



Critical Factors Responsible for Postharvest Losses in Wheat and Rice Supply Chain in Developing Countries

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Introduction

- About 70% more food will be needed to meet the food demand of expected 9.1 billion population in year 2050
- About one third (approximately 1.3 billion tons) of all food produced is lost or wasted every year [1]
- On the caloric content basis, loss of cereal crops holds the largest share (53 %) in total global food loss
- Minimizing these food losses can be one effective way to increase food supply, and positively impact the food security, economy, and improve smallholders' livelihoods
- Rice and wheat are major staple crops around the world
- Being a high energy calorie food, rice accounts for one-fifth of global calorie supply
- Most of the rice (95%) is produced in the developing countries, with China and India being the major producers

Objective

- To identify the status of postharvest losses in rice and wheat crops in major producer developing countries and critical factors responsible for these losses

Postharvest Losses in Rice and Wheat

- Postharvest losses in rice supply chain vary among different countries and can be as high as 25% (Fig. 1)
- Storage losses are the maximum fraction among all postharvest losses for both rice and wheat in most of the countries
- Losses during rice harvesting are second major contributor in total losses in the developing countries
- In case of wheat supply chain, many countries report significant threshing losses (e.g. Fig. 2 for India and Bangladesh)
- Grain losses vary within different regions of the same country based on the economic status, infrastructure, and technology availability (Fig. 3)

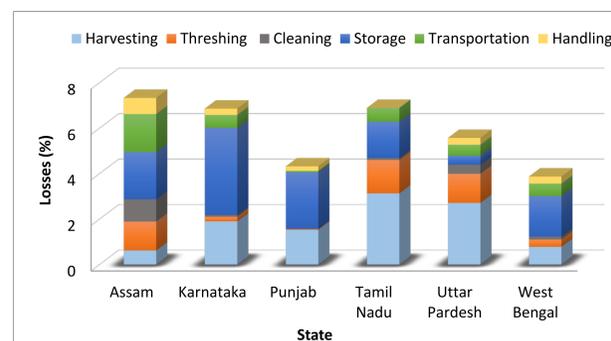


Figure 3: Postharvest losses during various stages in supply chain of Rice in various states of India [2]

Factors Causing Losses

- Moisture content during harvesting is one of the most critical factors affecting losses. Lack of mechanization and low operator skills are other factors causing harvesting and threshing losses.
- Harvesting at adequate crop maturity can significantly reduce grain losses (e.g. 75% reduction in losses for wheat harvested at best harvesting time in Fig. 3)
- Spoilage by insects is the major reason of grain loss during storage, especially in the tropical regions. Moisture content and temperature are most crucial factors affecting the insect growth and grain losses
- Inadequate drying and cleaning, lack of grain quality evaluation tools, and operator's poor skills cause significant milling losses
- Some underlying factors such as farm size, education level, climate conditions, and gender variability, directly affects the food loss
- Major factors causing various losses in cereal grain supply chain are illustrated in figure 5

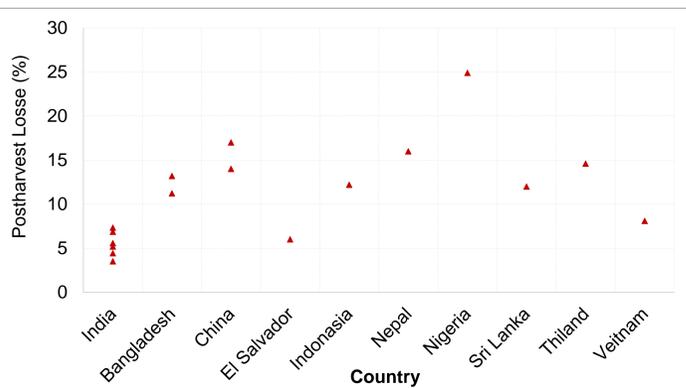


Figure 1: Postharvest losses in rice value chain in various countries (average values were used for the range of losses)

