

ECONOMIC IMPACT OF SANITARY AND PHYTOSANITARY MEASURES ON PHILIPPINE PINEAPPLE EXPORTS

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ABSTRACT

This paper determined the economic impact of sanitary and phytosanitary (SPS) measures on Philippine pineapple exports in accord to the implementation of the World Trade Organization (WTO) agreement on the application of SPS measures and compliance to importing countries' standards. As the Philippine SPS standards for fresh and processed pineapple were revealed to be at par with the Codex standards and that of the major trading partners, namely: Japan, South Korea, Canada, the Netherlands and the United States; the country has maintained its export competitiveness in the pre- and post-SPS regimes.

Results of the multiple regression analysis revealed that foreign exchange rate, domestic production, and export price positively affected the value of pineapple exports while domestic price negatively influenced the value of pineapple exports. Australia, which has imposed stringent SPS requirements, registered a declining import volume of Philippine fresh pineapple as shown by a significant and negative coefficient of SPS dummy variable. In general, in spite of the insignificant effect of SPS measures on total value of Philippine pineapple exports, there are still production-, marketing-, and trade-related problems in the industry that require policy directions in order to remain competitive in traditional and emerging foreign markets.

Key words: export competitiveness, Philippine National Standards, Codex standards

INTRODUCTION

Ananas comosus Merr., known locally as "*pinya*", has been sold as a fresh fruit but later developed into value-added products, namely: canned (slices, chunks, tidbits); concentrate; prepared; dehydrated; juice; vinegar; wine; pie; tart; "empanadita"; nata de piña; marmalade; jam; candy; machine decorticated fiber; hand woven piña cloth; handmade paper; and others. The main commercial cultivars of pineapple include Cayenne Lisse or Smooth Cayenne, Queen, Red Spanish, Abacaxi, Singapore Spanish, Selangor Green, Española Roja, Perola, Perolera, MD2, Josapine, and RL41; where the first four varieties are internationally traded. In the Philippines, Smooth Cayenne, Queen, Cabezona and Sugarloaf are popularly grown (Morton 1987).

The country's accession to World Trade Organization (WTO) is part of the trade reforms which started in the 1980s to improve market access and enhance export competitiveness. The main elements of the agriculture agreement are tariff and non-tariff reforms; reduction of State subsidy excluding agricultural R&D, irrigation, and market infrastructure; decrease in export subsidies; and removal of anti-trade bias of SPS measures. The General Agreement on Tariffs and Trade (GATT) in Article XX allows governments to adopt measures necessary to protect human, animal or plant life or health, provided that they do not arbitrarily or unjustifiably discriminate or use these as disguised protectionism. The WTO Agreement on the Application of SPS measures provides the basic rules for ensuring a transparent, scientifically defensible, and fair health laws and regulations. It includes basic rights and obligations of member countries; principles of harmonization, equivalence and

transparency; risk assessment; regionalization on import ban; and implementation and oversight of SPS measures (WTO 1994). However, the WTO noted that SPS measures can be very effective in protectionism due to its being technical and deceptive (Becker 2006). Various ex-ante and ex-post studies have shown that SPS measures have reduced the volume of exports of selected agri-based products in developing countries (Cook 2001; Otsuki, Sewadash, and Wilson 2000 as cited by Authukorala and Jayasuriya 2004; Ignacio 2004; Miranda 2004; and Marquez 2005). So far, no study has been done in the Philippines measuring the effects of SPS standards on the value of Philippine fresh and processed pineapple exports.

This study sought to: (1) assess the Philippine SPS standards versus Codex and other standards adopted by importing countries of Philippine pineapple exports; (2) determine the effects of SPS measures and other factors on the volume and value of pineapple exports; (3) compare the export competitiveness of pineapple exports before and after the WTO agreement on the application of SPS measures; and (4) identify problems in the pineapple industry and recommend appropriate policy directions with special concerns on SPS measures affecting the export competitiveness of the Philippine pineapple.

METHODOLOGY

Primary and secondary data were collected from national and international organizations/institutions. Primary data covered in the study include: (1) port, storage and distribution costs; export margin; and (2) domestic wholesale prices of fresh and processed pineapple products, which were obtained through personal interview of five processor-cum-exporters. These sample respondents which accounted for 30 percent of the registered processor-cum-exporters were selected using purposive sampling based on the list provided by the Department of Trade and Industry (DTI) and the Department of Agriculture-Agribusiness and Marketing Assistance Service (DA-AMAS).

Secondary data used in the study were: (1) world pineapple exports retrieved from the Food and Agriculture Organization (FAO) of the United Nations; (2) Gross Value Added (GVA) in agriculture, domestic production and prices, area planted, yield, and consumption of pineapple gathered from the Bureau of Agricultural Statistics (BAS); (3) export prices and volume and value of Philippine pineapple exports obtained from the DTI-Bureau of Trade Promotions (BETP); (4) average annual foreign exchange rate taken from the Bangko Sentral ng Pilipinas (BSP); and (5) local and international standards for pineapple products.

The Philippine National Standards (PNS) for pineapple were furnished by the Bureau of Plant Industry-Sanitary and Phytosanitary Standards Information System (BPI-SPSIS), Bureau of Agriculture and Fisheries Product Standards (BAFPS), Fertilizer and Pesticides Authority (FPA), Bureau of Food and Drugs-PNS (BFAD-PNS), and DTI Bureau of Product Standards (BPS). For international standards, these were collected from the FAO/World Health Organization (WHO) Codex Alimentarius Commission; FAO International Plant Protection Convention; and standards bureaus and government portals of top importing countries of Philippine pineapple exports, namely: the United States, Japan excluding Okinawa, South Korea, Canada, and the Netherlands. Australia's SPS measures were also gathered due to the country's trade dispute filed against Australia (WTO 2002). Using stringency analysis, the local and international standards were compared and contrasted.

