

Market analysis for Papaya (Production and Trade)

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FOREWORD

This work intends to identify and to evaluate the relevance of the papaya market within the fruit market in general and to develop a preliminary understanding of the production (i.e., origin, production history and developments), marketing (i.e., production and trade data and analysis), focusing the main constrains of this industry and/or preliminary indications of problems that may need to be addressed by the Fresh Fruits and Vegetables Scheme of OECD. It aims to set the background research of a complete market analysis for papaya, which is to be developed afterwards in case of necessity.

INTRODUCTION

Papaya, *Carica papaya* L., is a tropical fruit and its native origin is from southern Mexico (encompassing all Central America) until Colombia and Venezuela (Figure 1, Native/green). It was dispersed worldwide during and after the colonial period and currently it is widely distributed throughout the tropical and warmer subtropical areas of the world (figure 1, Introduced/purple)



(Source: <http://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:30011248-2>, *revised)

Figure 1: Global distribution of *Carica papaya* L.

Papaya is produced at commercial scale in 61 countries of the world (FAOSTat, 2018, *countries exporting 10 metric tonnes and higher, 2016), making it available year-round due to different geographical locations and conditions of the producing areas (Figure 2).

LOCAL VARIETIES & CULTIVARS OF PAPAYA

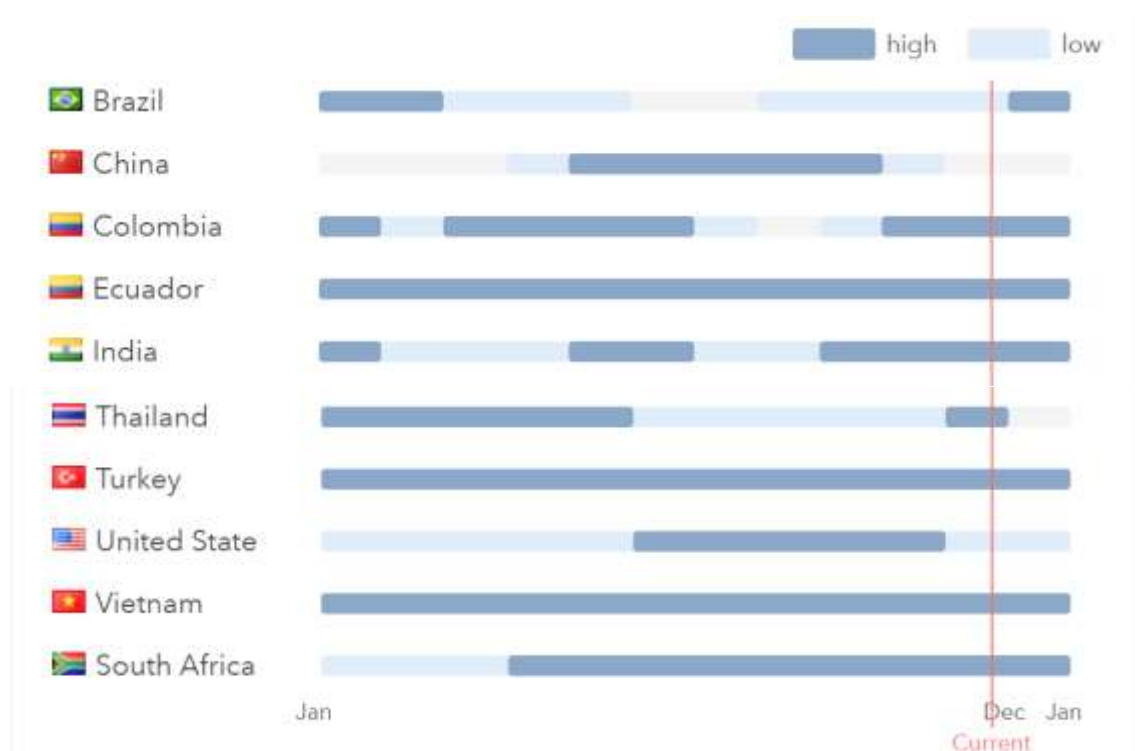
[EVANS & BALLEEN, 2012](#); [LUCENA, 2016](#) described two main diverse groups from which most of the cultivars derives:

- the small-sized Solo-type papayas (weighing about 500g, up to 1Kg); and
- the large-sized papayas (weighing about 4,5Kg and above).
- The Solo and the large sized papayas are also known as, respectively, Hawaiian and Mexican papaya ([KHCP/FINTRAC, 2012](#)).

