सत्यमेव जयते
NITI Aayog

DEVELOPMENT MONITORING AND EVALUATION OFFICE

Data Governance Quality Index

COMPENDIUM OF GOOD PRACTICES

USE OF ADMINISTRATIVE DATA BY MINISTRIES/ DEPARTMENTS OF THE GOVERNMENT OF INDIA FOR IMPROVED DECISION MAKING AND M&E

August 2022

NITI Aayog

Data Governance Quality Index

Compendium of Good Practices

ON

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AUGUST 2022

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PREFACE

The Central Government of India, through its Ministries and Departments spends an amount to the tune of more than USD 200 billion on various Central Sector (CS) and Centrally Sponsored Schemes (CSS) schemes. With rapidly evolving governance needs and tremendous growth in data capabilities with the advent of the Fourth Industrial Revolution technologies, it is imperative for governments to ride this transformative wave and shift to evidence-based policymaking for efficient utilization of resources to achieve intended development outcomes.

Against this backdrop, DMEO, NITI Aayog along with NIC/NICSI undertook an exercise to assess the data preparedness of Ministries and Departments (M/Ds) of the Government of India and create an index called the Data Governance Quality Index (DGQI). The idea was to enable these M/Ds to regularly measure the maturity level of their administrative data systems and its use in decision-making, identify reforms to reach the frontier of seamless data exchange and its synergistic use within the M/D, and define clear pathways to meet these goals.

Based on a literature review of several data maturity models, three pillars of data preparedness were identified under DGQI, viz. (a) Data Strategy to lay down systemic guidelines, (b) Data Systems to ensure smooth processes of data generation, quality control, management and its use, and (c) Data-driven Outcomes to integrate siloed data systems to create an open data ecosystem where non-personal data is widely shared across institutions and used by multi-disciplinary teams to drive policymaking. Within these three pillars, twelve themes were identified which helped M/Ds assess and improve upon specific areas for improvement.

In this process, DMEO, NITI Aayog identified several beacons of good practices in the use of administrative data for policymaking and monitoring & evaluation (M&E) that deserved wide dissemination as a public good. In this context, DMEO, NITI Aayog has prepared this compendium of good practices to enable all types of government agencies at central, state and local levels as well as other multilateral and non-profit organizations implementing development programmes to learn from these good practices.

This way, it is envisaged that this compendium would enable peer learning and aid in fostering a culture of evidence-based policymaking with the use of high-quality, seamlessly interconnected administrative data systems by governments across the globe.

ACKNOWLEDGEMENTS

This Compendium of Good Practices is the culmination of the arduous efforts of DMEO, NITI Aayog along with a wide range of stakeholders across the Government of India.

First of all, I would like to extend my thanks to the outstanding National Informatics Centre (NIC-NICSI) team, specifically, Sh. Prashant Kumar Mittal, Sh. Varindra Seth, Sh. Rajiv Rathi, Ms. Garima Sogani and Ms. Shehnaz Nayeem under the leadership of Dr. Neeta Verma, former Director General, NIC, who have not only been close partners in the execution of the entire DGQI exercise, but also supported the DMEO team in understanding and documenting these good practices.

Next, I would also like to express my gratitude to the leadership and the DGQI nodal officers at Ministries/Departments (M/Ds) who have proactively taken out time from their busy schedules to provide detailed information on these good practices to DMEO, NITI Aayog to enable peer learning.

I would also like to thank the DMEO team - Sh. Anand Trivedi, Ms. Gunjan Saini, Ms. Anmol Narain, Ms. Vaishvii Goel, Ms. Aishwarya Ravikumar, Ms. Veenu Singh, Ms. Aishwarya Salvi, Sh. Bishun Chaurasia - for their outstanding efforts, diligence and dedication under the overall leadership of former Director General Dr Sekhar Bonu and Sh. Shailendra Kumar Dwivedi, Joint Secretary towards producing this compendium of good practices on the use of administrative data which would immensely help in driving data-driven outcomes in the Government of India.

Director General,
Development Monitoring & Evaluation Office, NITI Aayog
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LIST OF ABBREVIATIONS

AAS	Agrometeorological Advisory Services
AAY	Antyodaya Anna Yojana
ABR	Allocation of Business Rules
AI	Artificial Intelligence
AMFUs	AgroMet Field Units
API	Application Programming Interface
AWS	Automatic Weather Station
BRLF	Bharat Rural Livelihood Foundation
CARI	Central Agriculture Research Institute
CLS	Central Location Server
CMFRI	Central Marine Fisheries Research Institute
COS	Change of Scope
COVID-19	Severe Acute Respiratory Syndrome Coronavirus 2
CPUE	Catch per Unit Effort
CRIS	Centre for Railway Information System
CSV	Comma Separated Values
DA&FW	Department of Agriculture and Farmers Welfare
DAHD	Department of Animal Husbandry and Dairying
DAMUs	District AgroMet Units
DBT	Direct Benefit Transfer
DGQI	Data Governance Quality Index
DHR	Department of Health Research
DI	Daily Incidence

DMEO	Development Monitoring and Evaluation Office
DOL	Day of Launch
DSS	Decision Support System
EAT	Expenditure Advance Transfer
EDBs	Electronic Display Boards
EOT	Extension of Time
FIR	First Information Report
FMD	Foot and Mouth Disease
FOIS	Freight Operations Information System
FPS	Fair Price Shops
FTO	Fund Transfer Order
GFR	General Financial Rules
GIS	Geographic Information System
GKMS	Gramin Krishi Mausam Sewa
GoI	Government of India
HR	Human Resource
ICAR	Indian Council for Agricultural Research
ICMR	Indian Council of Medical Research
ICMS	Integrated Coach Management System
CMS	Crew Management System
IFD	Integrated Finance Division
IFFCO	Indian Farmers Fertilizer Cooperative Limited
IIT	Indian Institute of Technology
IMD	Indian Meteorological Department
IMPDS	Integrated Management of Public Distribution System
INCOIS	Indian National Center for Ocean Information Services
IoT	Internet of Things
IT	Information Technology
IVRS	Interactive Voice Response Service
KPI	Key Performance Indicators
KSREC	Kerala State Remote Sensing and Environment Centre
KVK	Krishi Vigyan Kendra
LWE	Left Wing Extremism Affected

M&E	Monitoring and Evaluation
M/Ds	Ministries and Departments
MeiTY	Ministry of Electronics and Information Technology
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MIS	Management Information Systems
ML	Machine Learning
MoES	Ministry of Earth Sciences
MoPNG	Ministry of Petroleum and Natural Gas
MoRTH	Ministry of Road Transport and Highways
MoTA	Ministry of Tribal Affairs
MSS	Mobile Satellite Service
MSSRF	M.S Swaminathan Research Foundation
NADCP	National Animal Disease Control Programme
NADRS	National Animal Disease Reporting System
NAIP	National Agriculture Innovation Project
NCAER	National Council for Applied Economic Research
NCCR	National Center for Coastal Research
NFSA	National Food Security Act
NGOs	Non- Government Organizations
NIPFP	National Institute of Public Finance and Policy
NITI	National Institute of Transforming India
NPCI	National Payments Corporation of India
NSP	National Scholarship Portal
NTES	National Train Enquiry System
OMCs	Oil Marketing Companies
ONORC	One Nation, One Ration Card
OTP	One Time Password
PDS	Public Distribution System
PFMS	Public Financial Management System
PFZ	Potential Fishing Zones
PHH	Priority Households
PMAY-G	Pradhan Mantri Awas Yojana-Gramin
PMGKAY	Pradhan Mantri Garib Kalyan Anna Yojana

PMGKY	Pradhan Mantri Garib Kalyan Yojana
PMSSS	Pondicherry Multipurpose Social Service Society
PMUY	Pradhan Mantri Ujjwala Yojana
POS	Point of Sale
PPAC	Petroleum Planning and Analytics Cell
PwC	Pricewaterhouse Coopers
QR	Quick Response
RSP	Retail Sale Price
RTIS	Real-time Train Information System
SMS	Short message service
SOE	Statement of Expenditure
SOP	Standard Operating Procedure
SQL	Structured Query Language
SRF	Serum Response Factor
STC	Scheduled Tribe Component
STs	Scheduled Tribes
TSP	Tribal Sub-Plan
UCs	Utilization Certificates
UIDAI	Unique Identification Authority of India
UMANG	Unified Mobile Application for New-age Governance
UTs	Union Territories

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INTRODUCTION

Administrative data forms the backbone of concurrent evidence-based decision making in the Government of India. With emerging international evidence of the vital role played by data as an enabler in driving public policy across its lifecycle, the Central and State Governments have paid significant attention to their data systems over the past two decades. Management Information Systems (MIS) and dashboards have been developed for most government schemes and programs. To disseminate this information more widely, Open Data initiatives have also been undertaken. Recently, attempts have also been made to foster data exchange across Ministries/Departments via the Prayas Dashboard at Prime Minister's Office and the Output-Outcome Monitoring Dashboard at Development Monitoring & Evaluation Office (DMEO), NITI Aayog.

In this context, a comprehensive review of present data preparedness levels of all Ministries/Departments was required to chart the way forward and suggest measures for improvement. Against this background, the Data Governance Quality Index (DGQI) exercise was initiated in the year 2020 with the objective of assessing data preparedness of M/Ds on a standardized framework to drive healthy competition among them while creating an opportunity for them to implement and document good practices in different areas of data collection, quality control, data management, and data governance. The key idea behind this documentation of good practices was to speed up government-wide reforms and improvements by promoting cooperative peer learning.

Based on a detailed literature review of several data maturity models, three key steps were identified under DGQI for any entity to improve its overall data preparedness: (a) Data Strategy to lay down systemic guidelines and setup institutional structures to implement them, (b) Data Systems to ensure smooth processes of data generation, management and its use and (c) Data driven outcomes where data is utilized and widely shared by institutions to drive decision making. While DGQI 1.0 focused on only data systems pillar, DGQI 2.0 assessed data preparedness levels of Ministries/Departments across the three pillars.

These three pillars consisted of twelve themes which helped Ministries/Departments identify specific areas that require intervention. Within data strategy, there were two main themes: (1) Functioning of a Data & Strategy Unit (DSU) and (2) Existence and execution of a Data Strategy. Within data systems, there were six main themes: (1) Data generation, (2) Data quality, (3) Data analysis, use & dissemination, (4) Use of technology, (5) Data security & HR capacity, and (6) Data management. With data driven outcomes, there were three main themes: (1) Synergistic use of data, (2) Inter agency data collaboration, (3) Prescriptive analytics and (4) Good practices. For detailed information on

DGQI themes and pillars, readers are encouraged to refer to the DGQI methodology toolkit available at https://dmeo.gov.in/sites/default/files/2022-04/DGQI_2.0_Toolkit_28042022.pdf.

During the course of the implementation of the DGQI exercise, several outstandingly good practices were provided by Ministries/Departments under the 'Good practices' theme, some of which were identified by DMEO, NITI Aayog to be useful examples for peers. These good practices have been compiled and presented here as a public good for other governments to learn from.

As most good practices were not just restricted to a single theme under DGQI and spread across multiple pillars and themes, the good practices presented in this compendium were not bifurcated into theme wise sections. Another primary reason for doing so was to also help readers understand that these themes must not be seen in isolation from each other as they actually work in conjunction with one another. However, for the benefit of readers, each good practice was tagged to all the DGQI themes it covered.

It is hoped that this compendium of good practices would help governments learn from each other, enabling a paradigm shift in the way governments use administrative data and emerging technologies such as Machine Learning (ML), Internet of Things (IoT) etc. for informing policy decisions.

OBJECTIVES

This compendium of good practices has been developed with the overarching objective of widely disseminating real examples of the use of administrative data by Ministries/Departments of the Government of India in various areas of policy making viz., improved real-time decision making, granular and highly frequent scheme implementation and monitoring and transparent fund flow management among others.

A primary aim of this compendium is to enable peer learning among Ministries/Departments of the Government of India administering similar kinds of schemes to observe how can they create robust administrative data systems to generate high-quality, granular and frequent reliable data and subsequently how can they easily use this data to inform their policy making decisions.

This document aims to enable government agencies at any tier (Central, State, Local) as well as implementing agencies, multilateral bodies and other non-government organizations operating in the development sector to learn from these good practices and develop high-quality administrative data systems for their developmental programmes that can be used to meet their decision-making requirements.

It is hoped that suitable contextualization and adoption of these good practices by other Ministries/ Departments as well as other types of government would not only help in bringing accountability and transparency in government expenditure, but also ensure efficient and seamless delivery of services to citizens at the last mile.

APPROACH

This compendium of good practices on use of administrative data by the Government of India (GoI) has been compiled on the basis of the good practices provided by the Ministries/Departments of the Government of India via the DGQI self-assessment questionnaire. Ministries/Departments were requested to provide information on three main aspects for each of their good practice - a) the problem statement the Ministry/Department was trying to solve, b) the intervention undertaken (in terms of the data systems developed and technologies used) by the Ministry/Department to solve the problem and c) the impact of the intervention in terms of the resolution of the problem and other uses in decision making.

The information provided by Ministries/Departments under each good practice was then assessed on the following three parameters:

1. **Relevance:** It was assessed whether the stated problem and the implemented solution was relevant to the domain of data driven decision making. Another key element of consideration here was the replicability of the solution by any other Ministry/Department or any other tier of government, after suitable modification in their context.
2. **Exhaustiveness:** It was assessed if the Ministry/Department has provided exhaustive details on the what was the problem, how did the solution help overcome the problem, what was the implementation approach for the solution, how was it executed with help of which stakeholders, and how is the solution being used for driving better policy making decisions.
3. **Impact:** It was also assessed if the solution helped the Ministry/Department in making quicker fact-based decisions, mid-course corrections in programme implementation and enabled easier, granular and regular monitoring. The quality of supporting evidence provided to support the claim about generated impact was also taken into account, keeping in mind that the evidence should be verifiable and/or be institutional in nature against anecdotal evidence.

Each good practice was given a score between zero to five on each of these parameters, a simple average of which was used to generate a score for each good practice. To avoid subjectivity, the scoring done by one team member was cross-checked by another team member and vice versa. The scores were also transparently shared with Ministries/Departments as another backcheck mechanism.

From over 150 good practices submitted by Ministries/Departments, 14 good practices that were found to be making extraordinary changes in the way some Ministries/Departments handle and use their administrative data were shortlisted for documentation under this compendium. These good

practices have not just received the highest scores but they also have a high degree of replicability. It is believed that suitable modification and adoption of these good practices by other stakeholders can have a huge impact via generation of high quality administrative data and its effective use by policymakers to enhance efficiency and effectiveness in public administration.

1 DEPARTMENT OF RURAL DEVELOPMENT

Awaas App for beneficiary led data collection used for fund releases and monitoring of Pradhan Mantri Awaas Yojana (Gramin) Scheme

Themes: *Data generation; Data quality; Use of technology; Data analysis, use & dissemination*

PROBLEM STATEMENT

To achieve the objective of providing "Housing to All", the Government of India rolled out the revamped rural housing scheme, Pradhan Mantri Awaas Yojana-Gramin (PMAY-G) on 20th November, 2016 with effect from 1st April 2016. The program envisaged the completion of 2.95 crore PMAY-G houses with all basic amenities by the year 2022.

Some of the challenges faced by the Department in the monitoring and evaluation of the Pradhan Mantri Awaas Yojana (Gramin) scheme before the implementation and use of the Awaas App for monitoring included: non availability of unit/beneficiary level data at the central level to cross check last mile progress of the scheme, monthly progress reports submitted by states which were only prepared at the district level and prone to human errors and manipulations, no mechanism to monitor the end mile delivery of scheme benefits to only intended beneficiaries, delays in fund releases and inefficiencies in scheme implementation.

SOLUTION

The Department of Rural Development developed the Awaas App which can be used by both PMAY-G beneficiary to report physical progress of house under construction and the designated PMAY house inspectors to inspect the houses constructed under PMAY-G or other rural housing schemes monitored through AwaasSoft.

