flipkart or Amazon, making booking and delivery of sand a smooth experience. Mobile App in

Telugu language has deep penetration due to its simple format. Tractor owners can track their trip earnings online.

- **Enhancing income to hand-to-mouth tractor owners** by system driven FIFO system and auto Queuing for the next trip
- **Efficiency in transactions** led to increase in the revenue receipts of the District Sand Management Societies
- **Responsiveness** by the District Sand Management Societies to customers and tractor owner grievances in time
- **Effectiveness in control** – Collector and the officials of Sand Management Society have effective control over the Sand Management in the District as only authorized tractors are allowed to reach sand mine reaches, that too as per queuing system. Unauthorized sand mining is under control on account of the project. The Dashboards and MIS reports are highly useful to Sand Officials and District Collector for decision making as they are based on real time information.
- **Transparency in operations -** TS-MIV is completely transparent for each process. Sand booking to delivery, Tractor registration to trip allotment and revenue reconciliation with payment gateways, SMS to stakeholders at each stage, everything is system driven without any manual intervention.
- **Accountability at all levels –** Due to real-time and online information availability at various levels, the accountability is easily fixed on the defaulters. Tractor registration is done online, replacing the corrupt manual system. Trip allotment is under FIFO, removing the control out of the hands of sand reach officials. Photographs must be uploaded by Sand officials at various stages ensuring accountably fixation.

TS-MIV is a path breaking innovative e-Governance solution, developed on the latest technology platforms and equipped with features such as:

- ***Process Automation***: Through TS-MIV, customers can book sand, track orders and get delivery at doorstep through a single click. TS-MIV offers a long-term solution towards an effective Sand Management by automating 'end-to-end' sand supply chain in districts with real time information availability to all stakeholders.

    - Tractor registrations, their approvals and online file management are done through work flow processes
    - Vehicle allocations are automatic through FIFO based mechanism
- ***GIS***: Used for geo-tagging of photographs of sand loaded vehicles at sand reach location. TS-MIV is also compatible with the Vehicle tracking System (GPS). It is useful for effective Sand Management and controlling illegal Sand mining and transportation.
- ***AI Chatbots***: Used for automated online conversation related to customer service via text which is a rule-based, open source Chatbots that leverages AIML features
- ***Decision Support System***: Speedy decision-making system is enabled through Data Analytics, MIS Reports and Tableau dashboards available for relevant stakeholders based on real time information.

Other features instrumental in continuity of TS-MIV operations are as follows:

- Robust, reliable Data Centre infrastructure with redundancy
- Zero down-time, real time databases with responsive portal and apps
- SMS services at every stage of sand procurement and delivery ensuring responsiveness to the users
- Secured payment gateway is set up to avoid any payment issues
- Extensive training material, including document and videos capturing the FAQs
- Help desk is set up to assist tractor owners and customers in real time;
- Stakeholders can also file online grievances directly in the TS-MIV

10. Adaptability

- The only mode to book sand by Tractor Owners/citizens in the 11 sand producing districts is through the TS-MIV application, which is bilingual (Telugu and English).
- As there is no other mode to book sand (apart from TS-MIV application) and with adequate training and guidance, the Tractor Owners/citizens have adapted to this e-Governance Application.
- The application can be quickly adapted to the various enhancements required in the entire value chain of the project; technology upgradations; and regulatory environment.

11. Sustainability

TS-MIV application was developed with a focus on alleviating key environmental, social and financial sustainability challenges posed by the manual system.

11.1 Environmental Sustainability

- MIV has resulted in effective control of unauthorized excavation and transportation of Sand in the Districts by bringing transparency in direct accountability in the system. This helps in preventing major damages to rivers, streams, other waterways and the environment in general.
- Tractor registration, Sand bookings, payments, sand delivery at customer doorstep & monitoring of the Sand in the Districts are fully digitized and automated resulting in significant reduction in paper wastage.
- The CGG uses state-of-the-art IT infrastructure in the Data Centre @CGG that consumes less power and enhances power efficiency, thereby saving electricity

11.2 Social Sustainability

TSMIV provides fair employment opportunities to the Tractor owners and labourers in the districts. Sand is available at Govt. regulated nominal prices to all citizens, including those belonging to marginalized sections of the society. Customer satisfaction is very high.

11.3 Financial Sustainability

TSMIV has leveraged innovative technologies and effectively plugged revenue leakages in sand distribution. This has led to 2x increase in revenues for the Government from sale of sand. Tractor owner's income has considerably gone up. Tractor owners have their own Dashboard and keep a track of trip and total earnings at any given point of time.

11.4 Technological Sustainability

The system is designed and developed in the latest Technology Platforms. TS-MIV platform is eminently scalable and capable of adaptive accessibility across the multiple change vectors.

12. Lessons Learnt

- TS-MIV is the brainchild of Sri Rajendra Nimje ex-IAS, Director General, CGG. He had envisaged an “Amazon” kind of e-commerce experience for this application. His direction and close & deep involvement with CGG’s Development Team and all stakeholders, right from the overall architecture & project concept stage to design & development stage and finally to project implementation is one of the most important factors for the success of this project.
- Regular workshops and Stakeholder consultations with all the Asst. Directors of Mines & Geology in the State enabled the readiness and preparedness of this application by the Users
- MIV, being a citizen-centric project, engaging Stakeholders at all levels (including village & town dwellers and tractor owners) during the entire project development life cycle helped in overall success of the application
- Adoption of local language Telugu (in addition to English) in TS-MIV application helped in mass adoption of the application as most of the citizen consumer and tractor drivers are from the rural areas
- Helpdesk services and Grievance addressal system with timely response is an important value addition.
- Timely and regular enhancements through AI/Image Recognition to capture tractor registration number aided in bringing further transparency to the application
- Leveraging MIS and Data Analytics for Decision Support by User Department officials has helped in improving operational efficiency of TS-MIV.
- Having only one mode to book sand in all 11 sand producing districts, helped in User acceptance.
- CGG being a process driven organisation and adhering to processes, including ISO 9001:2015, CMMi L3 and ISO 27001:2013/DevOps /Security Audits through CERT-IN / GTGW helped in achieving the timely goals of the Project

12. Response of the stakeholders

Dept. of Mines & Geology

- We are using TS-MIV application for supply of sand in districts for the last two years and are quite happy with the services
- Dashboards and MIS Reports are useful for decision making by our officials at all levels.
- Trip allocations to drivers are easy, cancellations have reduced, cycle time for sand supply has reduced, driver payments are transparent and also stakeholder grievances are minimal

Citizen

- I am constructing a house here and for that I needed sand. I booked it through Mana Isuka Vahanam and it was delivered to me within 24 hours.
- Whenever I need sand, instead of going to Internet Centre, I book it over my phone.
- Instead of wasting my time by standing in long queues, I rather prefer booking this way through Mobile App as its delivered promptly on time.

Tractor Owner

- The Mana Isuka Vahanam Scheme is really a very good initiative of the Telangana Government
- This is the first time ever that such a unique scheme is introduced and we are all happy about it.
- I hope this programme is introduced in every dictrict

Tractor Owner

- I am a driver and own a tractor
- I use this to deliver sand through this Mana Isuka Vahanam Scheme
- There are about 250-300 tractors and now about 1000 families are making their living and surviving through this scheme.

14. Photo Gallery

TSMIV - Launch in Districts

TSMIV - Launch in Districts

CSI SIG eGov – Award Ceremony

CSI SIG eGov - Award of Appreciation

Tractor Allotment

Loading of Tractor at Sand Reach

Sand Delivery at citizen customer Site

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सत्यमेव जयते

Department of Administrative Reforms & Public Grievances
Government of India
New Delhi

प्रशासनिक सुधार की ई-पत्रिका
e-Magazine of Administrative Reforms

सत्यमेव जयते

न्यूनतम सरकार – अधिकतम शासन

Minimum Government - Maximum Governance

Best Practices in e-Governance
Part- II

Department of Administrative Reforms & Public Grievances
Government of India
New Delhi

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1. Telangana State Pattana Pragathi

Need for a M-Governance Solution

The Street Vendors Act, 2014 is for protection of livelihood rights, social security and regulation of urban street vending. The Street Vendors (SVs) provide vegetables/fruits /small grocery items to citizens at their doorsteps at bare minimum rate, and can be called as nano entrepreneurs playing a vital role in urban economy.

The Act envisages the formation of Town Vending Committees in various districts to ensure that all street vendors identified by the government are accommodated in the vending zones subject to norms. The implementation of the Act has been reportedly slow, and barring a few districts in Punjab, Madhya Pradesh and Maharashtra, Town Vending Committees haven't been formed, and street vendors continue to have to fend for themselves.

Prior to Pattana Pragathi App, there was a provision of manual enrolment/ paper-based enumeration of Street Vendors and data of only 83,666 Street Vendors were collected through manual survey (2016-20) in 141 ULBs across Telangana, against state quota of nearly 3.8 Lakh vendor loans.

This old system was problematic in terms of 1) Number of live registrations; 2) Time consuming; 3) Missing questionnaires; 4) Errors in records updates - Potential for fraudulent and bogus entries; and Opaque and unaccountable.

The COVID-19 Pandemic triggered the need of contactless enrolment at a rapid pace! The pandemic and the nationwide lockdown left daily wage workers and street vendors out of work. They usually work with a small capital base and might have consumed the same during the lockdown. Therefore, there was an urgent need to provide credit for working capital to street vendors to resume their business.

During this period of time, Ministry of Housing & Urban Affairs (MoH&UA) launched a PM Street Vendor's Atma Nirbhar Nidhi (PM SVANidhi) Scheme to empower Street Vendors by not only extending loans to them, but also for their holistic development and economic upliftment. The scheme intends to facilitate collateral free working capital loans of up to IN Rs. 10,000/- of one-year tenure, to approximately 50 lakh street vendors in the country, to help resume their businesses in the urban areas, including surrounding semi-urban/rural areas.

In response to the PM SVANidhi Scheme, Mission for Elimination of Poverty (MEPMA), Government of Telangana (GoTS) with Centre for Good Governance (CGG) quickly implemented a unique web & mobile based e-Governance solutions for increasing the coverage of Urban Street Vendor for financial security.

The Scheme is eligible to all the street vendors engaged in street vending activity in urban areas of Telangana State on or before March 24th, 2020.

Major Challenges Identified Are:

- Earlier, the field functionaries carried out the survey of street vendors through paper-based format.
- There is always a delay in entering the data of street vendors, capturing the vendor and vending photographs collected from the field locations.
- Involvement of Middlemen and likely Corruption.
- No financial security especially during crisis times such as Covid-19 Pandemic
- The nationwide lockdown left daily wage workers and street vendors out of work.

Strategy Adopted

Conducted a Baseline Study and Extensive Stakeholders Meetings

As a first step, Mission for Elimination of Poverty in Municipal Areas (MEPMA) had approached the Centre for Good Governance (CGG) for the speedy implementation of e-Governance (web & mobile based) solutions for the enumeration of Street Vendors through the

field functionaries. The details of baseline study along with stakeholders' consultation are given below:

Before taking up the development of the project, detailed requirement study is carried out with the following stakeholders at each stage of the modules development:

1) Street Vendors
2) Mission for Elimination of Poverty in Municipal Areas (MEPMA)

For faster implementation of this Scheme and to enrol maximum number of Street Vendors, CGG developed an e-Governance (Web & Mobile) solution called "Telangana Pattana Pragathi – Survey of Street Vendors" within 1 weeks' time with all the approvals.

Mobile app allows enumerators to capture Vendor and Vending Photographs from the field location to ensure transparency in registration of the street vendors and to avoid misuse of the scheme. Using the data submitted by the enumerators, approval authority will generate ID card and Street Vending certificate. This data is regularly submitted to PM SVANidhi. Street Vendor ID cards and vending certificates were issued using this system seamlessly allowing street vendors to apply for the loans under PM SVANidhi.

CGG team understood the existing processes (AS-IS), challenges, stakeholder concerns, street vendor registration process etc. through discussions. This helped in defining the requirements for the proposed e-Governance Solution (TO-BE) and identified areas of Process Re-engineering.

Required services were identified based on finalized TO-BE processes; Wireframes prototypes were designed and demonstrated to stakeholders for confirmation and to proceed with the Development of solution.

Identification of Key Issues

Some of the key problems identified by MEPMA are :

- The old system of survey with the paper-based formats would consume more time.
- Duplication of phone numbers and Aadhaar numbers.
- Delay and typographic errors in updating the vendor details.
- Issues in transparency and accountability.

- Unable to capture exact vending location.

Roll Out/Implementation Model

As a part of Software Development Life Cycle by following CMMI L3, ISO 9001:2015 & ISO27001:2013 quality standards, following stages were involved in project implementation:

- **Finalization of TO-BE processes** for Telangana Pattana Pragathi project after considering all the challenges and pain areas in the current process and firming up of functionalities required for e-Governance Solution
- **Development of prototypes**: Based on the finalised TO-BE processes, required services were identified; prototypes were designed and demonstrated to the stakeholders for confirmation.
- **Quality Assurance Testing & Audits**: Telangana Pattana Pragathi has undergone through thorough QA testing and audits at CGG level and thereafter its acceptance from MEPMA.
- **Implementation of the system**: Web and mobile based Telangana Pattana Pragathi application were developed and demonstrated to the enumerators and other relevant officials. Modifications or improvements were suggested which were addressed for the effective use of Pattana Pragathi App.

Process Flow of the Application

Telangana Pattana Pragathi is an e-Gov solution deployed by MEPMA, GoTS during the COVID pandemic to enrol the urban street vendors, their vending details and to ensure they get support benefits from GoI and GoTS, under Support to Urban Street Vendor (SUSV) Program.

App consist of a questionnaire with 22 fields, 2 photographs and list of family members details (multiple)

Enrolment of Urban Street Vendors across the state and issuance of Id card & vending certificate involves the following processes:

- **Street Vendor Enrollment**
    a. App consist of a questionnaire with 22 fields, 2 photographs and list of family members details (multiple)
    b. Officer needs to collect all the fields mentioned mandatory in the following categories of the survey form
        - ULB Details
        - Vendor Details
        - Bank Account Details
        - Contact Details
        - Vending Details
        - Family Member(s) Details
    c. And capture applicant & vending activity photos in live and submit the form
    d. One Aadhaar number is allowed only once for enrollment
- **Municipal Commissioner Approval**
    a. Using the data submitted by the enumerators, approval authority will generate ID card and Street Vending certificate
    b. This data is regularly submitted to PM SVANidhi.
- **Issuance of ID Card & Vending Certificate**
    a. Identity Card and Vending Certificate are issued in 1-2 days, which enabled more no. of street vendors to avail special micro credit loan under PM SVANidhi
    b. Monitor the enrolment activities of ULBs, through the Dashboard provided for officials

(For pictorial representation of the Process Flow of the Telangana Pattana Pragathi application, please refer to Figure 1 and Figure 2)

Figure 1: Telangana Pattana Pragathi – Enrolment Process flow

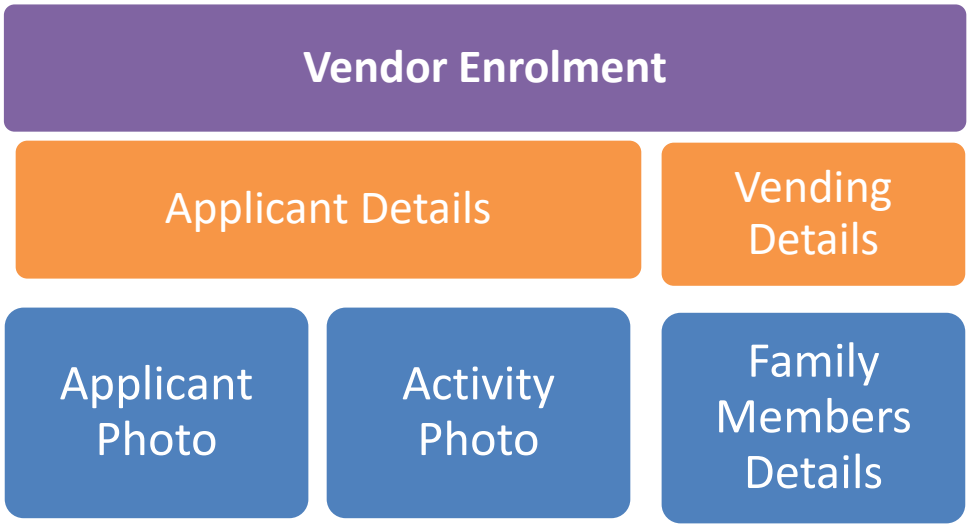
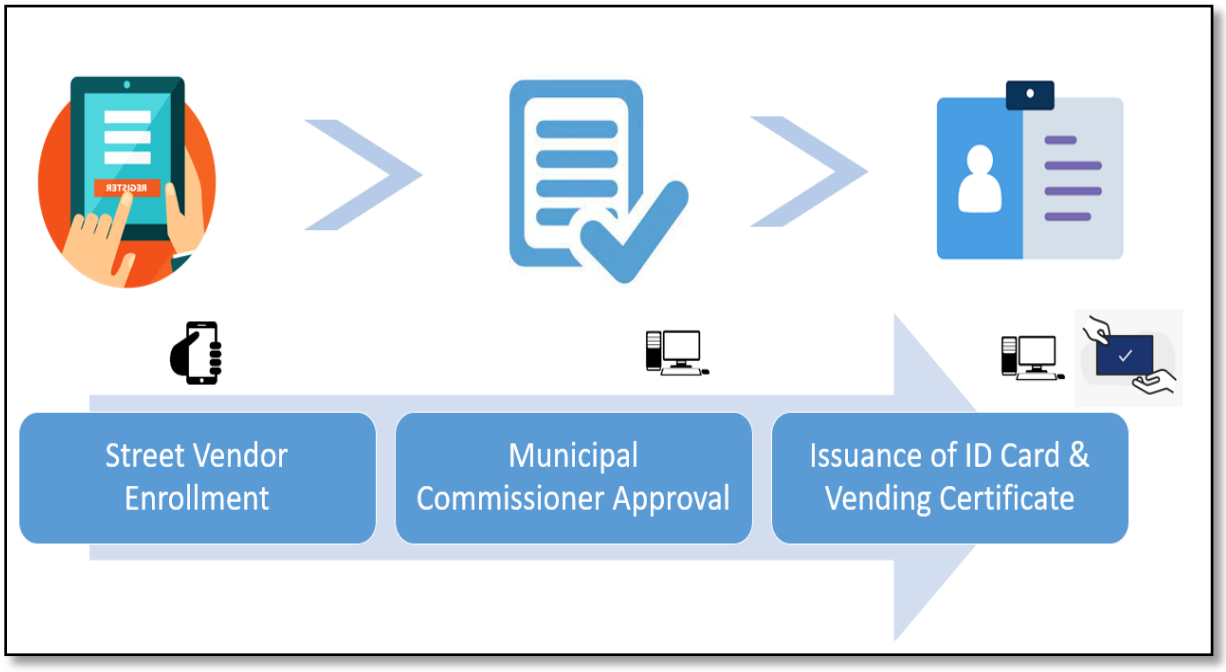


Figure 2 Telangana Pattana Pragathi – Easy 3-Steps Process



Feedback Mechanism

MEPMA and other stakeholders, including Street Vendors have given qualitative suggestions for the improvement of the e-Governance (web & mobile based) Solution. The mobile application is being used by approximately 5,600 users.

The Users have expressed that the Mobile application is very user friendly and there are no errors while uploading the data. There is also a provision of capturing the photograph of Street Vendor and Vending Unit in the mobile application. However, quality suggestions are provided on the following during the design & development of e-Governance (web & mobile based) Solution:

(i) To ensure user friendliness of mobile app for enumeration

(ii) To ensure user experiences while designing the UI

(iii) Efforts for ensuring uniqueness of the beneficiary

(iv) Effectiveness of the real time Dashboard

(v) Comprehensiveness of MIS Reports for efficient monitoring

Business Process Re-engineering

Earlier, the data used to be taken in physical survey format which took more time, possibility of losing survey formats and errors while uploading the data on the website. There was always a chance of losing or misplacing survey formats.

CGG team understood the existing processes (AS-IS), challenges and stakeholder concerns through discussions and meetings. This helped in identifying areas of process re-engineering and understand the requirements for the proposed Solution (TO-BE).

Situation Before Initiative	Situation After Initiative
• **Earlier there was a provision of manual enrolment of Street Vendor database and persuasion for constitution of Common Interest Group and promoting them top avail Group Loans** • **There were very less instances of Group loans availed by the Street Vendors as lot of hardships were involved** • **Only 83,666 Street Vendors were identified manually before the Covid-19 Pandemic**	• Digitisation of the Street Vendors enrolment has helped in speedy and timely registration, faster loan processing and loan disbursement to the genuine and needy Street Vendors • Overall significant rise in the Micro Credit extended to the street vendors • Nearly 6 Lakh Street Vendors identified through this application

Street vendors belonging to the informal economy, and often borrow from private lenders which charge them exorbitant rates of interest.	Upliftment of the beneficiaries as this loan charges below 12% rate of interest, and creates a credit score of the vendors, so that if they repay the loans on time, they can avail more.
The nationwide lockdown left daily wage workers and street vendors out of work.	The scheme aims at aiding the vendors in getting back on their feet financially. In the long term, it aims at establishing a credit score as well as creating a digital record of their socio-economic status, so that they can avail the Central government schemes later
Involvement of Middlemen and Likely Corruption	No involvement of Middlemen and no leeway for Corruption
No legal authorisation or rights for vending to the Street Vendors (informal Sector)	1. Formalises the Informal Sector including Street Vendors 2. Provides rights for Vending through legal ID and Vending Certificate
No financial security especially during crisis times such as Covid-19 Pandemic	Provides Financial Security resulting in upliftment

Result Achieved (End of Aug-2021)

No. of Street Vendors identified earlier through paper base survey from 24.02.2020 to 18.06.2020	**83,666**
No. of Street Vendors identified during Pattana Pragathi from 19.06.2020 through Mobile Application	5,18,852 (720.15% increase)
Cumulative no. of street Vendors identified	6,02,518 (4.12% of Urb. Pop)

Financial Savings

Followings are the financial benefits to the vendors after enrolling through "Pattana Pragathi App":

- Rs. 200.52 Cr. of Interest saving per annum to SVs for taking loans from PM SVANidhi, instead of private money lenders at higher interest rate
- Rs. 1.61 Cr. of interest subsidy availed by SVs for prompt repayment of loans
- 2,97,415 SVs are accepting digital payments and availed incentive of Rs. 19.11 Lakhs towards meeting the monthly targets of Digital Transactions

- Free vaccination completed to all **6 lakhs** SVs in 10 days as they fall under high-risk category
- Reduced man-power needs of the department in identifying, locating, and transacting with vendors as the updated details are available in App

Improvement in Efficiency/Productivity/Reduction in Waiting Time

This initiative helped in conducting survey in contactless mode during the pandemic strictly following the Lockdown guidelines. Mobile app enabled the Street vendor to enroll and apply for the required financial support to overcome the financial crisis during and after lockdown.

Street Vendor ID cards and vending certificates were issued in 1-2 days. The use of this system seamlessly allowed street vendors to apply for the loans under PM SVANidhi.

Scalability and Replicability

Telangana Pattana Pragathi application has been designed and developed on the latest Technology Platforms with scalability to ensure the Standardized enrolment process. Rolled out in all 141 ULBs of Telangana State, it can be extended to newly formed ULBs in future, and with minimal customization can be replicated for other state/central schemes.

The application leverages innovations in technology and processes such as AIML, Data Analytics GIS, and Latest Security features, DevOps etc. for continuously improving user experience thereby making it easily scalable and replicable.

Further, the application can be replicated across all states in the country and can be integrated with all the line department schemes for value addition and other entitlements. Mo Electronics & IT, GoI, and MoHUA, GoI can consider for Replication under Rapid Replication Drive in all ULBs.

The application is developed in open-source Java based technologies (for web app) and Android (for Mobile app); database is built on PostgreSQL Server, making it easily configurable and compatible with other technology platforms

Simplification of Procedure

Telangana Pattana Pragathi is an e-Governance Web & Mobile based application, providing solution for increasing the coverage of Urban Street Vendor for financial security through PM SVANidhi scheme in Telangana State.

The web application covers all **141 Urban Local bodies and 3,618 wards** in Telangana

Telangana Pattana Pragathi has improved the following aspects:

- Both e-Governance and m-Governance solutions were delivered by CGG in a record 7 days' time by following the guidelines of Digital India ie., Cashless, Paperless and Contactless.
- Enumerators from ULBs registered street vendors through the mobile application (android) and generated "Street Vendor Identification Cards (SVID) and Vending Certificate (VC) online.
- The app is highly useful for capturing real time data at the place of the business of the street vendor along with the vending activity capturing facility ensuring rightful beneficiary enrolment.
- Reports on vending type, Geographical areas etc are generated for its analysis by MEPMA and other stakeholders.
- Web based portal with real time Dashboards & MIS reports have provided decision support system on type of vending, Geographical area etc. for its quick analysis, data and timely decision making by MEPMA and MAUD, Govt. of Telangana.

Adaptability

- Prior to this Mobile app, the data was taken in physical survey format which took more time, with possibilities of losing survey formats and errors while uploading the data in the website. There was always a chance of losing or misplacing survey formats.

- The Users have expressed that the Mobile application is very user friendly and also there are no errors while uploading the data and with adequate training and guidance, the enumerators have adapted to this e-Governance Application.
- The application can be quickly adapted to the various enhancements required in the enrolment process and issuing Id cards and vending certificates; technology upgradations; and regulatory environment.

Sustainability

Telangana Pattana Pragathi application was developed by Centre for Good Governance, organization of GoTS within 7 days to standardize the enrolment process.

This service has enabled Commissioner to monitor and track the enrolment of Street Vendors based on real time reports in Dashboards based on Single Source of Truth. Also, enabled the officers to use the system for giving speedy approvals for the enrolment of Street Vendors for the generation of ID and Vending Certificate immediately.

The system is designed and developed in the latest Technology Platforms and has followed waterfall methodology applied for the development of e-Gov Solution (web & mobile based) and DevOps implementation for all deployments.

Lessons Learnt

- Digitization is the way forward – Post introduction of Pattana Pragathi App, Telangana witnessed six fold increase in enrolment of vendors.
- Adoption of Mobile app has maximized the outreach of government enabling them to reach out to the Street Vendors at their place of work causing them zero inconvenience; prior to this, SVs would have to visit government offices multiple times for availing services. It caused them loss of daily wages
- Leveraging MIS and Data Analytics for monitoring by User Department officials has helped in improving operational efficiency of Telangana Pattana Pragathi App.

- CGG being a process driven organisation and adhering to processes including ISO 9001:2015, CMMi L3 and ISO 27001:2013/DevOps /Security Audits through CERT-IN / GTGW helped in achieving the timely goals of the Project.

Response of the stakeholders

Street Vendor

- Dring lockdown, my vegetables business was completely shut down and my family had to survive on our past savings and other govt. schemes. ₹10,000 working capital loan under PM SVANidhi helped me restart my business.
- I got this loan easily as my name was enrolled under Pattana Pragathi App. Now, my business is doing fine and I am very happy with the government.

Street Vendor

- I was able to restart my footwear selling business once the lockdown was relaxed because of ₹10,000 financial assistance provided under PMSVANidhi scheme. Govt. officials approached me for enrolling under Pattana Pragathi and informed me of the benefits.
- I have already reapid this loan and I am now eligible for ₹20,000 which I plan to use for expanding my business.

Street Vendor

- TS Pattana Pragathi app enrollment was very convenient. Dept. officials came to my shop, took my basic details including Aadhaar number and I was given an official vending ID and Vending Certificate. They also assisted me in opening a bank account and I am also accepting payments through UPI
- Now, I have proper authorization for my fruits shop and no one can make objections.

Street Vendor

- I received ₹10,000 last year under PM SVANidhi last year and was able to quickly restart my tea selling shop after the lockdown was lifted.

Photo Gallery

Distribution of PMSVANidhi Loans to SVs by Hon'ble Minister, MA&UD, IT, IT, Ind&C, GoTS

Street Vending Zone developed under Pattana Pragathi Program in Bhongir, ULB

Visit of Chief Secretary, GoTS to Mehdipatnam Rythu Bazar Area, Hyderabad

Digital Onboarding of Street Vendors by issue of UPI IDs / QR Codes and training on digital transactions

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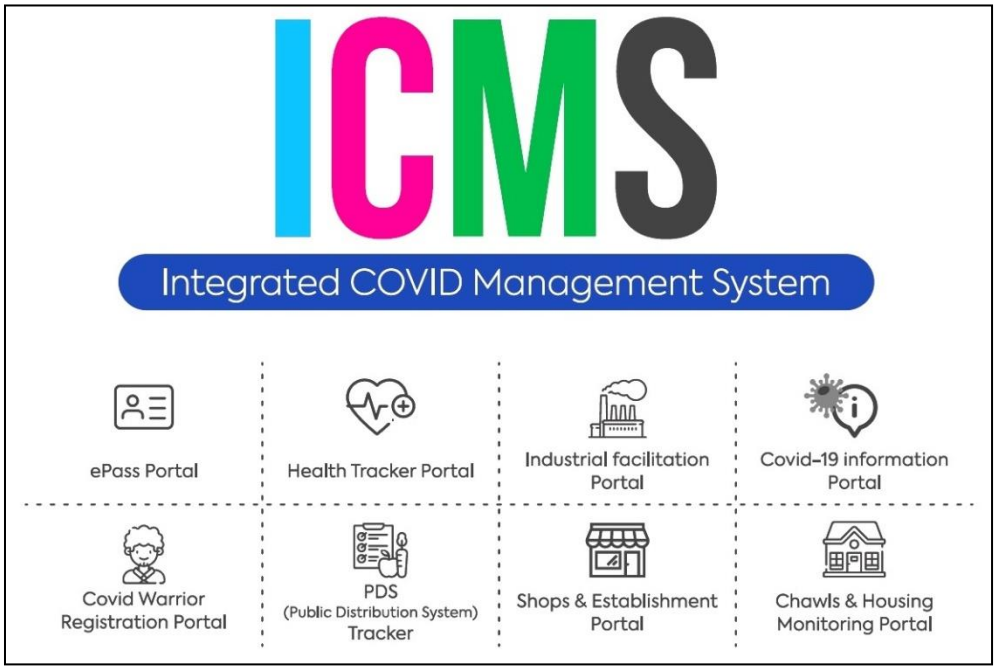
2. Integrated Covid Management System (ICMS): UT Administration of Dadra & Nagar Haveli and Daman & Diu Initiative



About ICMS

ICMS (Integrated Covid Management System) was designed as an integrated system to provide assistance in COVID-19 management through ICT to the UT Administration of Dadra & Nagar Haveli and Daman & Diu. **ICMS consist of 8 different portals/webpages for facilitation and monitoring of various citizen centric services and amenities during COVID-19.**

Due to this system, UT Administration of Dadra & Nagar Haveli and Daman & Diu remained COVID-free till 1st June 2020 despite being situated between 2 seriously COVID-19 affected states of Maharashtra and Gujarat.

Around 7.28 lakhs people were covered / facilitated through this System in fight against COVID-19.

Mortality rate of the UT has been the lowest (about 0.04% till August 2021) in the country due to use of this system along-with other measures (taking appropriate measures based on the inputs received through different modules).

WHY ICMS WAS REQUIRED ?	WHO WERE THE BENEFICIERIES	WHAT WE ACHIEVED THROUGH ICMS ?
• **Co-ordinated efforts towards Prevention of COVID-19** • **Covering Target Groups in a safe way** • **Database Creation (Future Purpose)** • **Monitoring of Activities on daily basis & Essential Services** • **Tracking Ground Reality**	Industries, Labourers, Industrial Workers, PDS beneficiaries, Shop owners, COVID Warriors……Overall Age Groups & All Citizens	By using the ICMS, we achieved the lowest mortality rate till date, reduced the spread of pandemic and we could also be able to have an updated data collection which can be utilized in future policy making in health and other sectors.

Challenges and Situation During Covid-19

COVID-19 brought peculiar situations and challenges before Administration. First and foremost was to tackle the chaos prevalent in all departments due to pandemic. All the services needed to be provided online and on time as much as possible, and there should be monitoring of services to be provided to different target groups. UT being a industrial region is having around 2 lacs of migrant labour population and during pandemic crucial industries (pharmaceuticals, medicinal products etc.) also needed to keep up their production with all the precautions.

Besides it there was need to create a data bank of all the details for continuous monitoring and updation regarding the situation:

- Due to lockdown during the COVID period and fight against pandemic, the UT Administration felt the requirement to control the movement of people across the UT and at every entry/exit.
- Even during the total lockdown, the essential services / industries / offices were to be operational.
- Administration also felt the requirement to capture the real time health parameters of such entrants for various decisions like quarantine and permission to move, etc.
- Administration also decided to disseminate COVID related information/ activities / guidelines etc, to the public.

Hence IT department initiated the task on war footing under these circumstances. NIC was entrusted to develop the required online systems / facilitation portals of Integrated COVID Management System (ICMS).

Objectives & Strategy

8 portals launched under ICMS were designed to cater to the specific population group (e.g. labourers working in factories, public entering UT, foodgrain subsidy beneficiaries, etc) which were mostly affected by the pandemic. For every target group of population (which almost includes all age groups within UT) we developed a portal to cater to specific service. Primary objectives of these 8 ICMS's portals / webpages were as follows -

(1) ePass - Provide the access control mechanism for the entry in UT, which has to be implemented at all the entry points of the UT and to be monitored by various authorities,

(2) Industrial Facilitation Portal - Provide access control to industries and its employees & provide the data collection for daily monitoring of the health environment of all the industries,

(3) Health Tracker Portal - Provide the data collection system to capture health parameters of the entrants and to assist in the Quarantine Management,

(4) Covid-19 Information Portal - To provide a portal to disseminate the COVID-19 related information.

(5) PDS Tracker - To provide a portal to capture the PDS distribution data at FPS level and monitoring at Secretary Level.

(6) COVID Warrior Registration Portal - To provide a portal where volunteers can register themselves.

(7) Shop & Establishment - To provide details regarding all kinds of shops / establishments within UT & provide details of services (Pharmacy, General Stores, etc.) by them.

(8) Chawl & Housing Portal - To provide information regarding migrant labourers / population residing in UT & keep track of their health details and also monitor the housing amenities (e.g. Sanitation, Toilet facility, Drinking water facility, etc.)

e-Pass **(April 2020)***	**Health Tracker** **(April 2020)***	**Industrial Facilitation** **(April 2020)***	**Covid-19 Information Portal** **(March 2020)***
Covid Warrior Registration (April 2020)*	**PDS Tracker** (April 2020)*	**Shops & Establishment** **(May 2020)***	**Chawls & Housing Monitoring** (May 2020)*

*Launch Month

Due to the use of ICMS, UT Administration was able to reduce the cases of COVID by taking appropriate measures based on the inputs received through different modules / portals and plan the strategy for effective & target specific planning of preventive measures. Further, these databases provided a mechanism to facilitate delivery of services and benefit under government schemes to the beneficiaries of all age group and all section of society.

	ePass Portal	Industrial facilitation Portal
Purpose	To provide access/ mechanism for entry / exit and movement within the UT (Green/Orange/Red Zone)	Issuance of movement passes to Industrial Workers. Capture the Health Parameters from Industries on daily basis.
Targeted Beneficiaries	All Citizens, All Age Groups	Industrial Labours and Management Employees
Beneficiary Count	~ 2,70,000	1,90,500 +
Outcome and Benefits	QR code equipped e-pass helped citizen for easy access. Administration's employees also benefitted	Bulk issuance of e-passes to workers made smooth movement and attendance of the industrial labour force. Daily data capture made easy monitoring of Health and hygiene of the Industries.

	Health Tracker Portal	Covid-19 information Portal
Purpose	To monitor flow of identified patients from checkpoint entry to discharge and post-discharge follow-up.	To provide a single point portal to disseminate all the information regarding COVID related activities to the citizens and to provide links of various modules.
Targeted Beneficiaries	Citizens. Health Authorities	All Age Groups , All citizens
Beneficiary Count	14,000 +	-
Outcome and Benefits	Due to constant monitoring of the entrants for possible COVID patient, the contamination of the COVID was very minimum.	All the information regarding the COVID pandemic including the steps taken by the UT Administration to fight against pandemic were available on portal.

	PDS (Public Distribution System) Tracker	Covid Warrior Registration Portal
Purpose	To provide a mechanism to capture the PDS distribution data at field level and monitor it	To provide a portal where anybody, who wish to work as a volunteer
Targeted Beneficiaries	Beneficiaries covered under National Food Security Act 2013	All Age Groups , All citizens
Beneficiary Count	114 Shops, 2,86,447 beneficiaries of 65,236 Ration cards	1,300+
Outcome and Benefits	Constant monitoring of the PDS distribution and PMGKAY Distribution, Updation of Database and identification of ineligible beneficiaries	The portal provided an easy way to the citizens to register as a volunteer and contribute themselves against the COVID pandemic.

	Shops & Establishment Portal	Chawls & Housing Monitoring Portal
Purpose	To capture details about all shops in the UT, their business, employee and hygiene details.	To capture details about all chawls in the UT, their safety and hygienic condition, amenities provided to tenants
Targeted Beneficiaries	Shop keepers	Chawl Owners and tenants
Beneficiary Count	5,900+	2,400+ chawls, 34,500+ tenants
Outcome and Benefits	The collection of shop's - general, hygienic and safety condition data which helped to reduce the spread of disease and provided the information of various supply availability.	Data of health and sanitary condition of the chawls, its safety parameters, cleanliness parameter, hygienic condition parameters captures and accordingly, teams were deployed to clean and sanitize the chawls. Thus reducing the chances of COVID spread.

Impact / Benefits Achieved

1. About 7.28 Lakh people were benefitted, which is about 125% of the UT population (Census 2011).

2. Due to the System, the UT was COVID free upto 1st June 2020. It's continuous use and monitoring alongwith other measures the UT kept COVID cases very low.

3. The mortality rate was 0.059% which was the lowest mortality rate (March 2021). The ICMS contributed a lot to achieve this.

4. Data captured using various modules like Health Tracker, Shops, Chawls etc, UT Administration made useful decisions to prevent the spread of the pandemic and reduced the number of cases and achieved the lowest mortality rate.

5. The Online e-Pass for Citizens proved a very useful tool for the citizens and other persons engaged in essential services. The QR coding and online verification reduced the chances of fraudulent incidents.

6. Bulk e-Passes to Industrial workers assured the availability of workers to the companies, which were required to run during lock-downs and COVID period. The details about the native place of workers were used in identifying the workers moving to their native and the transportation of those were made.

7. The Heath Tracker module helped to detect the possible COVID suspect at the checkpost itself sending him/her to quarantine centre, and then tracking up to the discharge.

8. The information portal provided a single point source of information and links to different modules and proved a handy tool to the citizens and other stake holders who required various information. It helped to citizens to prevent ignorance to the information.

9. The constant and real-time monitoring on public distribution of food-grains and other items under regular PDS, additional distribution assured that the supply reaches to real beneficiary and prevent the leakages. Also provided the true situation of food-grain stock.

10. General citizens, particularly students were very keen to provide their services and contribute in fighting against COVID, but did not know as to how to do it. The Volunteer Registration portal was a great help for those who turned up for help and provide services.

11. The cleanliness drives, sanitization programmes were getting good and proper inputs from the Shops and Chawls data capturing system enabling the teams to target the required area.

Beneficiaries & Further Use

Service	Beneficiaries
ePass for Citizens	**2,68,875**
ePass for Industrial Employees	**1,90,595**
Industrial Employee Details	**1,53,659**
Volunteers Registration	**1,309**
PDS	**2,86,447 ppls (65,236 ration cards)**
Shops	**5,902**
Chawls	**2,388 chawls (34,585 Tenants)**
Health Tracker	**14,068**
Total Beneficiaries	**7,28,000+ Beneficiaries**

FURTHER USE OF ICMS

1. **The portal has captured a good amount of the data related to Industries, Industrial Workers, Shops, Chawls etc.**
2. **These Data were utilized in identifying the needy beneficiaries under different schemes and formulating policies , e.g.**

Labour	Food Supplies	Health	Planning & Statistics	Social Security Schemes	Town Planning
•Labour Age Groups •Native places	• One Nation One ration Card • Weeding our of ineligible Beneficiaries (4974 Cards till date)	•Vaccination Drive Data •Developing systems during 2nd wave	Updated database after Census 2011 and SECC 2013	•PMGKAY • PMSBY •PMJJBY •NFSA PDS, etc.	•Chawl conditions •Sanitation, Drinking Water etc. • Policy Making

Total population of the UT, as per 2011 census, is 5,85,764. The services disseminated to the beneficiaries are about 7,28,000+. About 125% (which includes outsiders and migrating peoples) of the population is covered. The UT Administration had taken steps to avoid the entry of COVID cases in the UT.