The “Solo” papaya is the commercially dominant traded variety to retail supermarket chains and final consumers as a Ready to Eat produce, since they are small enough for an individual to eat whole (hence the name Solo).

[MEDINA et al, 2003](#) listed the varieties Kamiya, Mexican Red, Mexican Yellow, Maradol Roja, Vista Solo, Waimanalo, sunrise solo and sunset.

[TRIDGE, 2018](#), a web based traders networking and sourcing, lists the main varieties grown as Tainung Papaya (Carica papaya 'Tainung'), Coorg Honey Dew Papaya (Carica papaya 'Coorg Honey Dew'), Khak Dum Papaya (Carica papaya 'Khak Dum'), Holland Papaya (Carica papaya 'Holland'), Sunrise Papaya (Carica papaya 'Sunrise'), Formosa Papaya (Carica papaya 'Formosa'), Red Lady Papaya (Carica papaya 'Red lady'), Maradol Papaya (Carica papaya 'Maradol'), Hawaiian Papaya (Carica papaya 'Hawaiian').



(Source: <https://www.tridge.com/intelligences/papaya>)

Figure 2: Season of papaya at main producing countries.

The United States may be credited to the opening of the papaya international trade attributable to the growth and inputs made at the Hawaiian papaya industry since its beginning in the early 1900's ([MANSHARDT, 2012](#)).

The development of the “Solo” papaya varieties and its increased production enabled the US as the single and prime papaya exporter in the 60’s and 70’s with a production volume of 1.6 M tonnes and traded volumes above 6,000 tonnes ([FAOSTat, 2018](#)).

At the following years an increase of growing areas worldwide accomplished by a surplus in volume of harvested papaya and production in the 80’s, enabled a growth about 51 percent (1966-1980 range) and 100 percent (1966-1990 range), tailed by a shift at the global trade of papaya and the arise and positioning of other global players at the papaya market, such as Malaysia (80’s and early 90’s) and Mexico (mid 90’s till at present).

PRODUCTION

Data from the Food and Agriculture Organization ([FAOSTat, 2018](#)) illustrates the Global production of papaya (Table 1; Figure 3), showing that:

- 13.2 million (M) metric tons (t) of papaya were produced in 2016;
- There is a steady linear increase in production volumes along the years- more than doubling the production of papaya at each 20 years (2,43 times increase from 1996-2016 and 2.85 times from 1976-1996);
- A stable increase in production volumes which validates a linear model of growth and shows an average increase of 50 percent at each 10 year period since 1966, i.e., increases of 45 percent (2006-2016), 68 percent (1996-2006), 49 percent (1986-1996), 91 percent (1986-1976) and 17 percent (1966-1976).

Table 1: Global production and international trade of papaya

Year	Production (metric tonnes)
1966	1.6 M
1976	1.9 M
1986	3.6 M
1996	5.4 M
2006	9.1 M
2016	13.2 M

