



# Pradhan Mantri Gram Sadak Yojana Past, Present and Future



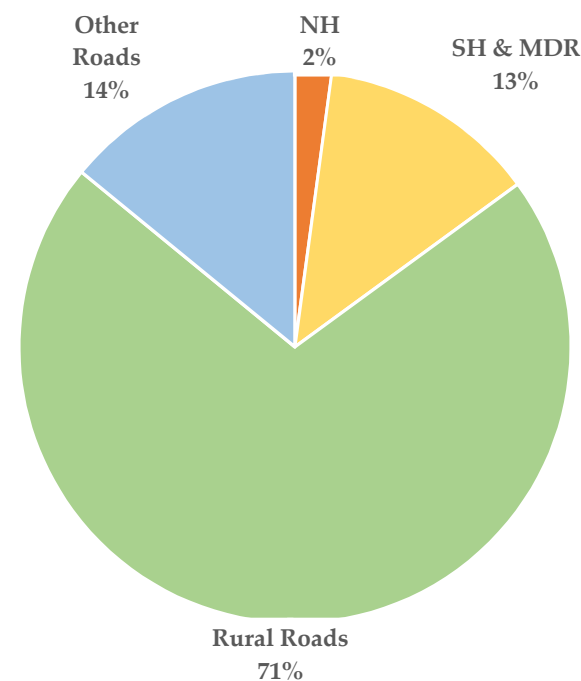
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# Scale of India's Road Network



- PMGSY is one of world's largest rural road construction programme
- Started in 2000 with objective of connecting unconnected habitations with all weather road (PMGSY-I)
- Moved to upgradation of major rural links and through routes to economic growth centers (2013) and schools, hospitals and markets (2019)

|                       |                 |
|-----------------------|-----------------|
| Habitations Connected | 1,61,917        |
| Length Constructed    | 7,07,314 km     |
| Total Expenditure     | Rs. 2,78,341 Cr |



**4.5 million km of rural roads catering to 71% of India's total network**

# Connecting Rural Lives



## Impact Evaluation Studies by various organizations

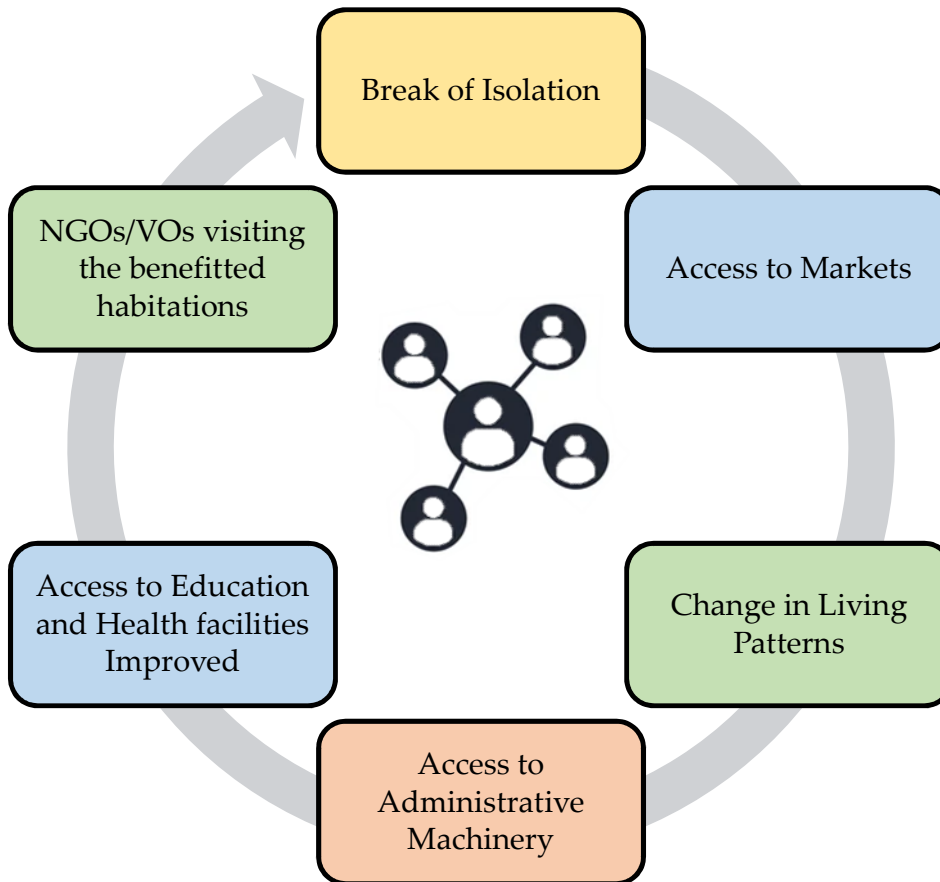
Direct movement to labour market is the major advantage of the all-weather connectivity provided by PMGSY roads (World Bank, 2014)

