ABSTRACTS
for
COUNTRY REPORTS
EXECUTIVE SUMMARY

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- Tropical fruit market in Japan:
  - Demand of fruit market in Japan has been changing over the last 30 years, which is a positive factor to develop imported tropical fruits market. Imported fruits are increasing due to variety of consumers’ preference.
  - Due to global warming, planting area of domestic fruits is moving to the northern part in Japan. This trend is supporting to introduce more varieties of tropical fruits in Japan.
  - Japan is expecting market for tropical fruits exporters to Japan if the products can meet consumers’ needs in quality, safety and functionality.

Market environment

- Growing market in tropical fruits
  Currently product range is varied and growers are producing more species. Tropical fruits market is also growing in Japan, i.e., avocado, mango, durian, mangosteen, etc.

- Conventional long distribution channel
  National distribution channel has been managed by Coop in Japan. This channel (Zen no network) is functioned to provide stable supply chain process for consumers as well as price control. However, margin for growers is limited due to quality requirements.

- Demanding consumers
  Japanese consumers are very specific on quality and safety management. This situation would be a burden to exporters to Japanese market, yet high quality and safe products can be accepted at higher value to the demanding consumers, which is positive to growers.

Growers’ effort & government focus

- Good Agricultural Practice (GAP)
  Many farmers in Japan are adopting GAP certification. This certification is to assure that the farm is well managed in terms of cultivation, production and safety. It ensures reliability of the goods produced by that farmer.

- Own distribution and value-added products
  Successful growers are managing multiple distribution channels such as conventional Coop network and their own distribution channel such as farmers market, internet, etc. In addition, growers are developing original processed foods.

- Food Communication Project (FCP)
  Food communication project (FCP) is an activity to visualize the food supply chain and to provide information to consumers related to stakeholder in the supply chain process. Government (MAFF) is focused on this project.

Key Success Factors

1. Original distribution
   Conventional fruit distribution is pretty much matured. Although this channel is stable and national network, profitability is low primarily driven by long distribution.

2. Quality & functionality
   If the product quality meets consumers’ needs, growers and/or suppliers are able to earn more profit. For instance, Mexican avocado is sold at more than US$2 at premium super market.

3. Safety & disclosure
   Japanese consumers are more and more food safety conscious particularly after the disaster in 2011. Tracking system and visibility are necessary in order to penetrate into Japanese consumer market.

Creative House Corporation
IMPORT TRENDS AND CULTIVATION OF MANGO IN KOREA

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Abstract

Korea started to import mango fruits from the Philippines in 1993. And import volume rapidly increased after 2000. The import volume in 2013 was 5,128 tons valued 19 million dollars. The increasing trend is still continuing.

Jeju Island is an island off the southern coast of South Korea. It is Korea’s largest island with an area of 1,848 km². It has typical mild coastal climate with minimum temperatures just below 0 degree Celsius even in winter due to warm currents. Due to global warming and needs of new economic crops, mango has been cultivating since 1980s. Total area of mango cultivation in the island in 2011 was 22.6 ha with 42 growers. About 50% of average mango orchard size is 0.3-0.6 ha, and only three farms have larger than one hectare. Harvesting period is from April to September. And the market price is the highest in April. Fresh mango fruits are distributed through the wholesale dealer or the National Agricultural Cooperative Federation (NACF) before reaching department stores or retail dealers.
Indonesia is lying on the tropical area, between 6°N to 11°S of latitude, has a total 253 million inhabitants. From the total 40 million hectares of arable land, 64 percent or 25.6 million hectares have been utilized for rice field, estate crops, vegetables, fruits, and ornamental crops. Fruits either tropical or sub-tropical have been cultivated in Indonesia, but generally in small scale or even subsistence. In preparation of market liberalization era, the Ministry of Agriculture has developed the state of competitiveness on agriculture, particularly the fruit sector, i.e., policies, research and development programmes, information, promotion, and trade. This paper discussed the programmes and the institutions which involved on the research and development of fruit sector mainly top four fruits i.e., banana, citrus, mango, and papaya. The Directorate of Fruit Cultivation and Postharvest generates the policies of Standard Operational Procedures (SOP) of cultivation and extension programmes. Institutions under the Agricultural Agency for Research and Development involves in research and development on fruit crop breeding, cultivation, machineries, policies, and development programmes. Universities also involve in fruit research and development programmes under the coordination of Ministry of Education. Directorate General of Processing and Marketing for Agricultural Products assists the promotion in domestic and international markets. The Center for Agricultural Data and Information System manages the database and information of fruit crops in term of production, consumption, productivity, planting area, import and export, and so forth. The Ministry of Agriculture coordinates with the Ministry of Trade to generate the policies of import and export of fresh and processed fruit products. International collaborations were carried out for three fruit crops. They are banana with Bioversity International and ACIAR, mango with ACIAR, and citrus with FAO. So far, there is no international collaboration programme for papaya.