Multiple regression analysis was used to determine the effects of SPS measures and other factors on the value of Philippine pineapple exports. Three functional forms (i.e. linear, semi-log and double-log) were estimated and tested to determine the best model using the following criteria: (1) coefficient of determination (R^2); (2) number of significant variables with logical sign; and (3) F-ratio.

Below is the model expressed in three functional forms:

$$\begin{aligned} XVAL_t &= \beta_0 + \beta_1 F_t + \beta_2 PROD N_t + \beta_3 DP_t + \beta_4 EP_t + \beta_5 SD_t + e && \text{(Linear)} \\ \log XVAL_t &= \beta_0 + \beta_1 F_t + \beta_2 PROD N_t + \beta_3 DP_t + \beta_4 EP_t + \beta_5 SD_t + e && \text{(Semi-log)} \\ \log XVAL_t &= \log \beta_0 + \beta_1 \log F_t + \beta_2 \log PROD N_t + \beta_3 \log DP_t + \beta_4 \log EP_t + \beta_5 SD_t + e && \text{(Double-} \end{aligned}$$

log)

where: $XVAL_t$ = value of pineapple exports in year t (M FOB US\$);
 F_t = foreign exchange rate in year t (PhP/USD);
 $PROD N_t$ = domestic production of pineapple in year t (mt);
 DP_t = domestic price of pineapple in year t (PhP/kg);
 EP_t = export price of pineapple in year t (US\$/kg);
 SD_t = SPS dummy variable where "0" is designated for pre-SPS (1985-1994) regime and "1" is for post-SPS (1995-2006) regime; and
 e = error term.

Similar models were used to determine the effects of SPS measures and other factors but this time on the volume of fresh pineapple bound for Australia. Time-series data on the value of exports were incomplete for this trading partner, thus were replaced by the volume of exports as the dependent variable.

Test of two means was employed to determine whether there is a significant difference in the export competitiveness of Philippine pineapple before and after the implementation of the WTO agreement on SPS measures. Student's t-test was done at one, five and 10 percent level of significance (α). A decision rule was made based on the level of significance wherein a p-value of less than 0.10 denotes a test statistic greater than the t-tabular value, thus rejecting the null hypothesis ($H_0: \mu_1 - \mu_2 = 0$). The assumptions of normality, independence, and equal variances were all checked.

Export competitiveness of fresh and processed pineapple was determined using the ratio of export parity price and domestic wholesale price in the pre- and post-SPS regimes. In addition, sensitivity analysis was done to present exporters' responses on a currency revaluation (PhP 50: US\$ 1) or devaluation (PhP 55: US\$ 1). The decision rule used for the simple price comparison for export competitiveness is shown below:

- (1) For $P_x/P_d > 1$, the Philippine pineapple exports are competitive; and
- (2) Conversely, for $P_x/P_d < 1$, the Philippine pineapple exports are uncompetitive.

where: P_x = export parity price (PhP/kg) is the Free on Board (FOB) value of the product adjusted for internal distribution and handling costs, and exporter's margin; and
 P_d = domestic wholesale price (PhP/kg) from BAS; and Manila wholesale price (PhP/kg) obtained from the processor-cum-exporters interviewed.

RESULTS AND DISCUSSION

Main Players in the World Export Market

In the world market, the main forms of pineapple exported are canned, fresh, juice and concentrates. The average shares of these forms from 1985 to 2005 in terms of volume and value, respectively are as follows: canned (44%, 51%); fresh (40%, 27%); juice (12%, 7%); and concentrates (4%, 5%). For all forms of pineapple exports, the Philippines came as the second major exporting country after Thailand (Table 1).

Table 1. Market share in terms of value by form of pineapple exports in the pre- and post-SPS regimes, 1985-2005.

FORM	PRE-SPS (1985-1994)	Market Share (%)	POST-SPS (1995-2005)	Market Share (%)
Canned	Thailand	42	Thailand	41
	Philippines	18	Philippines	15
	Kenya	7	Indonesia	11
Fresh	Costa Rica	21	Costa Rica	28
	Cote d'Ivoire	18	Belgium	15
	Philippines	15	France	11
Juice	Thailand	36	Thailand	32
	Netherlands	16	Netherlands	24
	Brazil	6	Brazil	12
Concentrate	Philippines	58	Philippines	30
	United States	12	Indonesia	17
	Belgium- Luxembourg	7	Thailand	11
All forms	Thailand	32	Thailand	23
	Philippines	17	Philippines	12
	Kenya	5	Netherlands & N. Antilles	8

Source of basic data: FAO (2006)

Thailand has dominated the canned pineapple export market due to five factors: (1) establishment of Dole Thailand Ltd. in 1972; (2) privileges provided by the Board of Investment to industry players; (3) higher domestic demand for fresh over canned fruits; (4) lower import duty on packaging materials; and (5) market development in supermarkets and retailers of importing countries (Asopa 2003). Indonesia has emerged in this industry during the post-SPS with market diversification from 20 countries in 1995 to 52 countries in 1999. Great Giant Pineapple Company, the largest canned pineapple processor in Indonesia, has also expanded acreage from 10,000 to 30,000 hectares between 1979 and 1999 to increase pineapple production (Hadi 2001). Leading processor-cum-exporters in the Philippines and Thailand such as Dole Package Foods Philippines Inc. (Dolefil), Del Monte Philippines Inc., Thai Food Processors' Association, Thai Pineapple Industry Association and Ruam Chai Sapparod have consistently enhanced production resulting to their high shares in the value of world pineapple juice and concentrate exports, respectively (Food Market Exchange 2003).

