GOVERNMENT POLICY AND REGULATION TO SUPPORT THE INTERNATIONAL TRADE OF MALUKU HIGH-GRADE NUTMEG COMMODITY IN SPATIAL PERSPECTIVE OVERVIEW

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Abstract

Purpose: Based on World Trade Organization (WTO) Agreement, Indonesia had an obligation to conduct international trade based on the liberalization principle. The International Trade should conduct non-discrimination among member states, except there is a condition fulfilled under the general exception. One of the exceptions is about international standards related to Sanitary and Phytosanitary Measures. This article will elaborate on what extend Government policy and regulation should support international trade by complying with the international framework.

Methodology: The method used in this research is the Analytical Descriptive Survey Method. The data collection technique used is a phased sampling process (Multistage Stratified Random Sampling) by taking into account the complexity of the population gradually from the Population Cluster to the farmer stage. In the final determination of the farmers that will be sampled, two non-probability sampling schemes, Judgment Sampling, and Snowball Sampling are used.

Main Findings: Based on the search from secondary data, it was obtained that the development of nutmeg potential in Maluku, in its area, number of farmers, and production for five years (2012-2016) experienced fluctuations, in which it increased in 2016.

Implications/Applications: The development of the nutmeg industry in the Maluku Islands requires various programs aimed at improving the quality and productivity of nutmeg commodity so that it can ensure the continuity of supply chains and the sustainability of nutmeg industry development. Some of the programs are suggested after careful analysis of the data obtained.

Novelty/Originality: The combination of technical and social aspects is compiled within the Geographic Information System and spatially visualized, then can be classified comprehensively into a zone of nutmeg presence in the Maluku Islands. The Information of Nutmeg condition in several areas with spatial technique analysis is useful to the development of supporting infrastructure, capacity building of nutmeg farmer society, nutmeg industries, and Government Policy of Maluku Province to develop their nutmeg product.

Keywords: Spatial Analysis, Spices, Nutmeg, Maluku Island, International Trading.

INTRODUCTION

Until now, Indonesia has been included as one of the biggest producers and exporters of nutmeg, with a 75% world market share (Sutiono et al., 2018). The main markets for the export of Indonesia nutmeg (from the side of export volume) are Vietnam, the United States, Netherlands, Germany, and Italy. As for the side of export value, the Netherlands becomes the export destination country with the highest value. The number of exports from Indonesia in 2011 reached 14,186 tons with a value of US$135,933. Indonesia also dominates the European Union market share with an annual export value of 30 million euros. (Table 1) (Yield, n.d.).

The Province of Maluku is one of the five biggest nutmeg producer provinces in Indonesia (Tjokrodiningrat, et al., 2016), besides North Maluku, Aceh, North Sulawesi, and West Papua. According to Supriadi from Spice and Medicinal Plant Research Institute, Indonesia is the largest nutmeg producer in the world that supplies around 66-77% world market, in which most of the nutmeg plantations (99.2%) are cultivated by crofters from the five provinces (Table 2) (Direktorat Jendral Perkebunan, 2017).

Ironically, around 62% of nutmeg exports from Indonesia to the European Union have been rejected because Indonesian nutmegs are detected to contain aflatoxin in the last 17 years (Pesavento et al., 2016). The nutmegs contaminated by aflatoxin are found in every level of the domestic market chain, starting from the farmers, collectors, until the exporters. It shows that aflatoxin in nutmeg is already common and very serious (Kokanuch, 2018; Supriadi, 2017).

In line with the case above, the Agriculture Quarantine Agency, Ministry of Agriculture in its publication through newsletter January – March 2016 editions noted that the rejection of Indonesian nutmeg exports by the European Union is related to health standard. The majority of complaints and rejections from the destination countries are related to the excess of aflatoxin and ochratoxin contents that are above the maximum threshold, in which the maximum threshold that
is required by the European Union is 5 ppb for aflatoxin B1 and 10 ppb for total aflatoxin. As for other cases of rejection, they occur due to the lack of health certificate in the product’s reason (Badan Karantina Pertanian, 2016).

Table 1: Exports of Indonesia Nutmeg to 10 Destination Countries in 2006-2011

| Country    | 2006     | 2007     | 2008     | 2009     | 2010     | 2011     |
|------------|----------|----------|----------|----------|----------|----------|
| Vietnam*   | 4,422    | 4,392    | 3,455    | 4,076    | 3,777    | 3,727    |
| The United States* | 1,226  | 779      | 1,539    | 1,417    | 1,397    | 1,812    |
| Netherland* | 2,471    | 1,968    | 1,472    | 1,247    | 1,929    | 1,808    |
| Germany    | 709      | 700      | 601      | 989      | 1,265    | 1,206    |
| Italy      | 241      | 404      | 439      | 366      | 664      | 1,006    |
| India*     | 2,485    | 1,148    | 621      | 559      | 848      | 902      |
| Japan      | 544      | 522      | 553      | 544      | 558      | 713      |
| Malaysia   | 758      | 682      | 697      | 575      | 727      | 620      |
| France     | 319      | 103      | 57       | 131      | 198      | 423      |
| Singapore* | 1,349    | 1,085    | 916      | 505      | 448      | 324      |

Source: U.N. Food and Agriculture Organization’s FAOSTAT database, 2011.