The ICMS has also played a key role and due to these steps, Administration was able to keep the COVID away for about 82 days (till 1st June 2020) after the lockdown. Even then, the cases were minimal.

OFFICE OF THE COLLECTOR - DAMAN
U.T. ADMINISTRATION OF
DADRA AND NAGAR HAVELI & DAMAN AND DIU
Government of India

Daily Entry & Exit ePass

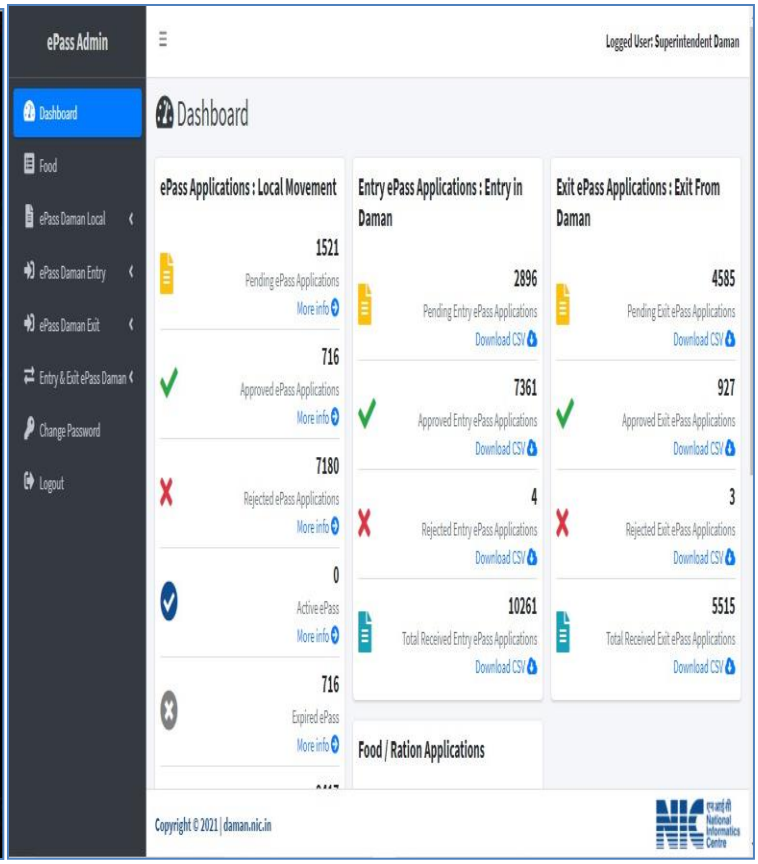
EE242927

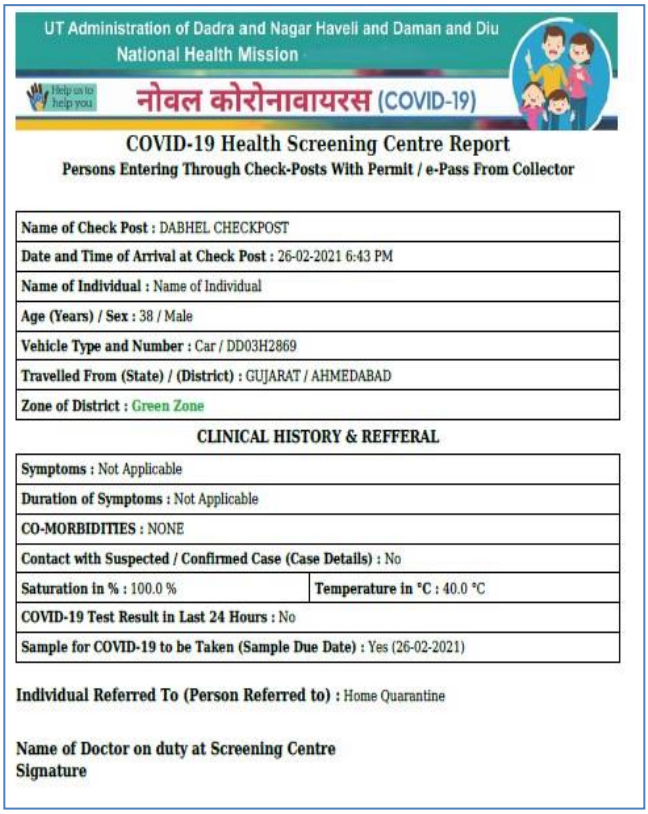
ePass Number
EE242927
Approved Time
26-02-2021 17:36:11

Verify ePass at : https://daman.nic.in/verify

Name : Nitin Bamania
Vehicle Type :On Foot
Vehicle No :
Driver Name : -
Total Number of Other Member Travelling : 0
Name of Other Member Travelling with ePass Holder : -
Travel From State : GUJARAT
Travel From District : AHMEDABAD
Travel From (From Address) : Travel From Address
Travel To State : DAMAN AND DIU
Travel To District : DAMAN
Travel To (Destination Address) : Travel To Destination Address
Journey Route : VIA DABHEL CHECKPOST

Use of Aarogya Setu App is Mandatory For Every ePass Holder





UT Administration of Dadra and Nagar Haveli and Daman and Diu
National Health Mission

नोवल कोरोनावायरस (COVID-19)

COVID-19 Health Screening Centre Report

Persons Entering Through Check-Posts With Permit / e-Pass From Collector

Name of Check Post : DABHEL CHECKPOST
Date and Time of Arrival at Check Post : 26-02-2021 6:43 PM
Name of Individual : Name of Individual
Age (Years) / Sex : 38 / Male
Vehicle Type and Number : Car / DD03H2869
Travelled From (State) / (District) : GUJARAT / AHMEDABAD
Zone of District : Green Zone

CLINICAL HISTORY & REFFERAL

Symptoms : Not Applicable	
Duration of Symptoms : Not Applicable	
CO-MORBIDITIES : NONE	
Contact with Suspected / Confirmed Case (Case Details) : No	
Saturation in % : 100.0 %	**Temperature in °C :** 40.0 °C
COVID-19 Test Result in Last 24 Hours : No	
Sample for COVID-19 to be Taken (Sample Due Date) : Yes (26-02-2021)	

Individual Referred To (Person Referred to) : Home Quarantine

Name of Doctor on duty at Screening Centre
Signature

U.T. ADMINISTRATION OF
DADRA AND NAGAR HAVELI & DAMAN AND DIU
Government of India

सत्यमेव जयते

RECEIPT ONLY

VM001314

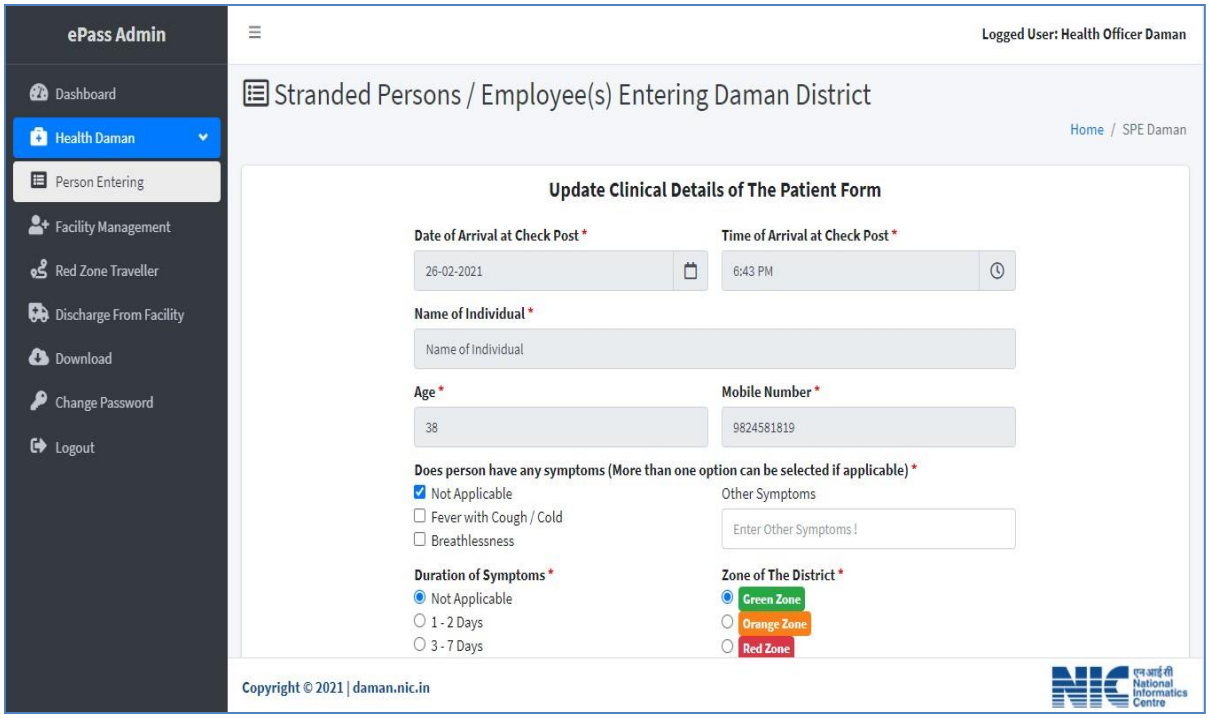
REGISTRATION REQUEST RECEIPT

https://daman.nic.in/volunteers

We have received your information !
We Thank You for your
Registration as a Volunteer.
Your Volunteer Registration
Request Number is : VM001314
We will contact you !

https://daman.nic.in/covid19

National Informatics Centre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Home / SPE Daman
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26-02-2021
Time of Arrival at Check Post *
6:43 PM
Name of Individual *
Name of Individual
Age *
38
Mobile Number *
9824581819
Does person have any symptoms (More than one option can be selected if applicable) *
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Fever with Cough / Cold
Breathlessness
Other Symptoms
Enter Other Symptoms !
Duration of Symptoms *
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3 - 7 Days
Zone of The District *
Green Zone
Orange Zone
Red Zone
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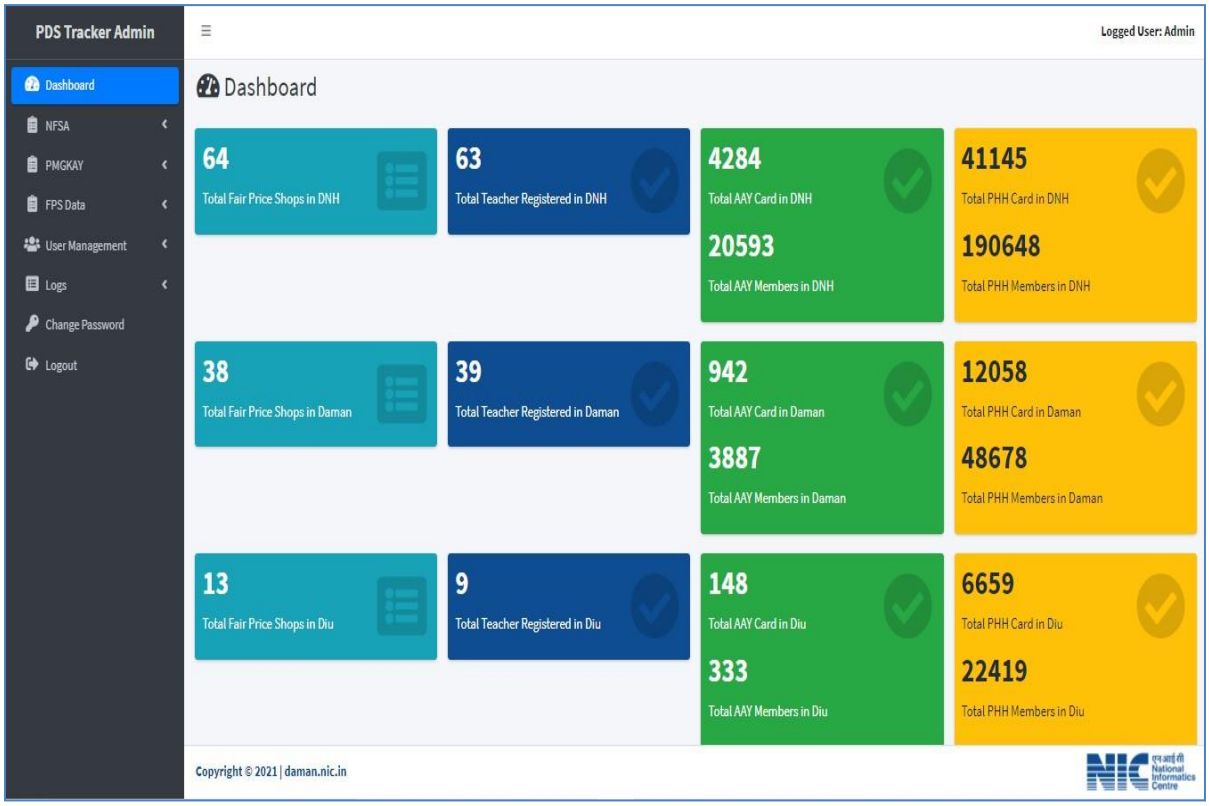
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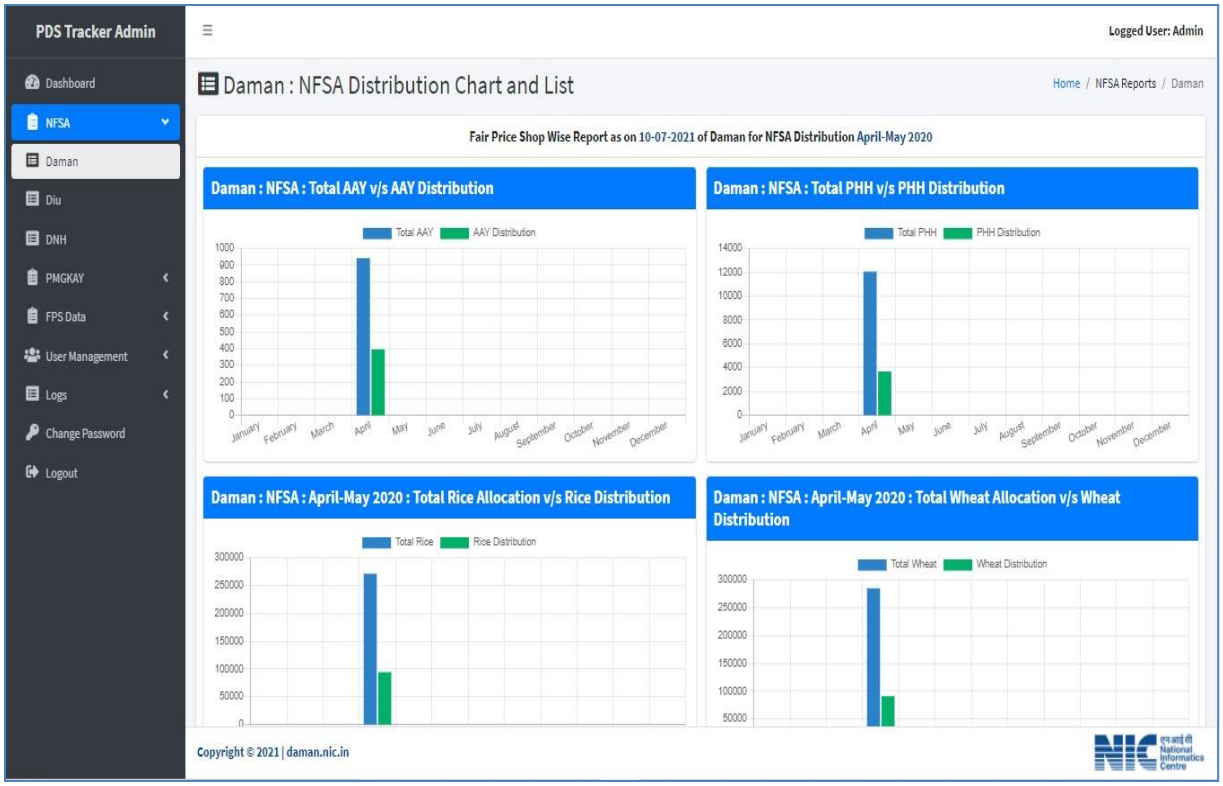

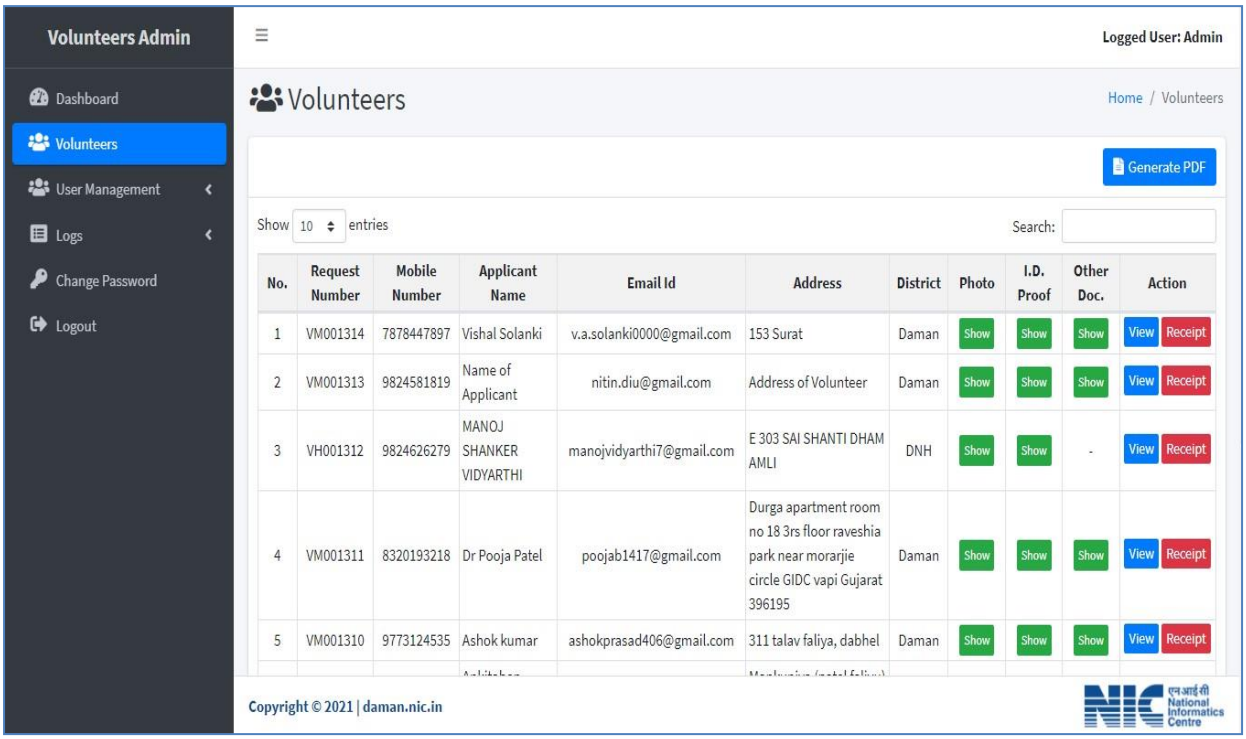

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2	VM001313	9824581819	Name of Applicant	nitin.diu@gmail.com	Address of Volunteer	Daman	Show	Show	Show	View Receipt
3	VH001312	9824626279	MANOJ SHANKER VIDYARTHI	manojvidyarthi7@gmail.com	E 303 SAI SHANTI DHAM AMLI	DNH	Show	Show	-	View Receipt
4	VM001311	8320193218	Dr Pooja Patel	poojab1417@gmail.com	Durga apartment room no 18 3rs floor raveshia park near morarjie circle GIDC vapi Gujarat 396195	Daman	Show	Show	Show	View Receipt
5	VM001310	9773124535	Ashok kumar	ashokprasad406@gmail.com	311 talav faliya, dabhel	Daman	Show	Show	Show	View Receipt

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3. Online Development Permission System, Gujarat

Introduction

Ease of Doing Business Project by World Bank provides objective measures of business regulations and their enforcement across 190 economies and selected cities at the subnational and regional level. India with overall rank 63 with score 71.0 is ranked 21st for dealing with Construction Permits with 78.7 score. The Ease of Doing Business (EoDB) index is a ranking system, established by the World Bank Group wherein the 'higher rankings' (a lower numerical value) indicate better, usually simpler, regulations for businesses and stronger protections of property rights. The Ease of Doing Business Score shows an economy's absolute position relative to the best regulatory performance, whereas the ease of doing business ranking is an indication of an economy's position relative to that of other economies. The indicators are from 11 areas of business regulation such as:

- Starting a Business
- Dealing with Construction Permits
- Getting Electricity
- Registering Property
- Getting Credit
- Protecting Minority Investors
- Paying Taxes
- Trading across Borders
- Enforcing Contracts
- Resolving Insolvency

The Government of Gujarat formally passed the Gujarat Single Window Clearance Act, 2017 to further streamline the ecosystem around Ease of Doing Business. The Act aims to expedite the processes for issuance of various licenses, clearances and certificates required for setting up a business and to provide an investor-friendly environment in the State. The Act has helped in increasing transparency, facilitate online applications and enhanced monitoring of applications., Construction permission plays as a stimulator in the in setup of an industry.

Government of Gujarat launched Online Development Permission System (ODPS 1.0) on Dt.01/07/2019 on e-Nagar portal and thereby all development permissions were made online throughout the state for urban areas (181 ULBs (Municipalities & Municipal Corporations) and Development authorities). The e-Nagar portal is developed by Urban Development and Urban

Housing Department to facilitate all urban services (e.g. Development Permission, Building Use Permission, Water Connection, Property Tax Payment, Hall Booking, Birth/Death Certificate, Marriage Registration etc.) through single platform statewide. On dt.03/12/2020, more enhanced version of Online Development Permission System (ODPS 2.0) was launched. Total xx development permission proposals are sanctioned since Dt.03/12/2020.

Objective of the ODPS:

- To improve the quality of Service Delivery system and offer Development Permission services with optimal effectiveness and transparency in a time bound manner. Re-engineer internal processes for better management, efficient and transparent revenue collection and informed decision making.
- To introduce automation and implementation of integrated framework for Development Permissions by leveraging Information and Communication Technology (ICT) with an aim to streamline, improve, integrate entire organizational workflow and support approval process of Development permission applications of Urban Local Bodies, Urban/Area Development Authorities across the State and ensures effective and faster service delivery to applicants.
- To provide automated scrutiny of proposals (CAD drawings/maps) in accordance with Comprehensive General Development Control Regulation (CGDCR) in turn to assist faster decision making to the government officials and service delivery to the end user.
- To provide centralized scrutiny engine for scrutiny of development proposals for entire urban area of the Gujarat State (Urban Local Bodies, Urban/Area Development Authorities across the state).
- To make available various No Objection Certificates (NOCs) at single interface by integrated framework with GIS (Geo graphical Information System) with other Government Departments e.g. Airport Authority of India, National Monument Authority of India, etc.

Situation before the ODPS

- Before ODPS, registered Engineer/Architects used to prepare Drawing/Map of development proposals in CAD format and were required to submit an application to respective Urban Local Body/Authorities along with the hard copies of required documents and Drawing/Map. Hence, below Bottlenecks/Challenges were being faced by both ULB/Authorities as well as Citizen/Architect/Engineers.
- On receipt of the application, ULB/Authorities used to give Challan of inward fees/Scrutiny Fees, which were to be paid offline at Civic Centers.
- Real time application tracking system was not available and hence, they had to visit ULB/Authorities to know status in the absence of online intimation or status tracking system.
- As Architect/Engineers had to submit the plans/drawing/documents physically, for authority it used to be a tedious job checking and doing the scrutiny as they had to do it manually by looking into physical sheet and maintaining record of it also. Also, they had to keep GDCR handy for verification and scrutiny of all aspect of development proposals. Hence, it used to take more manpower to just scrutinize the map/Drawing file. Moreover, once scrutiny is completed, they had to prepare all the scrutiny-related checklist (reports) manually which in turn used to take more manual efforts and were time consuming.
- After final decision is taken, user was either intimated to pay final fees in case development permission is granted or Refusal letter was issued.
- Final fees were to be paid offline at Civic Centre and after that physically Signed Development permission letter was issued to the end user.
- As mentioned above, before ODPS system, shortage of manpower, time to perform scrutiny, maintain precision, offline payments and accuracy were the main constraints to issue Development Permissions.
- It was time consuming to get the state level data of total numbers of applications processed/permissions granted and hence, it was impacting decision making/policy making at state level in the urban development area. To overcome above challenges and constraints, state government conceptualized Online Development Permission System (ODPS) project.

Challenges Faced

- Capacity Building of the staff at all the ULBs/Development Authorities to operate the system.
- Difficulty in adoption of the new system by some officials as well as stakeholders as it requires to learn latest technologies.
- Integration with other systems being adopted by Govt. of Gujarat.
- Modifications in the CGDCR requires instant changes / modifications in the ODPS scrutiny software, which in turn requires UAT efforts and constant monitoring of scrutiny of proposals after its deployment on production.
- 100% automation of Plan PDF composition is very difficult and it requires human intelligence to prepare presentable Plan PDF. As of now, resources at ODPS cell composes Plan PDF of pre-scrutiny pass applications centrally and system auto generates plan PDF of development proposals having built up area upto 125 sqmt.
- Challenges in maintaining the First-cum-First service in scrutiny of development proposals in pre-scrutiny module in cases of larger files which required more than 45 minutes time to perform scrutiny on server.

Strategy Adopted:

Details of baseline study

- Study has been carried out for existing systems and procedures, Departmental functional requirements, business processes and User requirements.
- The systems study has been carried out at the Head office, Zonal office and at the ULBs/Authorities for a comprehensive understanding of the system.
- Appropriate Business process re-engineering has been required to be performed in all aspects of the work.
- Analysis has been done to understand the roles/responsibilities of Citizen, Architect/Engineer and officials of ULBs/Authorities and accordingly process re-engineering has been realized for ODPS system.

- Each process has been divided in one or many sub-processes, having associated Primary and Secondary Actors to sub-processes. Each sub-process has been presented through a Use Case model (actor's communication with one or more use case).
- Based on study, it has been decided to use e-Nagar front end interface for registration, basic workflow, reporting, and user authentication system As e-Nagar platform is already providing other citizen centric services (eg. Marriage certificate, Property Tax, etc.)
- Analysis has been done to make the entire system/subsystem online/ web based centralized SSL secured scrutiny system, accessible for all the 181 ULB/Authorities and with a mechanism to maintain uniqueness of each ULB but operate on standardized procedures across the state.

Roll Out/Implementation Model

- Waterfall method has been followed in ODPS project life cycle which includes Functional/System Requirement Study, Gap Analysis, System Customization & Configuration, Development, Testing, Integration Testing, User Acceptance Test, User Training, Go Live and Warranty Support followed by Maintenance and Support.
- The Business Requirements Specification has been converted to Software Requirement Specifications; the Business Use Cases converted to system requirement specific use cases. Appropriate Business process re-engineering is performed in all aspects of the work.
- The programmers have used program specifications to customize their code. The program development team has ensured that every piece (individual units) of code is thoroughly tested.
- User Acceptance phase where Department has reviewed and tested the implemented functionality from an end to end perspective.

- Production Deployment and Go-live phase where the entire solution has been run and tested in an integrated mode with all features to ensure that all functionalities are integrated and working before going Live to the external audience.

Training & Awareness

Training sessions were arranged at various locations across the state. During training main focus was on:

- Architects/Engineers/Structure Engineers/Supervisors etc. were explained how to register themselves online as a Person on Record(POR) (as per CGCDCR, Architect on record(AOR), Engineer on Record(EOR), Structure Engineer on record(SEOR), Supervisor on Record(SOR) etc.)
- Architects/Engineers were given training to convert Development proposals made in AutoCAD in Pre-DCR format.
- Officials of Corporations and Authorities were given training to verify and analyze scrutiny reports generated by ODPS system and accordingly make the decisions on issuing development permissions.
- State Level Telephonic Helpdesk module and allocation of resources at local level to address and solve the issues/queries of officials as well as Architects/Engineers.
- CAD plan scrutiny based issues redressal mechanism is in place in order to resolve any queries/issues within stipulated time period.

- Regular follow-ups and feedback is received from Officials of Corporations and Authorities in meetings to ensure the smooth and flawless operation of ODPS.

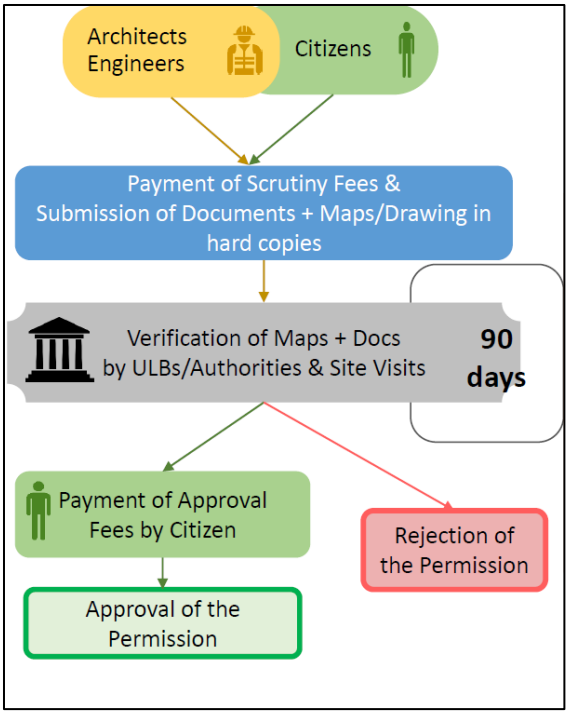
HelpDesk/ Feedback Mechanism

- In order to provide fast and permanent resolutions of the problems faced by Citizen/Architect or ULBs/Authorities, Helpdesk Grievance system has been implemented to identify the real time problems & the difficulties. Also logging of these issues is maintained so that it can be tracked for timely resolution of the issues.
- Also, telephonic feedback of beneficiaries is being taken periodically and it is reviewed by Hon. Chief Minister, Gujarat State through CM Dashboard. In addition to this, feedback of ULBs/authorities is taken in various review meetings arranged to ensure smooth and flawless operations of ODPS system.

Business Process re-engineering

Process Flow before ODPS

- POR (Architect/Engineer) used to prepare CAD plans and submits hard copies of plan, required documents and application form at ULB/Authority.
- Then ULB/Authorities used to give Challan of in-warded application, which was used by citizens to pay Scrutiny Fees offline at civic centers.
- Then, ULB/Authorities used to do scrutiny of submitted application (plans + documents) manually



- ULB/Authorities used to issue query if plans and documents not found appropriate. As, these queries were offline, Citizen had to submit complied documents and plan physically at ULBs/Authority.
- Once ULBs/Authority takes the decision to approve the application, they used to configure final fees manually. After that, they used to intimate citizen by letter to pay the final fees.
- Then citizen used to pay the fees at civic centers and used to present payment receipt at respective ULBs/Authorities to get the final Development Permission.
- Overall it used to take 60 to 90 days to get the Development Permission Letter.

Process Flow after ODPS

- POR (Engineer/Architect) applies for pre-scrutiny by submitting pre-DCR CAD Map/Drawing file using POR login along with appropriate information.
- Then Auto-DCR performs auto scrutiny and scrutiny status (PASS/FAIL), reports and planned PDF are generated and delivered.
- At present, 15 vital parameter based scrutiny is performed for all development proposals. Proposals are passed in pre scrutiny module only if all vital parameters are

found compliant with the prevailing development control regulations irrespective of compliance/non-compliance of non-vital parameter/s. Proposals are not failed on grounds of non-compliance of non-vital parameters and are displayed as "Alert" in the scrutiny report.

15 Vital Parameters
1. Margins 2. Parking 3. Height of the Building 4. Lift and Elevator 5. F.S.I. 6. Staircase 7. Ground Coverage 8. Common Plot 9. Access Road/ Approach Road 10. Open to Sky (OTS) 11. Set Back 12. Permissible Use with respect to zone and road width. 13. Minimum/Maximum Floor Height 14. Internal Road 15. Fire Regulations

- Citizen fetches PASS scrutiny results and submit the application by filling required details and uploading required documents from their login.
- Further, application goes to POR worklist for verification. POR can accept/reject the application. Application goes in ULBs/Authority's workflow once the POR accepts it. Then, citizen can pay the scrutiny fees online/offline and application is received at ULB/authority.
- Citizen gets a system generated Development Permission letter for development proposals of building height upto 15 meters and can commence construction work.
- ULBs/authorities verify received application (verification of documents, plans, Site Inspection (if required)) and Grant/Refuse the permission within 28 working days. During the verification ULBs/authorities can raise query against document/s if found inadequate in first 6 working days only.
- In any ULBs/Authorities across the state, approval levels are reduced to 3 levels with defined timeline for processing;

- L1 – Inward & distributor
    - L1 forwards an application to the concerned L2 within 2 working days.
    - L2 – Verifier & site inspector
    - L2 can raise document query (one time only) within 6 working days.
    - L2 can forward an application to L3 for drawing based rejection within 10 working days.
    - L2 can forward an application to L3 for site inspection based rejection within 20 working days.
    - L3 – Approver
    - L3 Approves/Rejects an application within 28 working days.

(working days are calculated from scrutiny fees payment date.)

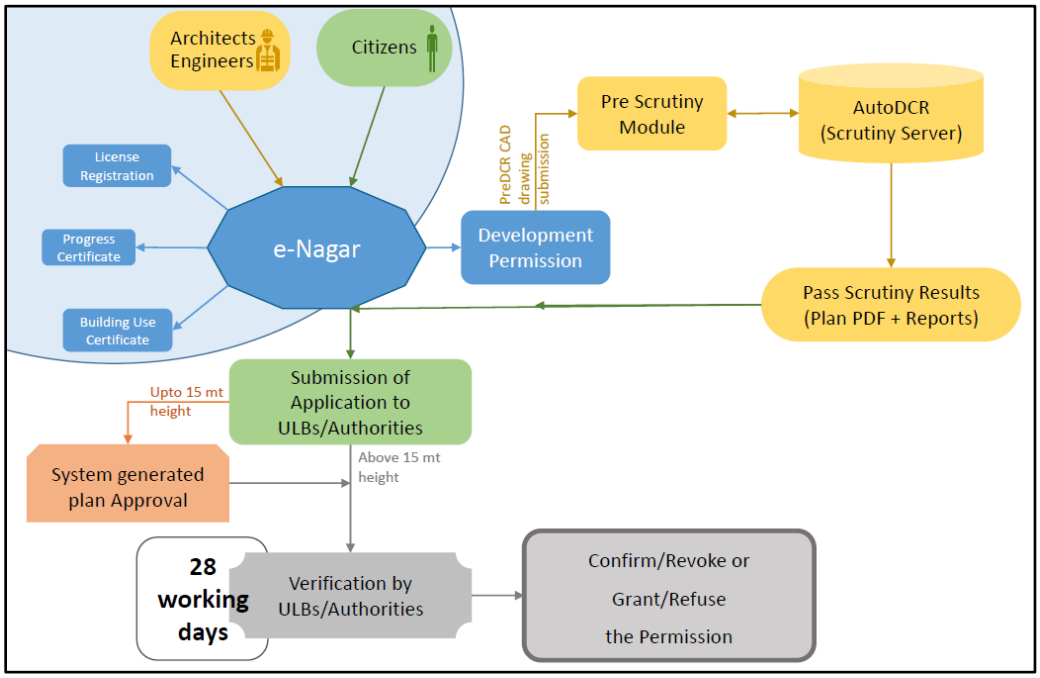


Figure 3 End to end workflow

- After 28 working days, ULBs/authorities cannot reject any application of Development Permission.
- Similarly, applicant has 14 days and 15 days respectively for document query compliance and approval fees payment.

- ULBs/authorities can revoke the system generated Development Permission (upto 15 meter building height) if any discrepancy is found in document (only if document query is raised), scrutinized plan or site inspection.
- If permission is granted, ULBs/authority configures the final fees, feeds Digital Signature and approves the application. Then, citizen can pay the final fees to get the digitally signed Development Permission letter.

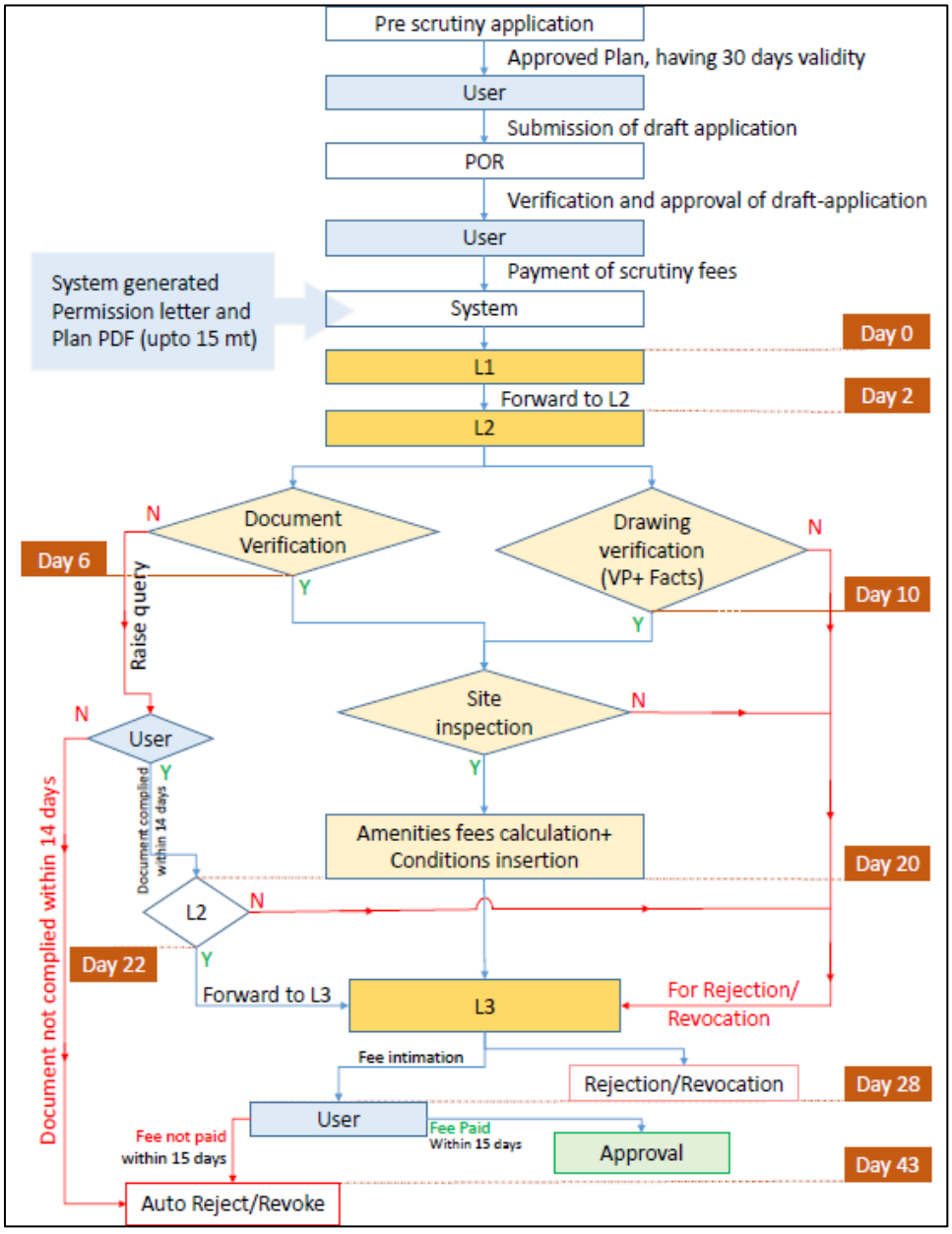


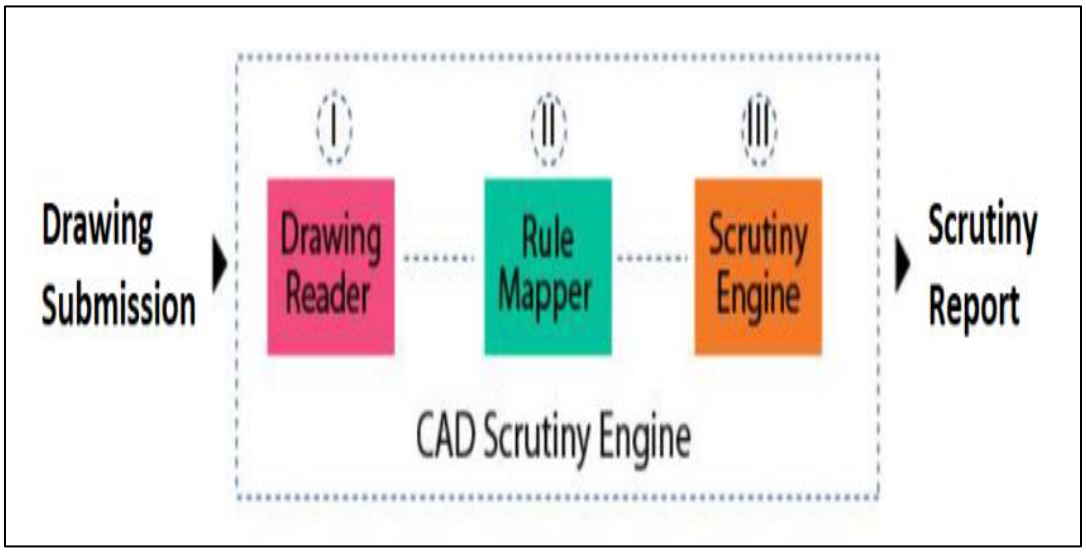
Figure 4 Process flow of ODPS

Removal of Non-Value Add Activities During Process Re-engineering in ODPS

- Hard copy of documents submission has been removed as application of proposal and document submission is online now.
- No touch point / Zero Contact with officials due to online system for scrutiny of the plans to get the development permission certificate which was required earlier in offline mode.
- Visit of civic centers have been removed as payment of fees can be done online.
- Redundant approval level and hierarchy has been removed.

