Using spatial group model building approaches to identify food system challenges in Bihar, India

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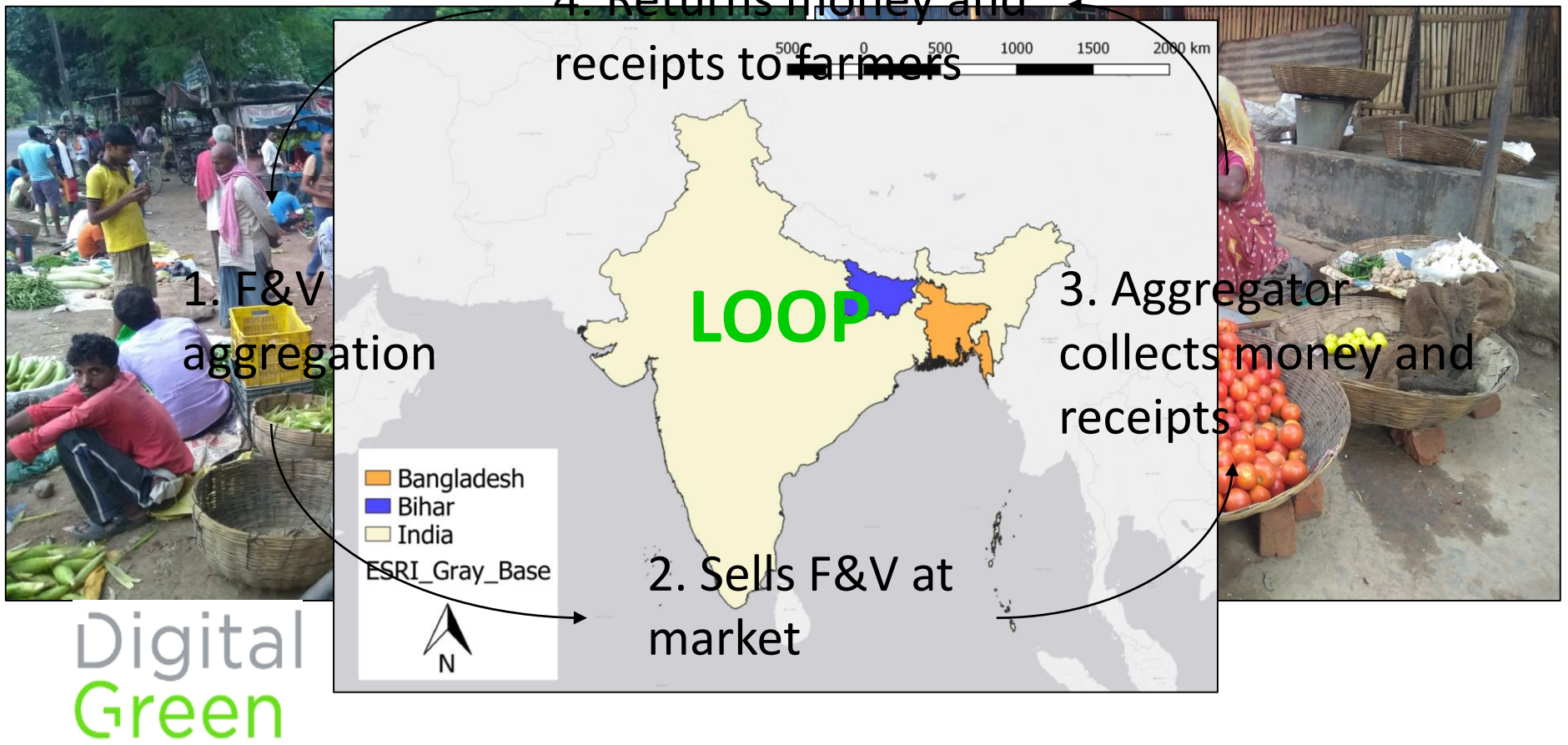
Market Intervention for Nutritional Improvement (MINI)



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Market Intervention for Nutritional Improvement (MINI)

MINI project aim:

Understand the present and potential future implications of the LOOP project for the availability of F&V in nutritionally vulnerable markets in Bihar.

