

FORECASTING CITRUS EXPORTS IN PAKISTAN

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ABSTRACT:- The present study was planned to check the trend analysis of export quantity and export value for citrus in Pakistan. The findings of the study are based on citrus export quantity and export value data from 1990 to 2011. Two models of trend analysis were applied but most appropriate model for trend analysis of the present study was quadratic trend model. Forecasting was done from 2012 to 2016. The forecasted export quantities are 1643.13, 1854.03, 2077.80, 2314.46 and 2564.00 thousand tons and forecasted export values are 673.67, 782.34, 898.57, 1022.35 and 1153.68 thousand dollars. Forecasted values are very close to actual values and have positive increasing trend in Pakistan.

Key Words: Citrus; Export Quantity; Export Value; Quadratic Trend Model; Pakistan.

INTRODUCTION

Pakistan is blessed with the agro-ecological environment diversity conducive to the production of about 30 types of fruits. Out of which citrus, mango, dates, guava and apple account for over 75% of the total annual production. The fruits economy of Pakistan is worth more than Rs. 65.5 billion by producing 6.64 million tons and Rs. 5.4 billion were earned through exporting fresh fruits during 2004-05. The share of only citrus fruits in total value of fruits' exports is one-third (GoP, 2006). Citrus occupies an important position among fruits in Pakistan. It accounts for about 40% of total production of all fruits in the country. It is grown on around 185,400 ha. In 2007-08, Pakistan produced 1.67 mt. Pakistan accounts for about 95% of the world total citrus production (Mahmood and Sheikh, 2006).

Pakistan produces 3 - 4% of the world citrus fruits and exports about 0.8% of its harvest. The case of citrus is picked for this study because it is the top most exported item in fresh fruits. Pakistan is the sixth largest producer of kinnow and oranges in the world, with production of 2.1 mt. Pakistan annually produces about 1.70 mt of citrus fruit predominantly kinnow mandarin on about 185,000 ha. Citrus fruit production share is about 40% of the total fruits produced in Pakistan. Citrus fruit is grown in all four provinces of Pakistan. Punjab produces over 95% of the crop and 70% of citrus grown in Punjab is under kinnow because of its favorable growing conditions and adequate water (Nawaz et al., 2007).

The main objective of the study is to forecast the trends regarding exports and accordingly past and future trends of citrus export quantity and export value in Pakistan is calculated

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by using appropriate trend analysis model. Trend analysis studies help policy makers in taking policy decisions.

MATERIALS AND METHOD

The study was conducted by using time series data of citrus export quantity and export value from 1990 - 2011 (22 years) of Pakistan. The data was collected from the various issues of Agriculture Statistics and Economic Surveys of Pakistan. Data was analyzed by using MINITAB software. In this study the linear trend Model was used (Finger, 2007; Boken, 2000; Rimi et al., 2011). Bieler (2010) used Quadratic models of trend analysis. The best model was selected on the basis of three accuracy measures. These accuracy measures were mean absolute percentage error (MAPE), mean absolute deviation (MAD) and mean squared deviation (MSD). Smaller values of all these measures indicate a good fitted Model with minimum forecasting errors (Karim et al., 2010). The best fitted model for this

study was Quadratic model; this model was also applied by Finger (2007). Presently this model was applied for forecasting the export quantity and export value of citrus in Pakistan from 2012 to 2016.

RESULTS AND DISCUSSION

Previous Trends of Citrus Export Quantity and Export Value in Pakistan

Analysing previous trends of citrus export quantity and export value in Pakistan there was zero export from 1990 to 2001. But from 2002 to 2010 there was upward and downward export of citrus in Pakistan. In the end in 2010 citrus export quantity was 3032 thousand ton and export value was 1325 thousand (Figure 1).

Diagnostic Measures for the Selection of Best Forecasting Method for Export Quantity and Export Value in Pakistan

This study applied Quadratic Model for trend analysis of citrus export quantity and export value in

