Forecasting Model for the Value of Areca Nut’s Export of Thailand

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Abstract

Having accurate information about the agricultural situation is very important. The predicting trends of agricultural product will allow to make right decision in economy nowadays. The aims of the paper are to demonstrate the trend in areca nut export in Thailand and import in India to specific period and to plan our strategy and policies accordingly to promote areca nut production and export. With this meaning, a study on areca nut export in Thailand and import and production in India from 2013 to 2020 was conducted. The result found that Exponential Growth Model is the most effective for forecasting in the export and import volume of areca nut. The data also was illustrated the trends in 5 years from 2021-2025. The result revealed that the forecasting trend of export volume of areca nut in Thailand for 2021 – 2025 is linearly decreasing from 3.47610MTs in 2020 to 0.450858MTs in 2025. While, the forecasting trend of import volume of areca nut in India for 2021 – 2025 is linear increasing gradually, from 35.5783 MTs in 2020 to 37.2886 MTs in 2025. Areca nut should be considered as an economics crop significantly of Thailand in future for export of Thailand because there are needs in the international market and price still be reasonable. Driving and implementing sustainable agriculture should focus on efficiency and effectiveness truly.

Keywords

Areca Nut, Forecasting Model Export, Import, Agricultural Product.

Introduction

Thailand has been known as an agricultural country, because topography is conducive to do agriculture. In addition, agricultural land was 46.53% of total land area in Thailand (The Office of Agricultural Economics, 2017). The most land in Thailand was used for agriculture. Thus, it is not surprised that agricultural products play vital role in Thailand. The changing circumstances and current problems, for example, crops prices decline, more competitors, political conflict, and trade barriers, have a significant impact on Thai agricultural product price and also income of farmers.
Thus, majority of exporting product is agricultural product. Many previous researches have been keeping study on rice, claimed that it is the most significant agricultural product of Thailand. However, there are more competitors from neighbor countries in this market sharing at the moment. It seems that the market sharing of rice export is going to be more extremely competitive.

Areca nut is the seed of the areca palm, as known betel nut, that is commonly used with betel leaves for the habit of chewing (Boucher & Manna, 2002). Areca nut has been consumed globally by 600 million people (Gupta & Warnakulasuriya, 2002; Arora & Squier, 2019). Areca nut has been popular because it is a common consumption by all sections of people. Many Indian and Asian use areca nut as an essential requisite for several proposes, such as, chewing, local medical treatment, religious, and social ceremonies (Naagarajan & Meenakshi, 2016). Thus, areca nut is an agricultural product in many countries, especially South east Asian countries (Hossain et al., 2015; Naagarajan & Meenakshi, 2016).

The largest areca nut consuming population is in India (Gupta & Warnakulasuriya, 2002; Hossain et al., 2015). According FAO statistics, India used to be considered as the largest production of areca nut in the world. With large of population in India have been consumed areca nut in daily life historically that make market in India is interesting to study. Although, there have been many researches claimed about the harmful effects of areca nut, most of consumers are not aware (Hossain et al., 2015).

Although, areca nut is popular consuming in India and India ranks first in areca nut production in the world, there is still import demand because production volume is not sufficient for domestic consumption (Naagarajan & Meenakshi, 2016). From 1995-2010, the gap between production and consumption has persisted. Consumption volume is always higher than production volume, although, this gap decreased in some years since 1995 (Kammardi, 2012).

To explore a new agricultural product for international market is necessary study significantly. Areca nut is an interesting agricultural product because there are some countries which still need to consume. In 2020, Myanmar was top exporter with an export value of USD 112M, while top importer was India with an import value of USD 75.5M (Tridge, 2021). China was top producer in 2019 (Tridge, 2021). While Thailand was 6th in ranking of global share market of areca nut of 0.26% with export value of USD 499.5K in 2020, and was ranked 7th with the share in import value of USD 787.83K in 2020, and
was also ranked 7th with the share in production volume of 40.04K Tons in 2019 (Tridge, 2021).

Areca Nut was believed as an interesting agricultural product to study. There is some remark about data of areca nut for few years ago that is sufficient data to predict the trend in the future economic growth in agricultural product support.

