

Performance and forecast of Indonesian pepper exports to Italy

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Abstract

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The pepper trade in the world today is quite competitive, limiting Indonesia's share of the export market. Consequently, Indonesia must look for new partners. One potential destination country for Indonesian pepper exports is Italy. Unfortunately, Indonesia is not optimally prepared to export peppers to Italy. The aims of this study are to ascertain the performance of Indonesian pepper exports to Italy and forecast its future. The research used Indonesian data and that of its competing exporters to Italy from 1989–2018. Descriptive and autoregressive integrated moving averages were used to analyze the data. Indonesian pepper exports are expected to continue growing in the future. By 2030, it is expected to increase to 25% over 2018. However, to increase those exports to Italy, Indonesia needs to meet the standards of the European Spice Association and strengthen its bilateral cooperation. It must also improve pepper quality and promotion so that it can compete with pepper from other countries.

Keywords: Indonesia; pepper; performance; forecast; competitive

Introduction

In 13th century, pepper was an expensive commodity that Europeans craved. Traders bought pepper in Alexandria, Egypt at 220 dinars, then sold it in Venice for 12 000 dinars (Ashtor, 1983). History details how colonization gave the Europeans access to pepper from other regions. Many countries then became European colony. One colonized country was Indonesia, with its large quantities of pepper (International Pepper Community, 2019). Many European countries, such as Portugal, England, and the Netherlands, sailed there to obtain pepper and other spices (Clark, 1980; Locher-Scholten, 1994). Indonesia has been ruled by 3 countries for almost 3.5 centuries.

Indonesia remains one of the largest spice exporters in the world. However, global competition between exporters requires vigilance. Almost 96% of Indonesian pepper is produced by small plantations (Directorate General of Estate Crops, 2018), so even minor economic shocks can rattle

volatile pepper prices, and slight changes to export quantities or prices can strongly impact farmer income (Razali, 2018).

As noted, the pepper trade in the world today is highly competitive. Viet Nam, which imports pepper from Indonesia, is actually the world's largest pepper exporter. The country also showed a high growth rate in pepper production compared to India, Indonesia, and Brazil (Sudjarmoko et al., 2015).

Fiercely competitive trade potentially reduces the share of Indonesian pepper exports. This will certainly have a negative impact on farmer income, as will the inability of pepper farming to optimally distribute value-added taxes (Kemala, 2006).

One solution to this problem is finding new export markets (Inayah et al., 2015). Some potential targets are countries in Europe, especially the Mediterranean region. In fact, Indonesia has exported pepper to those countries, especially Italy, for a long time. Today, Italian needs for spices are increasing, especially pepper, due to a large number of food

considerations, e.g., color, flavor and preservatives, as well as pharmaceutical uses. Based on UN Comtrade data, in 1994, Italy was importing 3015 tons of pepper. By 2018, that number had increased by 25 percent. However, Indonesia faces competition from other exporters, including Viet Nam, Brazil, and India, and high Italian food regulatory standards.

Indonesia must be able to compete in quality and price against other exporters. Instead, it tends to focus on trade with its traditional partners, especially the United States (US), and pays little attention to other potential outlets. In future, Indonesia must explore the prospects of pepper exports to Italy.

This paper, then, becomes instructive for advancing the Indonesian pepper trade to Italy, meeting its import requirements, and progressing in the international trade competition. The aims of this study are to assess the performance of Indonesian pepper exports to Italy and its forecast for the future.

Literature Review

Trade competition requires a country to promote the comparative advantages of its products and services. The comparative advantage principle requires higher relative productivity and/or lower costs in the production of a commodity. It determines the pre-trade relative prices in each country, terms of trade, and the gains to be had for its trading partners (Gupta, 2015).

Ricardo said that comparative advantage consists of economic agent (capitalists, workers, and landlords) and political economy. But, the main aspect of the comparative advantage is workers (Cinquetti, 2018). It will affect to the cost and price of a product. The comparative cost law states that a products advantage(s) depends on production and distribution costs. If those are low, the price will be lower and its comparative advantage will be stronger (Krugman et al., 2017). The results of a study by Inayah et al. (2015) reinforce that theory. The performance of Indonesian pepper exports increases when there is a decrease in transportation costs. Increased transportation costs drive the overall price up and lower demand as consumers seek out similar goods with lower prices.

