Shrimp Production Review

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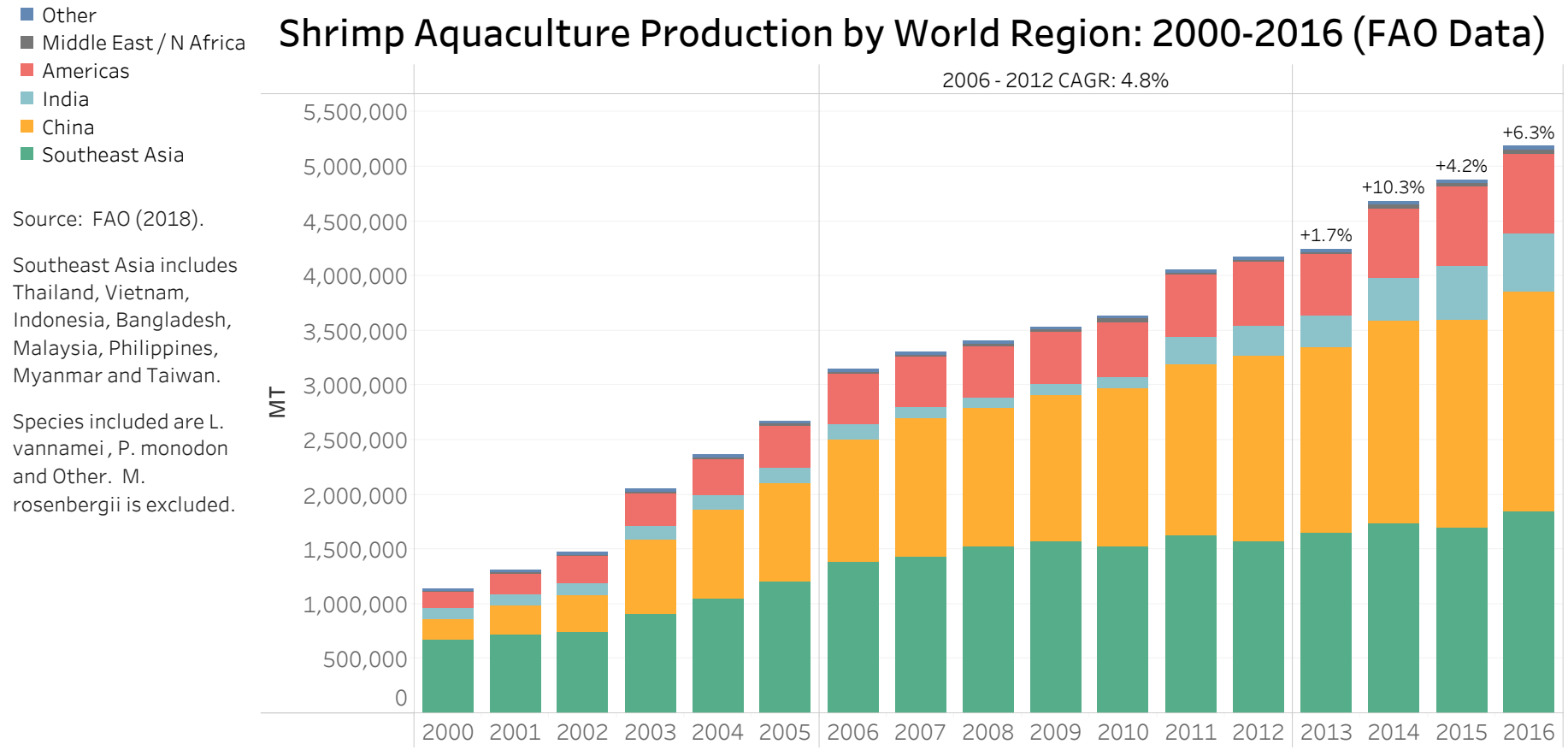
- **Dr. Darryl Jory**, Editor Emeritus, Global Aquaculture Alliance

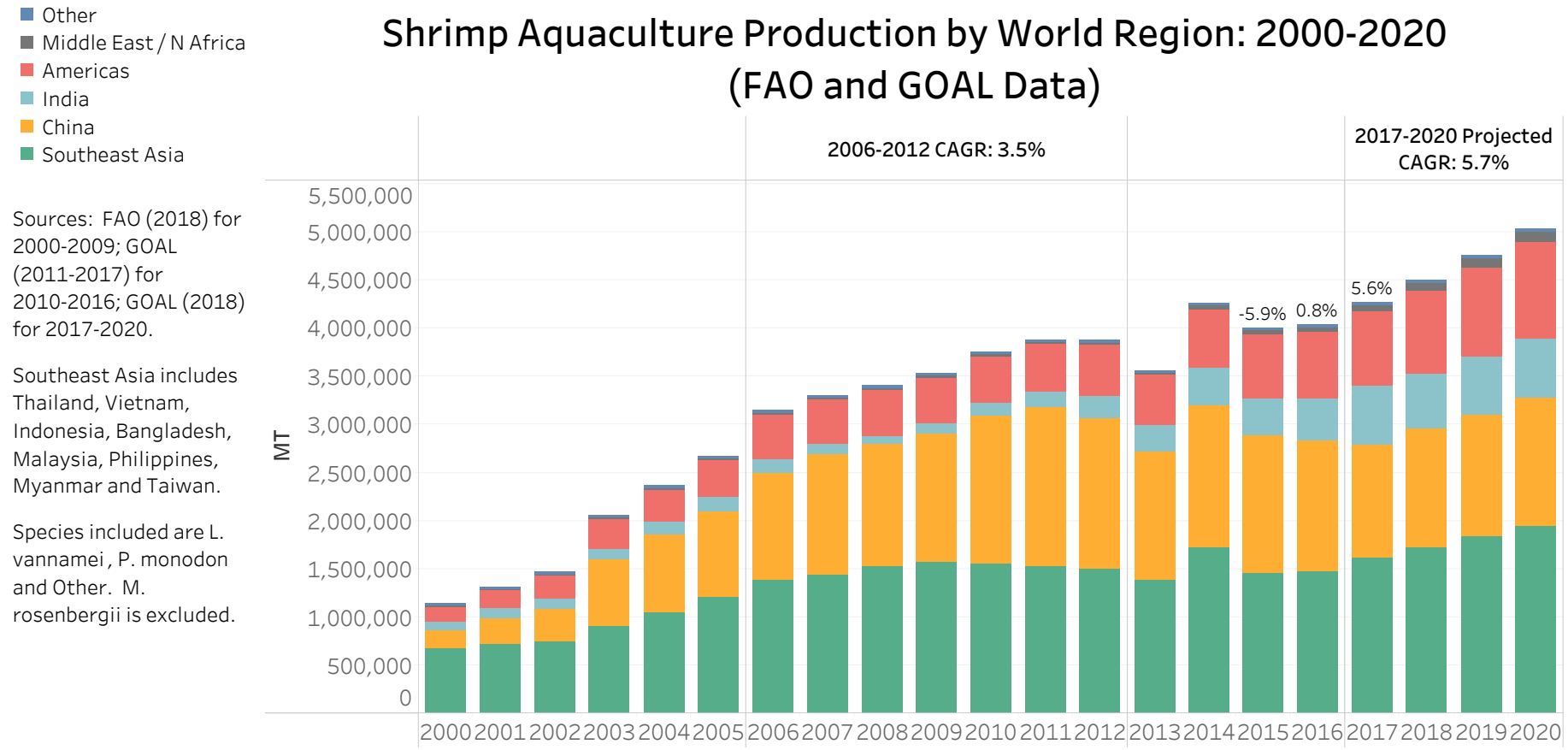
GOAL GUAYAQUIL ECUADOR SEPTEMBER 25-27, 2018



Source: FAO (2018).

Southeast Asia includes Thailand, Vietnam, Indonesia, Bangladesh, Malaysia, Philippines, Myanmar and Taiwan.

Species included are L. vannamei , P. monodon and Other. M. rosenbergii is excluded.



Sources: FAO (2018) for 2000-2009; GOAL (2011-2017) for 2010-2016; GOAL (2018) for 2017-2020.

Southeast Asia includes Thailand, Vietnam, Indonesia, Bangladesh, Malaysia, Philippines, Myanmar and Taiwan.

Species included are L. vannamei , P. monodon and Other. M. rosenbergii is excluded.

- Other
- Middle East / Northern Africa
- Americas
- India
- China
- Southeast Asia
- U.S. End-of-Year Composite Import Price

Sources: FAO (2018) for 2000-2009; GOAL (2011-2017) for 2010-2016; GOAL (2018) for 2017-2020.

Data source for prices: USDC/NMFS (2018). 2018 End-of-Year Composite Import Price is an estimate.

Southeast Asia includes Thailand, Vietnam, Indonesia, Bangladesh, Malaysia, Philippines, Myanmar and Taiwan.

