# MINOR TROPICAL FRUITS

## Mainstreaming a niche market

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As a follow-up to the assessment of global prospects for major tropical fruits published in the November 2017[1] issue of Food Outlook, this special feature focuses on developments in minor tropical fruits markets.

Contrary to their major counterparts, only a small share of minor tropical fruit production enters local markets, and, with few exceptions, the different varieties continue to be little known outside the areas where they are grown. However, production and trade of minor tropical fruits are gaining importance globally, mainly in recognition of their contribution to a healthy diet. In producing areas, minor tropical fruits play an important role not only in food and nutrition security but also as a source of income. Available household surveys from key producing areas indicate that the revenue from minor tropical fruits can account for up to 75 percent of the entire income of small rural households. In Cambodia, for example, fruits and vegetables are the second most important crop after rice, and provide the main additional source of income for most households in the country. In terms of agricultural export earnings, trade in minor tropical fruits weighs non-trivially in Thailand and Viet Nam. For Thailand, the latest estimates point to revenues of nearly USD 1.3 billion – or 7 percent of total agricultural earnings – from exports of minor tropical fruits in 2017.

In international markets, minor tropical fruits are still regarded as a novelty or niche product. Only a small number of varieties tend to be available either through ethnic markets targeting migrant consumers, mostly of Asian origin, or premium retail channels targeting conspicuous and affluent consumers. However, market opportunities have shown to be developing rapidly in China and other emerging markets on the back of income growth and urbanization. Demand is also set on an upward trajectory in key developed markets, most importantly the US and EU, mainly in response to increasing health awareness and changing dietary preferences.

[1] http://www.fao.org/3/a-I8080e.pdf

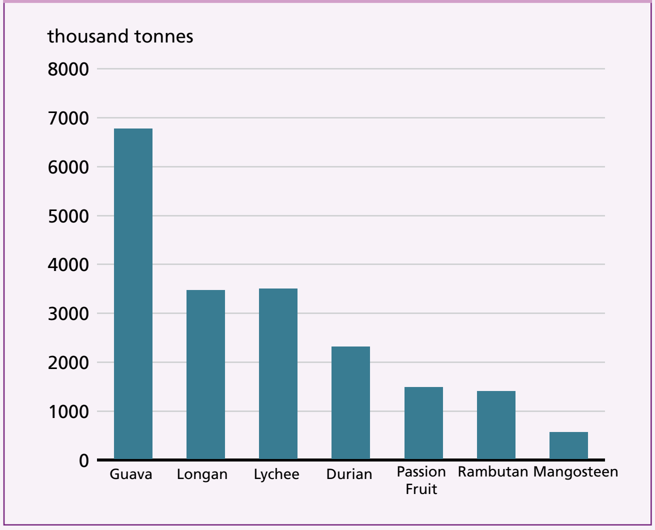
## PRODUCTION[2]

Following a decade of strong growth at an annual average rate of 3.8 percent, global aggregate production of minor tropical fruits suffered some weather-related declines in 2016 and 2017, arriving at an estimated 24 million tonnes in 2017. The value of production of minor tropical fruits is estimated at close to USD 20 billion in 2017. The bulk of these tropical fruits, in both volume and varietal terms, is produced in Asia, which is estimated to have accounted for 86 percent of aggregate global production over the 2015-2017 triennium. India and China rank as the largest producers, accounting for 24 percent and 22 percent of total global output in 2015-2017 respectively, but their produce is almost exclusively destined for domestic markets. Other significant producers are mostly located in Southeast Asia, with Thailand, Indonesia and Viet Nam accounting for approximately one third of global output combined. Brazil, as the leading producer of passion fruit, meanwhile held an estimated share of 7 percent of total global minor tropical fruit production in 2015-17. Again, production in Brazil is primarily for local consumption. Strong domestic demand helps sustain robust price levels.