Purpose of group model building:

Learn from the knowledge of stakeholders to help build and test our models of LOOP and the wider horticultural value chain

Spatial group model building

GMB involves stakeholders in model conceptualisation, formulation, analysis, evaluation and decision-making (Mumba *et al.* 2017)

Spatial: Use of the participatory GIS tool 'LayerStack' (Rich *et al.* 2016)

Mumba *et al.* (2017)

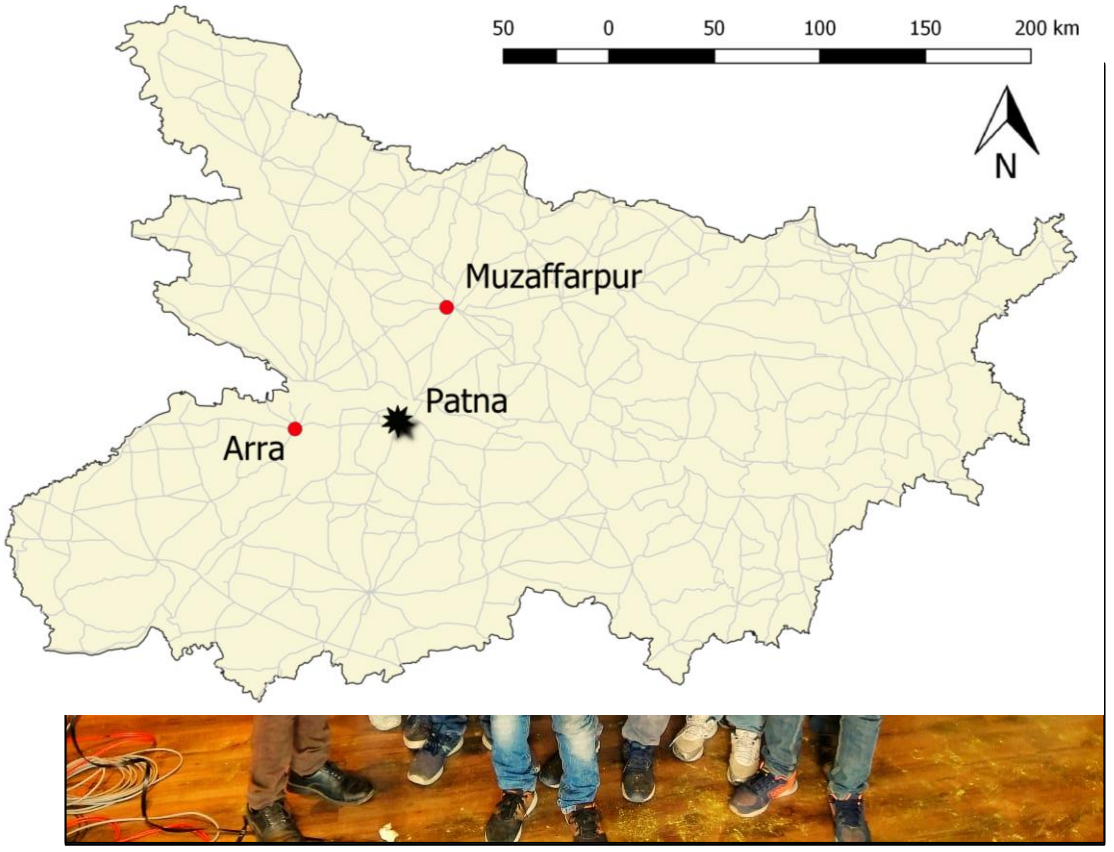
SGMB process in Bihar

Schedule: 5 meetings in both Arra and Muzaffarpur

Each session between **2.5-3 hours** long

Participants: 10-12 value chain actors e.g. 4 farmers, 3 aggregators, 2 retailers, 1 commission agent

Facilitators: 1 x modeller, 1 x facilitator (Hindi), 1 x translator (Hindi → English)