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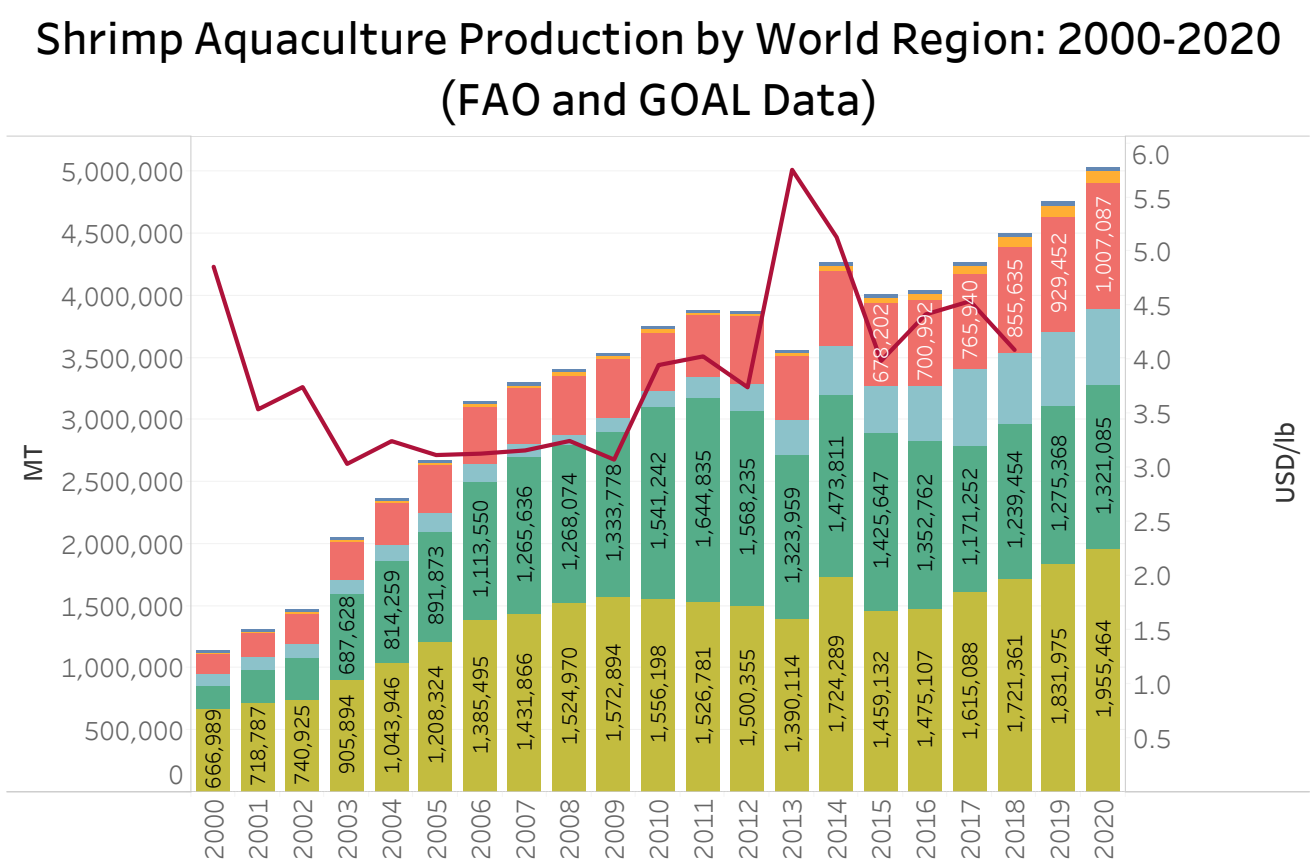
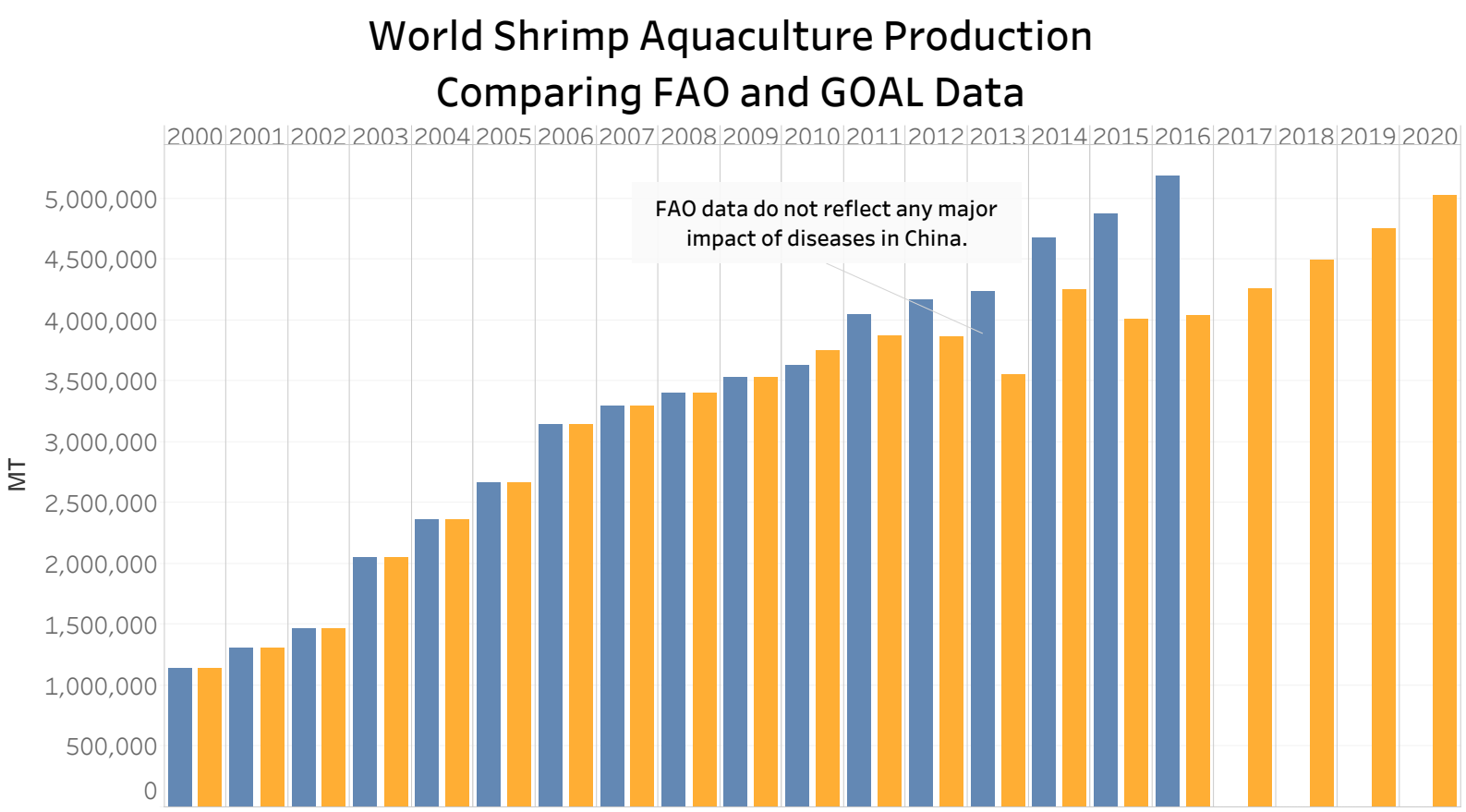
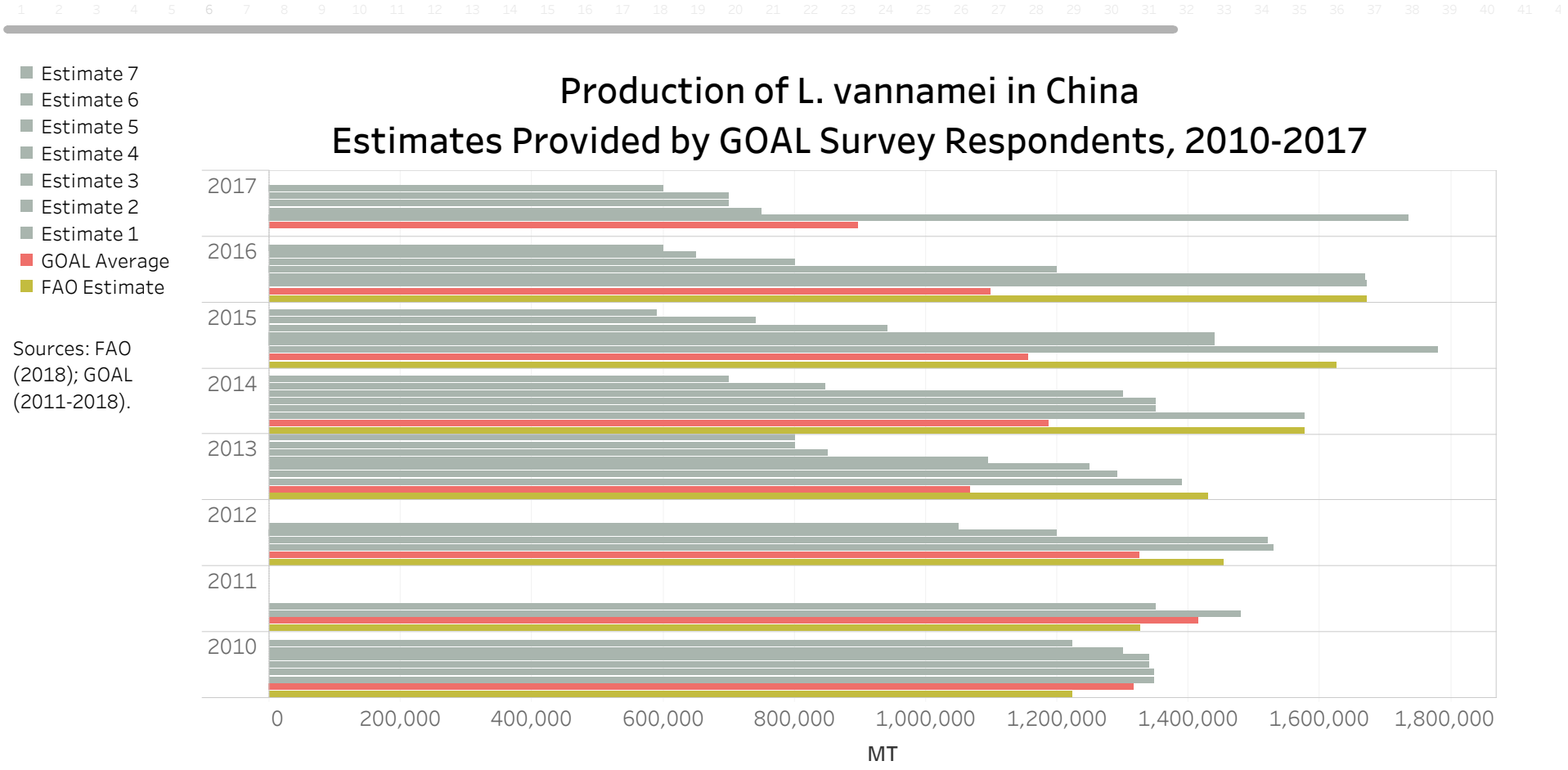


