**Forecasting the sales of the products**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Onion** | | **Potato** | | **Tomato** | | **Carrot** | |
| **Date** | **Purchased** | **Sold** | **Purchased** | **Sold** | **Purchased** | **Sold** | **Purchased** | **Sold** |
| 12-Mar-14 | **420** | **83** | **210** | **34** | **20** | **36** | **30** | **30** |
| 13-Mar-14 | **0** | **53** | **0** | **23** | **40** | **37** | **40** | **25** |
| 14-Mar-14 | **0** | **48** | **0** | **20** | **40** | **31** | **40** | **24** |
| 15-Mar-14 | **266** | **121** | **205** | **56** | **40** | **41** | **52** | **51** |
| 16-Mar-14 | **0** | **201** | **0** | **96** | **60** | **59** | **104** | **87** |
| 17-Mar-14 | **0** | **62** | **0** | **46** | **60** | **47** | **40** | **40** |
| 18-Mar-14 | **0** | **71** | **0** | **44** | **40** | **45** | **40** | **38** |
| 19-Mar-14 | **260** | **81** | **200** | **30** | **40** | **31** | **40** | **23** |
| 20-Mar-14 | **0** | **52** | **0** | **33** | **60** | **32** | **40** | **18** |
| 21-Mar-14 | **426** | **63** | **0** | **34** | **40** | **35** | **40** | **23** |
| 22-Mar-14 | **0** | **121** | **0** | **60** | **60** | **57** | **40** | **45** |
| 23-Mar-14 | **0** | **175** | **210** | **97** | **40** | **71** | **40** | **70** |
| 24-Mar-14 | **0** | **97** | **0** | **34** | **40** | **36** | **40** | **30** |
| 25-Mar-14 | **260** | **59** | **0** | **37** | **40** | **33** | **40** | **22** |
| 26-Mar-14 | **0** | **68** | **0** | **28** | **40** | **27** | **40** | **46** |
| 27-Mar-14 | **0** | **64** | **0** | **30** | **40** | **27** | **40** | **21** |
| 28-Mar-14 | **0** | **66** | **220** | **31** | **40** | **38** | **40** | **24** |
| 29-Mar-14 | **262** | **105** | **0** | **60** | **20** | **38** | **40** | **42** |
| 30-Mar-14 | **0** | **182** | **0** | **102** | **60** | **92** | **40** | **63** |
| 31-Mar-14 | **0** | **43** | **0** | **52** | **40** | **30** | **60** | **33** |
| 1-Apr-14 | **0** | **60** | **0** | **41** | **20** | **41** | **51** | **38** |
| 2-Apr-14 | **480** | **71** | **220** | **27** | **60** | **28** | **52** | **26** |
| 3-Apr-14 | **0** | **55** | **0** | **37** | **20** | **30** | **51** | **23** |
| 4-Apr-14 | **0** | **53** | **0** | **34** | **40** | **25** | **60** | **36** |
| 5-Apr-14 | **0** | **113** | **0** | **78** | **40** | **42** | **60** | **72** |
| 6-Apr-14 | **240** | **166** | **0** | **95** | **40** | **77** | **78** | **34** |
| 7-Apr-14 | **0** | **54** | **210** | **23** | **40** | **34** | **40** | **32** |
| 8-Apr-14 | **0** | **58** | **0** | **34** | **60** | **29** | **40** | **45** |
| 9-Apr-14 | **0** | **38** | **0** | **36** | **60** | **31** | **40** | **28** |
| 10-Apr-14 | **262** | **55** | **0** | **26** | **40** | **24** | **40** | **31** |
| 11-Apr-14 | **0** | **49** | **0** | **27** | **40** | **34** | **52** | **41** |
| 12-Apr-14 |  | 68.17 |  | 44.48 |  | 36.69 |  | 37.20 |

Fig 1: Sales of onion

Fig 2: Sales of Potato

Fig 3: Sales of Tomato

Fig 4: Sales of Carrot

The above table shows the purchase, sold and wastage for the month March and April. It can be predicted form the given data the purchase amount and sold amount and also the trend that the data set is following. Hence, the amount of waste can also be reduced if the amount to be sold is predicted before.