Awaas App, the mobile application (available for both android and iPhone users) was developed as a part of m-Governance solution. The app provides various citizen-centric features for ease of implementation of the scheme such as evidence capture and information dissemination. PMAY-G beneficiary login is based on One Time Password (OTP) which is sent on his/her mobile number registered on AwaasSoft at the time of house sanctioning. It can be directly used by any PMAY-G beneficiary or his/her representative to report the physical progress of the house under construction in order to obtain the next installment of financial assistance.

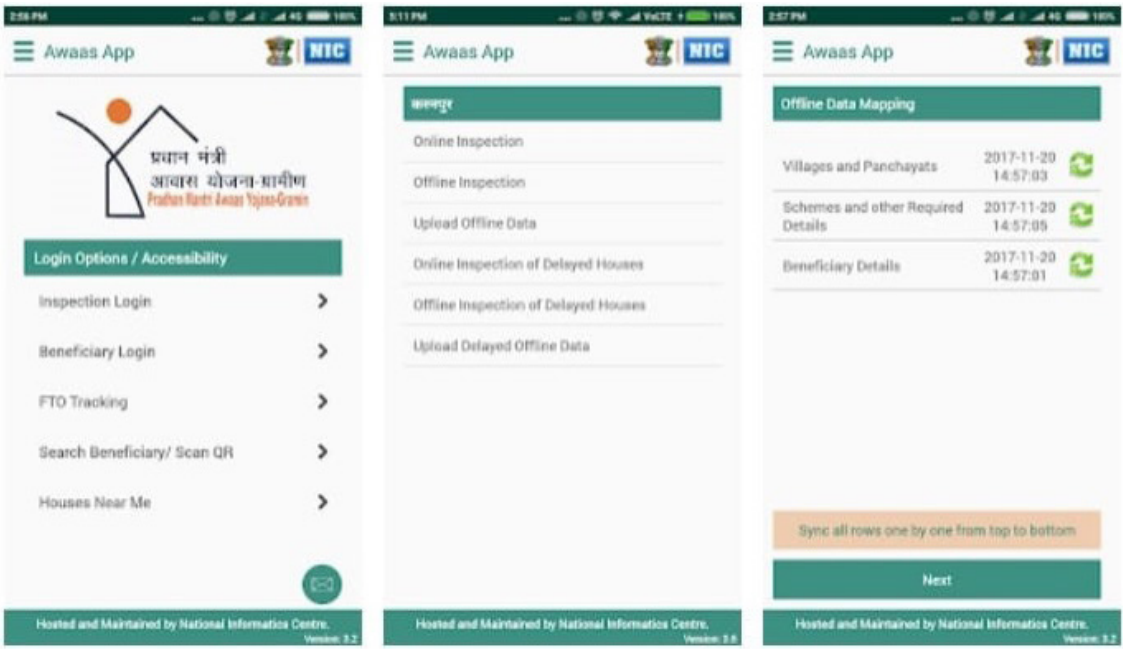

Figure 1: *Snapshot of Awaas App developed by Department of Rural Development*

The mobile application aims at capturing a good quality photograph with time-stamp and geo-coordinates of the houses at each construction stage, so that the next installment of financial assistance can be provided to the beneficiary without any delay which helps in automated release of payments after inspections. FTO tracking feature allows the user to track the payment status by directly entering the FTO number of the Beneficiary ID.

The uploaded images are further verified by the Block office on AwaasSoft in order to complete the inspection process. It also leverages the use of AI and ML to detect duplication of photos uploaded on the app which helps in automatic verification of data. The app also includes a feature which allows the QR code given in the printed e- sanction order to be scanned which allows the inspector to view details of the household and allows for hassle free inspection of the house.

Additionally, the app also has multiple user-friendly features like “Houses near me” which do not require any login credentials and enable any citizen to see the PMAY- G houses around his/her location. This location is auto-detected, and also s/he is provided with the route map to visit any PMAY-G house in the vicinity. The Awaas App also provides geo-referencing features and captures accuracy of coordinates and deviation from proposed site coordinates, which helps in on-ground monitoring of the scheme.

IMPACT

With the capability of working in offline mode, with dedicated logins (even for beneficiaries), proved to be a game-changer in ensuring that monitoring of house construction stages was accurate and that linking with the release of installments was incentivized for the beneficiary in the most promising way while removing inefficiencies in system. This mobile application not only ensured construction of houses and record of assets, but it also ensured the tracking and release of installments with money being credited to the beneficiary in time.

Real time generation of data helped drive data based decision making by the Department, as the monthly review meetings had reliable information on the basis of which key decisions were taken.

They also used prescriptive analytics to understand the resources that will be required to meet the set targets and thus were able to align the back end value chain across the country to ensure that enough steel and cement was available to ensure uninterrupted construction of houses. The mobile application also helped in streamlining resources for the construction of houses: once the houses were sanctioned, it automatically led to a request being generated for a job card to be issued under MGNREGA.

Besides addressing the housing deprivation in the country, the mobile application has helped contribute towards improving the quality of life. The adoption of DBT has plugged leakages in the system and enhanced the trust of rural citizens, besides enabling timely disbursement of funds. This has significantly reduced the average days taken to construct a house from 314 to 114 days, as indicated by a study undertaken by National Institute of Public Finance & Policy (NIPFP). The citizen-centric architectural approach of the Awaas App has helped the scheme become more citizen-centric and inclusive.

2 MINISTRY OF EARTH SCIENCES

Disseminating real time weather forecast information to farmers using mobile apps

Themes: *Data generation; Data analysis, use & dissemination*

PROBLEM STATEMENT

One of the crucial pieces of information for farmers in agriculture production and management is weather forecasts and climate related information. To provide this information to farmers, the Indian Meteorological Department (IMD), Ministry of Earth Sciences (MoES), started broadcasting weather services via radio and worked with state governments to issue forecast-based advisories.

In 1991, IMD started a Weather based Agrometeorological Advisory Services (AAS) program in some Agroclimatic zone levels to provide weather forecasts in the medium range (3 to 7 days in advance) to the farmers through five AgroMet Field Units (AMFUs). Further in 2008, IMD started issuing quantitative medium range weather forecasts (upto 5 days) twice a week at district level through its network of 130 AMFUs. IMD collaborated with Indian Council for Agricultural Research (ICAR) and State Agriculture Universities under this project. With their help, forecasts were collated and communicated via telephone and emails to the AMFUs. A panel consisting of experts from various fields of agriculture (e.g. agronomy, horticulture, entomology, plant pathology etc.) and allied disciplines (animal sciences, fisheries etc.) at AMFUs translated these forecasts into crop livestock specific advisories with the help of subject specialists and the same was disseminated through conventional means viz. mass media, telephone, post, extension agents, writing on walls in villages etc. Feedback on the service was also collected.

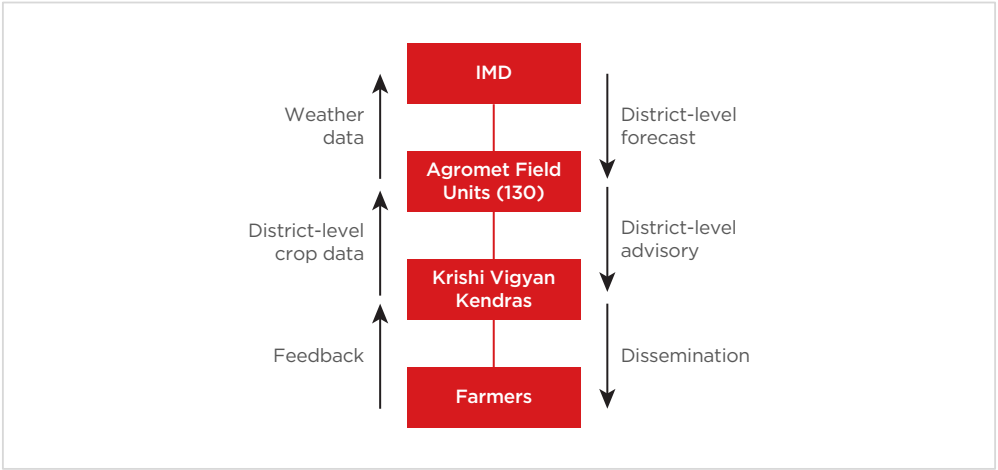

Figure 2: *Old structure of Agromet Advisory System (AAS) service*

Recently, Agrometeorological Advisory Services, rendered under Gramin Krishi Mausam Sewa (GKMS) scheme, prepared district level agro-advisories for all 130 Agroclimatic zones i.e 700 districts and block level agromet advisory for ~3100 blocks by leveraging Krishi Vigyan Kendra (KVK) and the existing collaboration with ICAR.

However, this mode of dissemination had challenges, as the process of communication used to cause one day delay in transmitting the information to the farmer thereby rendering usability of initial 24 hours forecast useless. The need of the hour was to find a way so that the farmer could receive information at the earliest after generation of forecast from the models.

SOLUTION

To address the above-mentioned problems, the Ministry developed a dedicated Decision Support System (DSS), called Agromet-DSS, to make exchange of data and information seamless, objective, timely, transparent and effective among concerned stakeholders leading to improvement in the quality of services. Agromet-DSS facilitates the scientists/institutions with customized tools to integrate weather and crop information to prepare agromet advisories at finer scales in short time to serve farming community at micro level[1].

Moreover, it helps in value addition to model-generated forecasts by Meteorological Centres and Regional Meteorological Centres of IMD and in verification of district and block level medium range forecasts as well as facilitates automated preparation of AAS bulletins at block and district levels.

To increase outreach of Agromet Advisories and keep individuals updated about thunderstorm/ lightning with the help of Regional Meterological Centre/Meterological Centres, IMD is in the process of establishing 530 District Agromet Units (DAMUs) in the premises of Krishi Vigyan Kendras (KVKs), under the network of ICAR. These multidisciplinary units are responsible for preparation and dissemination of district and sub-district agro-met advisory bulletins by using information generated by Automatic Weather Station (AWS) installed at KVKs. Such information on weather observations and weather forecasts are useful for studies on crops, pests and diseases, soil, agro-forestry, livestock, horticulture, agricultural physics, soil science etc. DAMUs are addressing wide variations in weather within a district by making advisories to be more crop and location specific. As per Gramin Krishi Mausam Sewa (GKMS) scheme's annual report for FY 20-21, 199 DAMUs have already been established[2].

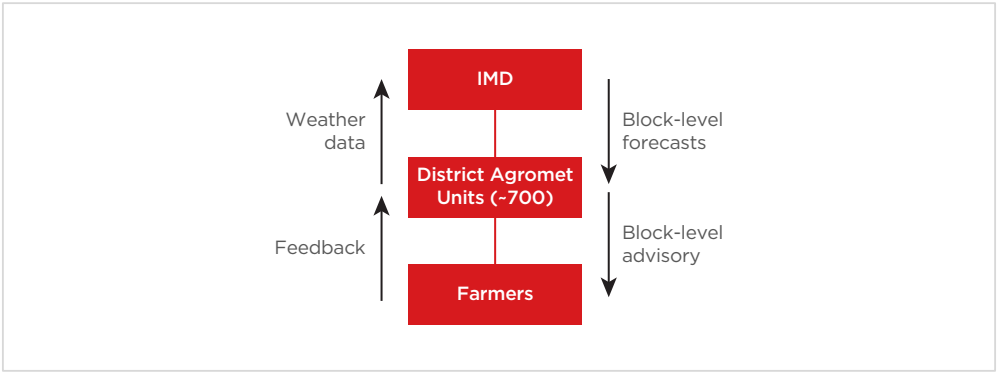

Figure 3: *New structure of Agromet Advisory System[3]*

1 Lok Sabha Question, accessed on 6th June 2022

2 Gramin Krishi Mausam Sewa Annual Report 2020-21

3 Agrometeorological advisory services in India: An assessment

Robust mechanism for dissemination has been evolved by introducing mobile Apps like MeghDoot and by leveraging Interactive Voice Response Service (IVRS) using mobile phones among other steps. Moreover, realtime weather data is being collected online and integrated into AgrometDSS and other mobile Apps. To ensure the receipt of information by the farmers quickly after generation of forecast from the models, the Ministry now shares weather alerts and warnings with farmers through mobile Apps and SMS for swift response. These weather information and agromet advisories are also shared with various agencies for use in their data platforms like *Kisan Suvidha*, UMANG, *KisanMitra* etc. to enhance outreach. Further WhatsApp groups of farmers have been created at block level by the AMFUs and DAMUs for easy accessibility of information. A dashboard has been created in the AgrometDSS and also in the website of Agromet Division for monitoring the entire process and timely follow up. Realtime dynamic feedback from the farmers is also collected and integrated in AgrometDSS for course correction.

IMPACT

Currently, 79.56 lac farmers[4]) used to receive SMS advisories on their mobile phones with a peak of 43.37 million (35 million through mKisan portal) farmers in July 2020 under GKMS. Later on, Policy for sending SMS advisories using mKisan portal was revised by the Department of Agriculture and Farmers Welfare (DA&FW). As per the latest SMS policy decision, the monthly quota of all the concerned agencies was reduced to 50% leading to substantial reduction in number of SMS advisories being sent. The DA&FW is shifting from existing push system of mKisan to pull system to enable information access by farmers.

Integration of weather forecast and advisory with state government's mobile apps/websites through APIs/web services has already been done in 9 states (Chhattisgarh, Tamil Nadu, Haryana Madhya Pradesh, Gujarat, Rajasthan, Bihar, Nagaland and Uttarakhand). Augmentation of dissemination of advisories is done by giving priority to different extension mechanism of State Government. (viz. State Department of Agriculture, District Agriculture Officer, Block Agriculture. Officer, Rural Agriculture Officer and Farmers).

About 13.55 Lakh farmers are being provided Agromet advisories through WhatsApp groups created by AMFUs and DAMUs covering 1,19,499 villages. About 3,02,000 farmers access the Agromet advisories through the *Meghdoot* app. Continuous efforts are being made to promote the use of the app among the farmers.

A third party evaluation of the AAS was done by the National Council for Applied Economic Research in the year 2020. The study covered 3,965 farmers across 121 rainfed districts of 11 States and 1,376 livestock owners across 92 districts of 10 states. The findings showed that 80% farmers reported to have reduced losses due to information received on high resolution weather events. Agricultural households belonging to Below Poverty Line category in rainfed areas reported to have an estimated additional annual income of Rs 12,500.

98% farmers and 76% of livestock owners reported making modifications to at least one of the critical practices based on the weather advisories. Moreover, majority of livestock owners (96%) reported that weather advisories are improving the practice of vaccination against seasonal animal disease too. 80% of farmers and 83% of livestock owners, who received information on natural calamities, reported to have reduced losses occurring due to them.

4 7,56,408 through mKisan portal of the Ministry of Agriculture + ~12 Lac through Whatsapp + ~60 Lac through the State Govt apps

The total annual economic benefits to the agricultural households' farmers and livestock owners taken together works out to be Rs 13,331 crores and incremental benefit over the next five years is estimated to be about Rs 48,056 crores for the farming community by continuing the GKMS services of MoES.

3 MINISTRY OF TRIBAL AFFAIRS

Digital Monitoring of Schedule Tribe Component (STC) through PFMS Integrated MIS

Themes: *Use of Technology; Data analysis, use & dissemination; Inter agency data collaboration*

PROBLEM STATEMENT

The Tribal Sub Plan (TSP) came into existence in 1974-75 as a strategy for the development of areas having tribal concentration. 41 Central Ministries/Departments have been identified for earmarking of Scheduled Tribe Component (STC). Besides, State Governments are encouraged to earmark TSP funds in proportion to ST population (Census 2011) in the State with respect to total State Plan. These funds are used for targeted financial and physical benefits to the Scheduled Tribes.

The monitoring of the Tribal Sub Plan (TSP) was done by the erstwhile Planning Commission till 2017. Despite huge allocation of funds across Ministries and States, the TSP tended to become more of an accounting exercise without adequate emphasis on the planning and execution of schemes to ensure demonstrable benefits for the STs. While the Ministry of Tribal Affairs was the nodal Ministry for overall policy, planning and coordination of programmes for development of STs since 1999, it had little role in the monitoring of Tribal Sub Plan.

