Future Agriculture e-magazine

E-ISSN: 3048-4553 (Online)

https://futureagriculture.co.in/

Article Id: FA-17

ISSUE- December, 2025 | Issue-3 pp. 52-54

Post-Harvest Management Strategies to Reduce Horticultural Losses

Nilesh Sharma*[1] and Preeti Mishra[2]

[1]*SMS (Horticulture), KVK, Raebareli-2, CSAUA&T, Kanpur, Up*

[2]*PRADAN - Subject matter specialist (Agriculture), Jaisinghnagar Team, Shahdol (M.P.)*

***Corresponding Author Email:** nileshsharma233@zohomail.in

Abstract

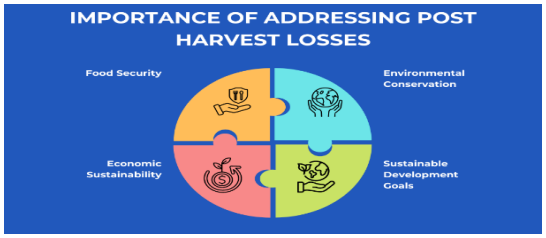
Post-harvest losses in horticultural crops pose a major challenge to food availability, farmer income, and resource efficiency. A significant share of fruits, vegetables, and flowers deteriorates between harvest and consumption due to improper harvesting, poor handling, inadequate storage, inefficient transportation, and limited processing facilities. Scientific harvesting at appropriate maturity, careful handling, and field-level sorting play a crucial role in maintaining quality. Improved storage systems such as cold storage, controlled atmosphere facilities, and suitable packaging materials significantly extend shelf life and reduce physiological and microbial losses. Efficient transportation supported by cold chain infrastructure preserves freshness during long-distance movement. Adoption of modern technologies, digital monitoring tools, and value addition through processing helps convert surplus produce into stable marketable forms. Farmer training, extension support, organized marketing, and policy-driven infrastructure development are essential for widespread adoption of best practices. Strengthening post-harvest management can substantially reduce horticultural losses, improve marketable surplus, stabilize prices, and contribute to sustainable agricultural growth and food security.

Keywords: *Post-harvest losses, horticultural crops, storage and cold chain, post-harvest management*

1. Introduction: Post-Harvest Losses in Horticulture

Meaning and significance of post-harvest losses

Post-harvest losses refer to quantitative and qualitative reduction in fruits, vegetables, flowers, and plantation crops occurring between harvest and consumption.



Magnitude of losses

Horticultural losses are estimated at 20–30% annually, translating into economic losses of nearly ₹90,000–₹1,00,000 crore per year.

Commodity-wise loss pattern

Losses range from 5–10% in potatoes and onions, 15–25% in fruits like mango and banana, and up to 35–40% in highly perishable vegetables and flowers.

Major causes of losses

Mechanical injury during harvesting, poor handling, lack of cold storage, improper packaging, delayed transportation, and microbial spoilage are key contributors.

Impact on food security and farmer income

Reducing post-harvest losses by just 5% can increase food availability equivalent to

expanding cultivated area without extra land or water use.

2. Harvesting Practices and Proper Handling Techniques

Importance of correct harvesting stage
Harvesting at physiological maturity reduces losses by 10–15%, while premature or over-mature harvesting increases respiration rate and shrinkage.

Time and method of harvesting
Early morning or late evening harvesting lowers field heat by 3–5°C, slowing moisture loss and wilting.
Use of sharp, sanitized tools minimizes mechanical damage by nearly 20%.

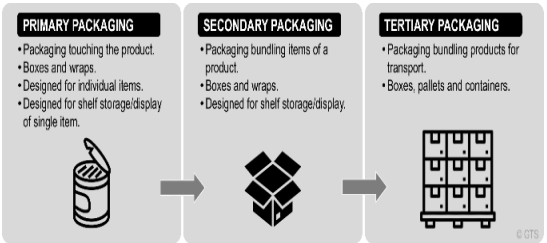
Handling during collection
Rough handling causes 30–40% of bruising injuries in fruits such as apple, mango, and tomato.
Use of padded field crates reduces impact damage by 50%.

Sorting and grading at field level
Removal of damaged and diseased produce at harvest stage lowers microbial spread during storage by 25–30%.

Use of clean containers and shade
Keeping harvested produce under shade cuts moisture loss by 5–7% within the first six hours after harvest.

3. Storage, Packaging, and Transportation Management

Role of scientific storage
Scientific storage extends shelf life by 2–5 times through temperature and humidity control.
Cold storage at 0–4°C reduces physiological weight loss in fruits and vegetables by 40–60%.