The function used in MS Excel is FORECAST. The procedure is as follows:

1. Place the cursor at the end of the date column and mark the date as 11-Apr-14 i.e., the next date.
2. Place the cursor at the end of the sold column and use the function forecast as FORECAST(X\_unknown, Y\_known, X\_known) where X\_unknown is the inserted date which is to be predicted, Y\_known is the given data on sold and X\_known is the given data on dates.

The trend of the sale can also be predicted by simply using the line chart. The procedure is as follows:

1. Select the line chart from the chart option.
2. Select the trendline as linear trendline from layout option to obtain the trend that the sale is following.

From both the table and graph it can be obtained that the predicted amount to be sold next day is 68 kgs. It can also be obtained on yearly basis. The same procedure can be applied for obtaining the amount to be sold for tomato, potato and carrot. Hence, the perishable products like tomato can be purchased in fewer amounts so that the wastage amount can be reduced.

**Prediction of Price**

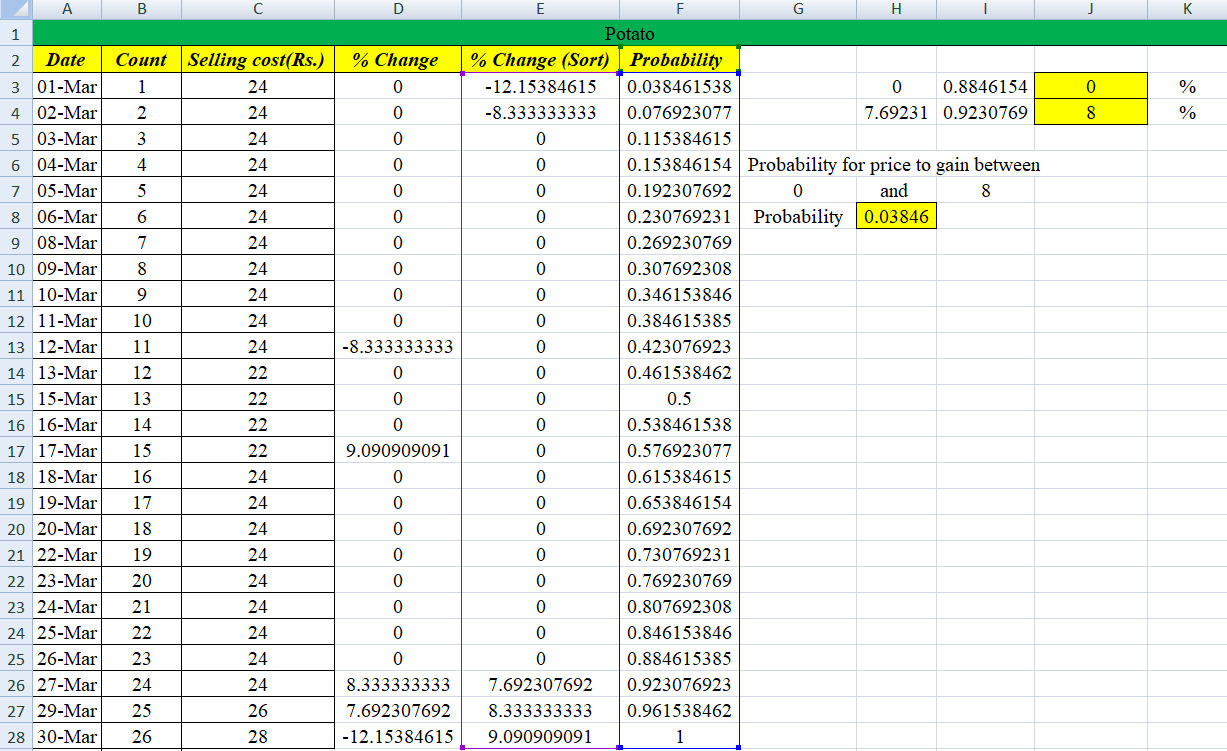


Table 2: Prediction of price for Potato

Fig 6: Probability of price of Potato gain between percentage changes

The objective is to find the probability of the price to go up or down in the next coming days. The future price has been estimated from the given data set of price. The first prediction is the percentage change in the price every day. Step to be followed is provided below:

