

# Catalyzing actions to reduce food loss and food waste in Maharashtra

## A SUMMARY OF MULTI-STAKEHOLDER WORKSHOP ON DEVELOPING STRATEGIES THAT SUPPORT INDIA'S TRANSITION TOWARDS SUSTAINABLE FOOD SYSTEMS

August 28, 2023 | Mumbai, Maharashtra | Compiled by: Dr. Nitya Sharma

### BACKGROUND

WRI India, in partnership with Samunnati, conducted an inception workshop on August 28, 2023, in Mumbai, Maharashtra. This workshop marked the initiation of a project aimed at catalyzing systems change and promoting circular food systems in Maharashtra, with a focus on reducing food loss and food waste. By leveraging evidence-based strategies, the workshop aimed to inspire and engage key supply-chain stakeholders to drive transformative change and pilot innovative solutions. Special addresses were delivered by the Food Safety and Standards Authority of India (FSSAI) and the National Bank for Agriculture and Rural Development (NABARD), shedding light on impactful solutions and the role of standardized hotspot identification in combating food loss and food waste.

The workshop brought together 44 diverse supply-chain stakeholders, including government officials, food industry representatives, non-governmental organizations (NGOs), farmers and farmer producer organizations (FPOs), research institutes, and finance specialists (see Participants). The breakout sessions highlighted various ongoing initiatives in Maharashtra, showcasing innovative solutions such as IoT-based monitoring, farm-level processing units, and projects focused on enhancing agricultural resilience and postharvest marketing. Identifying challenges in policy implementation, the workshop underscored the need to redefine roles among supply-chain entities, address policy convergence issues, engage multiple government departments, and overcome limited data availability. Discussions also delved into diverse strategies for measuring food loss and food waste, exploring collaboration opportunities among weather-forecasting organizations, direct and indirect measurement methodologies, surveys, technological applications, and dashboard-based approaches. Key emphasis was placed on optimizing the use of rejected food items, bolstering transport logistics, expanding outreach in food distribution, and streamlining timelines

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*These conference proceedings reflect the presentations and discussions of participants and do not necessarily represent the views of WRI India or other participating institutions.*

from collection to consumption to curtail food waste. Efforts to raise awareness and induce behavioral change were underscored, spanning comprehensive outreach, tailored training modules, fostering FPOs, empowering women's involvement, and educating households and food establishments on efficient food preparation and the judicious sale of surplus food. The sessions emphasized the importance of sustainable solutions such as establishing cold storage facilities, promoting eco-friendly strategies, and leveraging technology to minimize food loss and food waste in Maharashtra's food supply chain.

Essentially, this dialogue provided a robust platform for identifying challenges, exchanging best practices, and brainstorming strategies for transformative change. It encouraged stakeholders to collaborate and take proactive measures toward mitigating food loss and food waste in Maharashtra. In addition, a call for action was made to establish a regional coalition of supply-chain actors to further drive efforts to reduce food loss and food waste in Maharashtra.

The workshop began with a welcome note from Madhav Pai, CEO, WRI India, who underscored the role of policies in addressing postharvest losses and food waste for global food security. Ruchika Singh, Executive Director, Food Land and Water, WRI India, set the meeting's context by stressing the necessity for research-based solutions and cross-sector collaboration to combat the pressing issues of food loss and food waste. Sridhar Easwaran, Head, Samunnati Foundation, highlighted the significance of standardized hotspot identification to fortify strategies aimed at reducing food loss and food waste. Following this, Shweta Lamba, Program Manager, Food Land and Water, WRI India, laid the groundwork for the workshop by presenting the project's context. This presentation highlighted the difference between food loss and food waste (Figure A-1 in Appendix A) and emphasized the critical importance of tackling food loss and food waste, outlining its global impact and its alignment with Sustainable Development Goals (SDGs) 12.3 goals. It was noted that globally, approximately one-third of all food produced is lost or wasted, resulting in staggering economic losses amounting annually to US\$1 trillion (₹1 lakh crore). In India, the context was further explored, revealing alarming figures such as an annual economic loss of ₹1,52,790 crore (US\$ 18.5 billion) from postharvest losses and the annual waste of ₹5,200 crore worth of food in urban areas alone. The rationale behind selecting Madhya Pradesh and Maharashtra for the study was elaborated, based on their potential to significantly reduce food losses given their substantial scale of production and the livelihood implications across diverse crop categories — including cereals, fruits, vegetables, oilseeds, and pulses. This presentation aimed to underscore the pressing need to reduce food loss and food waste while strategically examining specific challenges within the food supply chains of these selected states.

