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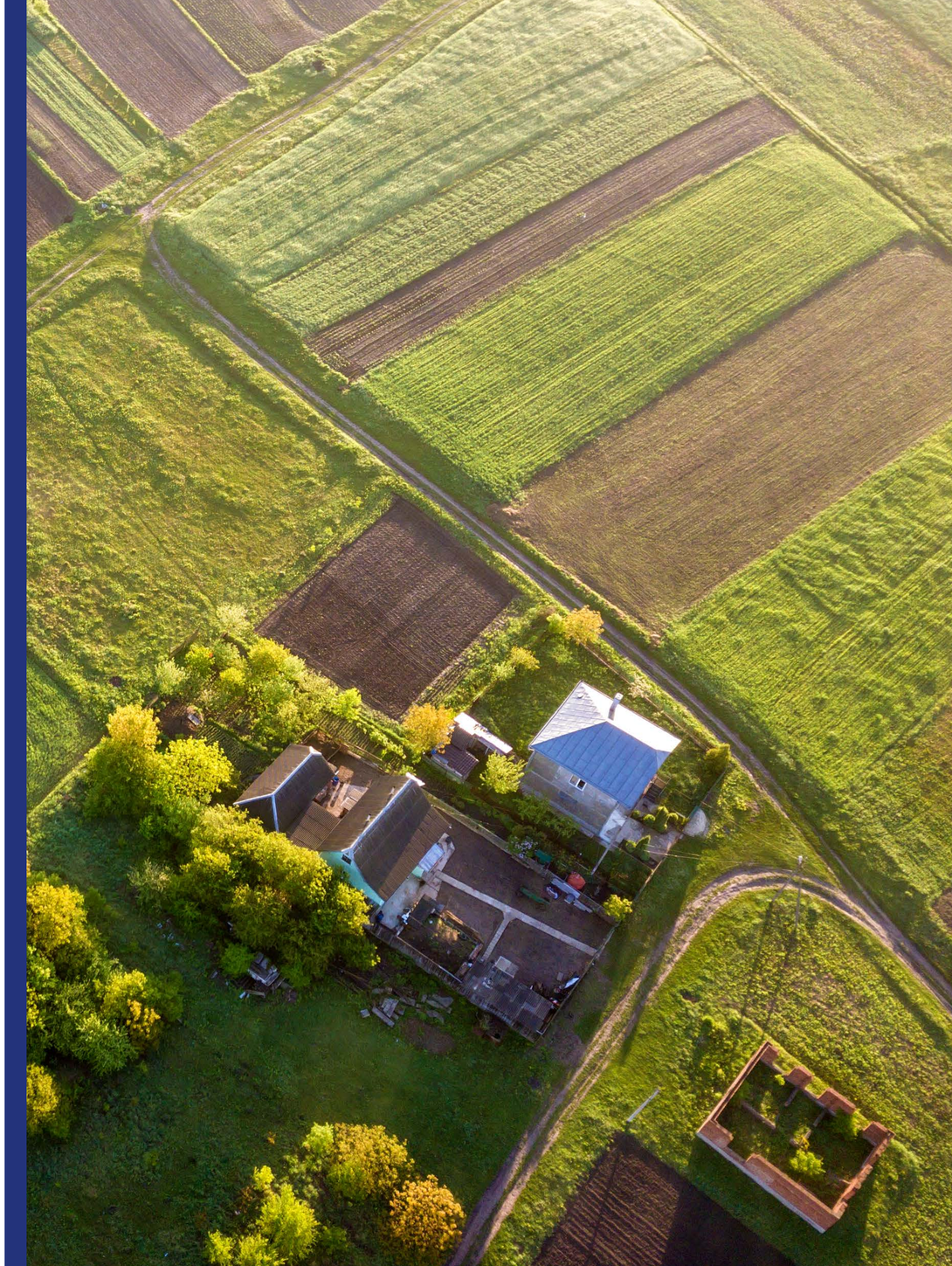
GUIDELINES TO REDUCE FOOD WASTE – PRIMARY SECTOR

This chapter provides guidelines for the primary production sector as part of a broader effort to reduce food waste across the agri-food chain. It is designed for stakeholders and decision-makers engaged in agricultural and primary production systems, while the recommendations are primarily intended for producers as key agents in reducing waste generation at the source. The guidelines build on the findings of the document **D1.1.2 FOOD WASTE AUDIT** and align with European Union (EU) strategies and frameworks promoting sustainable, circular, and regenerative food systems.