New Value Added Activities during Process Re-engineering in ODPS

- Before ODPS, architect did not have the facility for basic pre-check tool for CAD drawing/Map. With ODPS system in place, Pre-DCR tool has been provided at free of cost which is used by architect to convert CAD map/drawing into Auto-DCR compatible format.
- Pre-Scrutiny module of ODPS facilitates multiple attempt of CAD map/drawing scrutiny at free of cost before submitting the application to the department. Hence, no need to pay scrutiny fees until application is in-warded to department. It also helps architect to correct his/her CAD map/drawing (in case of scrutiny fail case) by providing failed scrutiny reports and error indications.



- From scrutiny of CAD map/drawing perspective,
  - Auto Dimensioning
  - PDF Conversion
  - Auto Generation of Layers
  - Integration with approved layout parameters/zoning data
- GIS Integration with BISAG
- MIS (Management Information System) came in place.
- SMS-mail based notifications are sent to Citizen/Architect for various events that have taken place during the process of Building Permission application.
- Help-desk setup is in place so that citizen/architect can get the resolution of any query related to development permission application.

Re-engineering in Development Control Rules and Policies

- There are 127 Constituted/Designated Development Authorities, 8 Municipal Corporations, 46 Municipalities, Industrial Development Corporations, Gandhidham Development Authority under the various ACTs of GoG, functioning across the State and issuing Development Permissions.
- Before ODPS, there were total 127 different regulations in place to give development permission. Government of Gujarat notified Comprehensive General Development Control Regulations-2017, applicable to all above development authorities, corporations, municipalities and Industrial Development Corporations. Hence there is a Single Rule Book (CGDCR) for entire state leading to ease in designing of ODPS.
- The various procedures practiced by individual authorities were streamlined and single procedure for development permission was enacted.
- Earlier Person on Record (POR) was required to obtain separate registration license for practicing in each authority. Now as per CGDCR, if a POR is registered in any of the Municipal Corporation and /or its respective Development Authority can practice in the entire state.
- Scrutiny fees, POR registration fees and amenities fees are regularized for the entire state.

- Common application form (earlier separate forms were available for different ULBs/Authorities) is applicable to the entire State.

Results Achieved:

- Total 19384 applications were processed in ODPS 1.0 phase (Dt.01/07/2019 to Dt.02/12/2020) and 36248 applications were processed in ODPS 2.0 phase (Dt.03/12/2020 to Dt.30/09/2021).

Duration	Total Application	Approved	Rejected	Pending
ODPS 1.0 ***(Dt.01/07/2019 to Dt.02/12/2020)***	19384	17319	2065	-
ODPS 2.0 ***(Dt.03/12/2020 to Dt.30/09/2021)***	36248	27205	7934	1109

- During ODPS 2.0, out of 27205 issued development permissions, 'Use wise' issued Development Permissions are as follows;

Building Use	Numbers of Development Permissions issued
Residential	25281
Commercial	556
Industrial	1264
Others (Assembly, Public Utility/Institutional)	104

- In ODPS 2.0, out of 27205 issued development permissions, Permission Type wise counts of issued Development Permissions are as follows;

Type of Permission	Numbers of Development Permissions issued
Amalgamation	1758
Amalgamation with Existing Building	22
Development Permission	20766
Development permission for Residential Affordable Housing (RAH)	10
Layout Development	1012
Plotting Layout with Development	20
SubDivision	3553
SubDivision with Existing Building	85

- In ODPS 2.0, out of 27205 issued development permissions, height wise counts of issued Development Permissions are as follows;

Building Height	Numbers of Development Permissions issued
Low rise (upto 15.00 meters)	27105
High rise (above 15.00 meters)	100

Situation after the ODPS

In ODPS, Engineer/Architects prepares CAD Drawing/Map of development proposals in PreDCR format using PreDCR tool, by which they can prepare more accurate Map/Drawing file and can submit to ODPS system for pre-scrutiny without visiting respective ULB/Authorities.

- As in ODPS, scrutiny of submitted Map/Drawing file is carried out automatically by Auto-DCR module, no manual intervention is required to do the same. This has improved scrutiny results from accuracy point of view. Time taken to complete the scrutiny is decreased considerably due to the use of ODPS system. Also scrutiny reports are being prepared by the system itself and delivered to respective architect.
- Now, users are having privilege of making all payments online as well as offline depending on their convenience.

- Application tracking came in place so that Citizen-Architect can get to know the status of submitted application without visiting respective ULBs/Authority.
- After final decision is taken, applicant is intimated via mail/SMS to pay final fees if permission is granted or intimated about refusal of the permission.
- If permission is granted, applicant gets digitally signed permission letter on payment of approval fees.
- As mentioned above, after ODPS system, Manpower, Time to perform scrutiny, maintain precision, online payments and accuracy are the major improvements from Development Permission perspective.
- As MIS reports are easily available now, decision making/policy making has become easy and effective for betterment of Development permission system.

Financial Savings:

- Efficient processing and monitoring at ULB level as applications are in-warded and transferred by online mode.
- Timely processing of development permission applications minimizes delay in the commencement of construction projects and helps in avoiding increase overall project cost.
- Users are no more required to visit in person at ULB/Authority hence reduction in travel, savings in fuel cost, human hours.
- On an average, minimum 30 (approx.) A4 size pages are required per application in an offline mode. However, it can be much more than that in several applications depending on the land and the scale of the development project.
- Therefore, 16.68 lacks A4 pages are saved till date considering total count of 55632 applications in ODPS.

Improvement in Efficiency/ Productivity/ Reduction in Waiting Time

- It became easy to track record in the process applications which, in turn, resulted in efficient processing, monitoring and informed decision making.

- System generated notifications and user friendly user interface increased productivity as officials can know status of the pendency as well as remaining days to act in the application.
- Fixed time limits for each activity resulted in assured processing of Development permission applications within 28 working days' time limit.

Scalability, Adaptability & Sustainability

The system is developed in such a manner that any new ULB/Authority, whenever constituted or any addition/change in the administrative jurisdiction area of any ULB/Authority can be accommodated in the ODPS.

- Scrutiny engine (AutoDCR) can be updated at any point of time whenever any rule is added or amended in the prevailing CGDCR.
- ODPS application is developed in a way that it can accommodate future changes, amendments in development control rules and other government policies can also be incorporated in the ODPS system.

Simplification of the procedure

- Document query is reduced to single time compared before.
- Fees payments are made online which are convenient to track and record compared to offline challan and payment receipts before.
- Approval levels are also simplified and reduced to maximum 3 levels compared to 6 to 7 levels before.

Lessons Learnt

- Use of technology can reduce human intervention and help in faster, better and accurate decision making.
- We have observed that earlier applicants had to pay the fees to scrutinize the development proposals and inward an application. In this scenario, it was time consuming and tedious as users had to resubmit CAD files in failed scrutiny cases. Hence, pre scrutiny module was developed to address this issue.

- Earlier there was no definite time limit to process the applications at ULB/Authority as well as User side, there were chances of deliberate delay in processing the applications. To address this, defined time limit is fixed for each activity in application process flow.

Replicability and Response of the Stakeholders

- Any ULB/Development Authority of other states of India can directly implement the same project with appropriate changes and modifications in the scrutiny engine as per their prevailing development control rules while keeping the project framework intact.
- Feedback is received through e-Nagar website and CM dashboard (which is also monitored and reviewed by Hon. Chief Minister, Gujarat State).

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4. The eASE-App: (Electronic Authority Services Enabling Application): Uttrakhand

In the modern world of digital governance use of information technology is in vogue in every aspect of human life. It has prominently impacted the services availed by citizens specially from government departments. Every citizen has faced challenges while availing any type of service related to any government department or functionaries. The department of Housing, Government of Uttarakhand took an initiative in line with the implementation of e-Governance and adaption of the digital transformation to automate all its G2C, G2B & G2G services rendered through its development authorities across the state of Uttarakhand.

Under the implementation guidelines of Ease of Doing Business (EoDB) program of Government of India and Digital India project, envision of rendering citizen centric government services and digitization & departmental operation, a project, General Services Management Software was initiated known as **eASE-APP**.

The eASE-App Application – An Introduction

Our proposed e-Governance initiative is the eASE Application. The project was designed and envisioned to bring a complete paperless G-G, G-B and G-C system for the development authority. This enables the Authority to provide its core services to the public on an easy-to-use platform, deliver services with quick turn-around times and with transparency never experienced. The project is developed with the following Objectives :

- Enable services on a single platform in congruence with the Ease of Doing Business Guidelines & e- Governance to reduce TAT (Turn Around Time) for services.
- Inclusive Approach to deliver services to the stakeholders to improve citizen centricity.
- Provide unparalleled transparency and near-zero physical contact points between the stakeholdersto promote Good & Transparent Governance.
- Dynamic System capable of adapting changes in organisational business process and user level changes as well as enable applying policy to reflect on application with the shortest of turn-around time.

- A Seamlessly integrative system to provide access to services of other departments external to the authority at National as well as State/ District level.

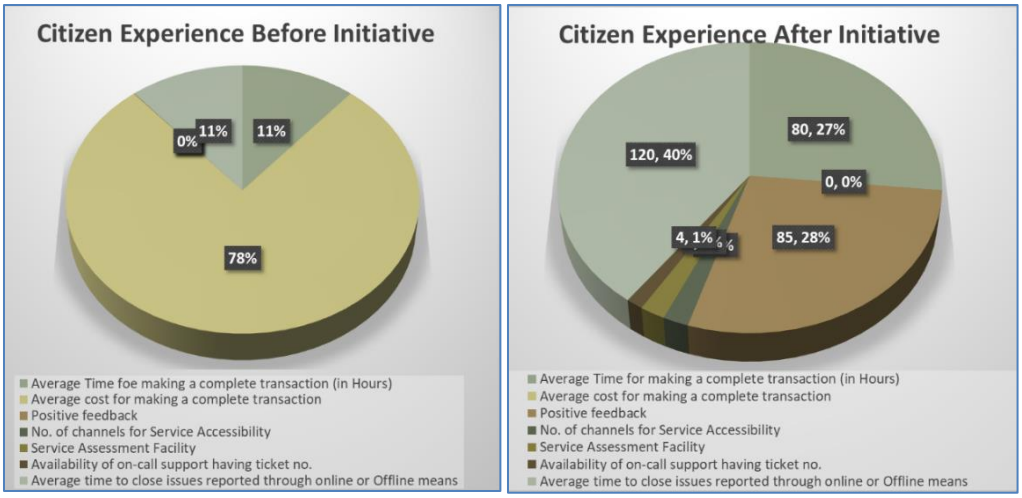
- Data Integrity: Bring in data from multiple departments and provide a mechanism to ensure information sharing and interoperability within multiple departments of the authority and syncall information in an easy to access and referenceable form to all users.

In order to achieve the above objective, some of the core features the application delivers are:

1. Issuance of Building Permits for infrastructure constructions.
2. Manage and approve Permits as per the state guidelines and Building Bye- Laws.
3. Provide grievances & redressal system to the stakeholders for effective, transparent, non-repudiation system and timely resolution through the application.
4. To provide effective Monitoring and Evaluation of infrastructure projects and other schemes.

Comprehensive Comparative Analysis (Before and After Initiative) –

#	Particular	Before Initiative	After Initiative	% increase or decrease (if applicable)
1	Average time for making a complete transaction(Service wise) (in Hours)	720	80	**-88.89**
2	Average cost for making a complete transaction (Service wise) (in Indian Rupee)	5000	0.5	**-99.99**
3	% Positive feedback out of total feedback received	1	85	**8400.00**
4	Name and No. of Channels for Service Accessibility (Mobile, Kiosk, website, Govt. office, CSC etc)	1	6	**500.00**
5	Service Assessment Facility	1	6	**500.00**
6	Availability of on-call support having ticket number	1	4	**300.00**
7	**Average time to close issues reported through online or offline means (Service-wise) (in Hours)**	**720**	**120**	**-83.33**



Figures on Data: Nov, 2017 ~ Dec, 2018 *[for Offline]* and Apr, 2019 ~ Dec, 2020 [for *Online]*

Action Plan

The Project development & delivery is divided in 3 phases with all the services categorised in 2 service category

Internal Service **(IS)** or *Public Service* **(PS)**

1. **Phase I:**
    a. **Building Permit: (PS)** - Service allows for applicants to submit / verify and get approval for new andold constructions
    b. **Unauthorized Construction Management System: (PS)** - Service for taking action and registering complaints of illegal or unapproved constructions. Including hearing and appeal process.
    c. **Right to Information (PS)** - For submission and response for information sought by the public fromthe Authority as per the RTI act.
    d. **Public Grievance Redressal System (PS)** - For general public to register complaints to the Authorityand to track and seek response or action from the Authority for the same.
2. **Phase II:**
    a. **HRMS and Payroll (IS)** - this is to manage all employees of the Authority and process their payrollsevery month as per the policies of the Authority.
    b. **Legal Case Management (IS)** -to track and monitor all legal case filings on

behalf of the Authorityby the empanelled lawyers of the Authority.

c. **Daak & File Management System: (IS) -** to track register and respond to all the letters and physical mails that are received by the Authority. This is also linked to any other service that is available

d. **Finance & Accounting Management Module (IS)** - to track and monitor all financial transaction of the Authority with support of reports that are required for regulatory compliances.

3. **Phase III:**

a. **Project Management (IS)** -to track monitor and control all development projects undertaken bythe Authority.

b. **Property and Land Management (IS)** - to track and manage the Land resources and development projects of the Authority

c. **Purchase and Inventory (IS) -** To track and manage all existing assets of the Authority as well as manage new purchases of the Authority.

d. **Nazool and Planning (IS)** - To provide service for the department to manage Nazool land within the jurisdiction of the Authority.

The baseline study done along with stakeholder with the objectives:

i) To get technological solution for quick service delivery,

ii) An independent system built from the ground up and adaptable as per the Authority's requirements.

iii) Minimum dependency on vendor for future changes and modifications in system.

The Study Included:

(i) Discuss system architecture with key heads of the Authority to identify requirements.

(ii) Collecting Guidelines/ policies/ Acts and Government Orders to identify key business process.

(iii) Discussion of Identified key business process with relevant business owners and design a systematic document with key features to be developed.

(iv) Agile methodology was opted for system's design and development. After consulting each stakeholder, the suggested relevant changes were included in

the system and demonstrated to the business process owners for further review for any changes if may be required.

(v) The same strategy was opted with each business process/ feature set that was required by the Authority.

(vi) To provide minimum retraining and also implement best business practices, for capacity building and KT, rigorous workshops were conducted in online and in onsite for internal and external user, onsite support, video manuals, user manuals, WhatsApp group was made available.

Technology Platform

A Web based Platform TUBA (Total Universal Business Automation) from the vendor CSII Pvt. Ltd. was selected via the tendering process. The platform was selected as it met most of the critical requirements to fulfil the vision of the Authority. Bespoke development was avoided and a more configurable Commercially off the shelf solution was chosen. Though the platform is a proprietary to the vendor, an agreement for a perpetual license was agreed upon to safeguard the interest of the Authority. A current version of the source code is also provided to the Authority as a safe guard measure. The platform has been built on open-source technologies like - Java - Angular - Crystal Reports RDMS - was a licensed from Oracle.

Challenges & Constraints:

1. **Technology:** -Legacy Systems had siloed operations with no interoperability. Data were identified as segregated. Data duplicity and data incoherence (No Single version of Truth) lead to wrong representation and wrong decisions. Government orders were implemented slowly due to the waterfall approach leading to critical delays in policy implementation and its efficacy.

2. **Operations:** -Some business processes were found to be redundant with many bottleneck. No set timelines were there on certain business operations processes, whereas overall TAT was only implemented which was difficult to track. No set accountability was set at the business process level. -User and applicant feedback of using previous applications were never wholly implemented. -Practical operational issues whether related to limited resources or single-

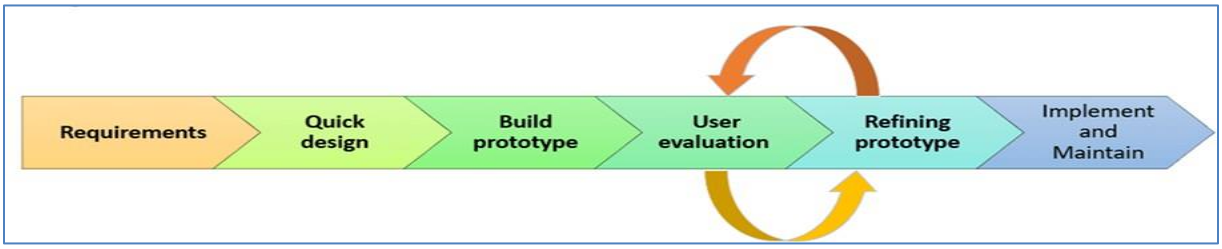
person risks were identified where it could lead to delays.

3. **Knowledge Transfer & capacity building:** Some aspects of the services being highly technical, any change for e.g., change in By-laws were difficult to communicate. -Confusing and difficult-to-use interfaces lead to a lot of difficulty and users were dependent on feedback from the Authority IT team for answers, which lead to a lot of to and fro information which again leads to delays and dependencies being created.

Key Challenges:

1. Building Permit is highly technical and expertise in the domain is specific to only certain professionals.
2. Due to Limited Digitally Literate resources at field level, implementing digital solutions was a challenge
3. Existing semi-digital / non-seamless / paper-dependent operating model wherein no clear standard operating models on ground were available, due to which the quick turnaround times were difficult to achieve leading to difficulty in monitoring and overseeing; thus, practical changes could not be implemented as mostly short-term fixes/ work-arounds were only possible.
4. Delay in one process led to cascading delays in other-following processes which lead to greater cumulative delays.
5. Lack of informative systems and transparency lead to confusion -Between stakeholders.
6. Existing systems were siloed systems due to which the Access and sharing of the information with the stakeholders were Adhoc and not in time.
7. Limited availability of personnel resources at the authority lead to delayed service delivery.
8. Lack of IT infrastructure and competent IT resources lead to ineffective and delayed implementation of ICT projects.

Process for Deployment / Implementation:



Workshops

- With Internal Stake Holders
- With External Stake Holder

Brainstorming Sessions:

- Input from Internal / External stakeholders were discussed with Development team to prepare a design document with critical features that need to be developed.

Proto- Cycling Methodology

- Quick Prototypes based on workshops and brainstorming sessions were done.
- Quick feedback and user evaluation was provided.
- Refinement of the prototype
- Test and implement the solution.
- Feedback post Go Live
- Improve the process and make changes as per real life implications.

Roll out and implementation was done on an Agile/Proto-Cycling methodology; The technology that was identified was important that implementation was not done on a waterfall methodology as changes and scenarios change very frequently in a government organization in case an issue is identified and implementation of this needs to be implemented so that the public can avail the new policy or change with immediate effect. This was an important consideration in choosing the vendor. Proto-cycling Methodology:

- Quick Proto-types solution was made based on workshops and brainstorming sessions with the Application development team / Authority IT team/ Business Users / External

user withtheir respective objectives.

- This Prototype was then made, showcased, and real-life operational scenarios were used to get feedback. -This feedback was then used to refine the service or feature.
- Final testing was done at the application level and then provided for a final User Acceptance Test, a time by which most features were in knowledge of Business User, key IT people, and stakeholders of the system which then led to a faster acceptance / easier training and smoother Go Live status.
- A Support team was parallelly applied for which involved itself at the later stages of the proto-cyclingand refinement of services stage, this allowed for smoother handover.

Process Flow

- A clear Process flow during system analysis & study was identified in alignment with the Business Users, IT team and the Vendor development team.
- A workshop with inter department representatives, Business Analyst and IT personnel of the Authority were conducted. After it, a functional and technical report for the same outlining the features sets required, business flows and technical aspects with dependencies were created and shared among the stakeholders.
- After the study by the relevant business users and the technical committee the same was approved for the development and configuration was provided.
- After the first Demo to all the relevant stakeholders, their feedback was provided to the development team and changes or enhancements were suggested.
- The final beta version was released for business users to use and provide any feedback pre-Go-Live.
- UAT and security test were certified and system was made Live.
- Post Go-Live Review Sessions. Even after the system was made live certain scenarios and enhancements as suggested by the public users and Business users on the practical working on the system is being collected and enhancements are being made based on their impact on the operations of the department and on the technical impact of the system from IT.

Use of application improved the performance of the Authority enabling it to deliver the public services effectively and efficiently. The application has led to improvement in service operations, including efficiency, reduced transactional costs, increase in the transparency and quality services for citizens.

Feedback & Assessment

A Feedback mechanism has been instituted to seek stakeholder's opinion in all aspects of service delivery. Followings are components of feedback mechanism:

- Google feedback form is sent through SMS to all stakeholders who seek services through application. The link for the feedback form through googles sheets is present on the website of the Authority.
- Feedback form submission is made as an integral part of onsite capacity building session.
- Stakeholders are added to WhatsApp group of the Authority there by enabling them to give instantfeedbacks.
- E-mail id of the support team is shared with stakeholders for support and feedback purpose.
- Helpdesk number is shared with the stakeholders on website of the Authority.
- Onsite support resources for the purpose of providing support to the stakeholders as well as for feedback collection.
- Word of mouth feedback mechanism. The feedbacks thus collected through the above-mentioned ways are analysed for all possible improvements which can be included in the Application towards providing citizen centric services.

The applicants today find it much easier to process and understand the building by-laws.

- Our application is a much simpler tools that also provides power to the applicant to guide through its errors and corrective measures, which in turn provides faster processing of files as well as better learning of the by-laws to the applicant.
- During and post Go-live system, a lot of redundancy and long-term processes were reengineered with better accountability trackability.

- Processes that delayed the overall transaction between the applicant and the Authority were now captured and alerted prior to overall delay so it allowed for remedial actions taken on time rather than post facto.
- The transparency in the system allowed the applicants and Users of the system to be clear on their status, reasons for delay if any and found their interaction limited to none specially when it came to understanding where the application stands and can plan as per that, thus removing confusion or any need to do multiple back and forth with the relevant authorities.
- The business Users found the system to be effective as it has made their tasks specific highlighting exact nature of the task for each process.
- Capacity building during and post implementation of the system has greatly reduced dependencies on vendor empowering the authority to manage it.

Interoperability and Integration

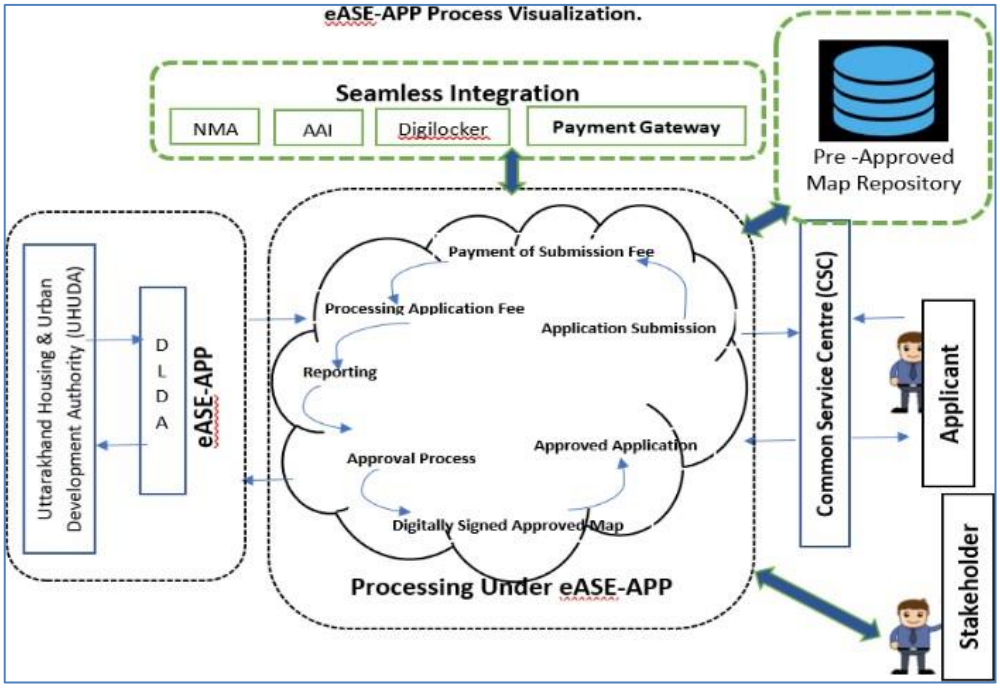
Interoperability and Integration were the key aspects of the project as identified earlier. In terms of Interoperability, we have ensured multi departments and multi services were interoperable in terms of communication and data share within the system. Having a critical single source of knowledge and non-siloed information was ensured by using the internal Document management System. A very high priority was given on interlinking services and reducing the redundancy of documentation to ensure different departments being made aware of the information with easy accessibility for any case. For example, if the building permit is being provided for a house where there is an Unauthorized construction, and there is a legal case pending for the same, that information is readily available to the relevant authorized user so the correct action can be taken. Integration and providing a complete package to the public under one roof was very important.

Hence, the system developed needed to have integration capabilities. So with lesser ToT we have integrated with external systems like: Payment Gateway: NDLS / CSC wallet Email and SMS notification CSC - Centralized Service Centre Integration with other external Agencies: NMA / AAI / Fire Depts. etc. Google Map Services.

Common Service Centres (CSC) scheme is one of the Mission Mode Project (MMP) under

the Digital India Programme of Government of India. CSC are the access point for delivery of essential public utility services, social welfare schemes, health, financial, education and agriculture services, apart from host of B2C services to citizens in rural and remote areas of the country. It is pan-India network catering to regional, geographic, linguistic and cultural diversity of the country, thus enabling the Government's mandate of a socially, financially and digitally inclusive society.

Towards the goal of e-Governance & Ease of Doing Business (EoDB) and also in pursuance to the Digital India Program of Government of India, the Department of Housing of Uttarakhand state through its development-authorities envisioned an integrated online solution.



While considering the key constraints as challenges in public service delivery, the Secretary Housing suggested for integration of the integrated online solution with Common service Centre (CSC). idea of This integration was a step towards increasing the scope of use of application to reach up to the last- stakeholder solution in the state of Uttarakhand with ease of accessibility and would consolidate service delivery through a universal technology platform, thereby making e-services through eASE-App, particularly G2C services accessible to citizens anywhere in the country.

Consent Management, Data Privacy and Cyber Security

During the study and development phase, certain sensitive and public data had to be shared to the private vendor for study and development requirements. A consent mechanism following guidelines of the Authority was followed with the agreement and assurance that the data shared by the Authority to the Vendor would only be used for the purpose it was being shared and not for any other reason.

i. The IT Act, 2000 and Uttarakhand State IT policy are leveraged to provide e-services.
ii. The consent management feature of the application platform ensures an individual's preferences are respected, providing a single source of knowledge for all data collection and processing based on consent. The consent management mechanism is achieved through the OTP validation.
iii. All Data is securely stored in the Data Centre secured, designed and equipped with all physical as well as technological measures important for Data Security and breaches.
iv. The application is SSL deployed and certified to ensure end -to-end data encryption.
v. Security audits were conducted to identify bugs and vulnerabilities and identified vulnerabilities were resolved to further ensure security.
vi. To ensure Cyber security the system will go through cyber security and safe to host certification from an Authorized Cert-in professionals once the delivery is completed in whole.

Issue with the Technology

There are certain issues with the technology that is used. These issues were foreseen and have been handled as best as it were possible. As a guiding principle, the Authority looks to use as many open-source platforms as possible. But in cases where we have been dependent on proprietary software / platform we have engaged the legal team to ensure the Authority has legal basis to use and change the platform as per the legal boundaries of the contract. The technology used in building permit for now only allows for AutoCAD to do the scrutiny

aspect of the application. Unfortunately, we have tried other non-AutoCAD/ open-source based platform, but this has led to more issues for applicants and Business users than it has solved. This is a challenge that we are looking into and working with the vendor to improve in the future and allow our users to not rely on a proprietary software from Auto-Desk and where such a provision is not available to the applicant the Authority provides with an alternate use of its service centre for now as an option.

Identified Benefits of the Application:

- Reduction of customers' and organization's **time, effort and costs.**
- Improvement of **service delivery** and citizens' **satisfaction**.
- Lowering of the **stress level** of the stakeholders.
- Improved **efficiency** of the Authority in processing of data.
- Seamlessly integrated online services with **transparency, accuracy** and less turnaround time.
- Access to application **Any Where, Any Time, Any Device** for services.
- Application is an enabler for "**Ease of Living**".
- Business process reengineered for **Accountability Trackability** so as to avoid delay in service.

Service Level Agreements (SLAs)

The Service Level Agreement is well documented and part of the implementation contract with the Vendor having a three pronged Service Level Agreement has been signed in.

1. Training perspective. Training is a very crucial part of the service that the Authority now provides for its e-services to be successful. We have built certain in-house capability for the same but as a back a trainer is assigned to the Authority from the vendor to provide weekly and monthly sessions as per the need of the Authority. This one resource is an obligation of the vendor to the Authority.
2. Platform and Application perspective. Application bug and changes support is assigned post go Live for 3 years. A bug/change request tracker is provided with the IT and Business team from the vendor to track and apply the changes. Any bug /change is

reported into the bug tracker system with it
being given 3 major categories. Critical/ Major /Minor.

(i) It is contracted that any critical issue is to be resolved within 4 hours or an alternative to be provided.

(ii) For any Major issue to be resolved with 24-48 hours.

(iii) For any minor issue up-to 7 days is provided.

(iv) A dedicated support team is also available with a support centre contact number(s) shared with the public where their issues can be logged with support available during all working hours of the Authority.

Replication and Scalability of the e-Gov Solution (eASE-App)

#	Particular	Remarks
1	Whether Replicated - Yes	Yes
2	Cloud Enabled / Ready	Yes
3	Mobile Enabled Yes	Yes
4	Integration using API Yes	Yes
5	Details If replicated, Name of States/UTs	Rest of Uttarakhand (12 other Authorities within Uttarakhand)

Way Forward:

With the onset of the usage of eASE-App, e-Gov initiative, at District Level Development Authority- Udham Singh Nagar, the reach & acceptability to the beneficiaries was high incomparison to the manual application processing. The fact turned up more promising, with the considerably high number of applications received and the revenue generated for the DLDA after implementation. An effective monitoring, tracking and evaluation of the applications in accordance to the Right to Service Act, has led to subsequent changes in the policies and guideline laid down by the state government, in terms of business process as per the outcome and suggestion from stakeholders.

Successful implementation of eASE-App at DLDA Udham Singh Nagar, under pilot-mode is now scaled up and implemented across all the thirteen DLDAs in the State of Uttarakhand. And within the short time span of nearly 8 to 10 months of implementation, the application today is widely accepted and adapted among the stakeholders. It is reinforced by the fact that we have received more than 9100 applications.

The robust and dynamic configurability feature of the eASE-App application has further allowed us to implement and deploy other modules viz: (Right to Information-(RTI), Public Grievance and Redressal System- (PGRS), Unauthorized Construction Management System- (UCMS), Document management & File Management System, Human Resource Management & Payroll System- (HRMS), Legal Case Management System- (LCMS) and MIS & Reporting Management) at each DLDAs as per their requirements and process flows.

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5. GYANODAYA: A Digital Learning Mission Mitigating India's Rural-Urban Divide

Pre-Intervention

The UNESCO 2021 State of the Education Report for India points out that the gross enrolment ratio (GER) for elementary schools has increased from 81.6 in 2001 to 93.03 in 2018-19 and stands at 102.1 in 2019-2020. However, it states that the overall retention is 74.6 per cent for elementary education and 59.6 per cent for secondary education in 2019-20.

Clearly, there is a sharp rise in the demand for education, both primary and secondary – and there is an evident increase in the number of secondary schools in India. Yet, the spread of secondary education throughout the country remains uneven. Regional disparities continue, as do the differences in the access of education, depending on the socio-economic background of students. Absence of teachers, lack of incentives, and low academic standards in government schools have contributed to the rise of the private sector in secondary school education. All these problems have led to poor learning opportunities to the marginalized.

The public education system in the Godda district of Jharkhand state is faced with similar challenges – limited infrastructure, shortage of teachers in schools, poor performance of students and zero tending ratio of number of students attending the school regularly to the number of students registered in schools.

The status of education in Godda was facing a lot of gaps and deficiencies. The findings of the primary field research were as follows:

1. **Poor learning capabilities of students**: Most of the students studying in 10th grade faced difficulty in understanding basic mathematical calculations and the principles of science. This is clearly reflected in previous year results of the district, where only 50% of the students passed the Board Examination.

2. **Shortage of Teachers in schools**: The problems faced in school education of the district stem from the shortage of teachers, especially science and mathematics' high school teachers. There were schools in the district, where students haven't studied chemistry because they don't have science teachers in the schools.
   Poor infrastructure in schools: Non-Operational Computer and Science labs, unavailability of benches and limited number of classrooms was true for almost every school of the district.
3. **Connectivity problems to schools**: Taking due note of the students residing in interior clusters of the district, where they do not have access to mobile or schools, an innovative solution was devised, Mobile School Van. Essentially a school on wheels, this van has been installed with a television screen and provides video lectures to the students while going around the remote areas. But this mission had limited reach.
4. **Limited reach of Internet**: Digital Reformation in India has ensured the reach of Mobile Internet to average 50% of the household of the Nation, including the rural population, whereas it remains less than 30% in Godda district.

During the last two decades, the educational scenario has seen major changes such as developments in Communication and Information Technology (IT) as vehicle for monitoring and management. Recent developments have already made way for use of IT in different ways, not only to manage the sector, but also directly assist in enhancing the quality of teaching and learning. As developments in the IT sector advance rapidly, new opportunities emerge constantly, which could be appropriately harnessed and adapted to assist in the field of education, especially in the remote and underserved regions of India.

Well-prepared teaching material at the primary and secondary class levels, adapted to local conditions, can act as a powerful tool and aid to the teacher. It has been said that 'a picture is worth a thousand words' – surely it should be possible to convey simple or even relatively complex concepts and ideas through animation and through pictorial depiction. It is important to pursue this as a potential instrument to sharply enhance the learning process in the classroom, particularly in the secondary schooling sector.

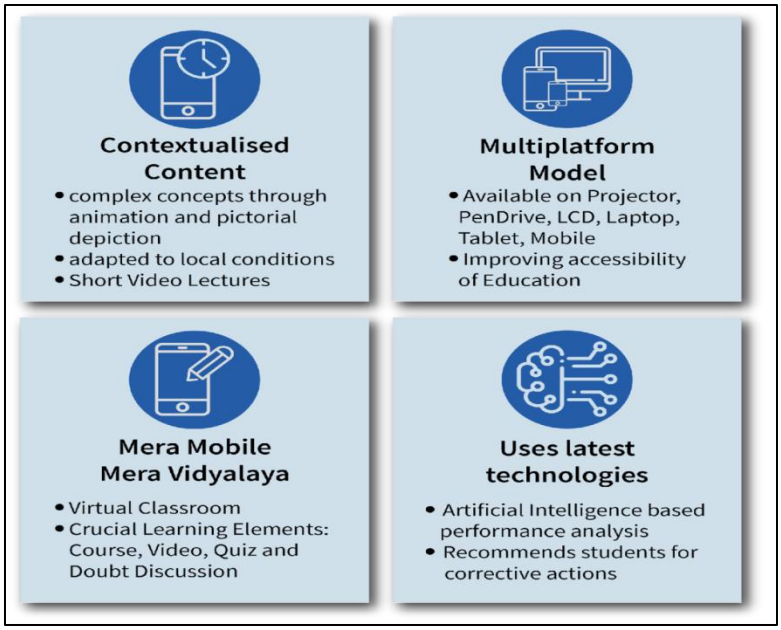
In this context, Gyanodaya has proved to be a successful **digital learning mission** to improve the **learning outcomes** and the passing percentage in Board Exams in all the **government schools (middle and high) of Godda district**. It was launched in July 2018 in this tribal districtofJharkhandwhich is declared aspirational by NITI Ayog. The project is a result of a collaboration among the District Administration (Godda), Adani Foundation and Eckovation Solutions Pvt. Ltd.

This intervention aims to provide quality school education in India by leveraging technology to deliver cutting edge curriculum with a focus on ensuring continuous monitoring and accountability in the system. The approach is towards institutional building and ensuring sustainability through capacity building of teachers and creating the pull for quality education at the bottom of the pyramid.

The Intervention

The Gyanodaya Godda initiative is improving the reach and quality of education to the students through integration of technology with a focus on ensuring continuous monitoring and accountability in the system. Under this initiative, Mobile Technology and ICT is applied to create an education ecosystem which enables teachers to be effective, improve the quality of course delivery and brings about efficiency through established monitoring and evaluation framework. Mobile-based Eckovation Platform and ICT is used for providing contextualized videos-based learning modules, continuous and comprehensive evaluation of students' performance and cohort learning facilities to students.

Furthermore, the Eckovation platform facilitates AI based performance analysis of each student. The daily attendance and performance of students are uploaded on the platform to obtain overall performance analysis of students along with generation of report-card of each student. There are separate performance monitoring groups which bring the teachers, administrators, Adani Foundation and Eckovation support team on a single platform to discuss, evaluate and continually improve the education delivery scheme. This ensures that the students remain the ultimate beneficiary of the system and teachers are accorded due responsibility and accountability for their performance.



Gyanodayahas set an example showing that Public Education Systems can be more responsive, transparent, efficient,and collaborative by leveraging technology:

Responsive: This unique model provided a single platform to all the stakeholders involved in the execution of the initiative; all the teachers, education department to connect and communicate with District Administration. The problems faced in implementation are directly communicated to every tier of administration, minimizing the communication gap. This also helped teachers getting recognition for their consequential efforts along with motivation and ideas from other teachers.

Transparent: This initiative taken towards delivery of quality education and capacity building of students through mobile-based platforms includes proper monitoring and evaluation framework to assess the success of initiative. The platform facilitates AI based performance analysis of each student. The accessibility of this evaluation is available to all the stakeholders bringing 100% transparency in the system.

Efficient: The platform has helped in analyzing performances of more than 60,000 students from more than 200 schools in just a few minutes, shortening the duration of assessment period and making it effective and transparent. The students giving assessment on the platform are provided with instant analysis and recommendations based on the performance using Big Data Analytics.

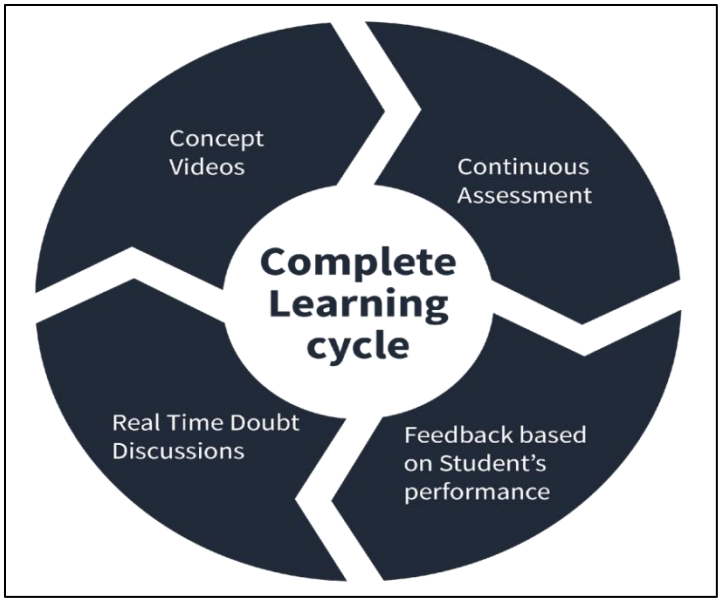
Collaborative:

- **District Administration:** The program has been progressing under the continuous guidance of District Administration. The administration is closely working with the team by providing guidance to the team members at every crucial step and conducting review meetings of the program in a structured manner.
- **Adani Foundation:** Adani Foundation ensures the availability of digital content as well as infrastructure such as LCD TVs, inverters and battery in schools; it provides the complete financial support for the creation of the content and the program's implementation. Program review meetings are conducted once in every 45 days.
- **Eckovation:** Eckovation prepares the best contextualised content of class $1^{st}$to 12^{th}along with several competitive exams such JEE, NEET and SSC and solution for personalized learning using best technological tools such as Machine Learning and Artificial Intelligence as per the guidelines by the district administration and Adani Foundation.
- **Education Department:** The education department is providing their valuable support and coordination at every step. Officials, namely DEO, DSE, BEEOs, are monitoring the project by making regular visits to the schools and providing motivation to the schools. Regular meetings with the education department provide the encouragement to teachers as well as students.