1. Mark the column with the name “Percentage Change”.
2. To calculate the percentage change at first we need to subtract the present day value from the last day value and multiply it with 100 and divide the result by the last day value.
3. The result is obtained in the column D.
4. In order to sort the value, the function used is SMALL as SMALL(the column to be sorted, the count column).

The percentage change can be implicated as the change in price between previous day and the present day. The percentage change is ordered in ascending order. From the table 2, it is evident that there is 9.09% increase in price on 17th March and there is a decrease of 12.15% in price of on 30th March. Now, equal probability is to be assigned for each change which is to be obtained from the total number of observation. The next step is to calculate the probability of price to gain between the percentage changes. Steps to be followed are:

1. The probability is obtained by dividing the count by total number of counts.
2. The function vlookup can be used to obtain the probability of gain between the percentage changes. VLOOKUP(the value of percentage change, the column of percentage change and the probability).

From the probability column we can calculate the likelihood of occurrence of first 2 changes can happen which is the cumulative probability that is 2 divided by the total number of observation. In other words, the probability that the price will fall more than 8.3% is 0.079. We can also say that the gain of price is not more that 9.09% from the given data. From the table, the probability that the change in price remains less than 8% is 0.92 and the probability that the change on price remains less than 0% is 0.88. The probability of percentage change in price to lie between 0 and 8 is obtained as 0.03846 by subtracting the probability of 0% change in price from probability of 8% change in price. This can be concluded that the probability of 8% and 0% change in price is not more than 3%. The probability can be manipulated according to the wish of the individuals.

Percentage change and probability values can be plotted using scatter plot. From figure 6, it can be concluded that the probability of price to go above than to go below 0% is 0.9 based on the data set.

The similar procedure is applicable for the prediction of price of other vegetables and fruits.