The special addresses further enriched the discussion, and Pritee Chaudhary, Regional Director, FSSAI, highlighted key issues contributing to food waste. Innovative solutions, such as mobile storage structures and food ATMs, have been suggested as potential solutions to address the issue of food waste. Furthermore, raising awareness about food-waste reduction in institutions such as schools and promoting food ordering according to appetite rather than social status were emphasized. Developing apps to reduce food waste and facilitate donations to food banks was identified as another effective solution. Additionally, CSR Murthy, Chief General Manager, Farm Sector Development Department, NABARD, elaborated on the evolution of cold storage infrastructure across India and the necessity of value addition to attract investment. Policy gaps in onion management in Maharashtra were noted, along with efforts to identify commodity loss hotspots using mapping techniques. Initiatives such as the Agricultural Infrastructure Fund were highlighted, emphasizing the importance of capacity building in agro-storage. Suggestions included the revival of packhouses as multi-service centers and the development of mobile applications for agricultural produce. These dialogues collectively offered a multifaceted perspective encompassing collaborative efforts, technological innovations, and policy considerations that are vital in addressing the complexities of food loss and food waste.

## KEY DISCUSSION POINTS

### Session 1: To map existing and ongoing work on reducing food loss and food waste in Maharashtra

This session began with the formation of two breakout groups, “Food Loss” and “Food Waste,” aimed at categorizing participating stakeholders according to their involvement in past and ongoing initiatives to reduce food loss and food waste in India, particularly in Maharashtra. The session focused on delineating essential parameters such as supply-chain stages (producers to consumers), specifying project names, designating target geographies or districts, selecting a specific crop or commodity, identifying key stakeholders, and establishing well-defined implementation timelines.

Following the session, representatives from both breakout groups summarized their findings for all participants. The insights highlighted past and ongoing initiatives aimed at reducing food loss and food waste in Maharashtra (see Appendix B).

### Session 2: Breakout group discussions on Target-Measure-Act

The session began by organizing participants into three breakout groups, “Target,” “Measure,” and “Act,” based on their respective areas of expertise or work focus. This aligns with the target-measure-act approach, which offers a structured framework crucial to combating food loss and food waste within supply chains. By setting specific targets, stakeholders can effectively reduce losses and waste. Through accurate measurement and monitoring, this approach enables stakeholders to identify areas of concern and track their progress. Finally, proactive action based on measured data ensures that interventions are targeted and impactful, thereby fostering a more sustainable and efficient food system. Guided by a series of predetermined questions distributed beforehand, each group engaged in focused discussions facilitated by the moderators (see Appendix C). The primary objective was to gain insight into the challenges, opportunities, strategies, and considerations essential for addressing the complex issues of food loss and food waste in Maharashtra’s food supply chain. Following the session, representatives from all breakout groups summarized their findings for all participants.

#### Breakout group 1: Target

The group discussed the landscape of opportunities and barriers inherent in the implementation of policies and incentives to reduce food loss and food waste. The key recommendations and challenges that emerged from this discussion are summarized below.

- **Redefining roles and responsibilities.** The group emphasized the need to redefine the roles and responsibilities of various entities within the food supply chain. However, the participants highlighted redefining as significantly challenging and requiring a meticulous approach to effectively address the issues of food loss and food waste.
- **Policy convergence.** The group also highlighted the impediments arising from policy convergence and the alignment of diverse regulations governing the supply chain. The complexities of synchronizing different policies pose an obstacle to reducing food loss and food waste.
- **Initiatives.** Various agricultural initiatives have been implemented to enhance farming practices and support to farmers and farmer groups across different regions to reduce postharvest losses. These initiatives include the implementation of grading systems, cluster modeling, and training programs, aimed at improving agricultural techniques, knowledge, and food loss.
  - Specific schemes such as the Nav Tejaswini Yojana supported by Mahila Arthik Vikas Mahamandal (MAVIM) provide essential support to rural and tribal women farmers, imparting skills to ensure their productivity by providing market and policy support. Targeted efforts such as “Mission Jackfruit” in Meghalaya aim to reduce crop losses and promote specific crop cultivation, contributing to economic

- growth and community resilience. Collaborative projects, such as the Project on Climate Resilient Agriculture (POCRA) in Maharashtra conducted with the World Bank, enhance agricultural resilience and sustainability, benefiting farmers and enhancing postharvest management techniques, thereby strengthening the agricultural sector as a whole.
- Projects such as the Maharashtra Agribusiness Network (MAGNET) project funded by the Asian Development Bank (ADB) address postharvest losses by improving postharvest marketing networks and value, focusing on horticultural crops, while the PM Formalization of Micro-food Processing Enterprises (PMFME) scheme provides subsidies to micro-processing enterprises, improving market access. These initiatives aim to enhance efficiency, reduce waste, and promote growth in the agricultural and food-processing industries.
- **Stakeholder engagement.** Engaging a wide range of stakeholders from multiple government departments, such as the Ministry of Consumer Affairs, Ministry of Agriculture, Ministry of Housing Societies, and the Food and Civil Supply Department, emerged as vital. However, the group agreed that engagement generated various communication and coordination challenges.
- **Lack of data.** The group also identified constraints posed by limited data availability and tracking challenges in effectively addressing food waste in supply chains.