The Gyanodaya Model

The initiative aims to provide Quality Education in the high schools of the district by leveraging technology with a focus on ensuring continuous monitoring and accountability. Presently, more than 60,000 students of 6^{th} to 12^{th} standard are learning through the Gyanodaya initiative.

It covers the entire learning cycle including teaching, continuous assessment, and feedback to students on their learning outcome.



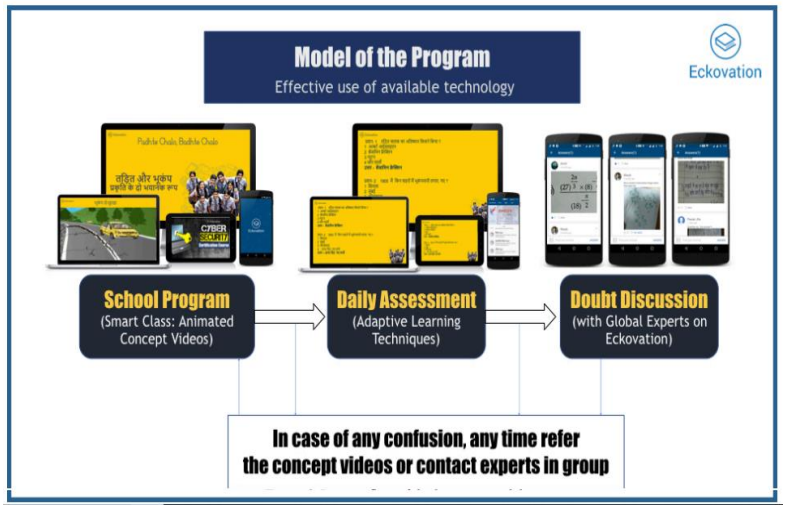
Implementation of Gyanodaya Model

The Gyanodaya Godda model is an integration of various tools and assets to improve overall learning outcomes of student with better conceptual understanding. These innovative teaching tools are as follows:

1. Audio-Visual Classes

The 1 hour sessions per class involve audio-visual classrooms having animated and contextualized lectures followed by daily assessments. The videos are kept highly interactive (which is done by inserting interesting questions during the video at specific contextual points)

which ensures a good level attentiveness from the students. Baseline and Analysis tests conducted every week help in identifying areas requiring improvement. Further to enable discussion of doubts, a mobile platform with a team of experts and peers is envisaged.



Brief Outline of Session

a) Concept Videos:

All audio video content developed for the project is customized to suit the needs of Jharkhand State. Various research documents attest that a child has better learning levels in case of teaching in their mother tongue. So, care has been taken to engage subject specialists with similar background to provide quality modules for students. Also, the content is designed with stringent compliance to the requirements of the syllabus as prescribed by Jharkhand State Board. The content developed can be used in any number of schools without any additional expenditure on account of content. This gives an immense scope for scalability of this initiative across the State.

Social Science Class at Gyanodaya School

b) Continuous Assessment and Evaluation:

Each module of the subject is followed by a short quiz containing five questions. Students are encouraged to solve these questions in order to apply the learning gained from the module. Immediate application of the learning enhances the retention level of students. Also, the quiz promotes discussion among the students and this will allow for peer learning.

Additionally, every week the students are provided with a baseline and analysis tests. These tests contain ten questions per subject. The baseline test is usually scheduled on Mondays and the analysis test is taken on Saturdays. These tests allow for an insight into the progress made by the child in the learning process.

Weekly Assessment at KGBV Meherma, Godda, Jharkhand

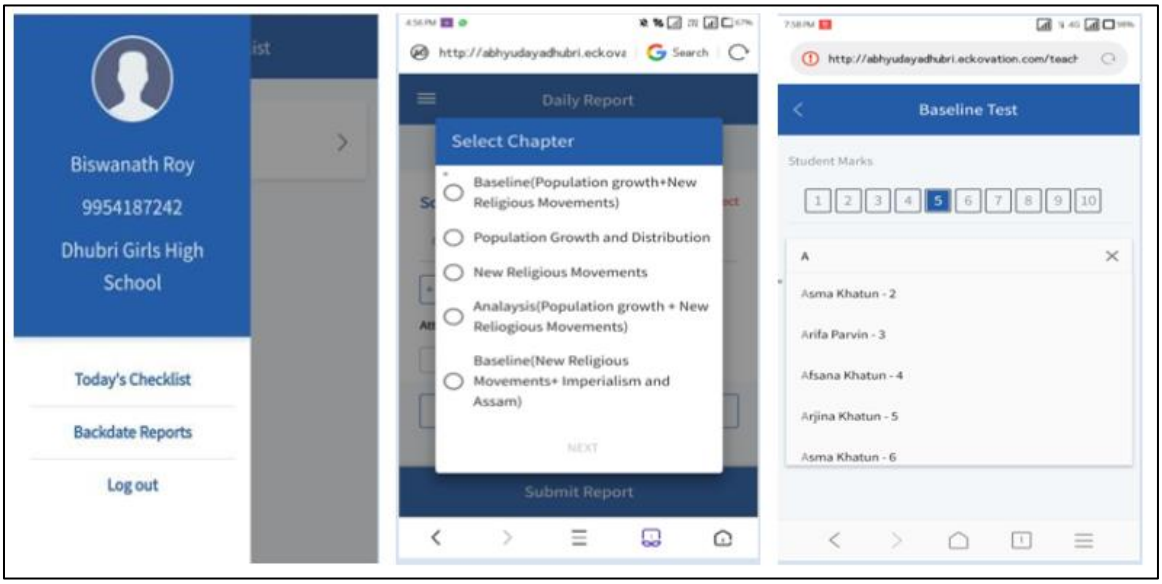
The results of weekly Baseline and Analysis Assessment are digitalized and based on this performance data points, students are provided with AI based recommendations to help them target the learning areas in which they are weak. The app analyses each student's performance while mapping it to the course curriculum and also benchmarking it with not just that district but with the country wide data on the same curriculum and generates unique actionable feedback for each and every student.

c) Discussion:

Dialogue and discussion among students on the topic taught in a class enables them to gain more refined clarity and understanding on the issue. The short quiz after each topic is instrumental in making students engage in discussion. Also, students who have already understood the topic well are encouraged to share it with fellow students. This apart from being a tool to encourage peer learning, also instils confidence in students who present the topic before the class.

2. Daily Progress Reporting by teachers

Gyanodaya has developed a web portal for the purpose of monitoring the project. Each day the teachers report the progress of the classes on this Portal. Details regarding all students are uploaded and kept ready for entry of test marks.

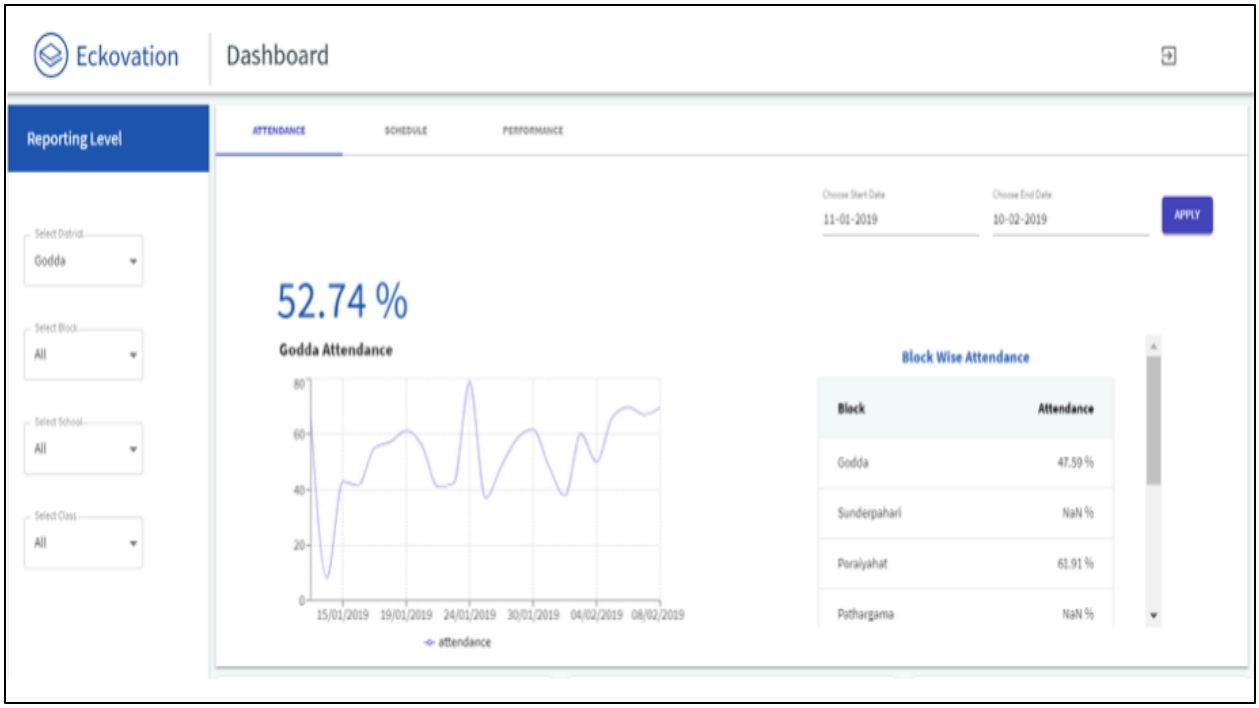


Screenshots of MIS portal with login details of teacher

3. State-level Monitoring Dashboard

A web-based centralized school monitoring system is developed to continuously track the progress of each school of the district by all the stakeholders. Key benefits of Monitoring Portal:

- Centralized monitoring of all the schools and students of the state
- Non-Performing schools are identified, and appropriate actions are taken
- Tracking of daily attendance and progress of students

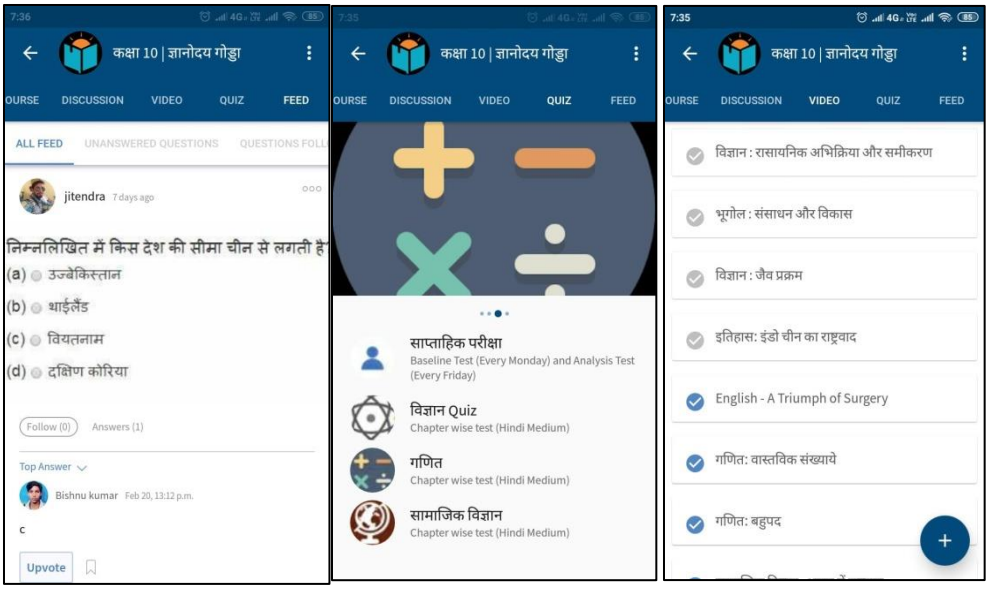


Screenshot of Monitoring Dashboard for Schools of Godda

4. Multiplatform Model

Along with improving the experience of learning, Gyanodaya also intends to take learning beyond the confines of the classroom. Apart from the display of the audio video modules in classrooms in designated class timings, the same content will be available in the computer labs of respective schools. The videos will also be viewable on the mobile application 'GyanodayaGodda' that is downloadable from Google Play Store without any cost. The scheme is to make learning after class possible at the convenience of the student.

The project has helped make the best use of omnipresence of Mobile Technology and internet connection even in the remotest regions and improve accessibility through a Mobile App where all the animated and interactive video lectures and 24×7 Doubt Discussion with teachers is accessible to students.



Screenshots from Std X Learning Group for Godda, Jharkhand

Following are some salient features of the technologies used by Gyanodaya Project for content development.

A. Animated Video Lectures: The critical concepts are explained using animated videos which helps in better understanding.

B. Child-Friendly Nature: The length of the videos is kept 7-10 min to improve retention rate.

C. Use of Artificial Intelligence: Continuous Assessment helps in enhancing learning curve of each students and providing ‘strength and weakness’ recommendations to the students.

The distinctive feature of Gyanodaya which makes it important to integrate with regular teaching:

A. Audio-Visual Lectures improves conceptual understanding and retention rate of students

B. Multiple revision (touch-points) of the same topic ensures better understanding of the topic. These multiple touch points are: Conceptual Video, Question Video, Revision after completing Syllabus and Assessments

C. Students can access and revise all the lectures at their home using the app “Mera Mobile, Mera Vidyalaya”

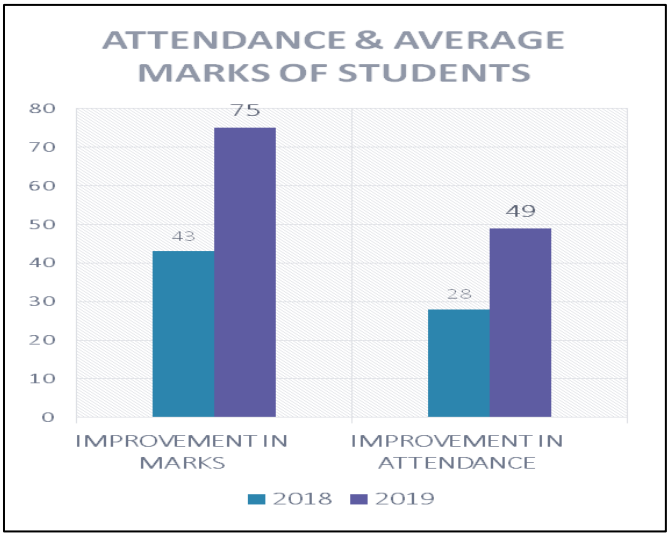
D. Continuous Assessment: Each concept video is followed by an assessment which helps in evaluation of understanding of the students using AI

E. Aiding unavailability of subject teachers in schools by providing video lectures for each topic

Reporting the Progress to all stakeholders

The below mentioned parameters are regularly evaluated to analyze the progress of the project and are shared with all the stakeholders:

1. Teacher Training: A monthly status on the number of teachers trained for effective implementation of the project are shared with all the stakeholders
2. Progress Report of students: The assessment of students is based on two crucial elements involving: Attendance and Learning Outcomes. The performance of each student is evaluated based on weekly and monthly assessments and this progress is reported on the monitoring dashboard, which can be accessed by all the stakeholders, where they can check the status on a real time basis. Also, a monthly evaluation report of each student is shared with school and parents which clearly highlights the strengths and weaknesses of the student.
3. Progress Report of Schools: Each schools' performance is evaluated based on the average performance of their students and regularity on conducting the given set of classes. The non-performing schools are red flagged on the monitoring dashboard.
4. **Impact of Gyanodaya Intervention**

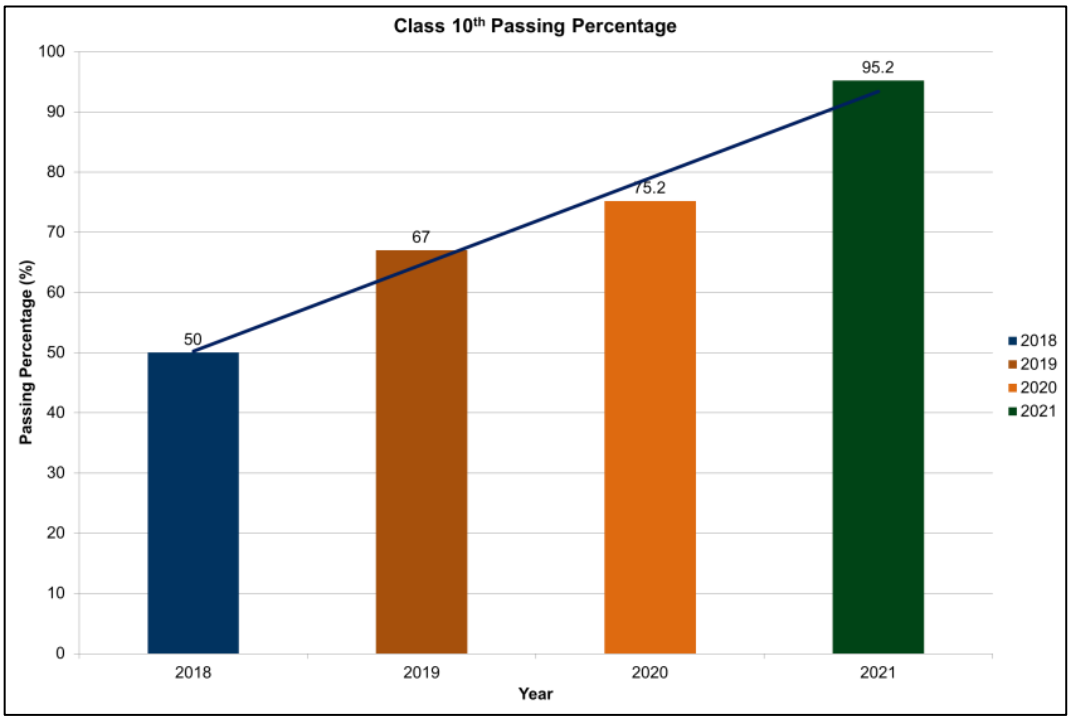


Students' Attendance

The attendance has significantly improved across all the classes. Majority of schools struggling with about 20-30% attendance before the introduction of Gyanodaya were able to improve significantly by about 77% after the advent of Gyanodaya. The growth in the class-wise attendance has been a result of making learning engaging and interactive using conceptualized and animated concept videos being taught under the Gyanodaya model. Interactive classroom teaching with the use of digital methods and gamification tools such as Virtual Reality and Trump Card has increased the overall attendance in schools.

Class 10th Passing Percentage

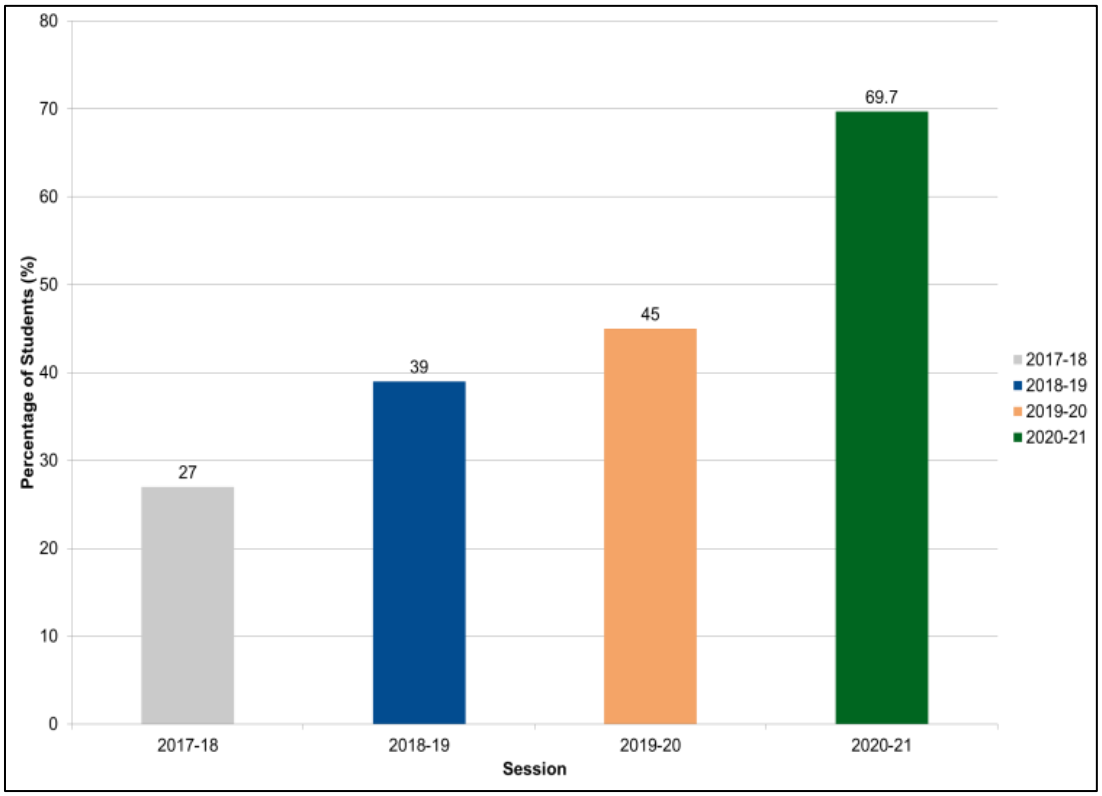
The graph on the left represents a comparison of the Passing percentage of last 3 year in class 10th board exam (Secondary exam).



The passing percentage has been found from the results of Jharkhand Board Examination for class 10th. The data has been collected from the education department of Godda district.

Students Scored First Division

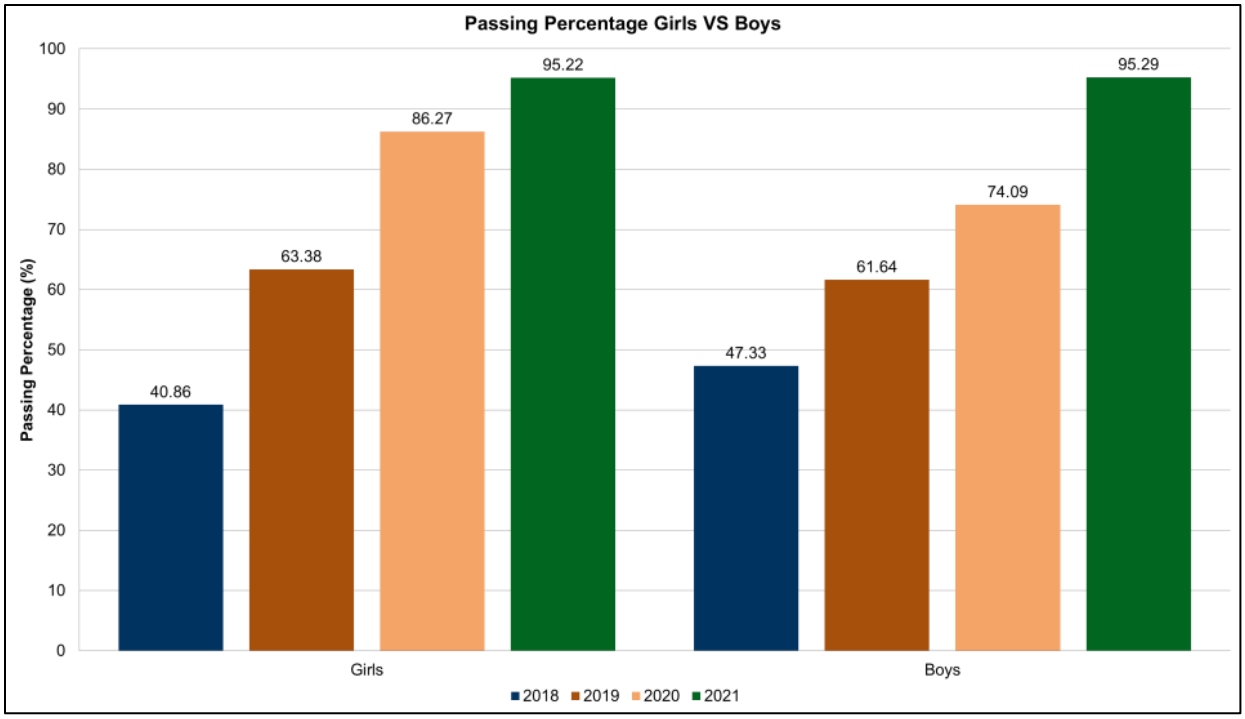
The graph presents a jump in the percentage of students who scored first division in the 10th board examination. In the Session 2017-18, 27% of students scored first division which jumped to 39% in 2018-19, 45% in 2019-20 and jumped to 69.7% in 2020-21.



Data has been collected from the education department and analyzed by Gyanodaya team.

Passing Percentage Girls vs Boys

The graph presents a sharp increase in the pass percentage of girls and boys compared with last 3 years. In the session 2017-18 girls passing was 40.86% which increases to 95.22 in the session 2020-21. Simultaneously boys pass percentage in the session 2017-18 was 47.33% which increase to 95.29 in the session 2020-21. The data has been collected from the education department of Godda district.



Sl	Description	Result Class 10		
		2018	2019	2020
1	State Rank	21	14	11
2	Total Secondary School	126	126	127
3	Class 10 Candidates	16676	15981	13126
4	Passing %	50.67	66.67	75.14
5	First Class	2957	4877	5045
6	Second Class	4168	4811	4233
7	Pass Class	1504	974	586
8	Students securing 90% and above	O	12	56
9	Schools with 100% pass percentage	3	6	8
10	Result of KGBVs	46.65	77.46	87.93
11	Highest percentage in district	88.18	92.04	95.20
12	Super 100 – Girls	NA	85/85	136/136
13	Super 100 – Girls: first classes	NA	84	130
14	Super 100 – Boys	NA	93/93	152/152
15	Super 100 – Boys: first classes	NA	92	143

Replicability

Gyanodaya is replicable due to its following unique characteristics:

- The technology running in background consists of simple and easy to use interface for users, who can use the platform with limited digital literacy.
- Gyanodaya does not require internet connection; and hence can reach remote areas with minimum infrastructure.
- It reinforces and complements the teachers to help explain difficult concepts with clarity to students.
- The Gyanodaya mobile application also works offline to provide objectivity and credible data - the topics covered by the schools daily; attendance in the classroom; performance of students; concerns at the school level. This transparent data is reviewed for its effectiveness and corrective actions at the block level, district level and by Adani Foundation in a structured manner.
- In the classroom, where the program is to be led by the teachers, the interface used is Smart TV, which can be operated by the teachers without prior technical skills.
- In just INR 150 per student/year the quality education is provided thus making the model cost effective and easily replicable at state and national levels

Sustainability

- The respective school teachers and the district and block level education department have taken up ownership of this initiative and that is the reason for the project's rapid growth. Started in 50 government schools in 2018-19, the program is currently running successfully in 281 government schools covering classes 6 to 12. In order to make Gyanodaya '**of the school, by the school and for the school**', teachers have been given the center stage through customized training and made them the flag bearers of Gyanodaya.
- To build healthy competition among the schools, recognition for the School of the Month and the Student of the Month have been institutionalized in the model.
- The Panchayat Raj (local village) institution, which has often been criticized for its non-responsiveness, has shown an exceptional enthusiasm in setting up crucial infrastructure

in the schools using the provisions of the 14th Finance Commission. Moreover, the ownership of the program by the Mukhiyas has helped to create a smart e- learning ecosystem at the village and Panchayat levels.

Testimonials by the teachers, parents, students and stakeholders; recognition by the Media: http://gyanodayajharkhand.in/static/media/Coffee_table_book.529a80dd.pdf

Gyanodaya believes that the students are at the center of any learning process and the highlight of the project lies in its social outreach. Children belonging to the families of farmers, vegetable vendors, rickshaw pullers, daily wage laborers, craftsmen, etc. stand to be the main beneficiaries.

Continuing Amidst COVID-19

Amidst the global pandemic, Gyanodaya innovated the delivery of education and chose multiple platforms to ensure learning for students. This includes Gyanodaya Godda App, YouTube and Whatsapp. Seeing the engagement and the impact of Gyanodaya Godda, Jharkhand Government scaled the project for 20 lakh students and broadcasted Gyanodaya Content on Doordarshan Jharkhand. Also, Gyanodaya Godda project is scaled to national level, where NCERT collaborated with Gyanodaya Project and taken the content DIKSHA App where more than 10 million students avail learning. The Gyanodaya Rath initiative was inaugurated to bring learning to the doorsteps of students on 1st October 2020. Under this initiative, designated vans are doing scheduled rounds of the district to make the smart curriculum available in the remotest non-network zone area for the students of classes 10 and 12. Gyanodaya Team along with school teachers had visited more than 180 households from where students were enrolled, after requesting parents to send their child for better preparation of upcoming board exam. The classes are conducted for 3 hours' duration during morning and afternoon hours with proper seating arrangement and social distancing. The Gyanodaya Rath mission has helped 2,750 students of class 9 and 10, hailing from 27 villages.

In spite of the pandemic, in about 3 years' time, the outreach of Gyanodaya has been well received by 281 schools, where more than 60,000 students are enrolled across the district – a number that is only increasing by a good margin every week, substantiating its commendable performance and enthusiastic reception. Gyanodaya mission clearly demonstrates that a program

that is effectively implemented through public and private partnership under a visionary leadership can provide significantly to the academic and human excellence, thus contributing towards ‘nurturing the dreams of a New India’.

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6. Panchayat Development Index: e-Governance initiative of District Bandipora, UT of J&K

Background

Developmental indices play key role in bridging the developmental gap and deficit of a particular area. We are familiar with "Human Development Index", wherein developmental transition of countries is measured statistically with regard to outcome parameters. The index assigns more weight to social outcome parameters than the infrastructure outputs and hence outrightly rejects the belief that only incurring of budgetary resources can bring transformation.

Jammu and Kashmir, so far, has not been exposed to formation of Human Development index, or any development index at District, Block or Panchayat level.

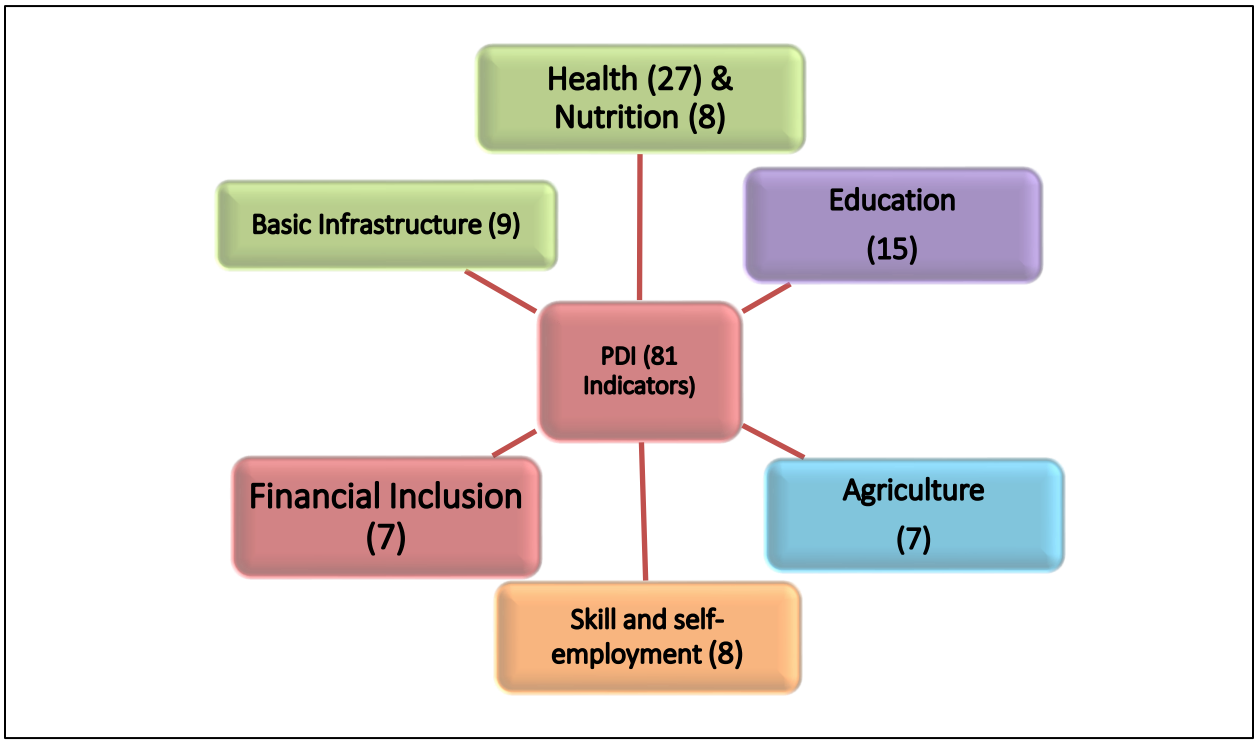
About the Project

An effort has been made by launch of Panchayat Development index in District Bandipora by the District Administration Bandipora UT J&K, on 21-12-2019 and a vibrant dashboard "www.realchangersbandipora.com" for data entry in all its 151 Panchayats has also been launched in 2020.

Panchayat Development Index (PDI) is a vital statistical tool to capture movement in Development at grass root level and to witness impact of centrally sponsored schemes at Panchayat level. The index is applicable to all Panchayats across the country. The index evaluates a base score of each Panchayat .

The Index keeps Government functionaries motivated towards outcome indicators in their respective areas and facilitates to adopt multi-sectoral approach through convergence, integration and focused attention. To achieve larger monitoring and evaluation objectives through e-Governance plateform The Panchayat Development Index is spread over 6 important thematic areas viz. Health & Nutrition, Education, Agriculture and allied, Skill Development and Self Employment, Financial Inclusion, and Basic infrastructure with assigned weights of 30%, 30%,

20%, 10%, 5% and 5% respectively. There are total 81 outcome indicators with around 156 data points in six thematic areas. There are 81 outcome indicators for which data entry is done



Guiding Principal (3Cs)

- Convergence (of Central & UT Schemes)
- Collaboration (among citizens and functionaries of Govt)
- Competition (among Panchayats)

Core Strategy of the Programme

- Panchayats as main drivers & Work on the strength of each Panchayat.
- Make development as a mass movement in these Panchayats.
- Identify low hanging fruits and the strength of each Panchayat, to act as a catalyst for development.
- Measure progress and rank panchayats to spur a sense of competition.

Objectives of the Project

The ultimate objective of the innovative Project is to monitor on real time basis the developmental transformation at grass root level through well-designed e-Governance Platform. Besides, it captures the development and improvement in development at grass root level helping rapid transformation of Panchayats by focused intervention in key areas. It monitors outcome indicators on real time basis in Key sectors, generating positive competition among Panchayats. It also strengthens PRIs by participatory approach in planning process.

Improvements after the launch of Project

Difficulty was observed in evaluating the impact of schemes at grass root level. There was no readymade portal to assess ranks of panchayats in specific terms and on important parameters with regard to National and international standard, There were apprehensions of loss to Government Exchequer due to non focused divergent approach in the scheme implementation, No user friendly data portal was available to store and disseminate information of panchayats in key indicators.

The formulation of Panchayat development index with vibrant dashboard has infused fresh energy in Govt. Officers/Officials enabling them to work in coordination for improving PDI score in the area. It has further helped Administration to identify week areas with ease to work towards their progressive upliftment on periodic basis. it has provided a basic tool for PRIs to understand desired outcomes of a particular Panchayats through a live Dashboard.

The following objectives have been met:

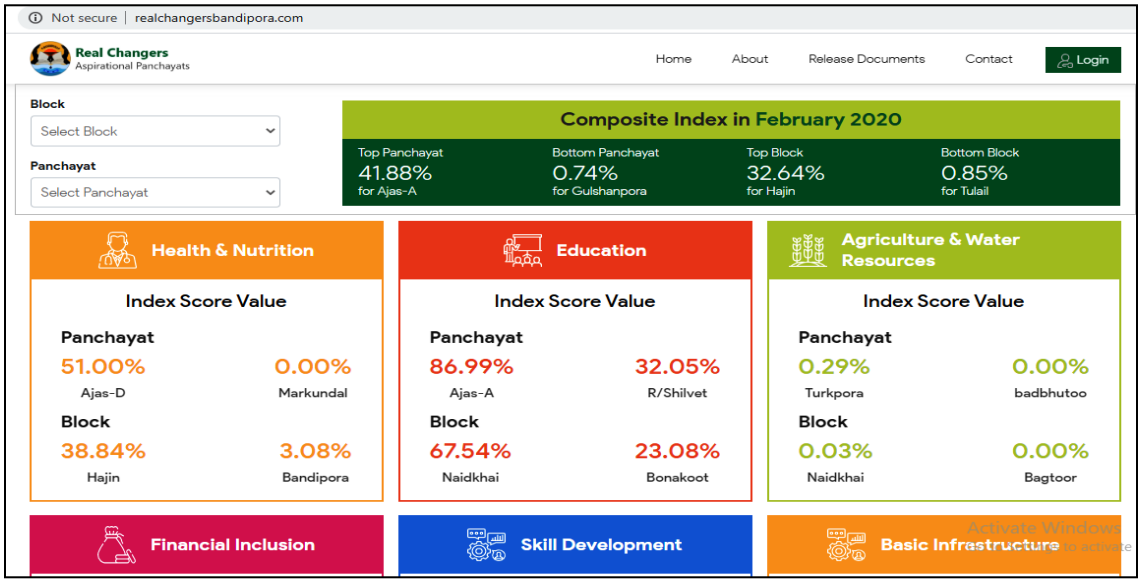
a) To capture the development and improvement in development process at grass root level.

b) PDI helps in focused intervention in key areas.

c) Generated positive competition among Panchayats. helped strengthen PRIs by participatory approach in Planning process.

d) Helped increase in capacity building of DDCs/ BDC chairpersons/ Sarpanch's and sensitize them about other key areas of development viz. Health, Education, Agriculture, Skill etc. in Rural Development sector .

e) Helped to achieve larger monitoring and Evaluation objectives through E Governance platform



Home page showing developmental scores as per periodicity at Block, Panchayat and theme level with top and bottom Block & panchayats

Major Developmental Impacts

The District achieved targets of Saturation faster and as of now it is 100*% ODF in SBM. 100% of Schools have clean drinking water and Washrooms. Each of Household is having electrical connection. The District has managed to provide Functional Household water Connections to 31000 houses out of 45000 surveyed households and work is on for providing connection to remaining ones . Under Health sector reduced Malnourishment in children's, universal immunization in each panchayat, 4 ANcs, improvement in sex ratio at birth is being monitored on monthly basis. Reduction in Dropout rate and improvement in female literacy is being observed. In fact, data of all key 81 outcome indicators are being collected to monitor

improvement in Health, Education, Agriculture, Financial inclusion, Basic infrastructure and Skill Development.

