

RESEARCH PAPER

Assessing the Post-harvest Losses of Spice Crops: Findings from Ri-Bhoi and West Jaintia Hills Districts of Meghalaya

Indina Lyngdoh Talang, Amod Sharma and Sh. Herojit Singh*

Department of Agricultural Economics, SAS, NU, Medziphema, Nagaland, India

*Corresponding author: herojitsem@gmail.com (ORCID ID: 0009-0009-3570-153X)

Received: 29-11-2023

Revised: 28-02-2024

Accepted: 07-03-2024

ABSTRACT

In this study, an attempt was made to find out post-harvest losses during marketing of ginger and turmeric in the state during 2022-23. Ri-Bhoi and West Jaintia Hills districts are the largest producers of ginger and turmeric respectively and are purposively selected for the study. Three villages growing ginger and another three villages growing turmeric were selected from Bhoirymbong and Laskein blocks in Ri-Bhoi and West Jaintia Hills. The study was conducted on 120 spice growers obtained by randomly selecting twenty from each selected village. The study reveals that the majority of ginger farmers (88.33%) and turmeric farmers (90.00%) are marginal in nature. The average post-harvest loss of ginger and turmeric for all the categories of farmer were 25.73% and 4.54 % where the highest loss of ginger (31.68%) and turmeric (6.37%) were found in small and marginal farmers respectively. High losses of ginger during storage are reportedly due to lack of proper storage facilities of the rhizomes. A proper storage and procurement policy of the spices may be facilitated so that storage losses and losses due to quantity deduction by buyers can be minimized.

HIGHLIGHTS

- Majority of ginger farmers (88.33%) and turmeric farmers (90.00%) are marginal.
- The highest post-harvest loss of ginger (31.68%) and turmeric (6.37%) were found in small and marginal farmers respectively.
- High losses of ginger during storage are reportedly due to lack of proper storage facilities of the rhizomes.

Keywords: Ginger, Marketing, Meghalaya, Post-harvest losses, Turmeric

Spices are aromatic and pungent plant substances that are used in food and other commercial applications for flavor, aroma and pungency (Konyak *et al.* 2022). They have potent medicinal qualities and a significant impact on a person's health and are also intended to enhance the shelf life of food. They are used for diverse range of purposes, the most common of which is culinary (Kannujia *et al.* 2021). India is regarded as the 'Spice bowl of the world' because a diverse number of high-quality spices have indeed been grown ever since ancient period. India has by far the most spice varieties on the planet and cultivates roughly 75 different kinds of spices (Kumar and Rajashekhar, 2017). The

major spices produced in the country are pepper, cardamom (large and small), ginger, turmeric and chillies. (Anonymous, 2020; Konyak *et al.* 2022). The foremost spices that are in high demand are black pepper, cardamom, chillies, ginger, turmeric, coriander, cumin, celery, fennel, fenugreek, garlic, spice oils and oleoresins (Kannujia *et al.* 2021). Ginger (*Zingiber officinale* Rosc), is a widely used spice throughout the world and because of its

How to cite this article: Talang, I.L., Sharma, A. and Singh, Sh. H. (2024). Assessing the Post-harvest Losses of Spice Crops: Findings from Ri-Bhoi and West Jaintia Hills Districts of Meghalaya. *Econ. Aff.*, 69(01): 463-467.

Source of Support: None; **Conflict of Interest:** None



pungency and flavour it is used in many foods and beverages as an additive (Ansari *et al.* 2021). India being the largest producer of ginger in the world produces 11.09 lakh tonnes of ginger and also has its second largest acreage next to Nigeria followed by China, Indonesia and Bangladesh (Ralte and Ekhe, 2022).

In Northeast India, ginger is one of the crops possessing regional advantages. Almost all the states in the region cultivate it however Assam, Sikkim, Meghalaya and Mizoram are the top producers (Ralte and Ekhe, 2022; Bey *et al.* 2023). It is the main cash crops for many ginger growers in the Northeastern region enabling them to support their livelihood (Asati *et al.* 2004). Holding a share of 30 per cent of the region's area and 20 percent of its production, Meghalaya is the largest ginger producer in Northeast India. Ginger is also an important source of income to the people of Ri-Bhoi district and is cultivated on more than 811 hectares, accounting for over 10% of the entire ginger area in the state (Tripathi *et al.* 2007).