Better market access due to better connectivity resulted in shift in cropping patterns

Roads have contributed to an increase in income for many households engaged in farming, trading, transport and other services (ILO, 2015)

PMGSY roads contribute to SDGs (Sustainable Development Goals) 2 & 9 and address issues of poverty, hunger and infrastructure for growth.

Provide long-term and sustained boost in the living standards of rural populations (NITI Aayog)



# Special Features



Design Standards & Specifications

Strong Focus on Maintenance

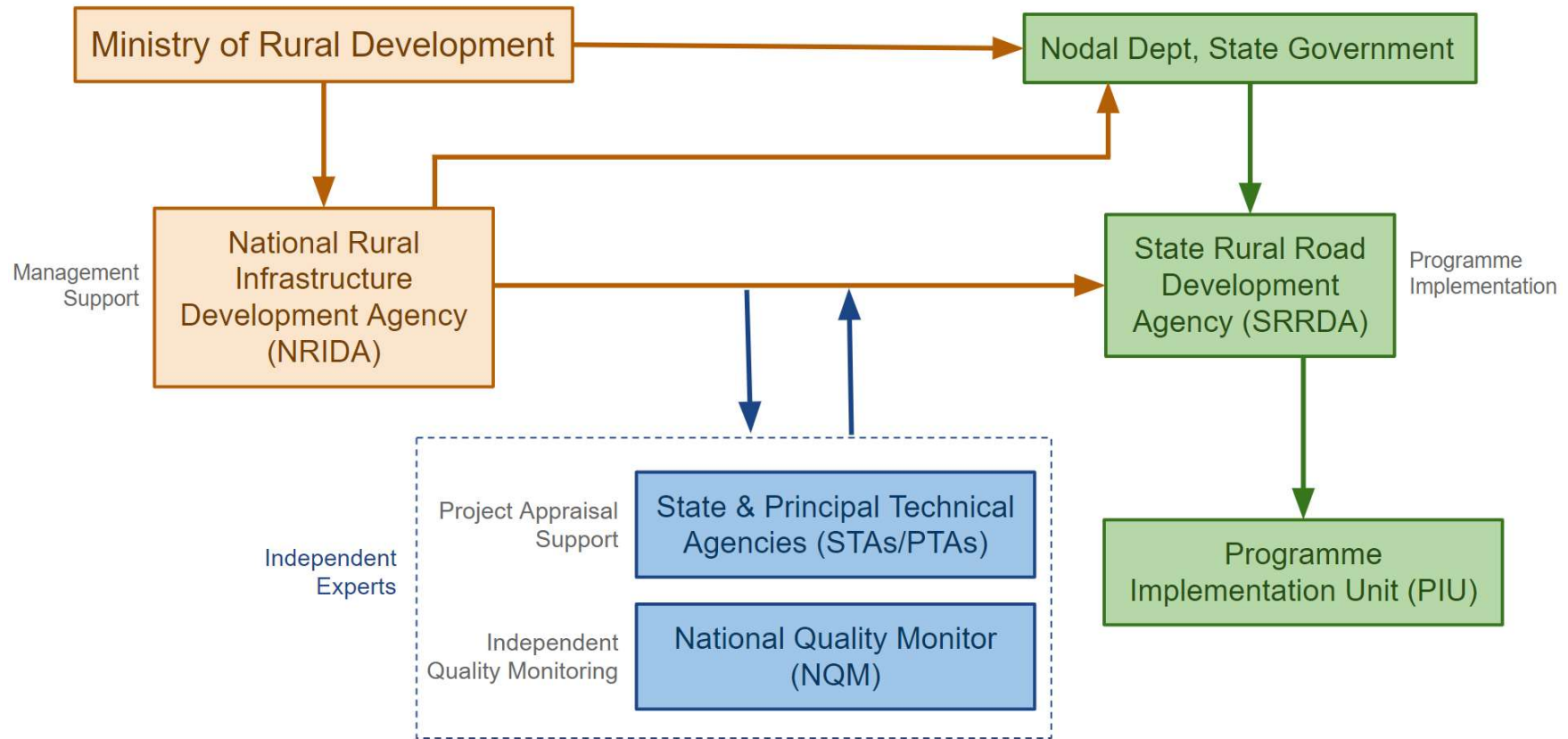
End to end digitization with ICT

3 Tier Quality Monitoring

Focus on New & Green Technology

Decentralized & Data Driven  
Planning

# Institutional Architecture



# Setting Technical Standards & Specifications for Rural Roads



- Rural Roads Manual prepared in October 2002.(Under revision)
- Standard Data Book and Specifications for Rural Roads published in Sept. 2004 (Rev 2014).
- Operational Manual in Feb. 2005.
- Design of flexible and rigid pavements for low volume roads published in June 2007.(Revised 2015)
- Quality Assurance Handbooks published in May 2007.
- Gravel Roads Manual published in September 2008.
- Standards for Steel Bridges published in March 2009.
- Manual on Procurement & Contract Management published in April 2012.
- Guidelines for Tree Plantation on Rural Roads 2014
- New Technology and Innovation in Rural Roads (2022)
- White Topping (2022)
- FDR for Rehabilitation of Low Volume Roads (2022)



**Ecosystem Approach: Impact beyond PMGSY; all documents are available online on [pmsgsy.nic.in](http://pmsgsy.nic.in) for broader use**

# Quality Assurance

- A three tier quality management mechanism institutionalized under PMGSY.
  - First tier- Quality control at Programme Implementation Unit (PIU) level. Process control through mandatory tests on material and workmanship at the field laboratory.
  - Second tier- Regular and structured independent quality monitoring at State level.
  - Third tier- Independent National Quality Monitors deployed for inspection at random. Guidance and monitoring of quality by a senior independent professional.
- Field Labs setup and Inspections carried out during FY21-22