Table 2: Nutmeg Area and Production in 2011

| Province  | Area (Ha) | Production (Ton) |
|-----------|-----------|------------------|
| Aceh      | 20,512    | 2,692            |
| Maluku Utara | 35,419  | 4,436            |
| Sulawesi Utara | 16,016  | 3,024            |
| Papua Barat | 7,548   | 1,373            |

Source: Directorate General of Plantations, 2011.

The rejection of Indonesian nutmeg has an impact on the economy which also directly affects the welfare of farmers and is detrimental to the image of Indonesia as the producer of nutmegs with the best quality in the world (Nurtjahja et al., 2018; Wang & Lee, 2017). The low quality of the nutmeg is caused by several factors including lack of maintenance, low productivity because half of the plants are old or not productive and have not used high-quality seeds, farmer institutions that are still weak, and low production quality. So, to be able to compete in the world market, an increase in production and product quality that meets the international market standard as well as the support of facilities and infrastructures are required (Asghar et al., 2020; Ehrenpreis et al., 2014; Okano et al., 2012).

The country's international trade activities can be carried out not only in the bilateral framework but also in regional and multilateral frameworks. Several international agreements are made to carry out international cooperation to increase international trade between countries. Indonesia is involved with various countries in the form of bilateral agreements with terms, in general, to jointly increase the international trade figures of the two countries. Another effort from countries in the world in increasing international trade is a cooperation between countries within one region, which are considered to have homogeneity so that it will be easier to reach several agreements, namely ASEAN (Association of Southeast Asian Nations) as one of the regional organizations between ASEAN member countries. Regarding the economy and international trade, Indonesia along with other ASEAN member countries are committed to increasing the economic activities of ASEAN countries by establishing a single market known as the ASEAN Economic Community in 2015. Whereas in the multilateral framework, there is a multilateral international trade organization called the World Trade Organization (WTO) and Indonesia has become its member country since 1994. In addition to the cooperation frameworks mentioned earlier, a broader pattern of cooperation begins to be sought, namely, collaboration carried out by a regional international economic organization with a third country that does not exist in the same region. An example of the international trade cooperation is the cooperation between ASEAN and China in the framework of the ASEAN China Free Trade Agreement (ACFTA) or also the one currently in negotiation is the collaboration between Indonesia and the European Union, known as the EU CEPA (Comprehensive Economic Partnership Agreement). Several negotiations are carried out within the framework of international trade including international standardization.

RESEARCH MATERIALS AND METHOD

The method used in this research is the Analytical Descriptive Survey Method (Pinsonneault & Kraemer, 1993). Descriptive research is intended to obtain a description of the characters associated with the nutmeg research that will be carried out. This research is descriptive and verification. Descriptive research is research intended to obtain a picture of consideration or description of the nutmeg in Maluku. On the other hand, verification research is intended to find out what aspects that determine the quality of the nutmeg through a process of hypothesis testing based on data in the field. Based on these limitations, then two methods are used in this study, namely the descriptive survey method and explanatory survey method (Somekh & Lewin, 2005).
The data collection technique used is a phased sampling process (Multistage Stratified Random Sampling) by taking into account the complexity of the population gradually from the Population Cluster to the farmer stage (Lohr, 1999). In the final determination of the farmers that will be sampled, two non-probability sampling schemes, Judgment Sampling, and Snowball Sampling are used. In the first type, Judgment Sampling, the sample unit to be taken is based on the expert judgment which in this case involves the relevant Maluku provincial government and nutmeg farmers. Besides, the Snowball Sampling scheme is used to collect data from other farmers (Ocholla et al., 2013), so that the sampling process continues to grow following the recommendations of previously sampled farmers (Noopataya et al., 2015). The survey data is processed using the weight of the evidence overlay method, in which weighting is done based on the respondents' answers (Fan et al., 2011; Gnagnon, 2020; Weed, 2005). This weighting result becomes an attribute for further analysis using spatial analysis (Brusndon et al., 1996). This spatial analysis uses weighting from the values produced on the indicators divided into technical aspects and non-technical aspects (Haining, 1990). The weighting is divided into 4 zones based on the range of the sum of the value results of the indicators in each aspect. The four zones are Zone A (Very good) with a value range of 76-100, Zone B (Good) with a value range of 51-75, Zone C (Poor) with a value range of 26-50, and Zone D (Bad) with a value range of 0-25 (Hope & Clarkson, 2014).