Moreover, having accurate information about the agricultural situation is very important. The predicting trends of agricultural product will allow to make right decision in economy nowadays. The right decision making about targeting and direction policies should be on the accurate information and current database and knowledge from inside and outside the country. Therefore, this study would address suggestion for utilization of country. It is the right time to demonstrate what the important of agricultural product for growth in Thailand in order to suggest and analyze policies, weaknesses, strengths, potentiality, overseas situations, and the rules of foreign countries support Thailand to evaluate reality and other countries situations, correctly.

Objectives

It is necessary to know the trend in areca nut export of the country and areca nut import in India to learn about reasons why areca nut export of the country is increased or decreased at specific period and to plan our strategy and policies accordingly to promote areca nut production and export. With this meaning, a study on areca nut export in Thailand and import and production in India from 2013 to 2020 was conducted.

Literature Review

Areca Nut in Thailand

There are few numbers of production of areca nut in Thailand. Although, areca nut palm is a plant that farmers in Phatthalung Province grown in a combination with rubber plantations, it is just an interesting supplementary profession for farmers in that area (Palakorn Satsue and Purawich Phitthayaphinant, 2016).

The amount of areca nut production was insufficient to meet the needs of both domestic and foreign markets because areca nut is an important raw material of many continuous industries nowadays (Palakorn Satsue and Purawich Phitthayaphinant, 2016). If we pointed the view that there are still need for consuming areca nut, areca nut palm should be support to be economic crops and encourage farmer to grow areca nut palm mainly.
Moreover, Palakorn Satsue and Purawich Phitthayaphinant (2016) claimed that Thai farmer have skill and knowledge sufficiently in areca nut palm planting. However, farmers still need supporting from government to improve agricultural production. Changing economic and social conditions including the limited capabilities of the farmers has made the traditional agricultural production changed to be more commercial production. Therefore, the government should improve and launch some policies to support farmer in order to improve their well-being and gain more income.

Supporting from Government

Policy on agricultural product’s price insurance program need to be practiced seriously. The government should support the agricultural product’s price explicitly because the agricultural product’s price was an obstacle for growing up and more risky than other sectors. Thai farmers who may be forced to sell agricultural products in lower price than it should be in the market. To guarantee agricultural product’s price helps farmer avoid the risk from unstable economy. To explore new international market for Thai agricultural product is also vital mission that need to practice.

Moreover, support from government by policies, financial assistance, or investment for smart farming is what led to emergence of agricultural improvement (Cobia, 1989; European Commission, 2017; Ministry of Agriculture and Cooperatives, 2017; Johnson & Monke, 2017). Although there were several factors to be considered on adding value in agricultural product encouragement, government support is an important factor that most farmers are interested. The enforcement from government by law, tax policy or government funding will support research and development in agriculture that will help many farmers are interested in adding value in agricultural product. Moreover, the government support will encourage farmers achieve adding value in agricultural product faster.

Method

The Collected Data

The statistical data of areca nut export value of Thailand in 2013-2020 and import value and production volume in India by Tridge (2021) was used for forecasting. Forecasting of areca nut export value of Thailand in 2013-2020 and import value and production volume, which are time series data.
The Analysis of Time Series by Decomposition Method

Decomposition method was used for analyzing time series data. Mean Absolute Percentage Error (MAPE) would choose the best model to forecast. The analysis of time series by decomposition method is the applied analysis of regression and time series analysis together. The time series was split into parts with two basic models, a multiplicative model and an additive model. Regression analysis was applied by the ENTER method for selecting a forecasting model. Applying regression analysis with time series analysis determines trend indication variables. Algorithm for constructing a time series analysis model by decomposition method used Minitab to process statistical data.

Trend Analysis - Growth Rate Analysis

The statistical tools were used for the analysis of the secondary data about growth rate of import, export and quantitative production of areca nut from 2013 to 2020 at the national level. To compute the compound growth rate from these data, the following models were Linear Trend Model, Quadratic Trend Model, and Exponential Growth Curve Model.

Diagnostic Checking

Diagnostic checking is to investigate the adequacy or suitability statistically by verifying the assumptions and properties, including the relationship. If the model is not consistent with the assumptions in statistical or incompetence, it will be a new and revised model. The need to define a new trial and the parameters of the new model until the model is consistent with assumptions and qualifies statistically. When we gain an appropriate sufficient statistical model then used to forecast future values.