FAO Data
GOAL Data

Sources: FAO (2018) and GOAL (2011-2018).

Species included are L. vannamei , P. monodon and Other. M. rosenbergii is excluded.





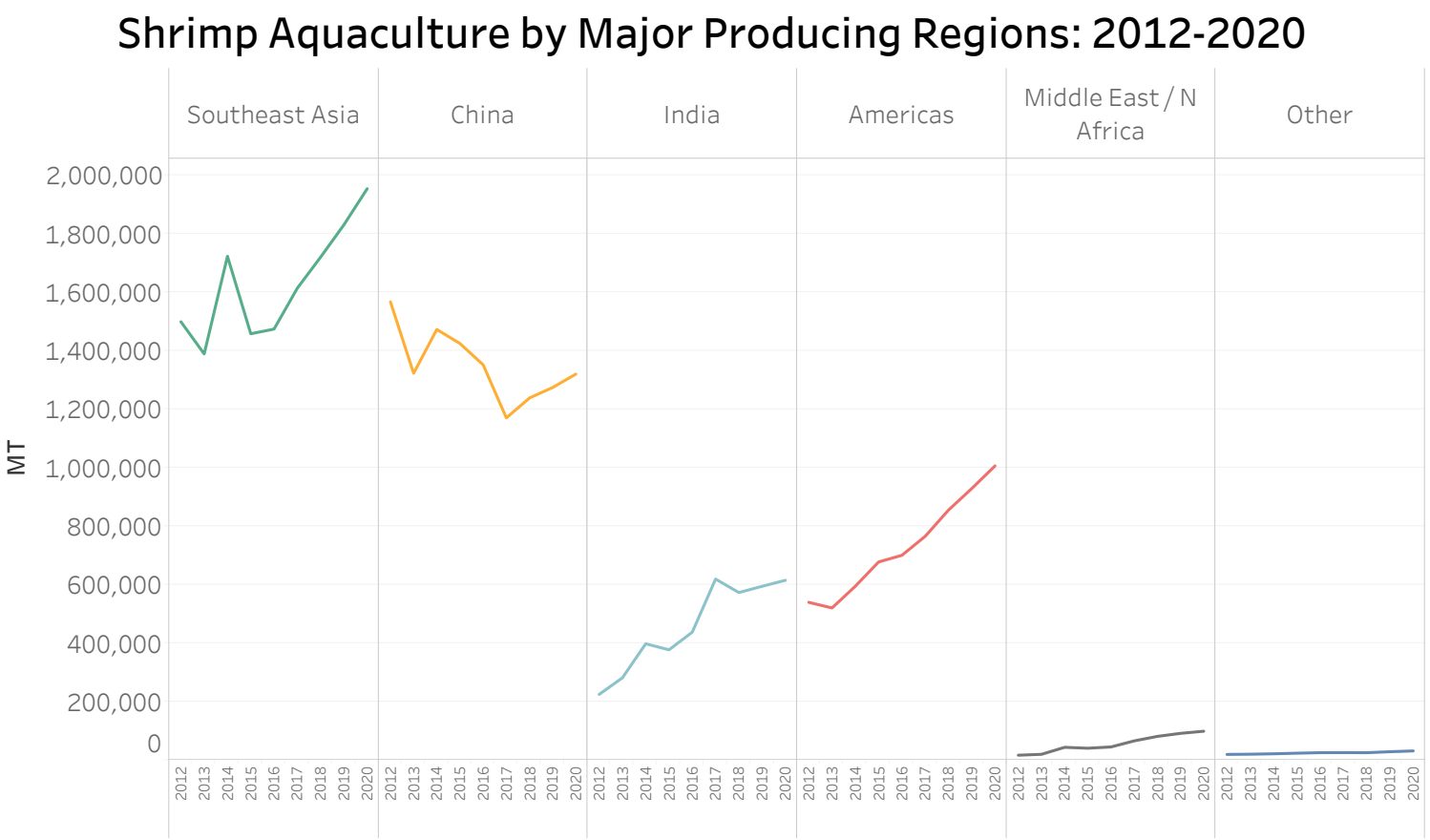
Sources: FAO (2018); GOAL (2011-2018).

Sources: GOAL (2013-2017) for 2012-2016; GOAL (2018) for 2017-2020.

Southeast Asia includes Thailand, Vietnam, Indonesia, Bangladesh, Malaysia, Philippines, Myanmar and Taiwan.

Species included are L. vannamei , P. monodon and Other. M. rosenbergii is excluded.

Impact of diseases: China, Thailand and Mexico reported declining production in 2012/2013. Production increased in 2014 in China, Vietnam, Indonesia and India but decreased again in 2015 in most Asian countries. A recovery seems to be underway since 2016/2017.