Mega Enrollment Drives in weak Panchayats

Better School infrastructure in Govt Schools

Child immunization at Panchayat Health & Wellness centre

Deputy Commissioner Bandipora kick starting Panchayat door to door Immunization programme

Dedicated Panchayat Health staff working in snow bound areas

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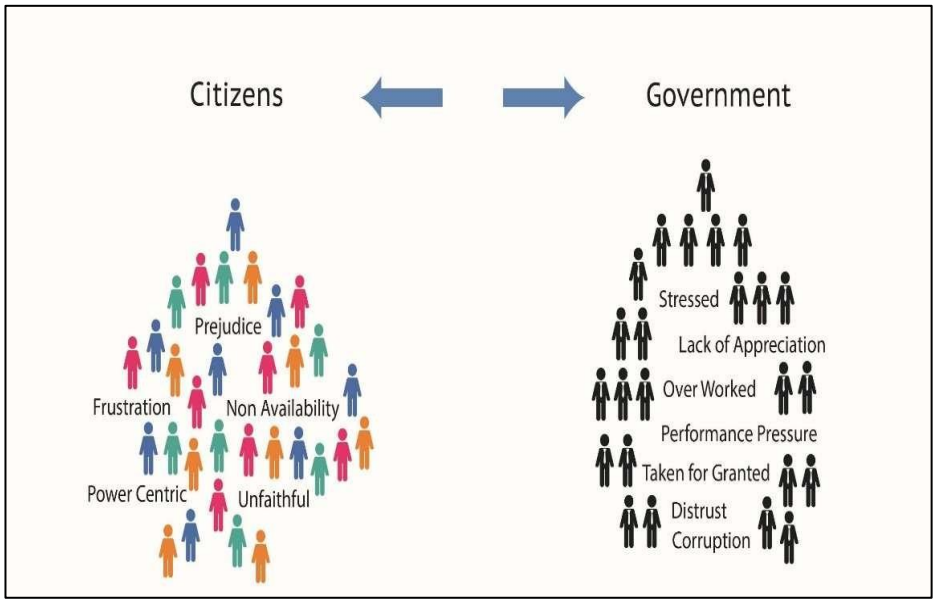
7. Complaint Management System: Silvassa

Like any other upcoming city in India, Silvassa Municipal Council (SMC) was looking for a digital switch over to its traditional system. The system that was in place for many years had its limitations and did not satisfy the new tech-savvy citizens who were supposed to go through the entire process of registering a complaint, tracking the complaint and communicating with the officers of the Municipal Council manually. This system with high service and communication gaps gave rise to multiple challenges which were not only technical in nature but extended to political intervention. The difficulty for citizens normally starts from lodging their request, since they are usually not aware of the correct department which can address their request. It was even more difficult for them to track the progress of their request or complaint. They never knew if someone had started working on their request or if it was even heard.

Before the implementation of the **Complaint Management System** by Vender Responscity, all the applications were received by the Chief Officer, SMC and were marked downwards to the dealing hand who was obliged or expected to put it up in a file with constraints and limitations.

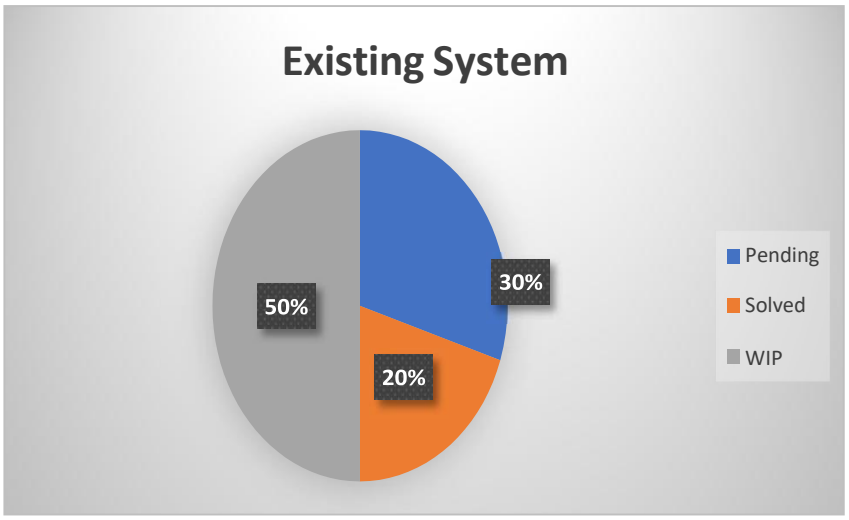


About Existing System

- Loss of information as the staff was not properly maintaining the record, it could be lost and the citizen would have to come again and again to make the same complaint.
- Wastage of valuable human resources as the staff will have to type and repeat the same thing again and again.
- Lack of communication with the citizen, because before connecting to the citizen every person will have to take the approval from the competent authority leading to delay..
- Non tracking of resolutions of complaints or requests because there was no management information system wherein the entire thing could be seen or monitored. This also increased the cost and loss of valuable time along with other resources.
- Since not every grievance was heard and not every request was entertained or could be attended, it also led to a lot of political interventions in the working of the executive where in different councillors requested or lobbied to get the work related to their knowns completed sooner which led to further complications.

Limitations of Existing System

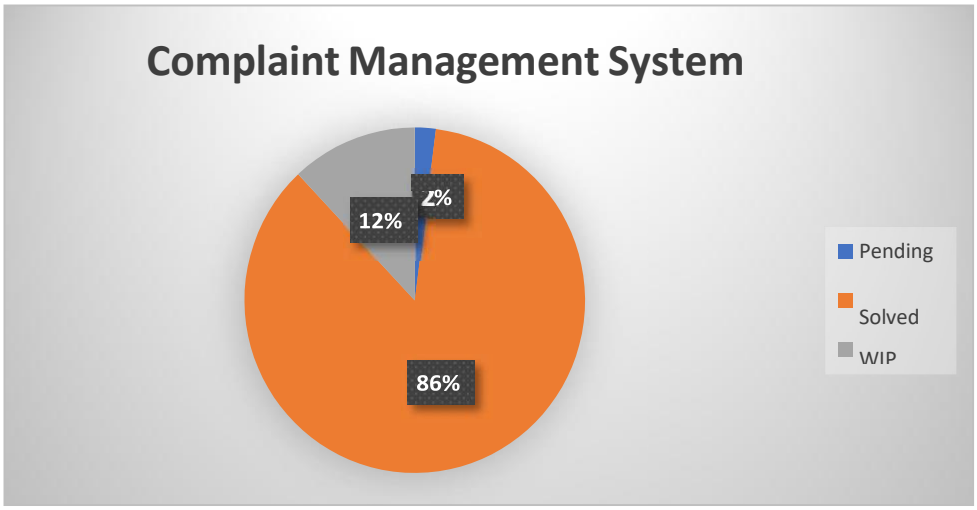
- No quick data searching facility for useful information
- Officer manually search data about complaints which they required to process.
- No proper management of information
- Data and useful application capped in physical file, which itself are stored in data/record room.
- There is a possibility of one's complaint to be checked by one or more officer and same status reported by them.
- Possibility of loss complaint records is high
- All complaints handled manually, so there is probability to loss of complaint records because of transferring complaint record between different physical levels.
- Lots of paper work



- For single complaint many documents needs to be created.

Objectives of System

- Fast and various way of searching
- Report Facility
- Higher speed of receiving complaints
- Auto distribution of complaints among different departments
- Citizen can send complaint from his mobile phone or web
- Citizen get alert SMS on status update
- Citizen can communicate with officer via Chat box provided in complaint status page
- Summary Report to analyse response time



This project was given with the fact that Silvassa Municipal Council had come into existence in 2006 and till 2017 there was no online system to create and redress these grievances. Thus, the need of the project was to make the registration of Complaints, Grievances, suggestions, seeking information applying for common services easy on the partof the citizen and also easy for the Silvassa municipal Council employees to maintain.

While developing the system customized to the needs of the existing system of Silvassa Municipal Council, we realized that the main problem was the complaint registering mechanism. The traditional system had unnecessary handovers and too many stakeholders instead of a simplified and unified approach. While devising Complaint Management System, we focussed on a platform independent application that could be accessed from anywhere in the system. It would be a digital tool to reduce the service gaps between the government officers and the citizens so that the complaints were maintained and tracked digitally without any loopholes or human errors. This platform would not only help the citizens but also help the staff of the municipality to categorize and distribute tasks and complaints to specific stakeholders. This system could deal with the day-to-day problems of the citizen with efficiency and correctness.

Implementation Strategy of the System

(i) Conducting baseline study along with the stakeholder consultation

The citizens, SMC department heads, staff members, corporators and other government officials were consulted for finding the real time on-field problems. Through conversations and surveys, problem areas of each stakeholder were noted and were prompted to list the areas where they think the system could improve on. This on-field information of the process that the stakeholder went through on daily basis were then used to understand and filter the features that should be adapted to the system.

(ii) The core loopholes identified

- Immense paper work with risk of loss or being unattended
- Incomprehensive complaints history
- Inconsistency in customer interaction

- Lack of prompt updating as to when a complaint issue has been resolved
- Lack of legitimate, precise & concise data about the customer's requirements & needs

(iii) Implementation model

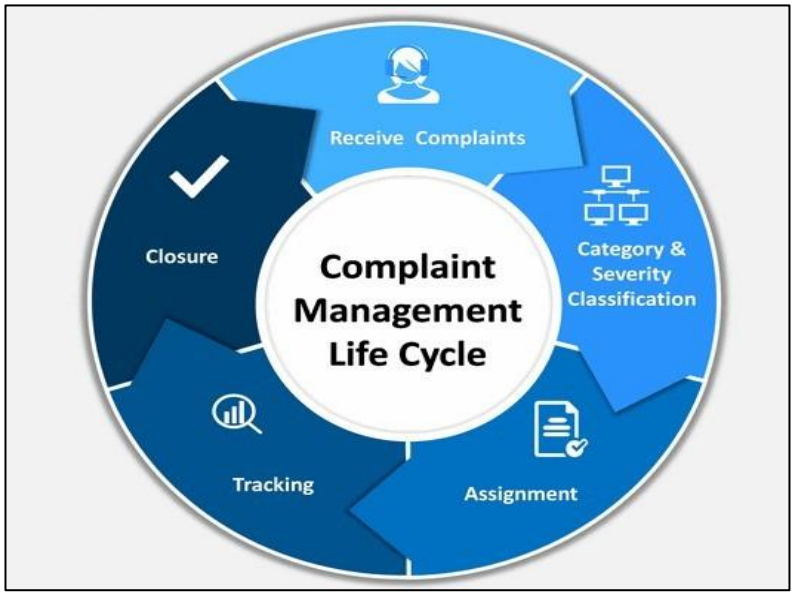
After understanding the scenario of the current system, the needs of the stakeholders and the major loopholes, we mapped our solution and created a fully digital system. This system would connect the citizens to the municipality officials at the tap of their finger through the channels of Web, SMS as well as mobile applications. An integral part of the system would be Responscity's GeoTag model where each house in the city is tagged with Easy City Codes that can be used to detect and trace the complaints better by the officials. The whole Citizen Connect model is compiled with features like Geo Tag that makes it possible for the whole process of the complaint system to be fully done with the help of technology.

(iv) Process Flow of Complaint Management System

Here is a step-by-step process of how CMS works in Silvassa after the implementation of the system

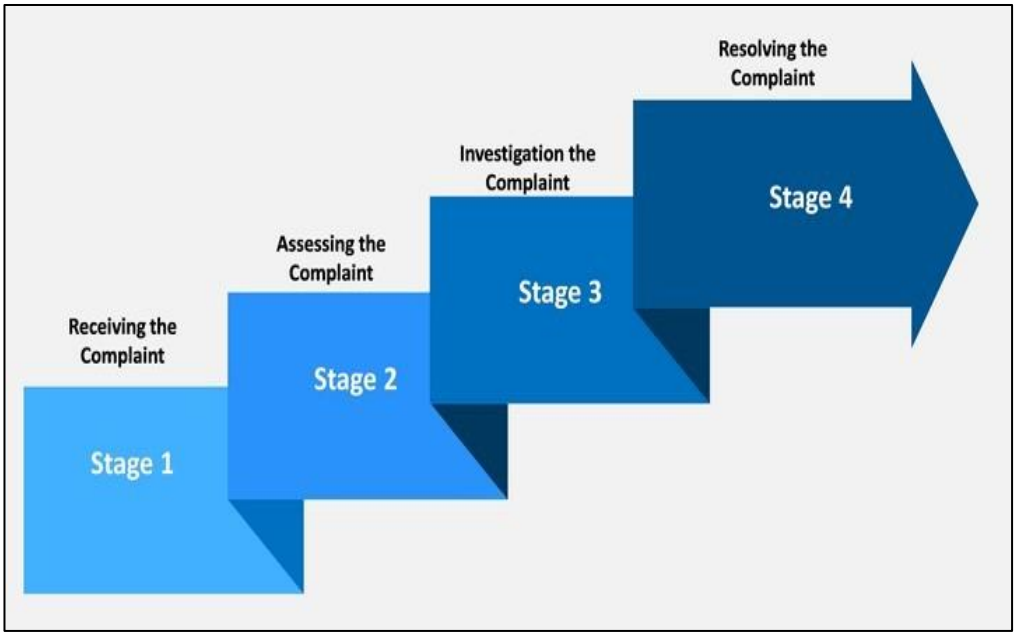
- Citizens having dissatisfaction over service provided by the SMC, can lodge a complaint on web or mobile based application of Complaint Management System. Afterward, they can attach the relevant documents or images and the geolocation with the complaint lodged.
- Complaints will be then sorted out as per the department under SMC, this will auto assign the ownership of the complaint to the concerned official along with a due date.
- The concerned official will be provided with related details on the web and an on-field officer will connect with the citizen for a better understanding of the problem reported.
- In an eventuality, the concerned official fails to solve the complaint in the given timeframe, the complaint will be forwarded to the higher authority to take sufficient actions.

- On the successful resolution of the complaint, a notification in the form of email and SMS is transmitted to the complainant. The notification consists of a URL which will facilitatethe complainant to give feedback to the concerned authority.
- As per the feedback received, the SMC would be evaluating the performance of its employee and can reopen the complaint if the complainant is not satisfied with the cooperation.



(v) Data Flow

When a user accesses the Complaint Management System webpage, the complainant is provided with a form. The form collects information about the name and contact details of the complainant along with the category of the complaint. Complainant then registers a complaint of the inconvenience faced. They can also provide necessary documents or images. Complaint can also provide the geolocation specific to the complaint. On registering the complaint, a complaint ID is generated to access the status of the complaint registered. Once the complaint is assigned to the concerned official, he can transfer the complaint to the concerned officer if not found relevant to his domain. The complaint could also get cancelled if he or she is found duplicate or false. Any update of the complaint is accessed easily by the complainant through the platform and after the completion status, they are prompted to leave feedback for the officials.



(vi) Capacity Building and Awareness & Communication Approach

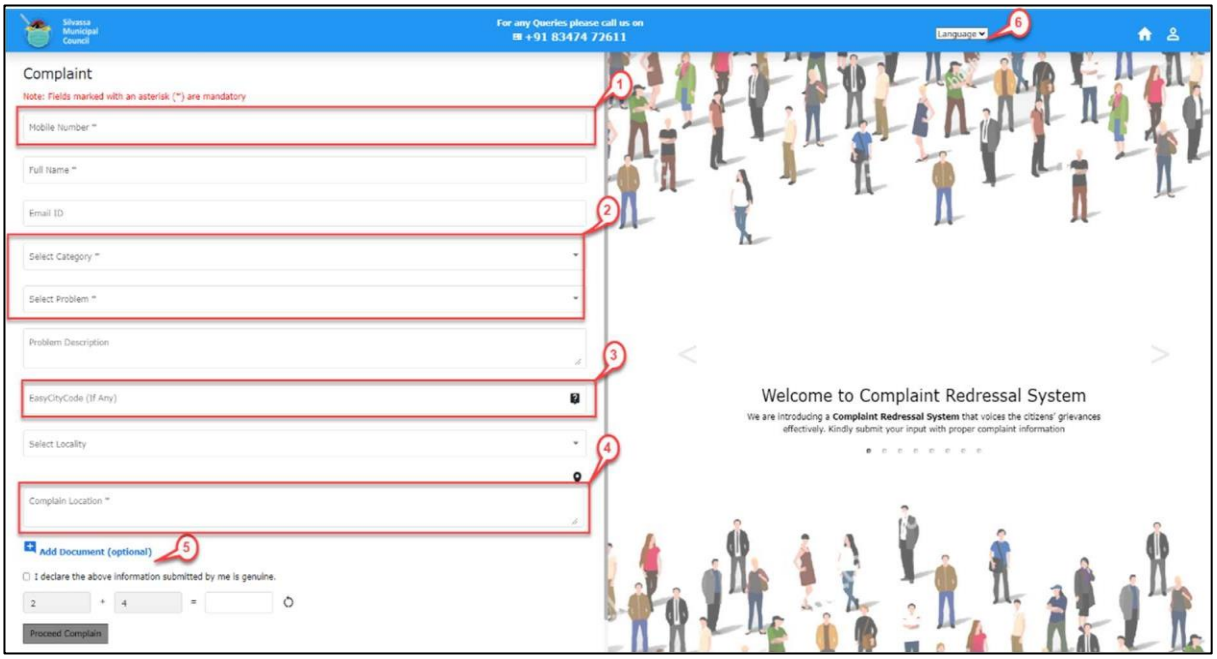
- Training was conducted among all the staff of Silvassa Municipal Council.
- The citizens of Silvassa were made aware of the Citizen Connect implementation for complaint management through press notes in Newspapers, Press conferences, Social Media platforms and meetings with RWAs.
- Silvassa Municipal Council also distributed pamphlets and installed hoardings in prime locations in the Silvassa Municipal Council area.
- Best Performing staff were awarded to ensure an active participation of staff in resolving the complaints.

(vii) Automated, Assisted and/or Physical Assessment or Feedback Mechanism is placed in public places to ensure the success of the system.

(viii) Consent Management, Data Privacy and Cyber Security Aspects Software helps to keep citizen personal information secured and prevent the breach of privacy. The secure, password-protected platform is safer than storing data in database. Role-based access facilities the officers to choose who can see and work on each complaint to maintain confidentiality.

Features

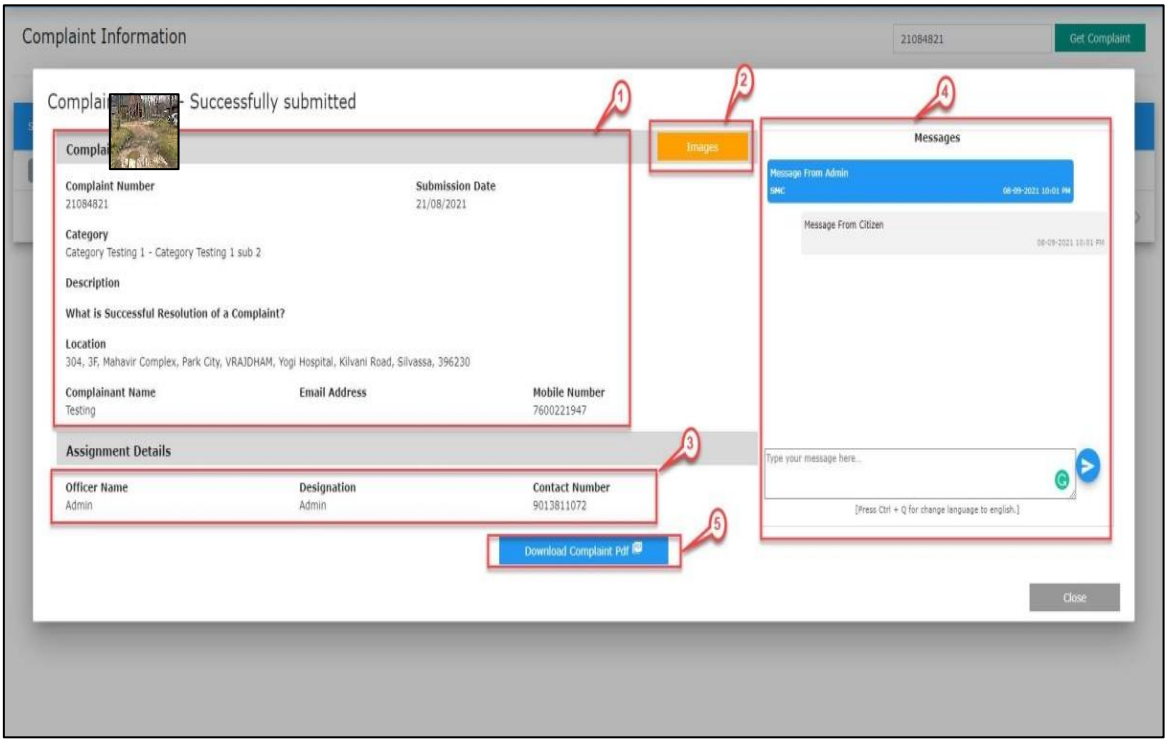
- Complaint Form with Advanced Features
- Auto fetch citizen information using mobile number. (If citizen has already applied for any complaint)
- Based on category citizen can select problem and assigned to officer.
- Easy City Code is added as optional to fetch locality and address.
- It is mandatory to add complaint location for officer investigation.
- Citizen can add multiple documents related to complaint.
- Citizen can change fields language with Hindi, English and Gujarati.



Complaint Status

- Citizen can use mobile number or complaint number to check the status of complaint. By using mobile citizen can also see all the past complaints. In complaint status, citizen can check status of complaint and details related to complaint with information of officer who is investigating/resolving the given complaint.
- Citizen can check or review the uploaded documents related to the complaint and on the other side officer can upload complaint resolving documents. These are visible to citizen.

- Complaint assignment details are given in complaint details with officer name and contact number.
- Officer and citizen can communicate with each other using chatbox bot.



- Citizen can download complaint using download button for future purpose.

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8. Third Eye: Evidence Based Policing Using CCTV Surveillance Matrix in Baddi, Himachal Pradesh

Key Words:

CCTV, Property Offences, crime, surveillance, prevention, public safety, policing.

Abstract: Closed Circuit Television (CCTVs) have made long ingress into the human lives and its use in the daily lives of citizens is increasing with every passing day. Police forces across the country have been relying on this mode of technical surveillance both for preventive policing as well as solving the crime after it has happen. However, till now money has been invested mostly in the CCTV installations, and scant attention has been given on studying the impact of their installations in the public domain. In this backdrop, this initiative involved installation of CCTVs from the public funds as well as under Private Public Partnership followed by analysis of the impact of the CCTV installations with respect to the property offences being committed by the criminals in the Police District Baddi, District Solan, Himachal Pradesh using easily replicable methods, Google My Maps, and standard GIS tools. The initiative applied the existing criminological theories with an aim to make this video surveillance technology more relevant for the police forces in the field. Findings suggested that there was significant reduction in the crime rate, spatial displacement and dispersion in crime was noticed and recovery of stolen property also increased with the help of the CCTVs. There was decrease of 19% in theft and burglaries in 2019 and 37% decrease in 2020 as compared to 2018. Unsolved property offences also reduced in 2019-20 by 50% when compared with 2018. Cost-benefit analysis of the invested public money was done and it was found that the CCTV technology has vastly increased the efficiency of the policemen acting as a force multiplier.

1. Introduction: Situation Before the Initiative

Conventional policing focuses mainly on the physical presence of the police force in the field whereas evidence-based policing involves statistical as well as geo-spatial analysis of crime in

order to develop suitable models to further detect, defend, mitigate and prevent the crime. Video Surveillance and analysis through CCTV as a part of evidence-based policing has been growing during the past few years. The proverbial third eye, opens up many aspects of street crimes which otherwise go unnoticed by the human eyes [1]. In spite of the high investigative value attached with the CCTVs, the focus of the agencies has been primarily on installation of more and more CCTVs in the public domain and very less on assessing the impact of the installations or doing the cost. Benefit analysis for extracting maximum benefits from the technology and analysis of patterns.

The scope of the present initiative was to assess the impact of the CCTV installations in the Police District Baddi, District Solan, Himachal Pradesh, installed under Public Private Partnership (PPP) with respect to the property offences, especially thefts and burglaries which have happened from the year 2017 to 2020 to further develop strategies for implementation in the field for better police performance.

Police District Baddi is an industrial hub having four police stations viz. Ramshehar, Nalagarh, Baddi and Barotiwala. All together they make one of the largest Pharmaceutical Hub in the North India. The industrial hub is spread over an area of 800 km^2 providing direct/ indirect employment to over 5 lakh people.

Major installation drive to install the CCTVs on streets in the district was started in the year 2019 under Public Private Partnership (PPP Mode). Total 2038 CCTVs have been installed in the Police District, including 1845 CCTVs installed by the industries under their Corporate Social Responsibility (CSR) / PPP Mode initiative on the roads outside their factory gates which has helped in developing a vast network of CCTVs on the public roads.

The initiative is structured as follows: Section II discusses the existing criminological theories supporting public surveillance systems; Section III explains the strategy & methodology including the data source, approach followed in the initiative, assumptions made during the analysis and setup of Control Room, CCTV and Cyber Labs under PPP Mode; Section IV discusses the results and analysis done in the initiative;

Section V focuses on the challenges and limitations faced during the study; Section VI further discussions and conclusions are made; areas for future replication and way forward is discussed in Section VII.

2. Literature Review

In recent years there has been a tremendous growth in the use of CCTV to prevent crime in public space [2]. Surveillance through CCTV in the public space has been an important tool to both prevent and solve the crime happening in the society [3]. The rational choice theory and routine activity theory support the notion that crimes decrease in the area where formal surveillance is present. More focused approach towards surveillance involves mapping of crime to selectively target particular areas where incidence of crime is high. Much of crime mapping is devoted to detecting high-crime-density areas known as hot spots. This Hot spot analysis helps police identify the high-crime areas, types of crime being committed, and the best way to respond [4]. Increase in CCTV surveillance in particular hotspots, it has been noticed that, there is decrease in crime [5] as well as displacement of crime [6]. Few studies are available which examine the issues in CCTV operations like effectiveness with respect to impact on crime, deterrence of crime and information collected by local surveys where authors have explained that CCTVs could be useful tool in the combating of crime [7] CCTVs, however, should be installed and managed in a scientific way keeping in mind the appropriateness of the location and reflecting the local crime situations for optimal utilization of resources.[8]

3. Strategy & Methodology

Four-Pronged Strategy:

1. **Installation:** CCTVs outside factory premises focusing on roads were installed by industries under PPP Mode as well as under public funds.

Fig. Installation of CCTVs outside factory premises.

2. **Maintenance:** Annual budget from local development authority was taken as a policy feature for maintenance of CCTVs
3. **Repair:** A dedicated Police CCTV Wing was set up for 24X7 CCTV maintenance.
4. **Analysis:** Mapping of CCTVs using Google My Maps open-source application. Mapping of crime hotspots was done too and side by side analysis was done with respect to Evidence Based Policing / Preventive Policing which resulted in better public service delivery to the public.

Fig. Four Pronged Strategy: Installation / Maintenance / Repair / Analysis

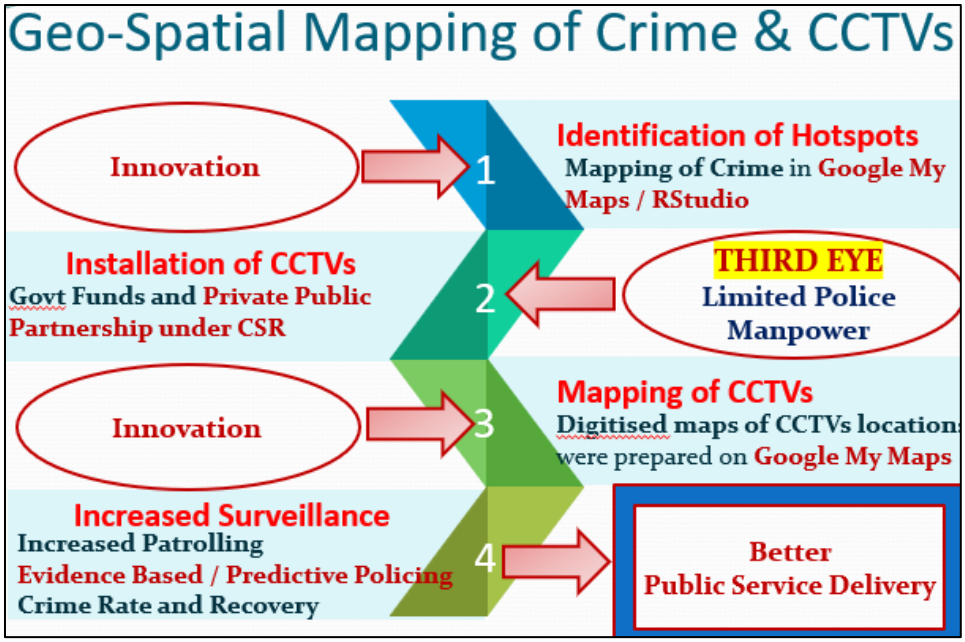


Fig. Methodology of the Project

Data Source: Data related to the property offences i.e., thefts and burglaries registered under sections 379, 457 and 380 of Indian Penal Code (IPC) was extracted from the Crime and Criminal Tracking Network System (CCTNS) for the years 2017 – 2020 for the entire police district. Simultaneously, data regarding the installation of the CCTVs was taken on record from the Security Branch, Superintendent of Police Office, Police District Baddi.

Methodological Analysis: The raw data related to property offences for the period under study was first compiled in Microsoft Excel. Further, small teams were formed that visited every spot of crime and tagged the exact GPS location of the crime scene using an online form builder Jotform. Based on the Survey of India maps, boundaries of the district were plotted on the Google My Maps. This was followed by simultaneous plotting of all the crimes, CCTV locations and jurisdiction boundaries of the district (including the police stations) on the Google My Maps. For analysis of the data, RStudio software was used to understand the displacement of crime, prediction of crime hotspots and assessing the effectiveness of CCTVs installed. A public survey on the feedback of CCTVs use in the public domain was also done in the field and ten multiple choice questions were asked randomly from 100 people and the results were tabulated using Google Forms. The target group included shopkeepers, passengers walking on the roads,

students, females, etc. Conclusions were drawn based on the assessment of data with further suggestions to improvise the working of the CCTVs.

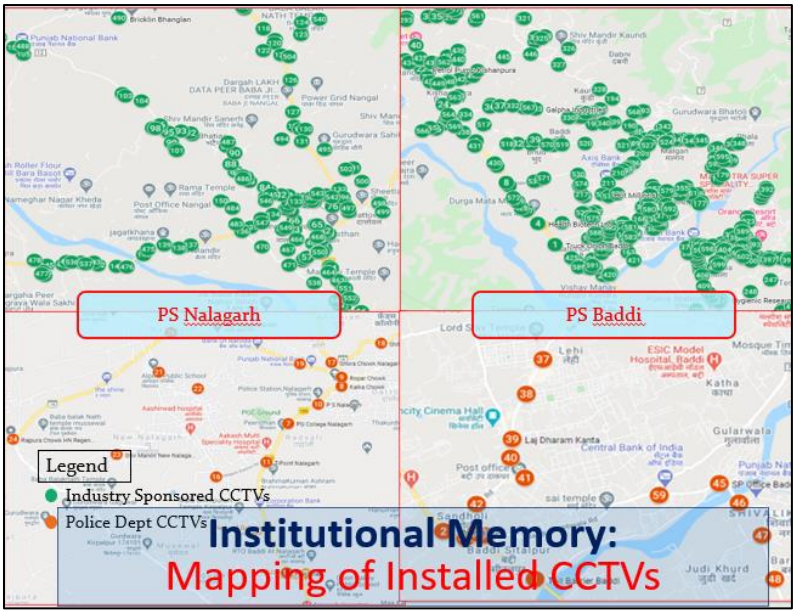


Fig. Mapping of CCTVs

Assumptions: Analysis of only those property offences was done which were reported and registered in CCTNS as First Investigation Reports (FIRs). Assessment of the crime not reported or reported but not registered was not included in the study. The value of the stolen property mentioned in the FIR was only considered and subsequent depreciation/ appreciation was not included in the study. Data related to 112 Emergency Response System was not included in the study. Overall, there was reduction in crime resulting both less mobility of people in the year 2020 due to Corona virus (COVID-19) pandemic in the world. While performing the cost-benefit analysis, only the cost incurred by the government in the installation and maintenance of CCTVs was considered. CCTVs installed by the private industrial units under their Corporate Social Responsibility (CSR) was not considered to measure the recovery affected with the help of CCTVs.

Old Control Room was renovated with all Command and Control under one roof with all HF, VHF, Fax, Email, Emergency Response Support System (ERSS), Vehicle Mount Cameras and other internet enabled CCTVs were brought under single command centre. Dedicated CCTV and Cyber Lab were setup under PPP Mode.

Fig. Old Control Room (Left) and New Control Room (Right)

Fig. CCTV Footage Analysis Lab and Cyber Crime Lab setup under PPP Mode

4. Analysis And Results

Prediction of hotspots: GIS data related to property offences, including thefts and burglaries (covered as per sections 379, 457 and 380 of IPC) from the year 2017-2020 was plotted on the RStudio Software and Google My Maps. As depicted in the Fig. below, two major hotspots of crime were identified in the district (K-Means clustering algorithm). Hotspot under police station Nalagarh accounted for 50% of the property related offences in the past four years but occupied

only 5% of the entire area of the police station. Whereas, hotspot in Baddi accounted for 65% of the crime but accounted only 14% of the area. Both hotspots primarily were present in the residential and urban areas of the district.

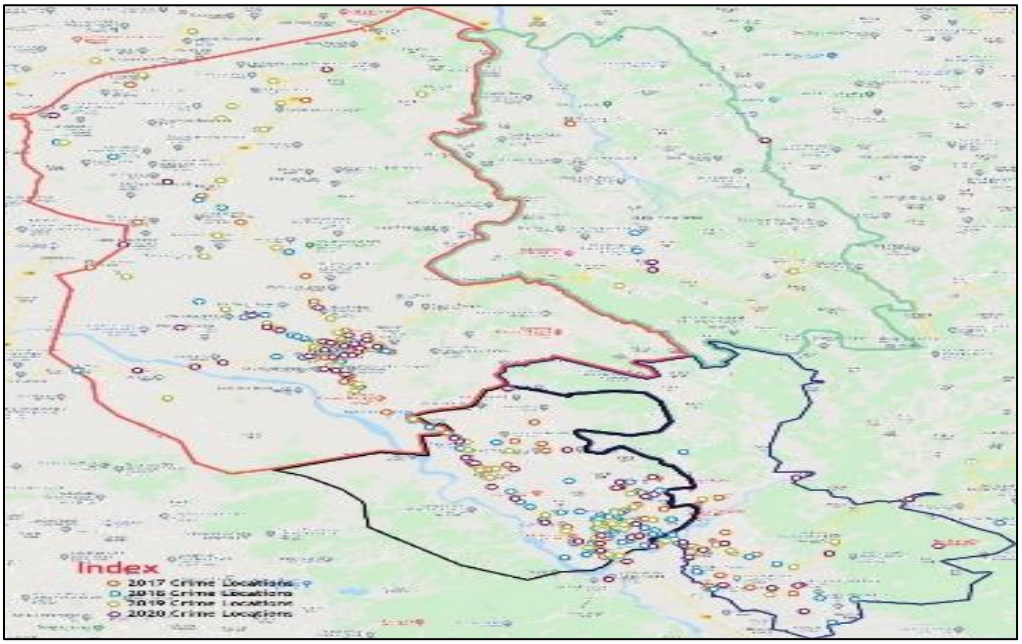


Fig. Hotspots of Crime. Year 2017 – 2020

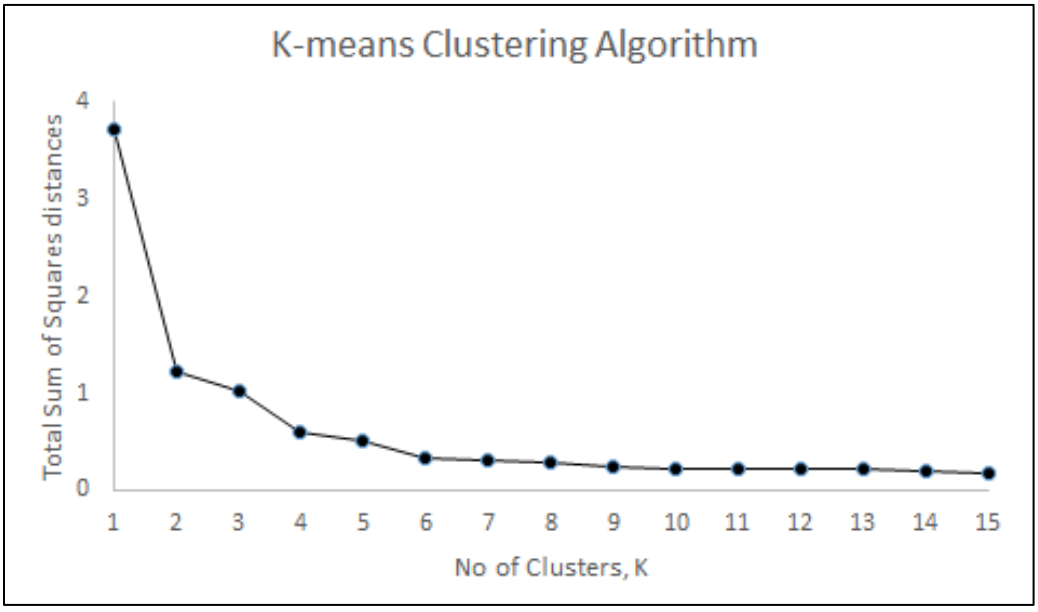
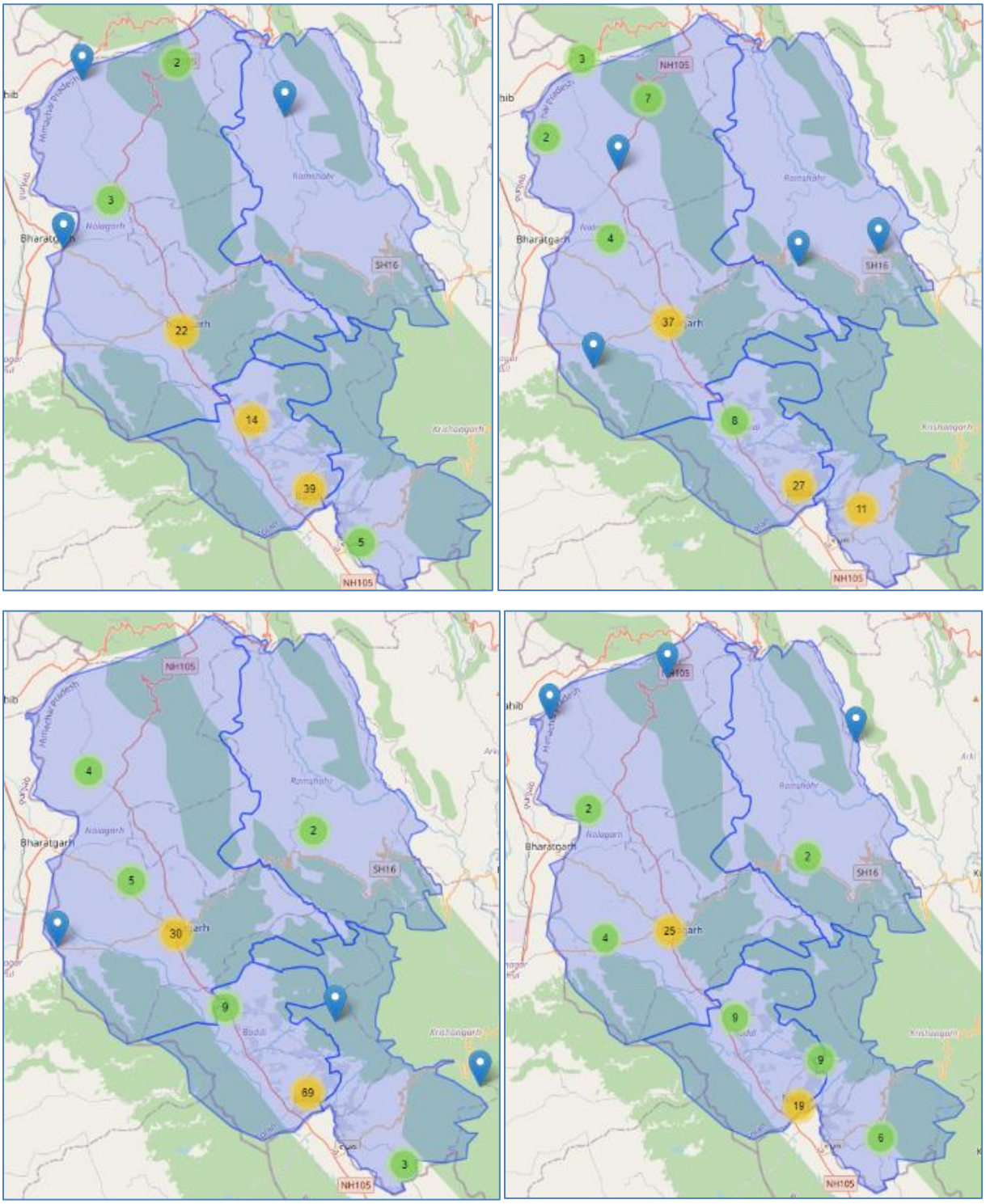


Fig. K-means Clustering Algorithm

Geo-spatial and temporal displacement of crime: Next, GIS data of individual years from 2017 to 2020 was plotted in RStudio to understand the crime displacement post CCTV

installations in the district. 90% of the CCTV installations in the district were between January to April 2019. Figs. below depict that geo-spatial displacement of crime was noticed post CCTV installations.



Figs A-D. Geographical Displacement of Crime from the year 2017 – 2020 consecutively.