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## Field Labs

11,342 Packages

## SQM Inspections

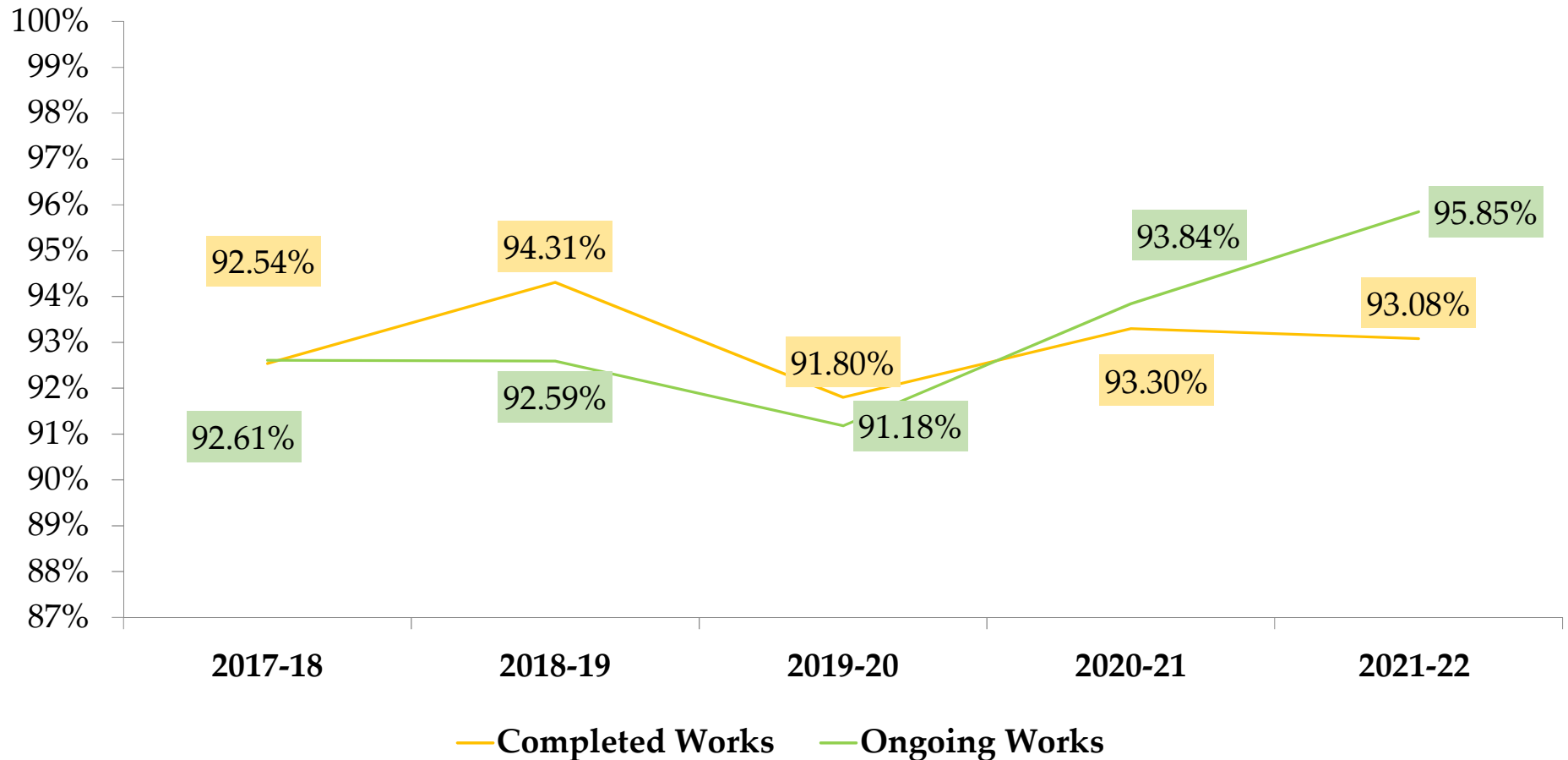