The largest of the minor tropical fruits in output terms is guava, with an estimated volume of 6.8 million tonnes over the triennium 2015-2017. Longan and lychee, two fruits of the soapberry family, accounted for an estimated production of 3.4 and 3.5 million tonnes, respectively. Production of durian, a highly popular fruit in Southeast Asia and China, was estimated at 2.3 million tonnes in 2015-2017. Meanwhile, rambutan, another popular fruit in Asia, and passion fruit, a staple in the fruit basket of Brazil, reached production volumes of around 1.4 million tonnes each in 2015-2017.

[2] Given the informality of production, most producing countries do not routinely record or collect data on minor tropical fruits, rendering analyses difficult. This report presents an assessment of the current situation of global minor tropical fruit production and trade, based on data collected and conveyed to the FAO by some producing countries, industry sources, as well as desk research of secondary data sources.

**Figure 1. Annual average production by type (2015-2017): Guava dominates the minor tropical fruit landscape**




Source: Official and unofficial sources including author's estimates

Production of jackfruit[3] amounted to an estimated 3.7 million tonnes in 2015-2017. Jackfruit is a widely known staple fruit in India and Bangladesh, where it is mostly prepared as a meat substitute, appearance- and taste-wise. Given jackfruit's rich micronutrient profile, the fruit plays a significant role in the nutrition security for its consumers. Average output of jackfruit stood at approximately 1.8 million tonnes in India over 2015-2017, 1 million tonnes in Bangladesh and around 700 000 tonnes in Indonesia. In all countries, jackfruit production has seen fast growth in response to increasing domestic demand.

[3] Estimates on global jackfruit production are currently included in the 'Others' category in the statistical tables, which further includes production volumes of carambola (star fruit); dragonfruit; salak (snakefruit); and lansat.

## TRADE

Previously little known outside the Far East, where the bulk of minor tropical fruits is produced and consumed, trade has moved minor tropical fruits outside their narrow original confines. The bulk of trade takes place within Asia, where demand for premium fruits is strongest in countries experiencing rapid income growth. This particularly applies to demand from China, the largest importer and the main recipient of minor tropical fruits from Thailand, the leading exporter.

In developed markets, import demand has evolved with migration, with consumers of Asian origin tending to maintain their dietary preferences. Higher health consciousness among Western consumers and the growing awareness of the nutritional benefits of minor tropical fruits are adding to demand for these fruits in developed markets. Retailers in the US and EU have started to routinely stock a growing array of minor tropical fruits, most importantly the better known fruits such as lychee, guava and passion fruit.

Global data on the trade of minor tropical fruits remain difficult to obtain, since apart from durian, there is no explicit Harmonised System (HS) classification for the individual fruits.[4] As such, HS trade data on guava and mangosteen are reported together with the more important mango. The three fruits combined reached a trade volume of 1.7 million tonnes in 2017[5], but available information

[4] Given the small volumes of traded quantities, and as per regulation of the World Customs Organization, data on fruit with an annual trade value of less than USD 50 million are collected at an aggregate level. Even at the 'tariffline' – HS codes of higher than 6 digits – information remains sparse on species of minor tropical fruit.

[5] Comprehensive analysis on recent developments and the outlook for major tropical fruits (including mango as well as pineapple, papaya and avocado) can be found in the November 2017 issue of Food Outlook (http://www.fao.org/3/a-I8080e.pdf).