Thus, notwithstanding numerous developmental interventions, the STs continue to face developmental deficits with respect to health, education as well as other socio-economic indices, many of which are well below the national average and tribal areas also faced infrastructural gaps. A study report on 275 schemes of 38 Ministries by PwC highlighted that funds allocated by the Central Ministries to the State Governments get merged with State funds and there is no dedicated mechanism to assess utilization of these funds for STs or ST benefited areas. Further there were many schemes where the funds are allocated on a notional basis or the scheme allocation is too meager to have any potential to fetch tangible results.

After the merger of Plan and Non-Plan, the TSP was renamed as Scheduled Tribe Component (STC) by the Ministry of Finance. In January 2017, the monitoring of STC was allocated to the Ministry of Tribal Affairs after the amendment in the 'Allocation of Business Rules' (ABR). Based on the framework and mechanism designed by NITI Aayog, the Ministry has issued detailed guidelines for implementation of STC by the Central Ministries/Departments and States/UTs and detailed modalities for effective utilization of funds meant for welfare and development of STs.

SOLUTION

With the given mandate, the Ministry developed an online monitoring mechanism which directly captures data from PFMS, providing detailed status of expenditure vis-a-vis allocations made to Central Ministries/Departments.

As of date, the portal is being used to track STC expenditure by 42 Ministries/Departments across 250+ schemes for the last four years.

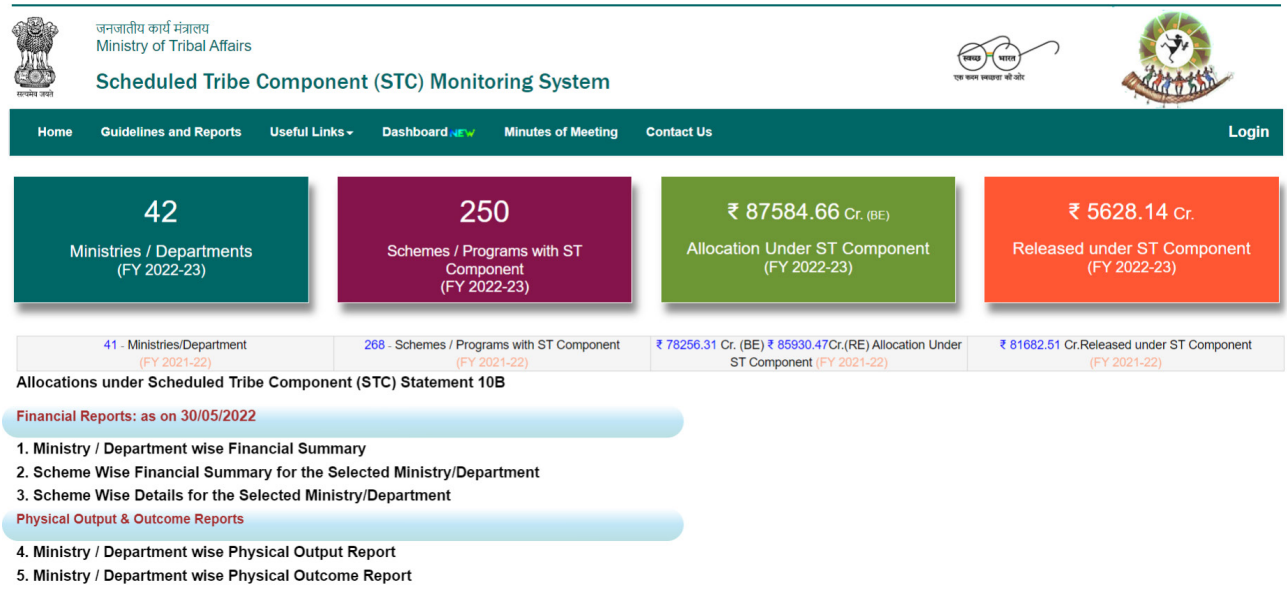

Figure 4: *Scheduled Tribe Component (STC) Monitoring System of Ministry of Tribal Affairs*

IMPACT

The initiative has brought a qualitative change in the treatment of TSP/STC from a plain accounting exercise to a pro-active, need-based, demand-driven planning process with stringent appraisal, approval, monitoring and evaluation mechanisms by various means.

The performance of each Scheme and Ministry in respect of utilization of STC funds is being monitored through the STC Portal and mapped to the Performance Dashboard of the Ministry to see how the funds relating to schemes of different Ministries are allocated to States and find out under-allocation, under-utilization or notional allocation if any.

Based on these findings, the Ministries are being sensitized to ensure that the budget allocated under STC is utilized strictly for tribal welfare. The Ministry of Tribal Affairs is now taking up specific issues with each sectoral Ministry, ensuring effective utilization of STC.

The system is now being used to not just track the utilization of funds but also ensuring the use of these funds for intended outputs as several Ministries are now sharing data of beneficiaries and assets being created through STC funds via this portal. This information can play a useful role in estimating the impact of fund utilization by different Ministries/Departments, identifying sectors that require more intervention and accordingly deciding STC allocations based on these needs.

4 MINISTRY OF PETROLEUM AND NATURAL GAS

Modification of cash transfers using payments data for implementation of Ujjwala scheme during Covid-19 lockdown

Themes: *Data analysis, use & dissemination*

PROBLEM STATEMENT

Due to the Covid-19 pandemic which spread rapidly across the country from March 2020 onwards, a national lockdown was announced across India increasing the vulnerability of millions of people while being confined to their homes.

To ensure that all those in need were able to get access to basic necessities such as food and fuel, the Government of India announced a slew of measures including three free LPG cylinder refills for Ujjwala consumers under the Pradhan Mantri Garib Kalyan Yojana (PMGKY). Ujjwala itself as a scheme had been launched on 1st May 2016 in Ballia, Uttar Pradesh by the Hon'ble Prime Minister of India.

Implemented by the Ministry of Petroleum and Natural Gas (MoPNG), Ujjwala scheme was launched with an objective to make clean cooking fuel such as LPG available to the rural and deprived households which were otherwise using traditional cooking fuels such as firewood, coal, cow-dung cakes and others which have a detrimental impact on the health of women using them. Given the context of the lockdown amidst the pandemic, the Government had announced that all the Ujjwala consumers were to be given a cash transfer advance for three refills.

The existing cash transfer mechanism was in need of modification as a prerequisite to enable three refills within Ujjwala. In the then existing Cash Transfer mechanism, there was no provision to provide free refills to customers. Customers used to pay the refill amount upfront and then the subsidy amount was transferred to his/her bank account as applicable. Hence a new logic was required where customers could be offered free refills without paying anything upfront. Additionally, the scheme was initially implemented for a period of Apr-June 2020. However, the scheme was later extended for next 3 months till Sep 2020 for those PMUY beneficiaries who were unable to avail the benefit of the scheme during the initial period of 3 months. Subsequently, the scheme was further extended for next 3 months till Dec 2020 for PMUY beneficiaries who had low LPG consumption and had not availed the scheme benefit, therefore the eligibility of consumers for an advance was varying month to month as per changing government guidelines.

The advance amount transferred also had to be reconciled with the actual retail sale price (RSP) of delivery and the monthly claim settlement with the Petroleum Planning and Analysis Cell (PPAC), which could be a manual and separate activity.

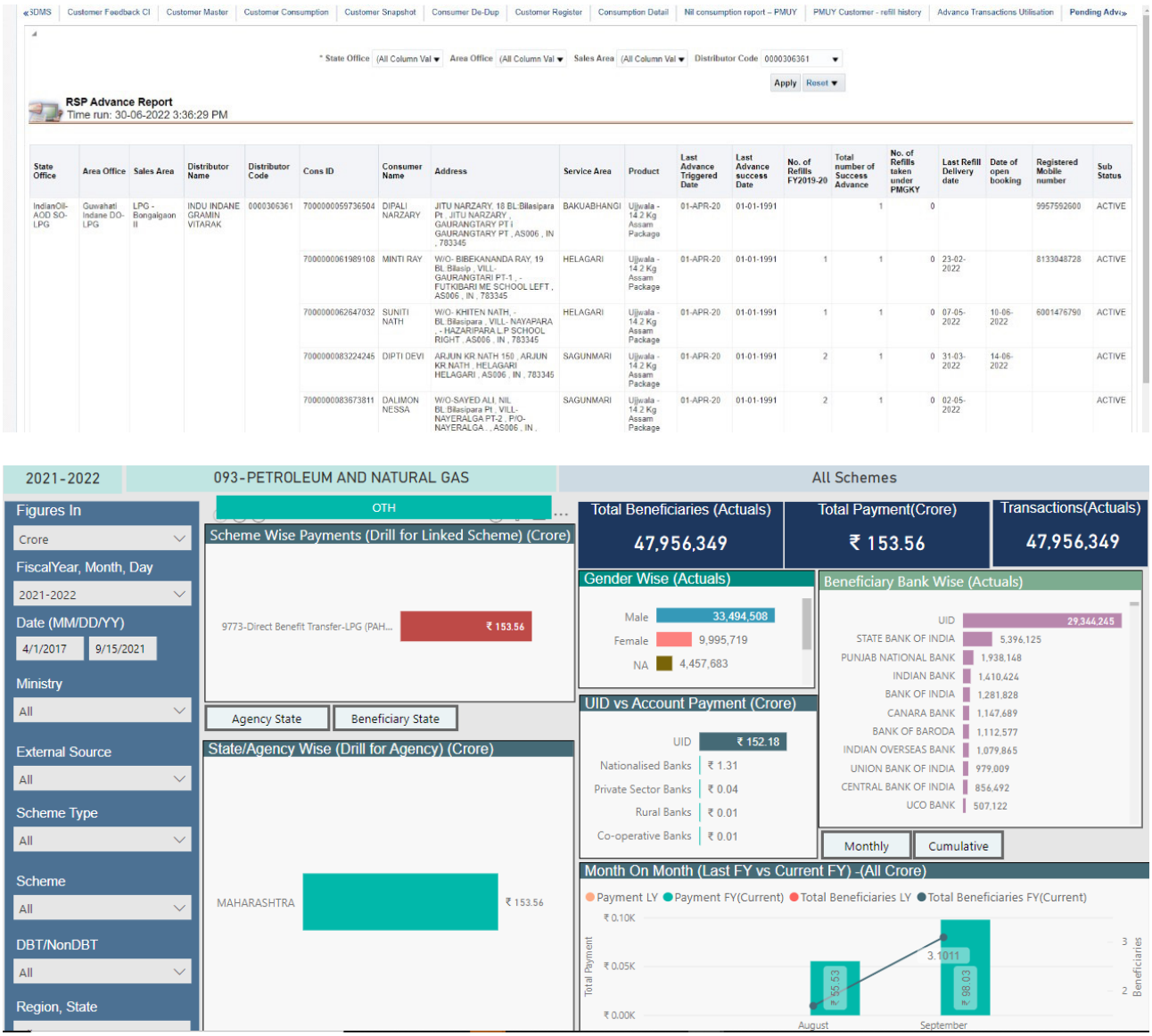

Figure 5: *Snapshot of Public Financial Management System (PFMS) Dashboard*

SOLUTION

Owing to a robust payment interface mechanism using consumer data, Oil Marketing Companies (OMCs) were able to create a cash transfer mechanism within a week of the announcement of the scheme. This was accompanied by the development of a SAS based module to speedily address OMC claims for PMGKY.

A robust MIS system was created from the start to monitor the scheme and ensure the reach of the scheme to maximum beneficiaries. OMCs upgraded computing storage and memory enhancement to handle peak transactional load of around 10X normal load. Data quality was ensured using SQL Constraint, Primary and Foreign Key for SQL backend.

Due to the lockdown, it was difficult for the consumers to reach the bank to withdraw money. Various digital channels were introduced for payment of refills like Bharat Bill Pay System, POS based payment systems. Exploration also started for feature-based payment services for which trials are underway.

An elaborate invalidation logic was written based on various data parameters like the last date of validation of the bank mandate and Aadhaar. The bank master update was done with a two-pronged approach,

a. Auto update of cases by retriggering of bank validation and

b. Update of any pending merger cases with due follow-up with NPCI.

Apart from these, other parameters like the last refill date of the consumer, location etc. were used to identify consumers for sending targeted communications and updates. Since consumers could not reach the banks due to lockdown, an alternative was provided for the creation of new bank accounts with Indian Post. Necessary data was provided to the Post Department which aided uptake of such bank accounts. In PMGKY, cash transfer records being created were around 21 times more than the daily average subsidy records.

Figure 6: *Beneficiary receiving benefits of Ujjwala Scheme during Covid-19 by the Ministry of Petroleum and Natural Gas*

IMPACT

With the steps taken, the PMGKY scheme was able to reach around 96 percent of the total Ujjwala beneficiaries, thus providing them the much needed relief required during the lockdown period. To avoid human contact due to Covid, many services which were earlier available by visiting distributors were shifted online digitally.

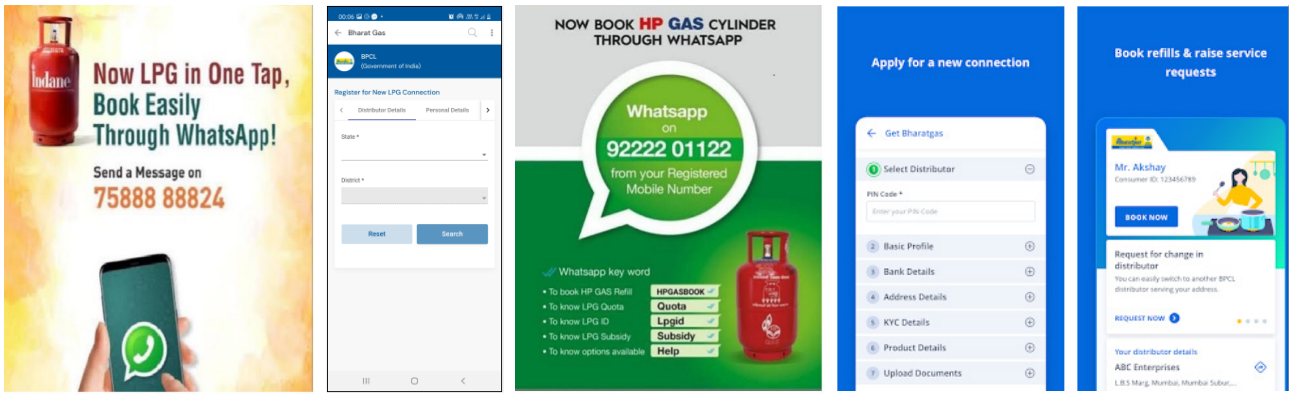

Figure 7: *Snapshot of online services being used by the beneficiaries*

OMCs also undertook a door-to-door survey of PMUY beneficiaries to contact them to help, refill and to update bank details as required for availing an advance. The consumption of PMUY beneficiaries increased and they consumed an average of 4.39 refills per annum in 2019-20 which was only 3 in the previous year.

5 MINISTRY OF HEALTH & FAMILY WELFARE

USE OF COWIN PORTAL FOR MONITORING OF COVID-19 VACCINATION PROGRAMME IN INDIA

Themes: *Data generation; Data analysis, use & dissemination; Inter agency data collaboration*

PROBLEM STATEMENT

In the wake of the Covid-19 pandemic in 2020, The Ministry of Health and Family Welfare was responsible for collecting information on the spread of the Covid-19 virus, testing progress, hospital admissions and availability of other resources in India. Collecting real-time granular data on multiple parameters was critical to obtain a bird's eye's view of the unfolding situation to allow multiple stakeholders and decision makers to direct relevant resources and attention to pressure points. Once vaccines were available, India kickstarted its Covid-19 vaccination programme in 2021 targeting over 30 crore beneficiaries. Planning and implementation of one of the world's largest vaccination drive including logistics and vaccine management required continuous monitoring of the COVID vaccination programme at highly granular levels. Not only it was a huge exercise, but it had to be also done in a transparent and structural manner, to ensure that vaccines reach the most vulnerable sections of the society.

