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Post-Harvest Losses In Sweet Oranges In Khall Valley Of District Dir Lower, Khyber Pakhtunkhwa

Zahid Khan[1*], Muhammad Azeem[2], Najma Salahuddin[3], Musarrat Ijaz[4], Sundus Hussain[5]

[1,2]Department of Statistics, University of Malakand, Chakdara, Dir (Lower), Pakistan.
[3,4,5] Department of Statistics, Shaheed Benazir Bhutto Women University Peshawar
** Corresponding author Email: zahid.uom1@gmail.com*

ABSTRACT

This study is conducted in Khall valley of district Dir Lower of Khyber Pakhtunkhwa with the objectives to estimate quantity of post-harvest losses in sweet oranges and to determine the factors responsible for post-harvest losses. Primary data is collected from a total number of 62 growers/farmers of sweet oranges by using cluster sampling technique through a well design structure questionnaire. Descriptive statistics and linear regression model are used for analysis of data. Main findings of the study reveal that after harvest, on average 277-420 dozen orange per acre are lost. Result of regression model showed that experience of the farmers, income and number of active family member in farming was negative related with response variable, while distance to market was positively related to post-harvest losses in oranges. The study concludes that accessibility to market reduce the post-harvest losses in the sweet oranges. To overcome post-harvest losses in the area there is a need for assistance of poor farmer financially; improvement in the infrastructure, hiring of labors and identification of model growers will lead to reduce the post-harvest losses in sweet oranges.

Key Words; Sweet oranges, post-harvest losses, Khall valley, linear regression model.

1. Introduction

Most of the developing countries rely on agriculture as an important component of the economy and a vigorous driver of growth (Begum and Yasmeen, 2011). Romero-Paris (2000) highlighted that majority of Southeast Asian countries lives in rural areas depends mainly on agriculture. According to Khan et al. (2008), post-harvest losses in agriculture production occur in every country but heavy losses occurred in developing countries. According to Kader (2005), one third of agriculture product lost after harvest in developing countries. According to Aujla et al. (2011), approximately 30 to 40 percent of fruits lost after harvesting, in the world. Debebe (2022) identified major factors responsible for post-harvest losses of crops. Some of these were; family size, levels of education, income, large landholding size access to extension support services, marketing membership, distance to market.

1.1 post-harvest losses in sweet oranges

Fruits are rich in phytochemicals that protect human populations against diseases. Sweet orange is a good source of folate, potassium, and vitamin C. It also contains phenolic compounds that are important antioxidants (Mwatawala et al., 2018). A size of sweet oranges wasted after harvesting which reduce the profit of the farmer. Some studies investigated the factors affecting post-harvest losses of sweet oranges. Tawanda et al. (2015) found that, during harvesting, transportation, at

the market, the sweet oranges losses at high percentages. Strano et al. (2021) conducted study on effect of cold storage on the post-harvest losses of sweet oranges. They estimated 10 to 14 percent losses in sweet oranges after 67 days of harvesting.

The Khall area, Dir (lower) is very famous for production of sweet oranges. The product of this area is popular for their taste all over the Khyber Pakhtunkhwa and other provinces of Pakistan. Keeping in view the importance of citrus fruits and post-harvest losses in it, the research motivated to conduct study on post-harvest losses in sweet oranges in Khall, district Dir lower, with the following objectives.

1. To estimate quantity of post-harvest losses in sweet oranges in the area.
2. To investigate the different factors responsible for post-harvest losses in sweet oranges.
3. To give some suggestions for decreasing quantities loss after harvest, of sweet oranges on the basis of study findings.

2. Methods and Materials

This study was conducted in Khall valley of Khyber Pakhtunkhwa. Khall is one f the main sweet oranges growing regions in Dir district of Malakand division. In Khyber Pakhtunkhwa oranges of this area is popular. Unfortunately, a huge part of this important fruit lost after harvest. To carry this study, Primary data was collected from a total number of 62 respondents/growers of sweet oranges by cluster sampling method. Information was collected by means of pre-tested structure questionnaire. In order to assess the significant factors affecting the post-harvest losses, linear regression model is used. The model is as follows,

$Yi = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + Ui$

Where;

Yi= post-harvest losses (in dozens)

X_1 = experience of the farmers (in years)

X_2 = distance to market from field (in kilometers)

X_3 = Income (in Pakistani Rupees)

X_4 = active family members in farming (in numbers)

Ui = disturbance term

3. Result and Discussions

The aim of this study is to investigate reasons of post-harvest loses in sweet oranges. Confidence interval for average post-harvest losses of sweet oranges, income and age of former was estimated. The Table 1 shows that on average 277-420 dozen of produce lost after harvest. Moreover, the average income of the former was 15977 to 23157 rupees, and their average age was 38 to 44 years.

Table I; Confidence interval of population mean

S.No	Variable	95% Confidence interval
1	Post-harvest losses	277 to 420 dozen
2	Income	15977 to 23157 rupees
3	Age	38 to 44 years

Table 2 shows the ages of the respondents. Majority of the growers (53%) age was 40 to 49.