India Turmeric (*Curcuma longa*) accounts for 78 per cent of global exports and also has a lion's share of the world's production and consumption, which has been known for its medicinal values for nearly 4000 years and also used in religious ceremonies other than its primary purpose (Prasad *et al.* 2011). The curcumin content of Indian turmeric makes it the best in the global market (Muthusamy, 2013). With 17.63 thousand hectares, Assam has the biggest area among the states, followed by Mizoram and Sikkim. Findings of Bey *et al.* (2023) reported a positive growth rate of Ginger crop area, production and productivity were found to be significantly increasing over the years. Meghalaya stands second in production with 16.63 million tonnes (Ralte and Ekhe, 2022). Jaintia Hills district is where turmeric (Lakadong variety) is grown most. This variety is considered as the world's finest turmeric variety because it has 7.4 per cent curcumin (Anonymous, 2020). Although turmeric is grown in nearly all regions of the state, Jaintia Hills remains to possess the largest area under cultivation and contributes more than half of the state's entire production (Daimei *et al.* 2012). Keeping in view the status and importance of spices cultivation in the state and the prospects it holds in strengthening the livelihood of the locals in future and the lack of research on post-

harvest losses of crops in Meghalaya, an attempt was made to study post-harvest losses during the transaction of spices in the state specially for ginger and turmeric.

MATERIALS AND METHODS

The study was purposively conducted during 2022-23 in the two districts of Meghalaya, Ri-Bhoi and West Jaintia Hills since these are the largest producer of ginger and turmeric, respectively. One block from each district i.e. Bhoirymbong block in Ri-Bhoi and Laskein block in the West Jaintia Hills were purposively chosen for the study because of the highest number of farmers cultivating ginger and turmeric in these blocks, respectively. Three villages growing ginger from Bhoirymbong block and three villages growing turmeric from Laskein block were selected. Lists of households engaged in ginger and turmeric cultivation from the selected villages were prepared with the help of local authorities and farmers, and 20 households were selected from each village using simple random sampling, giving a sample of 120 households.

Post-harvest losses were estimated during the marketing of ginger and turmeric in Meghalaya using the formula,

$$\text{Post-harvest loss (\%)} = \frac{\text{Quantity loss}}{\text{Total quantity received}} \times 100.$$

RESULTS AND DISCUSSION

Post-harvest loss means the decrease in both quantity and quality of any kind of food production from harvesting stage to consumption. Quality losses include those that affect a product's nutrient/caloric proportion, suitability and nutritive value, whereas quantity losses are those which result in a loss of product quantity. This study was primarily concerned with quantity losses. Ginger was harvested twice a year, i.e. June-August and December-January where the mother rhizomes and young rhizomes were harvested and marketed respectively Table 1 reveals the distribution of farmers according to size of land used for ginger and turmeric cultivation. They were divided into three categories, viz.; marginal (< 0.50 ha.), small (0.50 – 1.00 ha.) and semi-medium (>1.00 ha.) farmers. Majority (88.33 per cent) of the ginger farmers fall under marginal followed by small and semi-medium farmers constituting 8.33 per

cent and 3.33 per cent respectively whereas in case of turmeric farmers 90.00 per cent belonged to marginal, followed by small and semi-medium farmers constituting 5.00 per cent each. Altogether, out of the total sampled farmers 89.17 per cent are marginal, 6.67 per cent are small and 4.17 per cent semi-medium as per their size of land used under cultivation of the two spices. Table 2 shows the post-harvest losses of ginger at farmer's level in various stages. Highest post-harvest loss of ginger (31.68 per cent) was found in small farmers followed by marginal farmers (27.76 per cent) and semi-medium farmers (17.74 per cent). However, there was no major differences in the post-harvest losses due to grading and sorting and quantitative deduction by the buyers among different categories of the farmers. In case of ginger crop as stated by the farmers, storage loss (9.55 per cent) was the major loss incurred followed by loss due to quantity deduction by the buyers (9.51 per cent) and grading and sorting loss (6.56 per cent). The storage loss was mainly due to unavailability of well-structured

storage place for storing rhizomes. Majority of ginger producers in the state are lack in storage facilities (Singh *et al.* 2019). On an average there was 25.73 per cent post-harvest loss of ginger for all categories of farmers (Table 2). Primary wholesalers experienced a total post-harvest loss of 20.00 percent for ginger during the stages of grading and sorting, and transportation, as reported in Table 3. Specifically, during the grading and sorting process, primary wholesalers incurred a 12 percent loss.