59,328 Numbers

## NQM Inspections

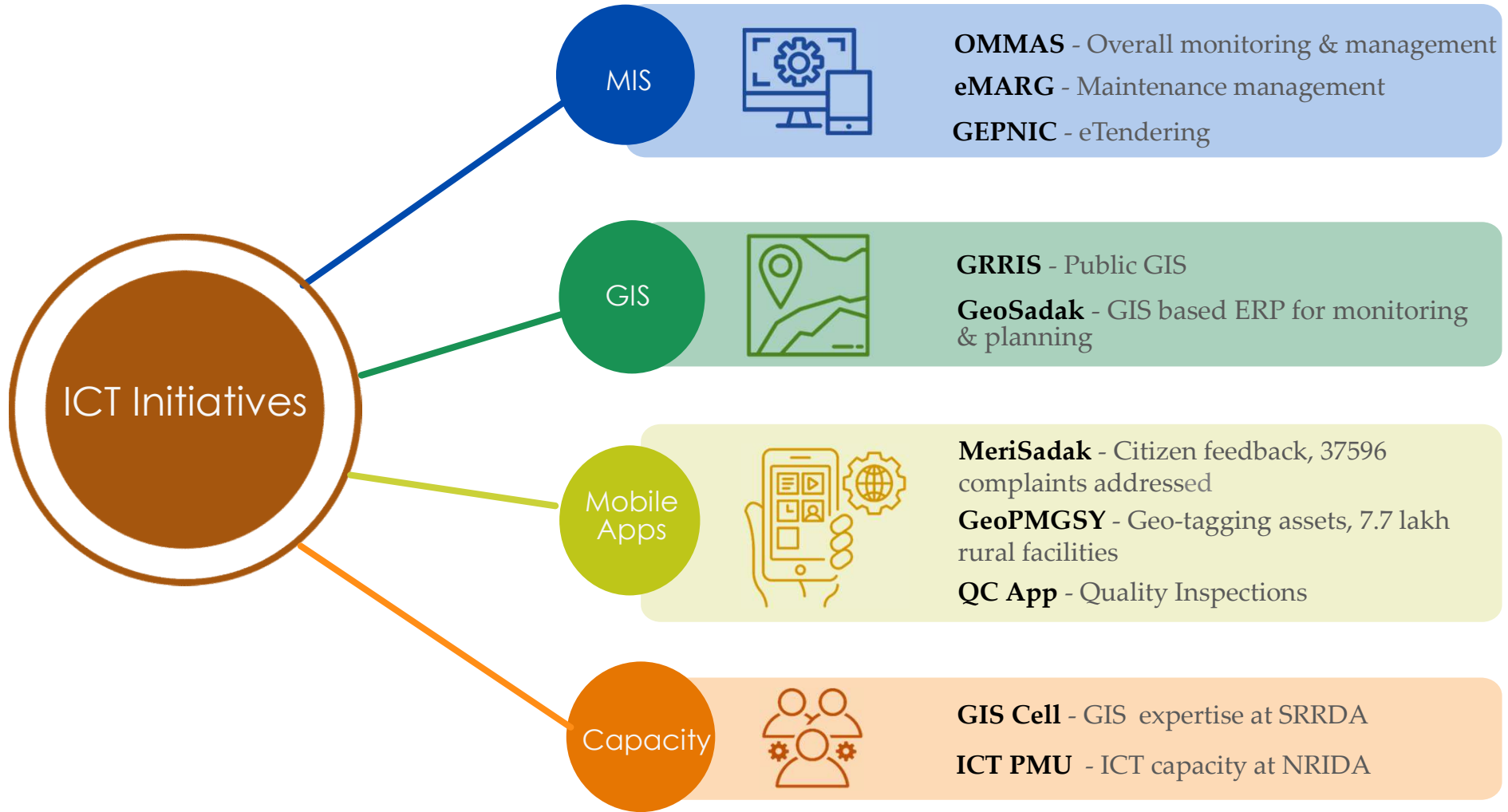
9,421 Numbers



# Satisfactory grading of completed