### Breakout group 2: Measure

This discussion focused on exploring various approaches and methodologies for effectively measuring and monitoring food loss and food waste. The key insights and strategies identified were as follows:

- **Collaboration for data leveraging.** Participants highlighted the potential for collaboration among weather-forecasting organizations, insurance companies, and government agencies. Leveraging data on production losses could enable early interventions, effectively reducing food loss and food waste.
- **Direct and indirect measurement methods.** Direct measurement methods in the field can provide high-quality data. However, these methods are expensive and time sensitive. Consequently, the group emphasized that indirect indicators such as productivity, income, and production can be used to gain insights into food losses.
- **Leveraging urban farmers' markets.** The discussion acknowledged the importance of urban farmers' weekly markets in Maharashtra as valuable platforms for assessing food losses by directly engaging with farmers.
- **Innovative technologies.** The group emphasized the role of innovative technologies, including real-time sensors, in assessing quality changes and storage losses. Traders and intermediaries within well-established food supply chains were recognized as potential data sources.
- **Surveys and applications.** Organizations employ various methods, including food-waste surveys by universities and college student volunteers (e.g., food soldiers). The discussion also highlighted that a dashboard/application-based method can be used to regularly assess food waste at different stages.

### Breakout group 3: Act

This discussion focused on outlining actionable strategies to reduce food loss and food waste, particularly in Maharashtra. The participants deliberated on strategies targeting improvements in handling, storage, transportation, awareness generation, and behavioral changes among stakeholders involved in the food supply chain. The key recommendations and insights were as follows:

### ■ Improving handling, storage, and logistics facilities across the supply chains

- The group emphasized the importance of effectively grading and marketing rejected or lower-grade foods. Strategies to share underutilized storage space and prevent distress selling were also highlighted.
- The group acknowledged the significance of coordinating with relevant stakeholders (such as traffic police) for the transportation of perishable foods, ensuring a more efficient and timely supply chain.
- The group also emphasized expanding food distribution outreach, particularly by collecting surplus food from hotels and event caterers for distribution among those in need. This effort should be streamlined to minimize the time lapse between collection, distribution, and consumption, while ensuring suitability based on specific dietary requirements.

### ■ Creating awareness and behavioral change

- The group stressed the criticality of raising awareness through comprehensive outreach and educational campaigns, especially by using customized training modules designed for diverse food supply chain stakeholders in local languages.
- The group also highlighted the role of FPOs in efficiently aggregating commodities, reducing losses, and promoting the increased participation of women in decision-making at both production and marketing levels.
- The discussion emphasized that educating canteens, households, and caterers on demand-based food preparation systems, while also promoting the sale of surplus food at discounted prices by food producers, can help induce behavioral changes.

## CONCLUSION AND CLOSING REMARKS

In summary, the workshop emphasized the urgent need to tackle food loss and food waste through a multi-faceted approach encompassing robust policies, innovative technologies, empowerment of farmers, governmental support, and awareness campaigns. Collaborative engagement among stakeholders emerged as pivotal in achieving these goals, laying the foundation for a sustainable food supply chain in Maharashtra.

In addition, insights into the existing Friends of Champions 12.3 India network were introduced. A call was extended to organizations committed to reducing food loss and food waste in Maharashtra to join this collective initiative and foster a similar regional coalition of supply chain actors. The event concluded with a vote of thanks from WRI India and Samunnati, incorporating key inputs gathered from discussions to catalyze the project activities.

### Looking ahead, the following key action points have been identified:

- Outcomes, including suggested interventions and their prioritization, are to be reviewed by the study team. These insights can be used to shape the final report by integrating the identified interventions into a comprehensive framework.
- WRI India to follow up with the stakeholders who expressed their interest in joining the regional chapter of the Friends of Champion 12.3 India network for formal enrolment in the regional network.