In agricultural trade flow analysis, comparative advantage is often neglected (Jambor et al., 2018). In fact, it is an important indicator for improving the trade performance of a country, especially for Indonesia. The country has long been one of the biggest pepper producer-exporters in the world. In 1350, the Indonesian Archipelago Majapahit traded peppers with merchants from China. By the early 17th centu-

ry, Indonesia was known as a supplier of pepper to Europe (Yung-Ho, 1982; Tarling, 1992).

In 2018, Indonesia was still one of the biggest pepper producers in the world. Pepper production in Indonesia increased from 1979–2003. After 2003, though, pepper production declined due to land conversion. The main cultivated areas of pepper in Indonesia are now Bangka Belitung, Lampung, and South Sulawesi Province. Other provinces produce pepper but in small quantities (Directorate General of Estate Crops, 2018).

Indonesian pepper is well-known and has become the world standard. The types of pepper produced by Indonesia are Lampung black pepper and Muntok white pepper. Each has different characteristics and effects on consumer tastes (Prayoga et al., 2020). Both are extremely popular in various countries because of the superior quality of flavor and aroma.

By 2018, Indonesia was the third largest exporter of pepper in the world. Nearly 49% of its production is exported to several countries, including Viet Nam and the US (Directorate General of Estate Crops, 2018). Indonesia also exports pepper to Netherlands, Hong Kong, India, Germany, Japan, Singapore, and Taiwan (Supriana & Yanti, 2013). The US is the main Indonesian pepper export destination, absorbing around 40% of pepper from Indonesia. In the last few years, however, Indonesian pepper exports to the US have dropped. In 2018, Viet Nam was the main destination, absorbing more than 35% of Indonesia's pepper export (International Pepper Community, 2019).

Indonesian pepper exports to Viet Nam are actually not profitable because Viet Nam re-exports the pepper. Based on UN Comtrade data, the price of Indonesian pepper exports to Viet Nam per kilogram is USD 4.16. Meanwhile, Viet Nam will resell the pepper at USD 5.01/kg. Indonesian pepper exports have several problems, including simple technology, pest and disease attacks, limited capital, and a long marketing chain (Lestari et al., 2019). Other problems are that farmers use mediocre seeds that are less than optimal for product processing and promotion (Kemala, 2006).

To maintain its competitive export advantage, Indonesia must find new markets. Producers need to take advantage of the entire business environment to expand their market share (Frates and Sharp, 2005).

Pepper needs in Italy are increasing from year to year. Most peppers imported by Italy from Indonesia are those with HS code 090411 (a classification system for international traded products). The increased need for pepper is due to greater public awareness of the benefits of eating natural food without preservatives (Indonesian Trade Promotion Center Milan, 2013).

Material and Methods

This study uses secondary data from UN Comtrade. The type of pepper used in this study was of the genus *Piper*, ex cubeb pepper, neither crushed nor ground. The data used in this research were the primary pepper export from Indonesia and competing exporter countries to Italy during 1989–2018.

Descriptive and Autoregressive Integrated Moving Average (ARIMA) are used to ascertain the performance and forecast future Indonesian pepper exports to Italy. Analysis of time series data is usually faced with data problems that are not stationary. The data needs to be made stationary by means of differencing. This manner of model is referred to as ARIMA. The model is actually differencing d times and applying ARIMA (p, q). Then the model becomes ARIMA (p, d, q). ARIMA (p, d, q), where p is the order (number of time lags) of the autoregressive (AR) model, d is the degree of differencing to makes the data stationary, and q is the order of the moving average (MA) model (Gujarati et al., 2017; Fattah et al., 2018).

$$(1 - \sum_{i=1}^p \alpha_i L^i) X_t = (1 + \sum_{i=1}^q \theta_i L^i) \epsilon_t,$$

where $Y_t = (1 - L)^d X_t$, so:

$$(1 - \sum_{i=1}^p \theta_i L^i) (1 - L)^d X_t = (1 + \sum_{i=1}^q \theta_i L^i) \epsilon_t,$$

$$(1 - \sum_{i=1}^p \theta_i L^i) (1 - L)^d X_t = \delta + (1 + \sum_{i=1}^q \theta_i L^i) \epsilon_t,$$

$$\text{An ARIMA } (p, d, q) \text{ process } \frac{\delta}{1 - \sum \theta_i}$$

where Y_t – the observation value, X_t – the export by a country, L – lag operator, α_i – the parameters of the autoregressive, θ_i – the parameters of the moving average part, and ϵ_t – error.

