Way ahead

GISE Hub

Milind Sohoni

2024

Way ahead

GISE Hub

The agenda - Creating Pathways - Getting geospatial technology to work for development

- The mechanism - Knowledge products and platforms, long-term engagements, partnerships
- Role of IITB as an institution
- Entrepreneurship and Innovation
- State and local government linkages

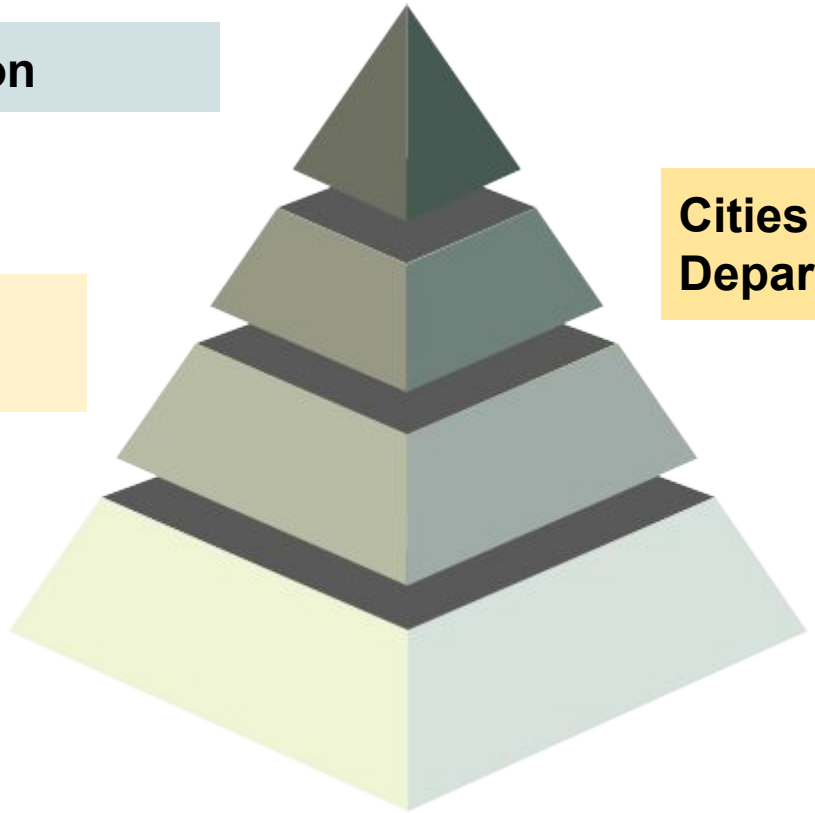
Delivering value

The usual way

Nation

Cities and Departments

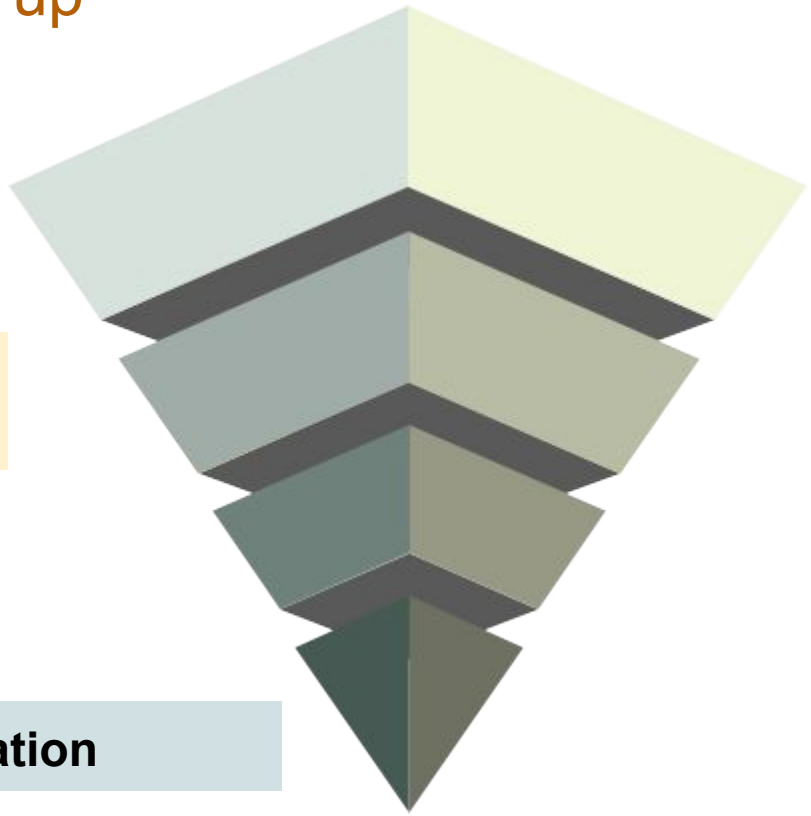
District or Town



Village and Community

Delivering value at scale

Analyse bottom up



Village and Community

District or Town

Cities and Departments

Nation

Lets look at a problem

Roads - Streamlining costs, improving quality and access

What are the roads in my village? How good are they? Which need repairs? When was the last repair done?