Philippine Pineapple Industry Situationer

On the average, the country produced 1.5 million metric tons (mt) of fresh pineapple valued at PhP 6.9 billion from 1985 to 2006 (Table 2). The sharp growth in production, area and yield in 1995 and 1999 onwards was mainly due to expansion done by transnational corporations (TNCs) and implementation of the High Value Commercial Crops Development Act of 1995. Conversely, the unfavorable domestic farmgate and wholesale prices of pineapple in 2006 led to the highest decline in production. However, despite the upsurges in the volume (3.04%) and value (8.98%) of pineapple production from 1985 to 2006, the share of this fruit production to GVA in agriculture dropped by 0.43 percent (BAS 2006). Northern Mindanao (48%) serves as the top pineapple producer from 1990 to 2006. Del Monte Philippines Inc., one of the world's leading pineapple corporations, is situated in this region, particularly in Bukidnon. It is followed by SOCCSKSARGEN (39%) where Dole Philippines, Inc. in South Cotabato is located (BAS 2006).

Average domestic pineapple consumption amounting to 654,371 mt increased by 4.42 percent from 1985 to 2006 (Table 2). This is attributed to the higher demand for fruit salads during holiday season by households and fast-food outlets (Medina 2004). Considerably, increasing population has also led to high consumption level. Utilization of pineapple as feeds for cattle and in

processing also grew by 4.42 percent. The share of domestic consumption to world consumption (8.23%) grew by 2.24 percent in the same period. The difference in per capita consumption between the Philippines and world's average (7.92 kg/yr) expanded by 2.74 percent (BAS and FAO 2006).

Nominal farmgate and wholesale prices of fresh pineapple remained generally fluctuating but surged by 6 percent in the pre- and post-SPS periods. Nominal retail prices remained stable with 7 percent growth from 1985 to 2006 (BAS 2006). This could be due to the high price elasticity of demand with stickiness in retail price (FAO 2001; Goldberg 2007; and Perner 2001). In real terms, only wholesale prices ascend between the two periods from PhP16.00/pc to PhP16.80/pc. Some wholesalers who provided inputs to contracted farmers reflected the increases in fertilizer prices in their production cost. Note that the average retail price of urea increased from PhP 7.38/kg in 1995 to PhP 14.84/kg in 2004 and the 0-0-60 fertilizer by PhP 2.39/kg (1995-2000) and PhP 5.68/kg (2000-2004) (FPA 2006). Canned pineapple exports shared 44 percent in volume and 59 percent in value of total pineapple exports from 1985 to 2006. It is followed by fresh (37%, 18%), juice (10%, 6%) and concentrate (9%, 17%) (DTI-BETP 2006). Pineapple concentrate has a greater share in total value compared to pineapple juice denoting higher average export price. Based on export price, the order of ranking is as follows: concentrate, canned, juice and fresh pineapple (Table 2).

Direction of Philippine Pineapple Exports

The Philippines has diversified its export markets in all forms of pineapple exports (Table 3). Filipino exporters give priority to traditional markets, especially those with 22 years of consistent importation, or those which have become regular buyers during the post-SPS regime. Some irregular markets are seen with potentials of becoming traditional markets while emerging markets are being developed to serve as regular foreign markets in the future.

Canned pineapple. The United States has topped the pre- (47%) and post-SPS (64%) regimes in terms of share in the volume imported from the Philippines. Proximity and liberalization of markets have led to this shift, except for the United States and Canada which have constantly imported canned pineapple for 22 years. Emerging markets include United Arab Emirates (UAE), Bahrain, Brunei Darussalam (Brunei), People's Republic of China (China), Switzerland and Thailand.

Fresh pineapple. Four countries have been identified as traditional markets for fresh pineapple in the post-SPS period: UAE, Hong Kong, South Korea and New Zealand. By volume share, Japan excluding Okinawa (92%, 83%) and South Korea (3%, 2%) ranked first and second in the two periods. In case of the country's trade with Japan, it is anticipated to further improve with the ratification of the Japan-Philippine Economic Partnership Agreement (JPEPA). It will create a Tariff Rate Quota (TRQ) for pineapple smaller than 900 grams under a zero in-quota rate, which is far better than the applied most favored nation rate (17%). For South Korea, the increasing trend in share of imports is expected to continue with the on-going talks on tariff reduction on pineapple exports which started in 2003. Dole Asia, the regional headquarters of the Dole Food Company Inc., grows pineapple in the Philippines and then trades this fruit in Japan, Middle East, Hong Kong and South Korea (SEC Info 2008). Emerging markets include China, Singapore and Taiwan.

Pineapple juice. Twenty-two years of constant exportation have been established with the United States, Bahamas, Canada, and Japan excluding Okinawa and Singapore for pineapple juice. Hefty bulk of the share in import volume was captured by the United States (77%, 65%) followed by Canada (6%, 6%). Dole Food Company Inc. has 27 direct selling offices in North America, Europe, Middle East, and Asia where pineapple juice processed in the Philippines is exported. Emerging markets include UAE, Australia, Brunei Darussalam, India and Micronesia.

Table 2. Production, area planted, yield, consumption, domestic prices and exports of pineapple, Philippines, 1985-2006.