Reducing food waste in the primary sector is an essential component of the EU's ambition to transform its food system under the **European Green Deal** (European Commission, 2019) and the **Farm to Fork Strategy** (European Commission, 2020a). Both initiatives stress the need to optimise the use of natural resources, reduce environmental pressures from agriculture, and foster resilience in food supply chains. The **Waste Framework Directive** (Directive 2008/98/EC, amended 2018) established harmonised measurement and reporting obligations for food waste, while its 2025 amendment introduced the first legally binding food-waste reduction targets for Member States. Similarly, the **EU Platform on Food Losses and Food Waste** supports knowledge sharing and best practices to achieve **Sustainable Development Goal 12.3**: halving per capita global food waste by 2030. The emerging **Framework for Sustainable Food Systems** (European Commission, 2023) reinforces this direction by encouraging systemic action to ensure that sustainability is integrated from farm to fork.



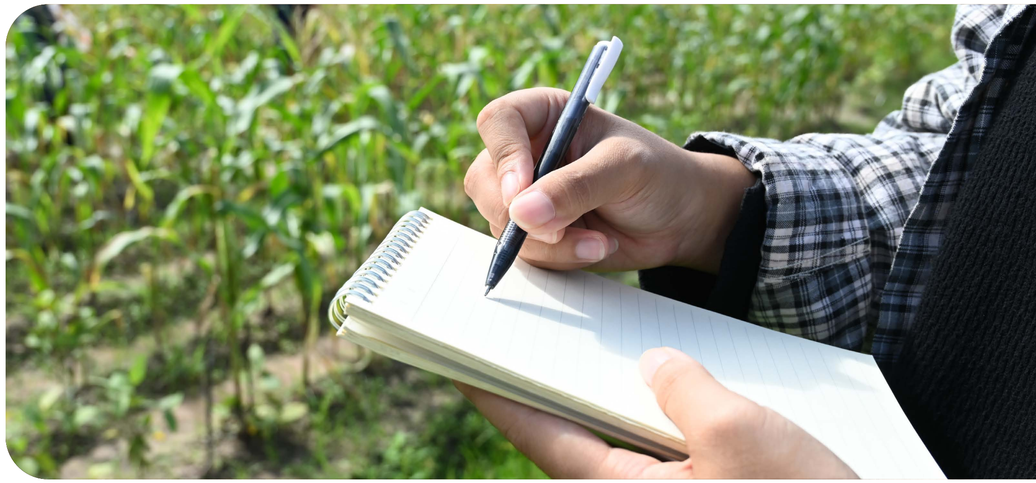
According to the findings of the **D1.1.2 FOOD WASTE AUDIT**, food waste in the primary production sector primarily stems from harvesting and product selection losses, raw materials expiring before use, and overproduction compared to market demand. Additional contributing factors include damage caused by pests, diseases, or extreme weather conditions, as well as inefficiencies in storage, logistics, and inventory management. Overall, the results suggest that waste generation is driven by both environmental and operational challenges, underlining the need for improved production planning, risk management, and more efficient post-harvest handling.

The same report shows that some producers have already undertaken measures to address these challenges, such as improving storage facilities, providing staff training, or collaborating with waste management and circular economy initiatives. However, systematic tracking and reporting of food waste remain limited, as does the use of digital tools for monitoring. Awareness of regulations is relatively higher among primary producers than in other sectors, yet compliance remains uncertain, and the uptake of financial incentives or support schemes is still moderate. These insights indicate that the potential for improvement lies not only in technological and logistical innovation but also in awareness raising, data management, and stronger institutional support. These findings point to both structural and behavioural aspects of food waste generation in primary production.

The following table summarises the main causes of food waste and proposes corresponding actions and outcomes to guide reduction efforts.