Over time, it should be checked whether the model forecasters is still adequate by using new data, if it finds a suitable excuse for new adjustment. In this study, we use MAPE to consider a fit forecasting model with the lowest MAPE. It will take a prophet to predict the value of areca nut import, exports, production advance further.

Result

The Export Volume of Areca nut in Thailand

Eight-year averages, from 2013 to 2020, of the Export Volume of Areca nut in Thailand was forecasted by Linear Trend Model, Quadratic Trend Model, and Exponential Growth Curve Model as shown in Figure 1, 2, and 3 consequently.
Figure 1 Forecasting Result by Linear Trend Model

Figure 2 Forecasting Result by Quadratic Model

Figure 3 Forecasting Result by Exponential Growth Model
When comparing the results of the 3 forecast models the export volume of areca nut in Thailand that are the most suitable 3 methods, the results are as shown in Table 5.

Table 1 Comparing the results of the 3 forecast models about the export Volume of Areca nut in Thailand

<table>
<thead>
<tr>
<th>Forecasting Models</th>
<th>MAPE</th>
<th>MAD</th>
<th>MSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear Model</td>
<td>2693.94</td>
<td>9.19</td>
<td>163.73</td>
</tr>
<tr>
<td>Quadratic Model</td>
<td>1742.91</td>
<td>10.15</td>
<td>131.96</td>
</tr>
<tr>
<td>Exponential Growth Model</td>
<td>430.287</td>
<td>18.156</td>
<td>533.386</td>
</tr>
</tbody>
</table>

From table 1, based on the graphs obtained from the forecast equation, MAPE gave the lowest value, MAD and MSD were the most suitable, thus, Exponential Growth Model is the most effective for forecasting in the export Volume of Areca nut.

The data also was illustrated the trends in 5 years later, from 2021- 2025 by Exponential Growth Model. The result revealed that the forecasting trend of export volume of areca nut in Thailand for 2021 – 2025 is linearly decreasing, as shown in figure 4 and Table 5. In case of export volume, there will be the decrease from 3.47610 MTs in 2020 to 0.450858 MTs in 2025.

Figure 4 Trend of export volume of areca nut in Thailand for 2021 – 2025

Table 2 The Forecasting Trend in Areca Nut Export in Thailand

<table>
<thead>
<tr>
<th>Year</th>
<th>Export volume (MTs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>3.47610</td>
</tr>
<tr>
<td>2021</td>
<td>2.31037</td>
</tr>
<tr>
<td>2022</td>
<td>1.53558</td>
</tr>
<tr>
<td>2023</td>
<td>1.02061</td>
</tr>
<tr>
<td>2024</td>
<td>0.678345</td>
</tr>
<tr>
<td>2025</td>
<td>0.450858</td>
</tr>
</tbody>
</table>
The Import Volume of Areca Nut in India.

Eight-year averages, from 2013 to 2020, of the Import Volume of Areca Nut in India was also forecasted by Linear Trend Model, Quadratic Trend Model, and Exponential Growth Curve Model as shown in Figure 5, 6, and 7 consequently.

![Time Series Plot of Im_volume](image)

**Figure 5** Forecasting Result by Linear Trend Model

![Trend Analysis Plot for im_mts_india](image)

**Figure 6** Forecasting Result by Quadratic Model
When comparing the results of the 3 forecast models the export volume of areca nut in Thailand that are the most suitable 3 methods, the results are as shown in Table 7.

### Table 3 Comparing the results of the 3 forecast models about the import volume of areca nut in India

<table>
<thead>
<tr>
<th>Forecasting Models</th>
<th>MAPE</th>
<th>MAD</th>
<th>MSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear Model</td>
<td>71.904</td>
<td>20.223</td>
<td>447.008</td>
</tr>
<tr>
<td>Quadratic Model</td>
<td>70.597</td>
<td>19.663</td>
<td>440.437</td>
</tr>
<tr>
<td>Exponential Growth Model</td>
<td>60.731</td>
<td>20.224</td>
<td>486.164</td>
</tr>
</tbody>
</table>

From table 3, based on the graphs obtained from the forecast equation, MAPE gave the lowest value, MAD and MSD were the most suitable, thus, Exponential Growth Model is the most effective for forecasting in the import volume of areca nut in India.