Keywords: tropical fruit, research, development, system, Indonesia
OVERVIEW ON FRUIT PRODUCTION, AND RESEARCH AND DEVELOPMENT (R&D) SYSTEM IN INDONESIA

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Abstract

This study aims at identifying the production as well as research and development system of major fruits in Indonesia. Eight of major fruits namely the top eight-fruit are selected based on its potential in the country in line with the national priority set by the Indonesian Ministry of Agriculture: 1) banana; 2) citrus; 3) papaya; 4) mango; 5) snake fruit; 6) mangosteen; 7) rambutan; and 8) durian. Among the top eight fruits, there are top selected four fruits, specifically: 1) banana; 2) citrus; 3) papaya; and 4) mango. The estimated annual consumptions of major fresh fruits and the top eight-fruit in the country from 2008-2013 were 68.50 kilogram per capita and 51.66 kilogram per capita, respectively. During the same period, the respective productivities of major fruits and the top eight-fruit were 30.70 ton per hectare and 23.73 ton per hectare. In addition, the proportion of trade value of fruits was aggregately 3.68 percent (export) and 96.32 percent (import). It is considered that research and development (R&D) system in Indonesia focus on prominent fruits comprises three-category, namely: 1) priority fruits (citrus, banana, mango, mangosteen, and durian); 2) superior fruits (papaya, snake fruit, pineapple, apple, and grape); and 3) prospective fruits (melon, passion fruit, guava, persimmon, rambutan, avocado, and longan). Essentially, the development of fruit sector in Indonesia is organized under the Horticulture Law No. 13/2010 and the Regulation of the Minister of Agriculture No. 86/2013 concerning the Import Recommendation of Horticulture Products.

Keywords: fruit, production, research and development, Indonesia
VALUE CHAIN FOR FRUITS IN MYANMAR

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Abstract

In this survey, mango, banana, guava, plums, pomelo, watermelon and avocado were studied. Being a staple food, rice was prioritized to cultivate in Myanmar. Fruit orchards and plantations are less than rice fields. Myanmar’s fruit sector is at the beginning of development but some of domestic producers are trying to meet all local demand and export quality. For the marketing approach, value chain of tropical fruits production should be started from the farm. Selection of cultivars and soil fertility management play the vital roles in fruit value chain. Avocado trees are planted from seeds only. Cultural practices such as mulching, weed control, compost applications are emphasized. Pruning is the major habit after harvesting in mango and plums. Avocado needs to do tree training but very rarely found in naturally growing. IPM was introduced systematically to all fruits growers by the Department of Agriculture and MFFVPEA (Myanmar Fruit, Flower and Vegetable Producer and Exporter Association). Growers can apply organic fertilizer twice a year rather than chemical ones. Majority of fruits growers utilized compound fertilizer. Proper pre-harvest farming and post-harvest handling practices have been taught by MFFVPEA through many trainings and knowledge sharing to the growers. MFFVPEA is also carrying out with help from FAO, GIZ and others organizations to be able to set standard such as GAP and organic certifications for the marketing improvement, food safety and quality control. Organic practices made shorter value chains of fruits. Annual fruits festivals, trade fairs and regular farmers market are created by MFFVPEA as market linkage and enhancement of export opportunities. The most important point for the value chain is the need to streamline all the process from product selection to reach end user across all over Myanmar and also to exports. Infrastructure and investment are still needed to improve with the ways of private public partnership. Therefore MFFVPEA, YCDC (Yangon City Development Committee) and other investors are trying to construct the high quality fruits and vegetable market with cold storage facilities in Yangon, Nay Pyi Daw and Mandalay.
DATA AND ANALYSIS OF THE FRUIT SECTOR IN MYANMAR