ITEM	PRE-SPS (1985-1994)	POST-SPS (1995-2006)	AVERAGE (1985-2006)
Production			
Volume ('000 mt)	1,343	1,661	1,517
Value (M PhP)	4,409	9,171	6,887
Area			
(Ha)	49,269	45,010	47,344
Yield			
(mt/Ha)	29.91	36.95	33.19
Consumption			
Volume ('000 mt)	545	746	654
Domestic Prices			
Nominal			
Farmgate (PhP/pc ¹)	3.09	4.33	3.96
Wholesale (PhP/pc ¹)	9.13	17.01	14.69
Retail (PhP/pc ¹)	10.54	22.57	17.10
Real ²			
Farmgate (PhP/pc ¹)	5.44	4.28	4.62
Wholesale (PhP/pc ¹)	16.00	16.80	16.56
Retail (PhP/pc ¹)	23.48	21.95	22.64
Exports			
Canned			
Volume ('000 mt)	189.70	194.00	192.00
Value (M FOB US\$)	89.70	89.67	90.00
Real ² Price (PhP/kg)	25.92	19.29	22.30
Fresh			
Volume ('000 mt)	156.50	169.83	164.00
Value (M FOB US\$)	23.10	31.58	28.00
Real ² Price (PhP/kg)	8.00	7.00	7.83
Juice			
Volume ('000 mt)	33.20	57.25	46.00
Value (M FOB US\$)	7.10	12.25	10.00
Real ² Price (PhP/kg)	11.60	8.76	10.05
Concentrate			
Volume ('000 mt)	34.50	42.75	39.00
Value (M FOB US\$)	20.60	29.92	26.00
Real ² Price (PhP/kg)	32.53	29.28	30.76
All forms			
Volume ('000 mt)	413.90	463.83	441.00
Value (M FOB US\$)	140.50	163.42	153.00
Real ² Price (PhP/kg)	18.49	14.70	16.42

¹One piece is approximately 2.40 kilograms.

²Real price = Nominal price/CPI (2000=100)

Sources of basic data: BAS and DTI-BETP (2006)

Pineapple concentrate. Five countries (e.g., United Kingdom and Northern Ireland, the United States, Canada, Lebanon and the Netherlands) have continuously imported pineapple concentrate for 22 years from the Philippines. Germany, formerly a traditional market, is now an irregular market due to the prohibition on the use of ethylene for flower induction (Hube 2004). In terms of share of the export volume in the two periods, the United States (75%, 54%) has topped the rank, followed by the Netherlands (7%, 5%).

International SPS Standards, Measures and Procedures

The set of rules formulated under the GATT-WTO concerning SPS measures reflects the standard requirements that shall be followed by trading parties. At most instances, a country not having its own standard follows the provisions set by standard-making bodies, namely: (1) FAO/WHO Codex Alimentarius Commission (2) World World Organization for Animal Health (OIE); and (3) FAO International Plant Protection Convention (IPPC), with the assistance of other international organizations concerned with food safety and plant health.

In the occasion that a relatively stringent standard is used by a trading partner, the principles of equivalence, harmonization and transparency are reviewed. Numerous documents from the FAO/WHO Conference on Food Standards, Chemicals in Food and Food Trade and series of texts developed from 1991 to 2004 have discussed these principles. An additional international standard followed by trading countries refers to pesticide residues and proper use of pesticide. The Codex Maximum Residue Limits (MRLs) set the allowable amount of pesticide to be present on fresh agricultural exports which is checked through a pesticide residue analysis. The International Code of Conduct on the distribution and use of pesticides adopted in 1985 give guidelines on pesticide use in support of increased food security and health and environment protection. However, its nature of being voluntary provides an option for compliance or non-compliance.

Table 3. Number of export markets by type and by form of pineapple exports, Philippines, 1985-2006.

FORM	NO. OF MARKETS ADDED ¹	TYPE		
		Irregular ²	Traditional ³	Emerging ⁴
Canned	82	52	32	6
Fresh	30	22	6	3
Juice	47	45	17	5
Concentrate	44	40	13	3

¹No. of markets added = Pre-SPS no. of markets – Post-SPS no. of markets

²At least two years of exportation and not qualified as either traditional or emerging

³Exportation of 10 or 12 years in either the pre- or post-SPS period

⁴Consistently exporting from 2000 to 2006

Source of basic data: DTI-BETP (2006)

Philippine SPS Standards, Measures and Procedures

Local standards on agricultural commodities are formulated, provided, and/or implemented by government agencies such as the BAFPS, Bureau of Animal Industry (BAI), Bureau of Fisheries and Aquatic Resources (BFAR), National Meat Inspection Service (NMIS), BPI, Philippine Coconut Authority (PCA), Sugar Regulatory Administration (SRA), Fiber Industry Development Authority (FIDA), Cotton Development Administration (CDA), FPA, BFAD-PNS, and DTI-BPS. Specific provisions on SPS measures are prescribed in various legislations, presidential decrees, administrative orders, and the likes.

The Consumers Act of the Philippines (RA 7394) has provisions on product standardization and consumer safety, one result of which is the formation of BAFPS. This body formulates and enforces standards of quality in the processing, preservation, packaging, labeling, importation, exportation, distribution, and advertising of agricultural and fisheries products; conducts research on product standardization; aligns local with the international standards; and conducts regular inspection of processing plants, storage facilities, abattoirs as well as public and private markets in order to ensure freshness, safety and quality of products.

The Agriculture and Fisheries Modernization Act of 1997 (RA 8435) not only aims to modernize Philippine agriculture and fisheries sectors but also prepares them for the challenges of globalization, which include those imposed by SPS measures. The Republic Act 3639 that led to BPI creation provides quarantine services and pesticide residue analysis for plant exports and imports. In relation to pesticide usage, LOI 986 released by BPI resulted to the establishment of pesticide laboratories all over the country to monitor pesticide residues in crops. Consequently, through Presidential Decree No. 1144, FPA was created.

The Plant Quarantine Law (RA 3027) enacted on March 8, 1922 together with the Plant Quarantine Service (PQS) of BPI under DA (PD 1433), which was eventually revised through the Administrative Code of 1987, defines the import and export quarantine procedures in the Philippines. In the import quarantine procedure, Permit to Import Form (BPI Q Form No.1) must be first filed to BPI.

