Journal of Tropical Plant Physiology 12(1) (2020):38-48
https://doi.org/10.56999/jtpp.2020.12.1.4

The Issues and Challenges in Complying with Sanitary and Phytosanitary (SPS) Measures in Exporting Malaysian Fruits

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Received: 6 November 2019; Revised: 4 March 2020; Accepted: 27 May 2020; Published: 1 June 2020

ABSTRACT

The main objective of this study was to identify the issues and challenges faced by Malaysian fruit producers and exporters in complying with the Sanitary and Phytosanitary (SPS) measures of the importing countries. Due to these measures, the exportation of high-value tropical fruits such as mango, pineapple, durian and starfruit to countries with strict SPS measures such as Australia, China, Japan and European Union are subjected to additional export requirements such as a single pre-export phytosanitary treatment on fruits or multiple measures applied at critical points along the fruit supply chain. Apart from the increase in exportation cost, phytosanitary treatments could reduce fruit quality and shelf life when fruits are exposed to certain fumigants and high or low temperatures as required in the import conditions. Suitable SPS measures are needed to ensure that fruit quality for export was not affected whilst achieving appropriate level of protection against movement of pest and disease of concern. Export stakeholders must be equipped with the right knowledge and tools to undertake effective SPS measures on their produces. The approval of market access into Japan and China for mango, pineapple and durian in recent times proved that the Malaysian fruit producers are competent in complying with the SPS requirements of these countries. This study showed that the lack of proper coordination and information exchange among related government departments and agencies would make it more difficult for Malaysian tropical fruits to penetrate new markets with stringent SPS measures.

Keywords: Fruit supply chain, market access, plant health, tropical fruits

INTRODUCTION

Malaysia is one of the main countries in the world that has been exporting tropical fruits to the world market. As the main producer of durian, mangosteen and starfruit, Malaysia has been producing 1.49 million metric ton of tropical fruits and exporting around 268,400 metric tons in 2017. However, the value in the exportation of tropical fruits for Malaysia does not contribute significantly in the balance of trade in the agriculture sector where the export value was around RM 1.2 billion compared to import of fruits at around RM 3.9 billion in 2017 (Department of Agriculture Malaysia, 2018). As a result, Malaysia is a net importer of food and this does not bode well with the aspiration of the Government in spurring the economic contribution of the agriculture sector. The National Agricultural Policy 3 (NAP3) (1998-2010) and National Agrofood Policy (NAP4) (2011-2020) had outlined the initiative to increase the commercial fruit production and export in order to reduce food import deficits. The formation of Food and Agro Council for export (FACE) in 2014 had further elevated the promotion effort of Malaysian produced fruits for export by prioritising 10 types of fruits namely watermelon, durian, pineapple, jackfruit, papaya, banana, starfruit, guava, mangosteen and rambutan. The promotion effort was in tandem with the production and export capability of these fruits in Malaysia. In terms of competitive position in exporting these fruits, studies by Nik Rozana et al. (2017) and Noodaeng (2017) have shown Malaysia's comparative advantage when

compared with other countries in the region namely Indonesia, Philippines, Thailand, Vietnam, China and India (Table 1). These studies showed that Malaysia has significant higher comparative advantage in exporting watermelon, papaya, pineapple and durian.

Table 1. Malaysia's comparative advantage in exporting several tropical fruits compared with Indonesia, The Philippines, Thailand, China and India.

Fruit Name	Competitive position	References
Watermelon	**Malaysia** > China > India > The Philippines > Thailand > Indonesia	Nik Rozana et al. (2017)
Papaya	The Philippines > **Malaysia** > China > India > Indonesia > Thailand	Nik Rozana et al. (2017)
Pineapple	The Philippines > **Malaysia** > China > India > Indonesia > Thailand	Nik Rozana et al. (2017)
Durian	Thailand > Vietnam > **Malaysia** *(Export data confined to China market only)*	Noodaeng (2017)
Starfruit	China > India > Thailand > **Malaysia** > Indonesia > The Philippines	Nik Rozana et al. (2017)
Banana	India > The Philippines > Thailand > **Malaysia** > China > Indonesia	Nik Rozana et al. (2017)
Mango	India > Indonesia > The Philippines > Thailand > **Malaysia** > China	Nik Rozana et al. (2017)

Generally, exportation of Malaysian tropical fruits was mostly concentrated to certain countries such as Singapore and Hong Kong. These trading nations provide Malaysian tropical fruits with consistent demands and easy passage for exportation with simplified regulations. The amount of fruits exported to these countries alone contributed to about 22% of the amount of fruits exported in 2017. Since 2006, the Ministry of Agriculture (MOA) Malaysia had stepped up their efforts in finding new market destinations that were considered as lucrative due to the willingness of the consumers there to pay high price for imported premium quality tropical fruits. Countries such as China, Japan, the European Union (EU) and the United States of America (USA) were known as countries with high consumption of tropical fruits and collectively imported more than 70% of the world tropical fruits (Food and Agriculture Organization of the United Nations, 2014).