Both technical aspects and non-technical aspects have different indicators, those are:

a. Technical aspects consist of indicators of Seed Origin, Seeding Patterns, High-Producing Blocks, Cultivation Patterns, Interference, Harvest Patterns, Harvesting Tools, Drying, and Storage.

b. Non-technical aspects consist of indicators of Supporting/Assistance (Seeding), Supporting/Executors (Harvesting), Executors (Post Harvest), Executors (Marketing), Certification, Collectors, Prices, Processed Products, Public Figures.

RESULTS AND DISCUSSION

Nutmeg Farming in Maluku Island

Based on the search from secondary data, it was obtained that the development of nutmeg potential in Maluku, in its area, number of farmers, and production for five years (2012-2016) experienced fluctuations, in which it increased in 2016. It was recorded that in 2016 the area of young plants was 12,644.5 ha, producing plants was 16,828.6 ha, and damaged plants were 2,074.3 ha. The total planting area reached 31,547.4 ha, or almost about 19% of the total area of nutmeg in Indonesia. With this vast area, the nutmeg plantation in Maluku Province produces 5,020.2 tons of nutmeg production (Table 3) (BPS Provinsi Maluku, 2017).

| Year | Area (Ha) | Farmer | Production (Ton) |
|------|-----------|--------|-----------------|
| 2012 | 31,205    | 27,179 | 4,307           |
| 2013 | 26,587    | 26,244 | 4,321           |
| 2014 | 28,436    | 27,775 | 4,743           |
| 2015 | 30,357    | 27,782 | 4,406           |
| 2016 | 31,547    | 28,363 | 5,020           |

Source: (Maluku Province BPS, 2017)

With its potential, Maluku Province has two companies that run the nutmeg export business, namely PT. Ollop and PT. Kamboti. The two companies export nutmegs to the Netherlands and must go through Surabaya to carry out laboratory checks related to the nutmeg quality. If they have been declared worthy of export, then the nutmegs will be moved to a container that has export standards. In the last two years, PT. Ollop has received complaints from importers because the nutmegs stay too long in Surabaya. Another problem affecting PT. Ollop is the discovery of aflatoxin in the nutmegs sent to the Netherlands and this problem was found in up to three shipments. Because of this, PT. Ollop chose to close the company.

Until now, it is only PT. Kamboti Pusaka Maluku that still operates the nutmeg export business. In its business experience, PT. Kamboti has collaborated with a nutmeg export company from Manado to strengthen company capital. PT. Kamboti has a representative office in the Netherlands to run nutmeg exports to Europe. In addition to Europe, PT. Kamboti expands its export market to Asian countries. Regarding aflatoxin, PT. Kamboti has a strategy to reduce the development of aflatoxin in its nutmegs. The strategy includes buying nutmeg directly from farmers, but what is purchased is the nutmeg that has not been dried. PT. Kamboti has a drying technology that can keep nutmeg from aflatoxin content that exceeds EU standards.

Problems of Nutmeg Industries in Maluku Island

Based on information from the Department of Agriculture, Seed and Protection of Plantation Crops Center, and Agricultural Technology Assessment Center, the potential of nutmegs in Maluku are located in the countries of Hatu, Liliboi, Alang, Seith, Morela, and Hutumuri, while in Seram region, the potential is located in the country of Rutah, and
Saparua region, the potential is located in the country of Booi. As for the Banda region, the information states that the potential of nutmeg is located in the countries of Mangkubatu, Walang, and Lonthoir.

From farmers and nutmeg breeders, information about other respondents was obtained, such as collectors, home industry players, and nutmeg entrepreneurs. Besides, descriptions of land ownership, nutmeg cultivation, nutmeg maintenance, nutmeg harvest, and nutmeg post-harvest were also obtained. On the other hand, information about nutmeg prices and the distribution process of nutmeg plants was obtained from collectors, while information about prices, packaging, export destination countries, and the process of exporting nutmeg to destination countries was obtained from the nutmeg entrepreneurs. From the home industry of the nutmeg plant, a variant of the use of nutmeg was found. From the Department of Industry and Commerce, information regarding UMKM (MSME) that developed the potential of nutmeg was obtained. However, the fact in the field shows that the UMKM (MSME) that develops the potential of nutmeg has not become a large scale.

Information on survey results can be classified into 2 types of data, namely data with parameters included in technical aspects and non-technical aspects. The technical aspect matrix includes 9 indicators with the weighting result value of the 9 questionnaire answer indicators by grouping based on the 12 countries (Table 4). The non-technical aspect matrix also includes 9 indicators with the weighting result value of the 9 questionnaire answer indicators by grouping based on the 12 countries (Table 5).

