

Review of Post-Harvest Loss of Agricultural Crops in India, its Causes and Mitigation Strategies

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Abstract

This review Paper highlightshow post-harvest loss is the matter of great concern in regards of food security and poverty reduction strategies in India. It reduces farmers output, income country economy. Major cause of post-harvest loss of agricultural crops in India was reviewed in this paper. It might be because of limitation in harvesting techniques, storage and cooling facilities, lack of infrastructure and transportation system. Hence in order to minimize the losses findings suggested that appropriate pre-and post-harvesting techniques should be used with improving marketing system, infrastructures and provide education and training to the farmers, middleman and consumers also.

Keywords: Post-Harvest Loss, Cause, Mitigation.

Introduction

Because of extreme range of ecological conditions diverse varieties of agriculture crops including temperate, tropical and subtropical crops grown in India. A vast number of agricultural crops such as wheat, Rice, corn, soyabean, fruits and vegetables are cultivated for local, national and international market needs. Such crops play important role in food security, poverty reductions and economic growth. They are excellent and cheapest sources of nutrients, minerals and vitamins for human wellbeing.

Post-harvest food loss is defined as measurable qualitative and quantitative food loss along the supply chain, starting at the time of harvest till its consumption or other end uses [1]. Every year, an estimated 1.3 billion ton - roughly one-third - of the food produced for human consumption worldwide is lost or wasted. In industrialized countries, significant waste occurs at the consumption stage, while in low-income countries, food losses take place primarily during the early and middle stages of the supply chain [2].

In India, the production is about 284.51 million tons of cereals and 311.7 million tons of fruits and vegetables[3] i.e., plant origin which are refined, stored and transformed into various usable products using conventional and modern post-harvest and food processing technology out of this amount there is 3.9% to 6% cereals, 4.3% to 6.1% pulses, 2.8 % to 10% oil seeds, 5.8% to 18% fruits and vegetables were lost during harvesting, post-harvest activities, improper handling and storage [4]. On the other hand, as per the estimates of the committee on double farmer's income (2019), at the all-India level, farmers are unable to sell about 40% of the total fruits and vegetables produce in the market or lose around 63000 crore every year [5].

Objective of the Study

1. To study Post-Harvest Loss of agricultural Crops in India.
2. To study causes and mitigation strategies of Post-Harvest Loss of agricultural Crops.

Content

Causes of Post-harvest Loss of Agricultural Crops in India

According to researchers' major causes are mainly connected to financial, managerial and technical limitations in harvesting techniques, storage and cooling facilities in difficult climatic conditions, infrastructure, packaging and marketing systems [6]. Similarly, some researchers reported the most common causes of postharvest losses such as lack of to eliminate defects before storage and transportation and the use of inadequate packaging materials, rough handling and inadequate cooling and temperature maintenance.

In India, there are several factors responsible for post-harvest losses of agriculture produce.

Lack of Appropriate Processing Technologies

Inappropriate processing technology i.e., crops after harvesting from the agricultural fields like drying, absence of storage, poor handling, lack of temperature handling, poor packaging material, lack of knowledge about how to maintain its quality and hygiene etc. plantation crops like tea, coffee, spices are processed carefully to maintain its quality. They are stored in dry form at room temperature to give it a longer shelf life. Perishable food items are handled carefully as they are more susceptible to degrade, they are stored at a certain low temperature to maintain the quality.

Environmental and Socio economic as external factors of post-harvest loss

Factors outside of the food supply chain can cause significant postharvest loss including climatic conditions, temperature, rainfall, humidity influence both the quantity and quality of a harvest. In general, the higher the temperature the shorter the storage life of horticultural products and the greater the amount of loss within a given time, as most factors that destroy the produce or lower its quality occur at a faster rate as the temperature increases. There is movement of water vapour between stored food and its surrounding atmosphere until equilibrium of water activity in the food and the atmosphere. A moist food will give up moisture to the air while a dry food will absorb moisture from the air. Fresh horticultural products have high moisture content and need to be stored under conditions of high relative moisture loss and wilting (except for onions and garlic). Dried or dehydrated products need to be stored under conditions of low relative humidity in order to avoid adsorbing moisture to the point where mold growth occurs [7].

Poor Packaging, Transportation and Storage as factor of Post-Harvest Loss

Inadequate packaging material, transportation and lack of appropriate storage facility were reported as factor of post-harvest loss of agricultural crops in India. About 30% of the fruits and vegetables grown in India (40 million tons amounting to US\$ 13 billion) get wasted annually due to gaps in the cold chain such as poor infrastructure, insufficient cold storage capacity, unavailability of cold storages in close proximity to farms, poor transportation infrastructure, etc. This results in instability in prices, farmers not getting remunerative prices, rural poverty resulting in farmers' frustrations and suicides [8]. As urbanisation increases day by day more people move towards cities from rural areas increases the need of more efficient and extended food supply chain resulting decreases the capacity of farming and harvesting which externally affect the post-harvest losses of agricultural crops.

Transportation of agricultural crop from agricultural field to processing and storage in a definite time plays a major role in deciding the quality of harvest. Poor roads cause rupture of variety of perishable like tomato and other different fruits and

vegetables. Different crops have different time from harvest to processing during which it maintains its quality. So, they should reach to their processing or storage within that time limit.