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Abstract

In Myanmar, many tropical fruits are cultivated in different areas and topographies. That is the reason many kinds of fruits are available year round. Myanmar horticulture industry is at a starting point but the domestic producers are able to meet all local demand and export. Mango, watermelon, musk melon and plums are top items for exporting through cross border to China and shipment to Singapore, Malaysia and Hong Kong. In 2013, 240.8 tons of watermelon and 38.7 tons of Sein Talone (One Diamond) mango were exported to China. Other mango varieties are cultivated in Yangon Region and Pegu Region for local consumption. Local varieties of plums are vigorous and bearing fruits in large quantities with low quality which are consumed as snacks and juice for domestic consumption. Avocado trees are grown as seedlings therefore not available true to type plants. There are no budded and grafted plants as vegetative propagation. Therefore avocado varieties could not be classified with typical characters. Myanmar local people cultivated naturally in their own home garden for domestic consumption. There are few commercial plantations in ShanState. Horticulture Section in the Department of Agriculture directs and promotes the GAP (Good Agriculture Practices) system, setting up the standards of fruit quality. IP section, Ministry of Science and Technology carried out the IP activities including brand name and geographical indication on fruits in collaboration with Myanmar Fruit, Flower and Vegetable Producer and Exporter Association. The most important aspect for the industry is the need to streamline all the process from product selection to reach end users across all over Myanmar and also to exports. Infrastructure and investment are still needed to become a modern producer with all the steps and procedures to compete in the world market. Postharvest technology, transportation system and storage are not strong enough for the fruit sector.
THE STATUS OF THE FRUIT INDUSTRY OF THE PHILIPPINES

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Abstract

Tropical fruit species abounds in the Philippines. These are generally grown from a backyard crop to large corporate farms for the export market. The top eight (8) fruit species produced in the country are: 1) banana; 2) pineapple; 3) mango; 4) citrus primarily calamondin and pummelo; 5) papaya; 6) watermelon; 7) durian; and 8) Lansium (Lanzones). Total production, hectarage, average yield, average farm gate price, utilization and sources and major forms of planting materials of these fruit species are presented. In addition, volume and value of fruit imports of the country are also indicated in this paper. Research and development efforts to advance the fruit industry are also discussed together with the major government and private agencies including state universities and colleges doing these activities.
SCIENCE AND TECHNOLOGY STRATEGIC APPROACHES ON SELECTED TROPICAL FRUITS

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Abstract

The PCAARRD’s mission is to provide strategic leadership in promoting science and technology (S&T) as a platform for agriculture, aquatic and natural resources (AANR) product innovation and environment resiliency. We have crafted Industry Strategic Plans (ISP) for 2012 to 2016, commodity-based, long-term S&T plans for each priority industry, which is a blueprint for operationalizing S&T vision. It provides information on technology baseline, benchmark targets and the set of required S&T interventions with the corresponding resources to achieve its desired outcomes, which will enable the agri-aqua sector to raise productivity to world-class standards.

The Philippines is endowed with rich diversity of tropical fruits but there are major concerns because of limited access to good quality planting materials, high incidence of pests and diseases, lack of production standards to meet the good agricultural practice requirements and weak marketing system to link the growers to the buyers. For the selected tropical fruits such mango, banana, durian and jackfruit, their respective ISPs will provide science-based solutions to these constraints towards increment in the productivity with the use of quality and disease-free planting materials, increase efficiency of production through proper cultural and pest management practices, postharvest handling and improved market structure.