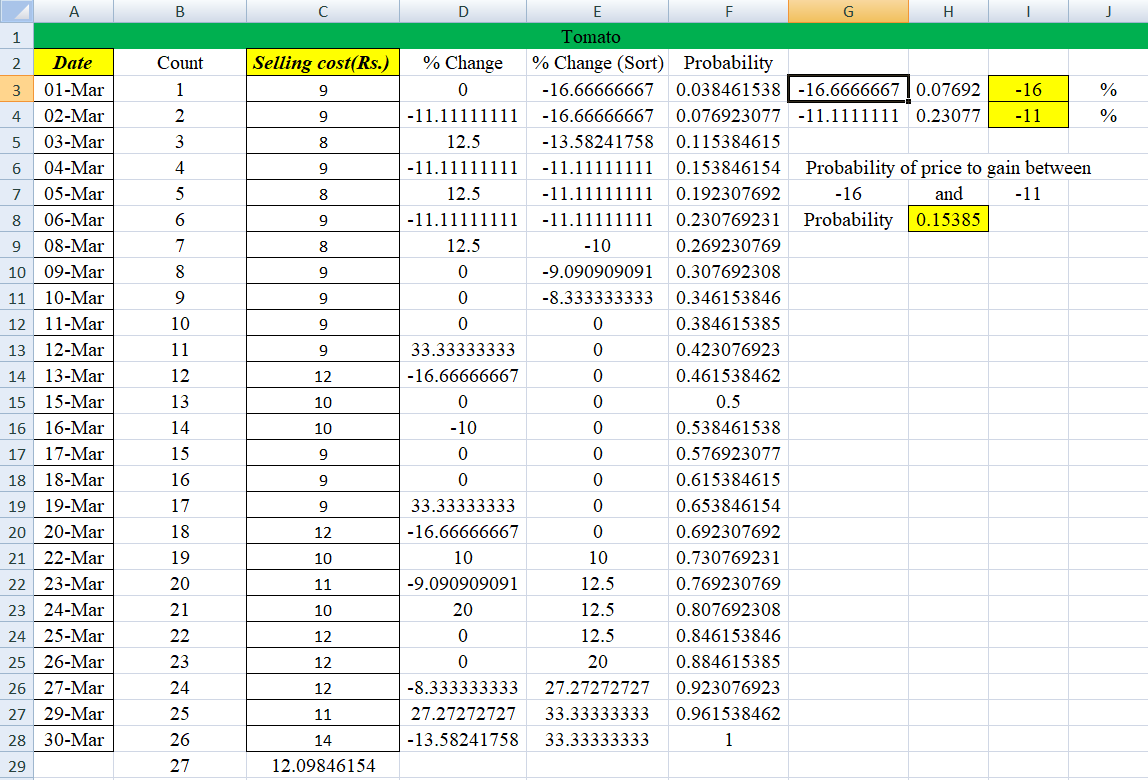


Table 3: Prediction of price for Tomato

Fig 5: Probability of price of Tomato gain between the percentage changes

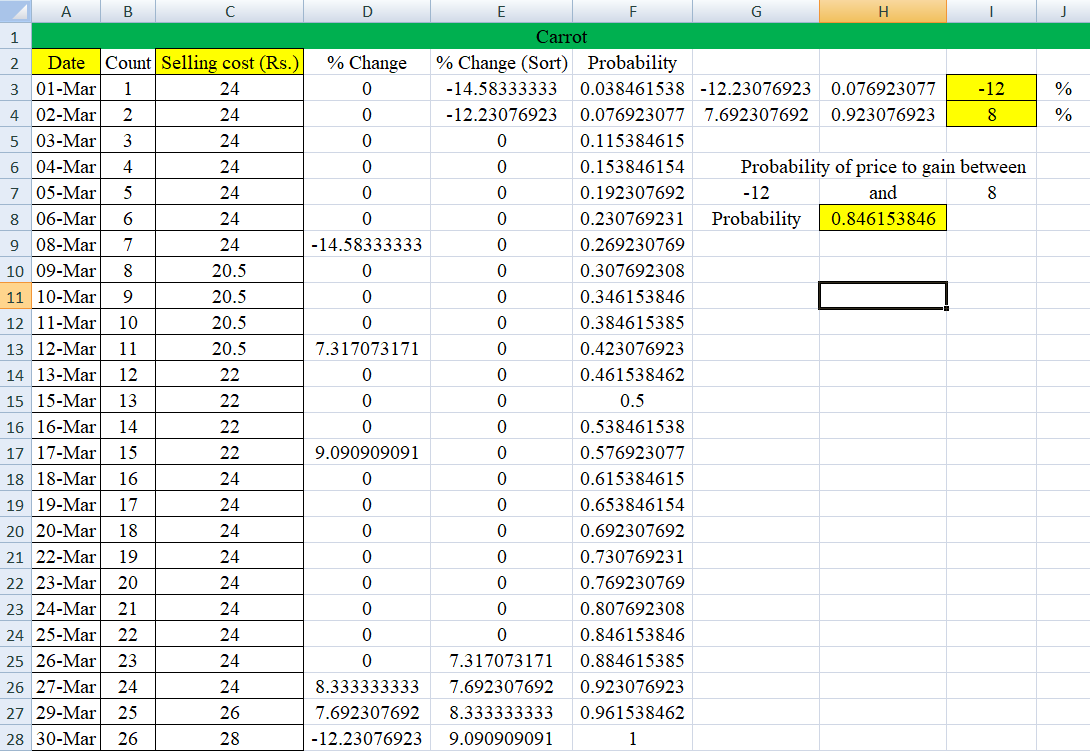


Table 4: Prediction of price for Carrot

Fig 6: Probability of price of Carrot gain between the percentage changes

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Date** | **Koyambedu** | **KPN, Velachery** | | |  |  |  |  |
|  | **Wholesale Price** | **Price** | **Procured** | **Wastage** | **Count** | **% Change** | **% Change(sort)** | **Probability** |
| 28-Mar | 22 | 37 | 40 | 7 | 1 | 2.702702703 | -19.047619 | 0.06666667 |
| 29-Mar | 17 | 38 | 40 | 8 | 2 | 10.52631579 | -11.764706 | 0.13333333 |
| 30-Mar | NA | 42 | 40 | 8 | 3 | 0 | -6.6666667 | 0.2 |
| 31-Mar | NA | 42 | 60 | 11 | 4 | -19.04761905 | -6.25 | 0.26666667 |
| 01-Apr | 10 | 34 | 51 | 6 | 5 | 0 | -5.8823529 | 0.33333333 |
| 02-Apr | 16 | 34 | 52 | 18 | 6 | -11.76470588 | -4.6349206 | 0.4 |
| 03-Apr | 16 | 30 | 51 | 7 | 7 | 0 | 0 | 0.46666667 |
| 04-Apr | 15 | 30 | 60 | 18 | 8 | -6.666666667 | 0 | 0.53333333 |
| 05-Apr | 15 | 28 | 60 | 4 | 9 | 0 | 0 | 0.6 |
| 06-Apr | NA | 28 | 78 | 18 | 10 | 14.28571429 | 0 | 0.66666667 |
| 07-Apr | 13 | 32 | 40 | 12 | 11 | 6.25 | 0 | 0.73333333 |
| 08-Apr | 15 | 34 | 40 | 8 | 12 | 0 | 2.7027027 | 0.8 |
| 09-Apr | 12 | 34 | 40 | 12 | 13 | -5.882352941 | 6.25 | 0.86666667 |
