Appendix 8.10

This case study forms part of the overarching
2017–19 ACIAR Mango Agribusiness Research Program

Project:	**Opportunities and strategies for improving biosecurity, market access and trade for selected mango markets**
Study:	**Vietnam**
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1 Acknowledgements

This study report for the Mango Biosecurity project was prepared by Le Minh Hung from the Sub-Institute of Agricultural Engineering and Postharvest Technology, Vietnam.

2 Case summary

China is an important export market and has export potential for Vietnamese mangoes, with about 70% of total fresh fruit exports being derived from this country of origin. Vietnam participated in signing the ASEAN China Free Trade Agreement, which came into effect in 2010. However, many Vietnamese enterprises have not taken advantage of ACFTA's opportunities and benefits; instead, continuing to export through informal channels such as cross-border trade. This study aims to evaluate opportunities and challenges for Vietnamese stakeholders to access Chinese mango markets via official channels.

When exporting mangoes into difficult markets (high-value markets), vapour heat treatment (VHT) and irradiation are applied to treat the pest Oriental fruit fly on mangoes. Regarding minimum residue levels (MRL) regulations in some areas, many countries import agricultural products using the MRLs of Codex; however, some countries regulate the value of their own MRLs. Following on from a process whereby Vietnam's Plant Protection Department (PPD) has attempted to negotiate and gradually resolve phytosanitary requirements and procedures of importing countries, Vietnamese fresh fruit products have been successfully exported to difficult markets such as US, Japan, South Korea, Australia, New Zealand, EU and Canada (MARD, 2018d). Increasingly, China is raising technical barriers for plant quarantine so the quarantine requirements associated with plants imported into this country will become more difficult. In 2018, the value of trade (imports plus exports) of agricultural products between Vietnam and China was US 11.12 billion. Vietnam imported 2.47 billion and exported USD 8.64 billion of which the value of fruits and vegetables was USD 2.78 billion. From 2018, China requires the application of traceability notifications for imported products, specifically in relation to the packaging area and packaging facility.

Regarding exporting mangoes into China, enterprises need to comply with the 2015 Food Safety Law and the People's Republic of China's sanitary and phytosanitary laws (IQS, 2015). Vietnamese exporters also need to meet technical requirements and regulations regarding food material safety (Decree No. 15/2018 / ND-CP), as well as Chinese food safety and plant quarantine regulations. Mango products must meet packaging technical requirements, sanitary conditions and must not be infected with pest/insects or diseases.

It is recommended that standardised agricultural practices for mango production areas, as well as developing management processes and techniques for cultivation, care, pest control, harvesting, packaging, storage and transportation be implemented in the future.

The project identified challenges and opportunities related to market entry, commercial constraints and phytosanitary requirements, plus gaps in knowledge that may exist in order to export mangoes to China via official channels.

Recommendations arising from this study included:

- VietGap or GlobalGap certified orchards should apply for the Chinese markets that require stricter inspection and quarantine.
- Further market research to better understand the market demands for China is needed.

- A review of the role of product quality information and traceability of imported products should be undertaken.
- Chinese or English should be written on all packaging to specify the name of the fruit, place of manufacture, place of packing or number/code.
- The importer should record key information above the barcode, security code, stamp or seal.
- Detailed information including names, addresses and registered number of mango orchards including pack-houses issued the PHCs are recorded and maintained by Vietnam Government Department of Plant Protection.
- Regular updates regarding regulations on MRL in the importing market are needed as well as relevant information about markets, regulations and rules for taking appropriate measures when using pesticides.

In conclusion, it is necessary to strengthen linkages between enterprises, cooperatives and management agencies on the basis of organising production according to the supply chain.

3 Introduction

3.1 Background

China is an important market and has export potential for Vietnamese mangoes, with about 70% of total fresh fruit exports being derived from this country of origin. In an effort to become integrated into global trade arrangements, Vietnam participated in signing the ASEAN China Free Trade Agreement. This Agreement came into effect in 2010 and is expected to bring practical benefits to Vietnamese enterprises, with tariff rates being reduced to 0% on nearly 8,000 different types of products. However, many Vietnamese enterprises have not taken advantage of ACFTA's opportunities and benefits; instead, continuing to export through informal channels such as cross-border trade. Currently, the Chinese Government has made strong demands for traders to enter the market through formal trade channels. The Vietnamese government also wishes to export to China through formal trade channels because cross-border trade is difficult to control. This arrangement would create a better environment for businesses on both sides.

