



C O D R

Annual Report

April 2020 - March 2021



Centre for Open-Data Research (CODR) is aimed at promoting open-data utilisation through data science research outputs, tools and techniques with an objective to apply the results towards progressing human development or enhancing customer consumption experience. Open-Data is defined as data that is freely available for access, reuse, redistribution for everyone without any restrictions

Vision

To be recognised as a premier institution promoting open-data utilisation and research for the benefit of society.

Mission

To effectively utilise and research data generated by various open-data initiatives and apply data science to address human development issues and improve citizen's customer experience.



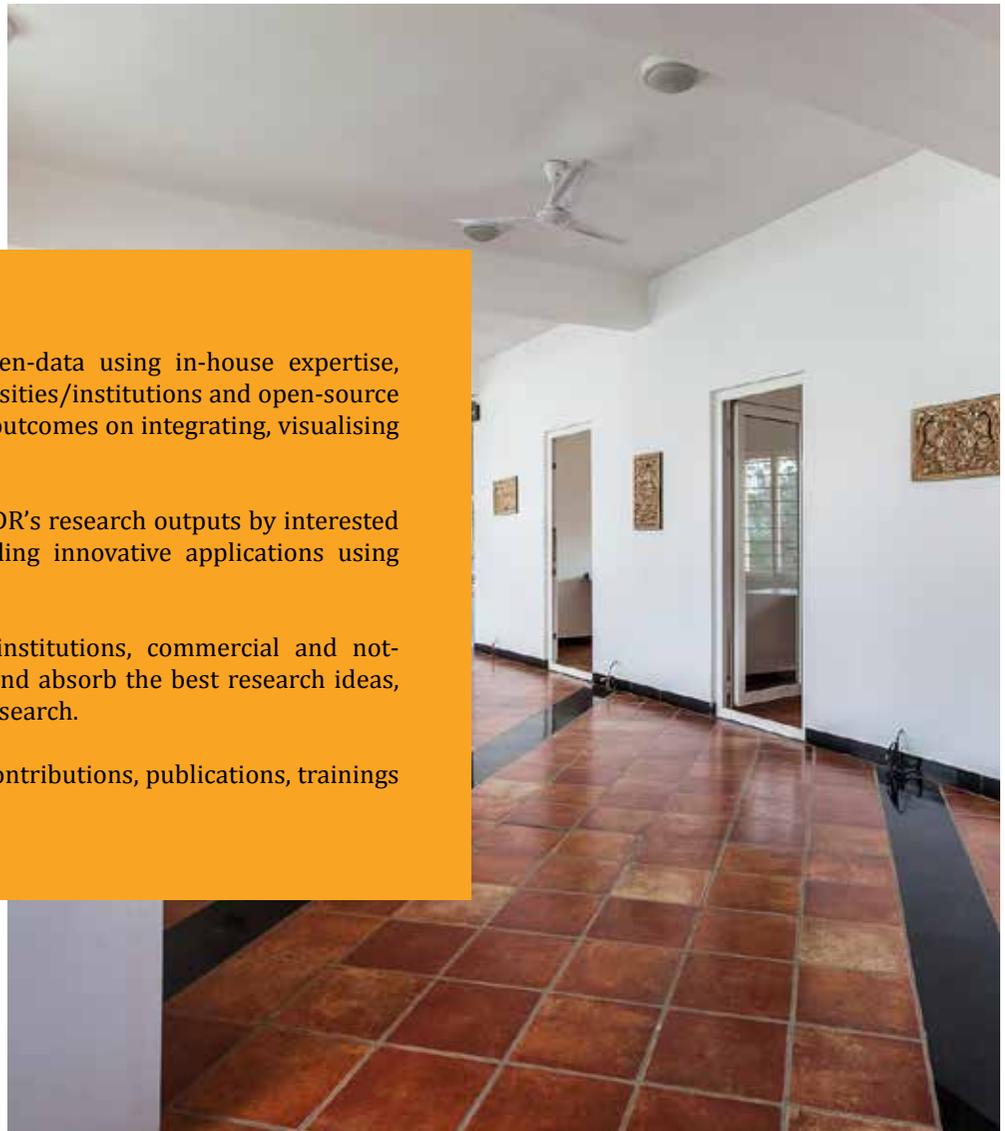
Objectives

Apply data science research efforts on open-data using in-house expertise, collaborations with Indian and foreign universities/institutions and open-source engineering community to ensure impactful outcomes on integrating, visualising and generating insights from open-data.