| Parameter        | Indicator            | H | Li | A | M | S | Hm | Wa | B | R | Mb | W | Lo |
|------------------|----------------------|---|----|---|---|---|----|----|---|---|----|---|----|
| Seeding          | Seed Origin          | 4 | 2  | 4 | 2 | 4 | 4  | 1  | 2 | 3 | 2  | 2 | 2  |
| Seeding Pattern  |                      | 3 | 2  | 4 | 2 | 2 | 2  | 1  | 2 | 2 | 2  | 2 | 2  |
| High Producing Block |                  | 1 | 4  | 4 | 1 | 4 | 1  | 1  | 4 | 4 | 4  | 4 | 4  |
| Cultivation      | Cultivation Pattern  | 4 | 4  | 4 | 4 | 4 | 4  | 1  | 4 | 4 | 4  | 4 | 4  |
| Maintenance      | Interference         | 4 | 4  | 4 | 4 | 4 | 4  | 1  | 4 | 4 | 4  | 1 | 4  |
| Harvest          | Harvest Pattern      | 2 | 2  | 2 | 2 | 2 | 2  | 2  | 2 | 2 | 2  | 2 | 2  |
| Harvesting Tools |                      | 4 | 4  | 4 | 4 | 4 | 4  | 4  | 4 | 4 | 4  | 4 | 4  |
| Post Harvest     | Drying               | 2 | 2  | 2 | 2 | 4 | 2  | 2  | 2 | 4 | 4  | 4 | 4  |
| Storage          |                      | 2 | 2  | 2 | 2 | 2 | 2  | 2  | 2 | 2 | 2  | 2 | 2  |
| Total Score      |                      | 26| 26 | 27| 26| 25| 24 | 18 | 26| 27| 25 | 28| 25 |
| Technical Aspect Weight |              | 72| 72 | 75| 72 | 69| 67 | 50 | 72| 75| 69 | 78| 69 |

Information: H: Hatu, Li: Lilibo, A: Alang, M: Morella, S: Seith, Hm: Hutumuri, Wa: Wallie, B: Booi, R: Rutah, Mb: Mangkubumi, W: Walang, Lo: Lonthoir.

From the results of this technical aspect weighting, the weights of the 12 nutmeg producing countries are obtained. The weighting results illustrate that in the western part of the Ambon archipelago, namely in the village of Alang, and the eastern part of the Seram islands, especially in the village of Rutah, are included in Zone A (very good). However, the villages in the central part, namely the villages of Lilibo, Hatu, Seith, Hutumuri, Morella, Booi, and Latu in the Seram Islands, are included in Zone B (good). In the southern part of the Banda Islands, there are two Zones, namely Zone A (very good) in the village of Walang, while the villages of Lonthoir and Mangkubatu are included in Zone B (good) (Figure 1).

| Parameter       | Indicator       | H | Li | A | M | S | Hm | Wa | B | R | Mb | W | Lo |
|-----------------|-----------------|---|----|---|---|---|----|----|---|---|----|---|----|
| Supporting      | Supervisor      | 4 | 1  | 4 | 1 | 4 | 1  | 1  | 1 | 4 | 3  | 1 |     |
| Harvest         |                 | 4 | 4  | 4 | 4 | 4 | 4  | 4  | 4 | 4 | 4  | 4 | 4  |
| Gatherer        |                 | 3 | 2  | 2 | 2 | 2 | 2  | 2  | 2 | 2 | 2  | 2 | 2  |
| Collector       |                 | 3 | 1  | 1 | 1 | 1 | 1  | 1  | 1 | 1 | 1  | 3 |     |
| Certification   |                 | 4 | 1  | 1 | 1 | 1 | 1  | 1  | 4 | 1 | 4  | 1 | 1  |
| Marketing       | Collector       | 1 | 1  | 1 | 1 | 1 | 1  | 1  | 1 | 1 | 1  | 1 |     |
| Price           |                 | 3 | 3  | 3 | 3 | 3 | 3  | 2  | 2 | 2 | 4  | 4 | 4  |
| Processed -Product |             | 1 | 1  | 1 | 1 | 1 | 1  | 1  | 3 | 4 | 4  | 4 | 4  |
| Figure          | Exist/does not - exist | 4 | 2  | 3 | 3 | 4 | 1  | 1  | 4 | 1 | 1  | 2 | 1  |
| Total Score     |                 | 27| 16 | 20| 17 | 21| 15 | 14 | 20| 16| 25 | 22| 22 |
| Non-technical Aspect Weight |        | 75| 44 | 56| 47 | 58 | 42 | 39 | 56| 44 | 69 | 61 | 61 |

Table 4: Results of Value Weighting on Technical Parameters

Table 5: Results of Value Weighting on Non-Technical Parameters
The results of this non-technical aspect weighting of the 12 nutmeg producing countries are hardly patterned geographically, such as in the Ambon Islands, the village that is included in Zone A (very good) is only in the village of Hatu, while there is no one in the Seram Islands. On the other hand, the ones included in Zone B (good) include the villages of Alang, Booi, Seith, Lonthoir, Walang, and Mangkubatu. In this non-technical aspect, there are many villages included in Zone C (poor) that need attention and become priorities to be improved or developed, namely the villages of Lilibo, Morela, Hutumuri, Latu, and Rutah. (Figure 2) From all indicators of each aspect, spatial statistical analysis is carried out by using the descriptive analysis to find out the characters of the aspects and their indicators as well as an inductive analysis, which includes conducting the process of hypotheses testing over expectations that previously existed. Descriptively, on the technical aspects, the cultivation indicator has the highest average score and the lowest in the average score of the marketing indicator. For the level of diversity, it appears that the highest diversity is in the maintenance indicator. On the technical and non-technical aspects, factor analysis will also be carried out to find out the scores of the most influential factors. From the results of the factor analysis, it is found that the marketing indicator has the greatest influence (76%). In addition to marketing, the indicators that have significant influence include figures (53%), post-harvest (41% and 45%), maintenance (45%), and cultivation (44%).