One of the Non-Tariff Measures (NTM) that has considerable impact on the trade of tropical fruits was the Sanitary and Phytosanitary Measures (SPS). Under the World Trade Organisation (WTO) Agreements whereby Malaysia is one of the member countries since 1995, the SPS agreement allowed member countries to restrict trade on the basis of preventing the introduction and spread of foreign pests and diseases which could be harmful to the life and health of human, animals and plants. Movement of plants, plant products and non-plant-based articles such as machineries, vehicles and packaging materials from a country that harbour certain dangerous pests and diseases, if not restricted, may cause serious economic consequences when these organisms are introduced and established at the country of destination. However, the use of SPS measures must be based on scientific justification whereby proper import risk analysis needs to be conducted. It should not be implemented arbitrarily and without proper notification and due consideration to the various stakeholders involved, otherwise SPS measures may become an

unjustified trade barrier. It was shown that countries seek this alternative to protect their trade interest through what was carried out by tariff barrier (Roberts et al., 1999).

Malaysia's effort to increase export of tropical fruits through new market destinations like Australia, China, Japan, South Korea and USA were hampered with strict import standards and regulations. The import requirements can be in various aspects such as plant health, food safety, product quality, environmental protection and social welfare (Table 2). Government regulations, mostly concentrated on plant health (phytosanitary), food safety and product quality aspects, are the basis for most restrictions in the importation of tropical fruits. Apart from that, there are also private sector standards set by business alliance in some countries that are imposed on importation of tropical fruits. The various governmental regulations and private sector standards can be burdensome to the production of tropical fruits for export especially for developing countries such as Malaysia and may become trade restrictive. These require farmers and exporters to acquire the necessary knowledge and information to comply with the various importing countries requirements. Government assistance and correct policies in overcoming these requirements can be both beneficial for the competitiveness of tropical fruits export sector in penetrating the global market and in elevating the standards of fruit production in Malaysia.

The various requirements that the producers and exporters need to comply with in order to penetrate these markets are quite overwhelming. In preparation for pre-market access negotiations, it was the responsibility of the Government to be equipped with the right information and supported with accredited fruits producers and export facilities to ensure market access success. Figure 1 depicted the market access procedures for importation of fruits into China as an example of the complicated process in getting the approval for a new export market with stringent SPS regulations. In Malaysia, the Department of Agriculture (DOA) started making formal request for market access to these markets as early as in 1989. DOA as the National Plant Protection Organisation (NPPO) of Malaysia was responsible in initiating the formal request and in compiling the necessary technical documents for submission to the importing country (International Plant Protection Convention, 2020). The technical document contained scientific and technical information on the intended fruit for export, production condition and climate, and information on pest occurrence, importance and official control programme (Food and Agriculture Organization of the United Nations, 2013). The importing country would then use this information to conduct Pest Risk Assessment (PRA) and for the formulation of appropriate import conditions and SPS measures for importation of the fruit. This assessment exercise may include visits to production sites, packaging centres and treatment facilities by the inspectors of the importing countries. When completed, the importing countries may grant market access approval in the form of an export protocol, import permits or by publishing the import conditions in the respective countries online databases. The objective of this study was to identify the issues and challenges faced by Malaysian fruit producers and exporters in complying with the SPS measures imposed by the importing countries.

Table 2. Various aspects of import requirements imposed by the importing countries on the trade of tropical fruits

Aspects of Import Requirements	Details
Food safety	Maximum residue limits (MRLs)
	Heavy metals
	Food additives
	Hygiene requirements
	Traceability
	Hazard analysis and critical control points (HACCP)
Plant health	Surveillance
	Plant quarantine
	Pest risk assessment
	Sanitation
Product quality	Grading
	Freshness
	Product composition
	Product cleanliness
	Labelling requirements
	Control of nutritional claims
Environment	Control of water and environmental contamination
	Recycling requirements
	Organic production requirements
	Protection of biodiversity
	Protection of endangered species
Social	Labour standards
	Fair trade standards
	Corporate social responsibilities