Build a platform to promote the usage of CODR's research outputs by interested communities and individuals towards building innovative applications using open-data.

Collaborate with universities, educational institutions, commercial and not-for-profit organisations globally to harness and absorb the best research ideas, techniques and goals relevant to open-data research.

Promote the CODR brand through research contributions, publications, trainings and events.



From the Director's Desk



Gurucharan G
Director

The Public Affairs Centre (PAC) adopted a five-year strategic action research framework focussing on human development - school education, primary health, women and child development, and livelihoods. An important element in the strategy was to develop data science use case applications - data analytics, machine learning, and artificial intelligence - to drive evidence-based development praxis and help improve public governance outcomes. The data science vertical of PAC called - Centre for Open Data Research (CODR).

CODR has since worked on two important aspects: first, to gradually expand the types of data and statistical methods that can be applied to draw insights to inform policy formulation and programme design; and provide predictive analytics, cluster analysis, and big data methods. Second, to develop a set of tools; and establish standards in the data analysis process. Two important data tools at the prototype stage include 'Siddhi' that helps spatial, temporal and contextual integration of data; and 'Drishti' that helps draw knowledge graphs for a deeper and more nuanced understanding of specific knowledge domains in development governance. Data science is now an essential component of all PAC action research.

PAC's primary aim is to help governments find and implement resource optimisation solutions and help improve human development outcomes. A pioneering project implemented successfully by the CODR at the request of the Principal Accountant General, Karnataka titled 'Project DIA - Data Integration and Analytics'. The project developed a framework to accomplish a data enabled audit process. The system DIA developed provides an integrated and comprehensive view of digitized audit resources and will help the AG in planning future audits. This removes subjectivity and the choice of audit is generated by the system based on objective criteria. The insights - temporal, spatial, and contextual- drawn from past audit data ploughs back into the audit planning process, thus improving the quality of the audit.

Since then we are partnering the government in other projects, and in recent months, especially in responding to the COVID-19 pandemic.

Message from the Head - CODR



Thomas J

**Head - Centre for Open
Data Research (CODR)**

“Currently, the CODR team is addressing the slowing down of activities due to the pandemic and had to overcome the COVID-19 related lockdown and other logistic challenges. We addressed the challenges by having clarity at all times and at all levels.

We continue to seek new challenges and projects and in this endeavor have started approaching and working with other central and state government agencies in the areas of data science and analytics”.

The Centre for Open-Data Research (CODR) was established in 2018 as a data research and analytical arm of the Public Affairs Center (PAC). It is aimed at promoting open-data utilisation through data science research outputs, tools and techniques with an objective to apply the results towards progressing human development or enhancing customer consumption experience. Open-Data is defined as data that is freely available for access, reuse, redistribution for everyone without any restrictions

PAC/CODR signed an MoU, to be the Knowledge Partner for the Application of Data Science in Governance. This Knowledge partnership focusses on helping the government to effectively implement Sustainable Development Goals (SDGs) by using data science application driven evidence-based policy formulation and outcome-based programme design on a government wide basis. To address this PAC has formed teams to include domain experts and data analysts where each team conducts research, analyses data and develops a report with recommendation. The SDGs include 1, 8, 10, 2, 3, 4 and 5.

Besides that any organisation that generates operational data and has made it a point to archive the historical data, are sitting on a gold mine because the data can provide them with invaluable insights on how they can perform their business in an optimal way. One classic example of an effective usage of data analytics is the project carried out by one of the DTH companies in the US. They captured the data of DTH remote clicks by the customer to see if the customer is changing the channel while a particular ad is being aired and analysed it along with the customers’ demographic information to arrive at the optimal customer group for a particular ad, so as to increase the viewership. Companies like Amazon and Flipkart are also doing a similar analysis on the buying pattern when they ‘recommend’ certain products while one browses on their web site.