and ongoing works based on NQM inspections



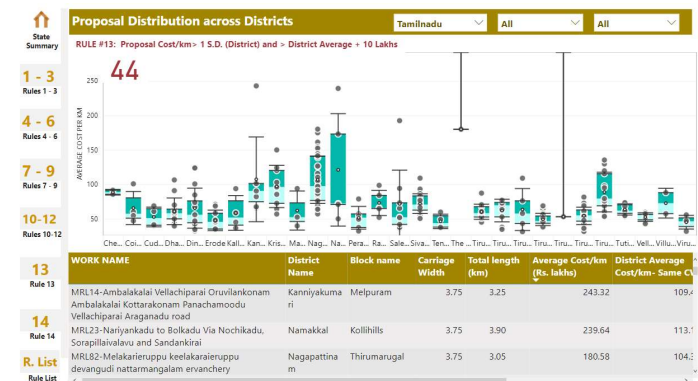
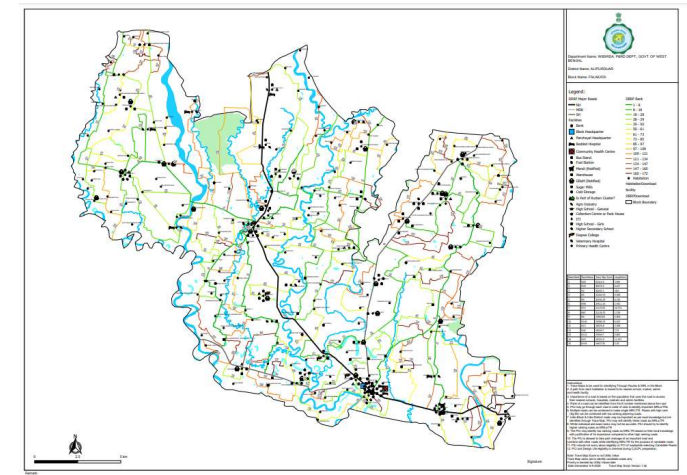