New hotspots developed in 2019 & 2020 in the Nalagarh rural area north west of the core hotspot of Nalagarh town, bordering Ropar district (Punjab). Similarly, another new hot spot developed in Barotiwala rural area (11% share in crime in 2019) south east of the core hotspot of the Baddi town bordering Pinjore/Kalka of Panchkula district (Haryana). Year 2020 also witnessed a new small hotspot (11% share in crime in 2020) which developed near the boundary of the Baddi and Barotiwala Police stations. Fig. below shows that the percentage of the crimes happening in the core hotspots of Nalagarh and Baddi towns decreased consistently indicating that crime was displaced post CCTV installations and new rural hotspots emerged in the periphery.

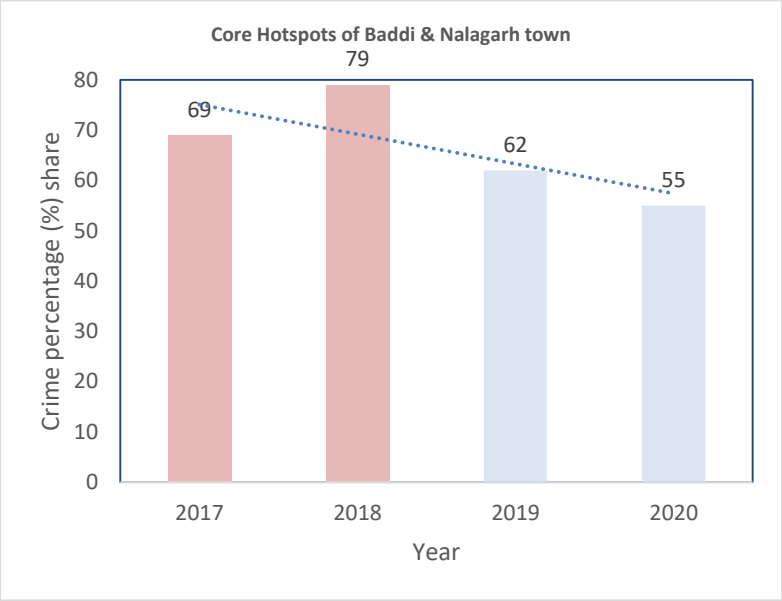


Fig. Percentage of crime happening in the core hotspots of Nalagarh and Baddi from the year 2017 – 2020.

Percentage share of core hotspots of Baddi and Nalagarh town decreased from 79% in 2018 to 55% only in 2020. However, no temporal displacement of crime was noticed. Fig. below depicts that the peak hours of incidence of crime remained between 00:00 hours to 04:00 hours both pre- and post-CCTV installations.

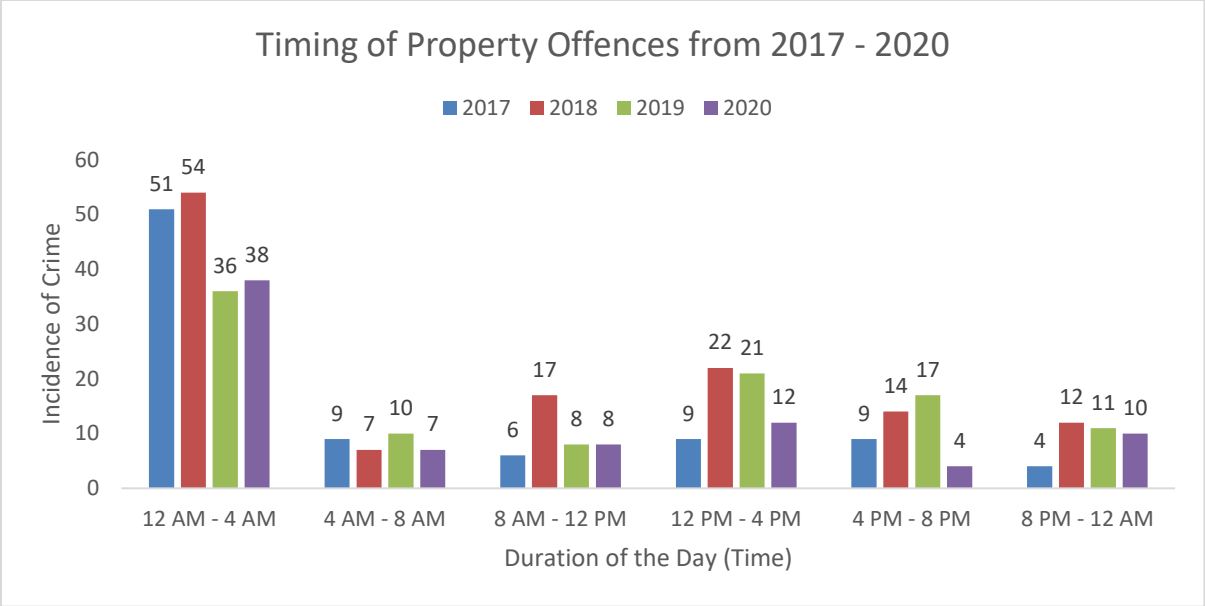
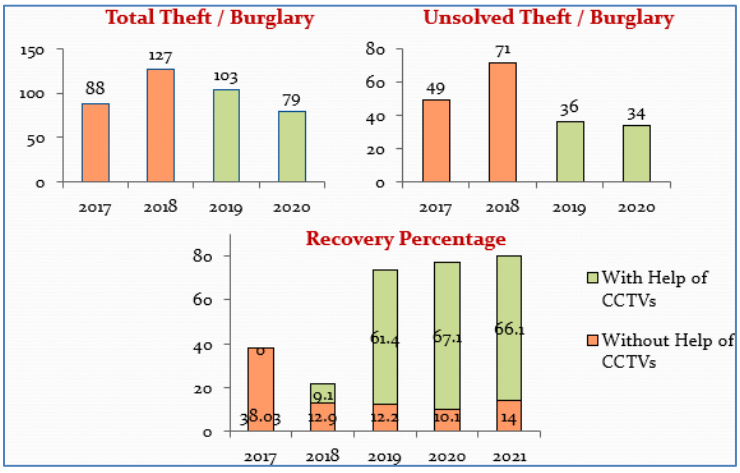


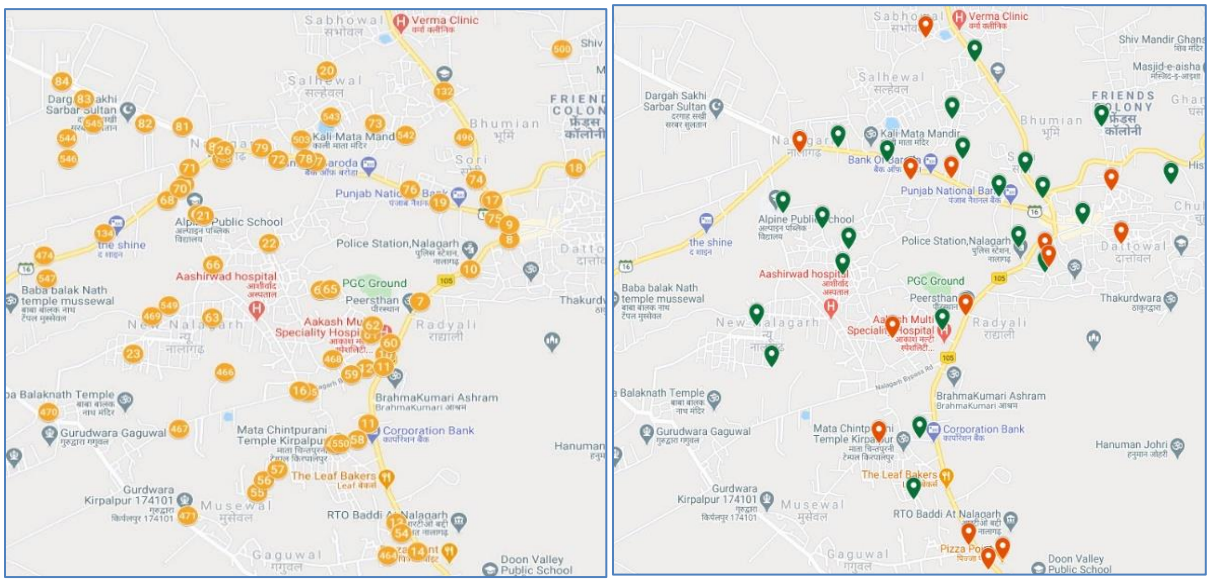
Fig. Timing of Property Offences from 2017 - 2020

Impact on crime incidence and recovery rate: Table 1 presents the total property offences cases registered from 2017-20, unsolved cases and the recovery of stolen items in these years. There was decrease of 19% in the incidence of theft and burglaries in 2019 and 37% decrease in 2020 compared to 2018. Unsolved theft and burglaries also reduced in 2019-20 by 50% when compared with 2018. At the same time, there was massive increase in the recovery of stolen property. Recovery percentage was just 21.84% in 2018 which increased to 73.67% in 2019 and 77.10% in 2020, majority of which was linked with the use of CCTVs. Figs. below depict the core hotspot of the residential area of Nalagarh where majority of the cases were solved due to large number of CCTVs present in the vicinity.



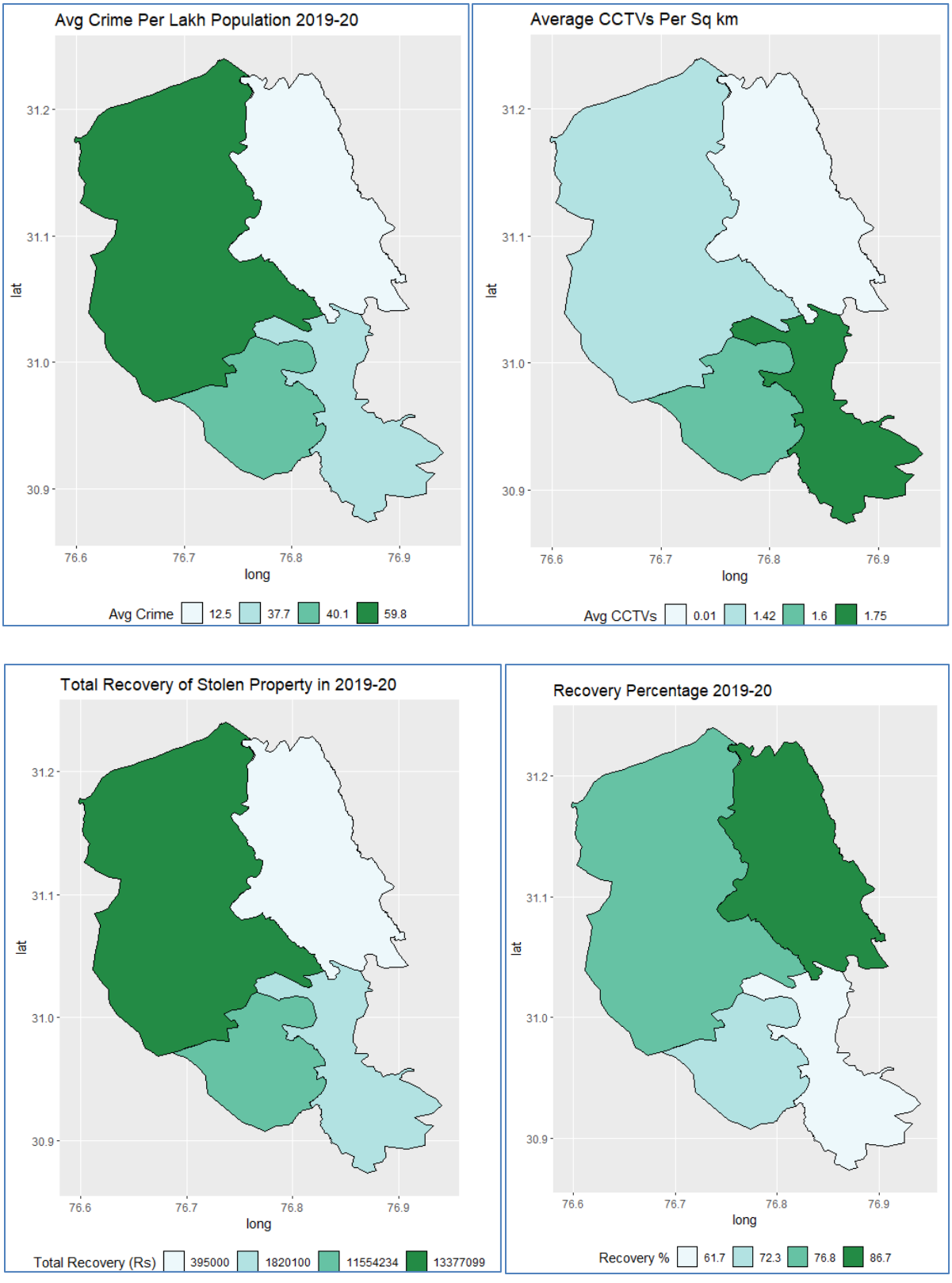
Year	Total cases of theft and burglaries	Unsolved cases	Recovery percentage	Solved Cases Percentage
2017	88	49	38.03	44%
2018	126	71	21.84	43%
2019	103	36	73.67	65%
2020	82	34	77.10	58%

Table 1. Total property offences from 2017 – 2020 and corresponding recovery



CCTVs locations **Solved Cases (Green) vs Old Cases (Red)**

Figs. Core hotspot of New Nalagarh where majority of the cases were solved with the CCTVs present in the vicinity.



Figs. AA-AD. Spatial analysis of Installed CCTVs vis a vis crime

Further spatial analysis of installed CCTVs vis-a-vis crime was done for all the police stations as presented in the Figs. below. Fig. AA shows that average crime per lakh population was highest i.e., 59.8 crimes in Police Station (PS) Nalagarh in 2019-2020. In Contrast, average CCTVs per square kilometre (sq. km) were highest to 1.75 in PS Barotiwala (Fig. AB) but recovery percentage was lowest i.e., 61.7% (Fig. AC). If low crime, PS Ramshehar is left aside, PS Nalagarh performed consistently with second highest recovery percentage and highest recovery of stolen property in absolute numbers (Fig. AD).

Further, sub-crime categories e.g., vehicles, industrial/raw material, cash & jewellery, household articles, mobile phones, cattle, etc were studied in the years 2017-20 and it was observed that nearly 60% of the crime comprised of vehicle or cash & jewellery related thefts and burglaries. Even after the installation of CCTVs in 2019-20, the break up percentage of the sub-crimes remained almost same. At the same time, different types of property offences of 2019-20 were analysed to study the impact of CCTVs in terms on recovery in a particular type of property offence. Table 2 shows that CCTVs were most effective in solving cattle & mobile theft/burglary related offences (100%), followed by offences related to cash and jewellery (83%). However, in terms of absolute numbers, CCTV guided solved vehicle theft/burglaries cases remained the highest.

Serial No	Type of Offence	Total cases registered in 2019-20	Total cases solved	Total cases solved with the help of CCTVs (percentage of total)
1	Vehicles	74	38	28 (74%)
2	Cash & Jewellery	34	24	20 (83%)
3	Industry Material	25	22	14 (64%)
4	Cattle	4	4	4 (100%)
5	Mobiles	9	4	4 (100%)
6	Others	39	20	11(55%)
	Total	185	103	81(79%)

Table 2. Different types of crimes registered in 2019-20 and corresponding cases solved with the help of CCTVs.

Cost-Benefit Analysis: Total cost involved in the CCTV installations and maintenance was divided into five parts i.e., maintenance of old cameras, one-time installation, recurring repair

and maintenance yearly cost, internet charges for the Internet Protocol (IP) enabled CCTVs and setup of central CCTV control room in the SP Office, Baddi. The cost is tabulated in the Table 4.

Serial Number	Type of expense	Number of CCTVs	Expenditure
1	Maintenance of Old Cameras	10	Rs 2,09,885
2	New Installation of cameras	153	Rs 31,17,028
3	Recurring repair and maintenance cost for two years (2019-2020)	134	Rs 5,51,800
	One-time installation charges for dongles near CCTV sites	75	Rs 55,000
4	Internet charges for IP Enabled CCTVs & control room for two years (2019-2020)	75	Rs 6,53,477
5	Setup of CCTV Control Room	-	Rs 8,56,580
Total charges for two years (2019-20)		-	Rs 63,01,003

Table 4. Cost of CCTV installation in 2019-20.

Nalagarh		Baddi		Barotiwala		Ramshehar		Total	
Police	Industry	Police	Industry	Police	Industry	Police	Industry	Police	Industry
73	623	66	888	40	334	14	0	193	1845

Table 5. Breakup of CCTVs installed by the police department and under Corporate Social Responsibility (CSR) initiative by private entities.

Total recovery of stolen property affected with the help of CCTVs in the district in the year 2019-2020 for two years is tabulated in Table 6.

Serial Number	Police Station	Total cases registered	Total cases solved	Total cases solved with CCTVs help	Percentage cases solved (%) with CCTVs	Total Recovery	Total Recovery with the help of CCTVs
1	Nalagarh	91	60	40	66	Rs 1,33,24,309	Rs 1,20,18,979
2	Baddi	57	31	27	87	Rs 1,16,94,115	Rs 1,04,14,234
3	Barotiwala	32	19	13	68	Rs 18,76,100	Rs 14,39,000
4	Ramshehar	5	2	1	50	Rs 3,95,000	Rs 2,80,000
Total		185	112	81	72	Rs 2,72,89,524	Rs 2,41,52,213

Table 6. Total recovery of stolen property affected with the help of CCTVs.

Tables 4-6 clearly show that the total recovery affected with the help of CCTVs was Rs 2,41,52,213 which was 3.8 times more than the cost incurred and the public investment done in 2019-20. There were several other cases like accidents, serious crimes like murder, dacoity, crime against women, etc in which the presence of CCTVs was immensely helpful in solving the crime but they were not included in this study.

Survey on public opinion regarding installation of CCTVs: To understand the perception of the people about how the CCTV surveillance is used by the police authorities and attitude of the public towards it, a survey was done in June – July 2020 in the district. The target group involved 100 people randomly chosen from amongst the shopkeepers, passengers walking on the roads, students, females, etc. The results are tabulated in the Table 7. Majority of the people said that they felt safe with the presence of CCTVs and believed that CCTVs prevent crime. Considerable percentage of people believed that criminals can escape CCTVs and were sceptical about their working.

Sr. No.	Question asked	Rating (Percentage)			
		Shopkeepers	**Passengers**	**Students**	**Females**
1	Know about CCTV	85	85	100	65
2	Feel safe around CCTV	65	71	75	61
3	Believe CCTV prevents crime	71	82	85	54
4	Criminals can escape CCTV	65	47	65	62
5	Doubtful about CCTV working	41	41	30	54
6	CCTV installations should increase	88	71	70	85
7	CCTV invades privacy	18	47	65	46
8	Will install CCTVs	95	71	70	77

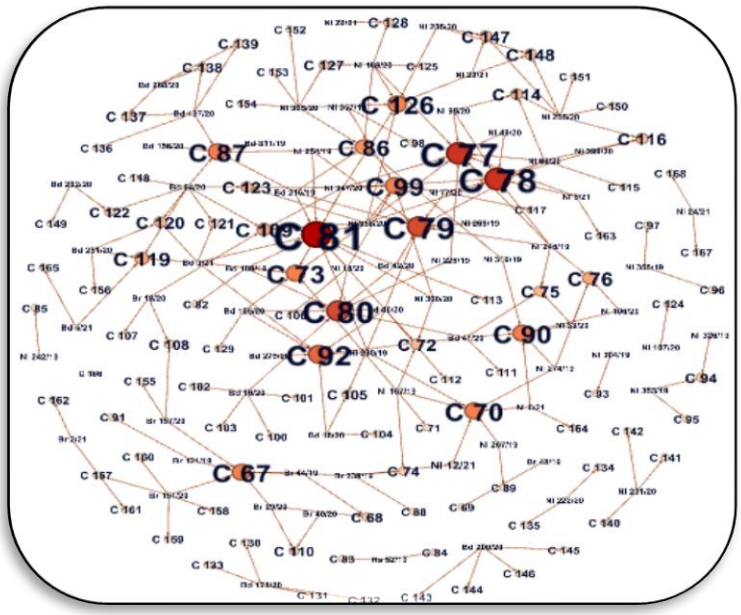
Table 7. Survey on public perception about CCTV surveillance

Diffusion of crime control benefits: Apart from the decrease in the property offences as well as increase in recovery of stolen property, as a "free-rider effect" there were few other improvements noticed as well. Hooliganism on streets reduced to a certain extent and investigation of crimes related to hurt / rioting in public places became easy to investigate. Unsolved cases of hit and run (blind accidents) also reduced considerably as depicted in Table. Boards conveying, "*You are under CCTV Surveillance*" were set up at various busy public junctions, bus stands, other public places, etc. Regular dissemination of information in media regarding more and more installation of CCTVs was done as and when funds were received from various government agencies. Occasionally press briefings also hinted at the help derived from the CCTV coverage. All measures, including the survey helped in raising awareness among the public, and assisted police in resolving other offences and in other areas where CCTVs were not installed.

Year	Cases registered (Hit and Run)	Cases untraced / unsolved	Percentage of unsolved cases
2017	179	50	28%
2018	181	49	27%
2019	169	36	21%
2020	149	18	12%

Table . Hit and run accident cases from the year 2017 - 2020

Case Study: Criminal case number 299/20 dated 22/09/20 was registered in Police Station Nalagarh under sections of 307 Indian Penal Code (Attempt to Murder) & 25 Indian Arms Act (Organised Crime Syndicate) in which few criminals had fired gun shot on a scrap dealer in his shop while extorting the money. In the case police retrieved CCTV footages of 29 CCTVs spread across Himachal Pradesh & Punjab and got actionable evidence from 16 CCTVs. In two CCTVs located 35 km away from the scene of crime images of the criminals got captured clearly where they were not wearing any masks / not covering their faces. Criminals had changed the registration number plate of their vehicle before committing the crime but the genuine number of their vehicle was also captured in these CCTVs located far away. Based on the images, vehicle details and other evidences police arrested 7 criminals later and charge sheet was submitted in the court. The CCTVs provided exclusive technical intelligence to the police and gave immediate breakthrough in solving the case.



Network Analysis of CCTVs installed was done to understand that at which locations CCTVs were accessed more. Strategies were formed for more installation of CCTVs at those locations with prioritisation of repairs and maintenance.

Fig. Network Analysis of CCTVs. CCTVs / Nodes which were accessed more are displaced big and bold.

5. Challenges And Limitations

CCTV surveillance is considered to be very simple and at the same time challenging, raising doubts many times. Success and its failure, in terms of measuring its impact on crime, can be ambiguous at times. So, all challenges and limitations need to be factored in during the assessment of impact of CCTVs on crime management. Few major challenges observed in the field during the analysis of CCTV footages, undertaking literature review and assessment of issues related to procurement are being enumerated below:

1. **Interpreting hazy CCTV pictures due to environmental concerns:** Although cameras are most helpful in providing the evidence of a crime, they can betray the men in field on a foggy or hazy day. This is because the visibility of a camera goes down on a hazy day rendering it difficult to capture a clear picture or video of a scene. The visibility is further reduced in the poorly illuminated crime scenes.

2. **Operational issues and human actor – Monitoring, Detection, Time and manpower:** Monitoring single or multiple feeds of CCTVs at the same time becomes sometimes difficult for a single person in which there are chances that he may lose sight or miss an important detail of the scene of crime. Sometimes, vital evidence captured by the CCTV cannot be appreciated by the human eye. Post-event investigation, video evidence from multiple cameras, locations, and data is collected and reviewed. These enormous quantities of video data translate into hours of manual review which requires huge manpower and time. To overcome such challenges, AI-backed video analytics is becoming a de facto standard for law enforcement agencies worldwide. Other human factor factors which increase the challenge in the analysis include multiple monitoring of screens, method of monitoring (split vs single screen), room ambience, field of view of cameras, bandwidth issues, etc.

3. **Training:** Often men in the field face issues related to training regarding handling CCTV footages which becomes a handicap, and in spite of availability of video data, the crime goes unsolved, due to lack of knowledge and tools for analysis of large volumes of data, inadequate analysis capabilities and competences.

4. **Repair and Maintenance:** CCTVs in the field require maintenance almost every alternate day, especially in extreme weather conditions like hot and cold climates, dusty environments, pollution, erratic power supplies, etc. Lack of adequate in-house police maintenance wing creates challenges for the field officials to retrieve CCTV footage when the actual crime happens. Moreover, funds are allocated for CCTV installations but very less budget is kept reserved for repair and maintenance for the next few years which also exacerbates the problems. Currently, most of the CCTV manufactures are China based so repair and maintenance has been a time-consuming affair in India. During corona virus (COVID-19) lockdown restrictions, required repair and maintenance / calibration, of electronic gadgets like CCTVs almost came to a standstill which affected the police functioning in the field.

5. **Fake Number Plates or use of masks during COVID-19:** Often criminals have started using fake number plates or plates with unauthorised fonts, tilted number plates, etc and covering their faces with masks which renders the CCTV surveillance helpless in zeroing on the criminals active on the streets.

6. **Lack of standardisation in the purchase:** Currently, there are no standard protocols or standardized specifications regarding the purchase of CCTVs. E.g. Box cameras, Automatic Number Plate Detection (ANPR) Cameras and Pan Tilt Zoom (PTZ) cameras are purchased based on the necessity in the field and technology without consideration to any specific standards or compliance guidance.

7. **Security and Privacy in Internet Protocol (IP) Enabled CCTVs:** It is a cause of concern as most of the systems are vulnerable to denial-of-service attack due to weak encryptions.

8. **Abstraction and orchestration in layers of technology and architecture used -** Such as Sensing layer; Communication layer; Platforms – related to Interfacing, Integration & Applications; Control & Command Centre, for Operation & Management and Service Delivery. All these layers require a systematic approach during installation and maintenance.

6. Conclusion & Lessons Learnt

In this initiative, we have explained reasonably that in various localities crime hotspots develop where the incidence of crime is high as compared to other areas. Such hotspots require aggressive surveillance through technology and patrolling in the field. CCTVs increase the efficiency of police units in terms of providing precise technical intelligence to solve the crime, and also act as a deterrent. The technology is immensely helpful for the police to keep a general surveillance and there is displacement of crime once surveillance systems are in place. Criminals tend to move in those areas where the chances of getting caught are less. However, the time of displacement of crime has not been observed. If regular maintenance and repair mechanism is in

place then results of CCTV installations will increase vastly. The initial costs in the installation are high but the recovery of public property with its help outweighs the initial costs involved.

The impact analysis of CCTVs installation is encouraging and with betterment in technology it can be a great asset in the near future. Moreover, with better video-analytics the true potential of the CCTVs can be better harnessed to solve all types of crime. As CCTV surveillance in public places increases in future, policy making will benefit from such evaluations of outcomes and implementation.

7. Way Ahead

Similar approach regarding impact of CCTV Surveillance on crime can be extended to other bodily offences like murders, dacoities, crime against women, traffic accidents, etc. Assessing the 112 Emergency Response System Call data parallelly with the criminal cases could give a better picture of effectiveness and efficiency of CCTV installations.

Analysis could be done on larger samples including entire state, solutions to challenges could be factored with focus on standardization and compliance to service/ abstraction and orchestration layers in architecture/ command and control/ interfaces. Also with better applications and capabilities built in the team, robust CCTV surveillance systems could be established in future for policing units in the field.

Media Coverage


नालागढ़ शहर पर सीसीटीवी की नज
बीबीएन में चोरी और सेंधमारी का क्राइम तो बढ़ा, लेकिन पुलिस भी 75 फीसदी मामलों को सुलझाने में रही सफल
अमर उजाला
प्रदेश
तीसरी आंख की मदद से नौ महीने में बद्दी में दबोचे 80 शातिर
सीसीटीवी नेटवर्क पुलिस केस रिकवरी में कर रहा मदद, अपराधियों की पहचान से लेकर उनके भागने के रूट तक चिह्नित करने में मिली सफलता
बीबीएन को सीसीटीवी कैमरों से किया पुलिस ने कवर
नालागढ़ और बद्दी में हर गतिविधि पर अब रहेगी तीसरी आंख की नजर
अपराधों पर लगाम लगाने हेतु पुलिस की सराहनीय पहल
आप कैमरे की निगरानी में हैं
अपराधियों पर सीसीटीवी से रखेंगे नजर
हाईटेक जिला पुलिस बद्दी अब करेगी लाइव नाइट पेट्रोलिंग
पांच वाहनों पर लगे कैमरे सीधा होंगे कंट्रोल रूम से कनेक्ट

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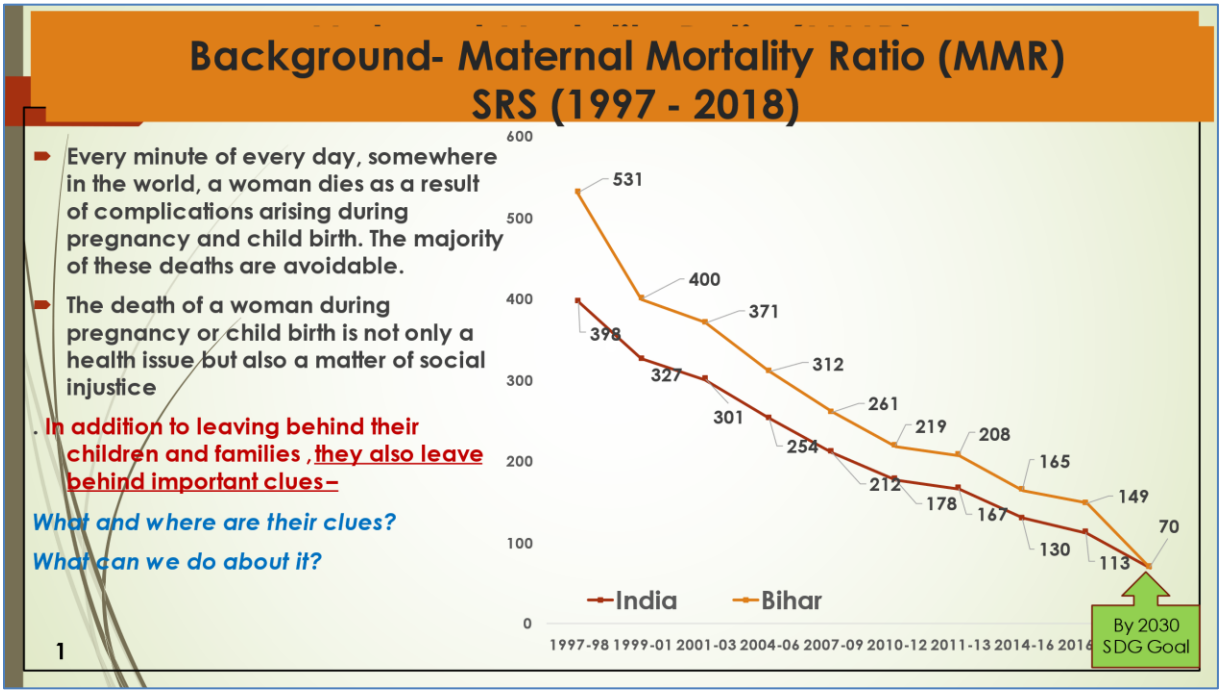
9. Wonder: An initiative to Reduce Maternal Mortality Rate, Bihar

Somewhere in the world, a pregnant woman dies every minute. Every Pregnant woman's death is not only a blow to family but also a loss to society and state. It is a sort of social injustice through technology and training, we aim to reduce the Maternal Mortality Rate (MMR) and set an example for the nation and the world.



Situation before the Initiative

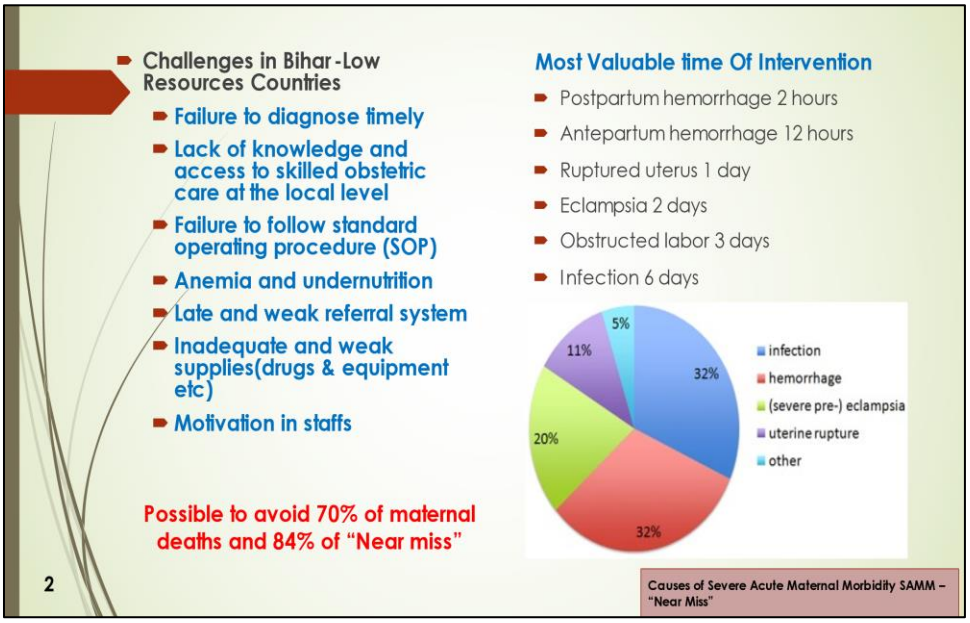
Darbhanga Faced Following Challenges before Implementation:

Failure to diagnose the problem timely resulted into many mothers developing complications and health problems. Lack of knowledge and access to the skilled obstetric care at the local level was a huge challenge. Failure to follow standard operating procedure (SOP), which is very critical in managing emergencies was a challenge too. Anemia and under nutrition was very prevalent. Late and weak referral system added to the woes. Inadequate and weak supplies (drugs

& equipment etc.), lack of skilled attendants meant that system was not geared to prioritize the emergency and respond promptly. And due to all above factors, motivation in staffs was low.

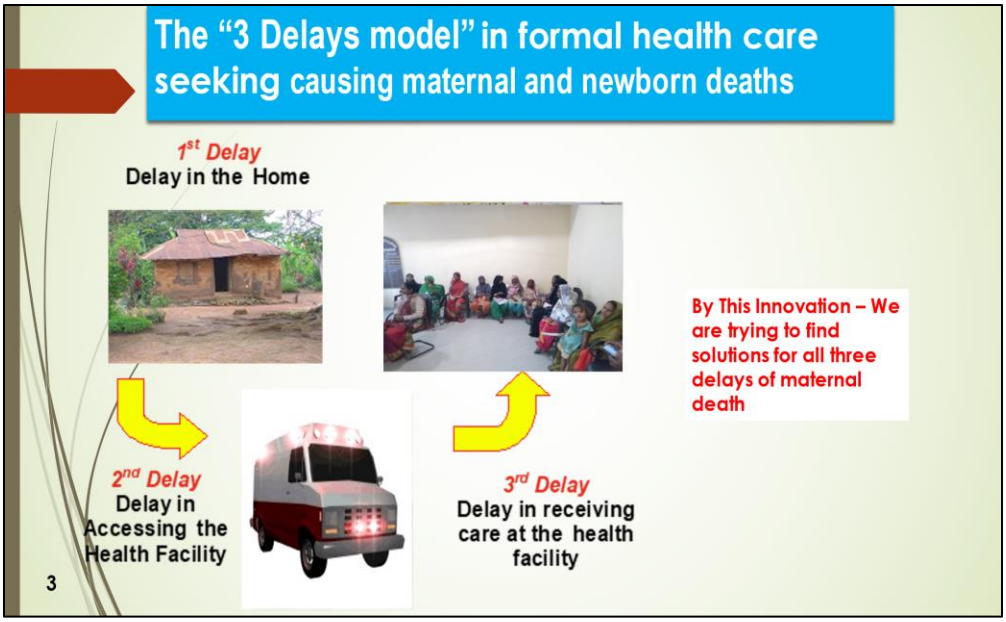
- **Stages of Maternal Deaths**

From our experience, we found that 25% occur during pregnancy, 50% during labor and delivery, 20% during 2-7days postpartum and 5% during 2-6 weeks postpartum.



The Maternal death review in the referral hospital suggested three challenges:

Firstly delay at home, secondly delay at accessing health facility and thirdly delay in receiving health care at health facility.



Hence, the application was conceptualized to emphasize the importance of early recognition of the seriousness of patient's condition, reduce the response time , early Warning Systems and use treatment bundles-standard operating protocol.

WONDER's Fundamental Principles

Wonder works on the basic premise that we need to identify early warning signs before a mother develops complications. If and when complications develop, keep the response time to minimum and implement standard operating procedure in the management of complications.

Through Antenatal camps, history details-medical, social, personal history; Vitals-Blood pressure, pulse, temperature; Pathological tests-HB, glucose etc through specially designed Wonder kits containing Haemocheck, glucometer are collected. The above details are entered in Wonder portal. Any deviation from normality prompts the system to generate alerts- yellow/red, proportionate to the deviation. With these alerts, standard operation procedures with complete management protocols in-built within the system props up. This includes the future course of investigations: Dosages, lifestyle changes to be followed. For instance, in Hanumannagar blocks, ANM, Srimati Sanju Kumari effectively treated and saved the life of a patient who developed eclampsia by viewing the protocol in wonder in the absence of Doctors in the wee hours of a morning.

Wonder program has created many such champions with the kind of in-built decision support systems and artificial intelligence.

Another critical aspect of the program is the electronic referral of the patient. Even before the patient reaches the referral Centre, the complete details of the patient get electronically transferred to the referral Centre. This saves the critical time in saving the life of a patient. Ideally, Golden period of saving the patient with post partum hemorrhage is 4-6 hours. Effective intervention during the golden period requires readiness in the referral Centre. For this critical information like blood grouping, HB percentage. other clinical parameters when provided to referral centers, enhance the readiness of the referral institutions.

Another technological parameter that has immensely helped in transforming the way mothers are treated during emergencies is the use of the artificial intelligence in the system.

When values of BP, Pulse, Respiratory rate in a patient with hemorrhage are entered, the system exactly shows the volume of blood loss which is THE MOST IMPORTANT FACTOR in deciding the blood transfusion that needs to be given.

In routine Antenatal care, digital monitoring of Antenatal mothers through separate login ID of the District Magistrate, Civil surgeon helps in the district monitoring of number of alerts generated, follow up and treatment done.

The service delivery includes a short SMS about the condition of the patient and the lifestyle changes that she needs to adopt to get healthy. The systems provide a unique ID to the patient, who can use it to get follow up treatment anywhere in the district. The referral unit and the peripheral units act as a single unit. It is an example of Hub and spoke model. It has ensured accountable, transparent, efficient, equitable, inclusive, participatory service delivery. The consistency of treatment across centers is another hallmark.

The WONDER App and Telehealth Solution has three components:

(a) a smart electronic health record system (EHR) with clinical alerts and treatment guidelines;

(b) a WONDER App, a mobile-based clinical Decision Support tool has at its core algorithmically scored patients in real time; and

(c) a tele-communications capability using existing and inexpensive infrastructure between remote Primary Healthcare Centers (PHCs) and the District Hospital (DH). The

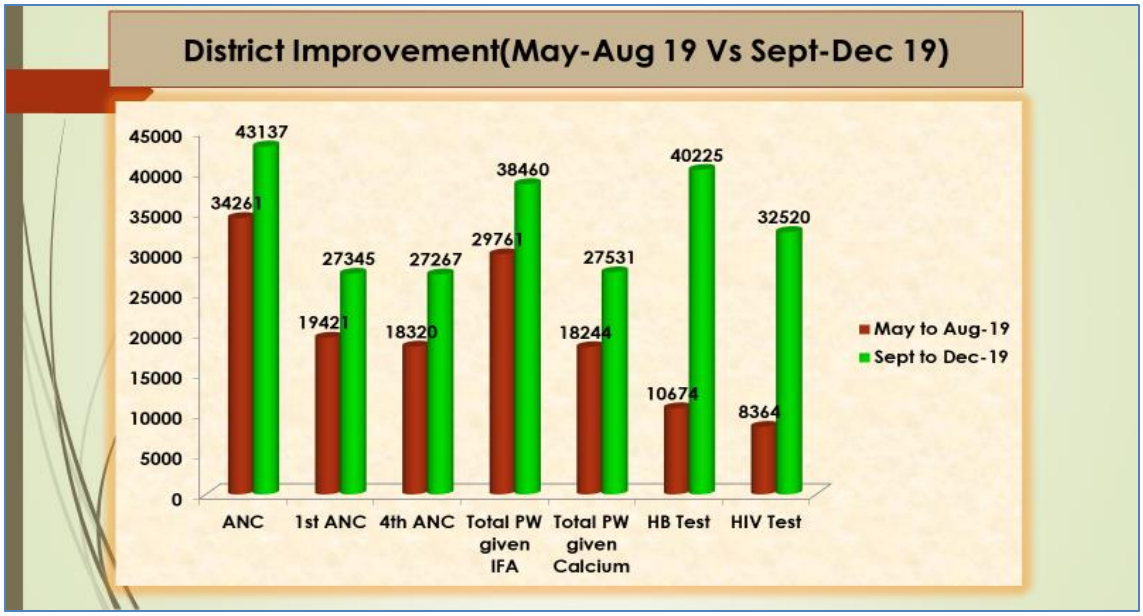
core of WONDER is an algorithm based on the Maternal Early Obstetric Warning Signs (MEOWS).

