The CoRE stack: Commoning for Resilience and Equality

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ACT4D: Appropriate Computing Technologies for Development IIT Delhi



Gram Vaani: Community
Powered Technologies for
Development

Some problems with the prevailing paradigm of technology design and management



Imposed top-down with a logic of control and exploitation coded in the technology itself



Removes agency of people to counter problems of unfair denial created either by the technology or the processes surrounding the technology



Creating community standards that are imposed centrally is an attempt to logically formalize social processes



Digital public good that tries to create a level playing field for innovation but may only end up reproducing existing inequities by not acknowledging power imbalances that need to be fixed

- What is common to these: Imposed top-down, not carefully steered towards equality, users are not granted agency, ambiguity in defining means and ends of the technology
- Leads to a shift of power away from users to the technology providers and bureaucrats who
 manage the technology

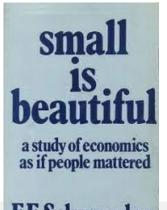
CoRE: Commoning for Resilience and Equality

- Community centered instead of designer imposed or individual-user centered
 - Meets genuine needs of the community
 - Not imposed coercively
 - Not exploitative, leads towards equality
 - Allows communities to steer the technology
- Communities will be able to control and steer technology only if they work in collaborative ways, through democratic principles that respect plurality, and provide mutual support to one another
- Answer: We need a commoning approach as a new paradigm for technology design and management

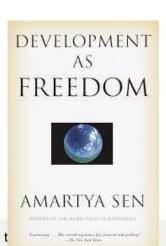
Economic & Philosophic Manuscripts of 1844

Karl Marx

Marxist humanism as creating positive social relationships through production that fulfils genuine use-value for society



Appropriate technology as that which can be produced and managed locally

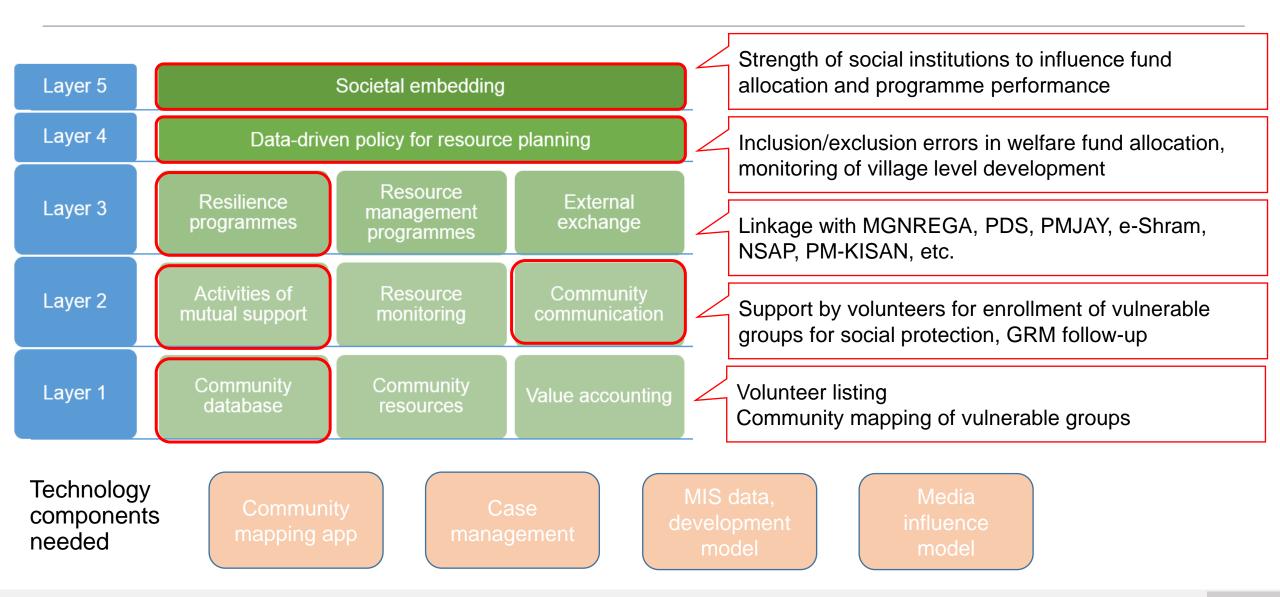


Social processes that provide freedom to realize capabilities, and require removal of structural injustices