Strategies for Reducing Postharvest Losses

Ensuring the sustainable development whilst ensuring the food security for the population is the major challenge that we are going through. According to FAO by 2050 to feed our growing population we need to produce 70% extra of the food that we are capable of today. Further trends like climate change, shift of lifestyle, diversifying diet pattern, increasing urban population and decreasing fertile land and biodiversity and this Covid-19 are making the situation more critical.

No doubt Government is doing marvellous job toward it and in due it launching SAMPADA (scheme for Agro -Marine Processing and development of Agro processing clusters) seems a huge initiative. These Food losses occurring between harvesting and sale of the product are the key challenge to us and its threat to food security too.

So, question arises how could we overcome this what sort of strategies producer, middleman and consumer should follow in regard to this. We are surely going to null this threat by following good harvesting and handling practices, taking into account the pre harvesting factors that affect post-harvest quality, better grading process and using suitable packaging material and technique, enhanced storage care and marketing of fruits and vegetables either processed or raw.

Proper Harvesting and handling will decrease the chances of cuts and abrasion this in turn will not allow microbes to grow and spoil the food or decrease its quality. We can harvest it on proper time to save it from thermal shock and absorbing field heat. Availability of in-farm storage facility can really bring down the post-harvest losses. Faster supply of the goods to the market is necessary and a strong supply chain management system will be much helpful in this process.

There are some pre harvesting factors that affects post-harvest quality of the produce and it's critical for any producer to keep in mind. These factors include combination of temperature and radiation that food product receives, it is important for proper growth of any plant. This combination differs for plant to plant. Another factor is relative humidity which has direct effect on the shelf life of the product. Nutrition and proper irrigation ensure the firmness flavour and structure of the food product so it should also be taken care off. Use of proper Plant growth regulators benefits the growth in both quality and quality of the produce.

Grading is most essential process in post harvesting. When you grade your product based on physical characteristics weight shape colour quality specific gravity, we are able to separate immature mature and over matures food products and when sorted they can be either processed or stored accordingly to be into their best attribute for long.

Packaging of food products not only saves the product from further damage and provides better shelf life but it also helps in marketing of the product too and forms essential link between produces and consumer too. Packaging material used can be wooden crates, pallet bins, plastic bags or others as suitable to the product.

Further proper marketing and strategic selling will help the producer to sell the produce in no delay and his quality of the produce would also not be decorated he can either reach out to consumer directly, to retailer, to wholesaler, to contractors or cooperative societies.

Significant progress has been made by developing different strategies to reduce post-harvest losses. With the introduction of new technologies, the process is improved and much more mechanized but these technologies may be more effectively and efficiently organized to reduce more post-harvest loss. Government and private sector must synchronously and simultaneously keep on improving this post harvesting and handling chain together for our future and in forming a better version of our world which is though sophisticatedly technical and digital but still simple and close to nature.

Conclusion

Post-harvest losses occur from the field to retail and even pre harvest practises and decisions are strongly affecting the degree of losses. Post-harvest loss is the issue of food security and poverty. Farmers, middleman, traders and consumers have enough knowledge of cause of losses and how to reduces these losses. Farmers should harvest crop at appropriate stage or time, keep the agricultural produce in proper storage conditions, use appropriate transport facility so that to minimizes product injuries. Therefore, educational and training programs could be the best strategies to combat with post-harvest loss both in the field and during storage.

Post-harvest losses are making the situation worse with economic and environmental loss both.

Due to post harvest losses, there is a measurable loss in in the net harvested product both quantitatively and qualitatively. Hence our prosperous future is really in need of an integrated and innovative approach to tackle this global cause. To tackle this situation, we need to create well equipped modern infrastructure with a highly efficient supply chain management from farm to retail.

References

1. Hodges, R.J., Buzby, J.C., and Bennett, B. 2011. *Postharvest losses and waste in developed and less developed countries: opportunities to improve resource use. Journal of Agricultural Science* 149:37-45
2. FAO. 2011. *Global food losses and food waste: extent, causes and prevention*, by J. Gustavsson, C. Cederberg, U. Sonesson, R. van Otterdijk and A. Meybeck. Rome.
www.fao.org/docrep/014/mb060e/mb060e00.pdf
3. http://face-cii.in/sites/default/files/food_processing_report_2019.pdf
4. Jha, S, R Vishwakarma, T Ahmad and A Rai (2016): "Assessment of Quantitative Harvest and Post-Harvest Losses of Major Crops/Commodities in India," ICAR.
5. Pandey, K (2018): "Poor Post-harvest Storage, Transportation Facilities to Cost Farmers Dearly," 28 August.
6. Gebru H, Belew D (2015) *Extent, Causes and reduction Strategies of Postharvest Losses of Fresh Fruits and Vegetables – A Review. Journal of Biology, Agriculture and Healthcare*, 5(5).
7. Atanda, S.A. Pessu P. O., Agoda S., Isong I. U. and Ikotun, 2011. *The concepts and problems of post-harvest food losses in perishable crops. African Journal of Food Science* Vol. 5 (11) pp.603-6013, 15 October, 2011
8. <https://doi.org/10.17660/ActaHortic.2006.712.100>