Results and Discussion

Performance of Indonesian pepper exports to Italy

Indonesian pepper exports to Italy increased 6–8 times between 1989 and 2018 (Table 1). Peppers in Italy will be used in food industries and pharmaceuticals (Barbero et al., 2016). Increased demand for pepper in Italy and other country is due to growing public awareness of the need to consume healthy food. Italian society began to reduce consumption of salt and sugar by substituting it with savory or spicy seasonings such as pepper (Indonesian Trade Promotion Center Milan, 2013).

The export of Indonesian pepper to Italy faces many competitors, including, since 1989, Brazil, Viet Nam, India, and Malaysia. Viet Nam began supplying pepper to Italy in 2000, and has continued to increase in the last few years, to where it now dominates that market. In 2017, Viet Nameese pepper exports to Italy reached a thousand tons, or almost 3 times the Indonesian exports.

Viet Nam's largest pepper export was initially just black pepper. However, since 2009, the country has also become the world's largest exporter of white pepper (International Pepper Community, 2019). Actually, Viet Nam imports pepper from other countries and then re-exports it. For example, in 2017, it exported pepper amounting to 191922 tons, with 7% imported from other countries, especially Indonesia. These conditions have contributed to the increase in Viet Nam's export competitiveness over the past two decades. From a 1996–2000 RCA value of only 2.57, it rose dramatically to 4.37 during 2011–2015 (Jambor et al., 2018).

Viet Nam is able to effectively develop agriculture because it has a large workforce with low wages and appropriate government policies. Trade policies undertaken by the government include the reduction of business expenses by 20% and actively conducting investment promotions (Clarke et al., 2017).

Viet Nam also implemented a policy of controlling the price on the international market by regulating the pepper planting pattern. Viet Nam's main pepper harvest does not coincide with other exporters. Instead, it sells its products when pepper is scarce, so it gays high price (Viet Nam Trade Promotion Agency, 2007). Rapid economic development has forced Viet Nam to concentrate on developing domestic, commodity-based processing industries, including pepper (Thong et al., 2017). The results of the research of Hoang et al. (2016) and Tran et al. (2019) attributed the success of Viet Nameese pepper exports to the quality of its product management and promotion. The country plans to ramp up pepper production to two thousand tons per year until 2030.

The other country, India, in the early 1990s, dominated pepper exports to Italy. Indian pepper exports at that time were almost 6 times greater than other countries. However, since 2011, the share of Indian pepper exports was overtaken by Viet Nam. Today, in 2020, there is the possibility that Indonesia will take the lead. The situation is caused by the export price of Indian pepper being more expensive than that of other countries. The research from Jacob & Job (2015) shows the freight on board price of Indian pepper in 2015 was 9680 USD/MT while Viet Nameese and Indonesian pepper prices were 8294 USD/MT and 8394 USD/MT, respectively. This makes it difficult for Indian pepper to compete with other countries.

Table 1. Pepper export quantity from Indonesia and its competitor to Italy, kg

Year	Indonesia	Vietnam	India	Brazil	Malaysia
1989	55007	n.a	1202625	241175	118000
1990	46000	n.a	1341250	369750	60000
1991	15000	n.a	997812	1132500	75000
1992	36000	n.a	1149375	451562	13000
1993	15000	n.a	1669125	212296	30000
1994	n.a	n.a	1925062	60312	55500
1995	58000	n.a	2114500	283000	29000
1996	150000	n.a	1873687	107035	28000
1997	n.a	n.a	1788250	178742	28000
1998	161000	n.a	1362062	75054	32000
1999	117488	n.a	1526812	15062	53000
2000	440660	202000	1045817	150000	68500
2001	224000	126266	1102801	240000	58708
2002	469843	638796	1440710	151500	84500
2003	114574	727806	800251	317000	180000
2004	30000	1212645	810062	246790	60000
2005	162000	1402611	836177	119100	900
2006	106000	1627270	997894	224950	3547
2007	30000	1175300	1341730	67602	30688
2008	142000	1329500	1176953	42400	15204
2009	201000	1692810	759369	290150	4026
2010	317441	1196000	1044162	102740	2800
2011	182999	941950	1297427	117140	316
2012	442000	1381240	523653	71280	3013
2013	161350	1474650	883552	57140	3342
2014	174000	1515261	182033	284500	3178
2015	341820	1447933	453320	603100	n.a
2016	492000	1054890	99701	482650	80
2017	383945	1113700	162890	908500	12464
2018	327950	n.a	390248	655205	6230