Key Cause of Food Waste	Recommended Action	Expected Outcome
Harvesting losses and product selection inefficiencies	Improve harvesting practices, provide seasonal worker training, use adaptive harvesting schedules	Reduced field losses and improved product quality
Raw materials expiring before use	Improve storage and preservation; apply inventory rotation (FIFO)	Extended shelf life and reduced spoilage
Overproduction compared to demand	Enhance demand forecasting; strengthen coordination with processors/distributors	Better market alignment and fewer surpluses
Damage from pests, diseases, or extreme weather	Apply integrated pest management and climate-resilient techniques	Increased resilience and reduced losses
Rejection due to quality standards or damage	Develop secondary product lines (processed goods, feed, compost)	Resource valorisation and circular economy benefits
Inefficient logistics and transport	Optimise logistics planning, invest in cooling and packaging systems	Lower post-harvest losses and higher efficiency
Lack of monitoring and reporting	Introduce digital tracking and data reporting systems	Evidence-based management and regulatory compliance

Food waste prevention in the primary sector begins with **optimised production planning**. Accurate demand forecasting, informed by data on market fluctuations and consumer trends, can significantly reduce overproduction. Producers should establish closer coordination with processors and distributors to align supply with real market needs. Contract-based production models and digital tools for demand prediction can help achieve this balance. Diversifying production and marketing channels, including short supply chains, farmers' markets, and community-supported agriculture schemes, also reduces the risk of surplus accumulation.



A critical area is **harvesting efficiency**. Significant losses occur during harvesting and selection due to mechanical damage, labour shortages, or strict aesthetic standards. Investing in better harvesting equipment, improved training for seasonal workers, and flexible harvesting schedules adapted to weather conditions can minimise such losses. Developing secondary uses for lower-grade or imperfect produce supports the valorisation of resources and minimises waste, which is fully aligned with the principles set out in the EU Circular Economy Action Plan (European Commission, 2020b).

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Storage and preservation improvements represent another high-impact area. Temperature-controlled facilities, humidity management, and proper ventilation significantly extend shelf life. Producers should implement standard operating procedures for sorting, rotation, and monitoring of stored goods. Where feasible, the use of innovative preservation technologies, such as controlled atmosphere storage, biobased coatings, or natural preservatives, should be encouraged. Regional or cooperative storage solutions can also reduce costs and improve resource efficiency, especially for smaller farms.

Digital monitoring and data management are emerging as essential tools for effective waste reduction. Manual recording remains prevalent, but it is often inconsistent and lacks analytical depth. Introducing digital platforms for tracking losses at each stage of production allows for accurate quantification, trend identification, and targeted interventions. Integration of these tools with existing farm management systems can improve decision-making, enable reporting, and support compliance with future regulatory requirements. To enhance adoption, public authorities and extension services could provide technical assistance or subsidies for digitalisation initiatives (European Commission, 2025).

Training and capacity building remain fundamental for lasting behavioural change. Training programmes for farmers and agricultural workers should focus on efficient harvesting techniques, handling practices, and quality management. Awareness campaigns at the regional and national level can foster understanding of the economic and environmental implications of food waste. Promoting a culture of prevention and valorisation within producer organisations can make waste reduction part of everyday practice rather than an occasional corrective action.

Collaboration within the **value chain and territorial ecosystems** is also critical. Partnerships with food processors, distributors, and local charities can facilitate redistribution of surplus products that remain fit for consumption. Synergies with bioeconomy and renewable energy initiatives, such as anaerobic digestion of unavoidable waste or composting for soil enrichment, strengthen the regenerative potential of agricultural systems. These actions are consistent with the principles of the **EU Circular Economy Action Plan** (European Commission, 2020b), which promotes resource loops and waste hierarchy compliance.

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The creation of **economic and policy incentives** is equally important. Financial measures, such as tax reductions or grants for implementing waste reduction technologies, can accelerate change. Payment schemes rewarding sustainable practices, or penalties for excessive waste generation, should be carefully calibrated to balance motivation and responsibility. Establishing clear reporting frameworks and linking them to access to funding could further encourage producers to monitor and disclose waste data.

To ensure that these efforts are effective and sustainable, **regulatory coherence and institutional support** must be strengthened. Many producers remain uncertain about existing obligations, suggesting a need for more consistent communication between authorities and the agricultural sector. Simplifying reporting procedures, integrating food waste metrics into existing agricultural monitoring systems (such as CAP indicators), and providing practical guidance through advisory services can increase compliance and confidence.