(United Nations Conference on Trade and Development, 2007)

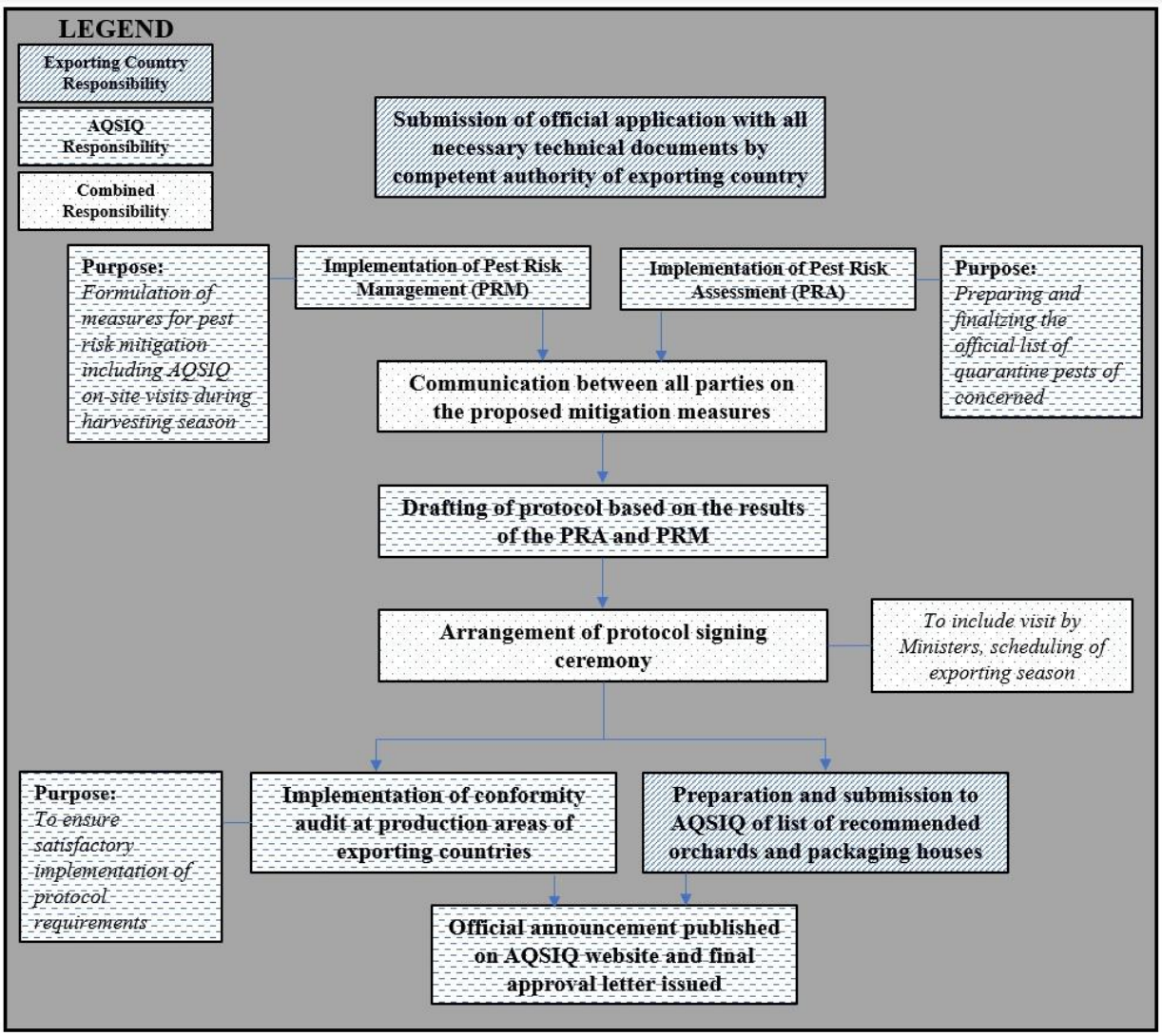

Figure 1. The General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ) Fresh Fruit Market Access Procedure [Adapted from Mabel Zhuang Marketing Communications (2016)].