Before releasing an import permit, evaluation and pest risk analysis must be conducted. For imports identified as hazardous or are genetically modified organisms (GMOs), the evaluation, approval and monitoring of the Institutional Biosafety Committee (IBC) and the National Committee on Biosafety of the Philippines (NCBP) are required. Next is the approval of the application and payment of regulatory fees (i.e., four copies of import permit are given to the importer). For inspection upon import arrival, the following must be presented: phytosanitary certificate issued by the Plant Quarantine (PQ) of the country of origin, import permit issued by the PQS, lading or airway bill, and a photocopy of inward cargo manifest and the Bureau of Customs (BOC) entry declaration. For exportation, the following must be settled: import permit from the country of destination stating the terms and conditions; accomplished application for phytosanitary certification; exports (i.e. randomly sampled) to be inspected, examined, and verified submitted at least 48 hours before the actual loading either at PQS or premises of the exporter; and necessary treatments.

The Philippines vs Codex and Importing Countries' Standards

Table 4 summarizes the various SPS standards applied to Philippine pineapple products. For fresh pineapple, Codex standard includes all varieties in its definition while PNS classifies it as Queen Formosa, Smooth Cayenne and Red Spanish. Provisions on de-crowned pineapple are stipulated in Codex, Japan, South Korea and Australia's standards. However, Australia solely accepts de-crowned pineapple as import. Three additional quality requirements are in Codex compared to PNS. In addition, maturity is measured in terms of total soluble solid for the former and maturity index for the latter. Contrarily, sampling method and compliance with specifications are explicitly stated in PNS and Japan's standards as compared to Codex. None of the provisions in Codex, PNS, Japan, and South Korea's standards stand out as detrimental in trade except that of Australia.

Codex has four additional style classifications for canned pineapple compared to United States standards. The former is also lenient as it permits more ingredients in canned pineapple vis-à-vis the latter. Provisions on food additives, contaminants, hygiene and labeling, though the manner of presentation is different, are discussed in both Codex and US standards.

For pineapple juice and concentrates, US standards have identified grade according to quality attributes including color, defects and flavor; and analytical attributes including minimum brix, acid, percent by weight of finished product prior to addition of sweetener, brix to acid ratio, and finely divided insoluble solids. These were also stipulated in Codex, PNS, Netherlands and Canada's standards. It may appear that the provisions on the presence of food additives, contaminants, labeling and hygiene in Codex are more stringent than United States standards for grades of pineapple juice. However, these are addressed in five sections of the Federal Food, Drug and Cosmetic Act of 1938

under the following headings: definitions and standards for food; emergency permit control; regulations making exemption; tolerances for poisonous ingredients in food; and food additives.

Results of the stringency analysis revealed that Philippine standards, in general, are at par with that of Codex; South Korea and Japan for fresh pineapple; the United States and Japan for canned pineapple; the United States and the Netherlands for pineapple concentrate; and the United States and Canada for pineapple juice. Only fresh pineapple export bound for Australia faces stringent measures based on the quarantine conditions formed from the risk management schemes they employed to prevent the 70 out of 186 associated weed pests in entering their country (Table 4). Based on their Final Import Risk Assessment (IRA) dated July 1, 2002, the following courses of action were recommended: (1) registration of source of plantations and fumigation facilities; (2) pest-free area for *Fusarium subglutinans*; (3) de-crowning; (4) in-field control and trapping of *Cryptophlebia leucotreta*; (5) methyl bromide fumigation; (6) packing and labeling compliance; (7) pre-export inspection, storage, and phytosanitary certification and documentation; (8) on-arrival inspection by Australia Quarantine and Inspection Service (AQIS); and (9) review of policy.

Philippine Pineapple Export Response to SPS Measures and Other Factors

The explanatory variables affecting the pineapple export value were foreign exchange rate (F), production (PRODN), domestic price (DP), deflated export price (EP) and SPS measures (SD). Linear functional form with export value as the dependent variable was chosen as the best model for canned, juice and concentrate as it yielded the highest F-ratio, R^2 and number of significant explanatory variables. Conversely, the semi-log functional form fitted the data for fresh and all forms of pineapple (Table 5).

Results of the multiple regression analysis showed that a unit increase in foreign exchange rate (PhP/US\$) would increase the juice export value by FOB US\$ 0.86 million; concentrate export value by FOB US\$ 0.24 million; fresh pineapple export value by 0.02 percent; and export value of all forms by 0.01 percent; setting other factors constant (Table 5). In the international market, a peso devaluation would make Philippine pineapple products, except for canned, become relatively cheaper vis-à-vis other country's pineapple exports.

Domestic production and export value were positively related. A metric ton increase in domestic production would make export value go up by FOB US\$ 62.50 for pineapple juice; FOB US\$ 161.00 for pineapple concentrate; 5.34×10^{-7} percent for fresh pineapple; and 3.82×10^{-7} percent for all forms; ceteris paribus (Table 5). This implies that improving local fresh pineapple production would raise the country's foreign exchange earnings from fresh pineapple, juice and concentrate exports.

Domestic price showed an inverse relationship with export value. A peso increase in domestic price would reduce export value by FOB US\$ 0.94 million for pineapple concentrate; 0.13 percent for fresh pineapple; and 0.05 percent for all forms; ceteris paribus (Table 5). With favorable domestic prices, growers would rather sell their fresh pineapple in the local market rather than process and/or export their produce. Higher export price indicated a direct relationship with export value. Holding other factors constant, a dollar increase in the deflated export price would raise export value by FOB US\$ 135.74 million for canned pineapple; FOB US\$ 58.77 million for pineapple juice; FOB US\$ 28.47 million for pineapple concentrate; 6.57 percent for fresh pineapple; and 2.26 percent for all forms (Table 5).