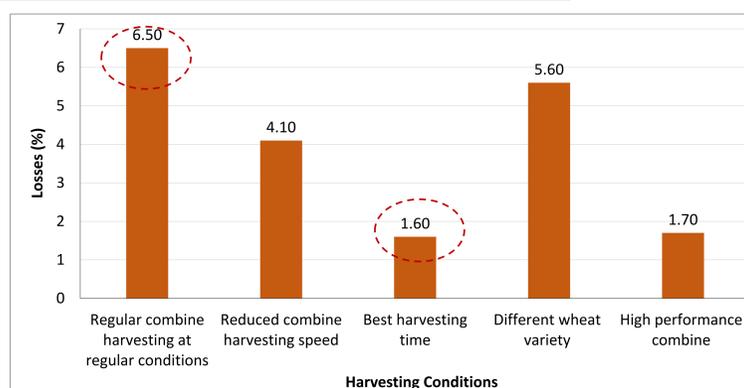


Figure 4: Losses during wheat harvesting in China under various harvesting conditions [4]

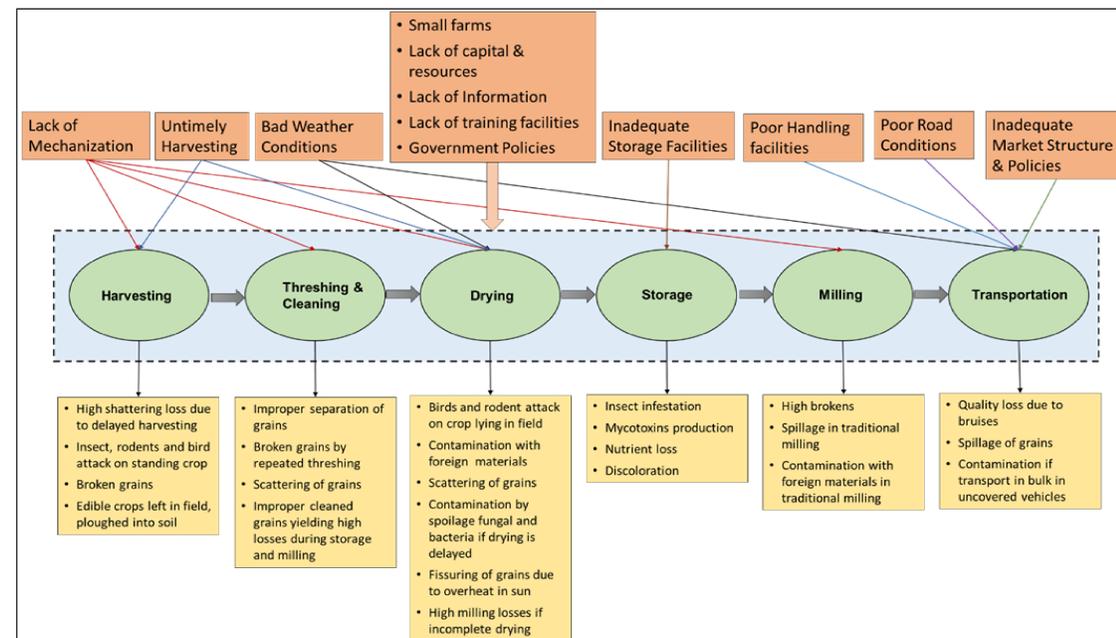


Figure 5: Various factors and types of losses during supply chain of cereal crops in developing countries

Conclusion

- Postharvest loss is a complex problem and its scale varies for different crops, practices, climatic conditions, and country economics
- The solutions to reduce postharvest losses require relatively modest investment and can result in high returns compared to increasing the crop production to meet the food demand
- Increasing awareness, development of adequate infrastructure, promotion of small scale technologies, and improving market linkages are top priority solutions to reduce postharvest losses strengthen the food security and ensure sustainable food supply

References

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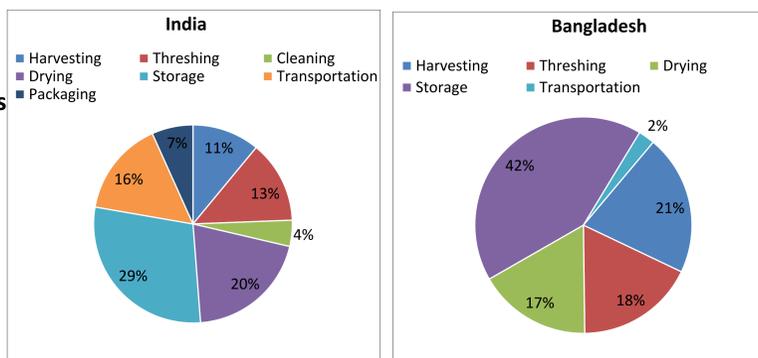


Figure 2: Wheat losses during various postharvest operations at field level in India [2] and Bangladesh [3]