SOLUTION

The Department of Health Research (DHR) along with the Indian Council of Medical Research (ICMR) initiated the development of a web-based data collection and analysis tool in March 2020 to track the spread of the pandemic in India. The portal included an interface which could be used by testing labs across the country to enter, view and modify patient data as well as API based data for states with separate COVID-19 data portals. It also had provision of dashboards for various stakeholders: national, state and district level authorities to detailed analysis including time trends of testing and positivity rates and built-in modules for lab infrastructure and inventory management. It also had AI based chatbots for assisting labs with frequent queries and provisions for capacity building such as trainings and video tutorials for data entry processes. This way, the Covid-19 portal became the basis for information and data analysis during the pandemic, while allowing decentralized decision making at state/district levels.

To aid in the rollout of the vaccination programme, the CoWIN (Covid-19 Vaccine Intelligence Network) portal was developed in a record time, with consideration given to scalability, modularity, and interoperability. On January 16, 2021, the Hon'ble Prime Minister of India unveiled CoWIN along with the launch of the national Covid-19 vaccination campaign. The Covid-19 Vaccine Intelligence Network (CoWIN) is the digital backbone of India's rapidly expanding COVID-19 vaccination program. It is a scalable, inclusive, and open platform for universal vaccination, and enables monitoring of vaccine utilization, coverage, and wastage throughout the system. The portal allows users a chance to book

vaccination slots and download certificates while simultaneously allowing healthcare providers to manager vaccine stock and track workflows.

The CoWIN portal was developed in several phases. In the initial phase, an online registration process went live where healthcare workers and frontline workers were sent system-generated notifications about their vaccination schedule. Due to the nature of their jobs, many were not able to attend their vaccination appointments. The government hence shifted from a supply-driven to a demand-driven approach for vaccinations in the subsequent phases.

In the second phase, when the portal was opened up for vaccination of individuals over 45 years of age, beneficiaries were hence allowed both walk-in and online vaccination registration, along with the choice of location and time slot as per their convenience. An assisted mode was also made available through the 240,000+ Common Service Centres (CSCs) and a helpline number. After demonstrating scalability and agility during the second phase, the APIs of the platform were made available to private players at the beginning of the third phase of the vaccination drive. Individuals above 18 years of age had multiple options to choose from amongst private and government service providers. Once access to its services was opened through APIs, more than 100 applications were integrated with CoWIN for providing search, booking and certification facilities to their users.

The platform tries to ensure universal access to vaccination, withstanding physical, lingual, digital, and socio-economic barriers. To this end, the portal has been made available in English and 11 regional languages to allow citizens across multiple states to access the platform with ease. To circumvent the lack of digital access, the platform allows for up to six members to be registered under one mobile-number linked account. The portal is convenient to use, provides easy access to information on vaccination sessions and centers and offers flexibility to register online or on-site from any point of convenience, ensuring provision of services even in areas with limited internet and mobile connectivity. It also had special provisions for vulnerable groups without a valid photo identity proof.

Each dose of vaccination is digitally acknowledged using a QR based certificate. The certificate can be easily traced and verified. This verifiable data can be easily used to monitor the total number of people vaccinated at all levels of programme management. This data also helps in ensuring that minimum prescribed time interval is maintained between the first and second doses of vaccination and that the same type of vaccine is administered. The Aadhaar/other identity proof based individual verification system helps in preventing pilferage and fraud. In case of adverse events following immunization, beneficiaries, vaccine batches, and vaccination centers could also be easily tracked.

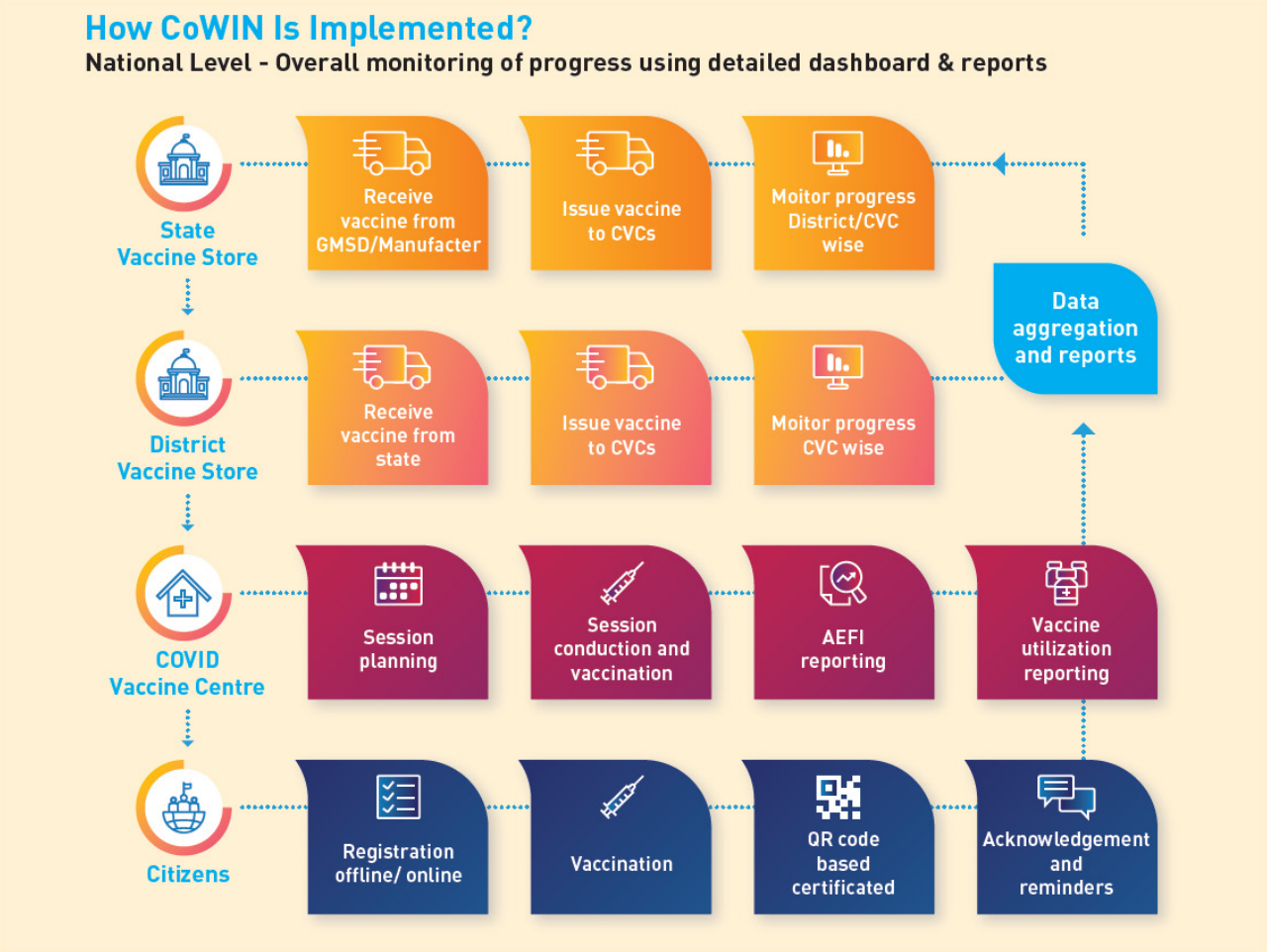

Figure 8: *Uses of CoWIN portal by various stakeholders*

IMPACT

Since the launch of the Covid 19 portal, comprehensive data on Covid-19 cases along with key analytics on time trends, state/district level disaggregation have been made available in public domain. The tool has become a valuable resource in generating useful analysis to help policymakers at all levels take key decisions with regards to identifying areas for setting up containment centres, identifying locations where there is a deficiency of hospital beds, ensuring supply of essential drugs and equipment in hotspot centres etc. It is actively being used by 7500 + labs collecting approx. 390 million records till date.

The CoWIN platform is a state-of-the-art digital solution with the ability to handle large transaction loads. It is being used to holistically manage vaccine supply chain planning and operations in government as well as in private setups. It has enabled assessing the extent of vaccine wastage and facilitating execution of appropriate measures to minimize it. It has effectively and efficiently enabled vaccination session management by allowing scheduling vaccination sessions for both online and offline modes. This has also helped in ensuring social distancing norms to be followed to control the spread of the pandemic by avoiding overcrowding at vaccination centers. Over 10 million + doses per day have been administered multiple times owing to the active use of the platform. Daily vaccination rate touched a record 25 million doses on Sep 17, 2021.Monitoring vaccination progress throughout the country at a granular level in terms of geographic and demographic coverage was also only

possible because of the platform. This data has greatly helped the government to inform planning and policy decisions at micro and macro levels to effectively manage the pandemic response.

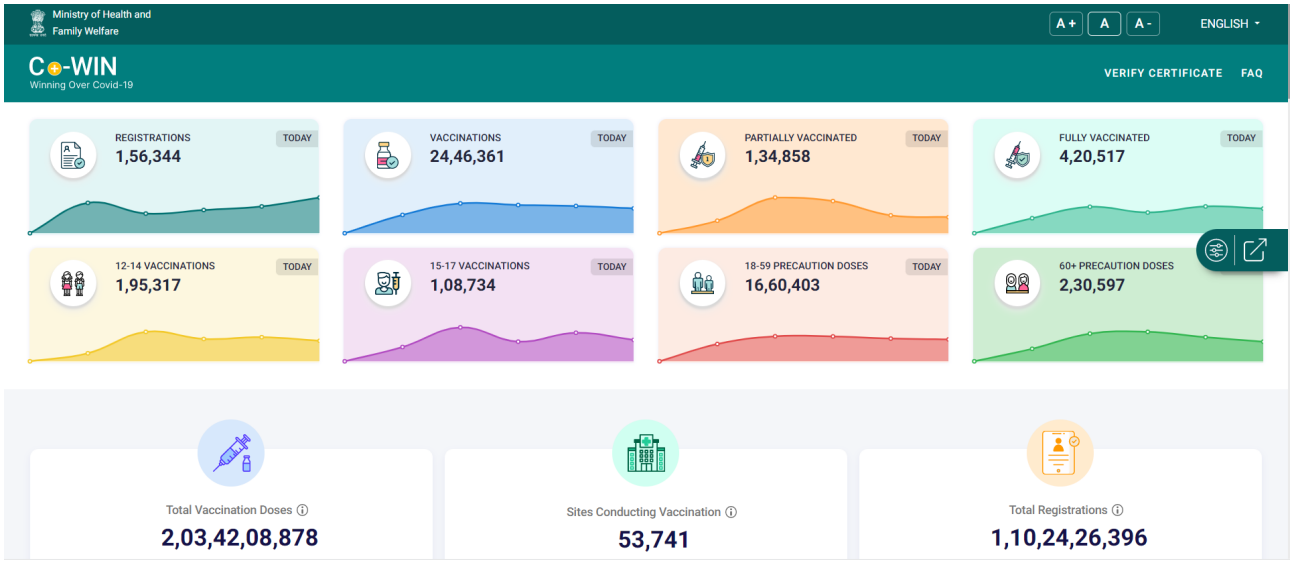

Figure 9: *A snapshot of the CoWIN portal dashboard*

Till date, more than 110 crore citizens have registered on CoWIN portal through online and on-site modes. More than 200 crore doses of vaccine have been administered and duly recorded on CoWIN portal. This way, over 90% of the citizens have been fully vaccinated in India using the CoWIN portal.

The open-source software behind the Co-WIN platform was also made freely available to other countries as a global good in the fight against COVID-19. More than 50 countries expressed interest in using the platform. The credentialing service used in CoWIN has proven to be a game-changer in the world of digital certificates. The credentialing service has been implemented in five other countries after India and may be adopted for other use cases also. Owing to its robust implementation and far-reaching benefits, the platform has opened up new avenues for digital health and is hence envisaged to be repurposed for other use cases as well as a universal immunization platform in the long run.

6 MINISTRY OF EARTH SCIENCES

Improving fishermen lives using Thondill App GIS-based dashboard

Themes: *Data generation; Data analysis, use & dissemination*

PROBLEM STATEMENT

The Indian coast is prone to tropical cyclones which particularly affects the fishing community. The Ockhi cyclone affected nearly 100 fishing villages across Tamil Nadu and Kerala which led to the death and disappearance of more than 350 people, most of them being fishermen. This loss was largely attributed to the lack of information about the impending cyclone and to lack of navigation as well as security features during the voyage. This incident demanded the development of tools for the safety of fishermen in sea.

Additionally, fishermen wanted the Ministry to help them in maximizing the amount of fishes caught by developing appropriate tools and resources. Traditionally, information about Potential Fishing Zones (PFZ), zones where fishes aggregate, was disseminated to fishermen using fax from Indian National Center for Ocean Information Services (INCOIS). Information related to PFZ location and availability of fishes used to be sent to fishermen association representatives who were further responsible for conveying this information to all sea going fishermen. Non-availability of integrated mobile application for getting fisheries & sea safety information, provision to send distress signals, etc. has led to dissatisfaction among fishermen who then demanded the Ministry to devise ways and means of communicating information on PFZ in such a manner that it reaches all the sea going fishermen in a timely manner.

SOLUTION

A user-friendly application named *Thoondil* for Tamil Nadu, and known as *Kadal Changayi* in Kerala, was developed to disseminate information efficiently and quickly to the fishermen. The android based app and dashboard was developed as a collaborative effort of the National Center for Coastal Research (NCCR), Indian Meteorological Department (IMD), INCOIS and Department of fisheries Tamil Nadu and Kozhikode administration.

Thoondil, means a fishing rod in Tamil, was developed by the National Centre for Coastal Research (NCCR) based on the request from the Department of fisheries Government of Tamil Nadu who provided all the required field datasets and user requirements for the development of the app. Thoondil after development and testing was handed over to the Department of Fisheries, Government of Tamil Nadu for operational purposes.

It is a web-GIS-based dashboard and mobile application designed to help fishermen and administrators, especially during times of hazards, in English and Tamil. The salient features of the

mobile application include a compass which shows cardinal directions, information on PFZ, offline maps, information on weather as well provision to send distress signals which helps authorities in the mitigation operation. In times of hazard, the Fisheries Department sends SOS to fishermen through SMS and the emergency escape route information feature on the app helps in giving information on the nearest port which is very useful during such times. Users can report any incidents during their voyage along with pictures to convey to the administrators.

Thoondil dashboard manages information about the users and their trips which help the administrator's access information about the fishermen at sea at any point of time, thus enabling a two way communication between the administrators and the fishing community. Administrators can respond to SOS or reported incidents from the dashboard through messaging system.

Besides developing the Thoondil app for timely dissemination of Potential Fishing Zone advisories, INCOIS also leveraged other tools available in the country. For example, Electronic Display Boards (EDBs) were installed at 100 fishing harbors, landing centers, fishing hamlets and fishermen cooperative societies to disseminate advisories,both in text and map form on a daily basis. Other dissemination channels that were adopted include telephone, local cable TV Networks, Doordarshan, All India Radio (Thiruvananthapuram) and Karwar community radio FM Radio Stations, local newspapers, SMS etc. In addition INCOIS has set up collaborations with various Non-Governmental Organizations (NGOs) such as M.S.Swaminathan Research Foundation (MSSRF), Reliance Foundation, and Pondicherry Multipurpose Social Service Society (PMSSS) etc. as well as with other private societies like Indian Farmers Fertilizer Cooperative Limited (IFFCO), Kisan Sanchar Limited etc. who are working with the fishing community to disseminate the advisories on a daily basis. MSSRF also disseminates the PFZ advisories through their Village Information Centers set up in the coastal villages of Tamil Nadu, Andhra Pradesh and Odisha.