The data also was illustrated the trends in 5 years later, from 2021-2025 by Exponential Growth Model. The result revealed that the forecasting trend of import volume of areca nut in India for 2021 – 2025 is linear increasing gradually, as shown in figure 9 and table 8. In case of import volume, there will be the increasing from 35.5783 MTs in 2020 to 37.2886 MTs in 2025.
Discussion

India is always top importer of areca nut. Thus, the agricultural market in India is interesting impressively. The production volume of areca nut in India is not enough to domestic consumption due to there is a huge number of populations who still consume areca nut daily life. However, the import volume of areca nut in India decreased dramatically from 2019, at -54.77%, therefore, the import value has also decreased, at - 49.62%. In 2012, India started launching the policy to restrict import of areca nut because they would to maintain domestic price of areca nut.

ERIA (2020) reported that The Indian authorities issued an announcement on May 15, 2012 that disallowing import of Areca Nut (i.e. Betel Nut) products is not permitted. Department of Commerce Directorate General of Foreign Trade issued the announcements that based on the Standard Input Output Norms (SIONs) book. SIONs is a standard practice in controlling the quantity of imported goods of India. Although the general principle stated that areca nut is disallowing import, there will be a specific permission notice in the standard account which mean to be able to import as Generic...
Description in the standard account of import-export goods. However, it must be in accordance with the updated announcement. India has announced periodic restrictions on areca nut, depending on the domestic production volume. This policy would control domestic sales prices, furthermore, this also prevents large scale smuggling of Betel Nut smuggling, especially from neighboring countries, which causes domestic sales prices to be lower than the standard.

Not only Thailand was affected from this restricted policy but Myanmar, top exporter also was affected mostly. Myanmar Times (2018) reported that India has set restricted import ban on areca nut in a bid to control illegal trade seriously from Myanmar. However, No reason were given concerning the ban from Indian government (Myanmar Times, 2018).

However, Naagarajan & Meenakshi (2016) pointed that the demand is increasing gradually in the developed countries including, USA, UK, Canada, Australia, Singapore, Netherland, and New Zealand because areca nut is also needed for other industries as important raw material. Thus, areca nut should be considered as an economics crop significantly of Thailand in future. Moreover, areca nut should be supported from government to be a main agricultural product for export of Thailand because there are needs in the international market and price still be reasonable.

**Recommendations**

In Thailand, sustainable agricultural development in practice has been still very slow. In the reform of Thai agriculture should be analyzed the problem in the number of farmers, the expansion of agricultural area, and agricultural policy. Driving and implementing sustainable agriculture should focus on efficiency and effectiveness truly. Therefore, there are two issues about Thai agricultural policies that should be considered, following:

1. Thai agricultural policy in long term has never supported the agricultural sector seriously and explicitly, as a result, it makes the agricultural sector is more difficult to grow up and more insecure than other sectors.
2. The price of agricultural products should be raised by promoting and developing the agricultural risk insurance system about crop insurance systems. Policy on agricultural product’s price insurance program need to be practiced seriously. The government should support the agricultural product’s price explicitly because the agricultural product’s price was an obstacle for growing up and more risky than other sectors. Thai farmers who may be forced to sell agricultural products in lower
price than it should be in the market. To guarantee agricultural product’s price helps farmer avoid the risk from unstable economy.

3. The government encourages farmers to develop quality and international standards of agricultural products in order to increase value of product.

4. Policy on financial supporting for smart farming need to be addressed by the government in form of loan and funding. Financial support from government seems benefit, sharing with the financial institutions of government in the form of increasing customers in the loan.

5. Policy on well-being of farmer should be implemented. Agricultural knowledge and technology should be disseminated to farmers seriously and equally. Any farmers can approach knowledge to develop agriculture in term of creating quality of agricultural product.

However, when Thai government conducts any policy on agriculture, they should consider on environment. Expanding international market for Thai agricultural product is vital mission that the government should do immediately. Moreover, government should establish the center to purchase agricultural products in order to add value in agricultural production. The objective of the center to purchase agricultural products is create standard of the processed agricultural products for expanding export. At all levels, government influence on agriculture is often the center of debate. Government policies must balance the costs and benefits to farmers, consumers, the environment, government budgets, and competing interests.

References


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