The adoption of technological S&T interventions by the tropical fruit growers in the production sites through a community-based approach system increased yields on mango by 57% and reduced postharvest losses by 50%; increased yields on durian by 90% and increased marketable fruits by 90-95%; increased yields on jackfruit by 60% and reduced postharvest losses by 25%; and increased yields on Lakatan variety of banana by 35% and reduced incidence of banana bunchy top virus (BBTV) from 70% to 20%.

Therefore, we hope that the industry S&T plans for selected tropical fruits can provide science-based solutions through a technological value chain approach to address food security, global competitiveness, and inclusive growth to the country by 2020.
DEVELOPMENT OF TROPICAL FRUIT VARIETIES AND CULTIVATION TECHNIQUES IN TAIWAN

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Abstract

1. Achievements of new varieties development in the past five years

For the past five years, scientists in Taiwan have bred and released a number of fruit varieties, including papaya, Indian jujube, pineapple, wax apple, loquat, lychee, and carambola. These new varieties provide consumers a richer choices of safe and healthy products and better fruit quality that greatly enrich the food supply for the people in Taiwan.

2. Targeted characteristics of varietal development

The varietal development targets at high total soluble solids (TSS), high ratio of edible flesh, pest and disease resistance, longer shelf life, and enhanced plant vigor. In some fruit, color of flesh or skin, high yielding potential, and rich nutrient contents are also important. For food safety reason, varieties with high level of resistance or tolerance to pests and diseases are emphasized so as to reduce applications of agrochemicals.

3. Development of unseasonal production technique for tropical fruit trees

With a diverse weather conditions, scientists in Taiwan have developed cultivation techniques for off-season production, especially for tropical fruit like wax apple, guava, mango and sugar apple. These fruit trees can be produced in their right season and subsequent off-seasons as well, even for a year-round production. For example, wax apple is originally produced during April to July in Taiwan. By using forcing culture techniques with black net coverage, girdling, flooding, cut roots, and fertilizers, it may alter the harvest time to November to March.

4. Potential areas of collaboration

Continued R&D efforts are being made in Taiwan to develop new varieties and technologies for improving productivity and safety, to cope with climate change, and to expand the markets in Taiwan and beyond. In order to achieve these objectives, Taiwan scientists strive for international cooperation on different levels of areas with counterparts in various countries.
EMERGING CHANGES IN THAI TROPICAL FRUIT SUPPLY AND DEMAND

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Abstract

Thailand enjoys wide varieties of tropical fruits throughout the year. The Thai tropical fruit industries (export 256,172 ton, USD120 million, source FAO, 2010) are mostly driven by strong fruit production base. In recent years, external influences such as shifting consumer preferences, new market dynamics, and stringent trade legislation, all slowly shape the traditional industries into a market-led model. The Thai tropical food industries follow a similar development direction as those in some advanced economies. In Thailand, emerging user needs and new market dynamics significantly foster new fruit industries. Consumers are more health conscious and look for high nutrition fresh fruits and fruit products. The industries develop a wide diversity of products, from individually packed premium fresh fruit to processed fruit products. In coconut, an unique aromatic coconut is being cultivated, alongside with high nutrition coconut juice, coconut milk, coconut pudding, etc. Every part of the fruit production, odd size and shape, are all utilized for extending a wider consumer market. In 2011, the government also drafted new strategies and supported the industries for better production, market development, product diversity, and organizational support; especially on aromatic coconut as new economic fruit crop. ‘Organic’ is still a privilege label in Thailand. Coconut is being developed into organic variances, among banana, mango and papaya. This attracts higher value in the export trade. Functional fruit is a new concept in Thai tropical fruit research subjects. Banana, coconut, mango and papaya, each contains unique substances that lower the risk of cardiovascular disease, retarding Alzheimer, delaying ageing, etc. Field application and production research yet to be planned. Food safety becomes a mandate in the trade as well as in the consumer market. Some farmers apply bio-control in fruit production that minimize the use of chemicals. For instance, in aromatic coconut production, Goniozus niphantidis is applied as a predator controlling the coconut black-headed caterpillar (Opisina arenosella Walker). When chemical is necessary, it will be applied according to the GMP recommendation. In coconut production, SMS (sodium metabisulfite) is carefully applied and is checked thoroughly the safety in the process.