1. Spatiotemporal data

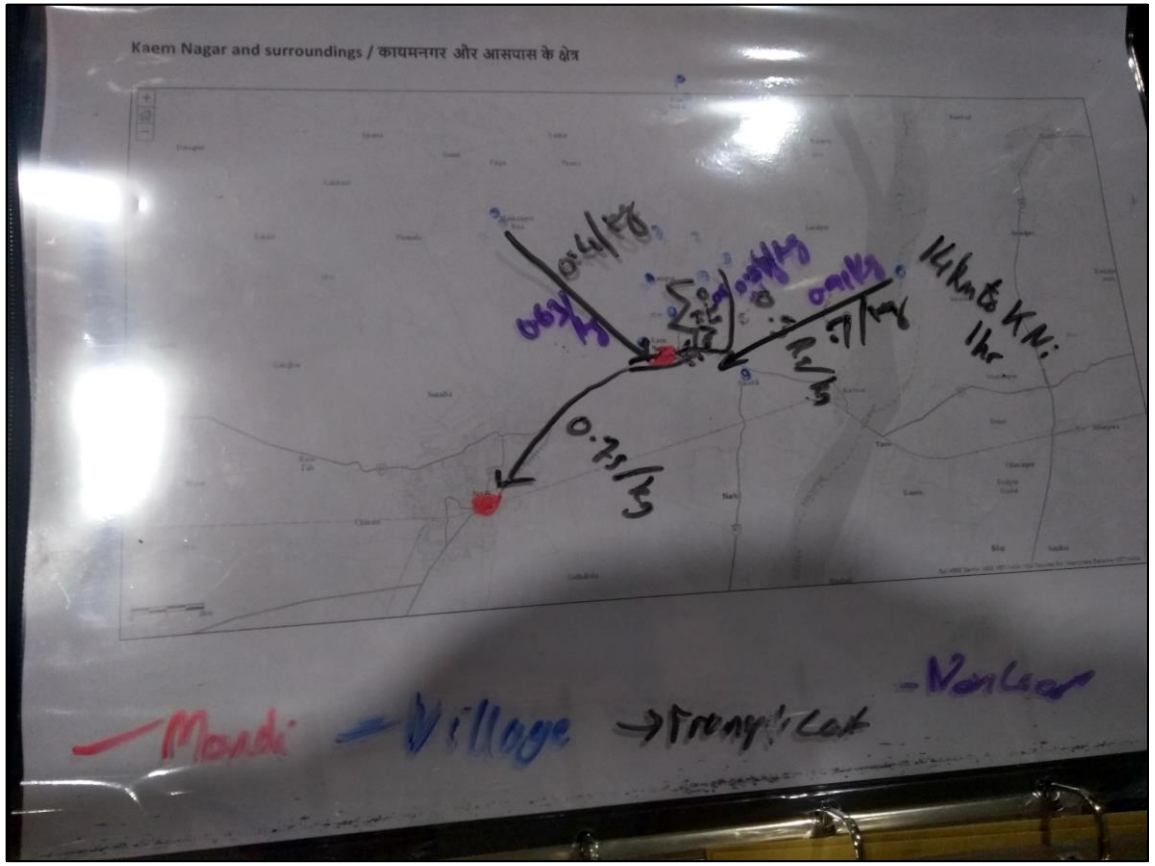
The sessions unlocked spatial data and their associated trends to aid with model parameterisation

Locations of markets and their **infrastructure**

Reference mode for **market supplies** over time

Transport costs (LOOP and non-LOOP)

Input sources and costs



2. Module outlines and quant data

Work with the participants to sketch out model '**modules**' (i.e. sub-models) and quantitative data needed for model parameterisation