However, in order to break into the Chinese market, businesses need to pay attention to product quality because Chinese agencies are becoming increasingly more stringent in stipulating that quality, traceability and packaging must adhere to Chinese regulations and standards. Vietnam's agricultural products are also subjected to intense competition in terms of quality, price, brand and distribution formats from other countries that offer similar agricultural products to the Chinese market. To achieve their required outcome, Vietnamese enterprises must meet specified requirements for food safety, hygiene and quarantine in order to develop and maintain good export activities with the Chinese market.

3.2 Study objectives

The study objectives were to evaluate opportunities and challenges for Vietnamese enterprises to access Chinese mango markets via official channels. The study is focused on opportunities and strategies to improve biosecurity, market access and trade for selected mango markets. Led by Griffith University, this agribusiness program has had significant contribution and country-level coordination from each of the six ACIAR-partner

countries: Cambodia, Indonesia, Pakistan, the Philippines, Vietnam and Fiji. Since China represents an important export and potential export market for all the ACIAR-partner countries – particularly Vietnam with its emerging middle class and relatively low consumption base – the study aimed to summarise the current issues and challenges that exporters face when exporting products to China.

3.3 Study methodology

The study introduced the mango area and production, as well as existing pests and diseases of mangoes according to records of known pest/host occurrences in Vietnam. Some study results found by Department of Agriculture & Rural Development (DARD) and research institutes identified which pest/diseases in Vietnam are most likely to be of quarantine concern. Based on the list of permissible and banned plant protection substances in Vietnam MARD-2018, suitable pesticides and chemicals for the treatment of these pests and diseases are also noted.

Up until now, Vietnamese fresh fruit products have been successfully exported to difficult markets. The Plant Protection Department under Vietnam's Ministry of Agriculture and Rural Development has negotiated and agreed on technical measures for phytosanitary in order to open up their market opportunities. The requirements of importing countries for exporting Vietnamese mangoes with regards to technical barriers such as phytosanitary quarantine and food safety were documented, as well as available technology that can be used for disinfestation for phytosanitary requirements (including location and capacity of irradiation and VHT facilities). Requirements for the importation of fruit products and quarantine into China were also noted.

Semi-structured interviewing methods were conducted to collect data from importers, wholesalers and other key informants, including customs and quarantine officials.

In a context where importers and wholesalers were very reluctant to share information, the involvement and support from governmental and provincial agencies, as well as research institutes both in China and Vietnam, proved to be a very important data collection and validation method.

This study selected Mekong River Delta (MRD) provinces such as Dong Thap and Tien Giang as the case study because they are the main mango production areas in Vietnam. Some fruit exporters in Ho Chi Minh City were also interviewed. Semi-structured interviewing methods were employed to collect data from mango pack houses, cooperatives, wholesalers, companies, exporters, and other key informants in Dong Thap, Tien Giang and Ho Chi Minh City (fruit exporters). These included Kim Nhung, Ba Dan, Cat Tuong, Hoang Phat FRUITS, Vegetigi, Long Uyen, Anh Duong Sao, Pan-Ventures, Goodlife, Cat Hoa Loc cooperatives and Vietnam Fruit Association.

Meanwhile, an extensive review of industry and government publications was conducted to capture the general background and key statistics related to mango production and export from Vietnam to China. These secondary data were collected from the Provincial Department of Agriculture and Rural Development (DARD), the Provincial Departments of Science and Technology (DOST), Southern Fruit Research Institute (SOFRI), Sub-Institute of Agricultural Engineering and Postharvest Technology (SIAEP), Post Entry Plant Quarantine Center No. II / Plant Protection Department and Ho Chi Minh City Science and Technology Information Center.

Assumptions and limitations

China is a market that offers great potential and opportunities that Vietnamese businesses need to pay attention to, particularly those related to agricultural and aquatic products. Previously, the export rate between agricultural quotas and the quota of seafood to the

Chinese market was 70%–30%. However, in contrast, up to 70% of seafood is exported by sea. Businesses in the Mekong Delta region in particular no longer have to go through intermediaries and are able to directly export to ports such as Shanghai, Shenzhen or Tianjin. These days, shipments of Vietnamese products are exported straight to Dalian port. Exporting fresh fruit to China is profitable for Vietnamese enterprises due to the very close distance, while the storage time is an advantage compared to Europe and the US ... The selling price in the Chinese market is quite high if the quality of products is good. For example, the current price of fresh jackfruit purchased by people to export to China is 30 to 40 thousand VND/kg. This is a great price for Vietnamese farmers and businesses exporting to Chinese markets.