Finally, food waste prevention in the primary sector must be seen as part of a **broader transition towards a sustainable and regenerative food system**. This transition involves rethinking the relationship between production, ecosystems, and resource use. By adopting regenerative agricultural practices, such as soil health restoration, biodiversity protection, and efficient nutrient cycling, producers can simultaneously reduce waste, enhance resilience, and contribute to long-term food security. In this context, food waste reduction is not an isolated goal but a cornerstone of a systemic shift towards sustainability, resilience, and economic efficiency.
The following figure illustrates the integrated framework that brings together all previously described guidelines for reducing food waste in the primary sector.

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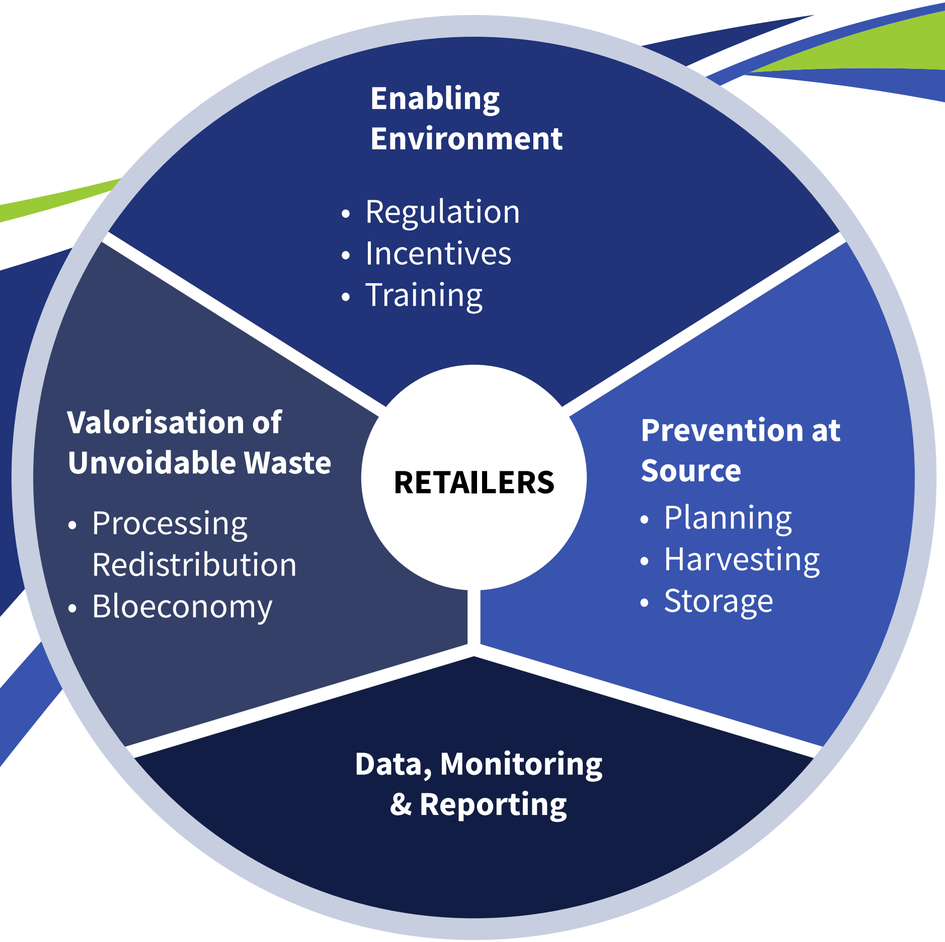

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In conclusion, reducing food waste in the primary sector requires an integrated approach combining technological, behavioural, and policy interventions. The findings of **D1.1.2 FOOD WASTE AUDIT** highlight that waste is primarily generated during harvesting, storage, and overproduction, but that producers are open to collaborative and circular solutions when supported by appropriate incentives, training, and data systems. Aligning these practical actions with the EU's broader sustainability agenda will enable the primary sector not only to minimise waste but also to create new value from resources that were previously lost, thus contributing to a regenerative and climate-resilient European food system.

THANK YOU FOR YOUR ATTENTION

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