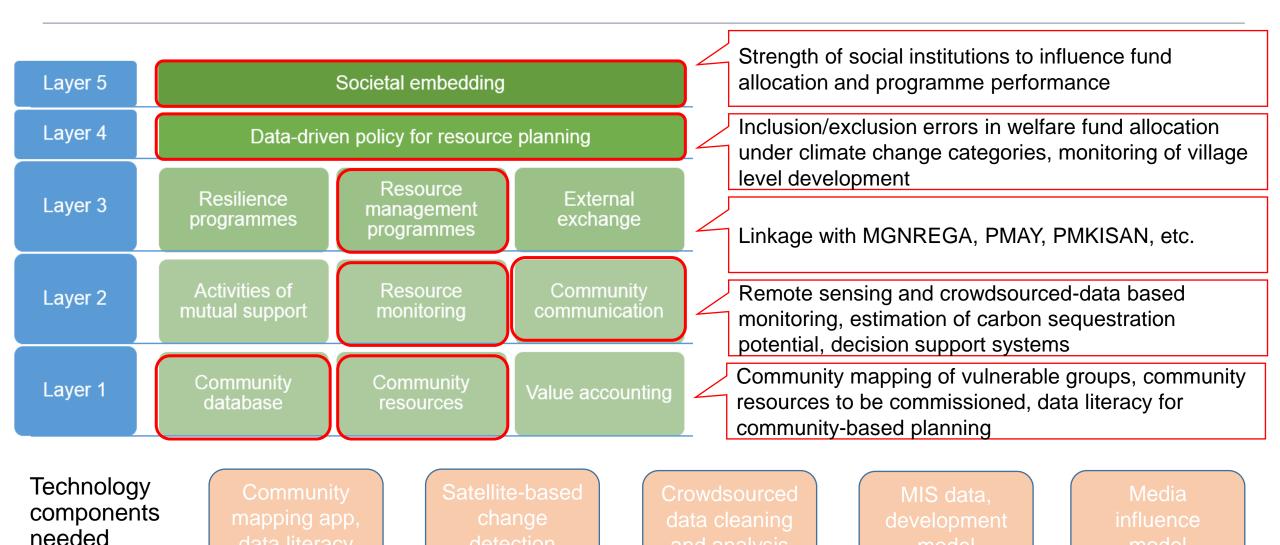
The CoRE stack: Commoning tools for communities

Layer 5	Societal embedding			Assess social institutions on their commitments
Layer 4	Data-driven policy for resource planning			Data-driven policy to ensure equity
Layer 3	Resilience programmes	Resource management programmes	External exchange	Programmatic linkages to channel funds and resources to communities
Layer 2	Activities of mutual support	Resource monitoring	Community communication	Tools for community networking and resource monitoring
Layer 1	Community database	Community resources	Value accounting	Base components for community and resource mapping