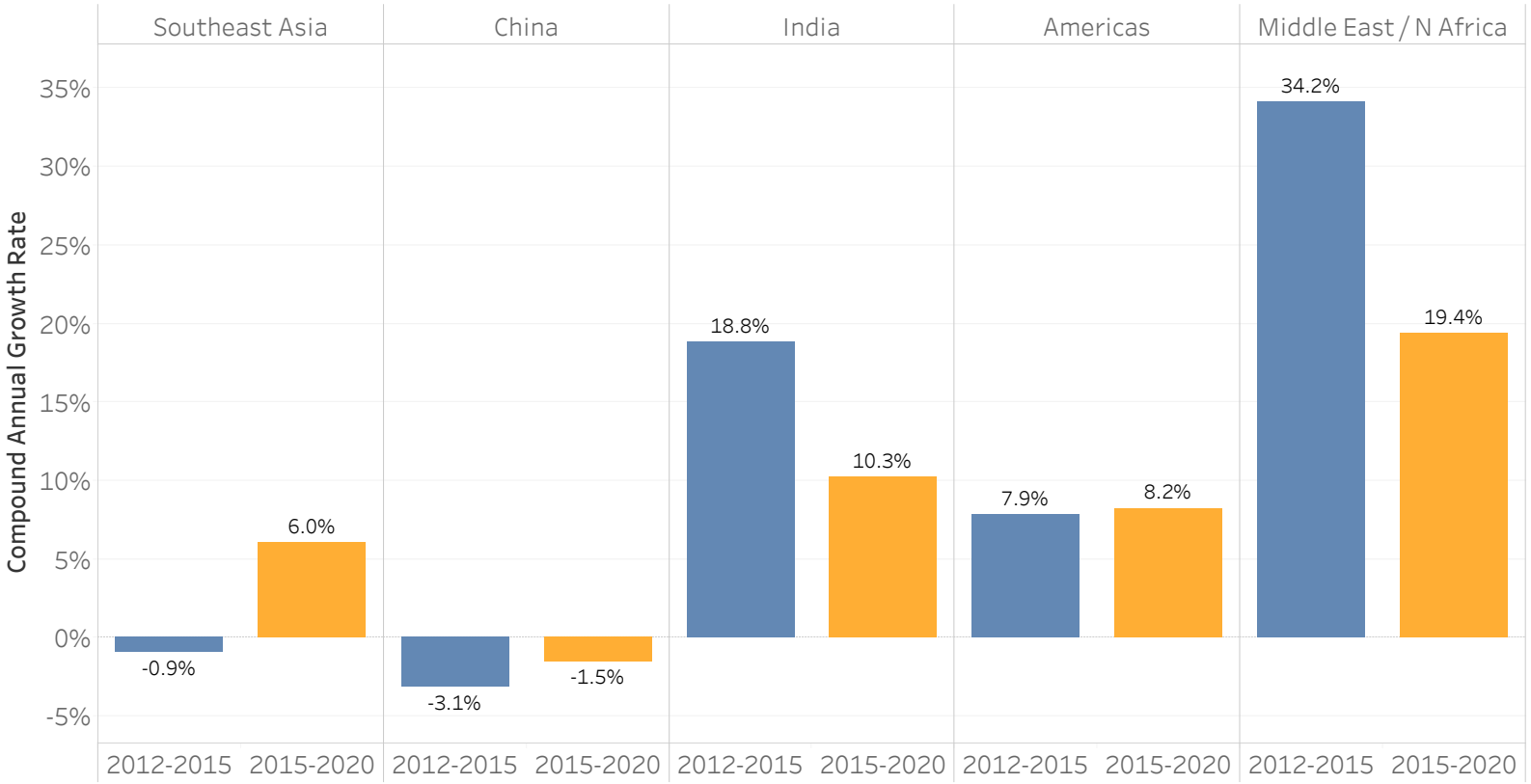


Shrimp Aquaculture by Major Producing Regions: 2012-2015 vs 2015-2020

Sources: GOAL (2013-2017) for 2012-2015; GOAL (2018) for 2017-2020.

Southeast Asia includes Thailand, Vietnam, Indonesia, Bangladesh, Malaysia, Philippines, Myanmar and Taiwan.

Species included are L. vannamei , P. monodon and Other. M. rosenbergii is excluded.



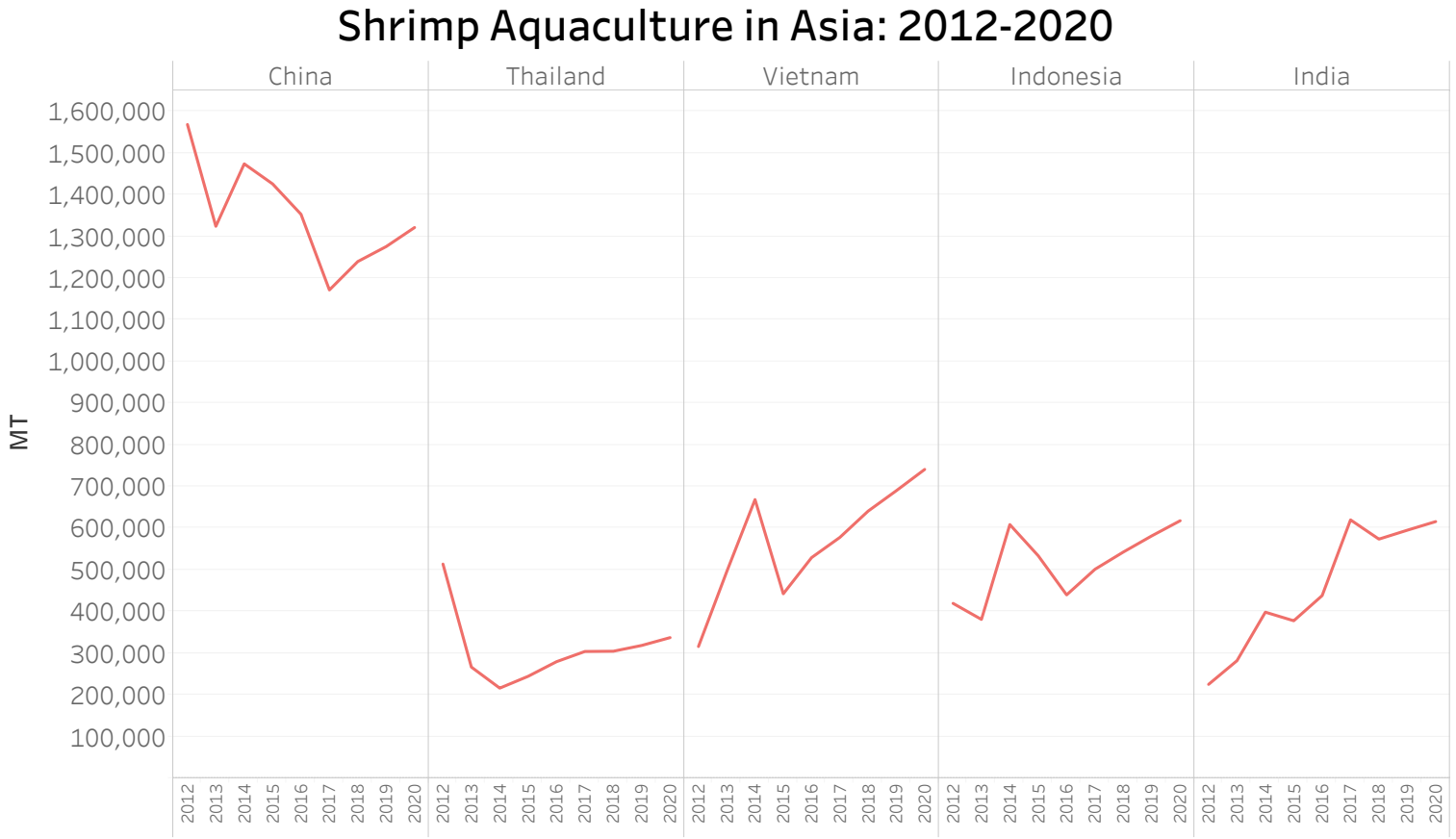
Impact of diseases: Production decreased substantially in China and Thailand in 2013, with only a partial recovery expected by 2020.

Production fluctuated in Vietnam and Indonesia, with positive growth trends by 2020.

Production in India increased substantially through 2017 but it is expected to remain stable during 2017-2020.

Sources: GOAL (2013-2017) for 2012-2016; GOAL (2018) for 2017-2020.

Species included are L. vannamei , P. monodon and Other. M. rosenbergii is excluded.