| 10-Apr | 13 | 32 | 40 | 9 | 14 | -6.25 | 10.5263158 | 0.93333333 |
| 11-Apr | 12 | 30 | 52 | 11 | 15 | -4.634920635 | 14.2857143 | 1 |
| 12-Apr |  | 28.6095 | 50.51428571 | 12.0952381 | 16 |  |  |  |

Table 5: Probability of price gain between the percentage changes based on the location (Velacherry)

Fig 7: Probability of price gain between the percentage changes in Velacherry

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Aandavar, IIT Madras** | | |  |  |  |  |
| **Price** | **Procured** | **Wastage** | **Count** | **% Change** | **% Change(sort)** | **Probability** |
| 34 | 18 | 2 | 1 | -17.6470588 | -26.66666667 | 0.06666667 |
| 28 | 25 | 3 | 2 | 17.8571429 | -17.64705882 | 0.13333333 |
| 33 | 19 | 5 | 3 | -9.09090909 | -9.090909091 | 0.2 |
| 30 | 23 | 5 | 4 | -26.6666667 | -7.875457875 | 0.26666667 |
| 22 | 25 | 3 | 5 | 13.6363636 | -4 | 0.33333333 |
| 25 | 25 | 5 | 6 | 0 | -3.703703704 | 0.4 |
| 25 | 25 | 6 | 7 | 0 | 0 | 0.46666667 |
| 25 | 20 | 3 | 8 | 0 | 0 | 0.53333333 |
| 25 | 22 | 4 | 9 | -4 | 0 | 0.6 |
| 24 | 17 | 2 | 10 | 12.5 | 0 | 0.66666667 |
| 27 | 24 | 5 | 11 | 0 | 0 | 0.73333333 |
| 27 | 23 | 5 | 12 | -3.7037037 | 0 | 0.8 |
| 26 | 25 | 6 | 13 | 0 | 12.5 | 0.86666667 |
| 26 | 25 | 3 | 14 | 0 | 13.63636364 | 0.93333333 |
| 26 | 20 | 7 | 15 | -7.87545788 | 17.85714286 | 1 |
| 23.9524 | 23.02857143 | 5.352380952 | 16 |  |  |  |

