

Catalyzing actions to reduce food loss and food waste in Madhya Pradesh

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

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BACKGROUND

WRI India, in partnership with Samunnati, conducted an inception workshop on September 22, 2023 in Bhopal, Madhya Pradesh. This workshop marked the initiation of a project aimed at catalyzing a system change and promoting circular food systems in Madhya Pradesh, 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.

A panel comprising representatives from the Food Safety and Standards Authority of India (FSSAI), the Indian Council of Agricultural Research – Central Institute of Agricultural Engineering (ICAR-CIAE), the Mandi Board, the Environmental Planning and Coordination Organisation (EPCO), and the National Bank for Agriculture and Rural Development (NABARD) discussed the challenges and potential solutions for addressing food loss and food waste in Madhya Pradesh. Moderated by Mr. R. Parasuram, former CS, GOMP, the panel discussion highlighted the importance of collaborative efforts spanning multiple sectors, innovative approaches to logistics and processing, and significant shifts in ethical and consumer behavior to address the problems of food loss and food waste. The discussions further acknowledged the critical data gaps at the state and district levels and stressed the importance of local initiatives to foster a comprehensive understanding and tackle food loss effectively.

The workshop brought together 45 diverse supply chain stakeholders including state government officials, farmers, and representatives from the Hotel, Restaurant and Catering (HoReCa) sector, implementation organizations, farmer producer organizations (FPOs), and research organizations for a breakout session. The “target” group focused on policy formulation, explored innovative transportation solutions and advancements in cold chain efficiency while identifying the need for an inclusive approach

CONTENTS

- 1 Background
- 2 Key discussion points
- 6 Conclusion and closing remarks
- 7 Participants
- 7 Appendix A
- 8 Appendix B
- 10 Acknowledgements
- 10 For more information
- 11 About WRI India

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to support small-scale farmers and sustainable practices across the supply chain. The “measure” group concentrated on measuring food loss and food waste and discussing methodologies, such as production loss assessments, mechanization, and value chain analysis. The group emphasized the importance of digital tools and collaborative efforts in capturing precise data for effective measurement strategies. The “act” group centered on implementing solutions to mitigate food loss and food waste, emphasizing optimized harvesting practices, advanced preservation technologies, and improved mandi operations. The group highlighted the critical role of FPOs in adopting technological solutions and advocated tailored approaches for specific crops alongside broader applications of innovative storage and transportation technologies.

Essentially, this dialogue provided a robust platform for identifying challenges, exchanging best practices, and brainstorming strategies for transformative change, thereby encouraging stakeholders to collaborate and take proactive measures to mitigate food loss and food waste in Madhya Pradesh. 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 Madhya Pradesh.

The workshop began with a welcome note from Ritoja Basu, Program Head, Food, Land, and Water, WRI India, and Nihar Priyadarshi, Lead, Samunnati Foundation. Following this, Shweta Lamba, Program Manager, Food, Land, and Water, WRI India, laid the groundwork for the workshop by presenting the project context. This presentation highlighted the difference between food loss and food waste (see figure 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 Goal (SDG) Target 12.3 by 2030 which calls for halving per capita food waste at the retail and consumer level while also reducing losses along food production and supply chains, including postharvest losses, by 2030. Globally, it was noted that approximately one-third of all food produced is lost or wasted, resulting in staggering economic losses amounting to US\$ 1 trillion (₹1 lakh crore) annually. 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 an 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.

KEY DISCUSSION POINTS

Session 1: Panel discussion

The panel discussion offered an overview of the challenges and potential solutions for addressing food loss and food waste in Madhya Pradesh. Panelists from diverse backgrounds contributed their perspectives, emphasizing the need for collaborative efforts across sectors, innovative logistics and processing solutions, and the importance of ethical and behavioral changes. The discussion highlighted significant gaps in data, particularly at the state and district levels, highlighting the need for further research to inform targeted interventions. Key issues discussed included challenges in food transportation and storage, and acknowledging the necessity for better transport methods and improved storage facilities. Climate-controlled infrastructure and the establishment of specialized food processing units were identified as essential measures for reducing postharvest losses. For example, the issue of coriander leaves spoiling due to inadequate temperature control during transport in Madhya Pradesh was cited, highlighting a critical gap in the supply chain. The panel also discussed a strategic shift in handling crops such as soybeans, moving from focusing solely on oil extraction to utilizing all parts of the harvest. This includes leveraging byproducts such as de-oiled cake for animal feed, human consumption, and even cosmetics and medicinal products, demonstrating a shift toward more sustainable and inclusive practices in reducing food losses.

