Transforming Agrifood Systems in South Asia

CGIAR

Value stream mapping: food supply chains in India and Bangladesh

Research Note 3, Work Package 3
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BACKGROUND

Working across South Asia, the CGIAR research initiative 'Transforming Agrifood System in South Asia (TAFSSA)' aims to deliver a coordinated program of research and engagement across the food production–to–consumption continuum to support equitable access to sustainable healthy diets, improve farmer livelihoods and resilience, and conserve land, air and groundwater resources. This transdisciplinary research seeks to map the impact of food waste across the different stakeholders in the food supply chains in India and Bangladesh using 'lean thinking' principles. In so doing, a sustainability performance matrix will be developed for encapsulating the economic, social, and environmental indicators as well as key performance indicators (KPIs) for identifying, assessing and benchmarking food waste across the food supply chains. The holistic sustainability performance matrix will help guide industry and policymakers to better understand the external costs of food waste and enable different stakeholders along the value chain to manage food waste more effectively. The new sustainability dimension of mapping the impact of food waste will contribute to both academic knowledge and improving industrial performance.

GOALS

1. To conduct value stream mapping of the food supply chains of three products in India and Bangladesh to measure the sustainability impact of food waste and losses.
2. To provide policy recommendations to achieve sustainable food supply chains.
3. To develop and explore the potential of value stream mapping as a comprehensive and applicable sustainability supply chain assessment tool for development cooperation.

Above: Local food supply in village haats in Dinajpur. Photo credit: Prakashan Veettil

CIMMYT International Maize and Wheat Improvement Center
IFPRI International Food Policy Research Institute
IRRI International Rice Research Institute
IWMI International Water Management Institute
CIP International Potato Center
WorldFish
ILRI International Livestock Research Institute

RESEARCH QUESTIONS

1. How is the local food supply chains in South Asia - Who are the key actors and what are the links from farm to fork?
2. To what extent can value stream mapping reflect and capture the perception of value chain actors on sustainability and multidimensional values?
3. What trade-offs and synergies can be identified along the value chains? How can these be negotiated among value chain stakeholders?

SPECIFIC OBJECTIVES

1. Construct a sustainability performance matrix for encapsulating economic, social and environmental indicators, and KPIs.
2. Map food waste and evaluate its impact across the different stakeholders using the 'lean thinking' value stream mapping method, to develop a new methodological lens for identifying, assessing and benchmarking food waste across the value chain.

3. Create a management toolkit based on the outputs of the sustainability performance matrix tailored to the practical needs of the various stakeholders (farmers, transporter, processors and retailers) along the supply chain.

RESEARCH UNIT AND SAMPLES

Food supply chains consist of actors at five stages along the chain: production, aggregation, processing, distribution and consumption (FAO, 2014). For example, in the tomato value chain, these include suppliers, farmers, traders, processors, distributors and consumers.