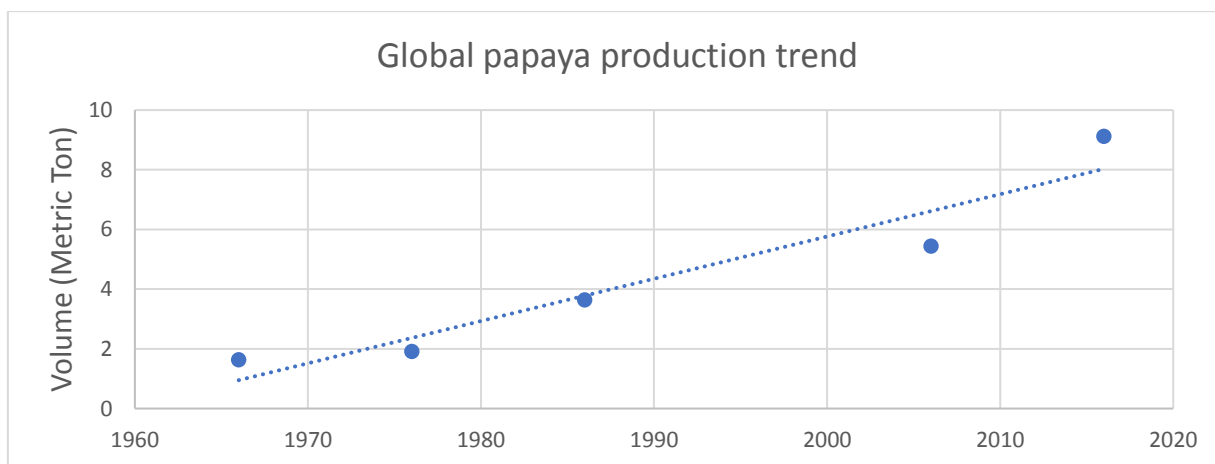


Figure 3: Linear growth of papaya production (Million/M metric Tonnes)

According to [EVANS & BALLEEN, 2012](#), virus diseases and poor post-harvest treatments are the two main constrains to the growth of the papaya industry, posing difficulties to the improvement of production volumes of papaya.

Nonetheless, environmental and climate constraints may also impact the papaya industry negatively. Between 2010 and 2016 the annual growth percentage of the production had a slight

decrease of 3.27 percent compared to 4.35 percent of 2002-2010. This may be credited to the huge decrease in 2014-15 global papaya production (minus 5 percent) due to severe climate conditions in Brazil and India (droughts), as well as in Belize (hurricanes).

Although recovery may be perceptible from FAOSTat 2016’s data for Brazil and India, there is not any indication that the Belizean papaya industry have recovered. On the contrary, FAOSTat 2016’s data indicates a possible movement of the growing areas from Belize to Guatemala, hypothesis corroborated with local media information highlighting the shift of the Belizean papaya industry to Guatemala and the Dominican Republic ([FAOSTat, 2018](#); [The San Pedro Sun Newspaper, 2016](#)).

Main producing countries are highlighted on Figure 4, showing India, Brazil, Mexico, Indonesia and the Dominican Republic as the prominent producers of papaya.