Production advancement and structured production management in the Thai tropical fruit industries are logical solutions to the increasing domestic consumption and the export demands. Thai mango producers develop crops that fill the supply gap in both domestic and export markets. Growers apply growth retardant ‘paclobutrazol’, hence mango is available year round. Banana, coconut and papaya have not been affected by seasonality. With better growth data and market demand trend, then precise
production scheduling could locate papaya and banana to reach the market at the best timing for the best price. Also, over-production could be minimized. Due to long growth cycle of coconut, scheduling technique could not be applied on its production. In aromatic coconut production, growers would postpone the harvest of over-produced coconut until the fruit aged for oil production, a lower valued downstream. Orchard management is also an effective measure against unpredictable climate change and uneven water distribution. Micro-climate forecast technology is being developed to prevent environmental stresses on the crop. Mini-sprinkler system is widely deployed in papaya production (32% countrywide) for better utilization of water resources. Mulching is also applied in mango production for maintaining consistent soil moisture. Management programs are setup for protecting high quality true-to-type plant materials and seedlings for better plant propagation requirements, for example, isolating the growing areas for aromatic coconut and ‘red flesh’ papaya (Khaek Dam) with high carotenoid. Breeding programs are customized for better adaptation to the adverse growing conditions. At the time of reporting, there is very few breeding program in Thailand that specific for banana, coconut, mango and papaya. In some mango production, GAP (Good Agricultural Practice) is deployed for regulating the process quality hence achieves better food safety measure. In aromatic coconut production, GMP (Good Manufacturing Practice) is also applied for better process and quality management. These are emerging changes in tropical fruit industries in Thailand. More new development in the supply and demand model, especially those at the upstream of the value chain in the tropical fruit production, is thus foreseen.
TROPICAL FRUIT SECTOR IN THAILAND: PRODUCTION, MARKETING AND NATIONAL FRUIT RESEARCH AND DEVELOPMENT SYSTEM