MATERIALS AND METHODS

Relevant information for this study which was largely linked to issues pertaining to market access negotiations and preparations for export was gathered through analysis of official documents and personal correspondences with officials from the MOA, DOA, Malaysian Agriculture Research and Development Institute (MARDI) and Federal Agricultural and Marketing Authority (FAMA). Feedbacks were also compiled and analysed during farms and processing facilities audit visits, stakeholders' seminars and workshops related to market access of several Malaysian fruits namely mango (*Harumanis* variety), pineapple, papaya, durian, jackfruit, mangosteen and rambutan. The issues and challenges were categorised into two phases namely pre and post-market access phases. Pre-market access phase was a period after the competent authority had made a formal market access request for a fruit and until export approval was given

by the exporting countries. Post-market access phase was a period when export approval was given with the agreed pest mitigation measures and up until the fulfilment of all measures. The findings discussed here can be a cross-cutting issue involving all or several fruit crops to an export market or specific issue involving one crop to be exported to an export market.

RESULTS AND DISCUSSION

The market access request for tropical fruits involved bilateral negotiations with the SPS competent authority of the importing countries. The negotiation process was mostly slow and consumed a lot of efforts for both the Government and the private sector who acted as producers and exporters. The endeavour so far has created various new market opportunities for Malaysian tropical fruit produces (Table 3). The success in getting new market access approval does not mean that it would immediately translate to a higher export figures for a fruit crop as there are other issues affecting production and exportation. However, overcoming SPS issues in negotiating for market access has brought about valuable lessons for the Government and the private sector in enhancing the production of commercial value tropical fruits for export in Malaysia.

Table 3. Market access approval accorded to Malaysian Fruits 2003 - 2018

Fruit Name	Forms	Country	Approval Date
Durian	Frozen whole fruit	Australia	13 Aug 2003
Durian	Frozen pulp	China	23 Nov 2007
Pineapple	Fresh	China	23 Nov 2007
Mango (*Harumanis*)	Fresh	Japan	14 May 2008
Durian	Fresh	Rep. of Korea	17 Sep 2010
Pineapple	Minimally processed	Australia	18 Mar 2011
Mango	Fresh	Rep. of Korea	8 Feb 2012
Durian, Rambutan, Mangosteen, Jackfruit	Freeze dried	China	30 Nov 2015
Pineapple (Revised Protocol)	Fresh	China	13 May 2017
Durian	Frozen whole fruit	China	20 Aug 2018

(Arshad, 2016; Department of Agriculture Malaysia, 2019)

Issues and challenges during the pre-market access phase

In this phase, exchange of technical information occurred extensively between the SPS competent authority of both countries to satisfy the needs of the importing country in completing the pest risk assessment and to come out with the appropriate pest mitigation measures for export approval. As Malaysia has been involved in market access bilateral negotiation since 1989, the following issues and challenges were identified during the pre-market access phase:

The lack of in-depth study on fruit production capacity and projection of market demand

In earlier days when Malaysia started making market access request, the type of fruit crop chosen was based on the current popular varieties being planted nation-wide but not based on the demand of the export market. For example, when *Harumanis* was chosen for market access to Japan in 1989, this variety of mango was popular among farmers and can be found prevalent in Peninsular Malaysia. However, since it is a seasonal fruit crop and farmers were facing difficulty in maintaining good harvest outside the state of Perlis, many farmers had replaced it with *Chok Anan* or *Sala* varieties since 2000 onwards. The negotiation for *Harumanis* to enter Japan was slow as there were many steps imposed by Japan (Faridah et al. 2010). It was only actively resumed in 2003 but at that time, the plantation of *Harumanis* was left with an area of only 128 ha in Perlis (Department of Agriculture Malaysia, 2007). The situation was further aggravated by Japan's condition of only accepting *Harumanis* and not willing to consider other mango varieties. Fortunately, DOA was able to prepare the farms for an audit visit by the Ministry of Agriculture, Food and Fisheries (MAFF) Japan's Inspector in 2007 and *Harumanis* was approved for market access in 2008. Since then, demand has soared to new heights fuelled by domestic consumption and export to Japan since 2010. Although production area had increased 10 fold since 2007 to 1,254 ha in 2019 and poised to increase to 1,320 ha in 2020 (Bernama, 2019), it is still insufficient and export to Japan has halted since 2016. Apart from the insufficient production, *Harumanis* had not been able to attain higher prices in Japan due to its lower market positioning compared with other imported mangos from Mexico, Philippines and Thailand. Furthermore, imported mangoes were normally sold cheaper in Japan than the high-end Miyazaki mango produced locally (Ohta, 2015). This factor has somehow discouraged the exportation of *Harumanis* to Japan since comparable retail prices can be obtained locally.