Milestones & Key Deliverables

16
January

Signed an MoU between PPMS GoK and PAC to develop data science applications for good governance

02
February

A Managing Committee (first one) with Shri TM Vijay Bhaskar, former Chief Secretary Chaired the meeting

17
October

The second Managing Committee meeting was held

April

Though there was a 6 months gestational period to enable CODR to set up its operations, CODR had commenced its work with COVID-19 data analysis

Submitted 2 sets of preliminary analysis reports for SDGs 1,8,10,2,3,4 and 5

Submitted a report on progress made under the Special Development Plan (SDP)

Health Optimisation, NeSDA Analysis of e-Services and Data Management for departments are some of the on-going projects

Chief Secretary Shri P Ravikumar visited CODR on April 7, 2021 to review the progress made by CODR.

Work Progress Accomplished in 2020-21

COVID-19 Reports

- Identified Districts in Red, Yellow and Green Zones
- Predicted COVID-19 cases for Karnataka
- Developed a phased exit strategy for lockdown in Karnataka
- Submitted a detailed Plan for restarting economic activities
- Analysed grievance data
- Conducted a comparative study for testing numbers in various states
- Analysed 55000 COVID-19 positive cases
- Conducted a comparative study of deaths reported from January to June (2019 and 2020)
- Developed trends for positivity rate

SDG and SDP Analysis Special Development Plan (SDP)

- Calculated Comprehensive Composite Development Index using 2018-19 indicator values
- Analysed Taluka movement across backward and developed categories
- Developed linear regression model to identify the departments and indicators impacting taluka performance
- Analysed SDP fund allocation from 2001-02 to 2018-19
- Estimated fund allocation across departments/sectors for the coming year
- Estimated Fund Allocation across talukas based on comprehensive deprivation index.

Work Planned for 2021-22

- Finalise the current report
- Revise SDP framework to align with aspirational district programme
- Analyse data based on the new framework.

Work Progress Accomplished in 2020-21



- Developed a comparative depiction of Karnataka in SDGs 1,8 and 10 against a benchmark i.e. national average and the best performing state.
- Developed a list of indicators where Karnataka is either a performer or an Aspirant
- Developed a list of Districts skewing the performance for each SDG and poorly performing indicators
- Mapped poorly performing indicators to departments and schemes
- Generated Poverty Map of Karnataka using the Multidimensional Poverty Index approach followed by UNDP
- Created a Capability ratio Index to identify districts who are resource starved
- Developed a time trend analysis on the MGNREGA scheme for Karnataka

Work Planned for 2021-22

- Work in progress- Growth model
- Identification of Growth centres in Karnataka
- Conduct mapping of skills and employment across the state under SDG 8.



- Analysed data to understand the current cropping pattern across 30 districts of Karnataka through crop concentration ratio (CCR).
- Carried out quadrant analysis to compartmentalise the major 7 principal crops into High Production High Productivity, High Production Low Productivity, Low Production High Productivity & Low Production Low Productivity categories followed by 30 district fact sheets for Karnataka state comprising indicators-- potential yield for the dominant crop in a district, the amount of cultivable and uncultivable land in a district
- Identified factors which are highly influencing the productivity of crops in terms of geographical land pattern, rainfall, cropping & annual rainfall as well as different types of irrigation, fertilisers, tractors & power tillers

Work Planned for 2021-22

- Feature importance analysis is in the process of being conducted for other factors such as market mandis, temperature & bank credits
- Projection analysis is in the process of being conducted for each dominant crop across 30 districts to understand the potential it will reach in 2030
- Gap analysis will also be conducted to measure the existing cropping pattern against the normative cropping pattern
- Ground-truthing of factors influencing the factors influencing agricultural productivity in High Production Low Yield (HPLY) districts.
- Key Informant Interviews with various stakeholders from Department of Agriculture and allied sectors to understand the factors influencing the agricultural productivity.