Development of Nutmeg Industry in Maluku Island

Controlling of aflatoxin in Nutmeg: Technically, the control of aflatoxin-producing A. flavus contamination can be done by carrying out appropriate and hygienic post-harvest handling. The temperature of drying can determine how aflatoxin-producing molds can grow. Aflatoxin producing molds grow well at 12°C to 48°C with the best growth rate at 37°C and 42°C and the best aflatoxin production at 25°C to 32°C (Hedayati et al., 2007; Okano et al., 2012). The use of high temperature is proven to be able to suppress the growth of aflatoxin-producing microorganisms and reduce the number of aflatoxin in products up to 17-63% (Yazdanpanah et al., 2005). Besides temperature control, humidity also needs to be considered in which A. flavus growth and the highest aflatoxin production are found in storage rooms with humidity reaching 94% (Al-Shikili et al., n.d.; Dharmaputra et al., 2004). The best treatment in reducing the amount of aflatoxigenic molds and aflatoxin production is with a temperature higher than 40°C and humidity lower than 70%, with recommendations for evaporation treatment and the use of biological anti-mold (Pratiwi et al., 2015; Pesavento et al., 2016).

**Figure 1:** Zoning Map of Nutmeg Center Conditions Based on Technical Indicators

**Figure 2:** Zoning Map of Nutmeg Center Conditions based on Non-Technical Indicators
Social engineering for nutmeg farmer and stakeholders: The social engineering that can be offered includes welfare guarantees covering finance, health, education, and others as well as providing incentives and disincentives for groups of farmers who want to improve the quality of their nutmegs by adopting recommended post-harvest technology and management (Ekasari et al., 2013). The welfare guarantee will minimize dependence on middlemen, so they can cut the supply chain and increase the selling price in the market. On the other hand, the granting of incentives and disincentives is expected to encourage farmers to improve post-harvest management of nutmegs to be more hygienic, so that the risk of aflatoxin contamination can be avoided and the quality of nutmegs produced can be increased. The existence of executors who can become role models or give influence to farmers is important considering the management of nutmeg cultivation for increasing the productivity of farmers (White, 2003). The role of this executor can be taken by the government through determining policies or rules, increasing the role of agricultural instructors, pilot farmers, or through figures, religious institutions that are trusted by the community, and embracing collectors and making them executors or controllers of hygienic and controlled nutmeg quality in the level of collectors (Thomson, 1991). This capacity building is prioritized in the areas of Lilibo, Morela, Hutumuri, Latu, and Rutah which are included in Zone C on non-technical aspects.

Nutmeg production innovation: Nutmeg can be utilized as a whole starting from seed, mace, to fruit that has not been maximized so far. The seed and mace whose quality is getting better can be projected for export with a condition that zero contamination from A.flavus or aflatoxin can be ensured. The seed and mace can also be processed by extraction to get essential oils, other fats (butter), and also to produce oleoresin. The conversion of raw materials into products for export projections can help to increase the added value of the nutmegs produced. On the other hand, the utilization of nutmeg which has been carried out so far is still focused on food commodities. A breakthrough in utilization is needed to increase the added value of derivative products from nutmegs by using them as an energy source through bioethanol fermentation or in producing biosurfactant.

Nutmeg production supporting facilities: Another important technical aspect to note is storage. Almost in all regions, the technique of nutmeg commodity storage is still modest. Most farmers do not keep nutmegs in hygienic rooms and under controlled conditions. If the individual approach is difficult to be carried out, perhaps improvements to this aspect can be done by building a shared warehouse that is integrated with the hygienically managed and controlled communal drying machines that are seconded to each farmer group. This is possible because farmers individually do not have decent places for storage, or for those who have the places, some of them function the places for other activities that tend to risk increasing aflatoxin contamination. Another problem is that the European Union has certification standards of nutmeg plants that must be tested in laboratories that have been accredited by the European Union. Those laboratories only exist in Surabaya and Jakarta. From the laboratory results, a Health Certificate will be issued if the lab test results are in accordance with the standards of the European Union by OKKPD, East Java Province Department of Agriculture.

Infrastructure and international trade route: The nutmeg processing industry stretches on Banda Island, where people make processed nutmeg for sweets, syrup, and jam. Besides that, in Walang country, there is a home industry for making essential oils from nutmeg and the products are exported to Korea (Nguyen et al., 2011). The main obstacle on Banda Island is transportation, in which the main transportation is shipping with a biweekly schedule, while planes are uncertain in their flight schedules. Transportation is one of the most important things (Hafizon et al., 2019) for nutmeg marketing in Maluku, in which marketing factors have the most influence in the development nutmeg industry in Maluku.