District/Taluka-wise road summary - pavement quality, expenditures. Mapping amenities, measuring access.

Coordinate with survey agencies. Mainstream methods and tools.

Maintain and update the above data. Prioritize expenditure. Work with other agencies. Enforce formats. Use analytic tools.

Design databases and schemas. Design new tools - Pavement Condition Index. New areas - state transport buses, crowd sourcing for autos.

The GS-IT stack. Engagement with state governments - Providing standards.

Knowledge products at each level - deliver value at each level

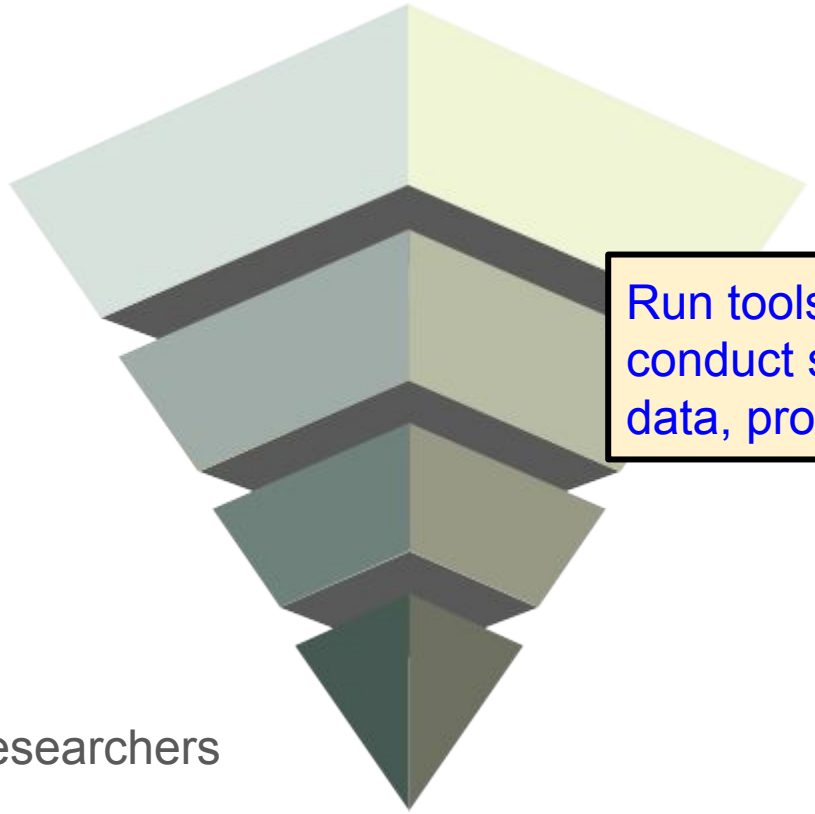
graduates

Engineering graduates

High-end institutions

Researchers

The Inverted Knowledge and Value Pyramid



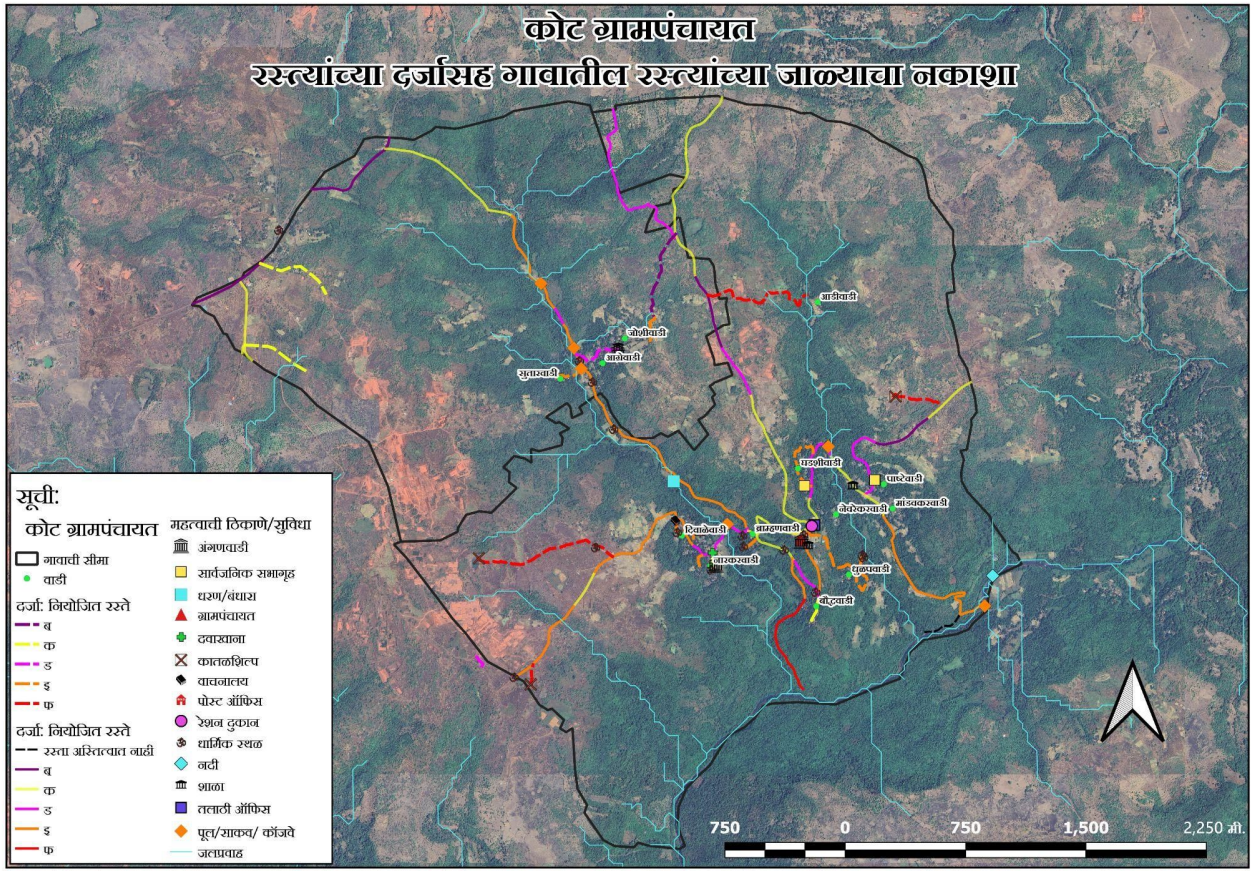
graduates

Run tools and methods, conduct surveys, populate data, provide basic reports.