Practices from the hotel industry, such as using smaller plates to reduce excessive food intake, were identified as practical interventions to address food waste at the consumer level. The discussion recognized food waste as an issue that extends beyond economic and environmental concerns to include ethical considerations, suggesting that integrating behavioral changes and ethical considerations could significantly impact mitigation efforts. Additionally, regulatory challenges in promoting food donation schemes were discussed, highlighting the complexities of creating a supportive environment for reducing food waste. The importance of local-level initiatives, particularly in smaller towns and communities, where awareness and resources may be limited, was acknowledged as an area for improvement. In conclusion, the panel highlighted the need for concerted efforts involving government, industry, and community stakeholders to effectively address food loss and food waste, emphasizing that this collaborative approach is key to understanding the problem and finding actionable solutions.

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 B). The primary objective was to gain insights into the challenges, opportunities, strategies, and considerations essential for addressing the complex issues of food loss and food waste in Madhya Pradesh’s food supply chain. Following the sessions, representatives from all the breakout groups summarized their findings for all the participants.

Breakout group 1: Target

The breakout group was convened to delve into the formulation of policies addressing food loss and food waste at various stages of the supply chain.

- **Stakeholder perspectives and policy importance.** The group members, including representatives from FSSAI, National Coalition for Natural Farming (NCNF), and the Mandi Board, discussed the critical role of policies in reducing food loss and food waste. FSSAI collaborates with state governments and industries to leverage surplus donated food, while NCNF actively pursues natural agriculture methods to target a 15% reduction in food loss. The Mandi Board has initiated an e-mandi platform to effectively address this issue.
- **Transportation solutions for reducing food loss.** Recognizing transportation as a major source of food loss, the group explored innovative solutions. They discussed the prospect of a direct distribution model from farmland to consumers, with the aim of minimizing food loss during transportation. This approach involves a system in which only registered individuals can procure from farmers, ensuring a streamlined process without imposing additional challenges on farmers.
- **Technological interventions for cold chain efficiency.** The group acknowledged that efforts to reduce food loss include a strong emphasis on efficient cold storage facilities at different stages of the supply chain. This technological intervention is seen as a crucial step in maintaining the quality and freshness of produce.
- **Inclusive approach for small-scale farmers.** Acknowledging the challenges faced by small-scale farmers who produce diverse crops, the breakout group advocated an integrated approach. This strategy aims to create a more sustainable and equitable system that addresses the unique needs of these farmers, while benefiting both producers and consumers.

Breakout group 2: Measure

The group mapped all the ongoing projects in Madhya Pradesh that are directly working on food loss and food waste. The participants included representatives from the Mandi Board, Institute of Livelihood Research and Training (ILRT), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Centre for Advanced Research and Development (CARD), Professional Assistance for Development Action (PRADAN), and the FPO. Most of the participants were working on addressing the food loss side of the supply chain by working with farmers and FPOs, especially small farmers and women farmers. The projects included digital solutions, value addition, processing, and improving pre-production practices focused on improving productivity and income while reducing food losses. The key crops mentioned included fruits and vegetables (tomatoes, onions, and potatoes) and cereals (rice and wheat).

Next, the group deliberated on methodologies for measuring food loss and food waste.

- **Production loss assessment.** Discussion participants highlighted the importance of quantifying production losses. This can be achieved using data from the agriculture departments. Such data may include information on seed distribution, the quantity of seeds sown, and the resulting production yields. By comparing the initial seed distribution data with the actual production data, it becomes possible to determine the contribution of the distributed seeds to the final agricultural output.
- **Role of mechanization.** Mechanization occurring at different stages of the food supply chain was identified as another valuable source of data for measuring food losses. The extent of mechanization can offer insights into how technology and automation are reducing losses at various supply chain levels. The data can be examined for technology-related reduction and extrapolated.
- **Transportation loss considerations.** Measuring losses during transportation is a complex task involving various factors. These include the distance covered during transportation, the skill levels of individuals handling produce during transit, and the impact of climate adversities on perishable goods. The participants emphasized the need to account for these factors when assessing transportation-related losses. In addition, one transportation-related data point can be collected from the Mandi app, which records the inward quantity of commodities.
- **Reverse measurement method.** An efficient approach for measuring food loss and food waste involves tracking the production process in reverse order from consumption back to the point of production. This method allows the identification of losses and waste at each stage of the supply chain. This approach was recommended in the Dalwai Committee Report, which emphasizes the importance of assessing food losses throughout the supply chain between fork and farm.
- **Interlinking supply chain levels.** The participants stressed the need to interlink food losses and food waste at different supply chain levels. Different strategies are required to address losses and waste at each level, because the nature of these challenges varies. Understanding how losses accumulate and transition between different stages of the supply chain is crucial for implementing targeted interventions.
- **Moisture loss assessment.** Assessing the moisture loss at each supply chain level has emerged as a critical consideration. The moisture content can significantly affect the weight and quality of food products. Collecting moisture loss data can help determine the actual food loss within the supply chain. In addition, an important point raised by the participants was that, in some crops, there is an unavoidable moisture loss that should not be factored as food loss.
- **Value chain analysis.** An extensive value chain analysis was recommended, encompassing factors, such as costs, benefits, losses, inputs, and outputs. Such an analysis provides a comprehensive view of the food supply chain and allows for a deeper understanding of where losses and waste occur.
- **Defining food loss and food waste.** This discussion highlighted the importance of tailoring definitions of food loss and food waste to specific crops. For example, in some cases, cattle feed may not be considered a food loss for soybeans. Establishing clear crop-specific definitions ensures the accuracy of measurements and assessments.