**Table 1. Minor tropical fruit key producing regions and countries ('000 mt) Average (2015-2017)**

| | World | Asia | Africa | Centr. America & Car. | S. America | Dev'd | Dev'ing | China | India | Indonesia | Thailand | Viet Nam | Brazil | Malaysia | Pakistan | Philippines |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Guava | 6 752.5 | 5 519.3 | 435.6 | 223.5 | 574.1 | 36.7 | 6 715.9 | 365.5 | 3 885.0 | 264.8 | 218.1 | 24.2 | 353.2 | 49.5 | 474.2 | 10.8 |
| Lychee | 3 477.2 | 3 333.4 | 124.3 | 19.5 | - | 9.3 | 3 468.0 | 2 215.8 | 567.0 | - | 52.8 | 374.8 | - | - | 4.3 | - |
| Longan | 3 445.4 | 3 445.4 | - | - | - | - | 3 445.4 | 1 919.4 | - | - | 980.3 | 517.1 | - | - | - | - |
| Durian | 2 295.0 | 2 295.0 | - | - | - | - | 2 295.0 | - | - | 862.1 | 717.6 | 253.0 | - | 381.6 | - | 74.7 |
| Passion Fruit | 1 468.8 | 181.5 | 39.1 | 6.3 | 1 241.8 | 31.3 | 1 437.5 | - | - | 114.6 | 10.0 | 20.0 | 948.1 | 5.0 | 0.2 | 0.4 |
| Rambutan | 1 386.1 | 1 386.1 | - | - | - | - | 1 386.1 | - | - | 692.0 | 344.8 | 261.4 | - | 62.7 | - | 7.7 |
| Mangosteen | 545.9 | 545.2 | - | - | 0.6 | - | - | - | - | 172.0 | 349.7 | - | - | 20.9 | - | - |
| Others | 5 205.4 | 5 202.1 | - | - | 3.3 | - | - | - | 1 854.7 | 1 694.0 | - | 513.3 | - | 50.2 | - | - |
| **Total** | **24 576.3** | **21 908.1** | **599.0** | **249.3** | **1 819.9** | **77.3** | **18 747.8** | **4 500.7** | **6 306.7** | **3 799.6** | **2 673.3** | **1 963.7** | **1 301.3** | **569.9** | **478.7** | **93.6** |

Source: Official and unofficial sources including author's estimates suggests that guava and mangosteen accounted for shares of only 5 and 3 percent of the total, respectively.

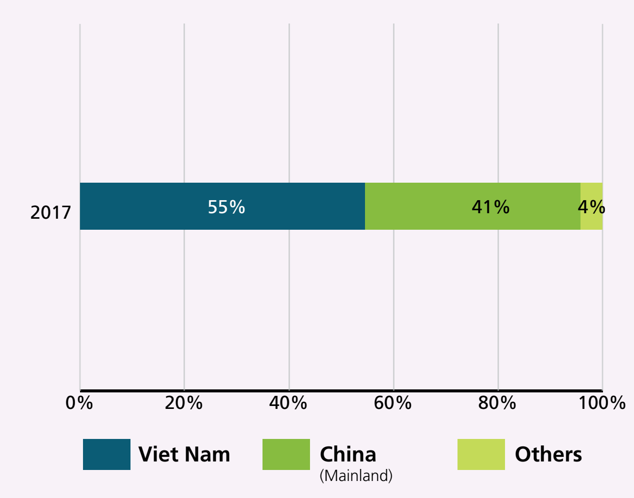
Trade data for longan, lychee, passion fruit and rambutan are clustered under the Harmonised System (HS) code 081090, together with other fresh fruit that are not classified separately because of their limited importance at the international level. This group collectively reached a global trade volume of 2 million tonnes in 2017. Within this cluster, Viet Nam and Thailand ranked as the largest exporters, accounting for 32 percent and 23 percent of global shipments, respectively, in 2017. Notably, Viet Nam registered fast trade growth for minor tropical fruits over the past decade, expanding export volumes from a total of 59 000 tonnes in 2007 to an estimated 600 000 tonnes in 2017 (all items in HS code 081090).