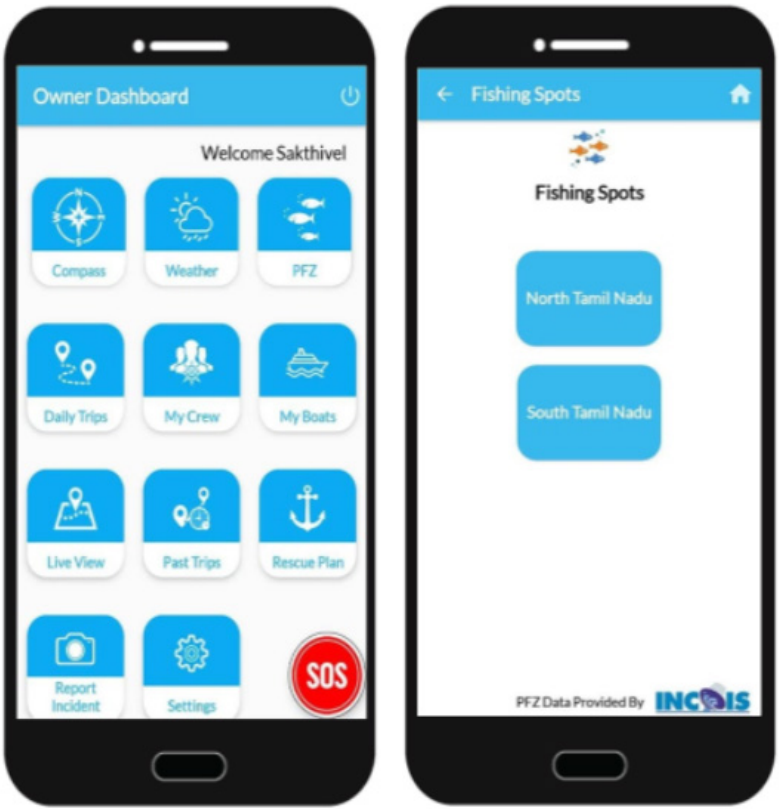

Figure 10: *Thoondil App Owner Dashboard and Fishing Spots of Ministry of Earth Sciences*

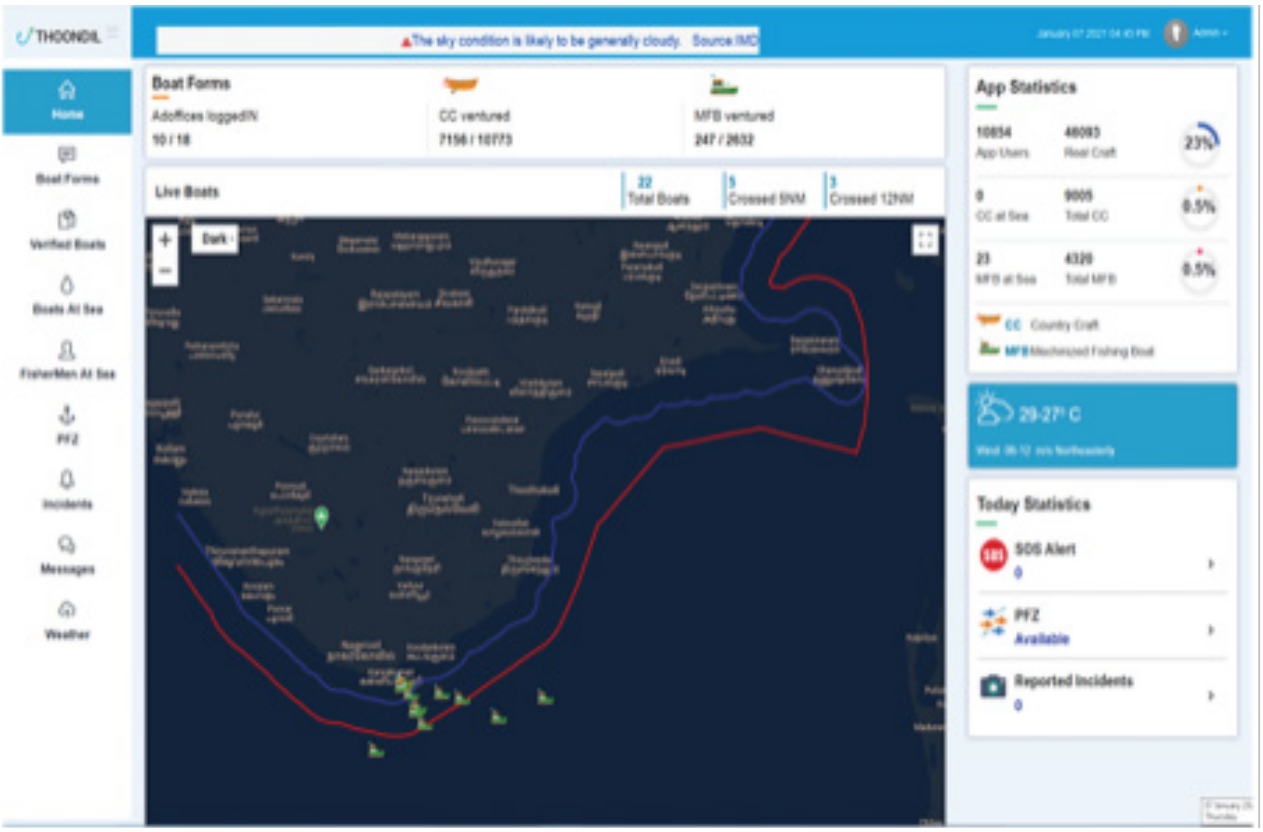

Figure 11: *Thoondil Web-GIS dashboard of Ministry of Earth Sciences*

IMPACT

The *Thoondil* app is available on Google Playstore and as on 1st April 2022, it has more than 17,000 downloads. Its simple design makes it user friendly for fishermen and an efficient tool for disaster mitigation. The use of the app has reduced risk to the fishing community, especially during hazards and has also contributed to the resilience of the coastal fishing communities.

It has been estimated that about 2.5 lakh users are accessing PFZ advisories through the Electronic Display Boards, Village Information Centre and direct means such as web site, emails, and SMS services from INCOIS. Although, actual number of users who receive advisories through means such as local radios and TV channels are not known, a conservative estimate suggests that about 25,000 to 50,000 users are receiving information through such means.

To assess the impact of using digital means to disseminate PFZ information, INCOIS had conducted validation exercises together with various academic institutions such as IIT-Delhi, Jadavpur University, Andhra University, Annamalai University, Anna University, Karnataka University, Dr. Babasaheb Ambedkar Marathwada University, Central Institute of Fisheries Education. INCOIS also collaborated with research Institutions such as Central Marine Fisheries Research Institute (CMFRI), Central Agriculture Research Institute (CARI), Kerala State Remote Sensing and Environment Centre (KSREC) etc. at several locations to assess the same.

The objective of these experiments was to engage two boats in such a manner that one of the boats went for fishing in the notified area i.e treatment area and the other boat went for fishing in the control area. The experiment confirmed that PFZ advisories helped fishermen earn 2 to 5 times more net profits due to the marked increase in Catch Per Unit Effort (CPUE) by 2 to 4 times. Major

portion of the profit came from the savings on the cost of fuel due to the avoidance of search for potential fishing grounds.On an average, the utilisation of PFZ advisories reduced the time spent on fishing by 30 to 70 percent.

A byproduct of the usage of PFZ advisories is decrease in emissions due to the lower consumption of fuel for fishing operations. An independent study conducted by National Agriculture Innovation Project (NAIP) covering 13 villages in the Raigad district of Maharashtra in 2013 showed that the usage of PFZ advisories helped in saving 500 kiloliters of diesel that translates into reduction of carbon emission by 804 tonnes per annum. In addition to this study, the economic benefits in terms of revenue and GDP growth, due to usage of PFZ advisories, has also been studied by National Council for Applied Economic Research (NCAER) in 2012. The survey report estimates the annual net economic benefits due to the scientific identification of PFZs based on satellite information to lie in the range of Rs 34,000 crores to Rs 50,000 crores. A 2020 report by NCAER to assess the importance of weather-based advisories in decision-making, reducing losses and improving livelihoods found that, on an average, fishermen were getting Rs.17,820 additional income per trip by using PFZ advisories and in terms of gross additional income, PFZ generated Rs. 1.92 crores. Moreover, the report also mentioned that 97% of the surveyed fishermen reported to have received PFZ advisories and 86% of them were able to minimize their losses

7 MINISTRY OF TRIBAL AFFAIRS

Portal for three-tier real time monitoring of Grants in Aid to Non-Government organizations and grievance redressal

Themes: *Data generation, Data quality, Inter agency data collaboration*

PROBLEM STATEMENT

The Ministry of Tribal Affairs provides Grants-in-aid to voluntary Non-Government Organizations (NGOs) working for welfare of STs in comparatively service deficient areas with significant tribal populations, where the direct outreach of Government through its institutional mechanism was not adequate in the health, education and livelihood sectors. The scheme runs an annual budget of approximately Rs. 100 Crores and grants are presently been given to approximately 200 NGOs for 350 projects in 24 states, wherein these NGOs have local roots and have the requisite resource capacity to work in the Left Wing Extremism Affected (LWE), hilly, remote and border areas.

Till 2018, the scheme for the provision of such grants was being implemented in manual mode with no digitization of progress or approvals. The NGOs were required to submit the proposal offline and the proposals were sent to states for physical verification. There was hence a time lag of several years before a grant for a particular financial year was released. Due to delayed release of funds, the NGOs were required to frequently visit the State and Central Ministry to inquire about their pending grants and there was no established grievance redressal mechanism. There was also limited visibility to the Ministry of Tribal Affairs about the use of these funds by NGOs due to no robust, granular and frequent monitoring mechanisms.

SOLUTION

The Ministry developed a dedicated portal in 2018 (https://ngo.tribal.gov.in) which provides a customized end-to-end solution for implementing the scheme.

It provides an end to end solution for NGOs for the provision of Grants in Aid via the facility of submission of online proposals, uploading project inspection reports, online recommendation or rejection, processing, and releasing of funds, making entire processes online and paperless.

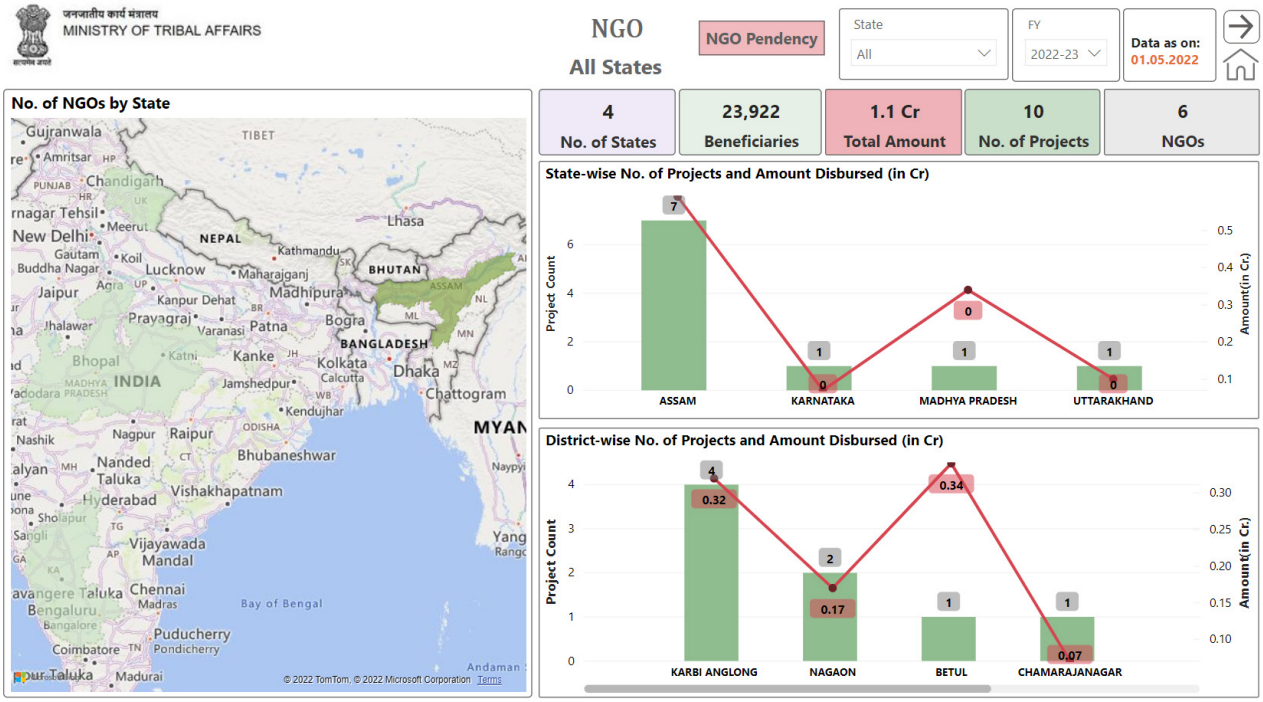

Figure 12: *NGO Portal developed by Ministry of Tribal Affairs*

The portal also ensures validation against mandatory registration of NGOs with NGO Darpan Portal of NITI Aayog. Each NGO is required to have a Unique-ID from NGO Darpan portal of NITI AAYOG. The Darpan ID is mandatory for registration of the NGO on the NGO Portal. Since NGO and Darpan Portal are integrated, the information submitted by NGO on NITI Darpan Portal is captured by NGO portal and vice versa. This way, the NGO portal ensures data quality and integrity by ensuring that the same information is reproduced on all portals.

After an online application is filed, the information is available in real time to the district, state as well as the NGO division and the Integrated Finance Division (IFD) of the Ministry. This way, a three level monitoring system is built in the portal. The online application submitted for a particular project by an NGO is verified online by district and state authorities. After physical verification of the project, the district authorities are required to upload an inspection report online. The purpose of this report is to cross check the data submitted by the NGO and to assess financial capacity, availability of necessary infrastructure and capability of the NGO to undertake the project as per scheme guidelines. After the online verification process is completed at district and state level, the project proposal is processed in the Ministry. After online administrative & financial approval, sanction orders are generated and grants are released through PFMS. Subsequently, the fund flow is also monitored and managed via the PFMS - EAT Module of the portal. The NGOs are required to submit the expenditure statements online through the Expenditure Advance Transfer (EAT module), which is the basic requirement for release of grants along with submission of audited account and utilization certificate as per General Financial Rules (GFR). All stakeholders can hence track the live status of applications with their access rights.

The Portal also has a Communication Module which facilitates two way communication between different stakeholders i.e. communication between the Ministry and NGOs and communication between Ministry & State/District Officials and vice versa. There is an inbuilt online grievance redressal mechanism through which NGOs can upload queries, documents like utilization certificates and other

documents online and can communicate with Ministry officials. This has reduced the processing time and grievances as documents were earlier sent by post which was time consuming. Since these documents are directly accessible to officials of the NGO division of the Ministry, they can upload online deficiencies in the proposal, upload sanction orders and send SMS/email notifications to NGOs directly. Once an application is submitted online, the NGOs have also been given the option to take corrective action if there is a mistake in the application. There is a facility to change district, type of project, bank account or any other details which are later verified. The portal has a notice board, where important communications are uploaded for easy viewing.

IMPACT

As NGO wise, sector wise, district wise data is available on funds release to NGOs along with progress on key metrics of projects undertaken by NGOs and the same is also publicly visible on the Performance Dashboard of the Ministry, this end-to-end digitization has brought transparency and accountability to the entire exercise.

With the ability of the portal to track applications and see the pendency of applications with a particular officer, the processing time for applications has also massively reduced and the Ministry is able to sanction major portions of the grants in the same financial year and redress grievances expeditiously.

To bring in even more accountability in the system and ensure that only credible NGOs are brought into the fold of the scheme, in addition to physical inspections done by district level officials, the Ministry has also engaged Bharat Rural Livelihood Foundation (BRLF) for independent verification of NGOs to grade NGOs based on their performance. This grading will also be available digitally so that past performance of NGOs can be taken into account while assessing their applications.

Further, the Ministry is also planning to use digital technology to map attendance of students and track movement of ambulances through a GIS-based tracking system to focus on education and health sector services.

8 DEPARTMENT OF FOOD & PUBLIC DISTRIBUTION

Ensuring Food Security for NFSA Beneficiaries through portable Ration Cards and digital biometric authenticated transactions

Themes: *Data generation; Use of Technology; Data analysis, use & dissemination*

PROBLEM STATEMENT

Dignified access to adequate food throughout the year is a basic necessity and food insecurity can have devastating impact on human survival, health & ability to engage in productive work. To ensure dignified access to adequate food grains, the Government of India runs one of the largest food security programs in the world through the Public Distribution System (PDS). Under this system, the government guarantees food grain access to over 80 crore people in India (almost two-third of the country's population as per Census 2011) as a legal right under National Food Security Act' 2013 (NFSA).