About the issue of the nutmeg export route, based on the facts in the field, it was found that Maluku could not directly take the export route to Europe because the costs incurred were too large. One of the forwardings in Surabaya said that ship and container owners objected if, in a trip to Maluku, their ships did not carry goods, and vice versa. They objected if the containers they brought from Maluku were not fully loaded. This means that the ship and container owners are not yet sure of the supply of nutmeg in Maluku. However, the nutmeg company of Ambon, namely PT. Kamboti takes the Asian market because the company can reach the Asian market by using direct lines from Maluku to Asian countries.

The infrastructure constraints for transportation on the islands of Maluku have been sought by the Government of Indonesia and become the center of attention for the government in developing the infrastructure of the Indonesian archipelago with the construction of sea tolls and regulations that support the easiness in developing local commodities in national or international trades. The policy in the management of the trades for container filling products is the key to the smoothness of the trade chain on the Islands of Maluku (Figure 3).

Government policy to increase nutmeg production and trading: The Maluku Islands with the diversity and uniqueness of nutmeg communities in some regions need government support through special policies that support the development of this nutmeg commodity. The uniqueness of the problems and specific aspects - geography, demography, socio-culture, and socio-economy - becomes the main reason for the emergence of demands related to the importance of asymmetric decentralization implementation.
Reviewing existing policies or formulating specific policies will provide certainty and the basis for de facto functional decentralization and asymmetric decentralization. This effort must consider the various unique aspects of the area so that the policy can achieve the desired goals. Asymmetric decentralization promises a variety of potential benefits. However, the implementation does not necessarily facilitate these benefits. This potential will be threatened if various existing problems, especially problems related to capacity weakness, are not handled seriously. The objectives to be achieved from asymmetrical decentralization will certainly depend on the design of the policy. Therefore, the design of an asymmetrical decentralization policy needs to be considered carefully and objectively, so that it can facilitate optimal results of governance and development (Rahmatunnisa et al., 2018; Redmond & Nasir, 2020).

**International Standards in International Trade**

Since 1994, Indonesia commits to be active in international trade activities by becoming a member of an international organization in the field of international trade, namely the World Trade Organization (WTO), which was established based on the Agreement on Establishing World Trade Organization (WTO) or known as Marrakesh Agreement. So since then, Indonesia has been bound to every agreement that is within the framework of the WTO and has also been actively involved in every international trade activity. At present, international trade activity is a necessity for a country. International trade is increasing not only in the form of multilateral agreements but also in bilateral and regional agreements. The international obligation as a WTO member country has begun since Indonesia ratified the Marrakesh Agreement with Act No. 7 of 1994 (Syadullah & Dwiyanti, 2020).

The international trade system offered by the WTO is a multilateral and predictable trading system. All WTO member countries that are bound have the same rules, namely all WTO agreements that bind each member country. Also, the provision of the WTO, namely the Dispute Settlement Body (DSB), is an individual guarantee for member countries to commit themselves to the WTO (Johannesson & Mavroidis, 2017; Sacerdoti, 2017). The WTO dispute settlement body becomes a guarantee that international trades among member countries will have a place and function of strict supervision in their implementations. International obligations that bind the state are also obligations for citizens to carry out obligations based on international agreements unless there are differences in implementation (Yohanes et al., 2017).

International trade will be bound to the provisions of international standards for a commodity so that it can be accepted as a trading commodity in the international trade market. In the context of international trade liberalization, one of the international trade agreements within the framework of the WTO that regulates standardization is the Sanitary and Phytosanitary Measures (SPs Agreement) (Afriansyah & Ardiastuti, 2019; Boza, 2016) and the Technical Barrier to Trade Agreement (TBT Agreement) (Pakhriah, 2020).

Both of them are WTO agreements regarding non-tariff barriers in international trade (Munadi, 2016). In terms of international trade, a trading commodity is not only bound by the tariff provisions but also related to non-tariff provisions. The provisions of international trade should also be a reference or consideration for a potential trading commodity in Indonesia (Fairuzzaman, 2018; Faigelbaum, 2020), to be prepared for the international trade market. Thus, this action is carried out with efforts to create harmony among members, based on relevant international standards including:

a. Codex Alimentarius Commission
b. International Office of Epizootics

c. International Plant Protection Convention

It means that efforts to form a law are a form of harmonization of regulations as stipulated in Article 3 of the SPS agreement, which requires member countries to make policies to improve the level of the animal, human and plant health by assuming international agreements as international standards, guidelines or recommendations and giving freedom to the countries makes the level of original health can be scientifically accountable and do not deviate from this agreement.

The obligation of the countries in international standardization is not only about the existence of scientific evidence, but also the performance of risk assessment and SPS level determination.