The lack of data on crop pest control management and the efficacy of phytosanitary treatment on fruits for export

The market access progress was often delayed when the importing countries asked for additional information related to pest control and phytosanitary treatment efficacy data. Upon receiving the technical document, the importing country would analyse the technical information on pest status for the fruit crop of interest and decide whether there were any pest(s) of concern that needed to be controlled and disinfested at the country of origin. If there was no pest of concern observed, the fruit crop of interest may be exported without any phytosanitary treatment. In the case of negotiating for *Harumanis*, Japan was concerned with the prevalence of fruit fly species in Malaysia especially the infestation of *Bactrocera papayae*, *B. cucurbitae* and *B. occipitalis* in mango plantation areas (Department of Agriculture Malaysia, 2007). Since Malaysia had not been able to provide a pest-free area or area of low pest prevalence against the fruit flies even with the use of various control methods such as bagging, protein bait trapping and chemical spraying, Japan had decided that mango from Malaysia must be treated with Vapour Heat Treatment (VHT) prior to export. Based on the VHT efficacy data from other countries exporting mango to Japan, disinfestation of fruit fly on mango can be done at temperatures of 43˚C to 50˚C (Dohino et al., 2017). Japan required Malaysia to provide experimental and commercial efficacy data since treatment severities for mangoes were varied based on the country of origin. This requirement had delayed the export approval process considerably as Malaysia needed to acquire the VHT machines from Japan to proceed with obtaining the treatment data. The approved phytosanitary treatment for *Harumanis* was to use VHT to heat up the fruit core temperature to 46.5˚C and hold for 20 minutes, followed by air cooling only. After the success of *Harumanis* in getting the export approval from Japan in 2008, it was planned that the acquired VHT machines must be utilised for other fruits such as papaya and mangosteen. VHT efficacy data for papaya was first derived using the Eksotika papaya variety in 2009. However, papaya plantation in Malaysia was severely affected and nearly wiped out due to the outbreak of papaya dieback disease which was caused by

a Gram-negative bacterium, *Erwinia mallotivora* from 2003 to 2011 (Sekeli et al., 2019). The scarcity of getting the supply of Eksotika papaya and other varieties had stalled the effort of completing the market access approval to Japan.

The difficulty of managing the establishment of phytosanitary treatment facilities

The capability of the exporting country in providing the required phytosanitary treatment for export of tropical fruits would determine the success of market access. The choice of treatment was decided by the importing country. For example, mango and papaya could be treated using Hot Water Treatment (HWT) or VHT to disinfect fruit fly prior to export (Dohino et al., 2017). Japan preferred the use of VHT, while China allowed the use of HWT which was a fraction of the cost of using VHT. The high cost of establishing VHT facilities and the reluctance of private players to bear the initial costs especially during the early phase of export meant that the Government had to allocate funds for its establishment as in the case of exporting *Harumanis*. Other methods such as irradiation were also used as phytosanitary treatment. Malaysia acquired the approval of the USA for the exportation of fresh fruits of pineapple, papaya, jackfruit and rambutan in 2011 using a generic treatment of irradiation with a minimum dosage of 400 Gy to disinfect a wide group of pests (Othman and Mohd Dzomir, 2012). The high cost in establishing the irradiation facility and ongoing issues related to the facility accreditation by the USDA and funding procedures for the attachment of US inspectors in Malaysia had halted the market access progress into the US for these four types of fruits.

SPS compliance issues and challenges during post-market access phase

In this phase, export conditions for a particular fruit had been stated or published in the export protocols or online database, but export had yet to commence pending the fulfilment of all export requirements including SPS measures. Two issues and challenges were observed in this phase.

The adverse effect of phytosanitary treatment on the quality and marketability of fruits

In 2007, China approved the export protocol for fresh pineapple by using methyl bromide (CH_3Br) fumigation as a single phytosanitary treatment at the rate of 32 g/m^3 for 2 hours which was then considered as cost effective. This treatment was effective in disinfecting all pests of pineapple that were of concern to China. However, Malaysia had limited prior knowledge on the effects of methyl bromide on pineapple fruit quality especially for *Josapine* and *N36* varieties that were poised to be exported to China. Subsequent testing by MARDI and DOA revealed that methyl bromide at the prescribed rate caused phytotoxicity which was browning of the fruit core. The fruit quality issue had rendered the pineapple treated with methyl bromide non-marketable. Renegotiation of the export protocol had to be initiated with Malaysia taking a proactive step of proposing alternative phytosanitary measures to China which would fulfil the phytosanitary requirement as well as ensuring the fruit quality was not affected. A new export protocol was only finalised and approved by China in 2017, which was almost 10 years after the signing of the first protocol. The new protocol outlined the use of multiple options of phytosanitary measures or Systems approach for pest management (Food and Agriculture Organization of the United Nations, 2017) along the pineapple supply chain namely pre-planting, planting, harvesting and post-harvest in order to control and eliminate the pest of concern to China. The protocol also required the use of fumigation of ethyl formate at a dosage of 48 g/m^3 for 4 hours followed by cold treatment at a temperature of less than 7°C for 10 days on all fresh pineapple consignments destined for China (Ministry of Agriculture and Agro-based Industry, 2017). This experience of getting the market access for fresh pineapple into China showed that market access negotiation was a laborious process. Without the correct and precise information, it may lead to misinformed decisions that would cost the nation to lose the opportunities to export the potential fruit crop as planned.