- **Ecological services.** The group discussed calculating food loss and food waste by subtracting the total production from consumption to reach an approximate figure; however, it was highlighted that we should factor in the crops used by farmers to feed biodiversity, which plays a very significant role in the ecosystem.

The group acknowledged that various digital tools and collaboration with key stakeholders can play an important role in the measurement of food loss and food waste in Madhya Pradesh's food supply chain. The group identified the following existing sources for data points in Madhya Pradesh:

- **E-anugya portal:** At the mandi level, the E-anugya portal was identified as a valuable source of detailed data. This portal records information on various aspects of produce, including its origin, arrival, dispatch, pricing, storage, and details of the farmers from whom the produce was procured. It also tracks sale prices and storage locations. Using this portal can provide comprehensive insights into food losses at the mandi level.
- **Farm Gate app.** Launched in 2022, the Farm Gate app has been highlighted as an innovative digital platform that connects farmers directly with traders. Farmers have the flexibility to sell their produce at a price of their choice through this app, which can also reduce transportation costs. Moreover, the app can serve as a valuable source of farm gate data, providing insights into production and sales at the farm level.
- **FPO data.** FPOs were recognized as repositories of data on the quantity of produce harvested and sold. These organizations maintain records of their members' activities, including production and sales. Consequently, they can be a valuable source of data for calculating losses at the FPO level.
- **Segregation and composting units.** The Madhya Pradesh government's initiative to establish segregation and composting units in 80 mandis was mentioned as an opportunity to gather data. These units can provide information on the quantity and grade of the produce being segregated, as well as the proportion sent to composting facilities. These data are crucial for understanding the fate of food products in supply chains.
- **Indore's compressed natural gas (CNG).** In the context of food waste measurements, the CNG plants in Indore were identified as potential data sources. These plants provide data on the volume of food waste received and its geographical origin. This information can be used to quantify food waste by tracing it back through the supply chain. However, it is essential that inedible components such as packaging material be removed from the calculation as these do not constitute food waste.

Breakout group 3: Act

Discussions were steered by a diverse group of stakeholders, including ICAR, Mandi Board FPOs, and civil society organizations (CSOs). The group deliberated on the different interventions required to reduce food loss and food waste in Madhya Pradesh.

- **Optimizing harvesting practices.** This discussion underscored the need to identify the precise timing for harvesting different crops, tomatoes for instance, by considering factors, such as ripeness and shelf life, to effectively minimize food loss.
- **Holistic utilization of produce.** Participants stressed the need for overall utilization of agricultural produce, highlighting the potential of elements, such as fruit peels, often considered waste, for their nutritional value. Strategies to disseminate this knowledge to the farming community were emphasized to ensure broad adoption.
- **Preservation and transportation methods.** Introduction of advanced and smart packaging solutions capable of adjusting oxygen and carbon dioxide levels, was discussed as a method to extend the shelf life of perishables, such as guavas and tomatoes, thereby reducing spoilage. In addition, the implementation of technologies such as tube heat exchangers was highlighted for their role in maintaining an optimal temperature during storage and transportation and in preserving produce quality.