Since 2013, China has become the fourth largest import market of Vietnamese seafood. This is market has a more stable rate of import growth in comparison to other countries. Export by sea from Vietnam to China is becoming increasingly more convenient and cheaper. Therefore, 2019 will bring many opportunities for businesses to expand their main export to major cities of China. During the past 30 years, trade exchange between Vietnam and China has mainly been conducted via cross border channels that create many risks in terms of payment and difficulties associated with controlling the quality and quantity of goods.

China is currently the largest export fruit and vegetable market for Vietnam. In 2018, the export turnover of fruits and vegetables to China reached USD2.78 billion, which accounted for over 70% of Vietnamese exports of these items. However, export of Vietnamese agricultural products in general, and specifically fruits and vegetables, to Chinese markets is not sustainable as it also depends heavily on cross border trade and small-scale trading. Legally binding agreements between buyers and sellers are difficult to control, in the case of litigation, Vietnamese export enterprises are likely to suffer.

Moreover, China is no longer an easy market for Vietnam as consumer demand for imported fruits and vegetables in this market is becoming increasingly exacting. In particular, China's quarantine policy has changed constantly. From 1 January 2019, fruits and vegetables exported to this market are required to have clear traceability in the form of a plant and/or animal quarantine certificate.

When exporting to the Chinese market, Vietnamese enterprises face many difficulties including lack of market information about any new regulations of the Chinese Government regarding import and export policies – in spite of the fact that the Vietnamese Ministry of Industry and Trade has put a lot of effort into combatting these difficulties. Moreover, Vietnamese importers and wholesalers are very reluctant to share information which makes it difficult for the researchers and enterprises to collect data. Detailed information (such as volume and turnover) about exporting to China from different sources from Chinese authority or Vietnamese authority or mango enterprises in Vietnam is still unclear and inconsistent.

4 Vietnam mango and production

Mango is a fruit crop that is grown and commonly consumed in many South-East Asian countries. According to FAO statistics, the mango-growing countries in South-East Asia are Thailand, Indonesia, Philippines, Vietnam and Cambodia. In 2016, Thailand was the largest mango producer in South-East Asia, with an output of 3.43 million tonnes, followed by Indonesia (2.18 million tonnes), Philippines (0.83 million tonnes) and Vietnam (0.73 million tonnes). Cambodia is also a successful mango producer with 65,000 hectares devoted to mango crops (IQS, 2015.

Vietnam has produced mangoes over a long period. This crop can grow in many different ecological regions across the country; however, the main area is still the southern provinces. In 2017, Vietnam had a total of 92,746 ha and production of 0.78 million tonnes

of mangoes, with the Mekong River Delta being the largest mango production area, accounting for 46.1% of the area and 64.4% of the country's mango production. This was followed by the south-east region which accounted for 19.2% of area and 64.4% of mango production nationwide (see Table 1).

Table 1. Mango areas and outputs in Vietnam, 2017

Region	Area		Output	
	ha	%	tonnes	%
Red River Delta	2,415	2.6	21,164	2.7
Northern Midlands and Mountains	12,195	13.1	28,723	3.6
North Central	1,675	1.8	8,364	1.1
South Central Coast	13,054	14.1	73,798	9.4
Central Highlands	2,918	3.1	19,174	2.4
South-East	17,765	19.2	129,460	16.4
Mekong River Delta	42,725	46.1	507,550	64.4
Total	92,746	100	788,233	100

Source: MARD, 2018c

5 Vietnam mango pest and diseases

Mango is an easy-to-grow fruit tree with high economic value. Consequently, in recent years, the mango production area in Vietnam has increased significantly in some Mekong River Delta provinces. Along with an increase in production area, pests and diseases associated with mango crops are also becoming more serious.

Anthracnose is a common disease that causes serious damage to fruit yield and quality. Anthracnose is caused by Colletotrichum gloeosporioides and results in damage to mango leaves, buds, flowers and fruits. In addition, a number of mango orchards are experiencing bacterial black blight which causes the fruit to crack and can then lead to infestation by fruit flies – seriously affecting productivity levels and quality of mango fruit.