Source: UN Comtrade (2020)

Another cause of decreasing Indian pepper production is pests and diseases. This has an impact on the competitiveness of Indian spice exports (Jambor et al., 2018). Meanwhile, domestic demand for pepper in India, now estimated at 45 thousand tons per year, continues to rise. As a result, India prioritizes domestic pepper consumption for the culinary and pharmaceutical industries and preservative use (Yongesh & Mokshapathy, 2013). To improve its export position, India implemented the Merchandise Exports from India Scheme. This policy takes the form of 2% export duty credit incentives. It is a product promotion through the Spices Export Promotion Council to procure the infrastructure to improve pepper quality and monitor the grading, packing, and storage processes (Chawla, 2016; Thomas & Sanil, 2019).

In general, the competitiveness of Brazilian spice exports has continued to decline in the past two decades. The de-

crease was due to the declining share of Brazilian spice exports due to being overtaken by other countries such as Viet Nam and China (Jambor et al., 2018). In 2011, Brazil implemented strategies to improve the performance of the pepper trade, including 1) increasing production and productivity, especially the handling of *Fusarium* disease, and 2) increasing pepper quality and its derivative products, especially the monitoring of pesticide residues to be free from *Salmonella* contamination (Jaffee, 2004; Brazilian Ministry of Agriculture, 2011).

Since 1989, Malaysia has not been the main exporter of pepper to Italy. Pepper supply from Malaysia to Italy has been very small and tends to decline. This is because Italy is not the main destination for Malaysian pepper export, China is. The other reason is the price of Malaysian pepper in Italy is USD 12 – 13/kg while Viet Nameese or Indonesian pepper

is USD 6 – 8/kg. This makes importers in Italy prefer the cheaper prices from Viet Nam and Indonesia.

In general, Indonesia also needs to be aware of Malaysia. Malaysia also has the potential to become a pepper exporter to Italy due to its success in increasing its area of pepper cultivation. Initially, pepper was not a priority commodity developed by the government. However, falling main commodity prices (rubber and cocoa) led the Malaysian government and farmers to plant pepper (Olaniyi et al., 2013). Malaysian pepper farming also shows relatively high technical efficiency (Rosli et al., 2013). The country's success in developing the crop is also supported by the Malaysian Pepper Institute, which is coordinated by the Ministry of Industry. That body has the task of conducting research, cultivation, quality control, trade, and processing of pepper. Malaysia is also very advanced in diversifying pepper into medical materials so that it provides many benefits to the country's economy (Abayomi et al., 2016). The Malaysian government formed The Malaysian Pepper Board (MPB) in 2006 to regulate the pepper trade, including buying pepper from farmers and exporting it to international markets. In addition, MPB monitors the quantity and quality of farmers pepper crops to ensure the sustainability of that country's industry (Kamarulzaman et al., 2013).

In addition to being wary of competition with other countries, Indonesian pepper exports to Italy must consider food standard's criteria in the form of a Phytosanitary Certificate, Sanitary Certificate, and Quality Certificate. Italy follows European Union (EU) rules regarding the regulation of food ingredients. Some agricultural products are rejected by Italy for using more pesticides than the minimum limit set by EU rules. For example, Italy refused pepper from Egypt because it exceeded the limit for pesticide levels (Camanzi et al., 2019). The contents of pesticides in food must comply

with Regulation 540/2011 established by the EU. Whereas pesticides that are not yet in the regulation, the Maximum Residue Levels will be set at the default level of 0.01 mg/kg.