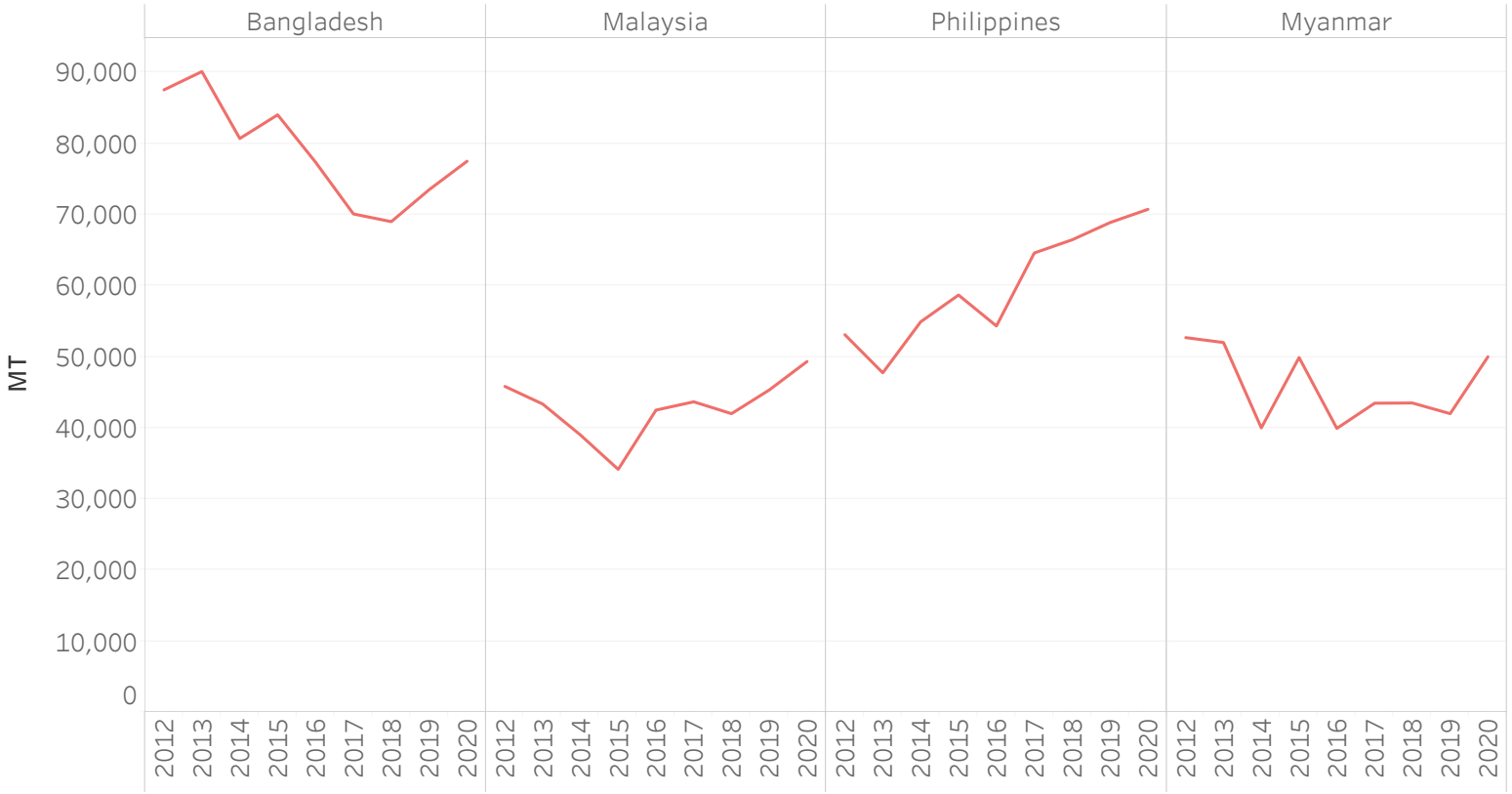


Shrimp Aquaculture in Asia: 2012-2020

Bangladesh and Myanmar respondents expect lower production in 2020 relative to 2012. Malaysia was strongly affected by EMS but the industry is expected to recover by 2020. The Philippines is expected to grow during 2017-2020.

Sources: GOAL (2013-2017) for 2012-2016; GOAL (2018) for 2017-2020.

Species included are L. vannamei , P. monodon and Other. M. rosenbergii is excluded.

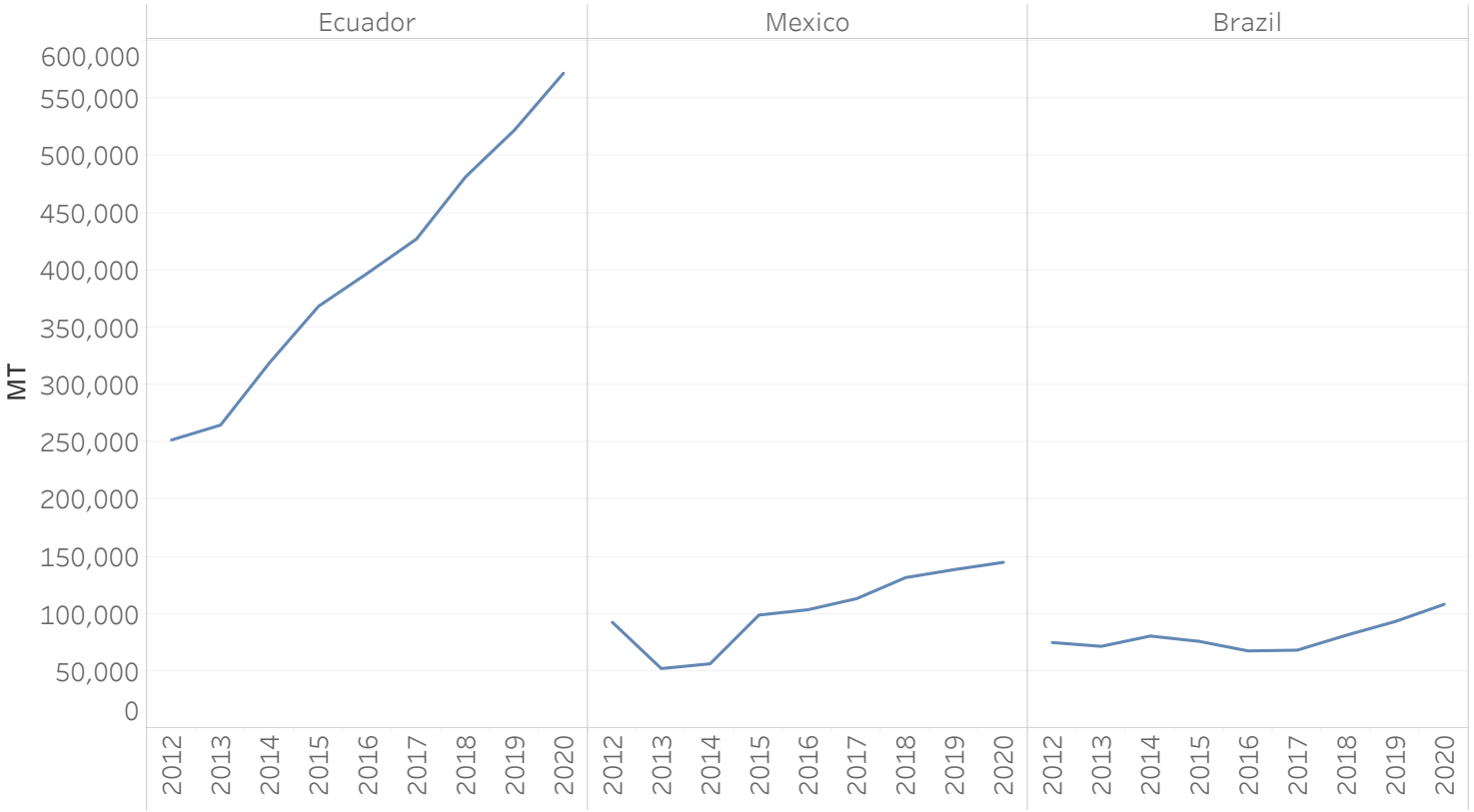


Shrimp Aquaculture in Latin America: 2012-2020

Ecuador has experienced strong growth in the last few years; expectations through 2020 are positive as well (CAGR = 11% during 2012-2020). Mexico has recovered after being impacted by EMS in 2013. Although production in Brazil has hovered around 75,000 tons, it is expected to exceed 100,000 tons in 2020.

Sources: GOAL (2013-2017) for 2012-2016; GOAL (2018) for 2017-2020.

Species included are L. vannamei , P. monodon and Other. M. rosenbergii is excluded.