Currently, around 80 crore NFSA beneficiaries identified across the country by States and Union Territories (UTs) i.e., Priority Households (PHH) and the Antyodaya Anna Yojna (AAY) households are being provided 5 Kg per person per month and 35 Kg per household per month respectively of food grains at highly subsidized rates of Rs.3, Rs. 2 & Rs. 1/Kg for rice, wheat & coarse grains respectively. In order to ensure delivery of highly subsidized food grain to beneficiaries, the Government of India bears more than 90% of the cost of food grains as a central subsidy.

However, until the introduction of portability of ration cards under the 'One Nation, One Ration Card' (ONORC) initiative, the delivery of subsidized grains throughout the year to the highly vulnerable migrant beneficiaries remained a major challenge in the traditional PDS. As many ration card holders often moved from one district to another or from one State to another in search of better job opportunities, temporary employment, etc., they often lost access to the PDS food grains during the migration period because the ration cards were tagged to a nearby Fair Price Shops (FPS) and card holders were allowed to lift the subsidized food grains only from the tagged FPS.

Also, due to information gaps, it was often difficult for the migrant beneficiaries to locate a nearby FPS and check Aadhar seeding status with their ration card. Usually beneficiaries faced issues related to lack of transparency pertaining to their transaction history and verification of their entitlement details.

Further, once the migrants leave, the leftover and un-lifted food grains in the FPS in the migrants' native village or town were also prone to diversion by the FPS dealers, leading to leakages in food subsidies given by the government.

SOLUTION

The ONORC facility in PDS, a part of the Hon'ble Prime Minister's technology driven systems reforms under the AtmaNirbhar Bharat Abhiyan, addresses the above issues and empowers all beneficiaries under NFSA, to seamlessly access their food grains from any FPS in the country by using the same ration card along with biometric authentication through electronic-Point of Sale (e-PoS) device.

Along with ONORC, greater transparency has been ensured through automation of FPS in the country. e-POS devices have been installed at FPS for distribution of ration, after biometric/Aadhar authentication. This automation provides a medium to record and transmit the transactions to authenticate the beneficiary and ensure that the commodity issuance is happening to the intended beneficiary by biometric authentication with UIDAI server. Fingerprint scanner, IRIS scanner and printers have been integrated for biometric authentication with UIDAI and printing receipt of sales.

In light of the increasing penetration of mobile phones and internet in the remote areas, there was a perceived need for a mobile application to expand the reach of ONORC's services. As a result, the 'Mera Ration' App was developed to facilitate access to ONORC-related services for National Food Security Act (NFSA) beneficiaries, including migrant workers, FPS dealers, and other key stakeholders, making it a single window information system for the beneficiaries. Using this multilingual app, the beneficiaries can find and locate the nearest FPS. This application is also linked to the Integrated Management of PDS (IMPDS) portal, allowing beneficiaries to view information such as food grain entitlement, transaction history etc. Beneficiaries and FPS Dealers can also submit recommendations or feedback using the application. The real-time feedback system nudges the FPS dealers to improve their service quality to the satisfaction of poor and vulnerable beneficiaries.

IMPACT

The ONORC based technology-driven reform has enabled the migrant beneficiaries to get their entitled quota of food grains in full or part from any e-PoS enabled FPS in the country. The power to choose any FPS proves extremely helpful to the beneficiaries as they do not have to tolerate the FPS with poor service, weighment issues, erratic working timings, etc. This infuses a sense of healthy competition among FPS dealers and thereby nudges them to improve service quality to the satisfaction of poor and vulnerable beneficiaries.

The 'Mera Ration' app has brought convenience for the beneficiaries in availing ration card services like obtaining information regarding transaction history and food grain entitlement irrespective of their location. Till date more than 20 lakh beneficiaries have downloaded the 'Mera Ration' app and availed its services.

The facility proved to be a life-saver for millions of migrant NFSA beneficiaries/families who were either working, living or got stranded in their location of work i.e. in some other block, district or State during the COVID-19 period. The enormity of support received can be gauged by the fact that so far, since the inception in August 2019, a cumulative total of around 70 Crore portability transactions have been recorded under the ONORC plan, delivering food grains worth Rs.39,000 Crore as food subsidy, showing a high uptake of ONORC plan by the beneficiaries for accessing their NFSA and PMGKY food security entitlements during the pandemic.

Also, the automation of FPS under the ONORC initiative has led to the generation and collection of Ration Card data, FPS data and e-PoS transactions & food grains distribution data. All this data

is maintained by the respective State governments which share incremental information with the central repository setup by the Department of Food & Public Distribution. This repository/system also acts as a gateway to check duplicity of ration cards/beneficiaries in and across States/UTs through a continuous Aadhaar based de-duplication process.

At present a total of 35 States/UTs have been seamlessly integrated under a single national portability cluster, covering nearly 77 Crore beneficiaries (almost 96.8% NFSA population) in the country. Around 3 Crore monthly portability transactions (including inter-state transactions, intrastate transactions & Prime Minister Garib Kalyan Anna Yojna (PMGKY) transactions) are being consistently recorded under ONORC plan.

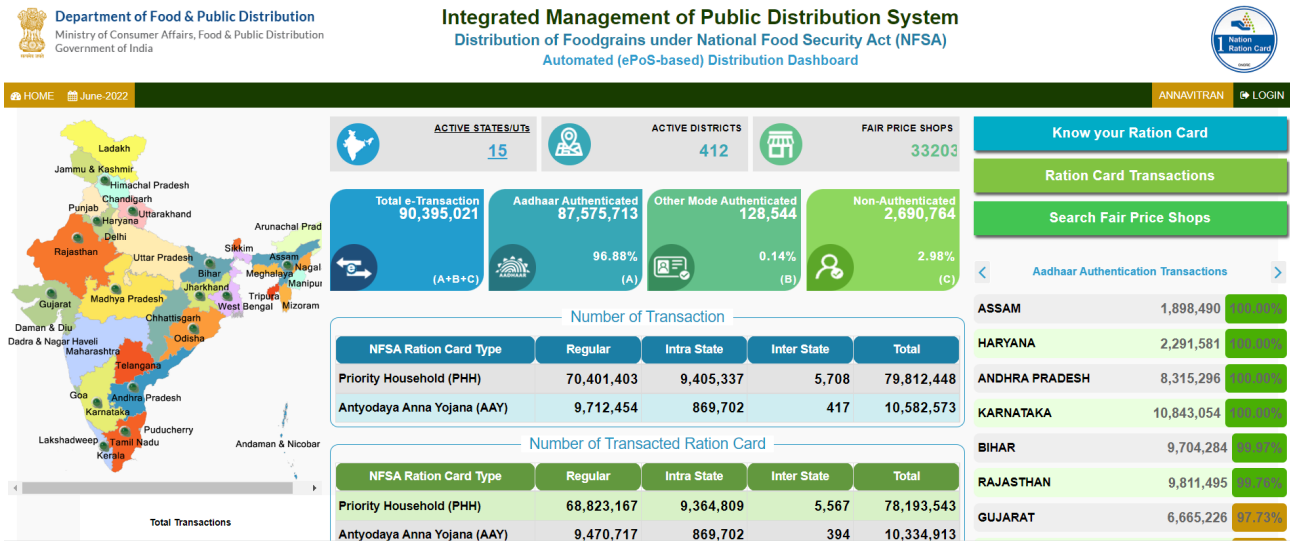

Figure 13: *Snapshot of the ePOS-based PDS Dashboard*

The Department is continuously monitoring the transactions and distribution of foodgrains through ePoS-based devices on the central Annavitran portal (www.annavitran.nic.in), which fetches intra-state portability transactions data from the servers of the States/UTs using web services. Similarly, the Department is monitoring the inter-State portability transactions and all related aspects of inter-State portability via the IM-PDS portal (www.impds.nic.in/). These portals/dashboards provide dynamic information/reports about the intra-state & inter-state portability transactions allowing for continual monitoring of the scheme's performance.

9 DEPARTMENT OF AGRICULTURE RESEARCH & EDUCATION

Disseminating Agricultural Knowledge Resources via KRISHI portal as an Information System Hub for Innovations

Themes: *Data management; Data analysis, use & dissemination*

PROBLEM STATEMENT

Indian Agricultural Research Institute (ICAR) being a research organization, collected data through various research activities which were usually kept in silos due to unavailability of standard policies and guidelines for data collection, preservation, and management. Data inconsistency was also seen in existing databases as they were developed for some sole specific purposes. There was a need to have data governance guidelines to address all these issues and develop centralized data repositories implemented through a robust IT infrastructure.

SOLUTION

ICAR developed Research Data Management Guidelines with a comprehensive set of standards for effective management of data in various institutes. It intended to increase awareness of maintaining data integrity and outlined expectations for maintaining prescribed standards of research from all persons engaged in research in ICAR Institutes.

These guidelines aimed to streamline definition of data, data ownership, data collection and recording, data storage and security, data access and sharing and data retention across organizations. Data acquisition guidelines and ICAR Data Use License were also developed to streamline use of ICAR data by other stakeholders.

Figure 14: *Snapshot of KRISHI Portal developed by Department of Agriculture Research & Education*

Agricultural Knowledge Resources and Information System Hub for Innovations known as KRISHI Portal was developed to bring all these resources under one platform covering Technologies, Data from Experiments, Surveys and Observational studies, Geo-spatial data, Publications, Learning Resources etc. ICAR Open Access Policy was also developed to enable ICAR institutes to set up an Open Access Institutional Repository.

IMPACT

KRISHI Agricultural Knowledge Resources and Information System Hub for Innovations Portal brought knowledge resources to all stakeholders at one place. This portal has also been sharing data with the Government of India's Open Data Initiative. The Research Data Management initiative has been recognized by the Ministry of Electronics Information and Technology by awarding Gold Icon Award in Open Data Championship Category.

Increased visibility of outputs of ICAR system provided interest among students to pursue education/ research in Agricultural fields as seen by more than 2 Lakh student IDs have been created in the ICAR Education portal. There have been more than 1.9 million downloads from the ICAR publication repository. A robust infrastructure enabled creation of more than 20,000 emails for ICAR personnel enabling Single Sign-on for KRISHI integrated applications with high data security and efficiency in the system.

10 MINISTRY OF TRIBAL AFFAIRS

Direct Benefit Transfers to disburse Pre- Matric and Post -Matric Scholarship Schemes

Themes: *Data generation; Inter agency data collaboration; Use of technology*

PROBLEM STATEMENT

The Ministry of Tribal Affairs implements 5 Scholarship schemes for pursuing studies from Class IX to Post-Doctoral level in India and abroad. The Pre-Matric Scholarship and Post-Matric Scholarship Schemes are Centrally Sponsored Schemes and are implemented through States with an annual budget of about Rs 2,000 Crores.

The Pre-Matric Scholarship Scheme is applicable for students studying in Classes IX-X whose parental income from all sources do not exceed Rs.2.50 lakhs per annum. Scholarships are paid @ Rs.225/- per month for Day Scholars and @ Rs.525/- per month for Hostellers, for a period of 10 months in a year. The Post-Matric Scholarship Scheme is applicable for students who are pursuing any recognized course from a recognized institution for which qualification is Matriculation/Class X or above and their parental income from all sources do not exceed Rs.2.50 lakhs per annum. This scholarship has 2 components: payment of compulsory fees charged by educational institutions subject to the limit fixed by the concerned State, payment of Maintenance amount varying from Rs. 230 to Rs. 1200 per month, depending upon the course of study pursued by the student.

Till 2018, both Pre- Matric and Post Matric schemes were implemented in manual mode by States. The applications were in physical form and were verified manually by concerned Institutes/district authorities. As the processing and verification process was paper based, it was cumbersome and time consuming resulting in delayed payment of scholarships with higher possibility of fake beneficiaries and fraudulent institutes availing benefits of these schemes. Due to high pendency of arrears combined with absence of robust communication or grievance redressal mechanism with States and students, it led to several cases being filed at Courts.

Some states did have IT systems. However, States using IT systems were having different agencies, platforms and data structures. Though such States had unit wise data of beneficiary, there was no established mechanism to share such data with the Ministry. When requested, the data was shared through email or pen drive with excel sheet and there was no system to collate such data. Further, as sharing of data was not a mandatory requirement for release of funds, states considered this as additional work, especially when the scheme guidelines had no provision for administrative expenses to engage dedicated manpower for this purpose.

Even after the scholarships were disbursed, States were sending paper-based utilization certificates (UC) for the funds spent. The UC was not supported with any data of how the funds were utilized. As Aadhar was not mandatory, the beneficiaries taking benefits from multiple schemes could not be ruled out.

Despite the huge expenditure and budget outlays, informational availability remained poor and the process monitoring was plagued with sequential difficulties and delays owing to the manual nature of the process.

SOLUTION

The Ministry of Tribal Affairs has developed the DBT Portal for Pre and Post Matric Scholarship which has resulted in end to end digitization of the process of applying and disbursal of the scholarships to students.

The DBT Portal is basically an MIS System which captures unit wise beneficiary data from all States mandated by DBT Mission with various other features. As States have unit wise data for pre and post matric students, there is a facility to share beneficiary information with development of scheme specific MIS. The process is now end-to-end digitized right from receiving of application, verification and processing with the integration of all stakeholders and processes with all stakeholders.

The process flow of the system has been as follows:

a. **States to develop IT Ecosystem for Scholarship Schemes of MoTA:** In pre and Post Matric Scholarship Schemes, since States are responsible for identification of beneficiaries, verification of students and institutes and disbursal of scholarship, all States were asked to shift from manual to digital mode. They were given an option to develop their own portal or shift to the National Scholarship Portal (NSP) developed by MeiTY. All States/UTs now have IT based mechanisms.

b. **Data sharing by States:** All States/UTs now have their own portals or are using the National Scholarship Portal developed by MeiTY. Since these portals are on different platforms, using different databases and different formats, a 30-field common format has been designed for data sharing by the States so as to capture beneficiary details, bank details, location of the school, course details and transaction details.

c. **Data Sharing mechanism:** In the DBT Portal, the States have been given the facility to share beneficiary data online through web services, Excel/CSV file or through manual entry of data depending on IT capability of the State via adaptive “Data sharing Module”.

d. **Data-analytics:** State Wise Data Analysis Reports are now quickly shared with states online so that they can clean and send correct data. Various MIS reports are being generated like State wise, Institute wise, gender wise, Stream wise reports for monitoring and coordination with universities and students.

e. **Expenditure Mapping:** Integration with PFMS: States are released grants through the PFMS system and states further release funds to the account of students through DBT. For this, mapping of states with PFMS has been done. Those states which have not shifted to PFMS are required to share expenditure data from treasury to PFMS and report expenditure at PFMS portal. Further DBT Configuration for disbursement of scholarship amount to the beneficiaries is to be done with PFMS.

f. **Communication System with States:** DBT Portal provides facility to states to directly upload queries, Utilization Certificate and Statement of Expenditure online through “Communication Module” and communicate with Ministry officials. This has reduced the processing time and reduced grievances. Since these documents are directly accessible to officials of the Scholarship division of the Ministry, they can upload online deficiencies

in the proposal, upload Sanction order and send SMS/email notifications to States and beneficiaries. The portal has a Notice board facility, where important communications can be uploaded for easy viewing.

IMPACT

These initiatives have resulted in a paradigm shift from manual paper-based UC based monitoring to data based online monitoring. Verification process has been strengthened and it has prevented fake and fraudulent cases and resulted in time saving with speedy and robust grievance redressal mechanism. The performance of all stakeholders, district wise details of the beneficiaries and the manner in which funds have been utilized is placed in the public domain through the Performance Dashboard.