Biasetti (2018) states that foodstuffs exported to Italy must include product information, content (gluten, fat, carbohydrate, sugars, protein, salt, and fiber), packaging waste (reuse, recycling, and recuperation), health claims, and labeling (genetically modified and organic). Other certifications to be considered are the Business Social Compliance Initiative and The Ethical Trade Initiative. This regulates labor use, especially the prohibition on the use of child labor.

The Indonesian government has actually made a mandatory regulatory requirement for the export of spices to the EU, namely, Europe Standard Association (Table 2). The regulation notes several important points, regarding food safety (General Food Law by EU, HACCP, and Quality Minima Document of the European Spice Association/ESA), that it be free from contaminants (aflatoxin, pesticides, and salmonella), fall under the maximum radiation limit (average overall dose maximum absorbed radiation is 10 kg), and comply with additive regulations (Indonesian Ministry of Trade, 2019). This is to ensure that Indonesia will not expose import ban from Italy. The import ban will reduce comparative advantages of a country (Smutka et al., 2019).

In general, Indonesian pepper export rules are in accordance with the ESA rules. However, Indonesian pepper exports have ever been rejected because they contain aflatoxin (Ariyanti, 2015). This substance is produced by *Aspergillus* spp. and causes health hazards, such as immunotoxicity and even death (Kumar et al., 2016). The most important step that needs to be done at this time is to conduct strict supervision of Indonesian pepper exports to Italy that conform them to the standards set by the EU.

Table 2. Assessment of the Italian food standards with the Indonesian pepper export rules

Criteria	Italian Food Standard	Indonesian Pepper Export	Result
The general principles and requirements of food law and stages of food/feed production and distribution	Yes, example : (Regulation (EC) No 764/2008 of the European Parliament and of the Council on the application of certain national technical rules regarding products, Council Regulation (EU) No 1308/2013 : marketing system for agricultural products)	Yes, example Indonesian National Standards (INS) 01-0004-1995 for white pepper and 01-0005-1995 black pepper	Need adjustment, example water content (INS 13% and ESA 12%), ash content (INS there is no standard and ESA 3.5%)
Residues, pesticides, veterinary medicines and contaminants	Yes	Yes, based on Indonesian Ministry of Agriculture Rule 55/Permentan/OT.140/9/2012 and 55/Permentan/KR.040/11/2016	Appropriate, example aflatoxin contaminant in Indonesia is 15 µg/kg appropriate with Commission Regulation (EC) No 1881/2006
Traceable	Yes	Yes, based on Indonesian Ministry of Trade Rule	Appropriate with ESA

Source: EU and the Indonesian Ministry of Trade and Ministry of Agriculture Rules

The research by Kemala (2006) shows that Indonesia needs to expand planting region, increase the use of high-yield varieties, agricultural extensions, and institutional and industrial strengthening to improve the competitiveness of Indonesian pepper. This needs to be done because the price of Indonesian pepper in the Italian market has actually been able to compete with Viet Nam. However, Indonesia needs to improve its pepper quality to raise its market share in Italy.

The last challenge faced by Indonesia when exporting pepper to Italy is that country's cooperation with other countries. For example, the largest pepper exporting country to Italy, has established regional cooperation with other members in the EU–Viet Nam Free Trade Agreement) so that the Viet Nameese pepper trade becomes more efficient (Hai & Thang, 2017; European Union, 2019). Italy has also established cooperation with North African countries through the Agadir agreement. That agreement develops agricultural exports between Italy and countries in North Africa, including pepper exports (Hedoui et al., 2019). Moreover, the distance from North Africa to Italy is an advantage because transportation costs are cheaper, driving down the price of pepper from North Africa. So, this cooperation could presumably reduce the quantity of Indonesian pepper exports to Italy.

Indonesia can take advantage of the EU–Indonesia FTA negotiations that were launched on 18 July 2016. Indonesia must use it for negotiations on various quality products, including pepper. Indonesia and Italy will also have cooperative agriculture negotiations in 2020. The Indonesian Ministry of Agriculture with the Republic of Italy Ministry of Agriculture, Food and Forestry created an MOU related to agriculture cultivation and mechanization, water resources management, education and training, research, and human resource capacity development. This collaboration is also

committed to increasing the value of trade and investment in agriculture. Indonesia must try to take advantage of this cooperation, especially to negotiate food standards and import tariffs.