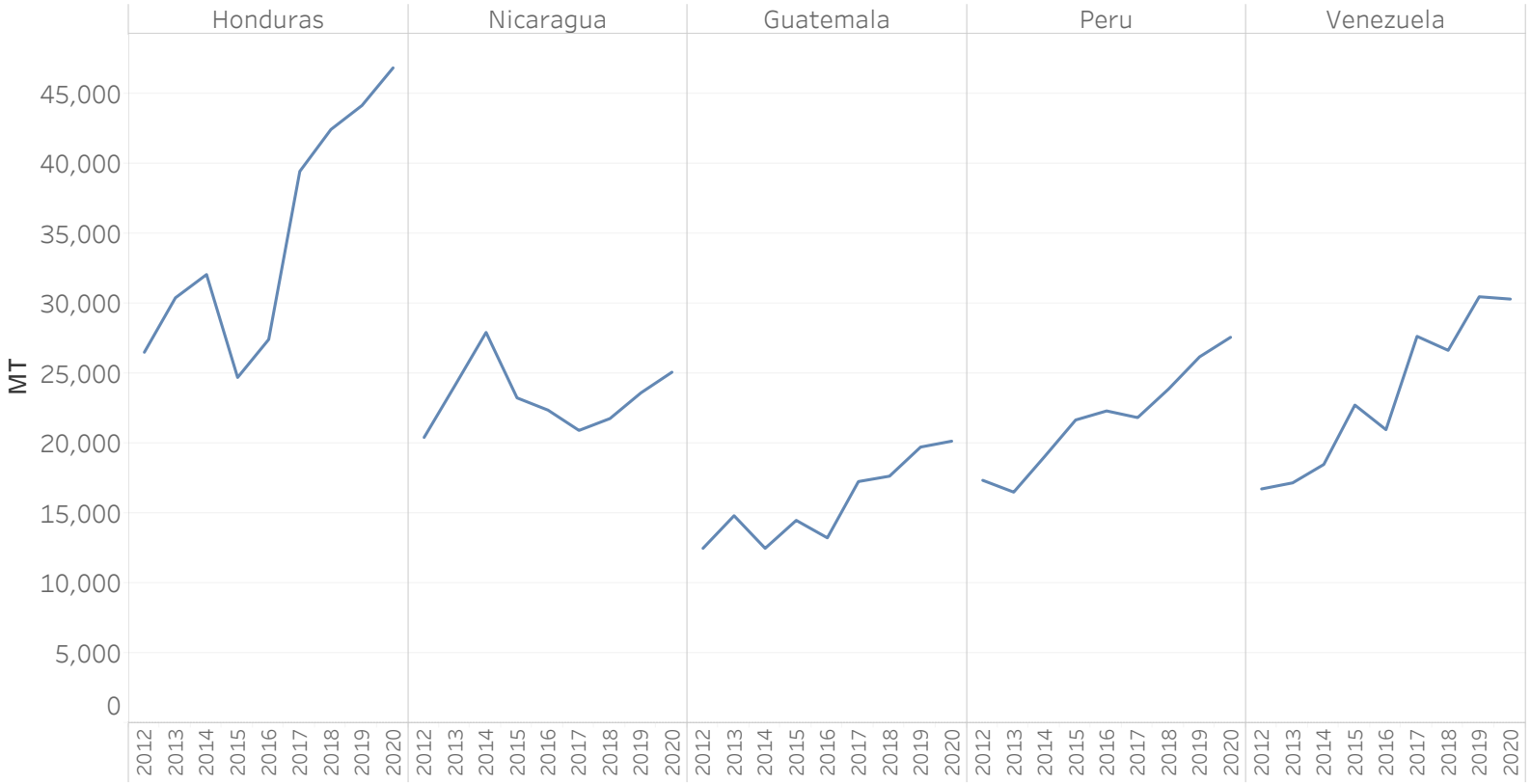


Shrimp Aquaculture in Latin America: 2012-2020

Strong growth is expected in Honduras. Production will also increase in Guatemala, Peru and Venezuela (despite its economic collapse).

Sources: GOAL (2013-2017) for 2012-2016; GOAL (2018) for 2017-2020.

Species included are L. vannamei , P. monodon and Other. M. rosenbergii is excluded.

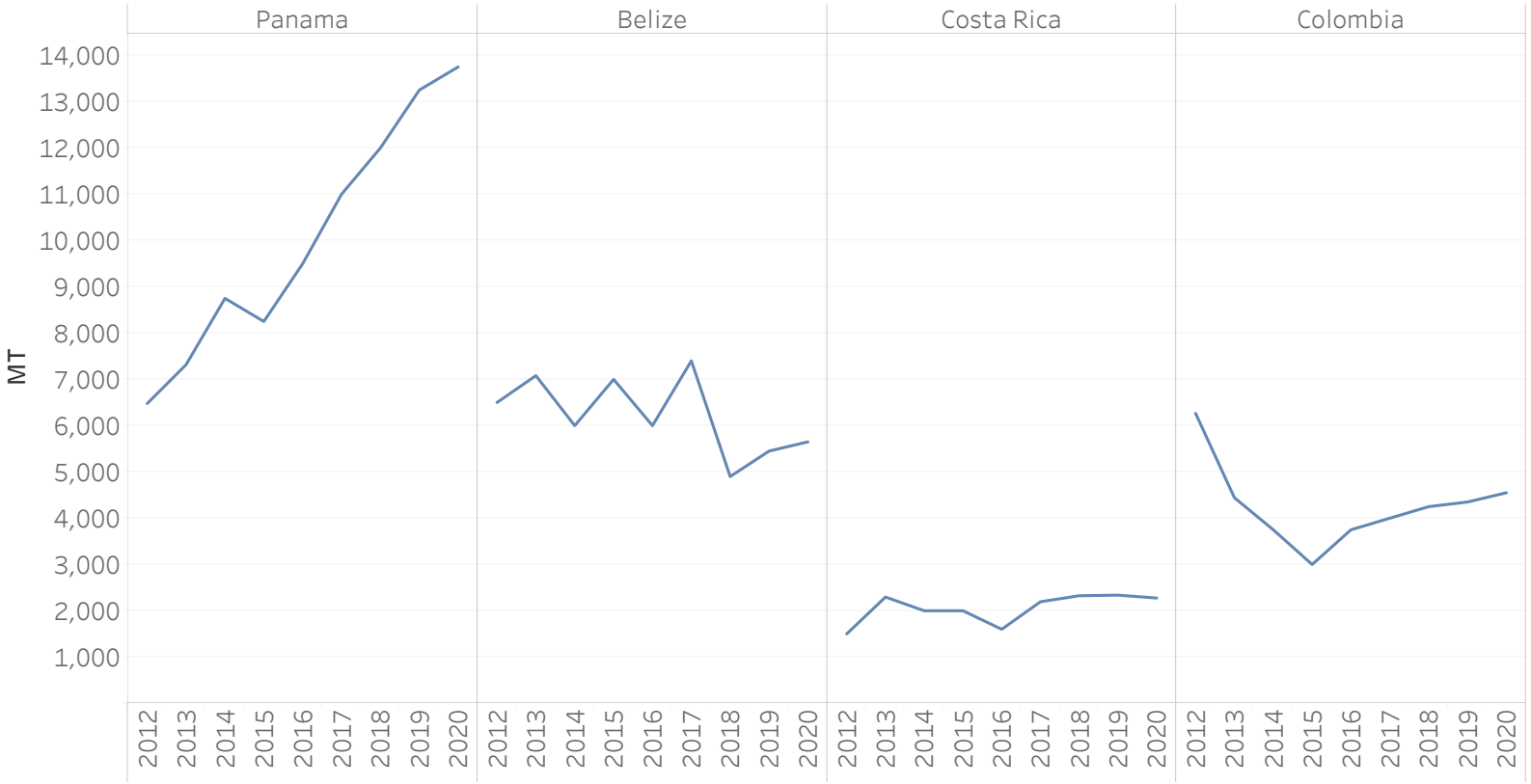


Shrimp Aquaculture in Latin America: 2012-2020

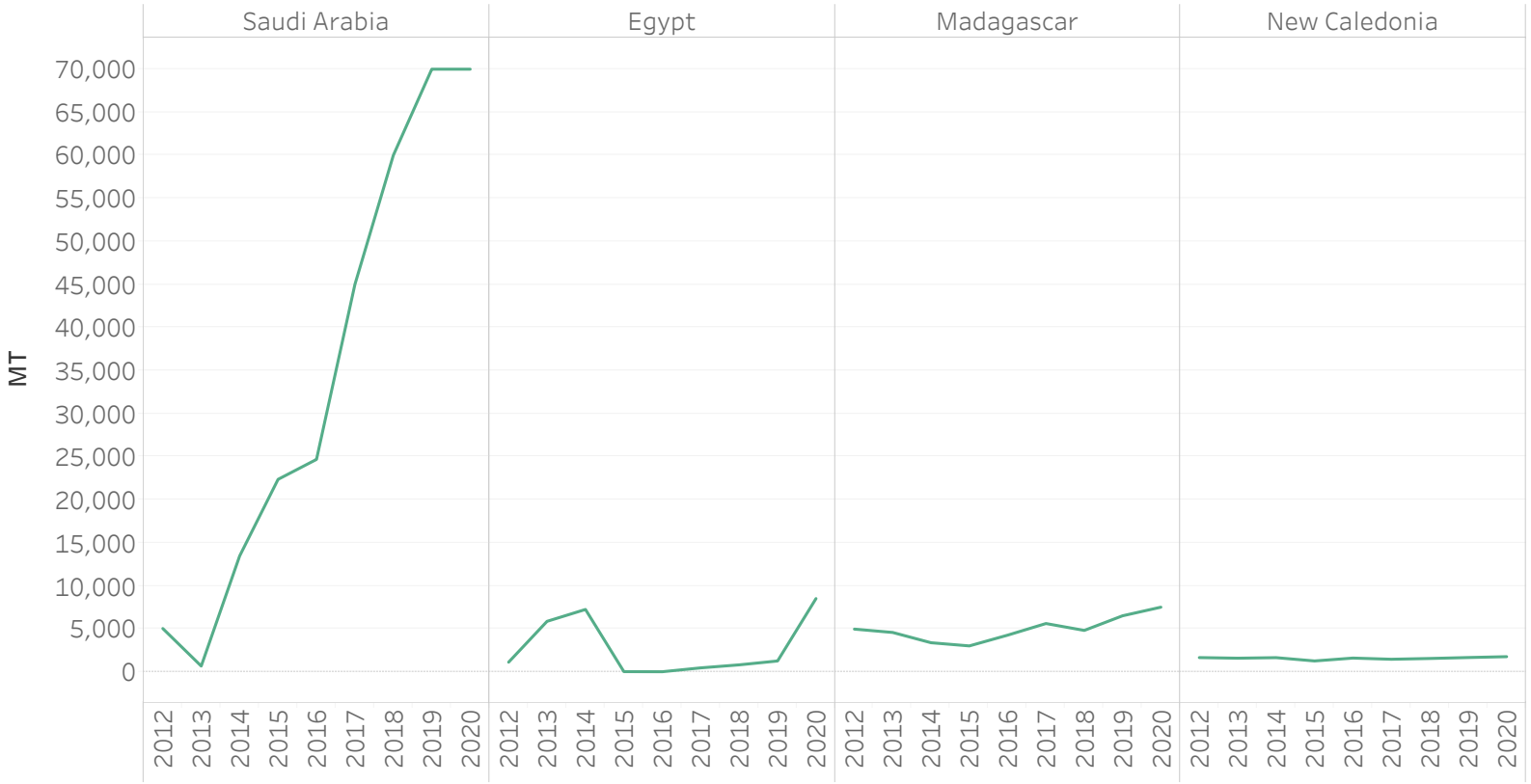
Among the smaller farming nations in Latin America, highest expectations for growth were reported for Panama.