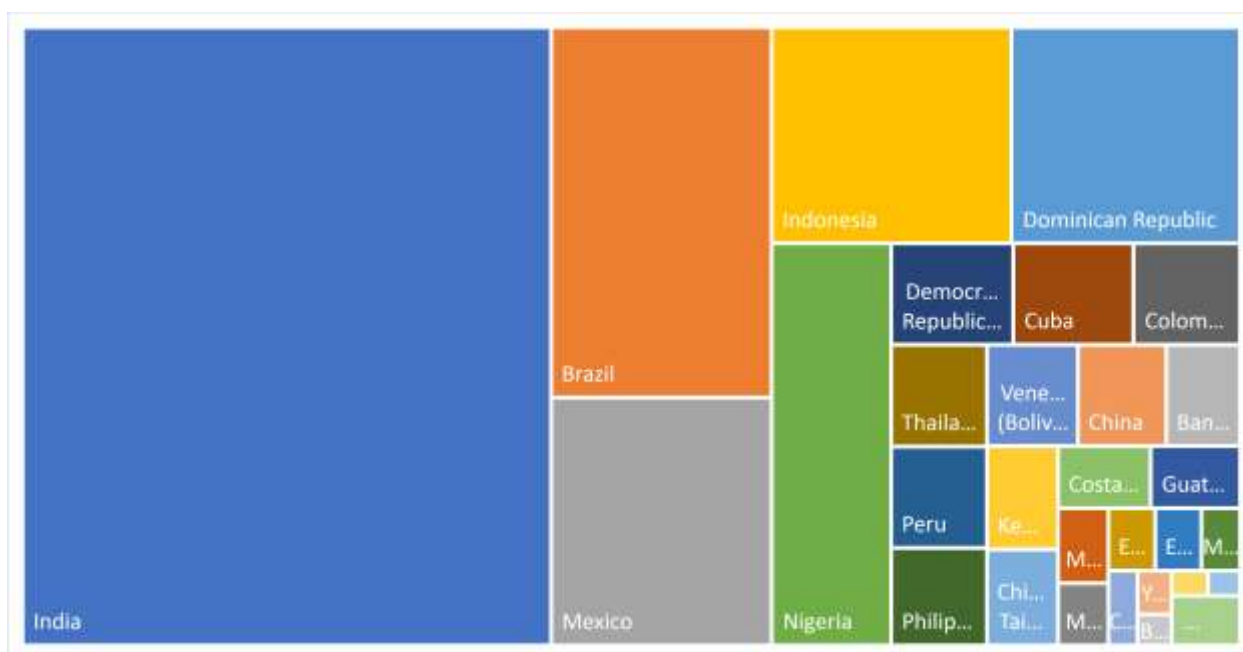


Figure 4: Top producing countries 2016 (as representative of producing volumes in tonnes)

INTERNATIONAL TRADE

International trade of papaya (Table 2; Figure 5) as set on FAOSTat 2016’s data, illustrates that:

- 356,950 metric tonnes (0.36M t) of papaya were exported by 87 countries in 2016;
- There is a steady exponential increase in trade volumes along the years with a huge increase of 10 times from 1976-1996 and a minor increase of 2.93 times from 1996-2016;
- The exponential growth pattern of trade volumes of papaya exports is visualized on Figure 4, showing increases of 2.93 times (2006-2016), 2.23 times (1996-2006), 5.19 times (1986-1996), 2.06 times (1986-1976) and 1.63 times (1966-1976).

Table 2: International trade of papaya

Year	Trade (metric tonnes)	Percentage of production volume
1966	0.01 M	0.43%
1976	0.01 M	0.60%
1986	0.02 M	0.64%
1996	0.12 M	2.24%
2006	0.27 M	2.98%
2016	0.36 M	2.70%

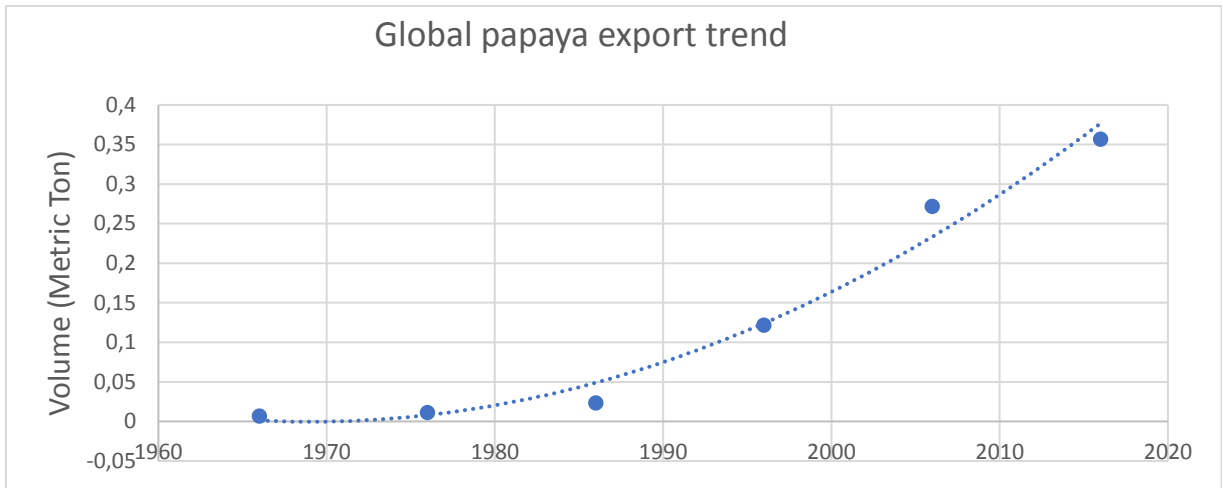


Figure 5: Exponential growth of papaya trade (Million/M metric Tonnes)

There are distinct growth rates of production and trade volumes of papaya, which may indicate a positive trend towards a strong trade growth towards the higher volumes of production.