Similarly, exports of minor tropical fruits from Thailand, the largest supplier overall, nearly tripled over the past decade, from 332 000 tonnes in 2007 to 930 000 tonnes in 2017. Minor tropical fruits constitute important commercial crops in Thailand, with half of all production destined for exports, predominantly to China and Viet Nam. For durian, global trade reached an estimated 609 000 tonnes in 2017, up from 172 000 tonnes a decade ago, with Thailand again having consistently dominated exports over this period to the tune of 90 percent

## OUTLOOK

While overall, global trade in fresh minor tropical fruits is estimated to account for only approximately 10 percent of production, there is ample commercial potential for exporters, including low-income countries. With wholesale unit prices

**Figure 2. Value of Thai exports by destination 2017**




Source: Official and unofficial sources including author's estimates

**Table 2. Estimated volumes of global trade in minor tropical fruit ('000 mt)**

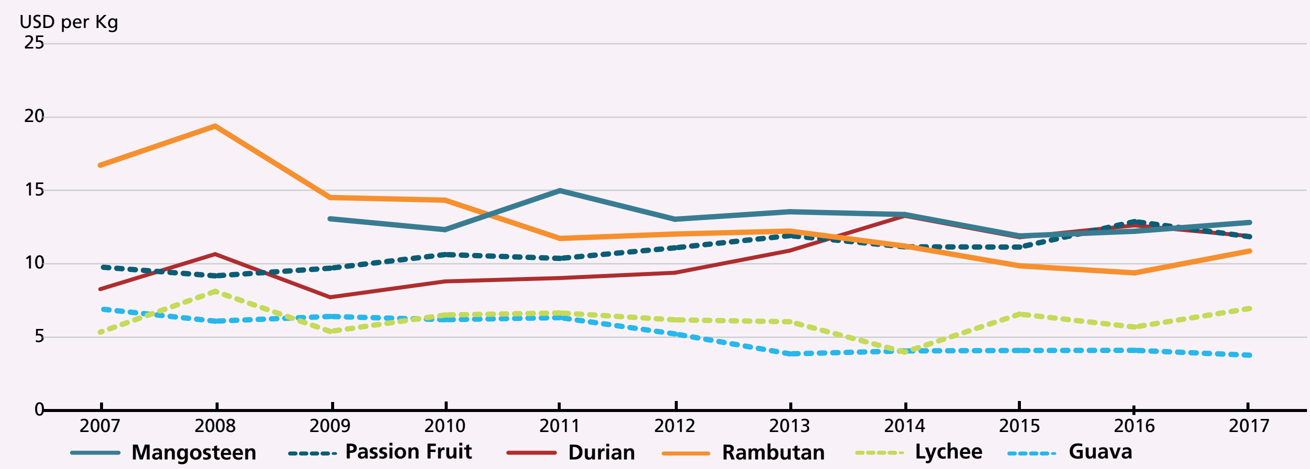
| | 2007[1] | 2017[2] |
|---|---|---|
| Durian | 171 627 | 609 000 |
| Guava | 22 818 | 85 000 |
| Mangosteen | 17 113 | 51 000 |
| Others[2] | 957 476 | 2 000 000 |
| **Total** | **1 169 034** | **2 745 000** |

Source: Official and unofficial sources including author's estimates

[1] Preliminary estimates.

[2] Data refer to HS code 081090, which clusters other fresh fruit that are not identified separately because of their minor relevance in international trade. The group includes, *inter alia*, data on longan, lychee, passion fruit and rambutan. Figures in this table exclude export volumes of durian, which are reported separately.

**Figure 3. US Wholesale prices**




Source: USDA Agricultural Marketing Service, wholesale price data from the terminal markets Boston, New York City, San Francisco and Los Angeles

