Rethinking Rural Drought Planning

Analytic model to support planning for systemic and multi-year drought in Rural Maharashtra

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TATA CENTER TECHNOLOGY + DESIGN

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Challenge: Rural Drought Planning

Modeling basaltic groundwater recharge and providing diversified long term solutions to drought planning.

- Basaltic fractures and composition are uneven, making groundwater withdrawal and recharge complex.
- Decision making must incorporate many factors, including: current and future demand for water in villages, district government finances, sporadic rainfall and irrigation.
- **How to predict and respond to sustained meteorological, hydrological, and access-related water scarcity in rural India.**

Drought Planning Model

This model supports (1) **district level water scarcity planning** and (2) community management **aquifer planning**.
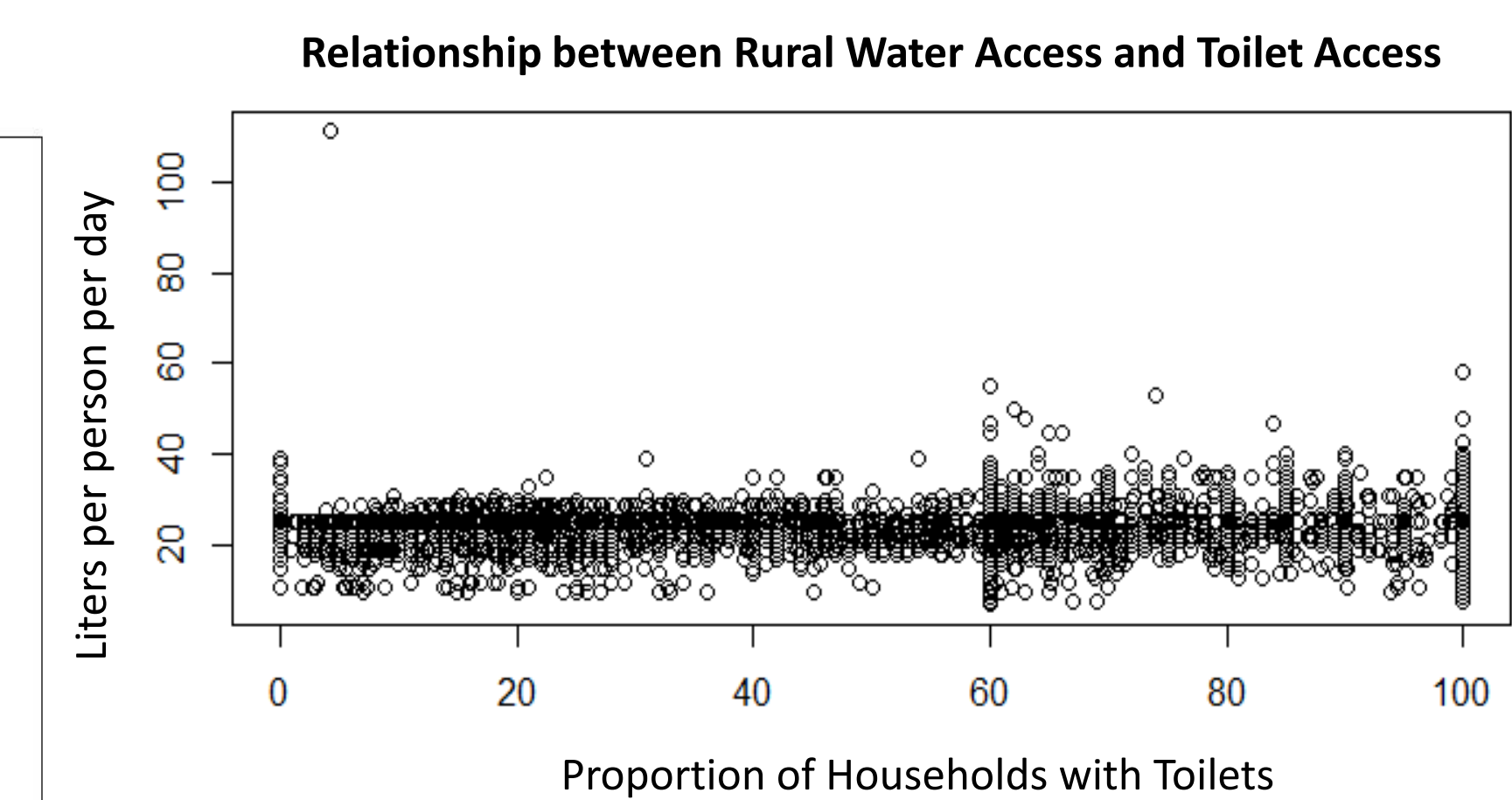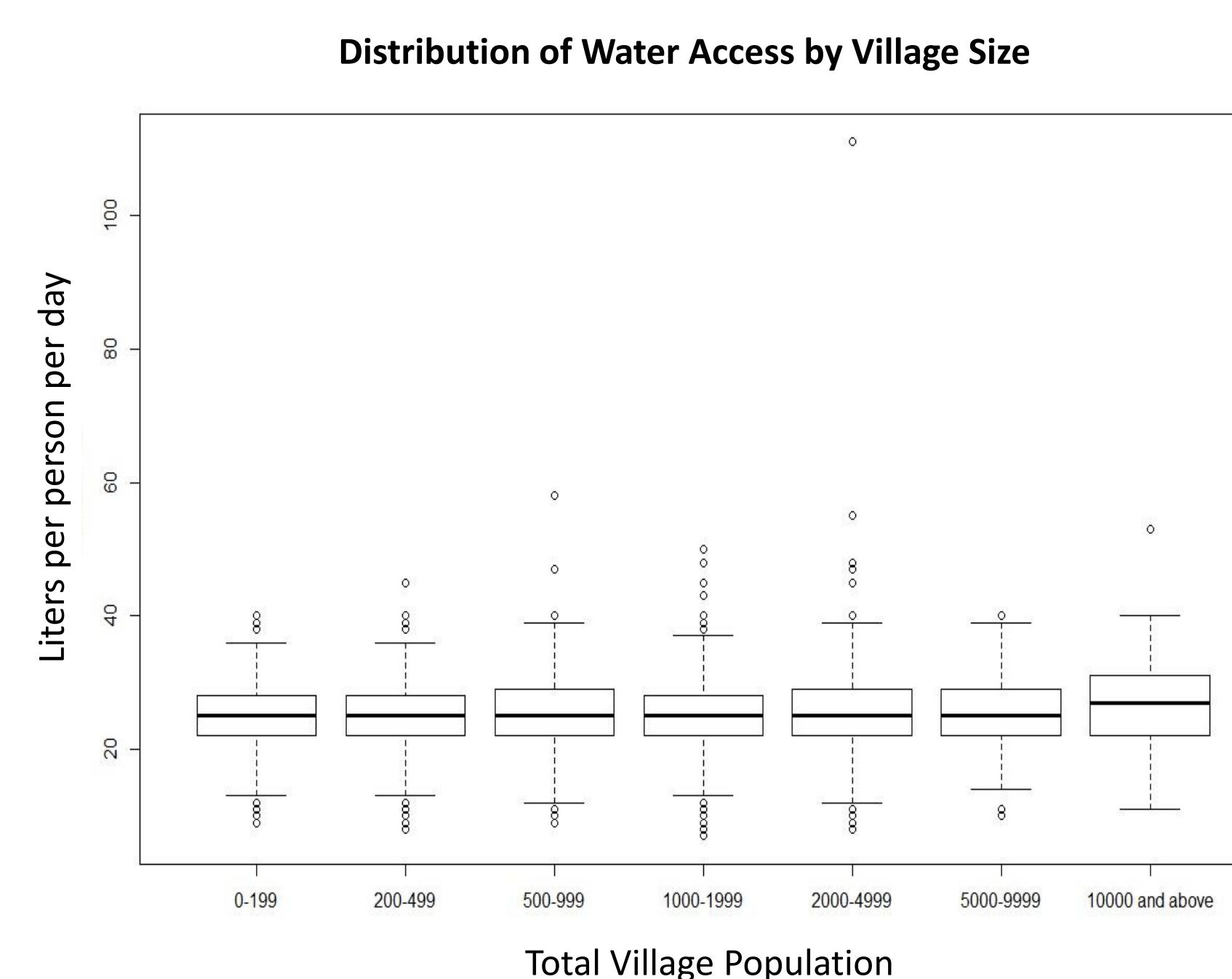
- Monitoring of public well water levels
- Modeling of private tanker market and usage by Taluka with population density
- Classification of water scarcity by type
- New government and community responses to suit water scarcity longevity, intensity and classification
- Over 100 years of historical meteorological data