# Use of Algorithms and GIS in Rural Roads



- Entirely GIS based road network, habitations and points of interests (released as open-data\*)
- Transport planning algorithm (Trace Maps) for simulating use-case based traffic on rural roads for planning of investments
- AI based flagging of road upgradation proposals which have large sections already in good condition
- AI based anomaly detection over 100 design/cost parameters to identify DPRs needing further scrutiny
- AI based flagging of irregular maintenance payments by verifying inspection photographs



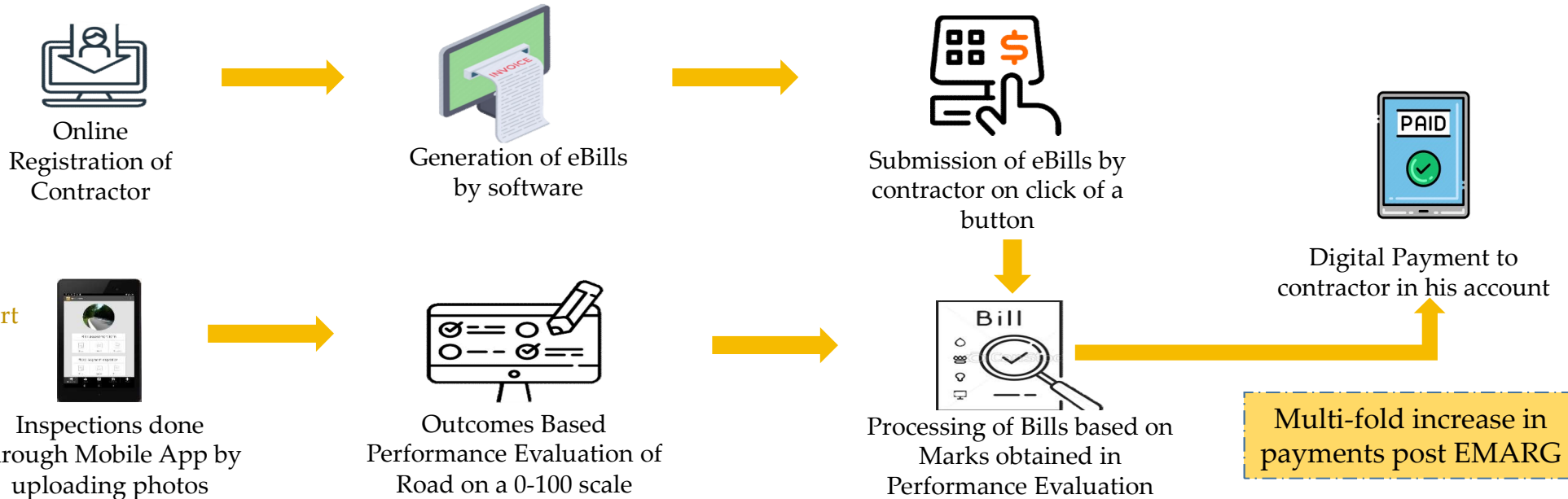
\* <http://geosadak-pmgsy.nic.in/opendata/>

# Maintenance



- Each PMGSY road has 5 years routine maintenance period as part of the construction agreement with same contractor
- With PMGSY-III, we have 5 + 5 contracts including periodic renewal
- All states have issued a Maintenance Policy
- EMARG – end to end online system for ease of doing business in maintenance:

Start

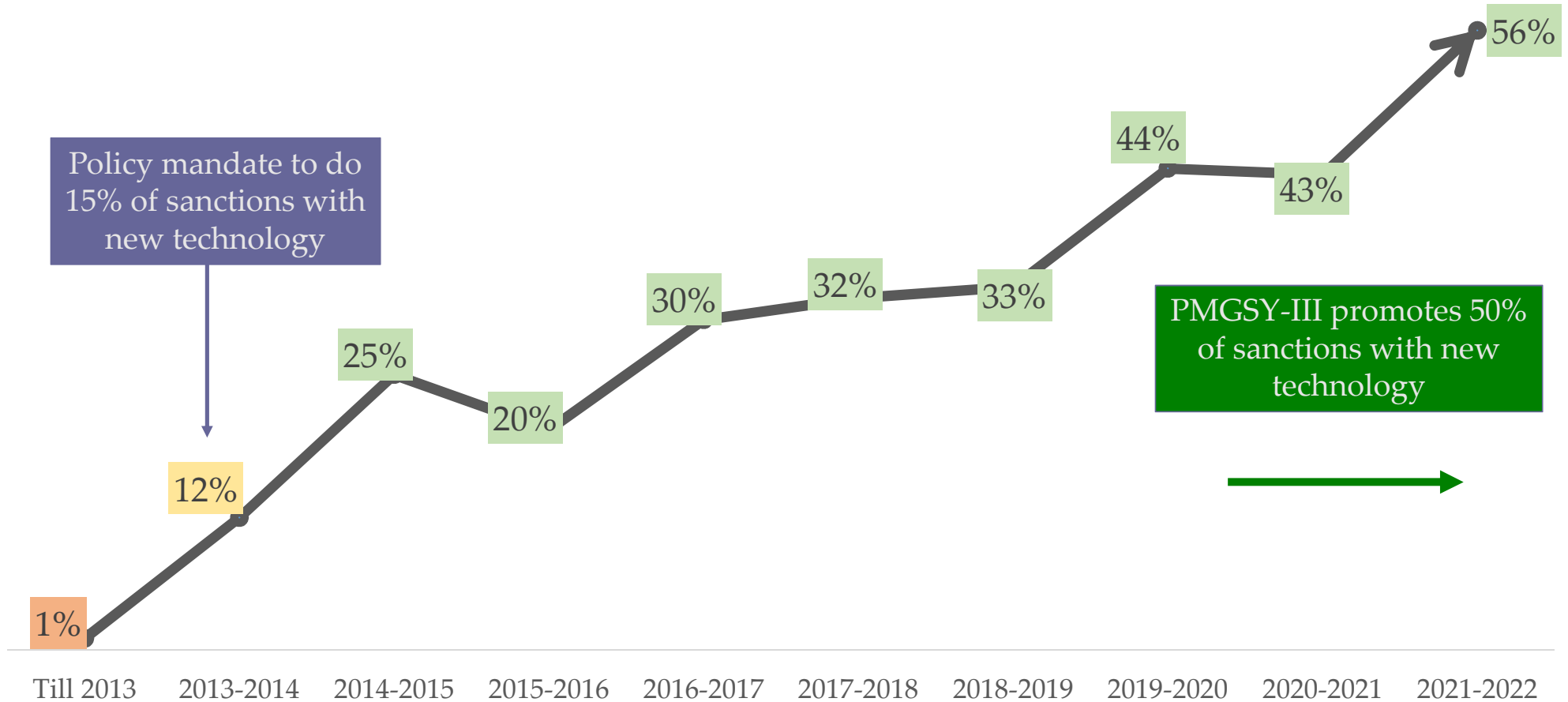


# New Technology

- New technology guidelines issued (2013) to use local, non-conventional and green technologies in road construction.
- States to use new technologies in 15% of total proposal (10% using IRC mainstreaming technologies and 5% IRC accredited technologies)
- Progress of New Technology Roads: 1,11,358 km has been sanctioned and 70,769 km has been completed
- Update overall guidelines, vision and technology specific guidelines issued based on learnings (2022)
- New technologies mainly used under PMGSY:
  - Waste Plastic
  - Cold Mix Technology
  - Cement treated sub-base/ base
  - Nanotechnology
  - Jute, Coir, cement/ lime stabilization
  - Full Depth Reclamation (FDR) technology