**Table 3. Evolution of exports from Thailand 2007-2017 ('000 mt)**

| Tonnes | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Durians | 157 407 | 203 127 | 256 172 | 207 501 | 271 948 | 351 124 | 367 056 | 369 602 | 358 192 | 403 634 | 488 716 |
| Guavas | 2 183 | 1 567 | 2 001 | 2 426 | 3 043 | 2 896 | 4 069 | 4 985 | 5 901 | 6 360 | 6 625 |
| Jackfruit (incl. Cempedak & Nangka) | 607 | 3 028 | 8 623 | 12 283 | 16 548 | 18 201 | 17 644 | 20 642 | 21 476 | 31 938 | 32 453 |
| Longans | 112 752 | 91 567 | 144 154 | 72 705 | 162 441 | 129 255 | 140 232 | 196 666 | 110 729 | 125 526 | 213 981 |
| Lychees | 10 372 | 5 880 | 16 811 | 6 496 | 3 750 | 11 642 | 3 461 | 8 138 | 4 260 | 4 748 | 4 900 |
| Mangosteens | 46 860 | 43 979 | 117 690 | 119 263 | 111 451 | 148 844 | 215 182 | 195 108 | 178 384 | 142 877 | 205 467 |
| Rambutan | 2 241 | 5 521 | 5 347 | 7 822 | 12 027 | 11 242 | 4 222 | 3 882 | 6 743 | 2 233 | 9 333 |
| **Total** | **332 423** | **354 669** | **550 797** | **428 496** | **581 208** | **673 204** | **751 866** | **799 026** | **685 686** | **717 316** | **961 475** |

Source: Official customs data

in the US ranging from around USD 4/kg for guavas and lychees, to around USD 13/kg for durian, passion fruit and mangosteen, cultivating minor tropical fruits could be more lucrative to smallholder farmers than staple crops, provided post-harvest handling and transportation of these highly perishable fruits are managed efficiently and cost-effectively.

However, a number of challenges persist on both the supply and demand side in moving minor tropical fruits from niche to mainstream. On the supply side, these relate to either low quality or low productivity in small-scale farming, as well as high perishability, especially in the harvesting of fruit when ripe. Moreover, the cultivation of minor tropical fruits is mostly seasonal, often characterized by short harvesting periods, which results in irregular market supply and large price fluctuations. Weather-induced shocks and the impact of climate change often threaten flowering and fruit bearing, promote pests and diseases, and affect production stability and regular availabilities for exports. Consequently, prices for minor tropical fruits can display high levels of volatility. The erratic quantity and quality of supply in turn impedes market penetration, a problem that is often compounded by a lack of infrastructure and logistics necessary to get the highly perishable produce to markets swiftly. Improvements in post-harvest handling, new technologies to prolong shelf life and lowering the cost of distribution are therefore critical to opening new markets.

On the demand side, seasonal variations are also observed for some fruits such as lychee, longan and rambutan, which usually experience higher demand and peak pricing during festive periods in both Asian and developed markets. European demand for lychee, for example, generally peaks in December and vanishes in January. Varying transport costs are another cause of price fluctuations, as are the costs associated with additional processing and preparation for retail sales. A lack of consumer awareness, high unit prices and increasing concerns about 'food miles'[6] pose further obstacles to a more expansive international marketplace. Furthermore, phytosanitary certification requirements and stringent private standards imposed by supermarkets act as hindrances, especially for destinations in developed regions. Much of the future market penetration will be contingent on making these fruits more accessible to the consumer, most importantly by lowering their cost of production and distribution, enabling them to be offered at more competitive prices, and not least, through strengthening consumer awareness. As low-calorie but nutrient-rich products, minor tropical fruits could gain market shares in the context of rising overweight and obesity rates and related non-communicable diseases.

In the shorter term, a more promising stimulus to minor tropical fruit sectors could arise from south-south trade. Preliminary estimates for 2018 indicate that the value of exports of minor tropical fruit from Thailand to Viet Nam and China alone could exceed USD 1 billion. This highlights the importance and the potential of south-south trade when viewed in light of Thailand's total estimated minor tropical fruit revenue of USD 1.3 billion in 2017.

[6] The perception that long distance value chains are environmentally unfriendly.