Applications

- Current research modeled from Aurangabad district, Maharashtra India
- **District officials** can use the model to determine a range of likely water scarcity scenarios for budget and response management.
- **Gram Panchayats** can use the model to assess aquifer water levels, and organize Gram Panchayats with shared groundwater resources to coordinate withdrawals and recharge efforts.
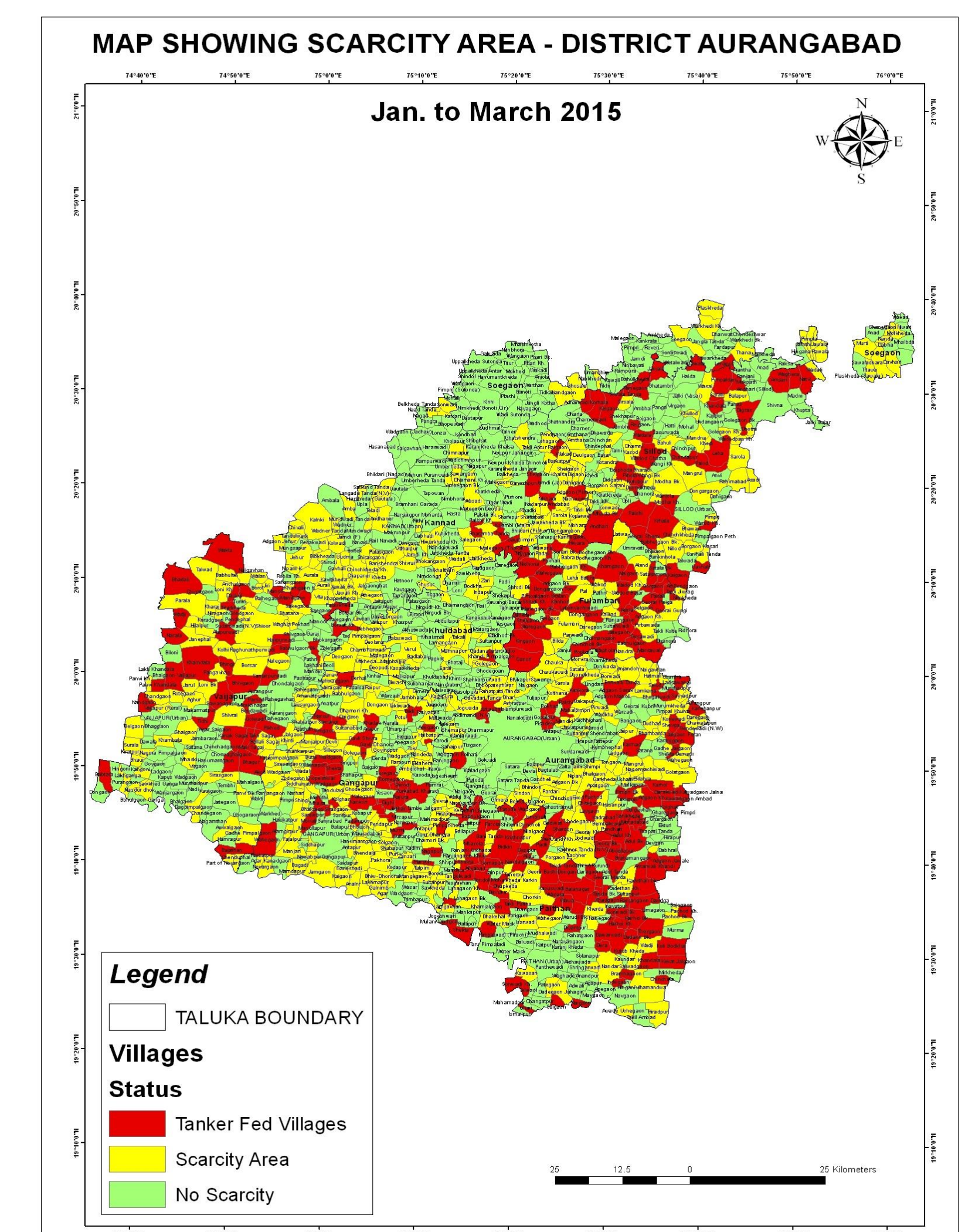
Phase 1: Water Exploitation Assessment

Analysis on the range of current and future water demand, as well as current water distribution scheme attributes as a means to estimate the potential shortfall in water supply.

Distribution of Water Access by Village Size

Relationship between Rural Water Access and Toilet Access

Phase 2: District Level Planning

Incorporating budgeting, current drought responses, and stakeholder feedback into long-term drought and water scarcity planning.

- Mapping of sub-basins, aquifers, public wells, and population density with monthly rainfall patterns
- Redesigning procedures and forms for communities to apply for water scarcity measures

MAP SHOWING SCARCITY AREA - DISTRICT AURANGABAD
Jan. to March 2015

Legend
TALUKA BOUNDARY
Villages
Status
Tanker Fed Villages
Scarcity Area
No Scarcity

Map provided by Groundwater Surveys and Development Agency, Aurangabad, India

Phase 3: Community Aquifer Planning

Cooperative management techniques for communities sharing aquifers.

- Incorporate water budgeting techniques to include private wells
- Design for extreme drought contingency plans *Agency*

Drought Planning: Next Steps

- Select aquifer or sub-basin within Aurangabad district
- Compare statistical inferences and models from District Annual Action Plan drinking water data with federal drinking water data for 2015-2016
- Partition scarcity plans by meteorological, hydrological, and access-related water scarcity in order to diversify classifications and response measures

Implementation Partners

Tata Trusts, Maharashtra State Government, World Bank

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