Controlled and modified atmosphere storage
Lowering oxygen to 2–5% and increasing carbon dioxide to 3–8% slows respiration by 30–50% in apple, pear, and kiwi.

Packaging material and design
Use of ventilated plastic crates cuts transit losses by 25–30% compared to traditional sacks. Corrugated fibreboard boxes reduce compression damage by 20%.

Transportation efficiency
Refrigerated transport maintains quality for 48–72 hours longer than non-refrigerated vehicles. Poor road handling accounts for nearly 18% of total post-harvest losses.

Stack management and load optimization
Proper stacking height and cushioning reduce crushing losses by 10–15% during long-distance transport.

4. Role of Technology and Value Addition in Loss Reduction

Use of post-harvest technologies
Pre-cooling techniques lower produce temperature by 8–12°C within hours, reducing spoilage by 20–25%.

Cold chain integration
End-to-end cold chain systems reduce overall horticultural losses from 25% to below 10%.

Digital monitoring and sensors
Temperature and humidity sensors improve storage efficiency by 15–20% through real-time monitoring.

Processing and value addition
Processing of fruits and vegetables into pulp, juice, dehydration, and frozen products saves nearly 15–20% of surplus produce.

Packaging innovations
Edible coatings and active packaging extend shelf life by 30–50% by slowing moisture loss and microbial growth.

5. Farmer Awareness, Policy Support, and Future Strategies

Importance of farmer training
Capacity-building programs improve post-

harvest practices, reducing on-farm losses by 10–20%.

Extension services and knowledge transfer
Regular advisory services increase adoption of improved handling and storage methods by nearly 30%.

Infrastructure and policy initiatives
Public and private investment in cold storage and pack houses raises marketable surplus by 15–25%.

Collective action and market linkages
Farmer producer organizations reduce intermediary losses and enhance price realization by 20–30%.

Future-focused strategies
Integration of climate-resilient storage, low-energy cooling systems, and digital platforms holds potential to cut horticultural losses below 10%.

Conclusion

Effective post-harvest management minimizes losses, enhances quality, boosts farmer income, and strengthens food security through improved harvesting, storage, technology adoption, and informed stakeholder participation.

References

Elik, A., Yanik, D. K., Istanbullu, Y., Guzelsoy, N. A., Yavuz, A., & Gogus, F. (2019). Strategies to reduce post-harvest losses for fruits and vegetables. *Strategies*, 5(3), 29-39.

Kiaya, V. (2014). Post-harvest losses and strategies to reduce them. *Technical Paper on Postharvest Losses, Action Contre la Faim (ACF)*, *25*(3), 1-25.

Banjaw, T. D. (2017). Review of post-harvest loss of horticultural crops in Ethiopia, its causes and mitigation strategies. *J. Plant Sci. Agric. Res*, *2*(1), 1-4.

Pokhrel, B. (2021). Review on post-harvest handling to reduce loss of fruits and vegetables. *International Journal of Horticulture and Food Science*, *2*(2), 48-52.

Bisht, A., & Singh, S. P. (2024). Postharvest losses and management of horticultural produce: A review. *Journal of Scientific Research and Reports*, *30*, 305-320.

Yogita, R. J., Prajapati, C. S., Roy, S., Abrol, P., Khan Chand, A. K., & Darbha, S. (2024). Extension strategies to promote post-harvest management and value addition: A review. *Horticulture*, *50*.

Dos Santos, S. F., Cardoso, R. D. C. V., Borges, Í. M. P., e Almeida, A. C., Andrade, E. S., Ferreira, I. O., & do Carmo Ramos, L. (2020). Post-harvest losses of fruits and vegetables in supply centers in Salvador, Brazil: Analysis of determinants, volumes and reduction strategies. *Waste Management*, *101*, 161-170.

Kasso, M., & Bekele, A. (2018). Post-harvest loss and quality deterioration of horticultural crops in Dire Dawa Region, Ethiopia. *Journal of the Saudi Society of Agricultural Sciences*, *17*(1), 88-96.

Cardoso, I. (2025). Post-Harvest Losses and Their Management in Horticultural Crops: Strategies for Sustainable Food Security.

Rajapaksha, L., Gunathilake, D. M. C. C., Pathirana, S. M., & Fernando, T. (2021). Reducing post-harvest losses in fruits and vegetables for ensuring food security—Case of Sri Lanka. *MOJ Food Process Technols*, *9*(1), 7-16.

Hailu, G., & Derbew, B. (2015). Extent, causes and reduction strategies of postharvest losses of fresh fruits and vegetables–A review. *Journal of Biology, Agriculture and Healthcare*, *5*(5), 49-64.