Good cooperation between Indonesia and Italy can contribute to the exchange of information between the two countries. Italy can share information on their consumers' preferences so that Indonesia can improve pepper quality. The exchange of information in the markets can significantly affect the export performance of a developing country like Indonesia (Nicita & Olarreaga, 2007). The experience of Indonesian pepper that Italy rejected should be resolved by negotiations between the two countries. On the one hand, Indonesia needs to meet Italian food standards but on the other hand, there of course needs to be a special relief that can be negotiated between the two countries. As for tariffs, Italy must implement a pepper tariff policy in accordance with the EU Directorate-General Taxation and Custom Union. At present, the Italian import tariff for Indonesian pepper with HS code 090411 is 0.00%. This rate is certainly very profitable because the price of Indonesian pepper in the Italian market becomes cheaper. This advantage must be maintained by Indonesia through close cooperation with Italy.

Forecast of Indonesian pepper export to Italy

To predict future Indonesian pepper exports to Italy, an ARIMA analysis will be conducted (Table 3). The model in this research must use the first derivative because the data is not stationary in the level. After that, it is necessary to look for AR (p) and MA (q) derivatives that provide the most significant value of ARIMA (p. d. q). Several models have been tried (1.1.0), (0.1.1), (1.1.2), (2.1.1), and (2.1.2)—but the best is ARIMA (1.1.2), because all of its independent variables have the most significant value.

Table 3. ARIMA model of Indonesian pepper export to Italy

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	10354.22	2765.452	3.744135	0.0010
AR(1)	-0.999998	0.172391	-5.800753	0.0000
MA(2)	-0.999096	0.004197	-238.0778	0.0000
SIGMASQ	1.28E+10	3.53E+09	3.629207	0.0013
R-squared		0.421525	Mean dependent var	9411.828
Adjusted R-squared		0.352108	S.D. dependent var	151384.8
S.E. of regression		121852.3	Akaike info criterion	26.53464
Sum squared resid		3.71E+11	Schwarz criterion	26.72323
Log likelihood		-380.7523	Hannan–Quinn criterion	26.59371
F-statistic		6.072355	Durbin–Watson stat	1.508821
Prob (F-statistic)		0.002987		
Inverted AR Roots		-1.00		
Inverted MA Roots		1.00	-1.00	

Next, the analysis of the model is continued by forecasting. Indonesian pepper exports to Italy, according to the forecast, will continue to increase until 2030 (Table 4). In the next decade, Indonesian pepper exports to Italy are expected to increase by 25%. This condition occurs with the assumption of intensive steps taken by Indonesia. However, Indonesian pepper exports can increase faster if there are efforts to improve the agribusiness of these plants, especially product quality. Moreover, the Indonesian government has done a lot of innovation by adjusting pepper export standards with the Italian requirements and strengthening agricultural cooperation with the Italian government over the last two years.

Table 4. Forecast of Indonesian pepper export to Italy 2019–2030

Year	Quantity, kg
2019	356841.44
2020	365419.04
2021	377549.88
2022	386127.49
2023	398258.33
2024	406835.95
2025	418966.78
2026	427544.40
2027	439675.22
2028	448252.88
2029	460383.67
2030	468961.31

Conclusion

Indonesian pepper exports to Italy show an increasing trend. By 2030, it is expected to increase to 25% over 2018. However, Indonesia still faces challenges in the form of intense competition with other countries, Italian food standards rules, and Italy's cooperation with pepper exporting countries.

Indonesia must focus on increasing the quantity of pepper exports to Italy because the Indonesian pepper price has advantages compared to other competing countries and the pepper import tariff applied by Italy is still low. However, Indonesia needs to maintain the quality of its pepper by monitoring its cultivation (Good Agricultural Practices) and post-harvest (Good Manufacturing Practices), as well as adjusting export regulations with Italian food standards (European Spice Association/ESA). There are several Indonesian export regulations that are not in line with the ESA rules.

Indonesia also needs to increase its promotion of pepper in Italy. It must prioritize lobbying between the govern-

ment and Indonesian business people with business people in Italy. Indonesia needs to convey information about better pepper quality and lower prices compared to other exporters through the Directorate General for National Export Development in Italy.

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