Table 4. Comparison of International and local SPS measures on fresh and processed pineapple exports, 2006

CODEX STANDARD	PNS STANDARD	IMPORTING COUNTRY'S STANDARD	
<u>Fresh pineapple</u>			
Codex Standard for Pineapples CODEX STAN 182-1993, REV. I-1999, AMD. 1-2005	PNS for Pineapples PNS/BAFPS 09:2004	<u>South Korea</u> - similar to Codex	<u>Australia</u>
8 provisions: 1. Definition of produce - fresh pineapple includes all commercial varieties of <i>Ananas comosus</i> (L) Merr. of the family <i>Bromeliaceae</i> 2. Quality - free of abnormal external moisture, excluding condensation; free of damage caused by low and/or high temperatures; and free of pronounced blemishes - maturity based on total soluble solid content in the fruit flesh 3. Sizing - A to H 4. Tolerances 5. Presentation 6. Marking and labelling 7. Contaminants 8. Hygiene	14 provisions: 1. Scope 2. References 3. Definitions - maturity based on maturity index 4. Varieties - Queen Formosa, Smooth Cayenne and Red Spanish 5. Minimum requirements 6. Classification according to general appearance, quality and condition 7. Size classification - SS (batterball), small, medium, large and extra large 8. Tolerances 9. Packaging 10. Marking or labelling 11. Sampling 12. Contaminants 13. Hygiene 14. Compliance with specification * Provision on uniformity not included	<u>Japan</u> - similar to Codex and PNS Food Sanitation Law No. 233 (December 24, 1947); amended through Law No. 87 (July 26, 2005) Specifications and standards for food, food additives, etc.; Notification No. 370 (1959); and Notification No. 499 (May 29, 2006) by the Ministry of Health, Labor and Welfare - provision on de-crowned pineapple - pesticide residue limits of 0.5 ppm for deltamethrin and tralomethrin - provision on sampling technique and analysis	Risk management schemes: 1. de-crowning 2. in-field management of arthropod pests 3. standard cleaning and hygiene practices 4. methyl bromide fumigation 5. phytosanitary inspection (pre-export and on-arrival) and treatment 6 pheromone trapping for <i>Cryptophlebia leucotreta</i> 7. area freedom for fusariosis, fruitlet core rot (<i>Fusarium subglutinans</i>)
* In provisions 2, 3 and 6, both crowned and de-crowned pineapple were described.			

Continued Table 4.

CODEX STANDARD	PNS STANDARD	IMPORTING COUNTRY'S STANDARD	
<u>Canned pineapple</u>		<u>United States</u>	<u>Japan</u>
Codex Standard for Canned Pineapple CODEX STAN 42-1981	- similar to Codex	United States for Grades of Canned Pineapple (March 1, 1990)	- similar to Codex
8 provisions:		13 provisions:	
1. Description		1. Product description	
- styles include that of the US standard in addition to quarter slices, pieces, chips and other styles meeting the criteria prescribed in Article 1, Sec. 4 of CODEX STAN 42-1981		2. Styles	
2. Essential composition and quality factors		- canned pineapple is classified as whole, slices, half slices, broken slices, spears, tidbits, chunks, cubes and crushed	
- include spices, spice oils, mint and vinegar in the other permitted ingredients		3. Definition of terms	
3. Food additives		4. Recommended sample unit sizes	
4. Contaminants		5. Brix measurements	
5. Hygiene		6. Fill of container for crushed style canned pineapple	
6. Weights and measures		7. Minimum drained weights for canned pineapple	
7. Labelling		8. Recommended drained weights for canned pineapple	
8. Methods of analysis and sampling		9. Grades	
		19. Factors of quality and analysis	
		- character and tartness are classified under quality factors	
		11. Requirements for grades	
		12. Sample size	
		13. Lot quality and analytical requirements	
* Provisions on food additives, contaminants, hygiene and labelling were explicitly stipulated.			
		* Most of the criteria were presented systematically by aid of tables.	

Continued Table 4.

CODEX STANDARD	PNS STANDARD	IMPORTING COUNTRY'S STANDARD	
<u>Pineapple juice and concentrates</u>			
Codex Standard for Concentrated Pineapple Juice Preserved Exclusively by Physical Means CODEX STAN 138-1983 8 provisions: 1. Description 2. Essential composition and quality factors 3. Food additives 4. Contaminants 5. Hygiene 6. Weights and measures 7. Marking and labelling 8. Methods of analysis and sampling	- similar to Codex	<u>United States</u> United States Standards for Grades of Pineapple Juice (April 1, 1987) 10 provisions 1. Product description - defines pineapple juice and concentrate based on standards for pineapple juice (21 CFR 146.185) under the Federal Food, Drug and Cosmetic Act of 1938 (FDCA) 2. Styles - unsweetened and sweetened pineapple juice and concentrate 3. Definition of terms 4. Recommended sample unit sizes 5. Grades - US Grade A, US Grade B and Substandard 6. Factors of quality and analysis 7. Fill of container 8. Requirements for grades 9. Sample Size 10. Lot requirements * Sections 401, 404, 405, 406 and 409 of FDCA include provisions on food additives, contaminants, labelling and hygiene.	<u>Netherlands</u> (for pineapple concentrate) - similar to Codex <u>Canada</u> (for pineapple juice) -similar to Codex
Codex General Standard for Fruit Juices and Nectars CODEX STAN 247-2005 9 provisions: 1. Scope 2. Description 3. Essential Composition 4. Food Additives 5. Processing Aids 6. Contaminants 7. Hygiene 8. Labelling 9. Method of analysis and sampling			

Sources of basic data: FAO, WHO, and standard bureaus/ministries and government portals of the Philippines and importing countries (2006)

The SPS dummy variable in fresh, canned, juice, concentrate and all forms of pineapple exports was insignificant at 10 percent probability level (Table 5). This implies that local standards are at par with the Codex and top importing countries' standards, thus the export values were not significantly affected by the SPS dummy variable.

Table 5. Results of the regression analysis showing the effects of SPS and other factors on the value of fresh and processed pineapple exports using the most appropriate models, Philippines, 1985- 2006.