At the satellite primary healthcare centers (PHCs) with limited facilities and skilled care, the system provided guidelines, order sets, and instructions for management of acute obstetric emergencies to the nurses or Auxiliary Nurse Midwives (ANMS) when a skilled provider was not available. In addition, since patient records were stored in the cloud, medical records for patients in remote PHCs were available in the GH as soon as they were created. In situations involving an 'unstable' patient in a remote PHC, the system provided the nurse or physician at the GH an alert to instruct the care provider in the PHC with instructions on how to stabilize the patient prior to transport. Once the patient was in transit, a flashing ambulance sign and alarm on the dashboard at the GH alerted the physicians and staff in the GH to prepare to take care of the incoming acute obstetric patient. Antenatal camps organized resulted in significant increase in antenatal registration, iron and calcium supplements, HIV and Hb testing at all sites. **In an effort to decrease the incidence of preeclampsia, calcium supplement and low dose aspirin as recommended by WHO are being administered to high-risk patients identified by the Wonder App.** With hub and spoke model, one skilled provider can manage sick patients in multiple PHCs. Most critical patient has been accorded highest priority. This has ensured effective and efficient maternal case.

Following benefits have been noted -

Parameters	Comparative progress of 3 months before and after the initiative
ANC Care	Increased by 3 folds.
1st ANC Checkup	Increased by 2 folds.
4th ANC Checkup	Increased by 2 folds.
IFA distribution	Increased by 3 folds.
Calcium distribution	Increased by 3 folds.
Hb testing	Increased by 4 folds.
HIV testing	Increased by 4 folds.

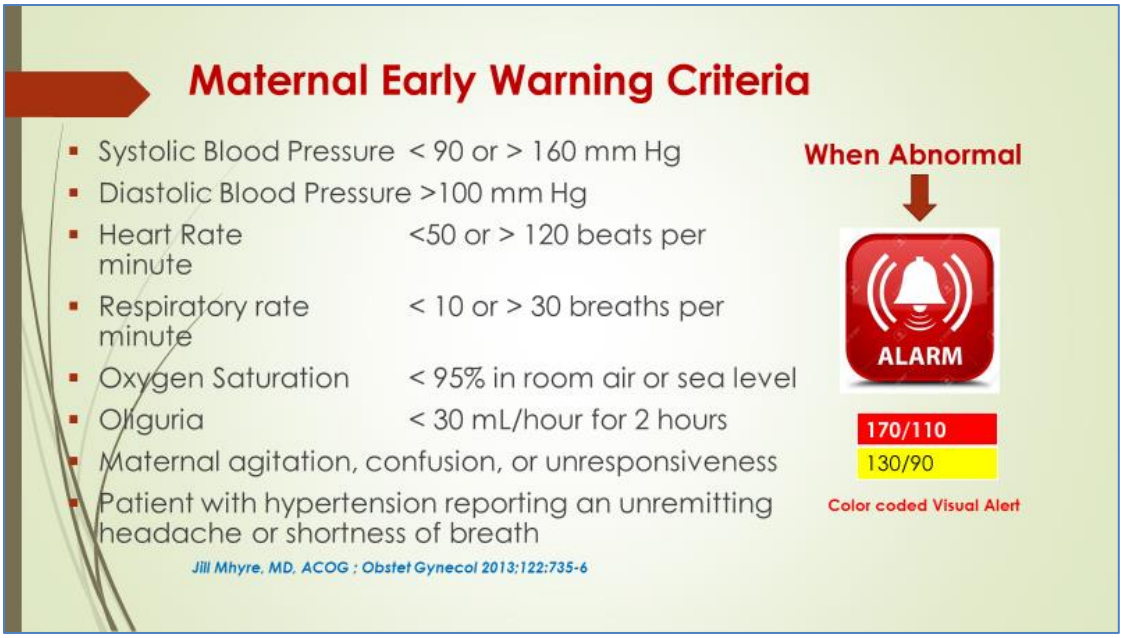
Apart from maternal case, allied health care services like neonatal care, immunization, family planning and payment of PMIAY also showed marked progress.



Process Flow

The WONDER algorithm works on the core concept that in many instances, individual vital signs of a woman in labor or post-partum may not indicate the presence or possibility of a crisis situation but when combined with patient history and readings on other vitals, they identify and forecast a potential emergency with a high level of accuracy. The WONDER EHR and APP system sets three color codes: green for normal vitals, yellow for a patient/situation that needs attention, and red to indicate a crisis situation requiring immediate attention. An audible alarm sounds whenever a patient is scored yellow or red. For scoring each patient and providing the appropriate color codes and any necessary alarms, the WONDER system inputs 5 vital signs: blood pressure, pulse rate, temperature, respiratory rate, and oxygen saturation.

WONDER includes a full decision support system. The decision support capability serve up a possible diagnosis and up-to-date treatment guidelines including, medications, dosage etc. actual recommendations from various organizations. This decision support system is designed to address the three major causes that collectively account for 52% of all maternal deaths: preeclampsia/eclampsia, postpartum hemorrhage, and.



Situation after the Initiative

Work Culture of Doctors and nurses has improved, they work with better motivation since they know whom to devote their time and energy. In other words, WONDER has brought about perceptible change in the service delivery systems with the same available resources. The knowledge gap in rural areas has been wiped off with the treatment bundles freely available across care centers.

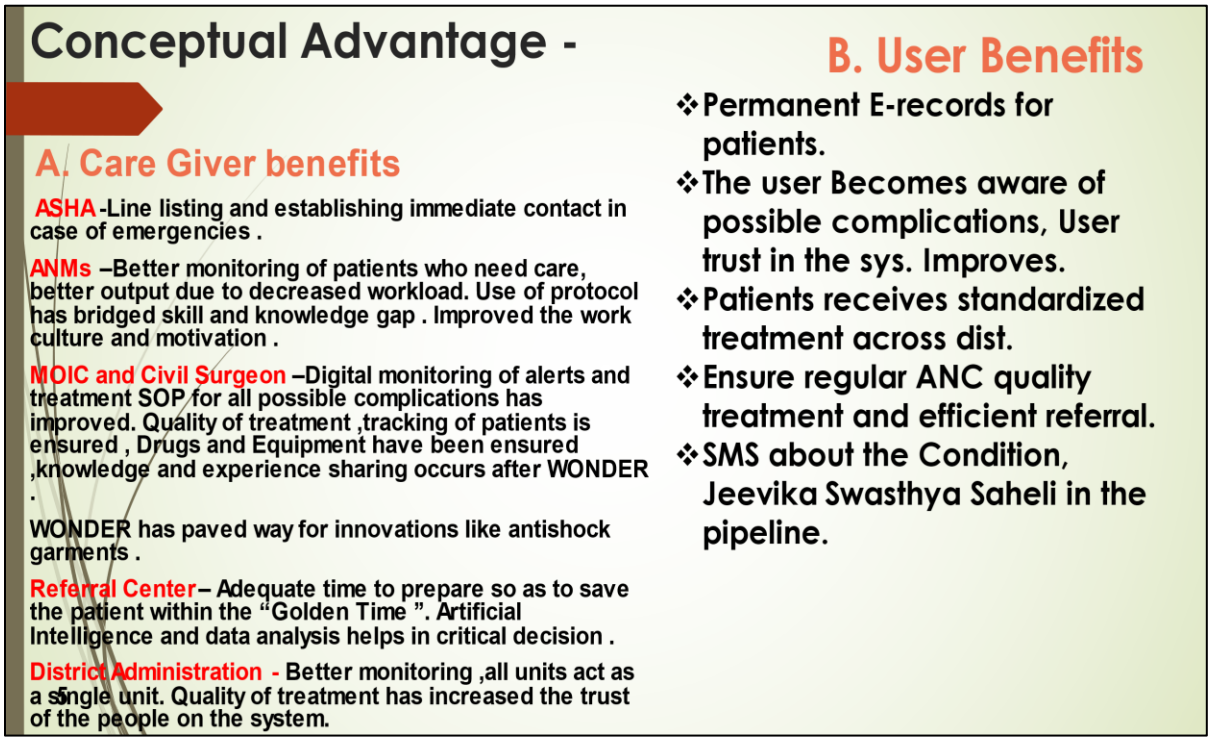
The close and direct digital monitoring has ensured adequate supplies and equipment. Seamless transfer of patients with instant access to medical records has strengthened the referral system like never before. The system allows enough time for the referral Centre to organize and deliver better. Earlier the ambulance taking pregnant women used to be diverted to private hospitals. Bow due to end-to-end tracking, the coccus got broken and brought about transparency.

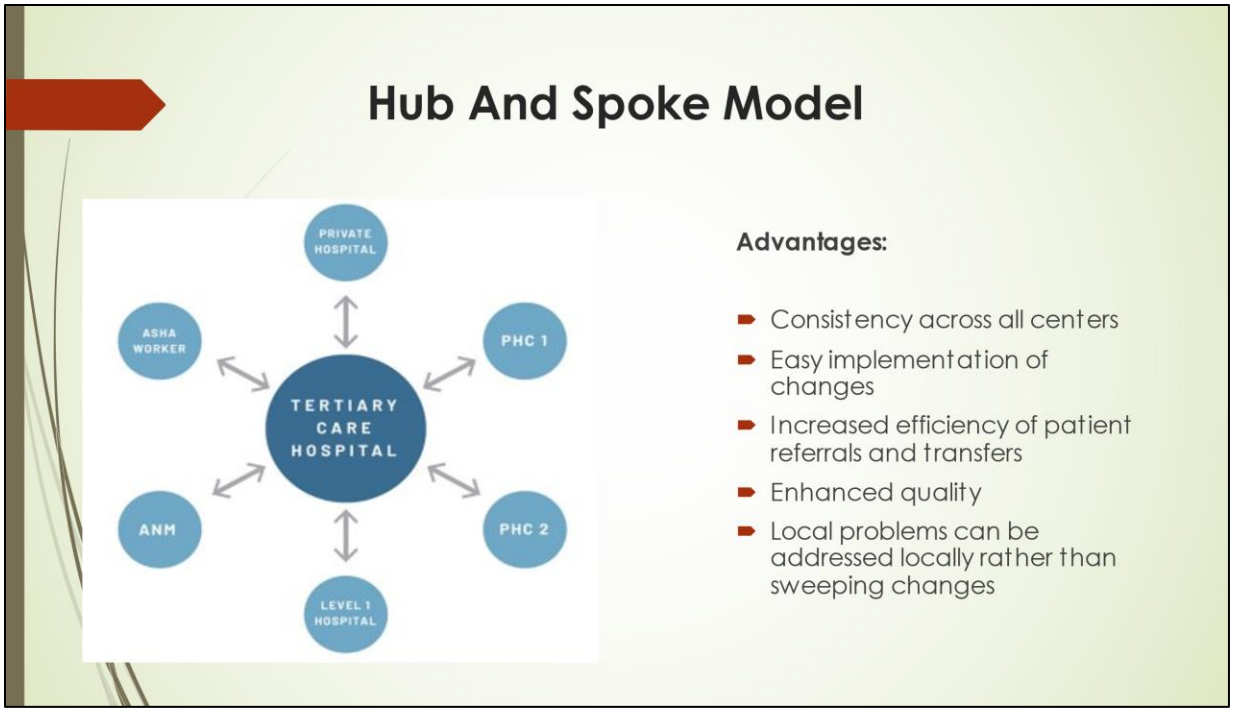
The referral center and the PHC's are inter-connected; constant feedback from either's side has brought about systemic improvements in both referral Centre and the PHC's. Referral center gives independent feedback on how first line treatment is given to patients at PHC's as it is being consistently provided with electronic Health records.

The system prevents delay at every stage and provides efficient and seamless delivery. The Complete tracking of the referred patient has ensured that Management SoP is being followed at

PHC, transport Protocol being followed in Ambulances and reception Protocol followed at referred centers. Uniform and quality treatment is possible across centers.

Above all, the system is simple, scalable, efficient and secured.





Strategy / Implementation Methodology Adopted

Door-to-Door survey and Panchayat Camps were held to cover pregnant women under this ambit. Once alerts were generated, separate files were kept to treat women with complications. Alert v/s treatment done was analyzed in detail. This automatically increased the identification of complications and treatment. The Computer Operators at DMCH (Referral Center) and PHC level were trained; ANM's were trained about the application and the details to be collected at ground level. MOICs and BHM's were trained too.Technology and Training-2 T's made it possible for us to change the landscape of maternal care. Target was covered through Door-Door survey by ANM's and Panchayat Camps. Later Pregnant women themselves started registering in the app. Social media, print & electronic media were widely used to publicize the programme. Through meetings of the public representatives at panchayat level. All MP's, MLA's, MLC's were briefed about the initiative. Pamphlets, posters, banners were used to propagate the benefits of the scheme so that pregnant women register themselves.

A new concept was introduced called “Swasth Saheli”. The pregnant women were tagged with self help group members called “Swasth Saheli”. They ensured regular follow up of pregnant women, they took care of the demand side of the initiative.

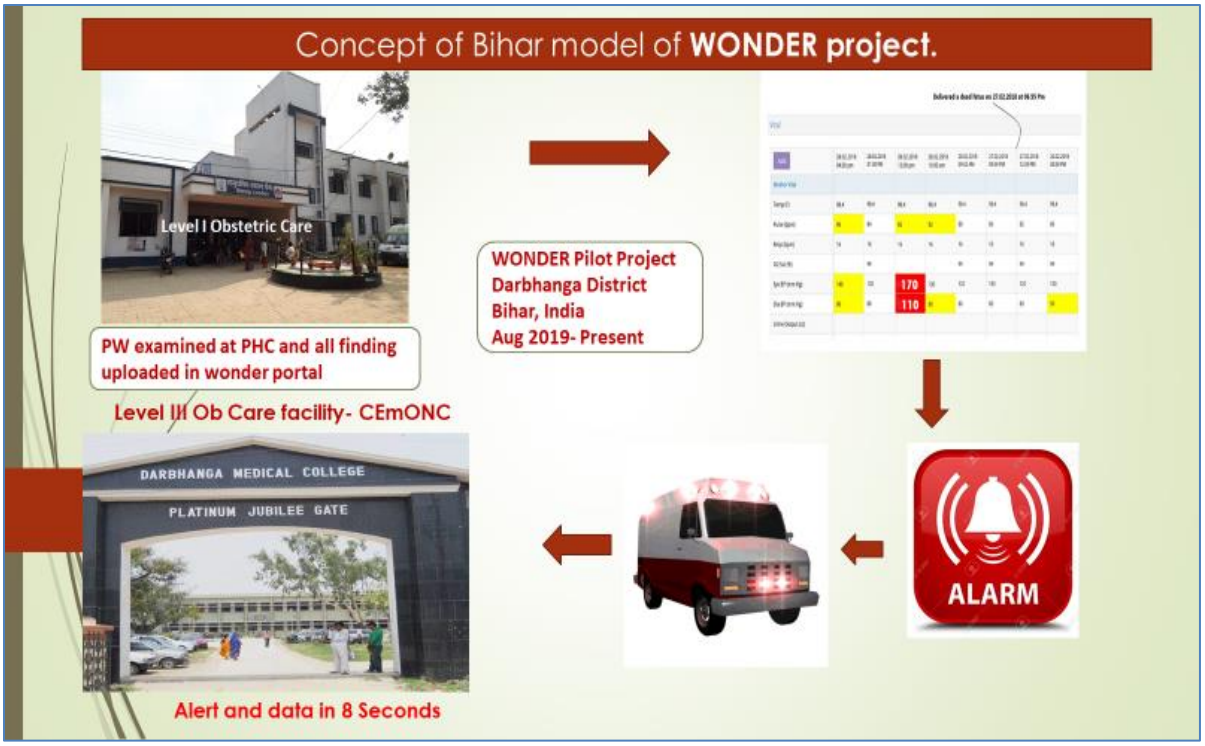
Problems identified- Identifying pregnant women with complications was a major challenge. With the lack of skilled Manpower at ground level, it was difficult to prioritize treatment. Every month 7-9 maternal deaths happened, in the DMCH, mostly during referral. This was a caucus working to divert referred patients to private hospitals. The referral system was time consuming and weak.

There was lack of knowledge and access to the skilled obstetric care at the local level. Failure to follow standard operating procedure (SOP), Anemia and under nutrition. inadequate and weak supplies (drugs & equipment etc.), inadequate skilled attendants were prevalent, system was not geared to prioritize the emergency and respond promptly. Motivation in staffs was low.

Making public delivery systems responsive, transparent and efficient particularly by leveraging technology:

The technology used in the system provides a forum to deliver the latest state-of-the-art treatment to the pregnant women regardless of where they are or what socio-economic class they belong to.

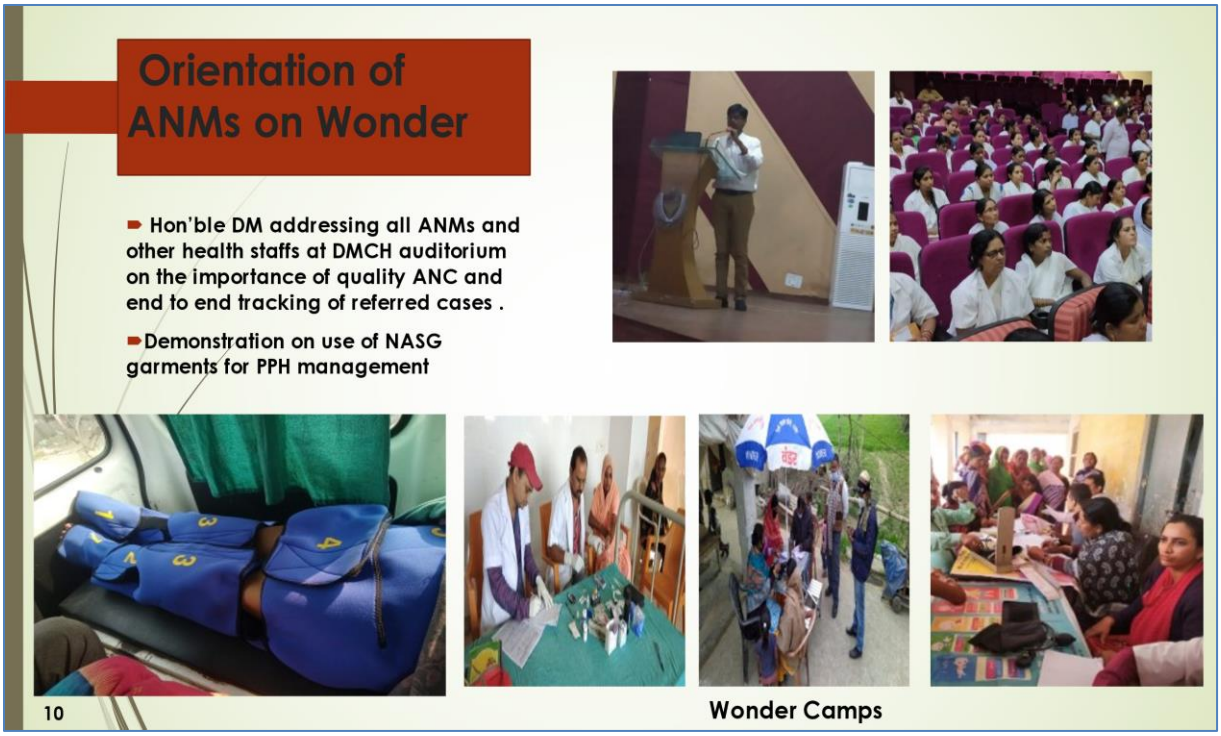
There is a way to constantly improve care. In case of adverse outcome the care provided can be retraced through accurate documentation which is time sensitive. The electronic health record ensures this. Also, unique log in ID gives accountability and responsibility. Errors and gaps in knowledge base can be identified and corrected and thus provides the ability to constantly improve care. The patient can get his follow up done anywhere in the District by using her unique ID. System has become more responsive. Most problems are local. Any problem in the hospital system or process can be corrected within that institution without making sweeping changes. It works well with the existing Governmental infrastructure without any interruption. The only requirement is the need for necessary hardware and manpower to enter data and connectivity.



Capacity Building and Awareness & Communication Approach

Hand held electronic tablets were provided to the ASHA and ANM workers. Wide technology insemination was ensured by phase wise training of all concerned. Block level operators were trained to use the technology. Through meetings of the public representatives at panchayat level. All MP's, MLA's, MLC's were briefed about the initiative to ensure maximum participation.

Pamphlets, posters, banners were used to propagate the benefits of the scheme to ensure 100 % pregnant women registered. Social Media , District Administration Facebook page was widely used to propagate the intent of the programme.



Feedback Mechanism

We can have Biometric devices which are blue tooth enabled and all the ANM need to do is to apply the device like BP apparatus to the patient's arm. Once the ANM clicks on the record button, the results or the reading will get automatically uploaded on to the system. In an assisted mode, it may be an automatic device .

Alternatively, we can have a wearable device with auto upload of values and in this case no one needs to do anything and the patient has to wear the device all day and it can be programed to check vitals (at lease BP and pulse) two or times a day and values will automatically be uploaded to the system. The values will go to the cloud from the device and the system will extract it from the cloud. Alerts will be created based on the preset value in the wonder system.

Feedback

We can get feedback from patients, the ANMs and the doctors through surveys. We can also access through the system when there were errors, and outcome-based assessment We also can develop AI algorithms based on analysis.

Success Stories:

Maternal death reporting & reviewing- Death Reporting Improved significantly due to end-to-end tracking of PW after implementation of Wonder project. All cases are being reviewed as per standard guidelines to plan the corrective actions to avoid future consequences.

Case 1-Dectecting Foeticide – Anjali Mahto resident of Lathraha village,Jale came for ANC check up with ASHA during special ANC day organized for Wonder . During interaction with her it came to be known about her 3 consecutive induced abortions. During counselling and interaction by ANM she confessed about sex determination of fetus by USG followed by forceful foeticides. ANM and other providers counselled her to continue the current pregnancy and about legal aspects of sex determination and foeticide She got convinced to continue her pregnancy and delivered her baby safely at RH Jale .

Client after delivery at RH Jale

Case-2-Helping Destitute- Mrs Puja Devi, resident of dist. Supaul was found hovering around Sakri . She was in advanced stage of pregnancy. She was left by her husband and family members. She was begging for food and shelter . ASHA saw the women and informed her about special ANC check up and assured her about proper care . She was convinced to go to PHC Manigachi with ASHA . She was attended immediately by MO and ANM as she was looking

very weak . During examination she was diagnosed with anemia (Hb-8 gm) with history of repeated abortions. Provider got alert in Wonder portal . Looking at the fact that she is alone ,MOIC decided to keep the patient at PHC under treatment and medical supervision till she delivers . She delivered a healthy baby after 3 days. PHC team again decided to keep the women for another 7 days under supervision. Providers ensured all postnatal check-up and counselling for mother and baby, including the birth dose immunization of the baby . She was very thankful to the nurses and doctor . She left the institution without informing anyone . MOIC gave the information to police and block administration.

पुल तक जाने वाली सड़क में वार्ड 8 में जानलेवा गड्ढा में गिरकर लोग दुर्घटना के शिकार हो रहे है। यह सड़क नप के वार्ड 7, 8, 9 होकर गुजरती है। मुहल्लावासी बताते है कि सड़क के बीच होकर जल निकासी के लिए बनाया गया नाला का स्लैब एक वर्ष पूर्व टूट कर जानलेवा बन गया है। रात्रि में साईकिल सवार उसमें गिरकर दुर्घटना के शिकार हो रहे है।

भटकी गर्भवती महिला का चल रहा इलाज

मनीगाछी

मनीगाछी | एक संवाददाता

धर्म विरुद्ध प्रेम विवाह में फंसकर महिला के दर-दर भटकने का मामला सामने आया है। मामला सुपौल जिला के भपटियाही थाना क्षेत्र के सरायगढ़ प्रखंड के छिटही गांव का है।

रणधीर राय नामक युवक के साथ शारीरिक संबंध बनाने के बाद पूजा देवी उर्फ समिना खातून ने गत वर्ष प्रेम विवाह कर लिया। दो धर्मों के बीच हुई यह शादी लड़के के परिवार वालों एवं इनके समाज को स्वीकार्य नहीं हुआ। इस बीच युवती गर्भवती भी हो गई। पारिवारिक एवं सामाजिक दबाव में आकर युवक ने लड़की का परित्याग कर दिया।

घर एवं समाज से बहिष्कृत महिला भटकती हुई सकरी रेलवे जंक्शन पर शरण लेकर भिक्षाटन कर अपना जीवन यापन करने लगी। गर्भ के अंतिम तिमाही में आसन्नप्रसवा के रूप में वह गत 9/11/19 को प्रखंड मुख्यालय स्थित पीएचसी इलाज के लिए पहुंची। जहां प्रभारी चिकित्सा अधिकारी ने उसकी चिकित्सा प्रारंभ कर दी है।

इस संबंध में प्रभारी चिकित्सा अधिकारी ने अपने पत्रांक 442 दिनांक 9/11/19 के माध्यम से सीएस, दरभंगा एवं बीडीओ, मनीगाछी को सूचित कर निर्देश की अपेक्षा की है। परित्यक्ता गर्भवती युवती पीएचसी में इलाज रत है।

बिहार राज्य मदरसा शिक्षा बोर्ड

5, विद्यापति मार्ग, पटना - 800001

सूचना

माननीय मुख्यमंत्री नीतीश कुमार के द्वारा विज्ञान शिक्षक के बकाया वेतन के

पावन है अयोध्या

सिंहवाड़ा

Case – 3 -Preventing eclampsia- Mrs Shabana Parween a pregnant women at third trimester was examined by MOIC and Nurse at APHC. She was identified as PIH with BP 160/122. Anti hypertensive medicine was given immediately and she was sent back to home in ambulance with proper counselling and follow up advice . Before she reached home she started complaining of Labor pain. She decided to go back to the institution. After she reached ,she was examined by

duty doctor and ANM and by that time her BP came down to normal level .i.e 122/78 and she delivered her baby safely .

MO i/c Baheri Examining Shabana

Case-4-Managing Aneamia- Mrs ASHA Devi a pregnant women at third trimester was examined by ANM at HSC. She was diagnosed with hypotension , tachycardia and aneamia. Proper counselling was given to her to consume IFA , take adequate diet and proper rest . She was advised to come for follow up after 15 days . She started feeling better and visited CHC Biraul, exactly after 15 days with ASHA for follow up. Her BP and general condition was much improved . Her family started trusting government institution and she is convinced to opt for institutional delivery at CHC Biraul .

Nurse Counselling ASHA Devi

Case-5-Infusing Credibility In System- Saima Parween ,resident of Delhi came to Darbhanga to visit her relatives. She visited Singhwara CHC for ANC check up during special ANC day organized at CHC. She was attended by lady MO and ANMs and got all her check ups and investigations done under Wonder program . She was so happy with services and facilities ,that she choose to deliver her baby at CHC Singhwara .She visited again when she was in labour and delivered a healthy baby Saima and her family developed confidence on government institution and they are also ready to recommend CHC Singhwara to other clients .

Satisfied Mother after delivering her child at CHC Singhwara

Case-6-Managing Hypertension & Malpresentation - Khushbu Devi of Radhi, Jale was identified with High BP during the check up at special ANC outreach camp . Providers got yellow alert for this case and they referred the client to RH ,Jale . All the remaining ANC check up was conducted at RH Jale, During advanced stage, the nurse and MO identified her baby with breach presentation and they referred the case to DMCH with proper advice .Intimation given to higher institution to ensure timely management. In spite of proper counseling, the client was taken to private hospital , where the woman delivered a daughter weighing 1600 grams .No advice for the weak newborn given at private institution and she was sent back home. As part of postnatal follow up block officials ensured regular check up of new born and home visit by ASHA. After rigorous follow up of 10 days both mother and baby are doing well and the baby's weight is now 2200 grams. She is now happy with government services and is remorse about her decision.


WONDER has been successful because of the following advantages:-

- Limited number of Obstetrician can provide skilled obstetric care for several centers – To address the problem of lack of skilled providers.
- Ensuring adequate supplies and equipment. seamless transfer of patients with instant access to medical records.
- Allows enough time for the level III center to organize the team and be ready with all necessary arrangements to receive a sick patient.

- Two way communication to help provide consultation as needed. Almost instant availability of records for review at center to provide guidance as needed. Prevents delay and provides efficient and seamless care delivery.
- Simple ,scalable, secured and efficient.
- Betterment in work culture and motivation.
- Apart from maternal care allied health care services like neonatal care, Immunization, family planning, payment of PMJAY & Other financial benefits.
- Capacity to expand beyond the local to state and national level

All the above has brought about institutional and systematic changes that are sustainable. Now "WONDER" has become a household name in Darbhanga.

Uses simple, easy, secure, scalable technology with not many resources needed. Hence scalable to all levels-state and national.

वंडर एप से मातृत्व मृत्यु दर पर लगेगी रोक, एक सप्ताह में गर्भवतियों का डाटा तैयार करें : डीएम

वंडर एप को पायलट प्रोजेक्ट के तौर पर सबसे पहले बहादुरपुर और बेनीपुर में लांच किया गया है

सिटी रिपोर्टर | दरभंगा

डीएम डॉ. त्यागराजन एसएम ने कहा है कि वंडर एप के इस्तेमाल से मातृत्व मृत्यु दर पर पूर्ण रूपेण रोक लग सकेगी। अभी जिला में मातृत्व मृत्यु दर 177 है, जो राष्ट्रीय एवं राज्य औसत से काफी ज्यादा है। जागरूकता की कमी एवं समुचित मेकेनिज्म के प्रचलन में नहीं रहने के चलते जिला में मातृत्व मृत्यु दर ज्यादा है। स्वास्थ्य विभाग का व्यापक नेटवर्क रहने के बावजूद मेटरनिटी डेथ हो जा रहे है, जो अत्यंत चिंतनीय है। इस समस्या का निदान वंडर एप से संभव है। वंडर एप को पायलट प्रोजेक्ट के तौर पर जिला के दो प्रखंडों बहादुरपुर एवं बेनीपुर में लांच किया गया है। इसके सकारात्मक परिणाम दिख रहे हैं। अब इस एप को पूरे जिला में लांच किया जाएगा। वे समाहरणालय सभाकक्ष में शनिवार को आयोजित स्वास्थ्य विभाग की बैठक में वंडर एप के ओरिएंटेशन वर्कशाप में चिकित्सकों एवं चिकित्सा कर्मियों को संबोधित कर रहे थे।

बैठक में संबोधित करते डीएम।

वंडर एप के बारे में जानना जरूरी :

डीएम ने कहा कि पहले सभी को वंडर एप के बारे में जानना जरूरी है। इस एप के बारे में जानकारी हो जाने पर इसका क्रियान्वयन भी बिल्कुल आसान होगा। यह एक मोबाइल सपोर्टेड एप है। इसे आसानी से किसी भी एंड्रायड मोबाइल में डाउनलोड किया जा सकता है। डीएम ने कहा कि यह बिलकुल नया प्रयोग है। इसमें कुछ पीएचसी के एएनएम को लीडरशिप देकर चैंपियन बनाना होगा। फिर ये अन्य एएनएम. को लीडरशिप प्रदान करेगी। उन्होंने कहा कि 3-4 सितम्बर को वंडर एप पर गर्भवती महिलाओं के डाटा बेस की प्रगति की समीक्षा की जाएगी। इससे पूर्व केयर इंडिया की डॉ. श्रद्धा द्वारा वंडर एप पर गर्भवती महिलाओं के निबंधन एवं मेडिकल/सोशल हिस्ट्री की ऑनलाइन इंट्री करने की विधि का प्रोजेक्टर पर पावर प्वाइंट प्रेजेंटेशन किया गया। इस वर्कशाप में सिविल सर्जन डॉ. एके झा, डीआईओ एके मिश्रा, जिला जन सम्पर्क पदाधिकारी श्री सुशील कुमार शर्मा, सभी प्रभारी चिकित्सा पदाधिकारी, डॉ. श्रद्धा, सभी एएनएम./बीएचएम व डाटा इंट्री ऑपरेटर आदि सम्मलित हुए।

कंटेनर ने स्कूटी सवार

गृह क्षति का सर्वेक्षण एप के माध्यम से होगा

मां के साथ

Review Meeting

एप से मातृ मृत्यु दर में आएगी कमी: डीएम

दरभंगा | निज संवाददाता

बोले डीएम

- डीएमसीएच ऑडिटोरियम में अलर्ट सिस्टम की दी जानकारी
- गर्भावस्था के दौरान मरीज का होगा उचित इलाज

मातृ मृत्यु दर में कमी लाने के उद्देश्य से वंडर एप लांच किया गया है। इस एप के जरिए गर्भवती महिलाओं का डिजिटल डाटा तैयार किया जाएगा और फिर उसकी पूरी देखरेख की जाएगी। ये बातें डीएम डॉ. त्यागराजन एसएम ने शुक्रवार को डीएमसीएच ऑडिटोरियम में वंडर एप के अलर्ट सिस्टम के सम्बंध में विस्तृत जानकारी देने के दौरान कही।

उन्होंने कहा कि इस एप के जरिये मातृ मृत्यु दर में काफी कमी आएगी। उन्होंने कहा कि गर्भावस्था के दौरान मरीज के हालत की मॉनिटरिंग कर उसे उचित ट्रीटमेंट दिया जाएगा। उन्होंने कहा कि फिलहाल जिले के दो प्रखंडों बहादुरपुर एवं बेनीपुर में इस एप को लागू किया गया है। वंडर एप से बहादुरपुर में 33 सौ गर्भवती महिलाएं जुड़ी हैं। बेनीपुर में भी लगभग 27 सौ गर्भवती महिलाएं इस एप से जुड़ी हैं। कार्यक्रम में मौजूद स्वास्थ सेवा के अपर निदेशक सह सिविल सर्जन डॉ. अमरेंद्र नारायण झा ने कहा कि सितंबर के बाद पूरे जिले में इस एप को लागू किया जाएगा। साथ ही दिसंबर-जनवरी तक पूरे प्रमंडल में लागू करने की योजना है।

कार्यक्रम के दौरान डीएमसीएच के प्राचार्य डॉ. एचएन झा, अस्पताल अधीक्षक डॉ. आरआर प्रसाद, डॉ. केएन झा, डॉ. मृदुल शुक्ला, डॉ. आशा झा, डॉ. सीमा प्रसाद, डॉ. मायाशंकर ठाकुर आदि उपस्थित थे।

डीएमसीएच ऑडिटोरियम में शुक्रवार को आयोजित कार्यक्रम में उपस्थित डीएम डॉ. त्यागराजन एसएम, प्राचार्य डॉ. एचएन झा, अधीक्षक डॉ. आरआर प्रसाद व अन्य।

एपीएचसी में चिकित्सक देने का आग्रह

मनीगाछी। राघोपुर दक्षिणी पंचायत स्थित अतिरिक्त प्राथमिक स्वास्थ्य केंद्र में चिकित्सक की प्रतिनियुक्ति करने का आग्रह एमएसयू के रमेश कुमार ने किया है। डीएम को लिखे पत्र में कहा गया है कि 53 लाख की लागत से छह बेड के इस अस्पताल में चिकित्सक के अभाव में लोगों को भारी मुसीबतों का सामना करना पड़ता है। बताया जाता है कि गत 4 माह पूर्व सप्ताह में एक दिन चिकित्सक की से सिविल सर्जन ने निर्धारित की थी जो अब बंद हो गई है, जिससे आमलोगों को कठिनाइयों का सामना करना पड़ता है। (ए. सं.)

CS Facilitating Session at DMCH

hindustantimes

An app works wonders for maternal care

Bishnu K Jha
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DARBHANGA: Bihar's Darbhanga district has become the first district in India to digitally monitor the health of pregnant women with the help of a mobile application called WonderApp.

Asha workers and Jeevika health workers, who visit the expecting mothers at their homes, create their individual data and keep uploading their health conditions on the app. If the patient's vital signs such as blood pressure, haemologbin, pulse, temperature or oxygen saturation level go adverse or the patient develops complications, the app immediately sounds an alert along with colour-coded warning on the dash board.

All the PHCs, equipped with the mobile application, then swing into action and send ambulances to the patients for further care. The doctor attending the patient would already be in possession of the patient's medical condition. So far, more than 21,000 pregnant women had been registered on WonderApp in Darbhanga till October 15. The number of red alerts generated on the App to date was 1,097.

The app has evoked very enthusiastic response from all the stakeholders and could strengthen ante-natal care (ANC) to curb maternal mortality rate (MMR) and birth of healthy child. MMR is the number of deaths per one lakh live births. As per statistics available in 2015, the MMR in India stood at 175.

Darbhanga DM Dr Thiyagrajan SM, the man behind this endeavour, decided to implement the app after it was unsuccessfully launched in Erode (Tamil Nadu). The application was developed by Narmadha Kuppuswami, an Illinois-based obstetrician and gynecologist with 40 years experience in field.

"It is an integrated approach to problem identification, identifying factors contributing to the problem, diagnosis, follow-up and treatment. PHC, CHC, referral hospitals are treated as one unit due to electronic transfer of records", the DM said.

According to the DM, the mobile app's electronic record system uses special vital health signs chart and a set of parameters based on separate maternal early obstetrics warning score system.

The colour coded information in green, yellow and red patches indicates normal, mildly abnormal and severely abnormal conditions of patients. In the case of red alert, the patient is provided immediate medical attention by health service providers right from ASHA, Jiveeka-Swasthya Saheli upto PHC and CHC level. As of now, it is being extended up to tertiary care centre at Darbhanga Medical College and Hospital.

Take this. Recently, Piniki Devi of Benipur block was found to have haemoglobin count of just 5.8gm. The App sounded a red alert triggering a chain reaction right from ASHA workers to PHC level. She was treated and she safely delivered her baby.

In yet another case, Shabana Parveen, into her third trimester of pregnancy, was provided medication at an APHC with high BP during a health check-up. She delivered a baby safely the same day.

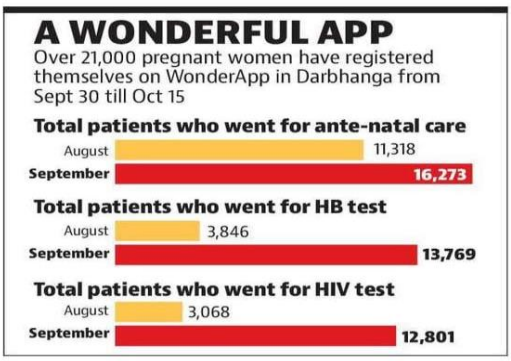
Darbhanga civil surgeon Dr Amrenda Narayan Jha said the Wonder App can identify risk patients in real time so as to enable efficient use of medical help.

Buoyed by the success of App to provide ante-natal care (ANC) in two blocks, the DM decided to extend the facility to all 18 blocks across Darbhanga district in August.

"It has already increased the proportion of mandatory health check-ups and lab tests during pregnancy. The comparative figure of various tests, including haemoglobin count, HIV testing, iron and folic acid (IFA), besides calcium tablets distribution among pregnant women, showed a drastic improvement. Many other vital indicators during pregnancy have also improved simultaneously whereby ensuring a qualitative antenatal check-up," the DM said.