Engineering graduates

High-end institutions

Researchers



The Village Map

Planned and unplanned, quality, access and amenities

Lanja tal. Ratnagiri - Village Maps

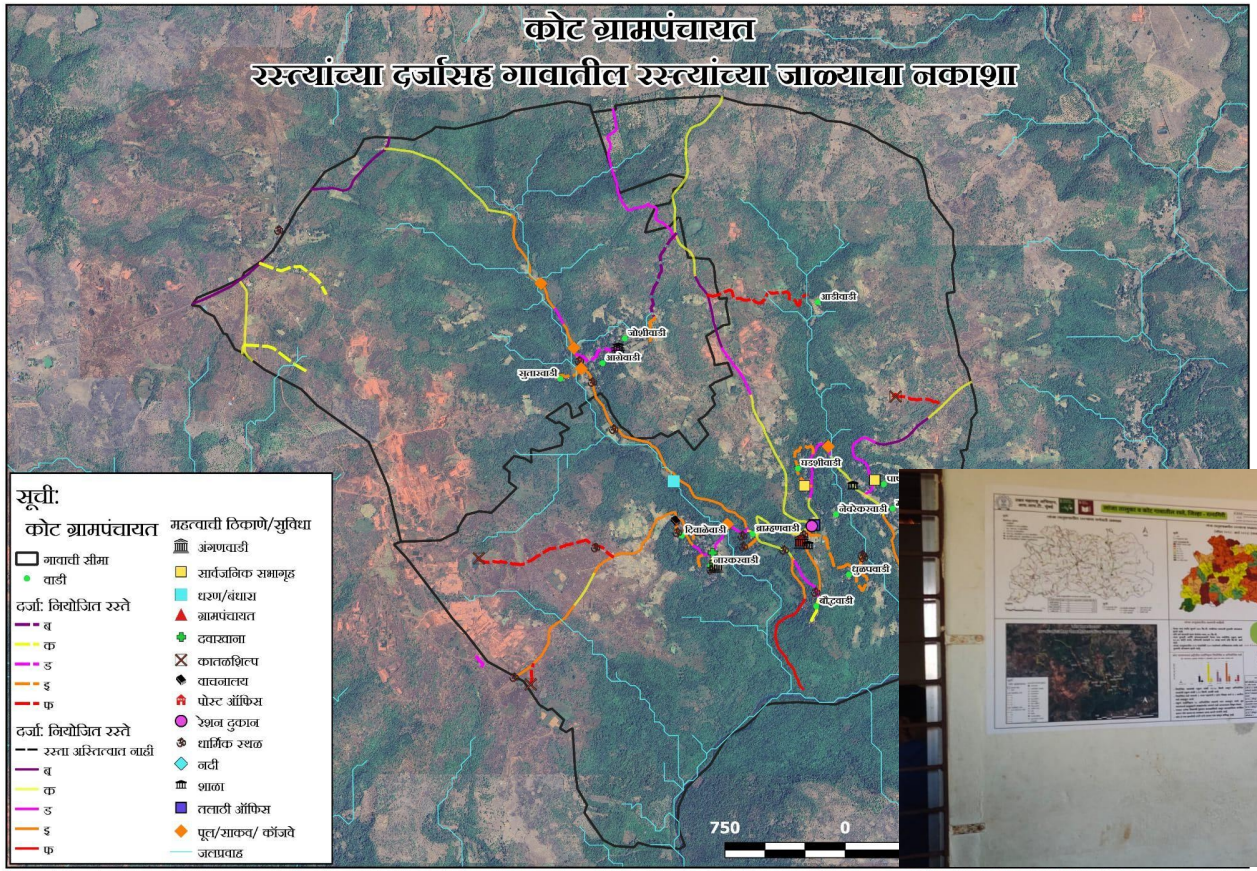
Executing a set methodology

- team of 2, one week training
- Rs. 13K per villages,
- ZP Ratnagiri paid 10K



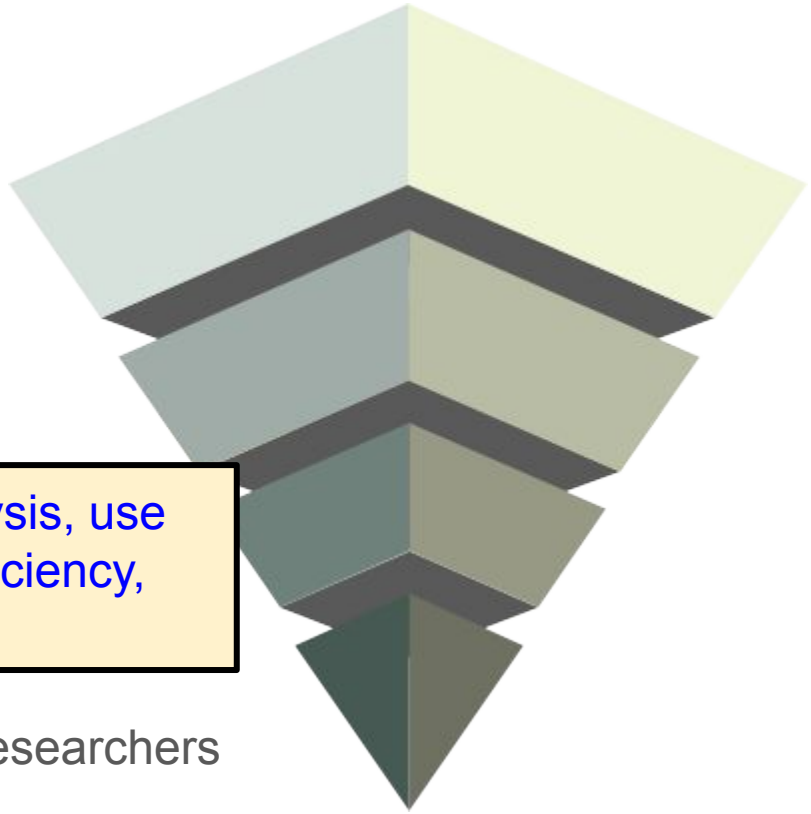



	Surveyor's honorarium		
Sr. No.	Task	Required Man Days (8 hours of working per day)	Budget (@Rs.1000 per person per day)
1)	Obtaining and Analyzing Secondary Data on Village Road Network	2	2000
2)	Field Visit: Measurement of road length, width and quality; Geotagging of village assets and habitations	2	2000
3)	Integration of the primary data with the secondary data and road condition status	2	2000
	Total	**6**	**6000**
B	**Resources**		
1	Travelling		1000
2	Training and Coordination		1000
3	Contingency		1000
	Total		**3000**
	Total (Honorarium + Resources)		**9000**
C	**Institutional cost @20%**		**2250**
	Total (Honorarium + Resources + Institutional cost)		**11250**
D	**GST @ 18%**		**2025**
Total			**Rs. 13,275/-**