ITEM	CANNED	FRESH	JUICE	CONCENTRATE	ALL FORMS
	Linear	Semi-log	Linear	Linear	Semi-log
Intercept	9.14*	1.48***	-9.97**	-9.47***	3.92***
Regression Coefficient					
F	0.29 ^{ns}	0.02***	0.86**	0.24***	0.01***
PRODN	3.64 x 10 ^{-5ns}	5.34 x 10 ^{-7**}	6.25 x 10 ^{-5***}	1.61*10 ^{-4***}	3.82x10 ^{-7***}
DP	-1.05 ^{ns}	-0.13***	-0.45 ^{ns}	-0.94*	-0.05***
EP	135.74***	6.57***	58.77***	28.47***	2.26***
SD	-3.29 ^{ns}	0.06 ^{ns}	1.32 ^{ns}	0.48 ^{ns}	0.02 ^{ns}
R ²	0.64	0.87	0.95	0.94	0.87
Adjusted R ²	0.53	0.83	0.94	0.92	0.82
F-value	5.69	20.80	64.16	51.22	20.70

¹All F-values are significant at 1% probability level.

²***, **, and * significant at 1%, 5%, and 10% probability level, respectively.

³ns means not significant at 10% probability level.

Sources of basic data: BSP, BAS, and DTI-BETP (2006)

Export Competitiveness of Fresh and Processed Pineapple

Using average export parity prices in all countries of destination and average wholesale prices at the national level, Philippine fresh pineapple exports have remained competitive as reflected by its mean price ratio of 1.16 from 1985 to 2006. Though it dropped from 1.18 to 1.14 between the pre- and post-SPS periods, this was not significant at 10 percent probability level. Similar observation was noted in fresh pineapple bound to Japan. Contrarily, the country became competitive in the post-SPS period for fresh pineapple exported to South Korea (Table 6).

Using wholesale prices gathered from processor-cum-exporters, results showed that fresh pineapple destined to Japan and South Korea has gained competitiveness from the pre- (1994) to post-SPS (2006) period. Higher competitiveness could be realized under a devalued currency scenario while a revaluation currency scenario would indicate the opposite (Table 7).

Higher price ratios were computed for canned pineapple exported to the United States and Japan between the two periods. It rose from 1.25 to 1.60 for the United States and from 1.02 to 1.38 for Japan between 1994 and 2006, implying that canned pineapple became more competitive in these countries. A similar finding was noted for fresh pineapple exports in an event of currency devaluation or revaluation (Table 7).

Estimated ratio between the export parity and domestic wholesale prices showed further improvement in export competitiveness for pineapple juice bound to the United States and Canada from 1994 to 2006 under peso devaluation. Conversely, a peso revaluation would reduce price ratios but still, the export competitiveness of this product would be maintained (Table 7).

Table 6. Average price ratio of Philippine fresh pineapple in the pre- and post-SPS regimes, 1985-2006.

YEAR	EXPORT PARITY PRICE (PhP/kg)	DOMESTIC WHOLESALE PRICE (PhP/kg)	PRICE RATIO
All Countries			
Average	6.01	5.26	1.16
Pre-SPS	3.47	3.07	1.18
Post-SPS	8.14	7.09	1.14
Difference	4.67 ^{ns}	4.02***	(0.04) ^{ns}
Japan			
Average	6.08	5.26	1.17
Pre-SPS	3.48	3.07	1.19
Post-SPS	8.25	7.09	1.16
Difference	4.78 ^{ns}	4.02***	(0.03) ^{ns}
South Korea			
Average	4.66	5.26	0.73
Pre-SPS	1.36	3.07	0.36
Post-SPS	7.41	7.09	1.04
Difference	6.05***	4.02***	0.68***

*** indicate significant relationship at 1% probability level

Sources of basic data: DTI-BETP and BAS (2006)

Table 7. Comparison of export parity prices of fresh and processed pineapple with domestic prices during the pre- and post-SPS regimes, Manila, Philippines.

FORM / COUNTRY OF DESTINATION	PRICE RATIO			
	PRE-SPS (1994)	POST-SPS (2006)	PhP 50: US\$ 1	PhP 55: US\$ 1
Fresh				
Japan	0.69	1.22	1.18	1.30
South Korea	0.69	1.05	1.02	1.13
Canned				
United States	1.25	1.60	1.56	1.72
Japan	1.02	1.38	1.35	1.48
Juice				
United States	1.06	1.59	1.55	1.71
Canada	1.16	1.54	1.50	1.65
Concentrate				
United States	1.07	1.00	0.97	1.07
Netherlands	1.37	1.58	1.54	1.69

Sources of basic data: BSP, DTI-BETP, and interviews with processor-cum-exporters (2006)

Among all forms of pineapple exported, only concentrate bound for the United States indicated a remarkable change from being an export competitive (1.07) during the pre-SPS period to a neutral position (1.00) during the post SPS period. It could also become uncompetitive (0.97) under a PhP50: US\$1 exchange rate. Alternately, pineapple concentrate bound for the Netherlands has become more competitive between the two periods (Table 7).

Australia’s Case on Fresh Philippine Pineapple Exports

Based on the most appropriate model, 91 percent of the variation in the volume of fresh pineapple bound for Australia could be attributed to the explanatory variables. The significant SPS dummy variable with coefficient having a negative sign confirmed the sharp plunges in the volume of fresh pineapple exported to Australia in 1999 and 2002 by 50 and 67 percent, respectively based on the data from DTI-BETP (Table 8). This result could be explained by the implementation of the Quarantine Proclamation of 1998 and Plant Biosecurity 2002/45.

Table 8. Results of the regression analysis showing the effects of SPS and other factors on the volume of fresh pineapple exported to Australia using the most appropriate model, Philippines, 1985-2006.