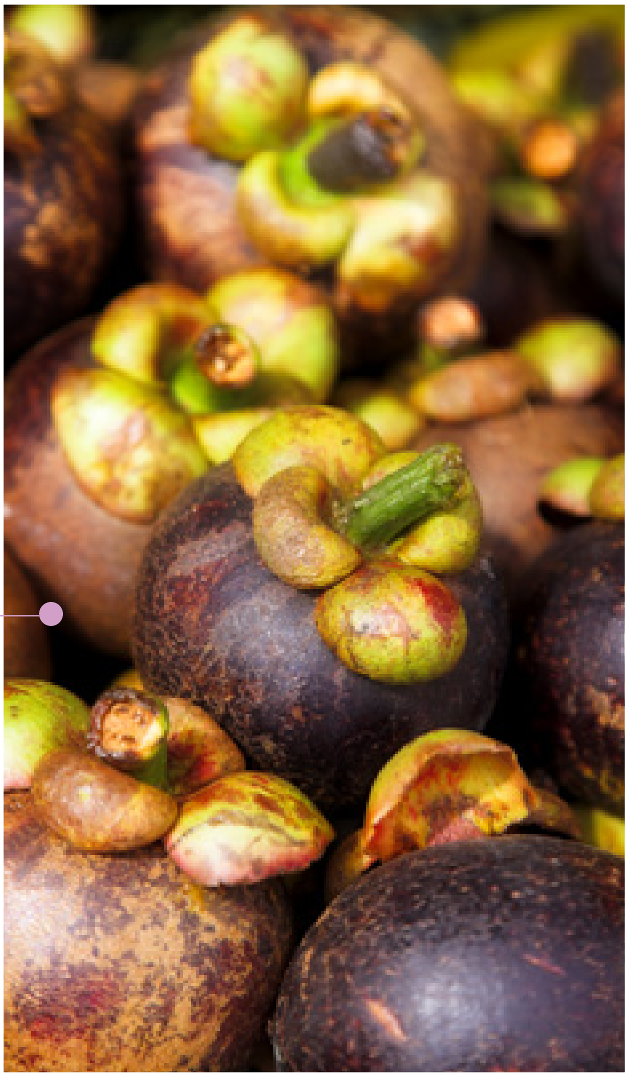
# Commodity Focus



## GUAVA AND MANGOSTEEN

At an estimated production volume of 6.5 million tonnes in 2017, guava is the largest of the minor tropical fruits in terms of production volume. The fruit is predominantly cultivated and consumed in Asia. India ranks as the major guava producing country, accounting for an estimated 56 percent of total global output in 2017. Adverse weather conditions were reported to have significantly reduced yields in the country, leading to a production decline by 10 percent, to 3.6 million tonnes, in 2017. Production in India is almost entirely directed towards domestic consumption, with only a negligible volume of approximately 2 100 tonnes exported to the US, EU, Saudi Arabia, Kuwait and Jordan. Other noteworthy producers, albeit at significantly lower levels, include Pakistan, Egypt, China and Brazil. With respect to trade, Ecuador ranks as the key player, with an estimated export volume of 30 000 tonnes in 2017.

Production of mangosteen, predominantly pursued in Southeast Asian countries, reached an estimated 700 000 tonnes in 2017. The fruit, known for its appealing flavour, is also gaining recognition thanks to its antioxidant properties and versatile uses that span nutritional, pharmaceutical and industrial uses. Thailand ranks firmly as the leading producer and exporter of mangosteen, at an estimated output of 530 000 tonnes and reported shipments of 205 000 tonnes in 2017, an increase of 44 percent compared with 2016.



Purple mangosteen
@ kovalvs

Guava fruit
@ nuwatphoto

## LONGAN

Global production of longan increased by an estimated 6 percent in volume terms between 2016 and 2017, following strong demand in China and Thailand, the two largest producers. In total, world longan production is estimated to have reached 3.6 million tonnes in 2017, placing longan as the second most important minor tropical fruit behind guava. Originating in Southern China, the fruit is widely cultivated throughout Asia, including locations in India, Sri Lanka and Myanmar. However, large-scale production is only pursued in China, Thailand and Viet Nam, which currently account for approximately 50, 30 and 15 percent of global production, respectively.