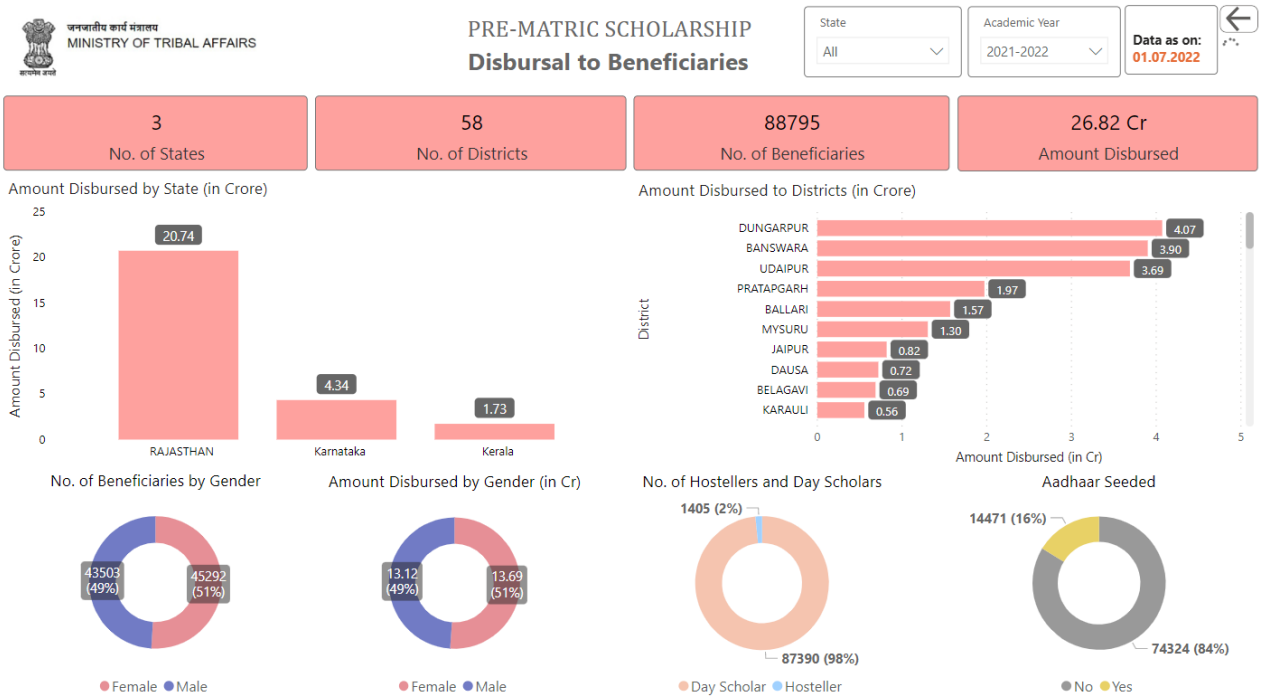

Figure 15: *Snapshot of key performance indicators of Pre-Matric Scholarship Scheme on Performance Dashboard*

With the implementation of the DBT Tribal Portal, MoTA is one of the first ministries to capture beneficiary data of centrally sponsored scholarship schemes as directed by the DBT Mission. Through this implementation, considerable improvement has come about in terms of process and monitoring. The move from analogue to digital workflow has transformed the existing system, bringing in more transparency, efficiency and general overall improvement.

Through the adoption of a Standard Operating Procedure (SOP), a single point has been created for collection and monitoring of data in a secure environment. This data pool then allows the relevant stakeholder role-based access to data, resulting in a much faster dissemination of information to and between various stakeholders. As the platform embraces digitalization, the service delivery in terms of both processing and delivery has seen improvements as well as mitigation of risk and fraud. Timeline reduction has taken place as submission of Utilization Certificates (UC) and Statement of Expenditure (SOE) are now online.

Through Digi Locker and Public Financial Management System (PFMS) respectively, the documentation is easily verified, and funds disbursed in an efficient, transparent manner. The communication modules integrated with the portal facilitates the stakeholders to share the information on a real time basis and also their grievances can be addressed promptly. This has eliminated time delays in the process.

The integrated approach has increased productivity, efficiency and turn-around-times. With Key Performance Indicators (KPI) easily monitorable, a focused execution of scheme objectives can take place. Planning and monitoring of funds can now be done based on beneficiary data. Additionally, the performance of states and UTs can be easily tracked for better implementation and synergy. Availability of KPIs on dashboard through Data Analytics has enhanced the planning and decision-making process by analyzing the trends and patterns.

11

MINISTRY OF RAILWAYS

Implementing Real-time Train Information System using Internet of Things (IoT) devices

Themes: *Data generation; Use of technology; Data analysis, use & dissemination*

PROBLEM STATEMENT

Movement of trains in a given journey of Indian Railways is controlled/managed by plotting a time distance control chart of the journey in the COA (Control Office Application) system. Earlier, train running information related to arrival and departure of the train at stations was fed manually by thesection controller in the COA system after taking the required information from station masters through hotline communication

This process of manual data collection was very time consuming which led to delays in the process as well as made the data points more prone to human errors. Due to this, the controller was spending more time in collecting and feeding the required data in COA system rather than focusing on the core train-control operations. Additionally, these issues were also affecting the information that was being disseminated to the passengers through various channels of the National Train Enquiry System (NTES) as it acquires the required data from the COA system.

Indian Railways' one of the greatest challenges and key requirements has been automatic acquisition of train movement data. Thus, there was an imperative need to find a solution for the same so that accurate train speed and position reporting can be undertaken.

SOLUTION

Indian Railways has automated the acquisition of train movement data by implementing Real-time Train Information System (RTIS). The system has been developed by Centre for Railway Information System (CRIS) in collaboration with Indian Space Research Organization (ISRO). RTIS facilitates efficient train control functions including train movement forecasting based on accurate real-time data.

RTIS is an IoT based system utilizing ISRO's SatNav & SatCom services. A ruggedized device has been installed in locomotives which determine train movement events such as Arrival, Departure, Run-through at stations using a pre-defined logic based on spatial coordinates and train speed received from Navigation systems[5]. These events along with other location updates (every 30 sec) are then communicated to a Central Location Server (CLS) of CRIS, using Mobile Satellite Service (MSS) as well as mobile data service (4G/3G).

5 GAGAN and IRNSS (GPS Aided Geo Augmented Navigation System, Indian Regional Navigation Satellite System-NavIC)

The CLS, hosted in CRIS data center, processes the received data, performs de-duplication and relays it to Control Office Application (COA) for automatic plotting of control charts.

As COA system is already integrated with NTES system, Indian Railways is able to automatically disseminate accurate real-time information to passengers. Earlier there was no visibility of trains' status between stations, but now for the first time, due to RTIS, mid-section visibility of trains' status is also available with the stakeholders.

RTIS system has also been integrated with FOIS (Freight Operations Information System), ICMS (Integrated Coach management System) and CMS (Crew Management System). It is also being used for single-touch emergency messaging from Loco pilot to control room in the event of emergencies. This system has the following key distinctions:

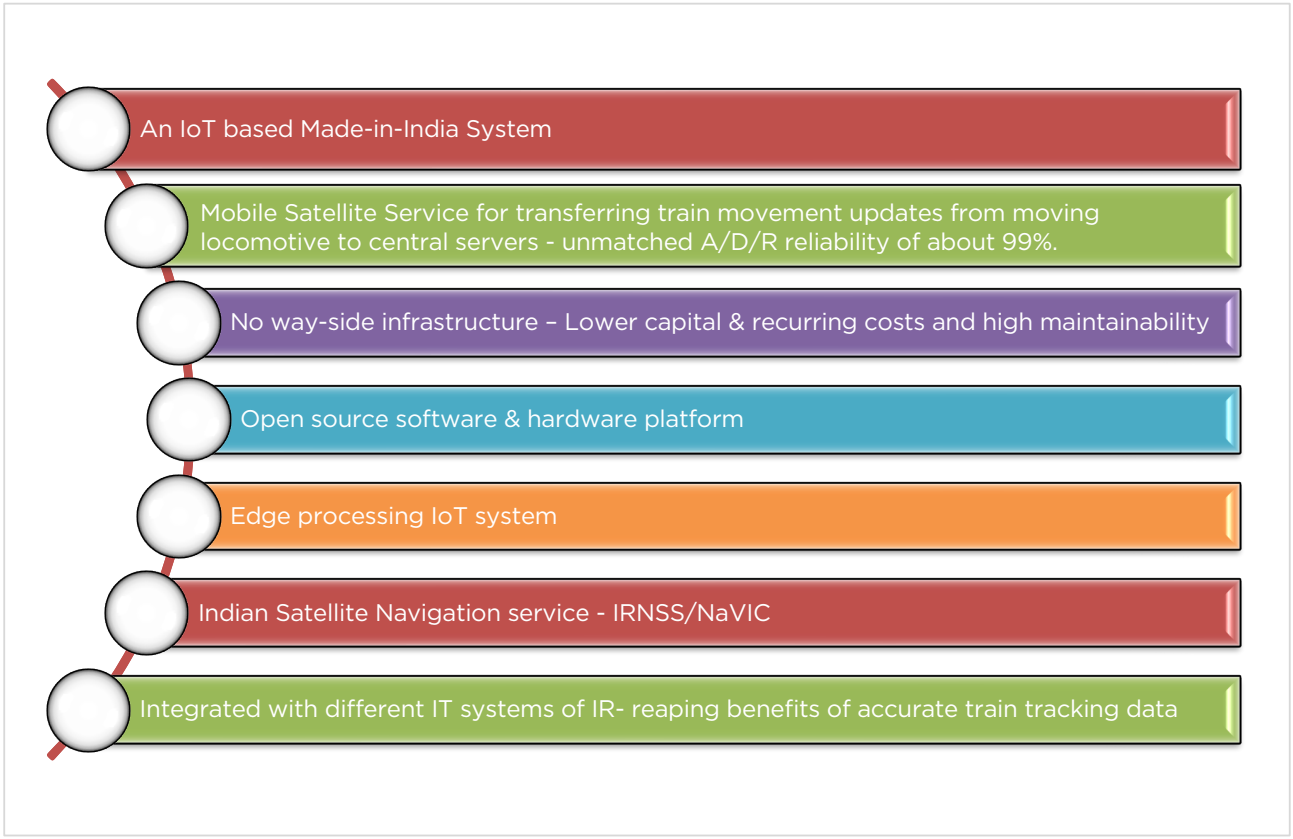

Figure 16: *Real Time Train Information System (RTIS) features*

Data generated by RTIS is not only helping in facilitating train control functions but also contributes in making decisions related to optimum crew booking & reduction in pre-departure detention (PDD). It is also being leveraged to monitor punctuality of trains, real-time tracking of locomotives, and location validation of locomotives in ICMS, FOIS & COA systems, at the time of their attachments. Moreover, it is being used for drawing trains' speed profile charts as well as for identification of train detention clusters across Indian Railways using Data Analytics & Machine Learning algorithms.

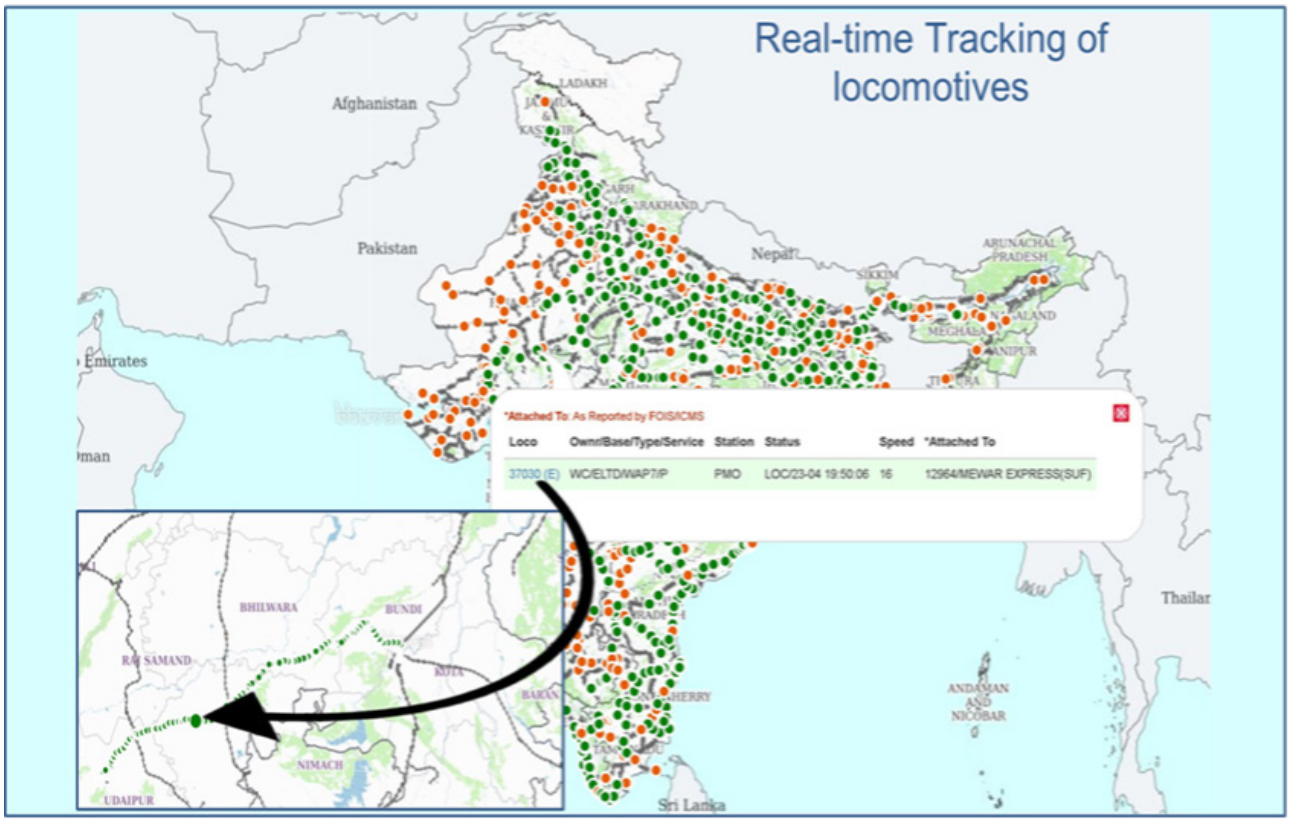

Figure 17: *Snapshot of Real-time tracking of locomotives by Ministry of Railways*

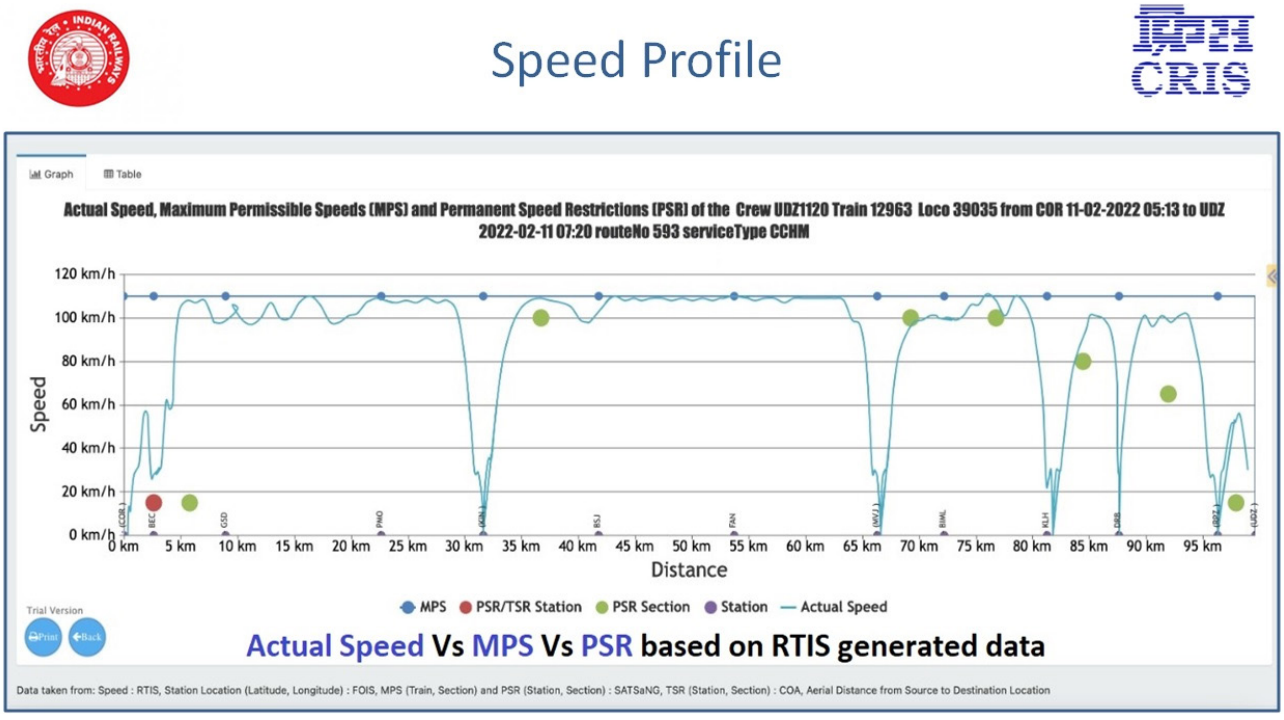

Figure 18: *Snapshot of Speed Profile of Trains based on RTIS data by Ministry of Railways*

IMPACT

RTIS system has been implemented to cover 2700 electric locomotives as part of Phase-1 roll-out in the loco sheds primarily serving the golden quadrilateral and diagonals (except the Mumbai-Chennai corridor) for passenger traffic covering 80% mail and express trains. In addition, loco position data from existing GPS tracking devices in 3800 diesel locomotives is also being utilized for tracking trains using the central infrastructure of RTIS. Other core objectives namely, emergency messaging from loco pilot to control room and accurate train running information to passengers have also been achieved for trains hauled by RTIS enabled locomotives. Pre-COVID, about 1.6 Lakh ADR events and 45 Lakh periodic location updates were being fed to COA automatically

In addition, the RTIS system has also facilitated several intangible benefits in train operations such as better punctuality monitoring as accurate train movement is fed into system without any manual intervention; better and more focused train movement planning by section controllers due to the reduction in their workload of fetching train timings from station masters & manual feeding into the system; better crew planning as accurate train running information is available; tracking of locomotives by loco sheds for the purpose of loco maintenance etc.