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Abstract

Thailand is well known as one of the major tropical fruit producers and leading the Southeast Asian region for exporting high quality fruits to the world market. Certain sub-tropical fruits, particularly, longan and lychee are of economical importance and can adapt and perform well in Thailand conditions. At present, 1.9 million households are engaging in fruit production and fruit growers represent 30% of total farm households of the country. Up to 57 different fruit species are commercially produced in the total area of 1.31 million hectare with average production of 7.5 million ton and the total value of 2,823 million US$ annually and 928 million US$ of which being generated from exporting of Thai fruits. Export markets are mainly in Asia where China, Indonesia, Malaysia, Laos, Vietnam, Singapore, Taiwan, Japan and Korea are major customers for fresh fruits while Canada and USA for the frozen ones. Australia and some European countries have imported Thai fruits increasingly due to their growing popularity. The six major economic fruit crops in Thailand currently are longan, durian, mangosteen, rambutan, mango and longkong covering the area around 0.9 million hectare and producing 4.45 million ton of fruits. The other six minor economic fruit crops are pummelo, lychee, tangerine, banana (AAA group; Gros Michel), baby banana (AA group; Kluai Khai) and papaya covering the area around 0.2 million hectare and producing 1.74 million ton of fruits. Detail information on production, growing areas, yield, farm gate value, harvesting season and export market of each important fruit from 2008-2013 was discussed. Although guava, dragon fruit and passion fruit are important tropical fruits in Southeast Asia, their production in Thailand is relatively small and their official statistics was very limited. With current production technology and expanding of production to different geographical areas, some seasonal fruits are now available year around. However, more than 90% of economic tropical fruits are in the market between April and September, particularly in May and August causing a problem of oversupply and low price repeatedly. Most of planting materials are asexually propagated by air layering, stem cutting or grafting depended on fruit species. Seed propagation is common for papaya, passion fruit and certain rootstalks. Many growers prefer to use their own mother plants for propagation to ensure the quality and uniformity of planting materials. Large number of planting materials can be also obtained from a trustful orchard via negotiation while commercial nurseries and governmental agencies contribute to this role in the less extend. Popular imported fruits in Thailand are apple,
pear, cherry, grape, orange, strawberry, persimmon, kiwifruit, etc. from China, Japan, Korea, Australia, New Zealand, USA, Chile, South Africa, etc. with the value over 1,000 million US$ annually. Apple is predominant among those temperate fruits and more than 100,000 ton of apple was imported annually with the value over 100 million US$. Research and development for Thai Fruit sector follows the Thai Fruit Strategy 2010-2014 that focuses on the development of production potential such as an increase in production efficiency, off-season production, proper postharvest management, development of new fruit cultivars having high potential for export and good adaptation to current environmental conditions, development of new fruit products, strengthening and empowering of fruit grower groups, establishing a network of production and marketing, development of domestic market system, promoting of fruit consumption, more control on fruit importation, logistics development and supporting the set up of fruit distribution centers domestically and internationally. Organization involved in research and development of fruit sector included the Ministry of Agriculture and Cooperatives, Agricultural Research and Development Agency, Thailand Research Fund, National Science and Technology Development Agency, National Research Council of Thailand, universities and institutions under the Office of the Higher Education Commission while the Ministry of Commerce has played important role in fruit export. Regional research centers under the Ministry of Agriculture and Cooperatives scattering over the country are in charge of fruit research specific to the region. An example of research and development center devoted for longan, the top fruit crop in Thailand, is located in Maejo University, Chiang Mai Province, north of Thailand. The center has gained funding support from both university and Thailand Research Fund and cooperated internationally with the German Technical Cooperation (GTZ) to run a wide range of research programs to provide knowledge and solutions necessary for longan production in Thailand.
Vietnam stretches from the north to the south latitudes with diverse ecological conditions. With the diversity of natural conditions, Vietnam has many kinds of fruit crops such as temperate fruit crops in the Northern mountainous provinces, subtropical fruit crops in the Northern provinces and tropical fruit crops in the Central and Southern provinces. The area under fruit cultivation and their production in Vietnam has increased rapidly in recent years, from 775,000 hectares with production of 5.3 million tons in 2008 to 832,000 hectares with production of 7.8 million tons in 2012. The fruit species with larger area under cultivation and high production in Vietnam includes longan, litchi, rambutan, banana, pineapple, mango, citrus and dragon fruit. The fruit species concentrated in the Northern provinces includes longan, litchi, banana, pineapple, citrus and some tropical fruit species; those concentrated in the Central provinces includes mango, dragon fruit, grapes, avocados and citrus and those concentrated in the Southern provinces includes longan, rambutan, mango, banana, pineapple, dragon fruit, durian, mangosteen and citrus. In the Northern provinces, the fruit species has the main harvesting time from June to December depending on species and variety. In the Southern provinces, in addition to main harvesting time of fruit species, most of fruit species can be treated for off-season flowering and some fruit trees can be harvested year-round. Fruit products of Vietnam are exported to over 50 different countries and territories with increasing export value over the years. In 2008, fruit and vegetable export turnover of Vietnam is USD 405 million and has increased to reach USD 1.0 billion in 2013. Some fruit species with large export volume includes dragon fruit, banana, litchi, mango, pomelo and apples. Some destination markets of key Vietnamese fruit products are China, Japan, USA, Korea, Taiwan, Singapore and Russia. Vietnam’s research and development programs on fruit crops are mainly carried out at various affiliated institutions under Vietnam Academy of Agricultural Sciences and some agricultural universities. The Government has set up the long-term research and development program plan for fruit crops which have larger growing area and higher production.