The Village Map has other uses too

The Inverted Knowledge and Value Pyramid



graduates

Engineering graduates

GIO- perform analysis, use platforms, bring efficiency, coordinate surveys

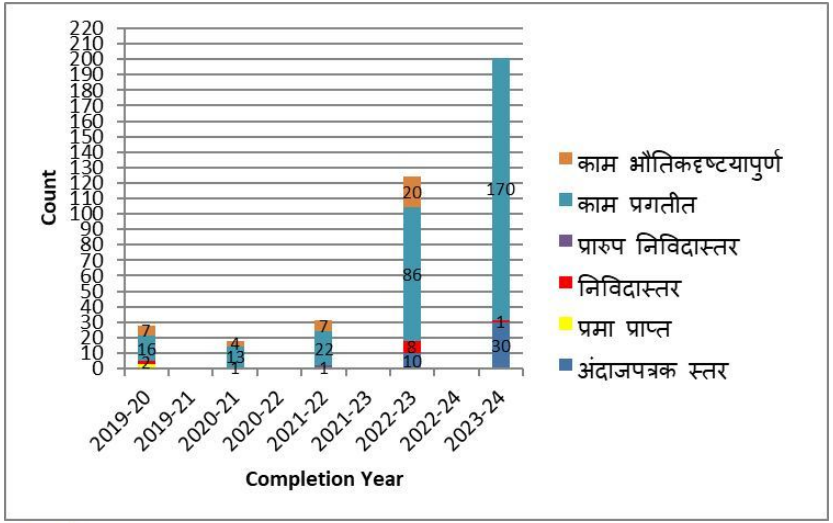
High-end institutions

Researchers

GIO Ratnagiri

Assist Executive Engineer

- analyse expenditure
- prioritize projects
- update databases

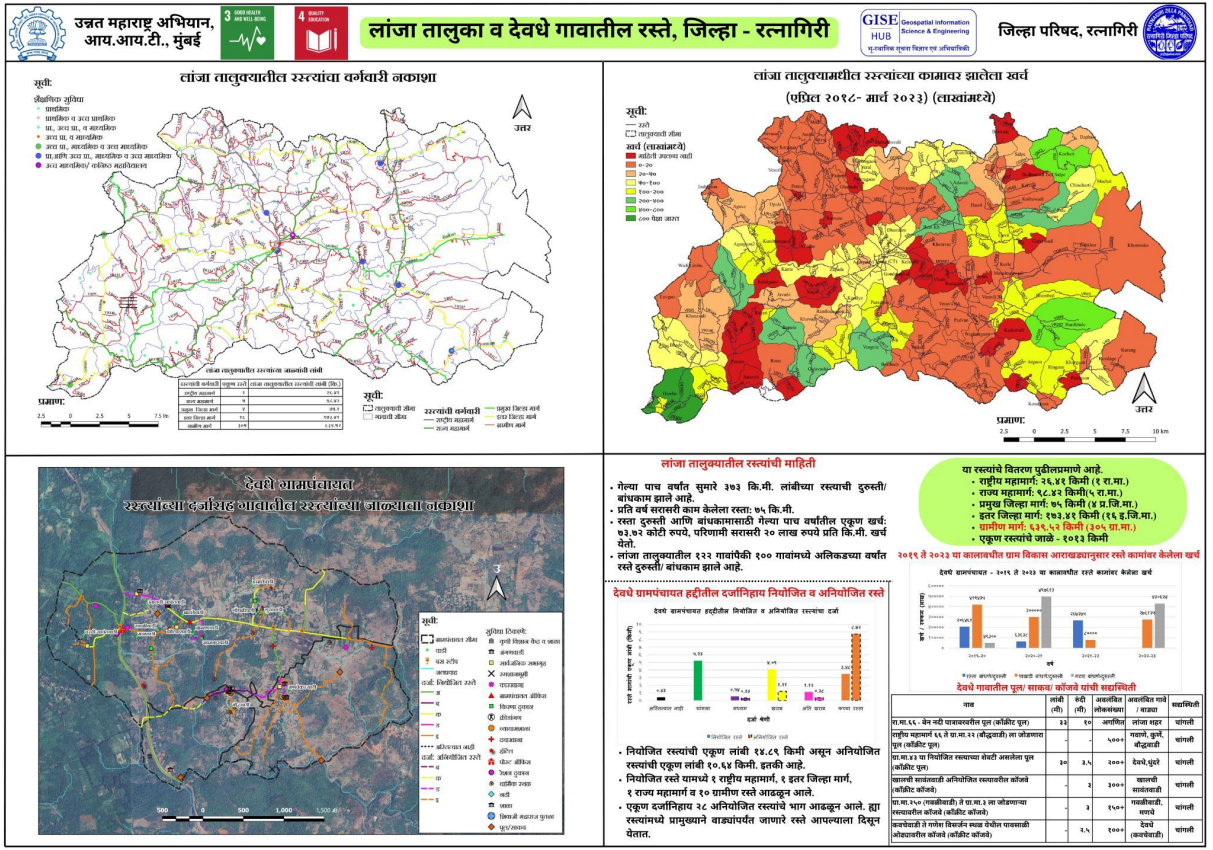


Road Number	Scheme	Year	From	To	Total work length	Expenditure
ODR99	MMGSY	2018-19	0.0	5.44	5.44	284.37
ODR99	Group-A	2018-19	3.800 & 5.0	4.500 & 8.0	3.700	1.00
ODR95	MMGSY	2016-17	0.0	6.7	6.7	413.27
ODR95	Group-A	2018-19	12.5	16	3.50	1.00
ODR95	Group-A	2019-20	13.5	15	1.50	1.99
ODR95	Group-A	2020-21	13.5	15	1.50	0.98
VR5	MMGSY	2018-19	0.0	5.9	5.9	230.97
VR5	Group-A	2018-19	0	5.4	5.40	0.49
VR5	HDP	2019-20	7.35	7.535	0.5	4.91