**FIGURE 1 | Participants in the multi-stakeholder workshop on catalyzing actions to reduce food loss and food waste in Maharashtra**



*Picture credits: Kritika Gadhvi/WRI India.*

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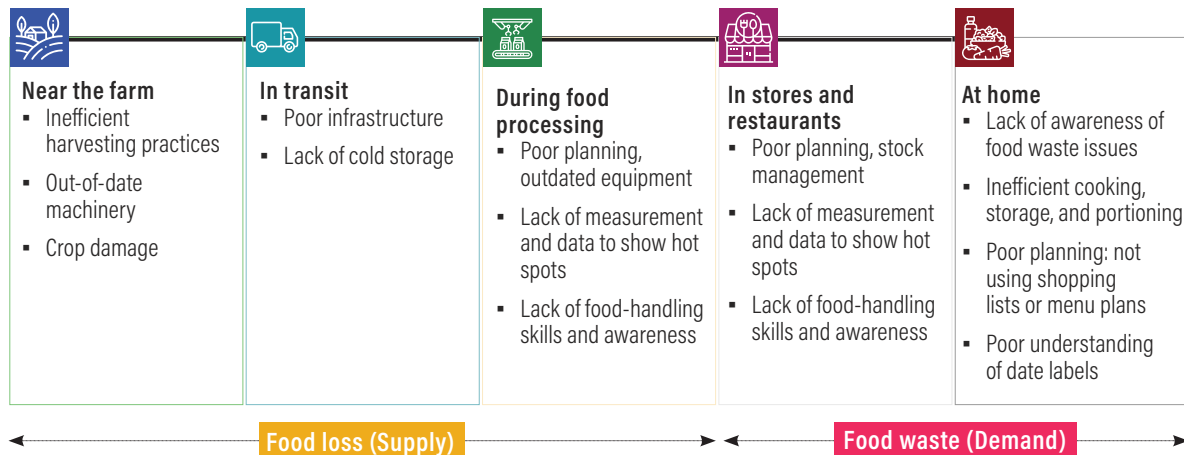
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## APPENDIX A

FIGURE A-1



## APPENDIX B. STOCK TAKING SESSION: DIFFERENT INITIATIVES MATRIX

The content in the table is derived directly from the work and projects outlined by the stakeholders of the respective organizations. It is not influenced by data from secondary sources or biases, thus ensuring accuracy and alignment with the initiatives undertaken by the stakeholders.

**TABLE B-1**

Name of Project/ Entity/ schemes	Supply chain stage	Target geography	Crop or commodity	Work undertaken	Key stakeholders	Time-line
<b>Food loss</b>						
Godaam Innovations Pvt Ltd.	Storage	Nashik	Onions	Innovative IoT solutions for real-time monitoring of onion quality, facilitating timely alerts to reduce postharvest losses.	Farmers	2019 – cont
Watershed Organization Trust	Farm	Ahmednagar		Working with farmers to understand postharvest losses and providing training to farmers to reduce it.	Farmers	
Reliance Foundation	Farm	Yavatmal, Prabhani, Nanded	Onions	Implemented Broad Bed and Furrow technique on 50 acres, utilizing photographic evidence to tackle losses in food production. Emphasizing plant nutrition, soil health, and supplementary irrigation for comprehensive cultivation stage resilience. Collaborated with 15 FPOs in Maharashtra and provided advisory services using technology.	Farmers, FPOs	2019 – cont
Intellectap	Farm, processing	Ahmednagar	Tomatoes	Project focused on processing infrastructure. A gap in farmers' processing skills was identified as a major challenge.	Farmers, FPOs	



Gramonnati Trust	Processing	Nizamabad, J&K	Exotic fruits and vegetables	Actively promoting agriculture and employment in Jammu and Kashmir, emphasizing exotic fruit cultivation and solar dehydration in Nizamabad, Telangana. Seventy percent of their workforce are women. Future plans include targeting grape and onion cultivation in Nashik.	Processors, women	
Tata Trusts	Farm		Pulses and cotton	Implemented the Central Lakhpati Kisan Scheme, which benefits tribal farmers with half an acre of land (1 lakh 15 thousand households).	Farmers	
Indian Pulses and Grains Association	Storage, procurement, market/distribution	Akola, Latur, and Nagpur	Pulses and grains	Imports pulses and grains. Utilize cluster-based modeling across India to optimize its operations.	FPOs	
Swayam Shikshan Prayog	Farm		Pulses	Membership of 3 lakh and associated with 6 Farmer Producer Organizations (FPOs). These FPOs mainly focus on pulses and organic cultivation, with around 5000 women being trained in these practices. The majority of the 1 lakh 35 thousand farmers associated with them are marginal farmers.	FPOs	
Mahila Arthik Vikas		Nashik	Tomatoes and onions	Combating food waste, they promote efficient management practices, conduct awareness programs, and have studied food wastage. Their findings revealed average vegetable wastage of ₹500 – ₹1000 per household, per annum.  The discussion also touched upon the Nav Tejaswini Yojana, focused on empowering and providing employment to women. The scheme supports skill training for women through allocated lump-sum amounts to Self-Help Groups (SHGs).	Women	
CRISIL	Farm	Latur, Solapur, Osmanabad	Soyabeans and onions	Advocates for FPO-based grading systems with a special emphasis on women-led FPOs.	FPOs	
MAGNET Project (ADB)	Market		Multiple perishable crops	Focuses on addressing postharvest losses by enhancing the postharvest marketing network and value for horticulture crops. This initiative serves as a front-end subsidy for beneficiaries.	FPOs	2021–27