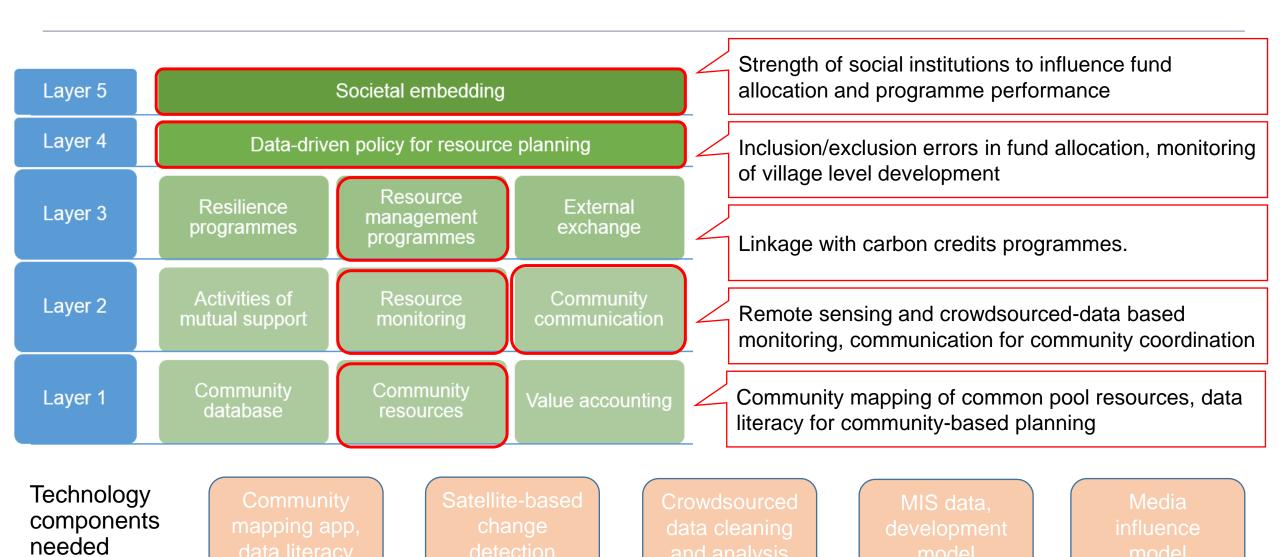
Governance CoRE: Rights and entitlements



Environment CoRE: Climate change adaptation



Environment CoRE: Commons management

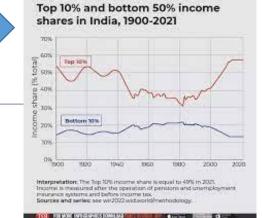


Technology components

Models to understand media influence on policy making, to indicate the Layer 5 strength of our social institutions Models for data-driven policy making to track programme inputs against Layer 4 observed development outputs Non-technological To collect bottom-up Layer 3 element to be built feedback on community through partnerships resources being planned, constructed, or in use. Channel problems for Layer 2 grievance redressal to appropriate authorities. Verify satellite-data based monitoring outputs. To track GRM For accountability Layer 1 support provided and community by volunteers communication For monitoring of forest change, agricultural land-use, surface water, soil For mapping of vulnerable communities, marking of common moisture, carbon sequestration potential, pool resources, marking of community resources to be bio-mass, carbon flux. Use in decision provisioned, other data layers for resource planning

support systems

System architecture









QGIS Server - Installation

MGNREGA MIS









Mobile Vaani: Technology. Media. Development

System architecture: Community mapping

Features:

- Smartphone app to annotate vulnerable community households, natural resources
- Overlay layers for surface water, soil moisture, forest cover, etc. – whatever can help with decision making for works demand
- Students: Harsh, Shruti, Sanjali
- Supervisor: TBD



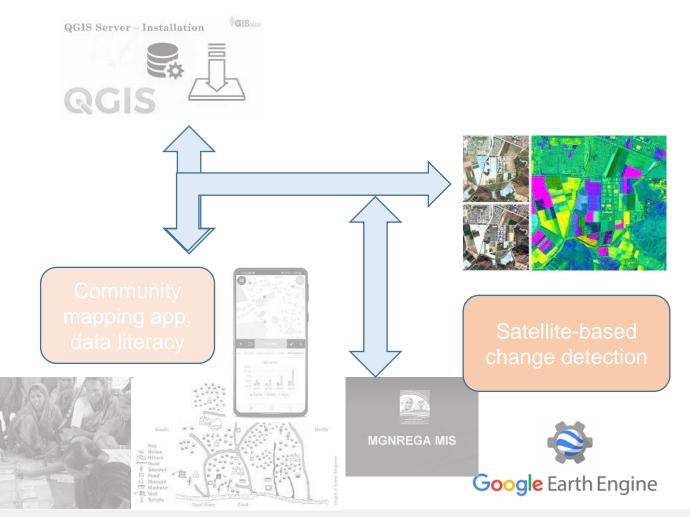
Features:

- Crawl MGNREGA works commissioned. Support from Sahil and Tanmay
- Annotate on smartphone app
- Overlay site-specific layers for works tracking
- Students: Ramita, Sayak
- Supervisor: Ashima

System architecture: Satellite-data based change detection

Prepare village-level and site-specific layers for:

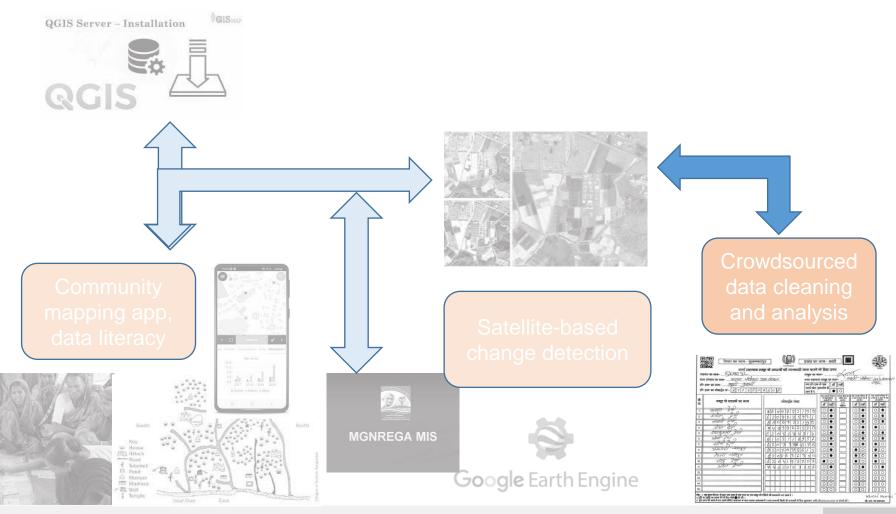
- Forest cover and change detection. Students: Shashwat, Eshan
- Land cover, land use, and change detection.
 Students: Arpit, Rahul, Ananjan
- Illegal mining: Ashish, Shivani
- Others: Soil moisture, carbon sequestration potential, carbon flux, forest type
- Supervisor: TBD



System architecture: Crowd-sourced data cleaning and analysis

Data collection tools:

- OCR, IVR, smartphone apps
- Applied to site-specific works tracking
- Students: Ramita, Sayak
- Supervisor: Ashima



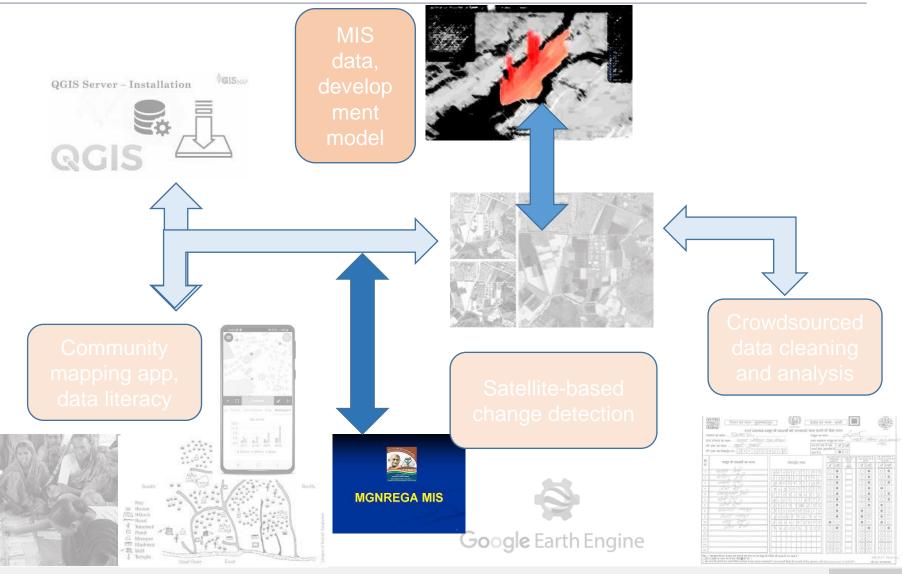
System architecture: Development modeling