A close relative to lychee, longan has seen rapid expansion in global production over the past decade, with an estimated 4.6 percent annual average growth over 2007-2016. Rising demand in China is the main driver of these developments, with both China itself and Thailand – as the largest exporter to China – investing heavily in crop expansion. Production growth in Thailand reportedly slowed in 2017 due to adverse weather conditions – both drought and excessive precipitation – leading to a slower growth rate than in 2016. Thai longans are particularly sought after in China and fetch higher prices due to their superior quality compared with domestically grown longans. Imports of longans by China reached approximately 49 000 tonnes in 2017, an annual increase of an estimated 140 percent.

Longan trees are considerably more productive than lychee trees, and harvesting can be postponed without the fruit losing quality. Longan's very high vitamin C content, and the fact that the fruit does not require chemical treatment to extend its shelf life, make it a popular substitute for lychee. Given the rising demand in China, the fruit's various positive attributes compared with lychee as well as the potentially larger profit margins, there is further commercial scope for moving to longan production. This is providing investment incentives to both existing growers and new market entrants. For example, longan growers in Australia have started to invest in production expansion to cater to rapidly growing import demand from China, and are expected to increase the volume of their shipments significantly.

## LYCHEE

Global lychee production has endured year-on-year contractions since 2015 owing to unfavourable weather conditions in two of the key producing countries, China and Viet Nam. Total global output is estimated to have reached 3.3 million tonnes in 2017, representing a fall of 8 percent from the previous year.

The fruit is native to the southern region of China, and historically, the country has ranked as the largest producer with a global output share of around 60 percent. But in 2016 and again in 2017, adverse weather severely disrupted flowering in the country's key producing

Longan fruit
@ topphoto

Fresh lychees
@ tristantan71

province of Guangdong. Production of lychee in China almost exclusively caters for domestic demand and the fruit continues to be widely popular, despite growing competition from longan.

After China, India and Viet Nam rank as the second and third largest producers, with an estimated volume of 580 000 tonnes and 330 000 tonnes, respectively, in 2017. Lychee production in India predominantly serves its domestic market, while in Viet Nam, approximately half of its produce is exported, mainly to China, the US, Japan and Australia.

Africa is the second most important growing region for lychee. While output volumes for the continent are dwarfed by Asia, production is on a firm upward trajectory, reaching 131 000 tonnes in 2017. Madagascar is by far the leading producer, accounting for some 80 percent of the region’s output. Much of the commercially grown crop is targeted for export, with EU member states, especially France and the Netherlands, being the principal destinations for African lychee. Production in South Africa reached an estimated 9 800 tonnes in 2017, of which 4 900 tonnes were delivered to the international market. The main export destination for African lychees is Europe, with France ranking as the core market for exports from Madagascar, and the Netherlands for exports from South Africa. Other destinations for South African shipments are the UK, Canada, Dubai and the US. In South Africa, lychee cultivation faces pressure from more lucrative crops like avocado and macadamia, which promise farmers better remuneration.

Marketing of lychee is difficult due to the fact that the fruit is highly perishable. Lychees deteriorate rapidly after harvest and have to be shipped within 24 hours of picking.

## DURIAN

Global production of durian reached an estimated 2.4 million tonnes in 2017 on the back of favourable weather conditions and strong production growth in the main producing countries of Indonesia and Thailand. With an estimated production volume of 840 000 and 860 000 tonnes, respectively, Thailand and Indonesia combined accounted for approximately 70 percent of world durian production in 2017, with the remainder produced by Malaysia and Viet Nam, at an estimated 390 000 and 270 000 tonnes, respectively. Durian is an exceptionally high-value crop, and, being one of the most prolific fruits in Southeast Asia, the market for durian is experiencing vibrant growth. Its popularity arises not only from its much-heralded taste, but also from its strong, yet unique odour.