Table 6: Probability of price gain between the percentage changes based on the location (IIT Madras)

Fig 8: Probability of price gain between the percentage changes in IIT Madras

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Kuberan, CIT Colony** | | |  |  |  |  |
| **Price** | **Procured** | **Wastage** | **Count** | **% Change** | **% Change(sort)** | **Probability** |
| 38 | 24 | 3 | 1 | -7.89473684 | -22.5 | 0.06666667 |
| 35 | 25 | 5 | 2 | 14.2857143 | -21.21212121 | 0.13333333 |
| 40 | 25 | 7 | 3 | 0 | -11.76470588 | 0.2 |
| 40 | 21 | 3 | 4 | -22.5 | -10.34482759 | 0.26666667 |
| 31 | 22 | 4 | 5 | -3.22580645 | -7.894736842 | 0.33333333 |
| 30 | 32 | 7 | 6 | -6.66666667 | -6.666666667 | 0.4 |
| 28 | 24 | 5 | 7 | 17.8571429 | -4.688644689 | 0.46666667 |
| 33 | 25 | 5 | 8 | -21.2121212 | -3.333333333 | 0.53333333 |
| 26 | 25 | 5 | 9 | 0 | -3.225806452 | 0.6 |
| 26 | 26 | 2 | 10 | 30.7692308 | 0 | 0.66666667 |
| 34 | 21 | 7 | 11 | -11.7647059 | 0 | 0.73333333 |
| 30 | 22 | 5 | 12 | -3.33333333 | 0 | 0.8 |
| 29 | 22 | 4 | 13 | -10.3448276 | 14.28571429 | 0.86666667 |
| 26 | 25 | 5 | 14 | 0 | 17.85714286 | 0.93333333 |
| 26 | 25 | 5 | 15 | -4.68864469 | 30.76923077 | 1 |
| 24.781 | 23.75238095 | 4.971428571 | 16 |  |  |  |

Table 5: Probability of price gain between the percentage changes based on the location (Kuberam)

Fig 9: Probability of price gain between the percentage changes in Kuberam

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Local Cart Vendor, Royapettah** | | |  |  |  |  |
| **Price** | **Procured** | **Wastage** | **Count** | **% Change** | **% Change(sort)** | **Probability** |
| 30 | 4 | 1 | 1 | -13.3333333 | -18.51851852 | 0.066666667 |
| 26 | 5 | 0 | 2 | 15.3846154 | -16.66666667 | 0.133333333 |
| 30 | 4 | 0 | 3 | -16.6666667 | -16 | 0.2 |
| 25 | 5 | 1 | 4 | -16 | -13.33333333 | 0.266666667 |
| 21 | 7 | 1 | 5 | 14.2857143 | -13.04347826 | 0.333333333 |
| 24 | 5 | 0 | 6 | 0 | -10 | 0.4 |
| 24 | 5 | 0 | 7 | 4.16666667 | -8 | 0.466666667 |
| 25 | 5 | 1 | 8 | -8 | -8 | 0.533333333 |
| 23 | 5 | 2 | 9 | 17.3913043 | 0 | 0.6 |
| 27 | 4 | 1 | 10 | -18.5185185 | 4.166666667 | 0.666666667 |
| 22 | 7 | 0 | 11 | 13.6363636 | 11.11111111 | 0.733333333 |
| 25 | 5 | 1 | 12 | -8 | 13.63636364 | 0.8 |
| 23 | 5 | 2 | 13 | -13.0434783 | 14.28571429 | 0.866666667 |
| 20 | 5 | 1 | 14 | -10 | 15.38461538 | 0.933333333 |
| 18 | 8 | 0 | 15 | 11.1111111 | 17.39130435 | 1 |
| 20 | 6.152380952 | 1.019047619 | 16 |  |  |  |

Table 7: Probability of price gain between the percentage changes based on the location (Royapettah)

Fig 10: Probability of price gain between the percentage changes in Royapettah