Work Progress Accomplished in 2020-21



First Report

- Developed district-wise Score Card for SDG3 indicators (inline with NITI Aayog's indicators)
- Identified Risk factors specific to Karnataka and with high association for
 - Maternal Mortality
 - Under 5 Child Mortality
 - Universal Immunization

Second Report

- Provided targets to activate on healthcare service delivery at District level
- Explored correlation analysis between expenditure on Schemes and Maternal and Child Care outcomes.

Work Planned for 2021-22

- Estimate per capita Health Care expenditure on Maternal and Child Care, Infectious Disease, NCDs, Injuries for one PHC to identify deficit between Out of Pocket Expenditure and Ex Chequer Expenditure
- Conduct gap analysis through Primary Survey for understanding Knowledge, Attitude, Behavior and Practices related to Maternal and Child Care
- Identify key data science interventions for pilot testing for Maternal and Child Care



Identified:

- Patterns and incidence of secondary school dropout among districts in Karnataka
- Gender disaggregated patterns of secondary school dropouts among districts in Karnataka
- Preliminary analysis of school level factors influencing secondary school dropout rate in Karnataka
- Mapped schemes to the relevant departments
- Identified household-level, child-level and school-level factors impacting the secondary school dropout in Karnataka.

Work Planned for 2021-22

- Conduct in-depth study of factors influencing the secondary school dropout rates among girls and boys in Karnataka and design targeted interventions- (District-wise analysis)
- Design a unit level optimisation model for a primary school defined by the National Education Policy 2020 Framework
- Develop a multi-dimensional analytical model to identify the influencing factors impacting a child's learning outcomes
- Conduct a micro-analysis through a time and motion study to identify the gaps and lacunae in quality of teaching.

Work Progress Accomplished in 2020-21



First Report

- An increasing trend in the number of rape cases was observed across 6 identified districts. Estimates from the CMIE, which does consider the COVID-19 pandemic, shows the given the current trends, FLFPR in the state can fall to as low as 6.53% (15-59) by September 2021.

Second Report

- A Gender Inequality Index was created at the district level and 5 poor performing districts were ringfenced (Bellary, Belgaum, Gulbarga, Dharwad, Raichur). What-If analysis to determine the degree of change required to improve the performance of these districts.

Work Planned for 2021-22

- Study the barriers and enablers for FLFPR at the district level and analyse ways to improve FLFPR (quantifying unpaid care work)
- Develop a model for optimisation of police patrolling and study the legal process for cases of crimes against women (in top and bottom performing district).

Health Optimisation

Unit Optimisation

- Calculated the accessibility index and the demand burden at public health unit level for each village of Chikkaballapur district
Classified these HUs as high, medium and low burden, prepared recommendations to upgrade, merge or downgrade
Recommendation given for the Health Units that are being newly constructed

Manpower Optimisation

PHC level resource optimisation recommendations are prepared for Chikkaballapur district as a pilot.

Supply Chain Optimisation

- Completed ABC, FSN and HML cost analysis at HU, district and state level
- Working on drug demand forecasting recommendations for new construct.

Data Integration of Government Data Sets

- Based on a suggestion by the then Chief Secretary, during the first Managing Committee meeting held on 02-Feb-2020, submitted a concept note in the second Managing Committee meeting on 17-Oct-2020 to integrate data on Land, People and Money mainly for 3 departments – Primary Health, Primary Education and Women & Child Development
- Khajane-2 and HRMS teams have conducted demos of their systems and explained various modules of the systems in detail to the CODR team
- Department of HFW has set up point of contacts for the CODR team. The team collected sample data formats from the basic units
- Could not establish any point of contacts in other departments

ARC-2 – NeSDA Analysis of Services

- Currently conducting NeSDA analysis and preparation of reports for 676 citizen specific services offered through Sakala and Seva Sindhu
- Completed analysis of 86 services from Revenue and Transport departments. The reports are submitted to ARC-2.
- Coordinating with the specific department officials to rectify issues encountered while accessing the services

Outreach



Blog Articles



Domain Bulletin

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