Table 2; Frequency Distribution of the Age of Growers of Sweet Oranges

Age	Frequency	Percentage
15—29	11	18
30—39	10	16
40—49	33	53
49 and above	08	13
Total	62	100

Multiple linear regression model was used to investigate the effect of; experience of the farmer, distance to market, income of farmer and number of active members of family in farming.

The estimated regression model as follows;

$Y= 443.387 – 3.397X_1 + 14.432X_2 – 0.22\ln X_3 – 0.33\ln X_4$

-2.282*** 9.162***

-1.806* -1.712* $R^2= 0.40$

* Significant at 0.10

** Significant at 0.05

*** Significant at 0.01

Dependent variable is per acre post-harvest losses in oranges and explanatory variables are experience, distance to market, income and number of active family members in farming. R^2 of this model is 0.40, implies that the model is good model of fit and 40 percent of the variation in post-harvest losses in sweet oranges was explained by factors; experience of the farmer, distance to market from orchard, income of the farmer and number of active family member in farming.

Description of the explanatory variables as;

3.1 Experience of the Farmer

Experience is very important factor of an individual in approximately every field of life. In farming of sweet oranges, the effect of this factor was very important. The coefficient of this explanatory variable in the model was -3.397, indication negative relation with response variable post-harvest losses in sweet oranges. The reason was that experience farmer knows post-harvest handling of sweet oranges than inexperience one. Experience farmer know harvest time, good transport vehicle, near market of the produce etc. Therefore, increasing experience of the farmers, result reduction in post-harvest losses in oranges. The regression model indicated, farmer having one year more experience had 3.397 dozen less losses after harvest of the production than others. Further our analysis showed that this coefficient was highly significant, that is at 0.01 level of significant. This result is match to Hanif and Ashari (2021) who also found farmer experience an influential factor for reducing post-harvest losses in citrus fruits.

3.2 Distance to the Market

Another important factor affecting the post-harvest losses of oranges was distance to market from the orchard. Majority of the farmers soled the produce in the local market which is one to two kilometers away from the orchard. Some orchards were situated far away from the market; no market was available in near area. Therefore, they had more losses after harvest. In the regression model the sign of coefficient of predictor variable distance was positive which shows that both variables change in same direction that is increase in distance result increase in quantity of post-harvest losses and vice versa. The reason of positive sign was bad infrastructure and unavailability of cold

transportation. Metallic road was not viable to majority of the orchard. Thus, during shifting the produce to market, part of the produce was damaged. Further local vehicles were used for transporting purposes which spoiled more produce when it covered more distance. The coefficient of predictor variable distance in the model was 14.432, which shows that one kilometer increase in distance from orchard to market had resulted in 14.432 dozens of sweet oranges. In other word 14.432 dozen oranges damage per kilometer from orchard to market. This is not negligible quantity for a farmer having orchard away from market.

3.3 Income of the Farmers

Incomes play key role in farming sector. High income farmer had high purchasing power of modern instrument of farming. Comparatively, rich farmers had high production and less post-harvest losses. Our analysis revealed negative relationship of income level of farmer and quantity of post-harvest losses in produce. High income farmer had good storage system, transportation, hired trained labor etc and reduce the post-harvest losses by spending money on post-harvest handling. Further the regression model indicated that increase one rupee in income of farmer, on average leads to about 0.22 dozen decrease in post-harvest losses of sweet oranges. In other words, growers had one rupee high income had 0.22 less losses after harvest of the produce than other farmers. Further P value of coefficient of this explanatory variable showed that this was significant at 1 percent. Like the study of Buyukbay (2011), the findings of the current study suggest that farmers having high income made better harvest and transportation and were able to reduce the post-harvest losses of the perishable fruit and vegetable.

3.4 Active Family Member

Faming required experienced and trained labors. According to Kumbhakar (1996) two type of labor was used in farming, family member and hired labor. The efficiency of family member was much higher than hired labor. He had no supervised cost and kept great care of produce than hire labor. The researcher was collected data about number of active persons of family in farming. The regression model indicated negative relationship between number of active family member in farming and quantity of post-harvest losses in sweet oranges. The reason was that family member had greater efficiency than hired labor. The coefficient revealed that farmer using one family member more had 0.33 dozen less post-harvest losses than another farmer. Increase in farming results in a 0.33 dozen decrease in post-harvest losses. The coefficient of this variable was significant at 10 percent level of significant statistically. But economically this variable was insignificant; the relation was very small and negligible.

4. Conclusion and Recommendations

It is concluded form the findings of the study that confidence interval for per acre average post-harvest losses of orange is 277 to 420 dozen. It is found that experience, income, distance to the market and number of active family members in farming are main factors affecting the post-harvest losses of oranges. Analysis reveals that income of growers was very important factor for improving production by reducing post-harvest losses.

To reduce post-harvest loses in oranges, income of the farmer should be concentrated. Farmers having low level of income should be funded by government. So that they can use money in post-harvest handling and reduce post-harvest losses in oranges. Beside of this road to market and

transport facilities for carrying of produce to market should be ensure by government. Policy makers should propose market of oranges nearby to orchard for reducing of post-harvest losses in the produce. Further, farmer should try to involve more family members in post-harvest handling. They should not trust on labor in post-harvest handling. It is also recommended that farmers supervise the labors properly, instructing them not to damage the fruit during post-harvest handling.

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