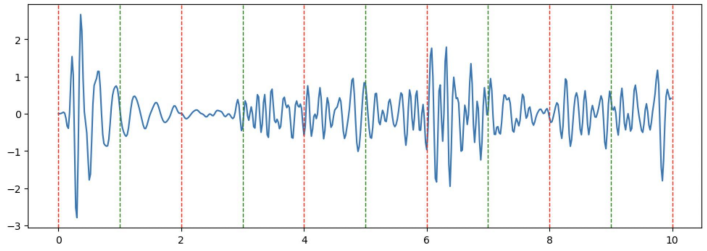
Training and Expense

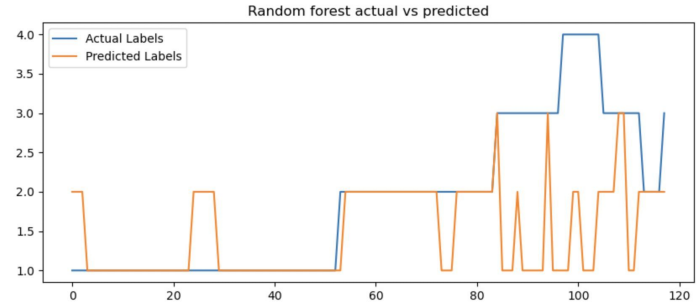
- Engineer with 1 month training in GIS
- 2 month refresher
- 5 lakhs p.a. + travel.
- Deployed in ZP Ratnagiri

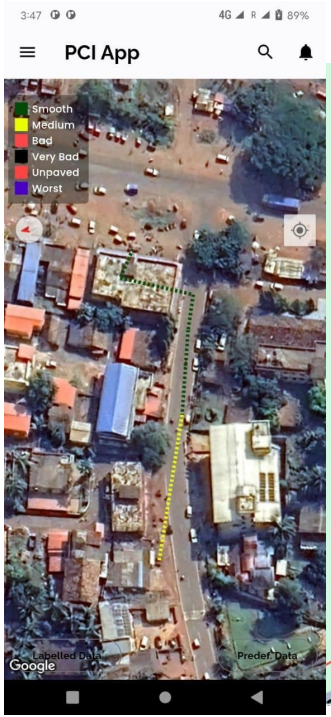
Prepare Index Maps!



At the high end- The Pavement Condition Index App







The Pavement Condition Index App

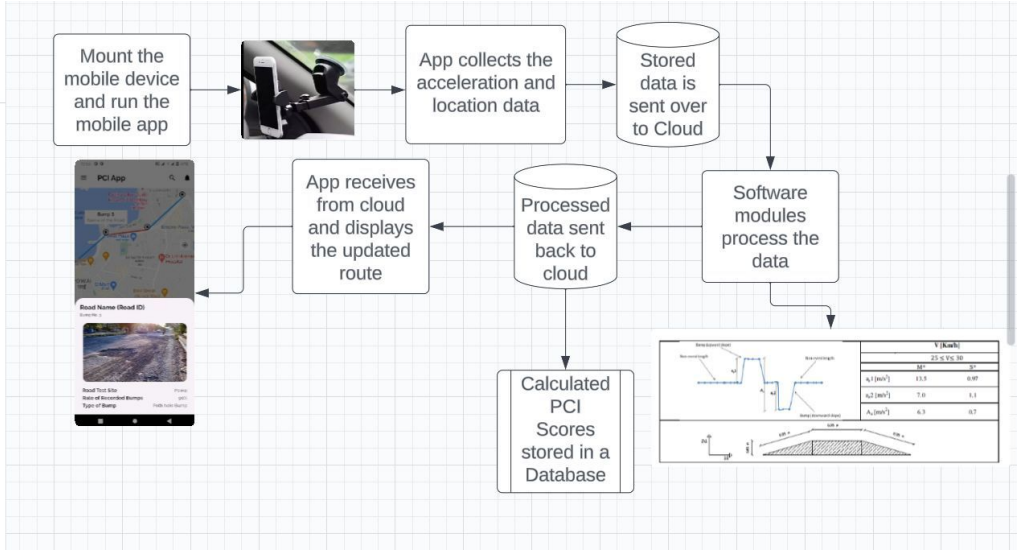
Complex workflow

3 btech students.