Bacterial spot caused by Xanthomonas campestris pv. mangiferae results in damage to mango leaves and fruit. Likewise, fruit borer is one of the most significant pests to greatly harm productivity levels and quality of mango fruit.

The scientific name for the Oriental fruit fly is Bactrocera dorsalis (Hendel) and they belong to the family Trypetidae which is two-winged set (Diptera). Fruit fly fruit is a versatile insect that is capable of damaging more than 30 different types of fruit and vegetables. There are many species of fruit flies, with the most common being B. dorsalis, B.coresta, B.cucurbitea. Fruit that is infested with flies may drop before ripening or continue to remain anchored on the tree. If left on the tree, the value of the trade is also reduced because the flesh is rotten. Not only do fruit flies reduce productivity and quality of mangoes, they also have an impact on exports because flies are the leading quarantine object in many countries around the world.

Another pest that is prevalent in mangoes is leafhopper. Belonging to the family Cicadellidae, Homoptera (Homoptera), there are many species of this insect but the most harmful for mango trees is still Idioscopus niveosparsus and Idioscopus clypealis. They appear only when plants begin to flower and peak at the blooming stage (if the density is

high, there may be hundreds or thousands of young hoppers on flowers). At this point, the mango fruit is no longer suitable for sale. After that, the hopper population will gradually decrease and no longer significantly affect the mangoes when the fruit is thumb-sized.

Another problem is thrips which develop in large numbers during the dry season. This pest causes damage to outer leaves of the fruit with blackspots and rough skin reducing the value of commercial products.

Since 1992, Vietnam has been conducting the Integrated Pest Management (IPM) program to solve pest problems and those related to overuse of pesticides caused by insufficient knowledge of farmers in managing crops and agroecosystems (Vietnam National IPM Program, 2017)

Vietnam MARD also issued Circular No 03/2018/TT-BNNPTNT to authorise a list of permissible and banned plant protection substances in Vietnam, with pesticides/chemicals used for treating common pests/disease also recorded (MARD, 2018a) (see Table 2).

Table 2: Pesticides/chemicals for the treatment of mango pest and diseases, Vietnam

Pests/diseases	Pesticides/chemicals
Black Spot Bacteria *Xanthomonas campestris pv*	Bismerthiazol
Anthracnose *Colletotrichum spp.*	Ascorbic acid 2.5% + Citric acid 3.0% + Lactic acid 4.0%; Azoxystrobin; Carbendazim; Chlorothalonil; Iprovalicarb 55 g/kg + Propineb 612.5g/kg; Mancozeb; Ningnanmycin
Fruit borer *Deanolis albizonalis*	Abamectin; Emamectin benzoate; Spinosad
Fruit Fly *Bactrocera dorsalis*	Abamectin 1.8g/kg + Bacillus thuringiensis 20g/kg; Spinosad
Mango leafhopper *Idioscopus niveosparsus*	Abamectin; Azadirachtin; Buprofezin; Emamectin benzoate; Pymetrozine
Thrips *Scirtothrips dorsalis*	Abamectin; Emamectin benzoate

Source: Author's analysis/MARD, 2018a
Notes: List of permissible and banned plant protection substances in Vietnam MARD-2018

6 Export conditions and environment

6.1 Market and import requirements

Negotiations to remove barriers relating to plant quarantine in order to open markets for Vietnamese agricultural products has achieved many positive results, especially for Vietnamese fresh fruit exports.

The main fresh fruit items to have been adopted by most of the demanding and high-value markets such as the United States, EU, Canada, Australia, Japan, New Zealand and Korea include dragon fruit, mangoes, rambutans, star apples and longans. This outcome has resulted in international recognition in terms of the reputation of Vietnam's plant protection and quarantine industry, as well as the reputation of the quality of fresh Vietnamese vegetables and fruits. This result has also contributed to an annual growth of Vietnamese fruit and vegetable exports (> 40%), with a turnover from about 1 billion USD in 2013 to 3.8 billion USD in 2018.

However, the technical barriers of importing countries have increased over time, including the Chinese market which is currently considered to be an easy market. These barriers in turn increase the cost of products and the associated risk of losing the market if an

exporting country does not comply with the requirements of the importing country. Regarding the quantity of Vietnamese fruit exported in 2018, 11,027.44 tonnes of fresh fruits required VHT or irradiation treatment before it could be exported to difficult markets such as the US, Japan, Korea, New Zealand and Australia.