Sources: GOAL (2013-2017) for 2012-2016; GOAL (2018) for 2017-2020.

Species included are L. vannamei , P. monodon and Other. M. rosenbergii is excluded.



Shrimp Aquaculture in Other Reporting Countries: 2012-2020

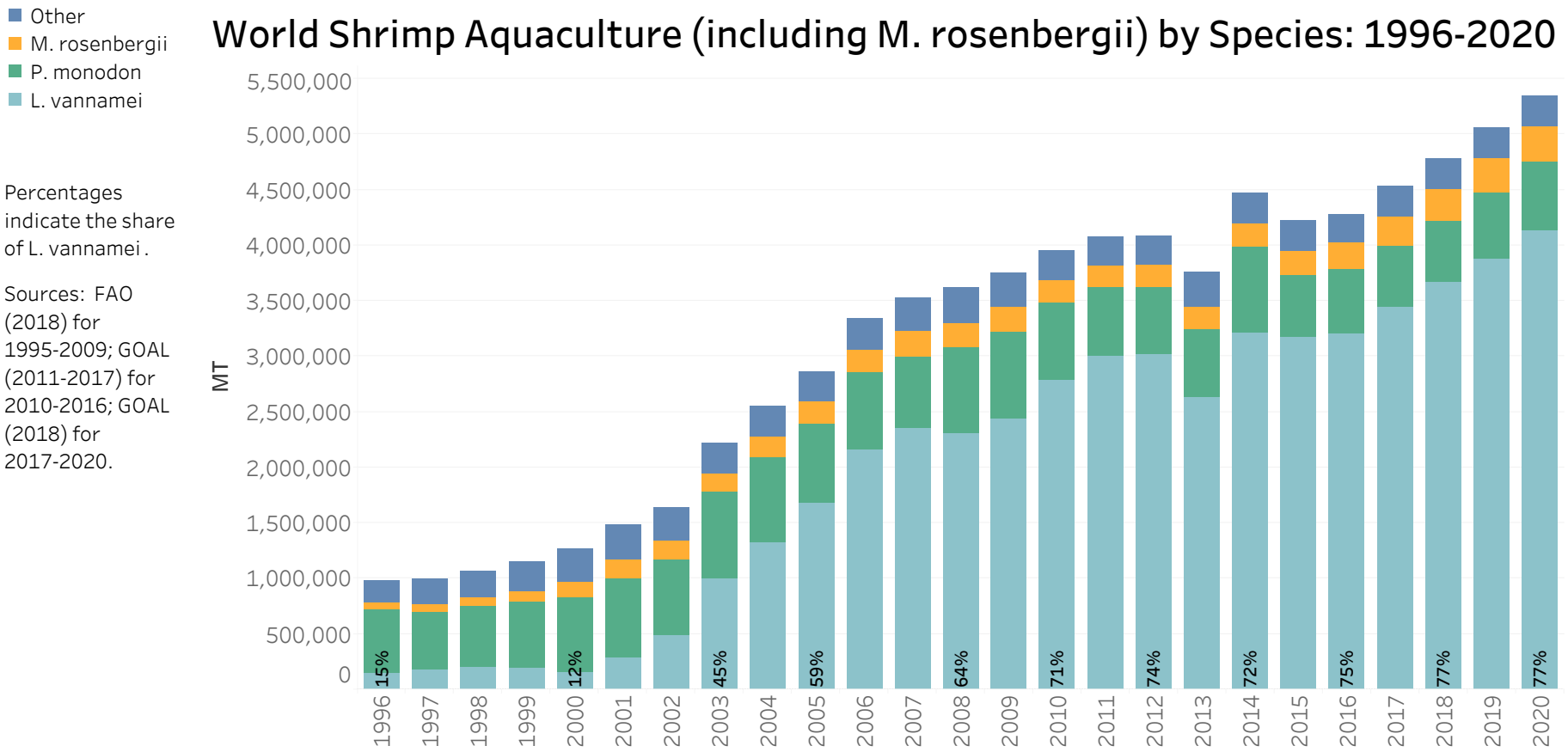


Saudi Arabia is expected to ramp up production of P. vannamei.

Sources: GOAL (2013-2017) for 2012-2016; GOAL (2018) for 2017-2020.

Species included are L. vannamei , P. monodon and Other. M. rosenbergii is excluded.

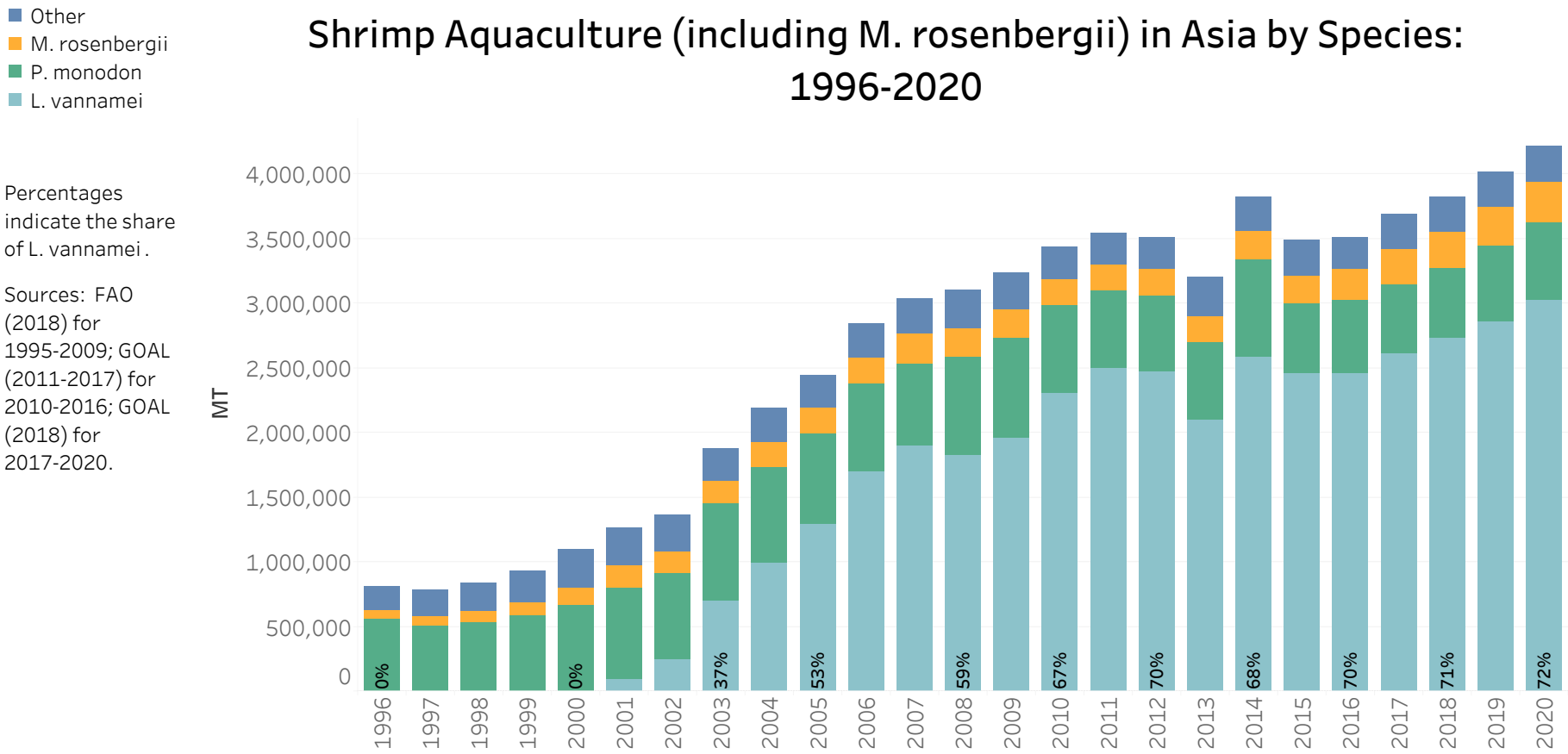
World Shrimp Aquaculture (including M. rosenbergii) by Species: 1996-2020



Percentages indicate the share of L. vannamei .