ITEM	LINEAR MODEL
Intercept	139.57
Regression Coefficients	
F	-0.48 ^{ns}
PRODN	-2.10 x 10 ^{-5ns}
DP	-5.49 ^{ns}
SD	-38.58**
R ²	0.97
Adjusted R ²	0.91
F-value	30.35***

*** and ** indicate significant relationship at 1% and 5% probability level

ns means not significant at 10% probability level

Sources of basic data: BSP, BAS, and DTI-BETP (2006)

CONCLUSIONS AND RECOMMENDATIONS

Results of trend analysis showed an upward trend in domestic production, yield, consumption, wholesale price in real terms, and volume and value of Philippine pineapple exports between the pre- and post-SPS periods. The country diversified its export markets as 203 markets were added for canned, fresh, juice and concentrate from 1985 to 2006. Top destinations of the Philippine pineapple exports included South Korea, Japan, the United States, the Netherlands and Canada. The multiple regression analysis revealed that foreign exchange rate, domestic production, and export price positively affected the value of pineapple exports while an upsurge in domestic price reduced the value of pineapple exports. The SPS dummy variable was insignificant and this could be explained by the fact that Philippine SPS standards were found to be at par with Codex and top importing countries’ standards and the export parity prices exceeded the domestic wholesale prices for all types of pineapple exports. On the other hand, the SPS dummy variable was significant and found to negatively affect the volume of Philippine pineapple exported to Australia. This is attributed to the more stringent SPS measures of Australia’s standards compared to PNS for fresh pineapple.

Despite the competitiveness of Philippine pineapple exports in the international market, there are production-, marketing- and trade-related problems that must be addressed to remain competitive. First, the high cost of fertilizer in the country which has been due to higher tariffs on imported fertilizers; and long clearance process for existing and potential manufacturers, processors, formulators, distributors, repackers, bulk handlers, dealers, and importers must be reduced. This could be done by increasing private sector involvement in fertilizer importation and distribution. By shortening the processing time for fertilizer licensing and registration and lessening the duties on imported fertilizer, a more conducive market for fertilizer players can be established. Organic fertilizer should also be promoted to reduce production cost (i.e., buying inorganic fertilizer and disposing pineapple by-products), improve soil characteristics, meet demand for organically-grown

pineapples, and produce other positive externalities.

Second, the associated health risk of pesticide usage such as diarrhea, dehydration, tremors, nausea, paralysis and death of farmers and local residents must be addressed by fast-tracking the implementation of integrated crop management (ICM). It combines site-specific nutrient management, integrated pest management (IPM), use of improved crop variety, and other crop management practices that minimize the use of chemicals in actual farm operations. In addition, information drives on proper agro-chemical usage could be provided by cooperatives, associations, civil society groups, LGUs and private agro-chemical manufacturers. The government should also require and ensure that the labeling of agro-chemicals is in the language or dialect the farmers are most proficient in.

Third, the high cost of processing inputs (i.e., fuel, electricity, sugar and tin) and limited availability of processing machines, equipment and technologies (i.e., washing and preparation, slice line, juice line, syrup line, packing line, sorting, de-crowning, soaking and washing, peeling, shredding and crushing, juice extraction, finishing, blending and mixing, pasteurization, filling, can closing, cooling, labeling, packaging, and other operations) could be addressed by reducing duties on packaging materials (15%) and food processing machines and equipment; inducing R&D activities that would improve pineapple production and processing among processing firms; and intensifying the sharing of technologies and practices from TNCs to small and medium-sized firms (SMFs). The government may provide loan assistance and fiscal and non-fiscal incentives (i.e., income tax holiday; exemption from taxes and duties on imported spare parts, from wharfage dues and export tax, duty, impost and fees; tax credits; deductions from taxable income; simplification of customs procedures; importation of consigned equipment; and the privilege to operate a bonded manufacturing or trading warehouse), as determined by the DTI's industry and investment group, to firms which will engage in such R&D activities. The same incentives could be given to TNCs which will provide technology transfer to SMFs. Currently, Dole Philippines, Inc., offers HACCP, ISO 9002, ISO 14001, GMP, ISO 9002, and ISP 14001 transfers to its subsidiaries. The programs linking pineapple firms shall be under the supervision of DA-AMAS and DTI's small and medium enterprises development group.

Fourth, the consumer preference on additional standards (i.e., Hazard Analysis and Critical Control Points (HACCP), Good Manufacturing Practices (GMP), International Organization for Standardization (ISOs) such as ISO 9001: 2000 on quality management systems, SA 8000 for socially responsible employment practices, Food Processors Association (FPA) Safe Standards for Food Safety, European Food Safety Inspection Services (EFSA), Internal Raw Material Assurance, and code for the security of ships and port facilities) could be satisfied by providing assistance to SMFs which have no capacity to comply with these standards. At present, Dolefil and Del Monte Philippines have some of these certifications.

Fifth, the stringent SPS measures employed by some importing countries (e.g., Australia and Germany) could be addressed by facilitating bilateral agreements with these countries. The Philippines, Sri Lanka, Thailand and the Solomon Islands could also pressure Australia to accept the technically feasible alternatives in the fumigation of soil and perishable and durable goods making this treatment optional (FAO 1998). Moreover, the country's unresolved trade disputes with Australia since 2002 and 2003, which were filed before the WTO Dispute Settlement Body, should be tackled. To ensure that Philippine SPS standards will continue to be at par with international standards, the executive and legislative branches of the government must be proactive in intensifying partnerships among public agencies and private companies at the local and international levels on information and knowledge sharing. The Philippines should maintain close collaboration with other governments via the ASEAN Consultative Committee on Standards and Quality (ACCSQ), Sub-Committee on Standards and Conformance (SCSC) under the auspice of APEC, and WTO standard-setting bodies to continue updating the country's standards.

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