Following on from Vietnam's Plant Protection Department (PPD) attempts to negotiate and gradually resolve phytosanitary requirements and procedures of importing countries, Vietnamese fresh fruit products have been successfully exported to difficult markets. The Plant Protection Department (under Vietnam Ministry of Agriculture and Rural Development) has negotiated and agreed on technical measures for phytosanitary in order to open up their export market to new areas including:

- United States: import permit for white flesh dragon fruit, red flesh dragon fruit, rambutan, longans, lychees, star apples and mangoes.
- Japan: import permit for white flesh dragon fruit, red flesh dragon fruit and mangoes.
- South Korea: import permit for white flesh dragon fruit and mangoes.
- Australia: import permit for mangoes, lychees and dragon fruit.
- New Zealand: import permit for mangoes, dragon fruit and rambutans.
- Europe: import permit for fresh fruits if it meets the requirements of Regulation 2000/29 / EC (must be treated with phytosanitary measures at establishments issued by the Plant Protection Department).
- The ASEAN countries, China, Canada: Fresh fruits from Vietnam can be exported to these countries. Plant quarantine regulations for consignments must be inspected and granted by a plant quarantine agency in Vietnam to meet plant quarantine requirements of the importing country.

Increasingly, China is raising technical barriers for plant quarantine Consequently, the quarantine requirements associated with plants imported into this country will become more difficult and export in the form of border trade will be gradually restricted. At present, China permits the importation of eight types of fresh fruits from Vietnam, including dragon fruits, rambutans, mangoes, longans, lychees, watermelons, bananas and jackfruit.

6.2 Technical barriers

6.2.1 Phytosanitary/plant quarantine

Requirements

Phytosanitary requirements are based on the Plant Quarantine Circular (No 33/2014 / TT-BNNPTNT dated October 30, 2018) which regulates procedures for plant quarantine for import, export, transit and post-import of subjects that require plant quarantine control and inspection (MARD, 2018b). When exporting fresh fruits, WTO-member countries must comply with the plant quarantine regulations of the SPS Agreement and the International Plant Protection Convention (IPPC). The basic requirement for fresh fruit is to have a certificate of plant quarantine issued by a competent agency and to ensure that a batch of produce is not infected with a plant quarantine object pest/disease. Some import markets only require the above basic requirements to be met, including countries in the Middle East (UEA, Qatar, Lebanon, Saudi Arabia); Eastern European countries (Russia, Ukraine); ASEAN countries (Thailand, Malaysia, Indonesia, Laos, Myanmar); and Canada.

In addition to these basic requirements, there are other additional requirements associated with the major markets such as China (mainland and Hong Kong) for Vietnamese agricultural products. EU countries (England, France, Belgium, Netherlands, Denmark, Spain, Italy, etc.) have developed specific regulations for each item in Directive 2000/29 / EC. Therefore, while there is no need to negotiate market opening for products

exported to the EU in order to maintain the market very high requirements on plant quarantine are required. The EU has a very strict control system for imported goods across the border. Any cases of violation are issued with a warning and, depending on the extent of the violation, they may be requested to return the product to its place of origin or destroy it or further importation many be temporarily suspended.

In order to open the market for fresh fruit products for the markets of developed countries such as United States, Japan, Korea, Taiwan, New Zealand, Australia, Chile and Argentina, the Plant Protection Department must develop a technical dossier including technical information required by the importing country. Also, the imported plant protection and quarantine agency performs pest risk analysis for each fresh fruit crop from Vietnam.

This process requires negotiation time to agree on the list of pests that must be controlled and measures to be applied to manage these pests (as shown in Table 3).

Table 3. Phytosanitary requirements, by country

Market	Fruit products	Quarantine treatment required
US	Mangoes, dragon fruit, longans, lychees, rambutans, star apples	Irradiation
Japan	Mangoes and dragon fruit (red, white)	VHT
Korea	Mangoes and dragon fruit (white)	VHT
New Zealand	Mangoes, dragon fruit, rambutans	Irradiation
Australia	Mangoes, dragon fruit, lychees	Irradiation, VHT

Source: author's analysis

These are difficult markets with strict requirements so the time associated with complete market opening usually lasts 3–15 years, depending on the requirements of the importing country.