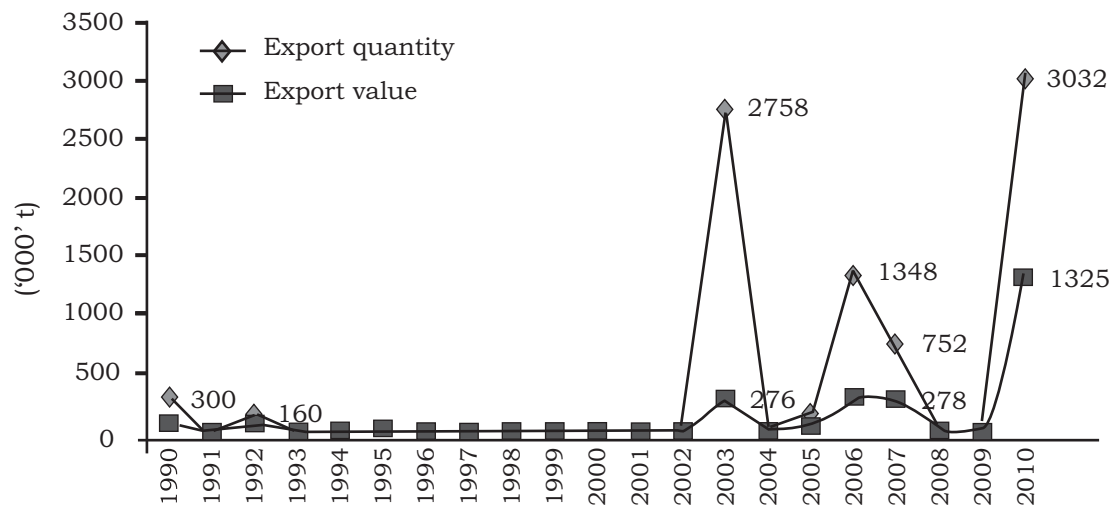


Figure 1. Citrus export quantity and export value in Pakistan

Pakistan on the basis of smaller values of accuracy measures (Karim et al., 2010). All the values of accuracy measures for citrus export quantity and export value in Pakistan are smaller in Quadratic Model, therefore, this model fits best to forecast the future values for citrus export quantity and export value in Pakistan for next six years (Table 1).

Forecasted Citrus Export Quantity

The forecasted export quantity of citrus has positive trend in Pakistan. The trend can be seen through analysis plot for citrus export quantity in Pakistan by using Quadratic Trend Model. The line showed actual values, fitted values and forecasted values of citrus export quantity at 95% prediction interval (Figure 2). Results revealed that if the present growth rates of citrus export quantity remain the same then forecasted export quantity of citrus in Pakistan would be 1643.13, 1854.03, 2077.80, 2314.46 and 2564.00 tons respectively for 2012, 2013, 2014, 2015 and 2016 (Table 2). Forecasted values of citrus export quantity in Pakistan have increasing trend in next five years. Similarly future trends of citrus

export quantity in Pakistan are also depicted.

Forecasted Citrus Export Value

The trend analysis plot for citrus export value in Pakistan by using Quadratic Trend Model showed actual fitted and forecasted values of citrus export value at 95% prediction interval (Figure 3). Results showed that if the present growth rates of citrus export value remain the same then forecasted citrus export value in Pakistan would be 673.67, 782.34, 898.57, 1022.35 and 1153.68 thousand dollars, respectively for 2012, 2013, 2014, 2015 and 2016 (Table 2). Forecasted values of export value under citrus in Pakistan has positive increasing trend in next five years in Pakistan.

A positive increasing trend for export quantity and export value in Pakistan is well evident (Table 2). Citrus export quantity is 1643.13 thousand tons in 2012, which can continuously increase to 2564.00 thousand tons in 2016. Similarly, citrus export value is 673.67 thousand dollars in 2012 which with increase can reach to 1153.68 thousand

Table 1. Best fitted model selection criteria for export quantity and export value

Measures of accuracy	Criteria		
	Mean Absolute Percentage Error	Mean Absolute Deviation	Mean Squared Deviation
Quantity			
Linear Trend Model	3598.0	540.0	608087.0
Quadratic Trend Model	4244.0	447.0	563794.0
Value			
Linear Trend Model	1708.8	152.2	65036.5
Quadratic Trend Model	2247.3	127.6	49812.5