Supplies to different **market traders**

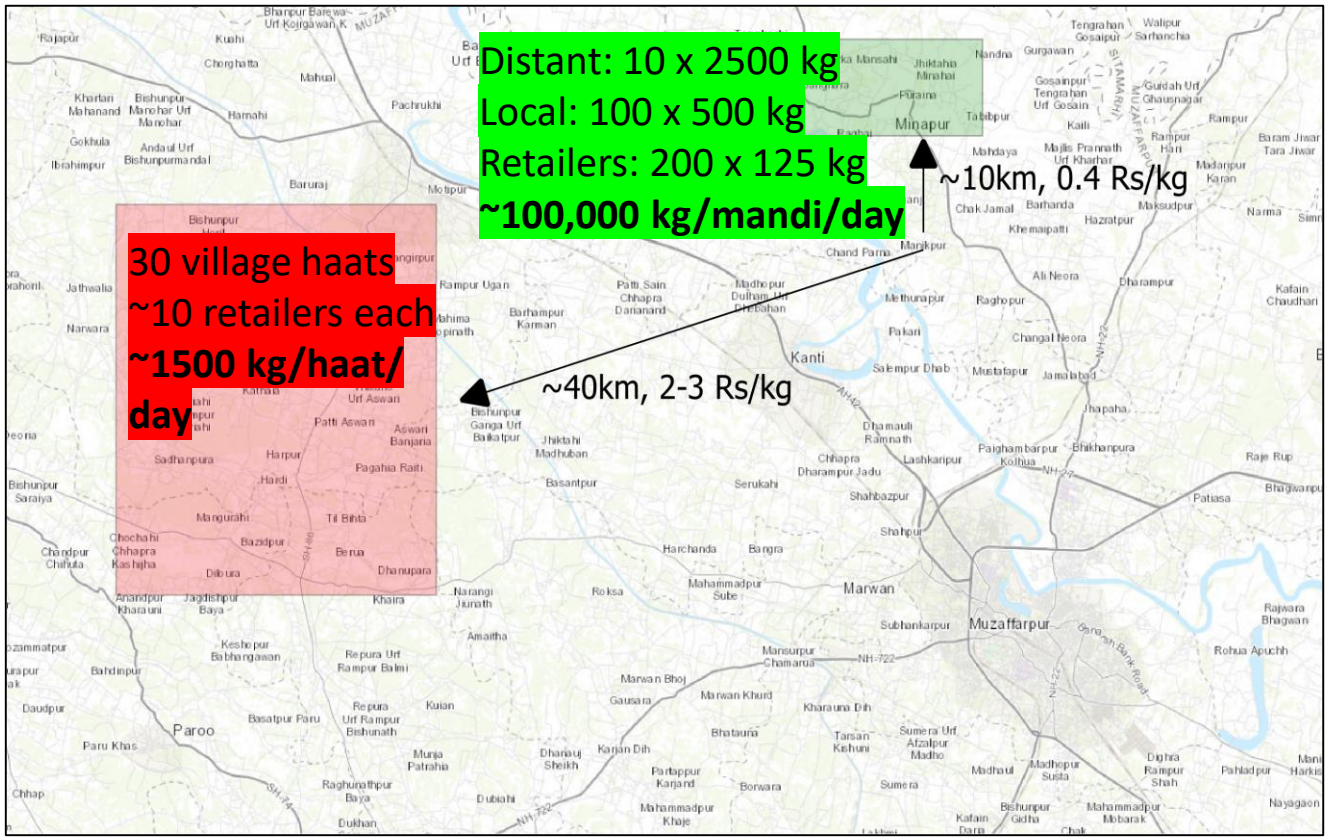
Daily and seasonal **price formation**

Changes in **market capacity** over time

LOOP adoption and disadoption

3. Key supply barriers and scenarios

1. **Transport costs** associated with supplying markets in areas identified as low production zones



2. **Insufficient capacity** of rural markets

3. **Cold storage** on wastage and price stability

4. **Distance traders** from neighbouring states inflate prices in Minapur

Session challenges…

Model evaluation and feedback was a critical step, but would require up to an hour at the start of each session (excluding GMB 1)

Internal power dynamics: participants often deferred to the LOOP aggregator despite the best efforts of the facilitators

Venue readiness! *You can never ask for a HDMI cable too many times*

… and next steps

Continue building SDM in STELLA, combining with survey, value chain and LOOP data

Feedback progress to ‘stakeholder’ and ‘expert reference' groups

Run formal model validation and **future scenarios**!

Summary

SGMB directly involves **stakeholders and decision-makers** in model building and evaluation

Adept at obtaining **time-series and spatial data** that would be difficult to access using traditional methods

Also uncovers location-specific food system **challenges, trade-offs and scenarios** to test with formal model

However, SGMB needs to be **meticulously planned** to overcome practical challenges

Thank you very much for listening!

References

Rich, K., Rich, M. and Dizyee, K. 2018. Participatory systems approaches for urban and peri-urban agriculture planning: The role of system dynamics and spatial group model building. *Agricultural Systems,* vol. 160, pp. 110-123. https://doi.org/10.1016/j.agsy.2016.09.022

Mumba, C., Skjerve, E., Rich, M. et al. 2017. Application of system dynamics and participatory spatial group model building in animal health: A case study of East Coast Fever interventions in Lundazi and Monze districts of Zambia. *PlosOne,* vol. 12, no. 12, p. 21. https://doi.org/10.1371/journal.pone.0189878.