Comparing the trend curves presented at Figures 4 and 5, the differences between the growth rate patterns for production volume (linear growth) and trade volume (exponential) indicate a stronger growth rate for trade volume. This may be attributable to the papaya industry specificities and may reflect the advancements in production, post-harvest technologies, improved logistics and/or other advancements in conditions and procedures of the supply chain to expand the global market of papaya.

Nonetheless, being the papaya fruit that goes to the international market only 2.7 percent of the total papaya produced worldwide, trade volume increase still has a long way to go, having papaya one of the lowest values if compared to other main traded fruits internationally.

Main exporting countries are highlighted on Figure 6, showing Mexico, Guatemala, Brazil, Malaysia, The United States, India and China as the prominent exporters of papaya.

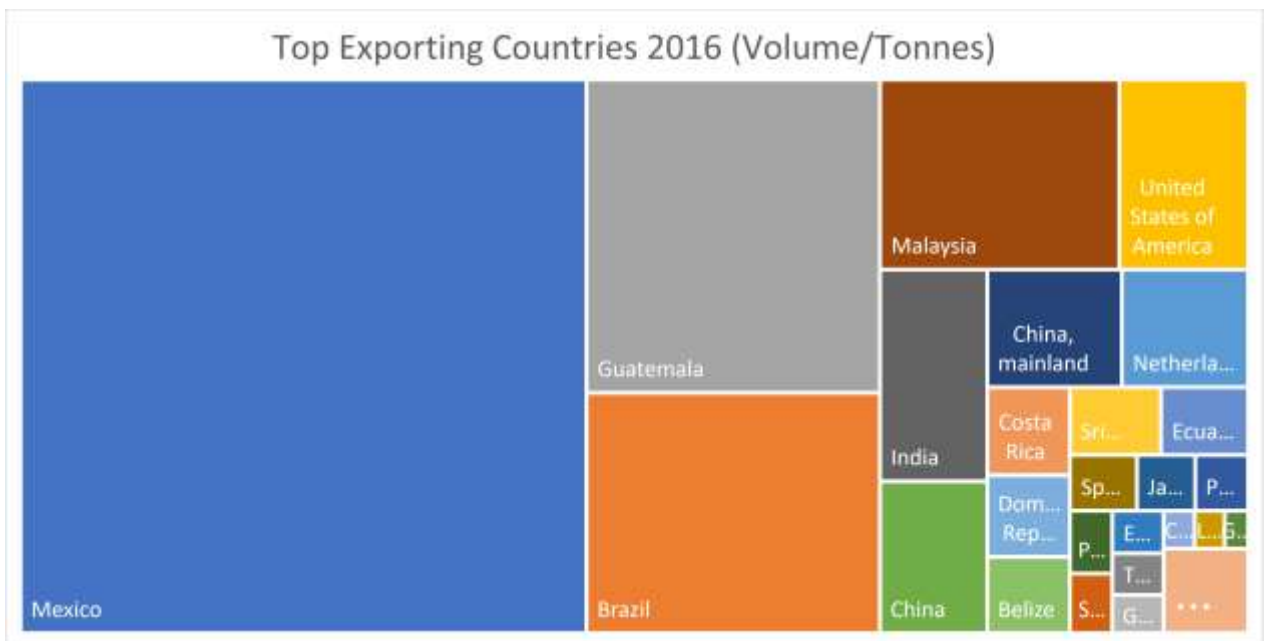


Figure 6: Top exporting countries 2016 in volume (Tonnes)

MARKET SHARE

Data from the [Rabobank, 2018](#) and [FAOSTat, 2018](#) displays that papaya export volumes are negligible (0,36 M ton) if compared to the top 10 fruit types by global production volume (Table 3).