ZP Ratnagiri paid Rs. 6L

Ample scope for Hi-End S&T

Need for main-streaming and standardization by Engineering institutions



Roads - Streamlining costs, improving quality and access

What are the ro irs? When was the last re

Maintaining an es.
Enforcing form

- Taluka-wis
- Coordinati ols.

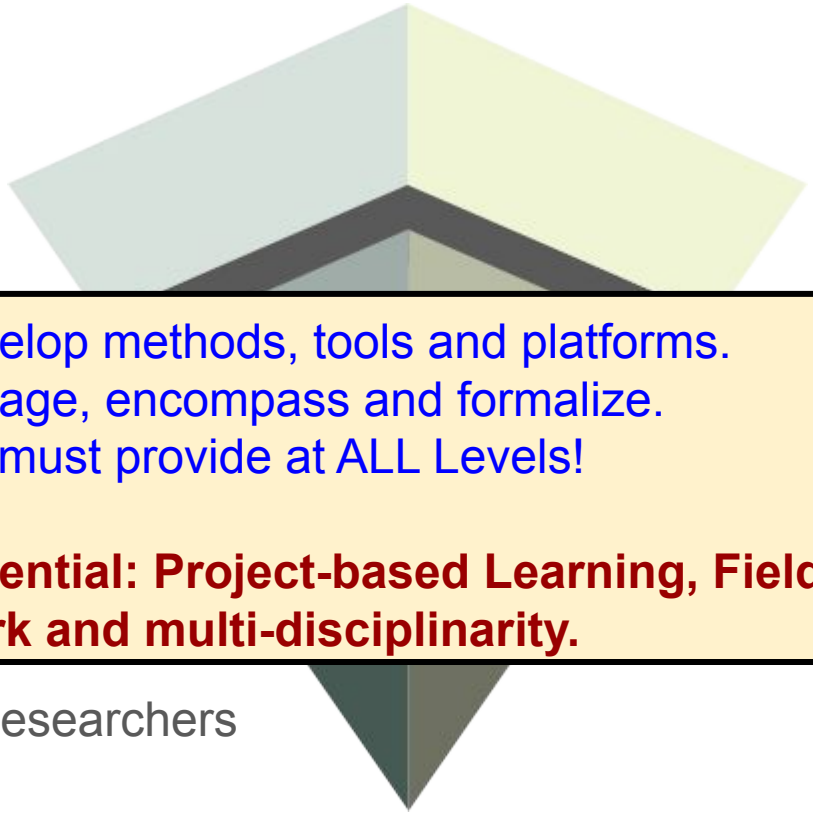
Designing data ndition Index. New areas - state transport buses, crowd sourcing for autos.

The IT stack. Engagement with state - Collector, Secretary Transport, PWD

Pathways

- A hierarchy of problems and value chain
- Identification of SoPs and Knowledge Products
- Identify solution and how to deliver it
- **Produce value and new jobs!**

The role of High-end institutions



graduates

Engineer
graduate

Develop methods, tools and platforms.
Engage, encompass and formalize.
We must provide at ALL Levels!

Essential: Project-based Learning, Field Work and multi-disciplinarity.

High-end institutions

Researchers

Pathways - Typologies

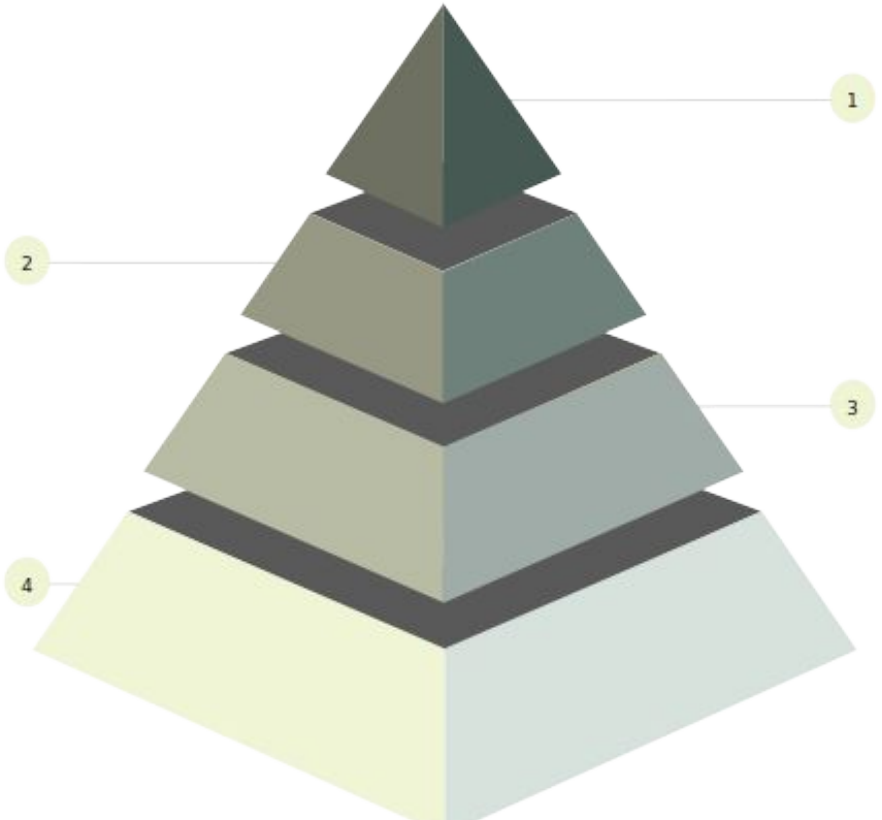
- Some begin at the household or community, but others may begin at the taluka, district or state.
- Scale and problem complexity may be different