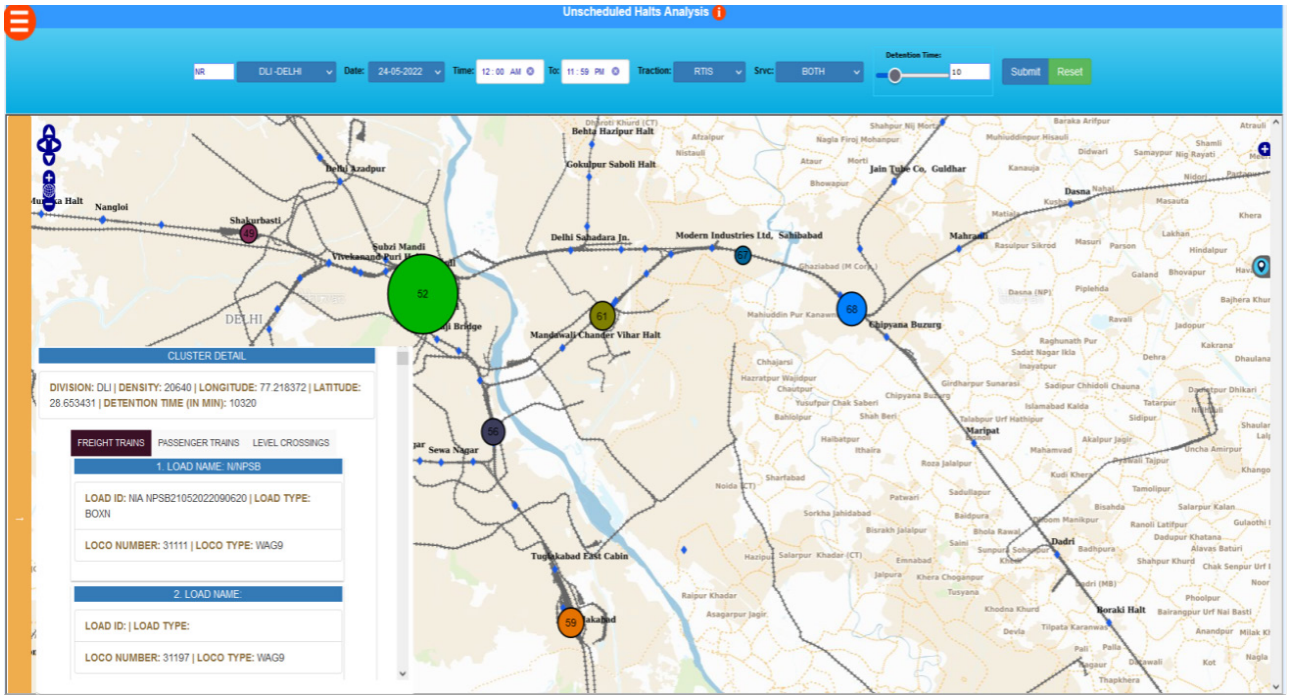

Figure 19: *Identification of Train Detention Clusters by Ministry of Railways*

12 DEPARTMENT OF ANIMAL HUSBANDRY & DAIRYING

Village-level Digital monitoring of Livestock Health & Disease Control Programme

Themes: *Data generation; Data analysis, use & dissemination*

PROBLEM STATEMENT

The National livestock disease surveillance programme was launched with an aim to serve as an early warning system in case of disease events to assess the effectiveness of intervention measures and to determine disease-free areas. The Livestock Health & Disease Control Programme includes identification and monitoring of critical diseases for timely control including foot-and-mouth disease (FMD) and Brucellosis under the National Animal Disease Control Programme (NADCP).

Traditionally, information under this programme was collected on paper and collated through email which was tedious and often led to manual errors in data while copying. Further, it was difficult to actually count the exact number of target animals on ground. Therefore, instead of actual identification of the target animals, only rough estimates were drawn out. In respect of the vaccination activities carried out under the program, it was difficult to trace and accurately verify the activities due to lack of animal identification and owner contact details. Moreover, since all records of the estimated target animals were maintained in an ad-hoc manner on paper, there was no consistency in data collection and granularity of data varied, which made it all the more difficult to trace outcome of vaccination activities such as herd immunity and decrease in prevalence of diseases.

SOLUTION

The Department of Animal Husbandry and Dairying (DAHD) under the Ministry of Fisheries, Animal Husbandry and Dairying, Government of India, supports the States in all matters related to livestock health and diseases through various animal disease control programmes and reporting systems. Among the various animal disease control programmes, the Foot and mouth disease (FMD) and Brucellosis control programme are implemented nationally while other diseases such as Classical swine fever and Peste des petits ruminants are implemented regionally[6].

The reporting of animal diseases in the country is governed by the DAHD using the National Animal Disease Reporting System (NADRS) which is a web-based information technology system for reporting the diseases from the field level from States and Union Territories (UTs). The primary objective of the NADRS is to record and monitor livestock disease situations in the country with the aim of initiating the preventive and curative action in a swift manner during disease emergencies[5].

6 Department of Animal Husbandry and Dairying (DAHD). Annual Report 2020-2021. 2021 New Delhi Ministry of Fisheries, Animal Husbandry and Dairying

The NADRS considers the village as an epidemiological unit for the purpose of reporting outbreaks and uses a computerized system of animal disease reporting, linking each block, district and State-level headquarters to the Central Disease Reporting and Monitoring unit based at New Delhi. In addition, this network also has been linked to the animal disease diagnostic laboratories from the district level onwards.

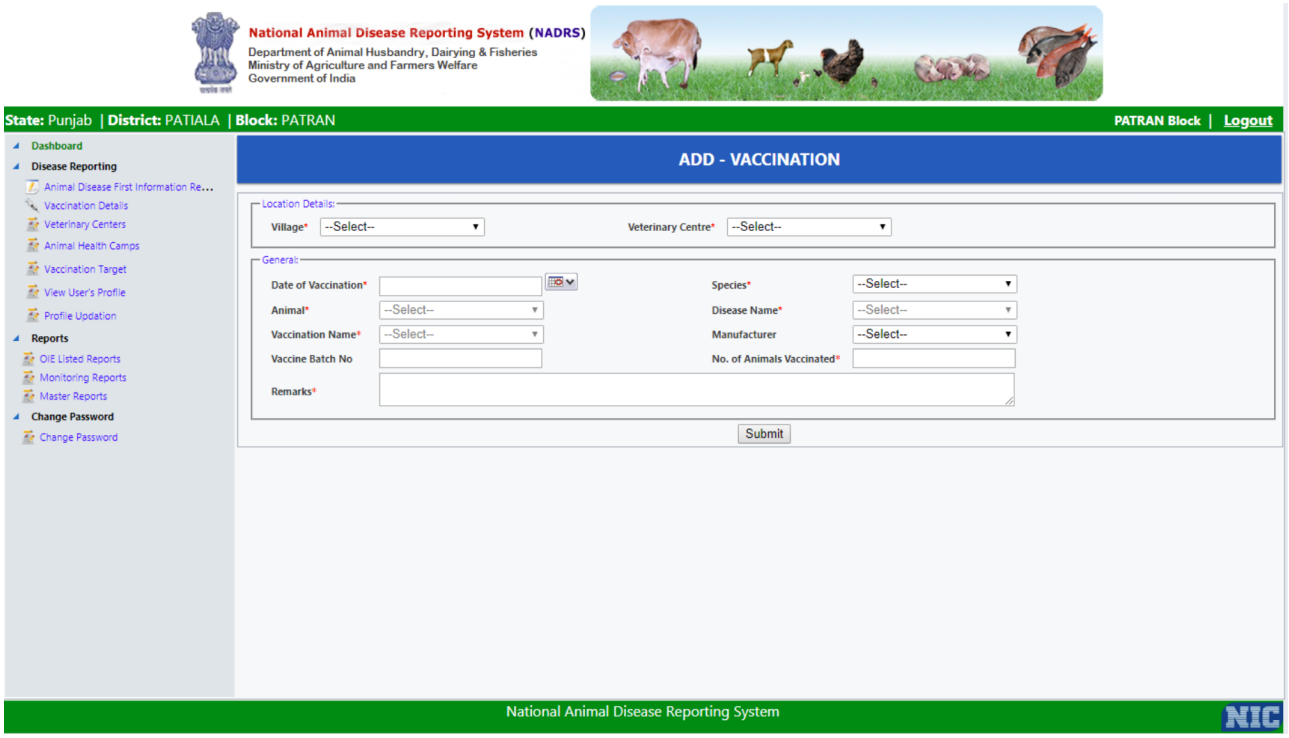

Figure 20: *Vaccination details on the National Animal Disease Reporting System (NADRS) portal*

Digitization of processes under the Livestock Disease Surveillance Programme has allowed for seamless data transfer from field- block, tehsil and district level which can be used to monitor progress of both animal registration through ear tags and vaccination against Foot-and-mouth Disease and Brucellosis. The access to the disease cases collected on NADRS is visible to States/UTs and they are able to monitor issues, if required, even at village-level. Further, the NADRS data also allows for efficient monitoring of the pace of vaccination campaigns in the State/UT(s) for quick follow up for expeditious implementation on-ground if required. Such active monitoring has been really helpful in handling livestock disease programmes during and post the pandemic. The Department has also launched NADRS 2.0 which is an android based mobile application for capturing of Animal disease information in terms of First Information Report (FIR), Daily Incidence (DI) cases and Vaccination coverage from the Block Veterinary Officers with validation by District Veterinary Officers and State Veterinary Officer.

IMPACT

Disease surveillance activities which provide the basis for knowing the disease burden in a country for follow up actions to control, prevent and eventually eradicate the disease are critical for overall health of livestock. Large countries like India have taken steps to develop digitized systems for animal disease surveillance and monitoring, which has had an important role to play in controlling any major livestock disease outbreaks over the years.

The data collected on NADRS is shared across various monitoring platforms such as PRAYAS, for direct benefit transfer and also synced with major performance indicators monitored for Aspirational Districts by NITI Aayog. The best and worst performing district data can be worked based on the near-real time data accessed from State/UT(s) and eventually make suitable interventions to ensure smooth and efficient implementation of eradication efforts. This portal has also increased transparency of implementation of schemes on ground as actual implementation on ground is being ascertained using central telephonic survey based on INAPH data in all cases where some deviant reports were detected. Using this as a backcheck mechanism, States/UTs are provided with feedback for correction/improvement in surveillance activities. The call centers at State-level can also troubleshoot area-wise issues.

The Department has also started using the NADRS data for performance based budgeting. All financial releases to States/UTs and other agencies have been tied to the performance of surveillance activities on ground. Based on the performance of States/UT(s), specific remunerations or funds are disbursed for ear-tagging of animals, vaccination, accessories, publicity, etc. Correlation of Foot-and-mouth disease vaccination coverage in a State/UT with sero-monitoring and sero-surveillance data helping in determining the vaccine effectiveness etc.

MIS reports generated can be accessed easily and shared across various platforms/Departments through electronic mode like emails and APIs. Near real time information generation on data on animals registered, vaccination done against FMD and Brucellosis, farmers benefitted etc., with less chances of error are being used for effective supervision. Visualization of State/District/Tehsil/Village-wise data on dashboard allows for easier ways to use data for policy making. The portal also allows for a more accurate assessment of immunity status and presence of infection as the sampling plan designed has the necessary details at village-level also. The portal also allows species-wise, age-wise target animal data capture- enabling ensuring aspects like booster vaccination etc.

CONCLUSION

In a rapidly evolving digital space, governance needs to evolve in a way that allows policymakers and public administrators to design data driven solutions. With tremendous growth in data analytics capabilities with the rise of the Fourth Industrial Revolution technologies, it is crucial for governments to ride this transformative wave and shift to evidence-based policymaking.

With the objective of enabling peer learning in the use of data for policymaking for all types of government agencies at central, state and local levels as well as other multilateral and non-profit organizations implementing development programmes, this document disseminates key good practices of the Ministries/Departments of the Government of India in this domain. It intends to inspire a journey that allows for innovations in the use of administrative data for policymaking as well as monitoring & evaluation which will improve accountability in public expenditure and enable better service delivery, eventually improving the quality of life for one and all.

As expected, most good practices are not exclusive to any one particular part of data's lifecycle, suggesting how improvements in data generation and quality also foster better data analytics and use. However, some practices outshine in the degree of their exhaustiveness. For example, the Scholarships Portal of the Ministry of Tribal Affairs using Direct Benefit Transfers facilitates the creation of IT ecosystems with an end-to-end digitized scholarship disbursement platform for students right from the application and verification stage to the monitoring of fund disbursement at all levels. This data has not only allowed to track the flow of funds but also analyze the profile of beneficiaries and identify gaps from coverage perspective.

The Performance Dashboard of the same Ministry specifically highlights the power in synergistic use of data by integrating siloed data systems to form integrated data ecosystems. The dashboard has enabled the Ministry to compare different schemes on similar key performing indicators, identify overlaps, explore convergence among schemes and assess the overall status of tribal welfare in the country. In addition to facilitating internal monitoring for decision making and adaptive policy design, data can be highly useful for service delivery to citizens as well as research and development when disseminated as a public good. A prominent example of this is the CoWIN portal of the Ministry of Health and Family Welfare which served multiple advantages of planning and managing workflow of vaccination processes, inclusive access of vaccines to citizens in convenient and safe manner and disseminating non-personal data on vaccination figures to inform pandemic policy decisions.

Several good practices on the use of emerging technologies for improving the quality of data for better decision support such as the IoT based Real Time Information System (RTIS) of the Ministry

of Railways and GIS-based Awaas App of the Department of Rural Development highlight different ways in which technologies can be used to generate transactional data with minimum human interference. Such high quality, granular and frequent data has proven to be immensely useful for these stakeholders to improve the use of public funds, make mid-course corrections and improve public service delivery.

This compendium highlights many other such outstanding examples of data generation and its use for better governance. This way, it is envisaged that this compendium would help other stakeholders learn from these practices, adopt in other contexts and upscale them. It is hoped that it will aid other governments at national, state and district levels in setting up robust, interconnected, high-quality administrative data systems which can be conjunctively used along with survey data for generating analytical insights for decentralized decision making. In essence, this compendium is a small attempt in the direction of enabling institutions and developing capacities for embedding data-driven decision making in the DNA of governments across the globe.

Development Monitoring and Evaluation Office

NITI Bhawan, Sansad Marg, New Delhi-110001

contact-dmeo@gov.in | https://dmeo.gov.in/