There were also quantitative losses of turmeric incurred by farmers during grading and sorting, storage and drying constituting 1.36 per cent, 3.18 per cent and 31.98 per cent respectively (Table 4). Although weight loss during drying or loss of moisture was the most significant loss, this cannot be taken to be an economic loss because drying of the rhizomes is an essential part of marketing. In case of turmeric crop the highest loss was incurred by marginal farmers (6.37 per cent) followed by small farmers (3.99 per cent) and semi-medium farmers (3.25 per cent). An overall loss of 4.54 per

Table 1: Distribution of farmers based on size of land holdings under ginger and turmeric

Sl. No.	Category of farmers	Ginger farmers	Turmeric farmers	Total number offarmers
1	Marginal (< 0.50 ha.)	53 (88.33)	54 (90.00)	107 (89.17)
2	Small (0.50 – 1.00 ha.)	5 (8.33)	3 (5.00)	8 (6.67)
3	Semi-medium (>1.00 ha.)	2 (3.33)	3 (5.00)	5 (4.17)
4	Total	60 (100.00)	60 (100.00)	120 (100.00)

Figures in parenthesis are per cent number of farmers.

Table 2: Post-harvest losses of ginger (kg.) at farmer's level

Sl. No.	Category of farmers	Total quantity received	Grading and sorting loss (A)	Quantity deduction by the buyer (B)	Storage loss (C)	Total loss (A+B+C)	Actual quantity held
1	Marginal (< 0.50 ha.)	628.92	48.19 (7.66)	59.98 (9.54)	66.42 (10.56)	174.59 (27.76)	454.33 (72.24)
2	Small (0.50 – 1.00 ha.)	1656.80	112.00 (6.76)	172.80 (10.43)	240.00 (14.49)	524.80 (31.68)	1132.00 (68.32)
3	Semi-medium (>1.00 ha.)	3320.00	175.00 (5.27)	285.00 (8.58)	120.00 (3.61)	580.00 (17.74)	2740.00 (82.53)
4	Average	1868.57	111.73 (6.56)	172.59 (9.51)	142.14 (9.55)	426.46 (25.73)	1442.11 (74.36)

Figures in parenthesis are per cent quantity of ginger.

Table 3: Post-harvest losses of ginger (kg.) at primary wholesaler level

Sl. No.	Intermediaries	Total quantity procured	Grading and sorting loss (A)	Transportation loss (B)	Total loss (A+B)	Actual quantity held
1	Primary Wholesaler	773.67	92.84 (12.00)	61.8 (8.00)	154.73 (20.00)	618.91 (80.00)

Figures in parenthesis are per cent quantity of ginger.

Table 4: Post-harvest losses of turmeric (kg.) at farmer’s level

Sl. No.	Category of farmers	Total quantity received	Grading and sorting loss (A)	Storage loss (B)	Weight loss during drying/ moisture loss (C)	Total loss (A+B)	Actual quantity held
1	Marginal (<0.50 ha.)	437.76	5.29 (1.21)	22.61 (5.16)	257.96 (58.92)	27.90 (6.37)	151.90 (34.71)
2	Small (0.50 – 1.00 ha.)	670.00	6.67 (1.00)	20.00 (2.99)	158.33 (23.63)	26.67 (3.99)	458.00 (72.39)
3	Semi-medium (>1.00 ha.)	1693.67	31.67 (1.87)	23.33 (1.38)	226.67 (13.38)	55.00 (3.25)	1412.00 (83.37)
4	Average	933.83	14.54 (1.36)	21.98 (3.18)	214.32 (31.98)	36.52 (4.54)	682.94 (63.49)

Figures in parenthesis are per cent quantity of turmeric.

Table 5: Post-harvest losses of turmeric (kg.) at trader’s /processor’s level

Sl.No.	Items	Total quantity procured/received	Loss during processing	Actual quantity held
1	Flakes/dried turmeric	153.41	21.48 (14.00)	131.93 (86.00)
2	Fresh turmeric	445.70	89.14 (20.00)	356.56 (80.00)

Figures in parenthesis are per cent quantity of turmeric.

cent was found for all categories of farmers. Table 5 reveals higher post-harvest losses of fresh turmeric (20.00 per cent) than that of flakes/dried turmeric (14.00 percent) at trader’s level.

From the above results it is very clear that in Meghalaya, ginger and turmeric are grown mostly in small scale by the farmers in spite of the state being the largest and second largest producer of ginger and turmeric respectively in Northeast India. Post-harvest losses of both spices are also very high in marginal and small group of farmers. Storage losses are major losses for both ginger and turmeric which are reportedly due to lack of proper and well-structured storage facilities of the farmers. Losses during storage of rhizomes is a major concern for farmers in Northeastern region of India (Singh et al., 2020). Another important post-harvest loss incurred in cultivation of ginger is loss due to quantity deduction by buyers which can be minimized if there is a proper procurement policy of ginger from the farmers. The losses incurred during the storage, sorting, and grading of turmeric were comparatively lower than those experienced with ginger.