In the case of fastidious markets, along with the requirement of implementing compulsory plant quarantine measures such as vapour heat treatment (VHT) or irradiation treatment, the importing countries appoint phytosanitary experts to work in Vietnam to check each batch of fresh fruit at the phytosanitary processing facility before export (i.e. the original inspection program). The main content of this program incorporates the following technical standards and traceability system:

(1) Production unit code (PUC) – Standard planting area
(2) Pack house code (PHC) – Standard packing house
(3) Treatment facility code (TFC) – Standard processing plant.

Main target pest for quarantine

The main target pest for quarantine is the Oriental fruit fly which is considered to be one of the most serious pests of fruit crops in Vietnam. Native to Asia, the Oriental fruit fly (Bactrocera dorsalis) is now found in approximately 30 countries, including parts of America and Oceania. The Oriental fruit fly is native to Vietnam (see Figure 1). Some studies on VHT and irradiation applications for Oriental fruit fly on dragon fruit and mangoes were performed and the resulting data have been accepted by importing countries as acceptable phytosanitary treatment for dragon fruit and mangoes (PPD, 2014).

Figure 1. Fruit fly Bactrocera. dorsalis

Source: Nguyen, 2019

Quarantine facilities

Fresh mangoes from Vietnam must undergo mandatory irradiation with a minimum absorbed dose of 400 Gy (Gy is an abbreviation for gray – the SI unit of the absorbed dose of ionising radiation) at a treatment facility approved by the relevant Vietnamese authority (Nguyen DL, et al., 2004) (see Figure 2). Mangoes can withstand VHT at a temperature threshold of 47°C at the fruit core centre (see Figure 3). Heat treatment times of 20 minutes and humidity levels of treatment chamber> 90% are applicable – except in the case of the following four types of fruit flies: B. dorsalis, B. correcta, B. cucurbitae and B. carambolae which harm mangoes destined for export (Decision No. 429 / QD-BVTV on Accreditation of VHT process for exported mango fruit flies as a new technology and technology, 2013.)

Figure 2. Irradiation facility

Source: Author's image

Figure 3. VHT treatment facility

Source: Author's image

The irradiation facilities in Vietnam are as follows:

- Son Son Irradiation Company, Ho Chi Minh City
- An Phu Irradiation Joint Stock Company (one facility in Binh Duong, one in Vinh Long and one more is being built in Bac Ninh Province)
- Hanoi Irradiation Center, Hanoi
- Toan Phat Irradiation Co. Ltd, Long An (currently being built)

The vapour heat treatment (VHT) facilities in Vietnam are as follows:

- Hong An Co. Ltd, Binh Thuan Province
- Fine Fruit Asia, Binh Thuan Province
- Hoang Phat FRUITS Co. Ltd, Long An Province
- Cat Tuong company, Tien Giang
- Yasaka, Binh Duong Province
- Goodlife, Ho Chi Minh City
- Tanifood, Tây Ninh Province

6.2.2 Food safety

Regarding MRLs regulations in some countries, many countries import agricultural products using the MRLs of Codex. Currently, Codex has established many MRL values; however, there is little value for the main agricultural products of Vietnam. Many active ingredients of Codex pesticides are not valid for MRLs. In the case of China and Australia, while there are national regulations on MRLs value, no default value is specified. Using pesticides on agricultural products without MRLs is considered a violation and a warning is sent. There are national regulations on the value of MRLs in the case of New Zealand market. For pesticides on agricultural products not yet constructed with MRLs, the default limit is set at 0.1 mg/kg.

There are national regulations on MRLs value for Korea and Japan markets. For pesticides on agricultural products without MRLs, the default limit is set at 0.01 mg/kg.

The United States has national regulations on the value of MRLs. In the case of pesticides/agricultural products without MRLs, the United States does not specify the default value. If a residue is detected in an agricultural product without a MRLs value that is specified in the United States, the product is not allowed to be imported into the country

European Union (EU) regulates the value of their own MRLs. Many MRLs of EU are regulated at Limit of Qualification (LOQ) value. Taiwan has regulations on the value of MRLs. For pesticides/agricultural products without MRLs, Taiwan does not specify the default value. In the case of pesticides/agricultural products without MRLs, it is considered to be a violation, and includes being warned and applying destruction measures or returning to the place of treatment.