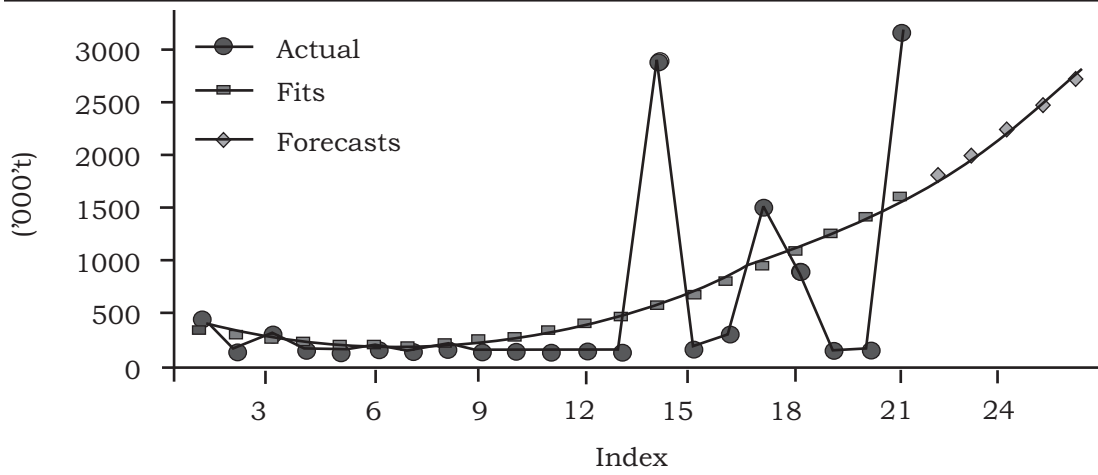


Figure 2. Forecasted citrus export quantity

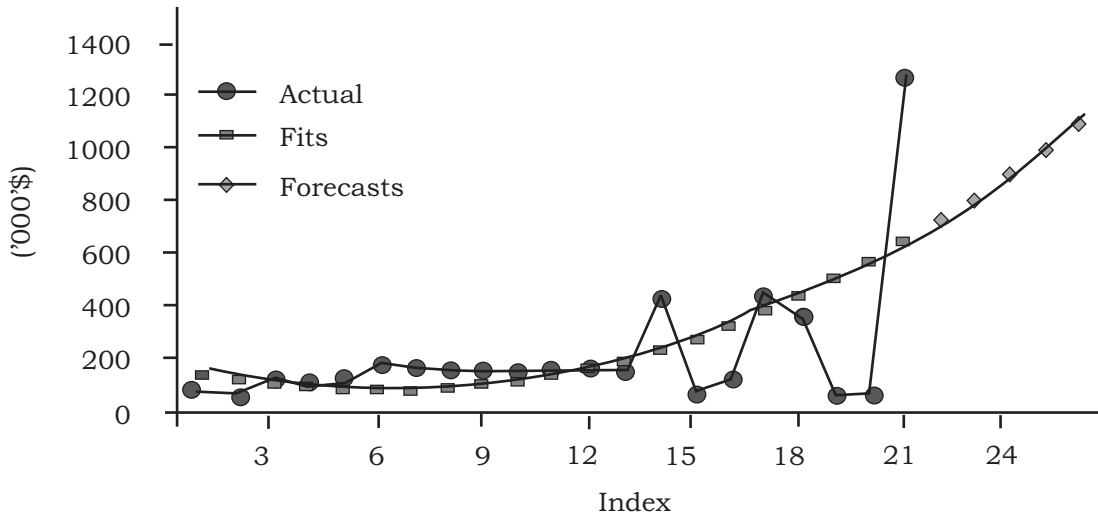


Figure 3. Forecasted citrus export value

dollars in 2016.

Quadratic Model provides good technique for predicting the magnitude of any variable. In this study best model is Quadratic Trend Model on the basis of best accuracy measures techniques. From the forecast available by using the Model, it can be seen that forecasted export quantity and export value has increasing trend from 2012 to 2016. However, it should be updated from time to time

Table 2. Five years 95% forecasted Export Quantity and Export value

Forecast year	Export quantity ('000't)	Export value ('000' \$)
2012	1643.13	673.67
2013	1854.03	782.34
2014	2077.80	898.57
2015	2314.46	1022.35
2016	2564.00	1153.68

with inclusion of current data.

LITERATURE CITED

- Boken, V. K. 2000. Forecasting spring wheat yield using time series analysis: A case study for the Canadian Prairies. *Agron. J.* 92(6):1047-1053.
- Bieler, G.S., G.G. Brown, R. L. Brogan, and D. J. Williams. 2010. Estimating model-adjusted risks, risk differences, and risk ratios from complex survey data. *Amer. J. Epidemiol.* 171(5): 618-623.
- Finger, R. 2007. Evidence of slowing yield growth - the example of Swiss cereal yield. *Agri-food and Agri-environmental Economics Group, ETH Zürich, Switzerland.* p. 11-23.
- GoP. 2006. *Agricultural Statistics of Pakistan.* Ministry of Food and Agriculture (Economics Wing) Government of Pakistan, Islamabad.
- Karim, R., A. Awal, and M. Akhter. 2010. Forecasting of wheat production in Bangladesh. *Bangladesh J. Agric. Res.* 35(1):17-28.
- Mahmood, M. A., and A.D. Sheikh. 2006. Citrus export system in Pakistan. *J. Agric. Res.* 44(3): 229-238.
- Nawaz, A. M., W. Ahmed, and M.M. Jiskani. 2007. High density planting-an approach to increase citrus yields. <http://www.pakissan.com/english/index.shtml>, 2007.
- Rimi, R. H., S.H. Rahman, S. Karmakar, and G. Hussain. 2011. Trend analysis of climate change and investigation on its probable impacts on rice production at Satkhira, Bangladesh. *Pakistan J. Meteorol.* 6 (11): 37-50.