In risk assessment, the members must pay attention to available evidence, relevant production processes and methods, relevant modes of inspection, sampling, and testing, whether certain diseases and pests can attack, whether there are areas free of pests and diseases, relevant ecological conditions and environment and quarantine or other treatments. If there is no relevant scientific evidence available, then information from relevant international organizations and based on SPS actions by other countries can be used (Liu et al., 2020; Nurhayati, 2017). This information can be used to estimate risks.

This provision is carried out by the European Union on Indonesian nutmeg products, in this case, PT Ollop, which are suspected of containing aflatoxin. In principle, restrictions imposed in international trade are inappropriate according to international trade law. However, it can be done as a form of exception to international trade, if it is found that this is done based on scientific evidence, applied in a non-discriminatory and not arbitrary manner. Concerning this provision, the WTO regulates it in the General Agreement on Tariff and Trade 1994 Article 20 concerning General Exceptions.

To prepare the trade commodity of Maluku which is a potential commodity, it must be encouraged by the presence of government supports both in the form of facilities and regulations that support the occurrence of the international trade atmosphere. With the binding of Indonesia which also includes Maluku in it, it makes the market access for entrepreneurs in the Maluku region wider and bigger. It is not only to be prepared to face the needs of national trade but also to penetrate the international trade markets whether they are within the frameworks of ASEAN, WTO, or European Union markets. International agreements that bind Indonesia should be treated as opportunities and challenges, not as threats (Putri et al., 2018). The international trade system based on international agreements is a predictable international trade and a result of joint negotiations between members.

CONCLUSION

The development of the nutmeg industry in the Maluku Islands requires various programs aimed at improving the quality and productivity of nutmeg commodity so that it can ensure the continuity of supply chains and the sustainability of nutmeg industry development. The set of programs appointed requires considerations from various fields as controlling of aflatoxin in nutmeg, social engineering for nutmeg farmers and stakeholders, nutmeg processed product innovation, supporting facilities for nutmeg production, infrastructure, and international trade route, and government policy to increase nutmeg production and trade.

Spatial techniques provide convenience in compiling and classifying the character and uniqueness of the Maluku Islands for the development of this nutmeg industry. Information from various stakeholders and assessments from various disciplines can be arranged as a reference in determining policy.

LIMITATIONS AND STUDY FORWARD

This research for the development Nutmeg in Maluku Island has limited to areas which high potential for nutmeg resources. For further research, it has to be expanded to wider area coverage and more aspect of nutmeg stakeholder activities.