Food waste						
Bee The Change	Distribution	Bengaluru	Surplus food	Discussed their development of apps aimed at tracking food waste, illustrated with the example of Hotel Lalit, which employs standees to raise awareness about food waste.	Food business communities	2023-cont
Robin Hood Army	Distribution	Maharashtra	Surplus food	Reutilizes excess food by collecting leftovers from hotels and events and distributing them to those in need. However, this volunteer-based approach faces challenges regarding distribution timings and restrictions imposed by food security regulations.	HORECA, other food business communities	2014-cont

## APPENDIX C. QUESTIONS FOR DISCUSSION

### Thematic group 1: Target

1. What are the current government initiatives, such as policies and incentives, to reduce food loss and food waste in Maharashtra? What are some of the private sector and civil society organization initiatives to reduce food loss and food waste in Maharashtra?
2. What opportunities exist for the introduction of initiatives aimed at reducing food loss and food waste, and how can these initiatives be effectively integrated into existing efforts by the government, private sector, and civil society organizations?
3. What are the barriers to implementing initiatives to reduce food loss and food waste at different stages of the food supply chain from farm to plate?
  - a. How does climate change affect initiatives to reduce food loss and food waste?
4. How can different stakeholders (e.g., private, government, CSOs, and FPOs) play a key role in reducing food loss and food waste?
  - a. What enabling conditions are necessary for these stakeholders, especially FPOs, CSOs, and the private sector, to support them in championing the reduction of food loss and food waste?
5. What are the key levers (e.g., policy, finance, capacity, and knowledge) that can enable systems change?

### Thematic group 2: Measure

1. Are you aware of the methods used to track and measure food loss and food waste? If so, could you elaborate on your current practices? What approaches have proven effective, and conversely, which have presented challenges or limitations?
2. Do you measure any of the SDG indicators in your work? If so, which ones and what are you learning?
3. What are the key geographical hotspots and critical loss points (stagewise) across the major food supply chains in Maharashtra? What data are used to identify these hotspots?
4. How have you tried to measure the economic, social, and environmental impacts of food loss and food waste? What did you learn?
  - a. If you do not measure these indicators, do you use existing data to inform your decisions? What are the sources of these data?

- b. How can we capture the impact of food loss and food waste on vulnerable groups (women, children, and the poor)? Have you tried to measure the impact of food loss and food waste on these vulnerable groups? What did you learn?
5. Which climate change indicators should be measured?
  - a. How can the impact of climate change on food loss and food waste be measured? What do you measure (e.g., postharvest losses)?
  - b. How can the impact of food loss and food waste on climate change be measured? Do you measure emissions? What do you measure (e.g., methane, and carbon)?

### Thematic group 3: Act

1. What innovative solutions or strategies would be effective in reducing food loss and food waste?
2. What are the key pressure points and levers you consider when developing strategies to reduce food loss and food waste?
3. How are you addressing social equity and inclusion in your efforts to reduce food loss and food waste?
4. How can stakeholders effectively build their capacities to implement food-loss and food-waste reduction practices?
5. What kind of policy support can enable action and at what stage of the supply chain?
6. What strategies can be employed to raise awareness about the environmental, economic, and social implications of food waste and inspire behavioral change?

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## ACKNOWLEDGMENTS

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## FOR MORE INFORMATION

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## ABOUT WRI INDIA

WRI India, an independent charity legally registered as the India Resources Trust, provides objective information and practical proposals to foster environmentally sound and socially equitable development. Our work focuses on building sustainable and liveable cities and working towards a low-carbon economy. Through research, analysis, and recommendations, WRI India puts ideas into action to build transformative solutions to protect the earth, promote livelihoods, and enhance human well-being. We are inspired by and associated with World Resources Institute (WRI), a global research organization. Know more: [www.wri-india.org](http://www.wri-india.org)



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