Most ASEAN countries (including Philippines, Indonesia and Thailand) recognise the use of Codex-MRLs. In addition, ASEAN-member countries recognise ASEAN-MRLs. In some cases, member countries set up some MRL values (such as the Philippines).

6.3 Production unit and pack-house codes for exporting Vietnamese fresh fruits

At the end of 2018, Vietnam’s Plant Protection Department issued 452 area codes for fresh fruits and vegetables that are exported to developed countries such as the US, Australia, New Zealand, Japan, Korea, Taiwan and Chile (all of which can be considered as difficult markets).

As the main export market of Vietnamese agricultural products, China is no longer an easy market for Vietnam. Increasingly, China is tightening up its specifications for agricultural trade in the form of border exchange and raising plant quarantine requirements so that regulations are stricter for imported agricultural products. From 1 January 2019, the Department of Animal and Plant Quarantine Supervision (AQSIQ) under the General Department of Customs of China will officially apply the standards of quality management and origin of agricultural products exported from Vietnam to China. In a short time, the Plant Protection Department has actively coordinated with the provincial People's Committees and Departments to implement the guidelines put forward by the Ministry of Agriculture and Rural Development (in official letter No. 3906 / BNN-BVTV dated 23/5/2018). As a result, the Plant Protection Department has synthesised and sent this data to China and accepted over 1,200 plantation codes (131 for mangoes) and 564 packing codes for eight types of fresh fruits (dragon fruit, mangoes, longans, lychees, rambutans, watermelons, bananas, jackfruit) exported to Chinese markets.

7 Official mango exports from Vietnam to China

Fifteen percent of the total fruit and vegetable volume in the world is imported to Chinese markets, with the value of USD 4.4 million coming from US, Korea, Brazil, Thailand, Philippine and Vietnam. The Chinese market is very important for Vietnam.

In 2018, the value of trade (imports plus exports) of agricultural products between Vietnam and China was USD11.12 billion. Vietnam imported 2.47 billion and exported USD8.64 billion in which the value of fruits and vegetables was USD2.78 billion.

Up to 2018, Vietnam has been permitted to export eight different types of fruits to China, including dragon fruit, mangoes, rambutans, jackfruit, bananas, lychees, longans and watermelons. From 2019 there are seven different types of fruits that China plans to open for official importation including durian, grapefruit, passionfruit, sweet potatoes, coconuts, custard apples and mangosteen (08/01/2019).

In addition to these basic requirements, there are other additional requirements for a major market like China (mainland and Hong Kong) for Vietnamese agricultural products. Increasingly, China is improving technical barriers for phytosanitary so requirements for importing into this country will become stricter and export via border trade will be gradually restricted. Currently, China has permitted major importation of eight fresh fruits from Vietnam, including dragon fruit, rambutans, mangoes, longans, lychees, watermelons, bananas and jackfruit. This produce must meet basic quarantine requirements such as granting plant quarantine certificates and being free from infection by plant quarantine object pests/diseases. In order to ‘open the door’ to a new type of fruit, China also requires a technical dossier to assess its pest risk, and then based on that result import requirements can be developed and a protocol signed.

From 2018, China requires the application of traceability notifications for imported products, specifically the packaging area and packaging facility. To meet this requirement, the Plant Protection Department has issued over 1,200 plantation codes and 564 packing houses, and continues to update them at the request of export localities. In order to issue codes for localities, information must be submitted in accordance with official document No 3906/BNN-BVTV on the provision of information on fresh fruit production areas and packing facilities for export to China, (MARD, 2018e).

Other requirements for Vietnamese enterprises to be permitted to export to Chinese markets via official channels are as follows (Official document No 3906/BNN-BVTV on the provision of information on fresh fruit production areas and packing facilities for export, 2018):

- Enterprises will have to list fruit product names, the place of origin or pack-house codes in Chinese or English.
- Enterprises can include more labels to add to the above information, and also barcodes, QR codes or anti-counterfeit stamps for checking at any time.
- Only mango production unit(s) and pack-house (s) registered with the Department of Plant Protection (MARD, 2018c) with approved codes (PUC and PHC) are permitted to register for Chinese markets.
- Since 2018, Vietnam's Department of Plant Protection has negotiated with Chinese authorities in order to conduct and issue plant quarantine for export to China.
- Mango is one of eight fruits that are permitted for export to China via official channels.
- Mango export shipments/consignments must have a plant quarantine certificate.
- Mangoes must not be infected with regulated articles that are subject to plant quarantine in China.
- Quality and traceability management of export fruits to China as noted by Guangxi Department of Quarantine and Inspection (GXCIQ) was applied from 1 April 2018.