A WONDERFUL APP

Over 21,000 pregnant women have registered themselves on WonderApp in Darbhanga from Sept 30 till Oct 15



Article regarding WONDER app got published in Hindustan times, highlighting the progress made in month of September after launch of Wonder

वंडर एप से गर्भवती की जांच आसान

निरीक्षण में जिलाधिकारी ने की शिविर के लिए स्वास्थ्य विभाग की सराहना

जागरण संवाददाता, दरभंगा : जिला के हनुमाननगर अंचल अंतर्गत थलवारा गांव स्थित उच्च विद्यालय में सोमवार को स्वास्थ्य शिविर का आयोजन किया गया। इस शिविर में 50 गर्भवती महिलाओं की क्लिनिकल एवं पैथोलोजिक जांच की गई और वंडर एप पर डाटा अपलोड किया गया। जिलाधिकारी डॉ. त्यागराजन एसएम ने हनुमाननगर पीएचसी द्वारा आयोजित स्वास्थ्य शिविर का निरीक्षण किया। उन्होंने कहा कि स्वास्थ्य विभाग की यह अच्छी पहल है। उन्होंने अन्य गांवों में भी ऐसे अनेक स्वास्थ्य शिविरों का आयोजन करने पर जोर दिया। शिविर में उपस्थित सिविल सर्जन, चिकित्सकों एवं पारा चिकित्सा कर्मियों को संबोधित करते हुए डीएम ने कहा कि वंडर एप से गर्भवती महिलाओं के स्वास्थ्य की डिजिटली मॉनीटरिंग करना आसान है। वंडर एप में प्रत्येक गर्भवती महिलाओं की संपूर्ण डाटा शुद्ध-शुद्ध प्रविष्टि की जाएं। इस एप की सबसे बड़ी खासियत यह है कि अमूक गर्भवती महिला को गर्भावस्था के दौरान कोई जटिल समस्या उत्पन्न होती है तो वंडर एप से अलर्ट जारी हो जाएगा। उन्होंने सभी चिकित्सकों से कहा कि वंडर एप से जिन महिलाओं का एलर्ट जारी हुआ है, उन सभी महिलाओं को तुरंत समुचित चिकित्सा सुविधा उपलब्ध कराई जाए, ताकि गर्भवती महिला एवं बच्चे के जीवन पर कोई खतरा न हो। डीएम ने प्रत्येक गर्भवती महिला की अलग फाइल बनाने को कहा। इससे उक्त महिला को आगे भी चिकित्सा सुविधा उपलब्ध कराने में आसानी होगी। शिविर में सिविल सर्जन डॉ. एके झा, प्रभारी चिकित्सा पदाधिकारी, हनुमाननगर, डीपीएम, एएनएम, प्रखंड स्वास्थ्य प्रबंधक एवं बड़ी संख्या में महिलाएं मौजूद थी।

स्वास्थ्य शिविर का जायजा लेते डीएम • जागरण

स्वास्थ्य जांच

- अन्य गांवों में भी ऐसे अनेक शिविरों का आयोजन करने पर दिया गया जोर
- वंडर एप में प्रत्येक गर्भवतियों का संपूर्ण डाटा शुद्ध किया जा सकेगा प्रविष्ट

DM and CS visited outreach ANC camp organized at Thalwara,Hanuman Nagar

मातृत्व सुरक्षा में नजीर बनेगा दरभंगा

वंडर एप

दरभंगा | संतोष कुमार झा

वैसे तो पहले के मुकाबले मातृ मृत्यु दर में काफी कमी आयी है, लेकिन सकारात्मक प्रयास से इसे और कम किया जा सकता है। दरभंगा जिला प्रशासन इसी प्रयास में जुटा हुआ है। इसमें 'वंडर एप' नाम का सॉफ्टवेयर काफी मददगार साबित हो रहा है।

डीएम डॉ. त्यागराजन एसएम बताते हैं कि यह एप अभी देशभर में केवल रहा है। इस एप में रजिस्टर्ड होने वाली गर्भवती की संख्या से वे खासे उत्साहित हैं। वे कहते हैं कि खासकर ग्रामीण इलाके में किसी गर्भवती के बीमार पड़ने पर उन्हें उचित इलाज मिलने में दिक्कत होती है। ऐसे में वंडर एप उनके लिए वरदान साबित

गर्भवतियों का डाटा एप में करना है अपलोड

डीएम ने बताया कि आशा और जीविका दीदियां घर-घर जाकर गर्भवती का डाटा इस एप में अपलोड करती हैं। इसमें गर्भवती की मेडिकल हिस्ट्री, सर्जिकल हिस्ट्री, फैमिली हिस्ट्री आदि की विस्तृत जानकारी फीड की जाती है। डाटा लोड होने के बाद से शिशु के जन्म तक यदि जच्चे के स्वास्थ्य में किसी प्रकार की गड़बड़ी होती है तो एप पर लगा लाल या पीला बटन जलने लगता है यानी अलर्ट जेनरेट होता है। अलर्ट जेनरेट होते ही नजदीक के पीएचसी में तैनात स्वास्थ्य कर्मी गर्भवती को अस्पताल लाते हैं और उसका समुचित उपचार करते हैं। मोबाइल के स्क्रीन पर मरीज का नाम-पता और उसे क्या तकलीफ है, इसका पूरा ब्योरा दिखने लगता है।

Article highlighting the improvements occurring in maternal health interventions

स्वास्थ्य के क्षेत्र में वंडर एप का इस्तेमाल डिजिटल युग की शुरुआत गर्भवती व बच्चों की मृत्यु दर में कमी आएगी : डॉ. त्यागराजन एसएम

सिटी रिपोर्टर/दरभंगा

स्वास्थ्य के क्षेत्र में वंडर एप का इस्तेमाल डिजिटल युग की शुरुआत है। भविष्य में स्वस्थ समाज के निर्माण में वंडर एप काफी मददगार साबित होगी। इस एप से गर्भवती व बच्चों की मृत्यु दर में कमी आएगी। अभी तक 25000 गर्भवती का इसमें इंट्री व 1400 गर्भवती का अलर्ट किया गया है। दिवाली व छठ के दौरान 15000 गर्भवती का एंट्री की जाए। जो भी इस कार्य में बेहतर करेंगे उन सभी एएनएम को सम्मानित किया जाएगा। एक-एक गर्भवती को चिन्हित कर उसका इलाज व हिस्ट्री एप में एंट्री करना है। जैसे ही वंडर एप से किसी गर्भवती महिला के बारे में अलर्ट जारी होता है, उक्त महिला को तुरंत चिकित्सा सहायता पहुचाई जाए, ताकि इसकी प्रतिष्टि वंडर एप में कर दी जाए। ये बातें डीएमसीएच के सभागार में वंडर एप पर कार्यशाला में जिलाधिकारी डॉ. त्यागराजन एसएम ने कही। उन्होंने कहा कि हमें सीमित संसाधन में सभी गर्भवती का इस एप के माध्यम से मदद करनी है। डीएमसीएच के गायनी वार्ड में रेफर गर्भवती का रिकॉर्ड तैयार करना व जो भी गर्भवती महिला आती है, उसका भी इस एप में रिकॉर्ड इंट्री की जाए।

डीएमसीएच के सभागार में वंडर एप पर कार्यशाला का हुआ आयोजन, वंडर एप में मदद करने वाली एएनएम हुईं सम्मानित

वंडर एप के लिए बेहतर कार्य करने पर सम्मानित होती एएनएम।

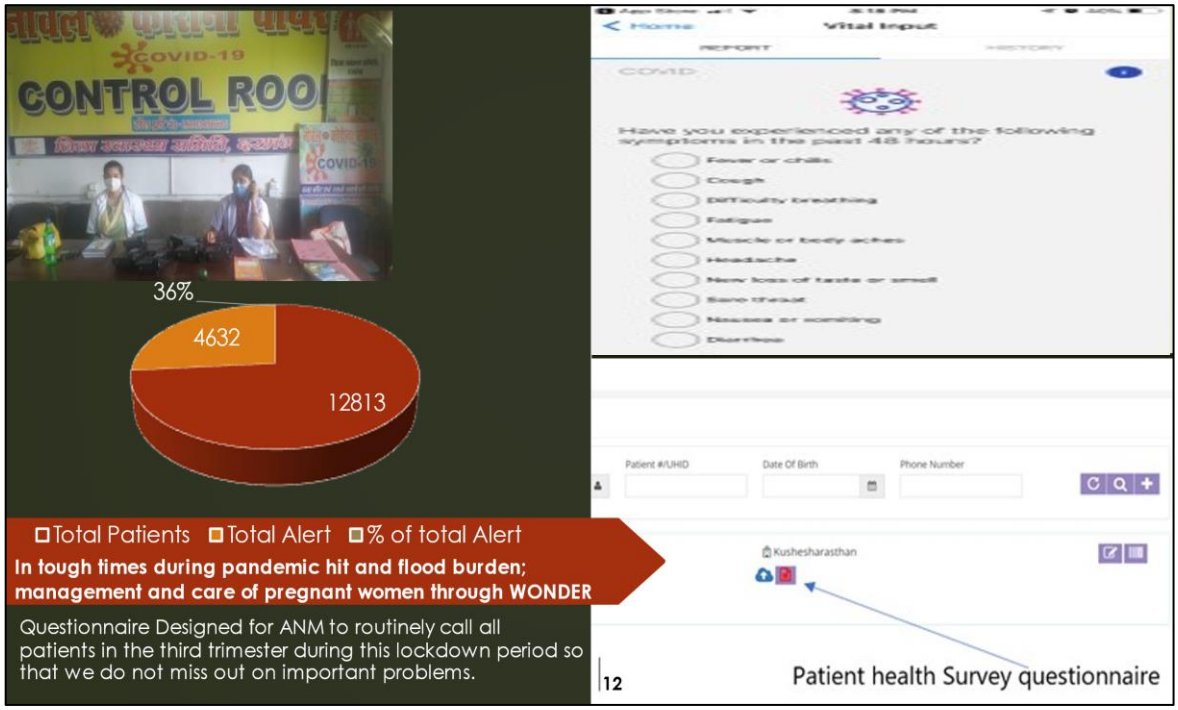
कार्यक्रम में उपस्थित जिले के चिकित्सा पदाधिकारी व एएनएम।

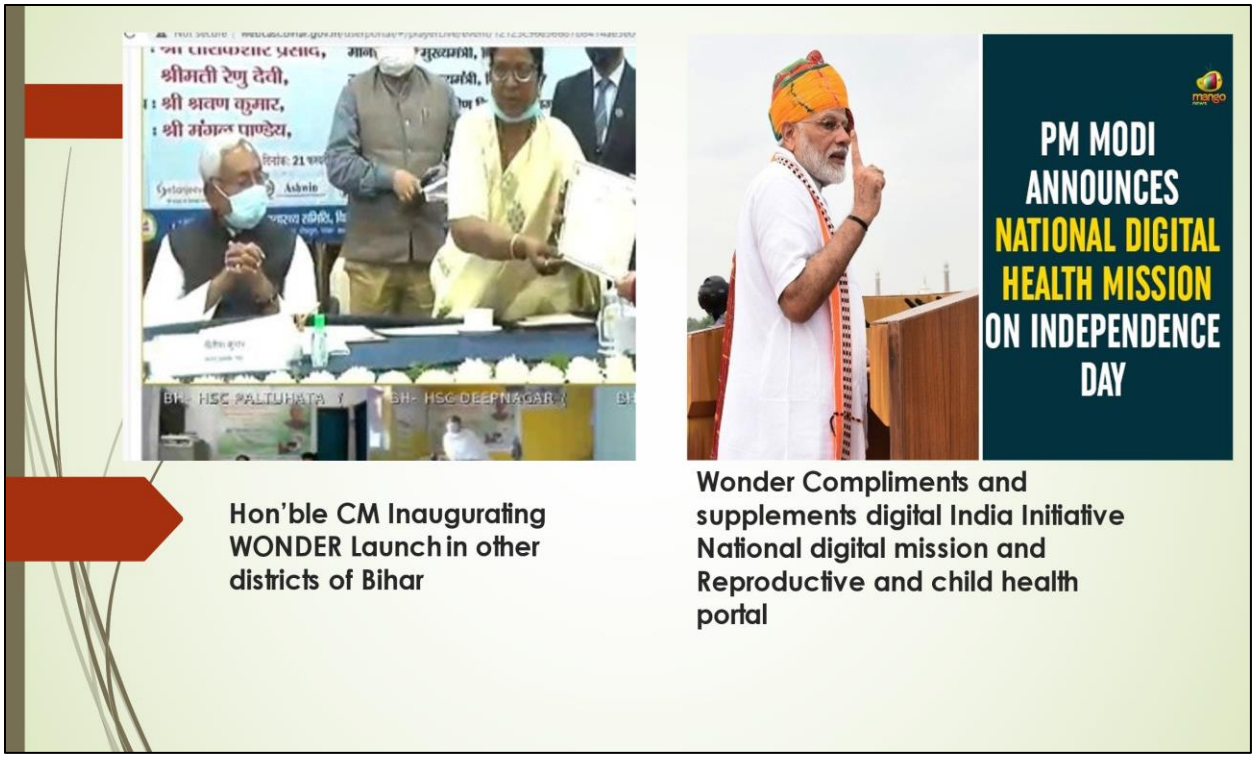
पूर्व के प्रसव में हुई दिक्कत को एप में एंट्री करें : सिविल सर्जन

सिविल सर्जन डॉ. एएन झा ने कहा कि इस एप में गर्भवती को पूर्व के प्रसव में कोई दिक्कत आई है, तो उसे भी इंट्री करें। उसकी इलाज से जुड़े सभी इतिहास को इसमें शामिल करें। डॉ. अशोक कुमार सिंह ने कहा कि यह वंडर एप मानवता के लिए एक इतिहास रचेगा। मौके पर डीएमसीएच उपाधीक्षक डॉ. बालेश्वर सागर, डॉ. मणीभूषण शर्मा, डीआईओ डॉ. अमरेंद्र मिश्र,डॉ. जय प्रकाश महतो, जिला कार्यक्रम प्रबंधक विशाल कुमार, डॉ. श्रद्धा झा, प्रखंड चिकित्सा पदाधिकारी व सामुदायिक उत्प्रेरक आदि मौजूद थे। एएनएम को वंडर एप में गर्भवती की इंट्री करने में मदद करने पर सम्मानित किया गया। ये है शांति कुमारी, बबीता कुमारी, सोनी कुमारी, लीता कुमारी, रेभा कुमारी,आरती कुमारी, कलावती महतो, पूनम कुमारी, शांति कुमारी, सोनी कुमारी,रीना कुमारी, रेखा कुमारी, शांति देवी, शबाना खातून, प्रेमवती, मंजू कुमारी, रंजना कुमारी सहित दर्जनों एएनएम सम्मानित की गई।

20 साल से एक भी महिला टिटनेस की नहीं आई : डॉ. आशा झा

गायनिक विभाग के विभागाध्यक्ष डॉ. आशा झा ने कहा कि हमें कभी भी कोई एएनएम कॉल कर रेफर्ड केस को बता सकती है। इस एप के माध्यम से एक मां के मृत्यु को वापस लेने में जो खुशी होगी, वह बताने नहीं सकते है। उन्होंने सभी एएनएम को तारीफ करते हुए कहा कि टिटनेस की रोकथाम में उनकी भूमिका अहम है। अभी 20 सालों से एक भी महिला टिटनेस की डीएमसीएच में नहीं आ रही है। उन्होंने माताओं से कहा कि दो बच्चे के जन्म के बीच में जरुर समय होनी चाहिए। ताकि माताओं का स्वास्थ्य बेहतर हो सके।





Wonder has revolutionized the way maternal health care has to be looked at. Given our demand side, technology, braining and behaviour change of care givers and users is the way forward to achieve our common cherished dream of 'every mother's life is invaluable'.

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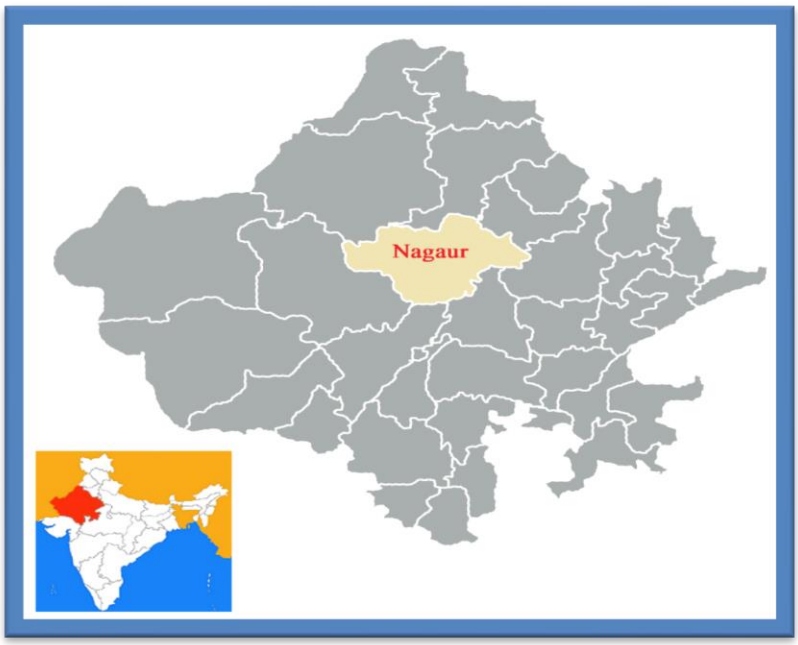
10. Silicosis Care: Nagaur District, Rajasthan



Nagaur District is located on Jodhpur-Bikaner rail route between $26^0$25 to $27^0$40 north latitude and $73^0$18 to $75^0$15 east longitudes. It is flanked by Churu and Bikaner Districts in the north, Jaipur and Sikar districts in the east, Ajmer and Pali districts in the south and Jodhpur in the west.

The district is rich in terms of mineral production like - Chuna stone, Timber, Marble, Gypsum, China Clay, etc. The salt of Nawan region (Sambhar Lake) is also famous in the country and all over the world. The world-famous Taj Mahal of Agra was built from the white marble mined from Makrana.

Silicosis CARE

Mining, being a major part of Nagpur's economy and a major source of employment, a large number of the population gets exposed to minute dust particles. This increases the chances of deadly respiratory diseases like Silicosis. Silicosis is defined as a long-term lung disease caused

by inhaling large amounts of crystalline silica dust, usually over many years. Silica once inside the lungs causes swelling (inflammation) and gradually leads to areas of hardened and scarred lung tissue (fibrosis). Lung tissue that is scarred in this way doesn't function properly. It can increase the risk of getting infected with serious and potentially life-threatening disease such as tuberculosis, heart failure and lung cancer.

'Silicosis Care' campaign was launched as an initiative to provide financial aid to the deprived silicosis patients and to benefit them from various government schemes at a single window.

Objective of the Project

During the review of Silicosis in August 2020, it was found that the number of Silicosis patients in the district is high. Keeping this in mind Silicosis Care project was launched to monitor, manage and implement grant processes of silicosis patients and provide them with Pension, *Palanhar* and NFSA. This campaign was launched as an innovation to provide early payments to the deprived silicosis victims and to give them benefits from other schemes.

A plan was prepared for quick disposal of Silicosis Applications received in the district on "Silicosis Grant Disbursement Portal" and prompt payment to the certified patients. An action has to be taken with in a week's time and this is reviewed timely (mostly on week-to-week basis). For this, "Database Program Silicosis Care Campaign" was launched to dispose of all the

applications at the lowest level. This was done to create and design a web-based application for disbursement of grant processes of –

- Financial aid
- Silicosis Pension
- Silicosis Palanhar Yojana and
- Food Safety Scheme.

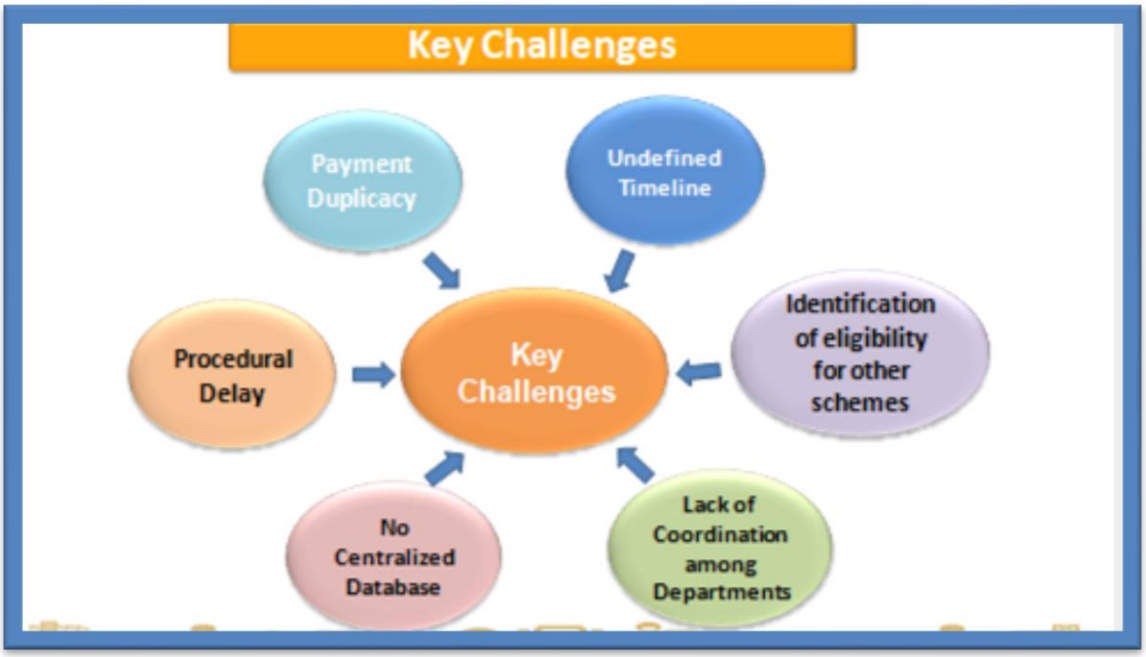
This can be compared to a "Single Window Clearance mechanism" for people suffering from Silicosis.

To increase the efficiency and effectiveness of the Scheme and to deliver services to the beneficiaries with "Minimum Waiting Time" and "Minimum Physical Visits" to the hospital and Government Offices, "An IT enabled Program Silicosis Care Campaign" was created. The campaign not only minimized Duplicate and Multiple Claims Applications for financial assistance by a single beneficiary or his/her family but also brought transparency and reduced complexity.

Silicosis Care is a program based on Database in which the data of certified patients is prepared. This data is accessed by departments related to Pension, Palanhar, NFSA etc. to provide them prompt assistance and seamless coordination. It saves the time consumed in the file movement and quick redressal is made promptly. As it is being done scientifically and systematically, chances of Duplicate Beneficiaries are reduced to zero. This program also facilitates detailed reporting of various departments.

Brief Details of the Project

During Silicosis Care Campaign, "Silicosis Care Database" is prepared to give benefits to the patients. Data of all patients benefiting from ex-gratia (offline and online) in these Database is updated timely. The benefit of this is that if an online application is made after a victim has received offline benefits in the past, then it becomes easy to cross check and eliminate the possibility of repayment. Hence, in order to provide quick benefits to the victims who are deprived of the schemes, weekly review is being done, in which the Silicosis Care Database is proving to be effective.



Silicosis Care Survey

Special camps of silicosis were organized in Month of August, 2020 in the First phase of Silicosis Care Campaign.

- In which 1111 workers were examined by doctors out of which 64 workers were found suffering from Silicosis.
- 109 Silicosis patients identified in the camps have benefited from the Palanhar Scheme
- 140 patients have been registered in Silicosis Pension Scheme
- 550 Nutrition Packets were distributed to Silicosis Victims

Silicosis patients quickly benefitted from this assistance amount.

Silicosis Care Camp visit by Dr. Jitendra Kumar Soni, DM, Nagaur

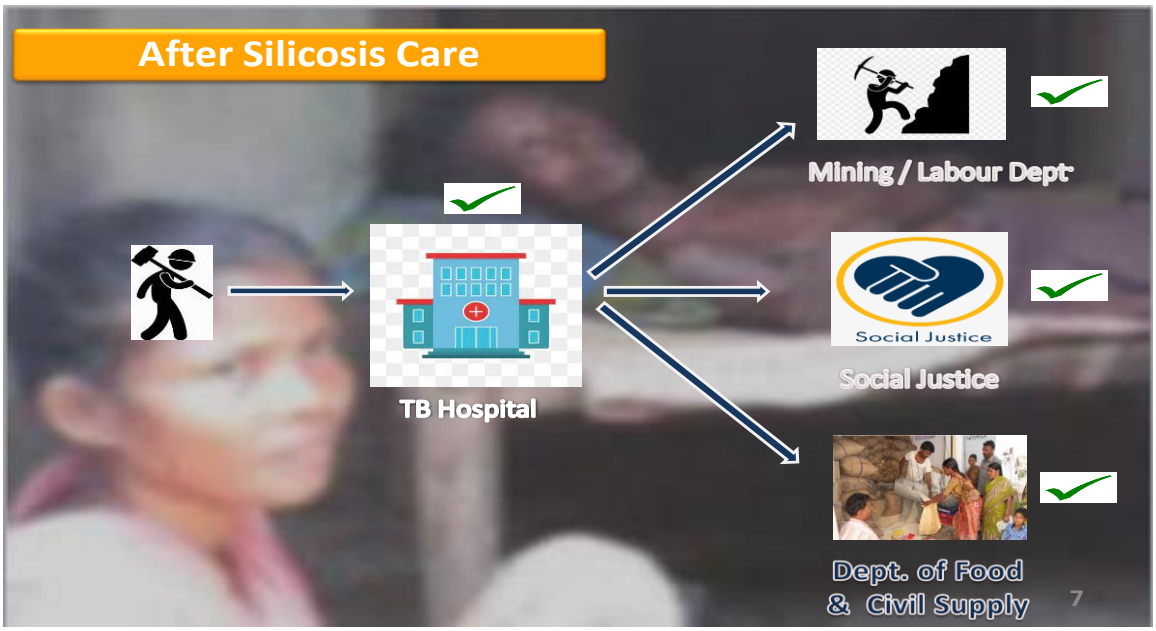
In Silicosis Care Camp Examine by Medical Team

Situation before the Initiative

- Certified patients were limited, and many were deprived of government assistance.
- Certified patient had to travel frequently for help to various departments and Document had to be verified.
- Even after authentication, there was a delay in payment for several months.
- Establishing mutual coordination between different departments was a difficult task.
- It used to take time for file movement and verification work in various departments.
- Reporting was not done up to Block Level and Gram Panchayat Level due to which review could not happen.
- Earlier, silicosis patients used to have offline payments, due to which records were not available on the portal.
- There was possibility of duplicate payment.
- Database: Formerly there was no central database for people suffering with Silicosis or people working in Mining, Glass Manufacturing, Construction, Ceramic, Gem cutting and polishing, etc. and having Pension, Palanhar and NFSA, etc.
- Planning: Due to lack of information on Persons suffering with Silicosis, It became a challenge to plan any scheme/ benefits for the beneficiaries as per their requirement

Situation after the Initiative

- In addition to the assistance amount to the patient, other government assistance such as Pension, Palanhar and NFSA started being received immediately after verification.
- Delay in payment of aid after authentication was reduced significantly.
- Mutual coordination established between various departments.
- Reduced the time spent in document verification and file movement.
- Reporting of silicosis patients up to the village panchayat and block level started being received, making it easy to review in the district.
- Possibility of duplicate payment negated due to compilation of data of silicosis patients receiving offline payment.



Process Flow before GPR

After patient appears for diagnosis at TB Hospital, and silicosis is confirmed, a medical certificate generation application is sent to the nodal officer for approval. Nodal officer forwards the request to the Department of Mines or Labor Department then after Silicosis Grant Disbursement is processed subsequently data is recorded in Silicosis Care and same data is shared to other Line Departments. The request is sent to the Social Welfare Department for

Pension and District Logistics Office for NFSA. Entry is made into the Silicosis Care Program as per its action by the Department.

But other benefits from various schemes are not delivered to silicosis patients. Silicosis mostly affects laborers who are generally illiterate and poor. They lack awareness about their entitlements and various beneficiary schemes by Central and State Government. This is coupled with poor reporting by various government departments and district administration at block level. The idea of creating a Silicosis Care Program originated as a solution to above mentioned problems. Subsequently data is recorded in silicosis care and same data is shared to other line departments. The request is sent to social welfare department for pension and district logistics office for NFSA. Entry is made into the silicosis programme as per its choice by departments.

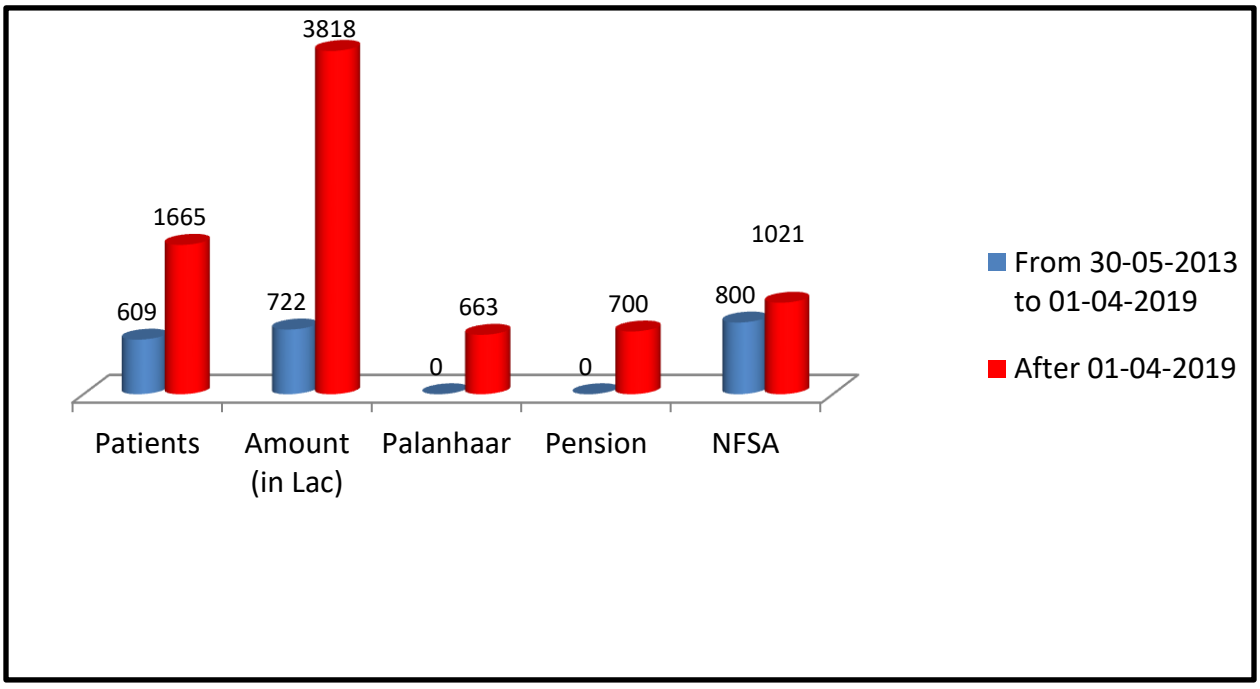
Information / Data Flow before GPR

Data entry of patient is first created by the TB Hospital on Silicosis Portal. After that data is examined by CMHO Office and Medical Record is validated. If application is accepted, then the record is forwarded to Collector (the nodal officer for approval of bank account details). Nodal officer forwards the application to the Department of Mines or Labour Department. The Department of Mines or Labour Department maintains the data of the actions taken by them in the Portal. They examine the patient in respect of their Labour Diary or belonging to mining affected areas. Records are finally sent again to Collector for Sanction Order Generation. After that payment is transferred directly in beneficiary account using pay manager.

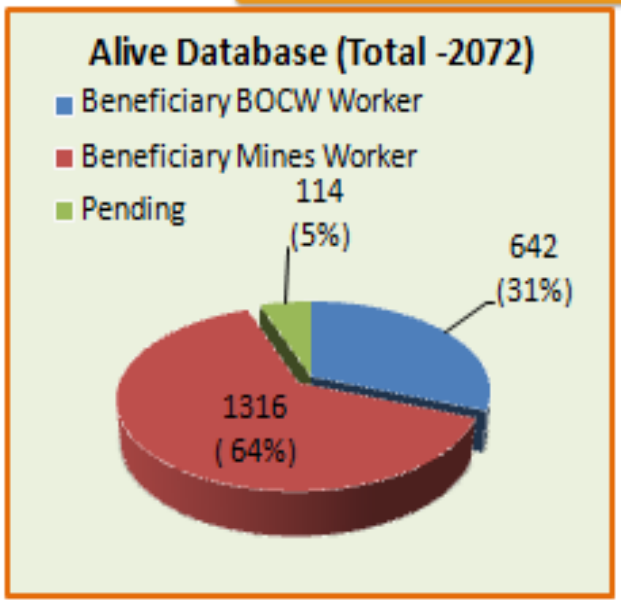
Silicosis Care Dashboard

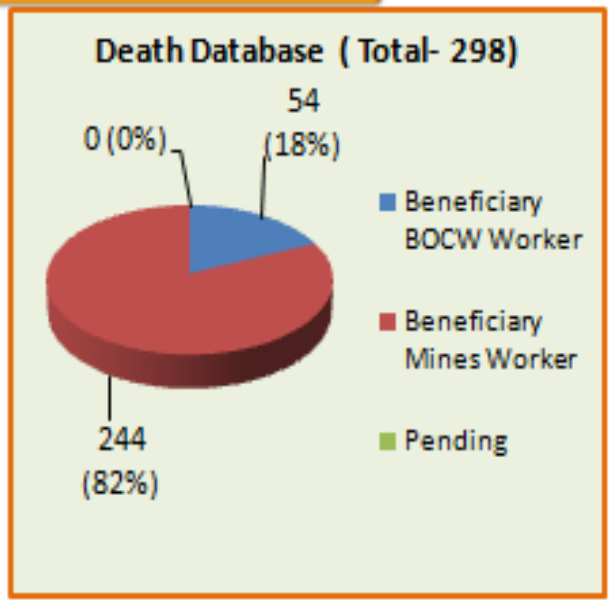
Alive Total	2072	Death Total	298
Alive Silicosis Disbursment by BOCW	642	Death Slicosis Disbursment by BOCW	54
Alive Slicosis Disbursement by Mines	1316	Death Slicosis Disbursment by Mines	244
Pending entries	114	Pending entries	0
Pension (Minimum Rs1500) fill by SJED		**Palanhar Benefit (Y/N) fill by SJED**	
Silicosis	1636	Yes	31
SSP	164	Not Eligible	255
NO	224	NO	0
Pending entries	48	Pending entries	2

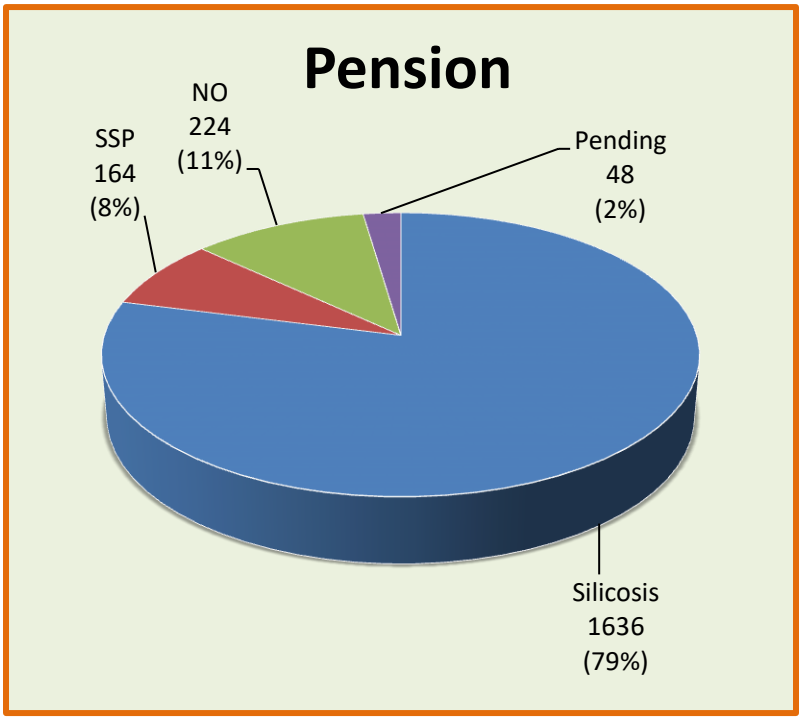
Comparative Analysis

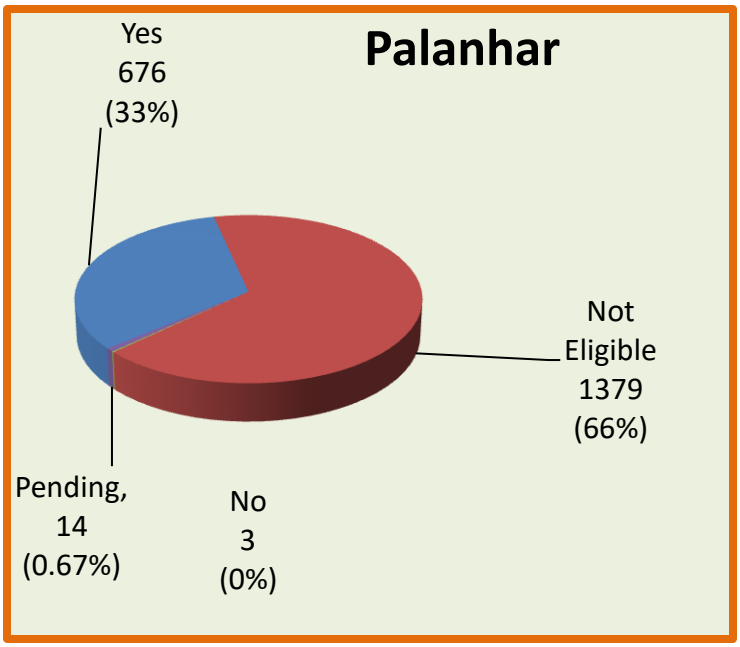


Reports and Statistics









Specifics on removal of non-value added activities during GPR

1. To deliver services to the beneficiaries with minimum waiting time and involving minimum physical visits to the hospital and to Collectorate / offices of respective departments.
2. To minimize duplicate / multiple claims /applications for financial assistance by a single beneficiary or his/her family.

Specifics on new value addition activities during GPR

1. To design a web-based application for implementation of silicosis Pension, Silicosis Palanhar Yojana and Food Safety Scheme of silicosis patients.
2. To create transparency and reduce complexity

Strategy/Methodology Adopted:

1. **Details of baseline study done**

    1. Safeguards against Dust were lower in areas where more patients were found.
    2. There was a lack of awareness among the workers
    3. The mine owners were also careless about the health of the workers. There was more possibility of silicosis in the workers due to no protection.
    4. Silicosis patients were deprived due to not being aware of the assistance given by the government and other schemes.
    5. Even if the patient had been informed of the plans, he had to travel to many offices, which used to take a lot of time to get the benefits.

2. **Problems identified**

    1. Non-availability of any type of equipment by mine owners to prevent workers' illness.
    2. The Patient not being aware about schemes.
    3. Lack of cohesion in various departments to give benefits of schemes.
    4. High possibility of duplicate payment
    5. Lack of time and monitoring to give benefits of all schemes.

3. **Roll out/implementation model**

    - Creating a platform in which all departments can register their work presence.
    - Creating a program that can be easily shared with stakeholders.

In this program, various departments are given access to transfer data as per their function. Once application is registered by the patient, verification of the medical board in the TB hospital takes place. Here the data of patient is entered into the program. After verification by the Medical Board, the data of facilities related to respective departments is updated in the Database as per the guidelines. Reporting can be obtained by applying a formula to get data of various departments at the block level and Gram Panchayat level.

4. Capacity Building and Awareness & Communication Approach

- Medical camp is organized at block level for screening of silicosis patients
- Publicity is done through media and social media.
- Periodic meetings with NGOs and leaders of various trade unions are organized. Suggestions are sought on the problems faced by the workers.
- Mine owners are bound to provide safety measures.
- Telephonic talks are held with patients and suggestions are sought from them.
- Regular Video conferences are being organized with all stakeholders and patients for betterment.

Interactive Session with Silicosis Patient Through VC

5. Automated, Assisted and/or Physical Assessment or Feedback Mechanism

As soon as the patient's certificate is generated, the data is entered in the program. Pendency list of Schemes offered by various departments can be accessed. Monitoring of schemes run by various departments is done during weekly meetings.

Case Study 1

Smt. Teeja Devi w/o Late Kirtaram: Village Tankla , Tehsil Khinwsar

Kirtaram used to work in Mining area. He got affected with Silicosis disease. An offline certificate of silicosis was issued to him from Jodhpur. After Data Mining using Silicosis Care, It has been identified that a certificate was issued to Kirtaram long back but neither he (when he was alive) nor his family (After his Death) received any financial aid. Kirtaram's death information was found from the compiled data of this tool which helped Mining Dept to approach Smt. Teeja Devi and provided the financial aid (Rs 2 Lac) within a week.

Case Study 2

Sh. Birmaram s/o Sh. Surjaram: Village Bhawad, Tehsil Nagaur Birmaram had been carving stone for 15-20 years. Suddenly he started facing breathing issues. He visited various hospitals for the treatment and spent a lot of money. For that he had to sell his 8 Bigha land. He was a TB Suspect. After reading an article in newspaper about Silicosis Care, someone suggested him to visit TB Hospital, Nagaur. He approached there and was diagnosed with Silicosis. Within a week he received amount of 3 Lacs in his account and got proper treatment. He was benefitted with various other aids. With this money he purchased his land back.

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सत्यमेव जयते

Department of Administrative Reforms & Public Grievances
Government of India
New Delhi