Department of Land Records - Fixing Village Maps, fixing roads, preparing encroachment indices. *Company formed - **TerraStack***

MSEDCL Agri.: Linking transformers with catchments, cropping pattern, irrigation and peak loads, load balancing and simulations *Company wanted!*

PoCRA: Bio-physical models, farm level vulnerability, climate event analysis, dashboards. **Now in Himachal Pradesh!** *Company wanted.*

The value chain



Project Deployment

Prepare software tools and workflows for scale, and deploy the final product on scale

Proof-of-Concepts

Build toy models for each use case, understand technical possibilities and demonstrate potential

Pilots and IT stacks

Generate pilot proposals, develop the software stack, and test and improve the product in pilot regions

Use Cases

Identify where satellite intelligence and GIS algorithms can benefit land records, agri and other industries

What do we do? Pick a Pathway and an owner academic department

Use Cases: Take students out on field work. Talk with end-users. Spot problems. Work in the lab.

PoCs: Engage with agencies. Get data. Work on an SoP or KP.

Pilot: Develop for deployment. Smaller scale. Seek funding from agency. Run the pilot.

Project: Form a company. Make an MoU. Get first contract. Deliver.

What do we do? Pick a sector and an owning department

Academic Frameworks

Professional Frameworks

Use Cases: Take students out on field work. Talk with end-users. Spot problems. Work in ab.

s: Engage with agencies. Get data. Map end-use to SoP or KP. Work on that.

Pilot: Develop for deployment. Smaller scale. unding from agency. Run the pilot.

ct: Form a company. Make an MoU. Get first contract. Deliver.

How to implement a *Pathway* at an IIT - **Phase I**

Academic Frameworks

1. 2+ lead faculty, coordinator, IT person + support team
2. Introductory 3-4 lecture material in core courses
3. Elective courses and project-based courses for Use-Case and PoC development. ***Interdisciplinarity and Field work.***

Engagement Framework

1. Funds for GIO positions, field projects
2. Development of methods and tools, IT stack and text books
3. Liaison with colleges - training programs, GIOs, field work
4. Enabling GRs and engagement with Secretary

Phase - II

Annual engagement contracts

- PhD students and R&D projects
- Mentoring colleges
- Start-ups in Solutions and IT services
- Engagement with consulting Companies

Self sustaining in 2-3 Years! Revenues Rs. 1-2 crores per year to IIT.

Within IIT

■ Considerable IIT faculty commitment. ■ GIO fellowships, ■ Leeway in consultancy and sponsored projects. ■ Support for Interdisciplinary work and field work.

Institutional Linkages

- Unnat Maharashtra Abhiyan provides access to HTE
- Data MoUs with parent departments. Such MoUs exist with DoLR, MSRTC, DoA , MoH, WRD and others
- Field projects need MoUs at district level. Such exist with Ratnagiri

BUDGET Phase I per year			
	Item	**Rate**	**Total (L)**
	Coordinator +IT support	1+1 L p.m.	24
	Engineer + Field	0.5*3 L p.m.	18
	Reporting and Office	1L p.m.	12
	Field Projects (2)	15L	30
	GIO	10L	10
	Student Support (UG+Mtech)	10L+15L	25
	Liaison and Training	-	10
	TOTAL		**~140L**

Hub’s Role

Liaison with state agencies and higher education institutions, universities.

Provide support with existing mechanisms - GIO, Workshops, Visiting teachers, Visiting researchers, well-funded projects, field projects

Guide faculty members on pathways, prepare courseware, provide IT services and data, pose problem areas, liaison with state agencies.

Provide entrepreneurship support. Vet and validate PoCs and pilots. Identify research projects. Set objectives and organize data.

Develop linkages with consulting companies. Develop executive programs for top bureaucracy and consultancy agencies.

Work with institute administration. Coordinate and Report. Provide strategic guidance.