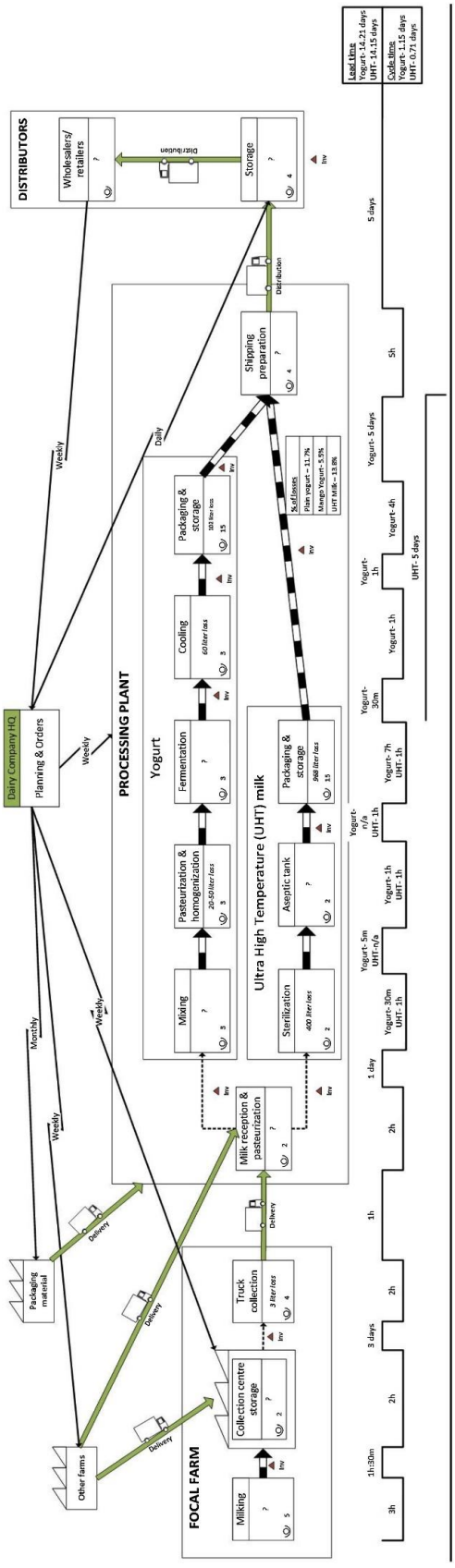

Figure 1: Value stream mapping. Diagram Credit: Manoj Dora

RESEARCH DESIGN

We use a mixed-method approach and a stepwise research design:

Step 1: exploratory phase. Methods include focus group discussions with supply chain actors (farmers, fisherfolk, processors, transporters and retailers) and semi-structured interviews with stakeholders.

Step 2: workshops with value chain actors to score for relevance and to identify and rank the selection of related indicators.

Step 3: quantitative surveys and qualitative semi-structured interviews, conducted with stakeholders.

Step 4: evidence-based assessments of indicators (both primary and secondary data-based) to identify a sustainability matrix.

Step 5: validation workshops to receive feedback on the suggested SHSs and discuss possible solutions and recommendations.

VALUE STREAM MAPPING

Value stream mapping is a methodology used to document, analyse and improve the flow of materials and information. It is a visual representation of the steps, delays and decisions involved in supply chains. The goal of value stream mapping is to identify and eliminate waste, reduce lead time, and improve efficiency. Value stream mapping can be used to assess sustainability in several ways, for example, to:

- Identify and eliminate waste in the process, which can reduce the use of natural resources and energy and minimize pollution and waste.
- Identify opportunities to use sustainable materials such as recycled or renewable resources in the process.
- Identify opportunities to reduce the environmental impact of transportation and logistics in the process.
- Identify opportunities to reduce the carbon footprint of the process, using renewable energy sources or energy-efficient equipment.
- Identify opportunities to engage stakeholders in sustainability efforts.
- Identify opportunities to reduce the environmental impact of end-of-life disposal of products and materials.

Above: A TAFFSA representative meeting with farmers in Nalanda district. Photo credit: Manoj Dora.

- Identify opportunities to reconfigure supply chains which are more sustainable and have a lower environmental impact throughout their lifecycle.

By using value stream mapping to assess sustainability, we can identify specific areas for improvement and develop a plan to make supply chains more sustainable.

In this project, we follow/track food bundles produced by farmers up to the end consumer. For instance, a famer in Nalanda produces multiple food items in a season (*e.g.* potato, cauliflower, tomato, beans) which are then transported to the nearest market or *mandi*. Other actors such as transporters, middlemen and traders are involved in this process. Next, retailers and shopkeepers sell the products to consumers.

Value stream mapping documents waste at each stage and identifies the causes of food waste. The next step is to measure the sustainability impact of food waste in each of the stages.

INDICATORS

Based on the literature review and interaction with stakeholders during the field visit to Nalanda, Bihar we have identified the following sustainability assessment indicators (Table 1) (Ref: Smith, B. G. (2008); Chiffoleau, Y., & Dourian, T. (2020); Kumar, A., Mangla, S. K., & Kumar, P. (2022); Bloemhof, J. M., & Soysal, M. (2017); Zhu et al. (2018); De Steur, et al. (2016), Wesana, et al. (2019)).

ANTICIPATED OUTPUS

Value stream mapping of local food system identifies food wastage, collaboration opportunities for multiple stakeholders involved in the supply chain, improve resilience and introduce better management tools in the food industry. The expected outputs from this work stream are:

1. Value stream mapping and identifying the food wastage in the local food supply chain
2. Management tool kit to introduce sustainable management in the food sector in South Asia
3. Stakeholder engagement on food wastage and tools for sustainable management
4. Scientific publications

Table1. Sustainability assessment indicators

Environmental	Economic	Social
Pesticide usage	Profit margin	Inclusion
Energy usage	Productivity	Gender
Water usage	Connectivity	Bargaining power
Soil management	New investment	Health implication
Food miles	Value addition	Fairness
Recycling	Price difference	Access to resources
Waste and loss	Quality	Participation

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Above: TAFFSA representative visiting farmers to identify sustainability assessment indicators for local food system in Nalanda. Photo Credit: Manoj Dora.

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ABOUT TAFSSA

TAFSSA is a CGIAR regional integrated initiative to support actions that improve equitable access to sustainable healthy diets, improve farmers' livelihoods and resilience, and conserve land, air and water resources in South Asia.

ABOUT CGIAR

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