Inputs:

- Village-level development layers: Anant, Akshay, Aman, Gaurav
- Village-level scheme expenditure layers: Sahil, Tanmay, Chintan
- District-level amenity layers: Jatin, Deepanshu, Gauray

Prepare models for:

- Industrialization: Saurabh, Gaurav
- Scheme expenditure based on development needs
- Anomaly detection
- Supervisor: Ashima



System architecture: Media influence

Media influence model

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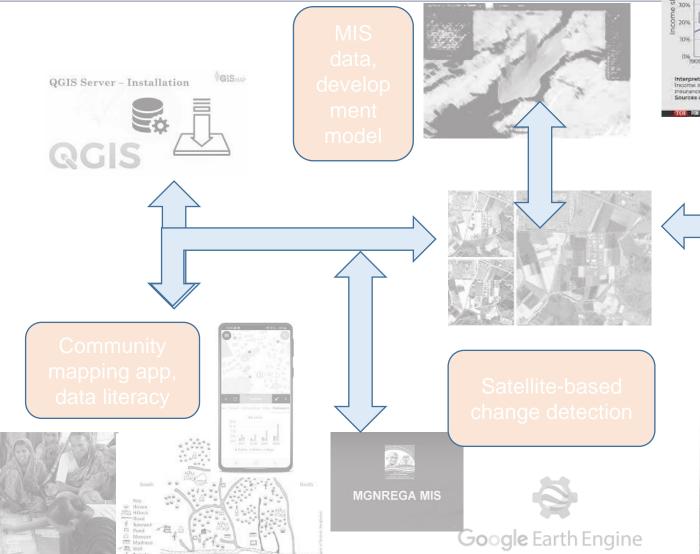
Top 10% and bottom 50% income shares in India, 1900-2021

Inputs:

- District-level development layers: Aman, Gaurav
- District-level scheme expenditure layers: Sahil, Tanmay, Chintan
- District-level media data and newsfeeds: Aadish, Chintan
- State-level media data: Utsav, Diwaker, Chintan

Prepare models for:

- Media influence on scheme expenditure Anomaly detection
- Supervisor: Ashima



Impact tracking and learning

Rights and entitlements

Number of villages mapped, number of vulnerable households identified

Number of grievances and requests registered, followed-up, resolved

Number of advocacy events initiated, outcomes realized, data-driven policy recommendations made

What incentives support volunteers to contribute? Under what conditions does social accountability improve performance? What kind of decisions can development models help with?

Climate change adaptation

Number of villages mapped, number of works demanded, utilization of decision support systems

Monitoring of works commissioned, triangulation through crowd-sourced data, environmental impact

Funds channelled, livelihood created, data-driven policy recommendations made

How can data literacy be created for community involvement in works demand? Fairness notions for works demand? Accuracy of monitoring of works in progress, recommendation of works? Augmentation of remote monitoring through crowdsourced data? Incentives for crowdsourced data?

Commons management

Number of villages mapped, common pool resources identified, utilization of decision support systems

Monitoring of resources, crowd-sourced data to augment, commons lands claimed, environmental impact

Funds channelled, livelihood created, data-driven policy recommendations made

How can data literacy be created for community involvement in commons management? Challenges in making commons claims? Accuracy of monitoring of commons, recommendation of commons? Augmentation of remote monitoring through crowdsourced data? Challenges in coordination for commons management?