Table 3: International trade of fruits in order of trade volumes (decescent)

Product	Production M metric tonnes	Trade M metric tonnes	Trade's percentage of production volume	Product	Production M metric tonnes	Trade M metric tonnes	Trade's percentage of production volume
Bananas	113,2803	20,64	18,2%	Melons, other (inc.cantaloupes)	31,1669	2,27	7,3%
Grapes	77,43893	4,45	5,7%	Watermelons	117,0226	3,55	3,0%
Apples	89,32918	9,04	10,1%	Cranberries	0,683671	0,20	29,4%
Oranges	73,18757	6,83	9,3%	Grapefruit (inc. pomelos)	9,074176	1,09	12,0%
Avocados	5,567044	1,91	34,4%	Plums and sloes	12,0508	0,71	5,9%
Tangerines, mandarins, clementines, satsumas	32,79253	5,06	15,4%	Blueberries	0,552505	0,15	26,3%
Lemons and limes	17,34715	3,12	18,0%	Persimmons	5,430365	0,49	9,1%
Kiwi fruit	4,27487	1,68	39,2%	Apricots	3,881204	0,33	8,4%
Pears	27,34593	2,72	9,9%	Coconuts	59,01064	1,04	1,8%
Cherries	2,317956	0,55	23,6%	Papayas	13,05075	0,36	2,7%
Strawberries	9,118336	0,85	9,4%	Figs	1,050459	0,02	2,3%
Peaches and nectarines	24,97565	2,16	8,6%	Currants	0,65503	0,01	1,8%
Mangoes, mangosteen s, guavas	46,5087	1,67	3,6%	Quinces	0,677949	0,04	5,3%
Pineapples	25,80904	3,64	14,1%	Gooseberries	0,174309	0,00	1,0%

(Source: [FAOSTat, 2018](#))

According to [FAOSTat, 2018](#) data, papaya's international trade in volume is smaller than for 20 other well-known fruits (i.e., Bananas 20 M, Apples 9 M, Oranges 7 M, Tangerines/mandarins/clementines/satsumas 5 M, Grapes 4 M, Pineapples 4 M, Watermelons 4 M, Lemons and limes 3 M, Pears 3M, Melons 2 M, Peaches and nectarines 2 M, Avocados 2 M, Kiwi fruit 2 M, Mangoes/mangosteens/guavas 2 M, Coconuts 1 M, Strawberries 1 M, Plums and sloes 1 M, Cherries 1 M, Persimmons 0,49 M).

REMARKS AND CONCLUSIONS

The papaya commercial production had settled its first roots at the early 1900's and, nowadays may be considered a well-developed and mature industry worldwide.

Although an exotic tropical fruit at the most developed markets of Europe and the US, papaya fruit is well known thanks to the efforts and marketing investment of the Hawaiian and US researchers and extension services in the 50's and 60's of the last century.

Nonetheless, the papaya industry is ranked 14th in production and 21st in trade, when compared with the 28 fruits listed at FAOSTat 2016's. Papaya fruit production in 2016 represents 1.6 percent and trade volume merely 0.5 percent when compared with the total for the 28 FAOSTat listed fruits production and trade data. As a reference, banana represents 14 percent of production and 28 percent of trade volume of the total for the 28 FAOSTat listed fruits consulted (Table 3).

Those weakness may be credited to major constrains of this industry such as virus diseases that impacts production negatively with decreased and/or impediment to production. Viruses are considered the main drivers of the reduced expansion of production sites globally and may continue to pose constrains in the future, with linear growth that may be better connected with new plantation areas than productivity (Figure 3).

Another constrains referrers to general deficiencies in infrastructure, logistics and post-harvest treatment, among others, but these may have been addressed by globalization and the expansion of the global fruit transit and commercialization, and the consequent afflux of information and revenues, as visualized at the steady exponential growth of trade volumes (Figure 5).

New constrains identified at this work are related to climate changes and the rapid movement of producing areas from a region or country to another. This situation may pose severe shortages to farmers and local economies, and may impact future growth of this industry towards capacitation and bigger investment needs.

Based on the collected data and information papaya industry is a relevant sector, but constrains impairs growth and leverage to the production side. Opposingly, trade did not show any sign of those negative factors, which may be partially credited to high number of producing locations – traders have a ample choice of fruits, available year-round due to different geographical locations and conditions of the producing areas; and the huge distance between produced and traded fruits - only 2.7 percent of total papaya produced enters international trade.

The Fresh Fruits and Vegetables Scheme of OECD may aggregate value to this industry setting clear references to the current quality parameters as set on the [Codex Stan for Papaya \(183-1993\)](#) for the classification and international trade of papaya, benefitting growers with a reference of the desired quality to competitive markets.