CONCLUSION

Meghalaya stands as the primary producer of ginger and turmeric in Northeast India. Nonetheless, the majority of farmers cultivating these spices in the state fall under the category of marginal farmers. Additionally, small and marginal farmers face the highest average post-harvest losses for ginger and

turmeric. Aside from losses incurred during grading and sorting, storage and quantity deductions by buyers represent significant contributors to the post-harvest losses of ginger. Furthermore, post-harvest losses of these spices also prove to be substantial at the primary wholesaler’s and processor’s level. The primary reason for the elevated post-harvest losses of ginger during storage appears to be the absence of adequate storage infrastructure for the rhizomes. To address this issue, the government could establish storage facilities on a district/block/village level, while simultaneously providing training to farmers on the scientific methods of rhizome storage. To mitigate quantity deductions by buyers and alleviate farmers’ concerns about selling their produce, it is advisable to implement an effective procurement policy for the spices. Simultaneously, farmers should be encouraged to expand the cultivation area for these spices by providing them with assistance aimed at enhancing production.

REFERENCES

Anonymous. 2020. Handbook on Spices and Condiments (cultivation, processing and extraction). Accessed on 29th April 2021.

Anonymous. 2022. Department of Agriculture, Government of Meghalaya. Accessed on 10th June 2022.

Ansari, R. F., Choudhary, A. K., and Ahad, M. 2021. A review on ginger (*Zingiber officinale* Rosc) with unani perspective and modern pharmacology. *J. of Medicinal Plants Stud.*, 9(3): 101 – 104.

- Asati, B.S. and Yadav, D.S. 2004. Diversity of Horticultural crops in North Eastern Region. *ENVIS Bulletin*, **12**(1): 34 – 37
- Bey, B.S., Ahmed, R., Singh, R. and Majumder, S.H. 2023. Crop diversification vis-à-vis shifting cultivation in Karbi Anglong district of Assam: an empirical analysis. *Curr. Sci.*, **125**(5): 536-543.
- Daimei, P., Kumar, Y., Sheikh, N., Pfoze, N.L. and Paduna, S. 2012. The finest Lakadong variety of turmeric from the Jaintia Hills of Meghalaya, India. *Pleion.*, **6**(1): 141 – 148.
- Kanaujia, S.P., Narayan, R., Sema, A. and Changiri, M. 2021. Spice Production (A Textbook). 1-2p. 1st ed. Today & Tomorrows Printers and Publishers, New Delhi, India.
- Konyak, T., Majumder, S.H. and Deka, N. 2022. Resource Management in Naga King Chilli Production: Evidence from Nagaland, India. *Econ. Aff.*, **67**(05): 721-729.
- Kumar, D. and Rajashekhar. 2017. Price Spread of ginger in Bidar district of Karnataka. *J. of Pharma. and Phytochem.*, **6**(5): 501 – 503.
- Muthusamy, A. 2013. A study on Export performance of Indian Turmeric. *Ind. J. of Appl. Sci.*, **3**(4): 54 – 56.
- Prasad, S. and Agarwal, B.B. 2011. Turmeric, the golden spice: From traditional medicine to modern medicine. In Benzie IFF, Watchell Galor S (eds.) *Herbal medicine: Biomolecular and clinical aspects*. 2nd ed. Boca Raton: CRC Press/ Taylor & Francis.
- Ralte, R. and Ekhe, B. 2022. Major Spices of North Eastern Hill Region of India: A review. *The Pharma Innov. J.*, **11**(10): 437 – 445.
- Singh, R., Chauhan, J.K. and Feroze, S.M. 2019. Supply Chain Management of Ginger in Meghalaya- Empirical Analysis. *Indian Res. J. Ext. Edu.*, **19**(2&3): 39-45.
- Singh, R., Feroze, S.M. and Kumar, S. 2020. Production of Turmeric in North East Hill Region of India: A Value Chain Analysis. *Indian J. Agril. Econ.*, **75**(4): 359-374.
- Tripathi, A.K., Verma, R.M., Mandal, S. and Hussain, S. 2007. Economics of Ginger Production in Ri-Bhoi District of Meghalaya. *Int. J. of Trop. Agri.*, **25**(3): 637-644.