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AUTHORS CONTRIBUTION

FX Ari Agung Prastowo and Anwar Sani work as Social Communication nutmeg field survey team, Gemilang Lara Utama as Environmental Aspect Analysis, and Prieta Amalia as Legal Aspect Analyst in international trade.
24. Lohr, S. I. (1999). *Sampling Design and Analysis*. Duxbury Press.
25. Munadi, E. (2016). Indonesia non tariff measures: An overview. In Ing L.Y. S.F. de Cordoba and O Cadot (eds), *Non Tariff Measures in ASEAN*. ERIA Research Project Report 2015-1
26. Nguyen, P. H., Kang, H. W., Le, T. V. T., Chae, J., Kim, S. K., Kwon, K. I., Lim, S. I., & Oh, W. K. (2011). Simple process for the decrease of myristicin content from Myristica fragrans (nutmeg) and its activity with amp-activated protein kinase (AMPK). *Journal of Food Biochemistry*, 35(6), 1715-1722. https://doi.org/10.1111/j.1745-4514.2010.00496.x
27. Noopataya, S., Thongsatsakul, S., & Poolkhet, C. (2015). Social network analysis of cattle movement in sukhothai province, Thailand: A study to improve control measurements. *Veterinary Medicine International*. https://doi.org/10.1155/2015/587252
28. Nurhayati, I. (2017). The Implementation of the WTO agreement on the application of sanitary and phytosanitary measures in selected Southeast Asian developing countries: A comparative analysis and evaluation. University of Queensland, Australia
29. Nurtjahja, K., Dharmaputra, O. S., Rahayu, W. P., & Syarief, R. (2018). Fungal population and aflatoxin contamination on stored gamma-irradiated nutmeg (Myristica fragrans) kernels. *Atom Indonesia*, 44(2), 57-61. https://doi.org/10.17146/aji.2018.593
30. Ocholla, G. O., Bunyasi, M. M., Asoka, G. W., Pacha, O., Mbogua, H. K., Mbuti, P., Mbiti, S., Wendo, H. K., & Kamau, P. K. (2013). Environmental Issues and Socio-economic Problems Emanating from Salt Mining in Kenya: A Case Study of Magarini District. *International Journal of Humanities and Social Science*, 3(3), 213-223.
31. Okano, K., Tomita, T., Ohzu, Y., Takai, M., Ose, A., Kotsuka, A., Ikeda, N., Sakata, J., Kumeda, Y., Nakamura, N., & Ichinoe, M. (2012). Aflatoxins B and G contamination and aflatoxigenic fungi in nutmeg. *Journal of the Food Hygienic Society of Japan*, 53(5), 211. https://doi.org/10.3358/shokueishi.53.211
32. Pesavento, G., Ostuni, M., Calonico, C., Rossi, S., Capei, R., & Lo Nostro, A. (2016). Mycotic and aflatoxin contamination in Myristica fragrans seeds (nutmeg) and Capsicum annuum (chilli), packaged in Italy and commercialized worldwide. *Journal of Preventive Medicine and Hygiene*, 57(2), E102.
33. Pinsonneault, A., & Kraemer, K. L. (1993). Survey research methodology in management information systems: An assessment. *Journal of Management Information Systems*, 10(2), 75-105. https://doi.org/10.1080/07421222.1993.11518001
34. Pratiwi, C., Rahayu, W. P., Lioe, H. N., Herawati, D., Broto, W., & Ambarwati, S. (2015). The effect of temperature and relative humidity for Aspergillus flavus BIO 2237 growth and aflatoxin production on soybeans. *International Food Research Journal*, 22(1), 82.
35. Putri, R. R., Chandrawulan, A. A., & Amalia, P. (2018) Peringkat Arus Investasi Indonesia dalam Kerangka ASEAN China Free Trade Agreement (Perbandingan dengan Singapura, Malaysia, Thailand dan Vietnam) ditinjau dari Prinsip Fair and Equitable Treatment. *Journal of the Food Hygienic Society of Japan*, 53(5), 211. https://doi.org/10.3358/shokueishi.53.211
36. Rahmatunnisa, M., Hindersah, R., & Achmad, T. H. (2018). Why regions with archipelagic characteristics in Indonesia also need asymmetric decentralization? *Journal Bina Praja*, 10(2), 251-261. https://doi.org/10.21787/jbp.10.2018.251-261
37. Redmond, T., & Nasir, M. A. (2020). Role of natural resource abundance, international trade and financial development in the economic development of selected countries. *Resources Policy*, 66, 101591. https://doi.org/10.1016/j.resourpol.2020.101591
38. Sacerdotti, G. (2017) The future of the WTO dispute settlement system: Confronting challenges to consolidate a success story. In C. A. P. Braga & B. Hoekman, *Future of the global trade order*. Italy: European University Institute
39. Somekh, G., & Lewin, C. (2005). *Research methods in the social sciences*. Sage Publications.
40. Supriadi. (2017). Aflatoxins pada Pala di Indonesia dan Pengendaliannya. *Perspektif*, 16(2), 102–110.
41. Sutiono, A. B., Faried, A., McAllister, S., Ganefianty, A., Sarjono, K., Arifin, M. Z., & Derrett, S. (2018). The Bandung neurosurgery patient outcomes project, Indonesia (Part II): Patient pathways and feasibility and acceptability of telephone follow-up. *The International Journal of Health Planning and Management*, 33(1), e49-e56. https://doi.org/10.1002/hpm.2406
42. Syafulin, M., & Dwiyanti, A. (2020). Position Indonesia in WTO reform. *International Journal of Economics and Financial Issues*, 10(1), 42-51.
43. Thomson, N. R. (1991). Environmental science and engineering. *Canadian Journal of Civil Engineering*, 18(1), 159-159. https://doi.org/10.1139/v91-019
44. Tjokrodiningrat, S., Ashari, S., Syekhfani, S., & Aini, N. (2016). The characteristics of nutmeg (myristica fragrans houtt) growth using agroforestry system in ternate island, Indonesia. *Russian Journal of Agricultural and Socio-Economic Sciences*, 58(10). https://doi.org/10.18551/rijas.2016-10.02
45. Wang, Y., & Lee, S. H. (2017). The effect of cross-border e-commerce on China’s international trade: An empirical study based on transaction cost analysis. *Sustainability*, 9(11), 2028. https://doi.org/10.3390/su9112028
46. Weed, D. L. (2005). *Weight of evidence: A review of concept and method*. *Risk Analysis* (25(6); 1545-1557).
47. White, S. M. (2003). Social engineering. *Proceedings - 10th IEEE International Conference and Workshop on the Engineering of Computer-Based Systems, ECBS 2003*. https://doi.org/10.1109/ECBS.2003.1194807

48. Yazdanpanah, H., Mohammadi, T., Abouhossain, G., & Cheraghi, A. M. (2005). Effect of roasting on degradation of Aflatoxins in contaminated pistachio nuts. *Food and Chemical Toxicology, 43*(7), 1135-1139. https://doi.org/10.1016/j.fct.2005.03.004

49. Yield. (n.d.). World ranking: Nutmeg, mace and cardamoms, U.N. Food and Agriculture Organization’s FAOSTAT database. FAOSTAT.

50. Yohanes, T., Sulistiyono, A., & Hawin, M. (2017). Legally Binding of the World Trade Organization Dispute Settlement Body’s Decision. *Hasanudin Law Review, 3*(2), 160-174. http://dx.doi.org/10.20956/halrev.v3i2.1107