# Increasing Sanctions under New Technology (Percentage)



# New Technology Impact Evaluation

## Waste Plastic

26,700+ km constructed

### Savings Achieved

**9960** ton of waste plastic used  
**14953** ton of CO2 emissions saved

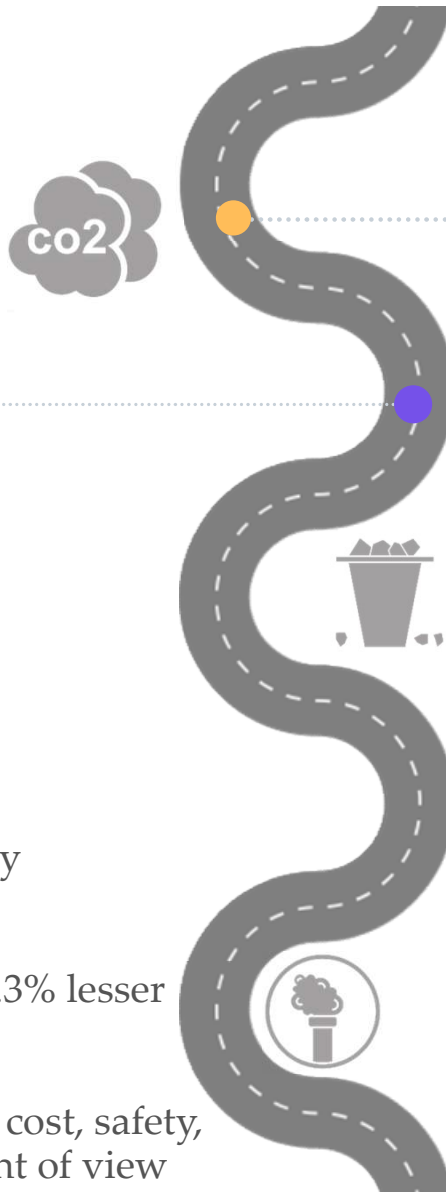
(estimates based on WHO document)

### Evaluation

Cold Mix and Waste Plastic Technology  
Evaluation (2019):

Life cycle cost of Waste Plastic roads 4.3% lesser  
compared to conventional roads

Cold Mix has edge over Hot Mix from cost, safety,  
environment impact, productivity point of view



## Cold Mix

17,300+ km constructed

### Savings Achieved

**26.3** million litres of fuel saved  
**76523** ton of CO2 emissions saved

(estimates based on studies by CRR)

### Evaluation

As per evaluation by TERI (2017):

- “Energy savings and less CO2 emissions over the life span of rural road on use of Cold Mix Technology”
- “Cold Mix does not require periodic maintenance for a longer period”





# New Technology Vision 2022 – Surface Course

- a) Compulsory use of waste plastic more than 70 % in eligible proposed length involving Hot Mix.
- b) 100% use of Mechanized Surface Dressing (MSD) in T-1 to T-5 category of roads.
- c) From T-6 to T-8 category of roads, minimum 50% of length shall be taken under MSD. Surface Dressing can also be done with cold mix technology.
- d) Cold Mix Technology shall be used in minimum 25% of the total proposed length. The use of cold mix technology shall be prioritised in climatically suitable areas.

# New Technology Vision 2022, Base Course, Sub-Base Course and Sub-Grade:



- (a) At least 50% of length to be constructed with new new/green technology materials.
- (b) Each state shall promote two new innovations.
- (c) 100% proposed length under Cement Concrete shall be constructed using thin white topping (Panelled cement concrete or Cell Filled Concrete). Only in exceptional cases Pavement Quality Concrete (PQC) shall be used.
- (d) Where pavement cost is high due to non-availability of nearby high quality aggregate, FDR shall be preferred to attain cost economy, better compaction, quality and durability.
- (e) In areas near to thermal power plant, fly ash shall be used in CTB and embankments.
- (f) In areas near to steel plant, slag shall be used in subbase course, base course and embankments.
- (g) Construction and demolition (C&D) waste duly processed shall be used in subbase/ base course at least 10% of the proposals.
- (h) Geo textile, Geo net, soil nailing shall be used for slope protection in hilly areas and other areas of application.





**Thank You**

<http://omms.nic.in>  
<http://geosadak-pmgsy.nic.in/opendata/>  
<http://pmgsy.nic.in>