Producers and exporters preparedness in complying with the export requirements

Accreditation of farms, packing houses and phytosanitary treatment facilities were part of the requirements for export of tropical fruits. Some countries such as Australia and the EU relied on the competent authorities (i.e. DOA for phytosanitary issues and Ministry of Health Malaysia for food safety) in conducting mitigation measures related to SPS. However, several countries such as China, USA, Japan and the Republic of Korea conducted audit inspections themselves and did not allow for importation of fruits from non accredited entities along the export supply chain. Currently, orchards that intend to export their fruits were accredited under the Malaysian Good Agricultural Practices (MyGAP) scheme (previously SALM – Skim Amalan Ladang Baik Malaysia) while packing houses and treatment facilities either as one entity or otherwise were registered under a special registration scheme for export under DOA with prior accreditation of various food safety related accreditation schemes namely Good Manufacturing Practice (GMP) and Hazard Analysis and Critical Control Points (HACCP). These registration schemes were vital in ensuring the integrity of the fruits being exported with strong emphasis on traceability and minimising post-harvest loss. In the exportation of durian to China, the number of durian farms that had acquired valid MyGAP accreditation was still very small, at 19 farms. Meanwhile, different variations of phytosanitary treatments were applied on different forms of frozen durian. Loose pulp and paste must be frozen at -30° C for 30 minutes while durian whole fruit needed to be frozen at -80°C to -110°C for not less than 1 hour. Immediately after treatment, both durian forms needed to be stored and transported for export at temperatures of -18°C or less (Department of Agriculture Malaysia, 2019). While the use of conventional blast-freezer was sufficient to be used on loose pulp and paste (Tagubase et al., 2016), cryogenics freezing using liquid nitrogen had to be applied on the whole durian to achieve the required temperature and to retain freshness (Ding, 2018). As many as 31 durian processing facilities were accredited to process and export loose durian pulp and paste since 2011. However, when approval to export frozen whole durian was given in 2018 (Table 3), only five facilities were ready to be inspected and finally accredited by China. The audit inspection carried out had revealed several aspects of practice along the supply chain that needed to be improved. At farm level, farm record keeping and pest control management for pests of concern were still not entirely satisfactory and proper guidance needed to be addressed. At the packing houses and/or treatment facilities, fruits to be exported to different countries had to be processed and segregated properly to ensure the integrity of the SPS measures were being undertaken. Non-compliance incidents occurred at the point of entry for Malaysian fruits such as frozen durian paste in China were mostly related to improper product labelling and product quality due to foreign contamination.

CONCLUSIONS

More concerted efforts are needed in improving the capability of the Malaysian tropical fruit producers and exporters in overcoming SPS measures. This study showed that the lack of proper coordination and information exchange among related government departments and agencies made it more difficult for Malaysian tropical fruits to penetrate new markets. Bigger allocation of funds to increase the participation of farmers in obtaining MyGAP accreditation and exporters in gaining technical knowledge to conduct and comply with SPS measures are crucial in increasing Malaysia's competitive edge in exporting to the world market tropical fruits of premium quality and safe for consumption.

AUTHORS CONTRIBUTION

AA and NWI conceived, designed and performed the analysis. AA and NWI wrote the paper. NWI checked and approved the submission.

CONFLICT OF INTEREST

The authors declare they have no conflict of interests.

FUNDING

The authors wish to acknowledge Universiti Putra Malaysia (UPM) for funding this research with project number GP-IPS/2013/9391500.

ACKNOWLEDGEMENTS

The authors would like to express their gratitude to the Institute of Agricultural and Food Policy Studies, Universiti Putra Malaysia (UPM) for their support to this research.

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