Global trade in durian reached an estimated 609 000 tonnes in 2017, an increase of 18 percent compared with 2016. Thailand by far ranks as the main exporter of durian, accounting for an average 82 percent of world shipments over 2015-2017. China, as the leading importer of durian, procured an estimated annual average of some 300 000 tonnes during 2015-2017. Testament to the fruit’s growing popularity beyond Asia, the value of exports of Thai fresh durians to the US increased by 68 percent in 2017, to approximately USD 5.1 million.

Durian fruit
@ davidgn

**Table 4. World exports of durian 2007-2017 (mt)**

| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 *(estim.)* |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Indonesia | n/a | n/a | n/a | 25 | n/a | 3 | 0 | 11 | 0 | 10 | 174 |
| Malaysia | 14 089 | 19 443 | 19 624 | 15 390 | 19 515 | 23 521 | 20 152 | 13 215 | 19 892 | 17 754 | 14 106 |
| Philippines | 10 | 3 | 1 | 1 | 1 | 19 | 18 | 94 | 71 | 37 | 129 |
| Thailand | 157 474 | 203 127 | 256 172 | 207 501 | 271 949 | 351 124 | 367 057 | 369 602 | 358 192 | 402 660 | 488 716 |
| Viet Nam | n/a | 14 | 35 | n/a | 145 | n/a | 820 | 2 087 | 23 189 | 94 352 | 105 537 |
| **World** | **171 627** | **222 795** | **275 869** | **222 928** | **291 763** | **374 852** | **388 346** | **385 086** | **401 473** | **514 839** | **608 754** |

Source: Official customs data
n/a (not available)

## PASSION FRUIT

Global production of passion fruit reached an estimated 1.5 million tonnes in 2017, on the back of strong harvests in Brazil, Colombia and Indonesia, the most important producers. Passion fruit is native to Brazil and enjoys high levels of popularity in the country, to the extent that domestic supply struggles to meet domestic demand. Brazil's total production volume reached nearly 1 million tonnes in 2017, following year-on-year growth of about 3 percent. In response to surging domestic demand, Brazil opened its borders to passion fruit imports from Peru in June 2017. According to industry sources, the value of passion fruit shipments from Peru to Brazil is expected to reach USD 2 million over the next three years. Peru has ample potential for exporting passion fruit, since production covers more than 12 000 ha in the country's highlands and rainforests. In terms of other international suppliers, Ecuador ranks as the largest producer and exporter globally, followed by Australia and New Zealand.

Yellow passion fruit
@ areeya

## RAMBUTAN

Rambutan is native to Malaysia and Indonesia, where it is predominantly produced for domestic consumption. Global production of the fruit witnessed a slight recovery from the contraction experienced in 2016, reaching an estimated 1.3 million in 2017. Output in Indonesia, the largest producer, had been severely disrupted by poor weather conditions in 2016, inducing an estimated 21 percent decline in total global production. Rambutan is a fragile crop with low resistance to weather changes, and, despite an improvement in growing conditions in 2017, total global production remained well below the estimated annual average of 1.5 million tonnes over the previous decade.

Rambutan is equally fragile after harvesting, requiring consistent cold chains and humidity control during transport to avoid darkening of the peel. Even though no damage to the flesh occurs, darkening is known to negatively influence prices. Exposure to inadequate temperatures during transport and storage also results in rapid deterioration of the fruit. As such, rambutan is typically shipped in small quantities by airfreight, within 24 hours of harvesting.

Perishability lowers availability for domestic consumption and even more so for trade, and makes rambutan a high value crop. Thailand has emerged as the second largest producer of the fruit on the back of rising regional demand, exporting around 9 300 tonnes in 2017, up from an average of 4 500 tonnes in 2015-2016.

Outside the region, the international market for rambutan remains niche. Demand largely stems from Asian buyers located outside the continent. The fruit is little known by Western consumers, and high prices have further curtailed market penetration in the past. However, as retail prices have softened recently, rambutan could gain market shares going forward.

Rambutan
@ Andrelix