Project conceptualization with SPWD, Jharkhand

Climate change adaptation

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Community mapping app, data literacy

an

Ramita, Sayak:

Demographic characteristics of people working at the MGNREGA sites

Regular surveys

Other data about works progress, challenges, wage delays, local corruption Satellite-based change detection

Shashwat, Eshan,

Various land-cover

Rahul, Arpit,

and change-

detection layers

Village-level and

site-specific layers

Ananjan:

Anant, Akshay, Aman, Gaurav:

Village-level and district-level development layers

Disparity

Sahil, Tanmay, Chintan:

MIS-data based layers

Ramita, Sayak:

Mapping of vulnerable groups

Identification of MGNREGA works

Conversion into MGNREGA works layer

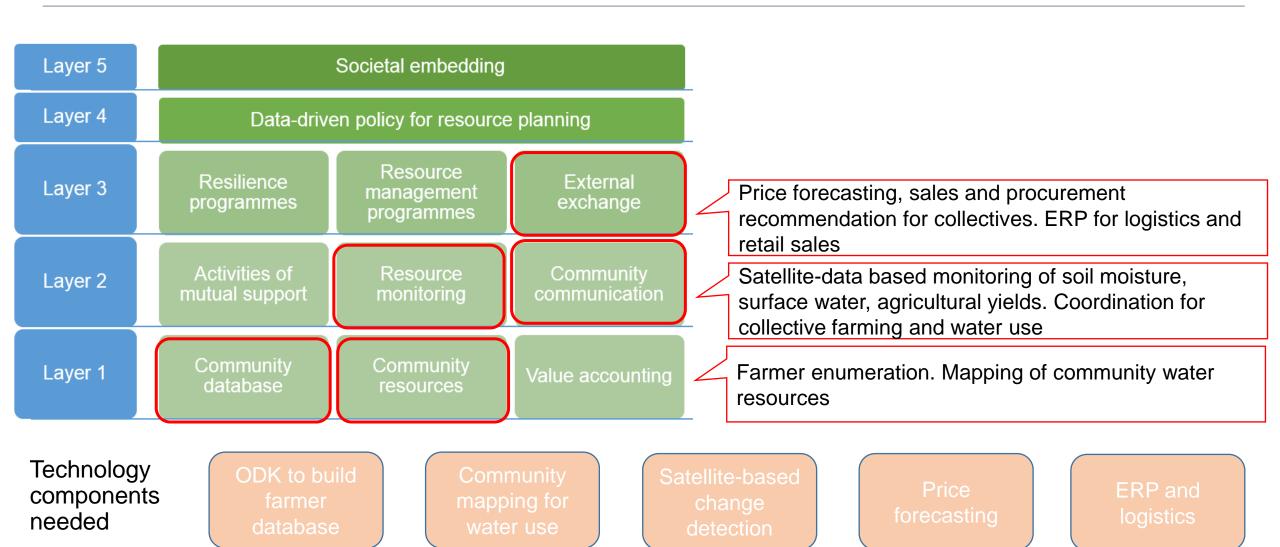
Harsh, Shruti, Sanjali:

Mapping of commons areas

Layering of satellite-data based layers

ile Vaani: Technology. Media. Development

Agriculture CoRE: Strengthening farmer collectives



Project conceptualization with CCD

Strengthening collectives

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Number of farmers mapped, water resources mapped, accuracy of price forecasting, participation in price surveillance



Internal trust and solidarity within collectives, coordination for collective farming



Market surplus secured for collectives, environmental impact of collective farming

Does better price forecasting and sales recommendation help collectives to secure greater market surplus? Challenges in building internal trust and solidarity for collective farming and coordinated use of community resources?

ODK to build farmer database

App for price surveillance, sales

Abdul, Reuben

Satellite-based change detection

Nikita, Jitender, Hari, Ronak, Souray:

Rainfall data layer at the state level

Land-use layer at the block level

Spatio-temporal crop identification and yield estimation model

Price forecasting

ERP an logistic

Aditya, Rishi, Rashul, Ronak, Sourav:

Price forecasting

Prospect theory for risk-reward based recommendation

Nishant:

Publicly available dashboards

TBD

What we hope to achieve over the coming years

- Demonstrate how technology stacks for digital public goods should actually be envisioned
- Highlight why technology stacks need to go beyond just the technology to ensure responsible outcomes
- Learn about challenges in following the commoning approach: Countering entrenched economic rationality, growing amidst a market economy
- Build the commons in a bottom-up manner. Understand value-circuits within the commons, and between the commons and the market