- **Improving market operations (mandis).** Improvements in mandi operations, including the introduction of farmer-level grading, were discussed as essential for enhancing the efficiency of marketing chains and minimizing food loss and food waste.
- **Empowerment of FPOs through technology.** The role of FPOs in adopting and implementing cutting-edge solutions and technologies at various stages of the supply chain was emphasized, highlighting the need to effectively bridge the gap between farmers and markets.
- **Advancements in storage and transportation.** The critical importance of on-farm storage and transportation technologies in reducing food loss and food waste was discussed, with a call for their widespread adoption across the agricultural sector. The importance of technological support from non-governmental organizations (NGOs) and the adoption of innovations such as zero energy cold chambers (ZECCs) for improving storage conditions, especially for crops requiring cold storage, was emphasized.
- **Addressing systemic challenges.** Participants acknowledged existing systemic deficiencies, such as lack of incentives and issues with market monopolization, which pose significant barriers to food loss and food waste reduction efforts.
- **Tailored solutions for specific crops.** The group explored unique challenges and solutions for particular crops, such as onions, focusing on the need for proper ventilation systems to prevent spoilage, and discussed leveraging ICAR-developed technologies for broader application.

Awareness and education campaigns targeting all levels of society were identified as foundational for instigating behavioral change and fostering a culture of responsible consumption and sustainable agricultural practices. Initiatives such as village-level food waste regulation and targeted training programs for farmers on safe harvesting practices were discussed as crucial for building local capacity to address food loss and food waste. The conversation also highlighted the significant influence of consumer awareness in regulating demand for sustainably produced and consumed food, suggesting a pressing need for supportive policies that facilitate food loss and food waste reduction across the supply chain. To achieve these objectives, the group identified several key areas requiring action: development of policies and legal frameworks, implementation of supportive government schemes tailored for FPOs, and introduction of incentive mechanisms designed to motivate leadership within agricultural organizations.

CONCLUSION AND CLOSING REMARKS

In summary, the workshop highlighted the pressing need to address food loss and food waste through a comprehensive approach that includes technological interventions, governmental support, and awareness campaigns. The collaborative engagement of stakeholders was highlighted as an important step in achieving these goals, thereby establishing the groundwork for a sustainable food supply chain in Madhya Pradesh.

In addition, insights from the existing Friends of Champion 12.3 India network were presented. A call was extended to organizations committed to reducing food loss and food waste in Madhya Pradesh to join this collective initiative and foster a regional chapter of the network. 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, 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 an interest in joining the regional chapter of the Friends of Champion 12.3 India network for formal enrolment.

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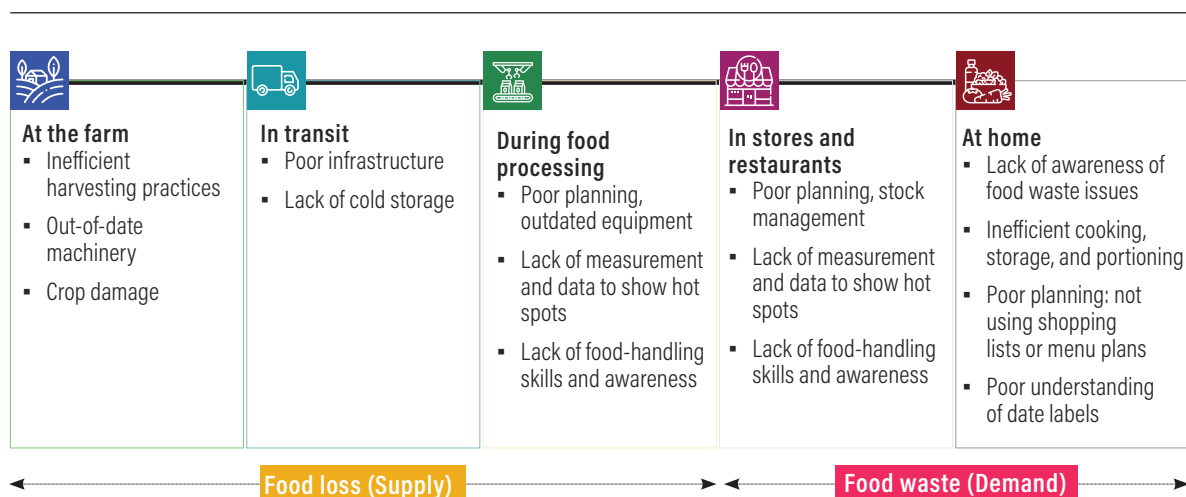
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APPENDIX A

FIGURE A-1



APPENDIX B. 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 Madhya Pradesh? What are some private sector and civil society organization initiatives to reduce food loss and food waste in Madhya Pradesh?
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 with existing efforts by the government, private sector, and civil society organizations?
3. What are the barriers in 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, FPOs) play a key role in reducing food loss and food waste?
 - a. What enabling conditions are necessary for 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, 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 your learnings?
3. What are the key geographical hot spots and critical loss points (stagewise) across the major food supply chains in Madhya Pradesh? What data are used to identify these hot spots?
4. 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? If so, 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 loss)?
 - 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, 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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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



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