Mango quality and standards for Chinese markets via official channels can be assessed as follows:

- Mango quality and standards are assessed according to the contracts between Chinese clients and Vietnamese suppliers.
- Stamps/stickers must be stuck on the individual fruits for traceability purposes.
- Weight of the mangoes should be high (≥ 600 grams).
- Mangoes must be washed and cleaned.
- Quarantine requirements must be free from insects or diseases.

The importation of fresh mangoes from Vietnam must follow the 'Quarantine Requirements for the Importation of Plants or Plant Products into the Republic of China', as well as standard quarantine requirements. It is also necessary to apply phytosanitary measures and food safety protocols in order to protect the health and life of people, animals and plants, and to avoid contamination and infestation through international trade.

Some application should be implemented at the necessary level, based on science, transparency and non-discrimination between countries and enterprises at home and abroad such as (sanitary and phytosanitary) SPS Program- WTO, ASEAN-China FTA Agreement, agreement in commercial agricultural products to facilitate trade and agreement signed between MARD and Department of Supervision on Animal and Plant Quarantine (AQSIQ) before Cooperation in the field of food safety and sanitary and phytosanitary (SPS).

In order to export mangoes into China, enterprises must comply with the 2015 Food Safety Law and the People's Republic of China's sanitary and phytosanitary laws and adhere to directions in documents which specify the implementation of these two laws. Exporting enterprises must meet all conditions for workshops, machinery, production equipment and laboratories in terms of basic quality criteria for products, workshops, warehouses and related technical requirements to ensure food safety (e.g. technical records, production logs). The competent authority of Vietnam checks and meets the technical requirements prescribed by Vietnam and China before being permitted to grant export codes to enterprises dealing with China. Chinese authorities can conduct inspections when necessary.

Moreover, exporters need to meet technical requirements and regulations for food material safety (Decree No. 15/2018 / ND-CP) and Chinese food safety and plant quarantine regulations. The enterprises must register the area code with China Inspection and Quarantine (CIQ-Guangxi). The importer companies must clearly declare the origin of the produce by means of appropriate labels.

Mango products must meet packaging technical requirements, sanitary conditions and must not be infected with pest/insects or diseases.

It is recommended that standardised agricultural practices for mango production areas, developing management processes, techniques for cultivation, care, pest control, harvesting, packaging, storage and transportation be implemented in the future.

It is noted that there have been some changes in monitoring import and export into the Chinese market. The Department of Supervision on Animal and Plant Quarantine (AQSIQ) merged into the General Department of Customs of China (Department of Export and Import Food Safety and Department of Quality Control and Animal and Plant Quarantine). Moreover, food products imported into China must have a food safety certificate that has been issued by the competent authority of the exporting country for shipments (mandatory from 1 October 2019).

8 Conclusion and recommendations

8.1 Conclusion

In conclusion, the following have points been identified in this study:

- An informed understanding of the mango market entry and biosecurity for Vietnam exports (particularly to Chinese markets).
- Limited understanding of the current capacity (including infrastructure and access) to support successful mango export development.
- Challenges and opportunities related to market entry, commercial constraints and phytosanitary requirements, and gaps in knowledge that may exist in order to export mangoes to China via official channels.
- It is important to recommend opportunities for improving policy and communication in relation to Vietnam mango exports.

8.2 Recommendations

The following recommendations arise from this study:

- VietGap or GlobalGap certified orchards should be employed for Chinese markets that require stricter inspection and quarantine.
- Vietnamese traders should not only focus on building their own distribution channels within Vietnam but should also link with other traders for export.
- Product quality information and traceability should be studied to understand:
    - The need to use Chinese and English script on packaging (e.g. boxes, bales) to specify the name of the fruit, place of manufacture, place of packing or number/code and all the information, barcode, security code, stamp, and seal.
    - Detailed information including names, addresses and registered number of mango orchards that have been issued the PUC as well as pack-houses issued the PHC are recorded and provided by Vietnam Department of Plant Protection.
    - Conduct training with information on banned substances for farmers in their local mango-producing areas. Develop a communications network to advise updates related to MRL regulations in the importing markets and relevant information.

9 References

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