Sources: FAO (2018) for 1995-2009; GOAL (2011-2017) for 2010-2016; GOAL (2018) for 2017-2020.

Shrimp Aquaculture (including M. rosenbergii) in Asia by Species: 1996-2020

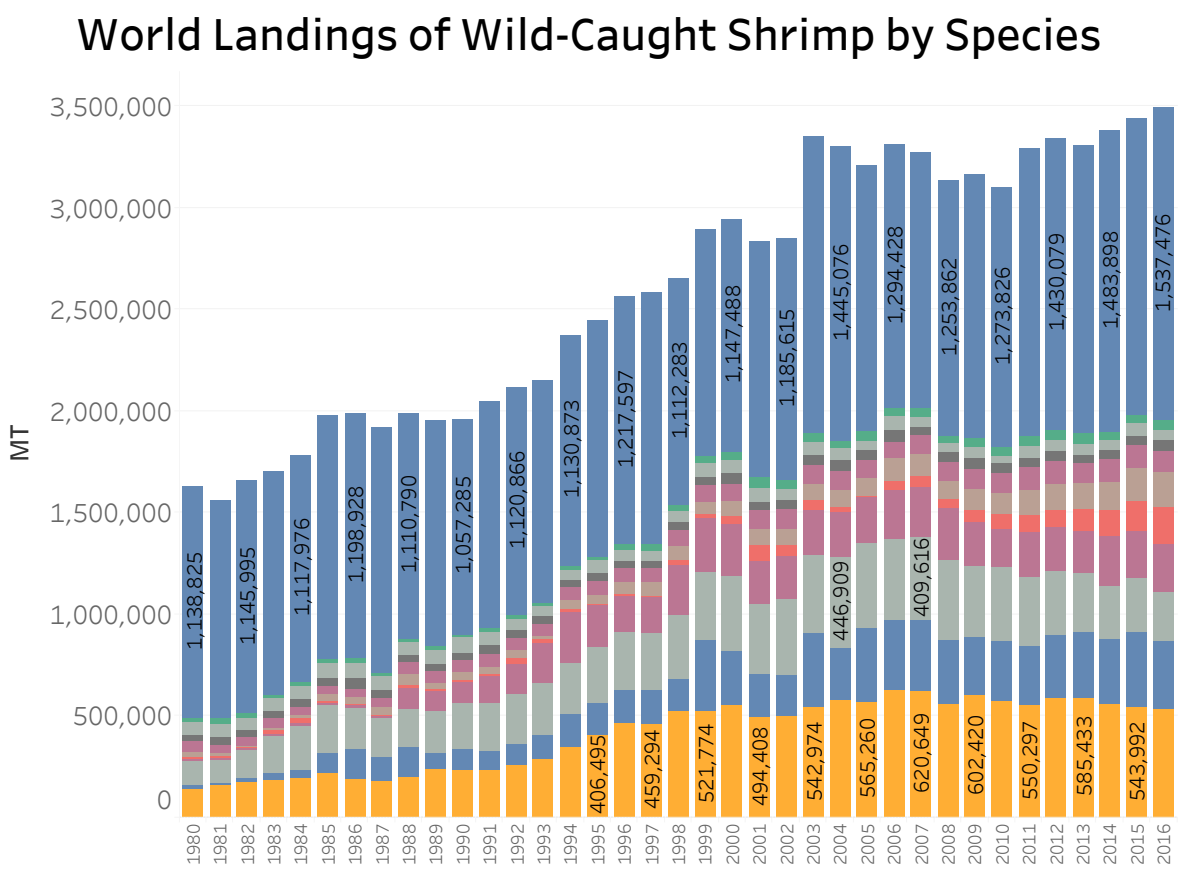


Percentages indicate the share of L. vannamei .

Sources: FAO (2018) for 1995-2009; GOAL (2011-2017) for 2010-2016; GOAL (2018) for 2017-2020.

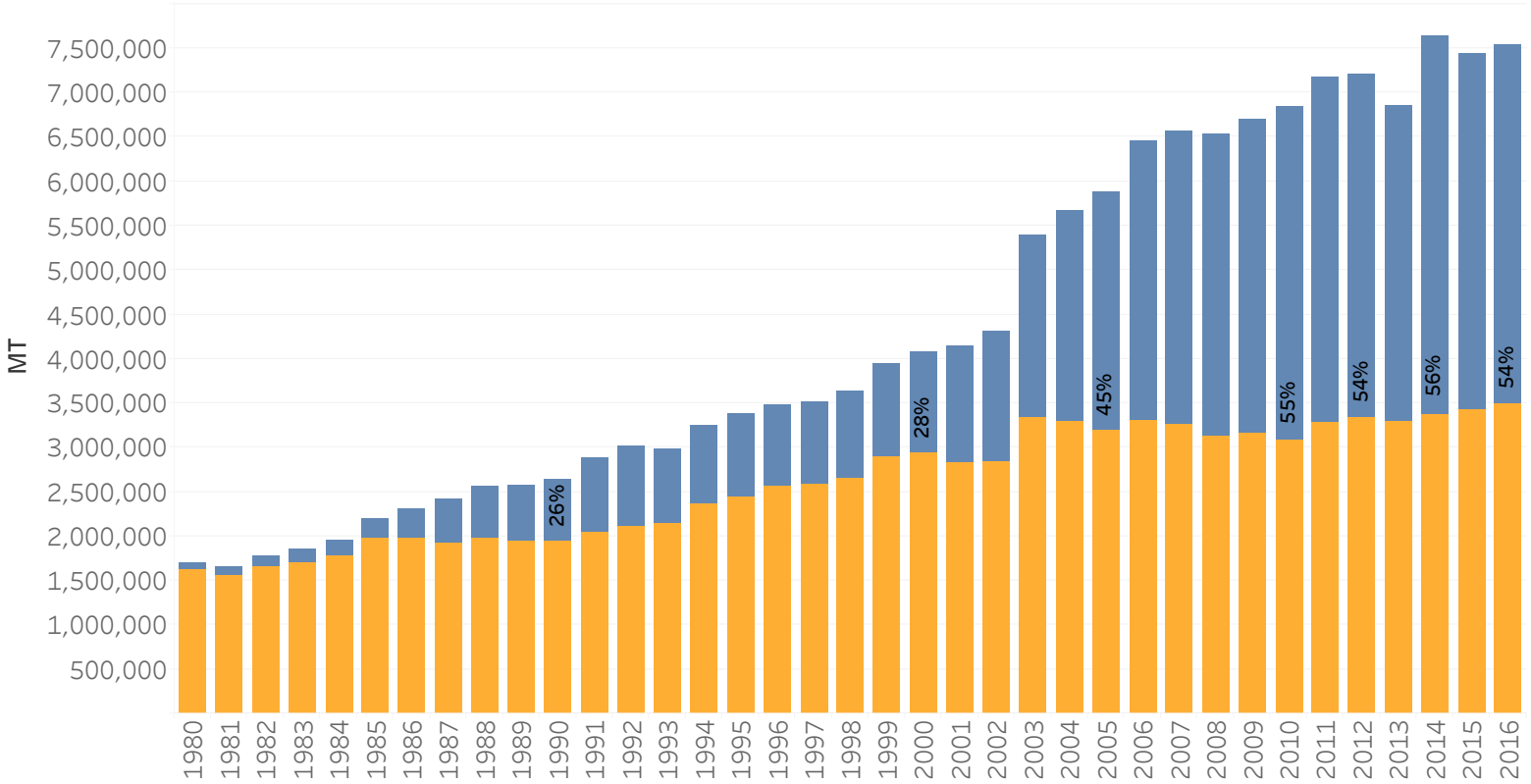
- Others
- Atlantic seabob (Xiphopenaeus kroyeri)
- Northern brown shrimp (Farfantepenaeus aztecus)
- Northern white shrimp (Litopenaeus setiferus)
- Banana prawn (Fenneropenaeus merguiensis)
- Fleshy prawn (Fenneropenaeus chinensis)
- Argentine red shrimp (Pleoticus muelleri)
- Giant tiger prawn (Penaeus monodon)
- Northern prawn (Pandalus borealis)
- Southern rough shrimp (Trachisalambria curvirostris)
- Akiami paste shrimp (Acetes japonicus)

Source: FAO (2018).



Aquaculture
Capture Fisheries

World Production of Shrimp: Capture Fisheries & Aquaculture



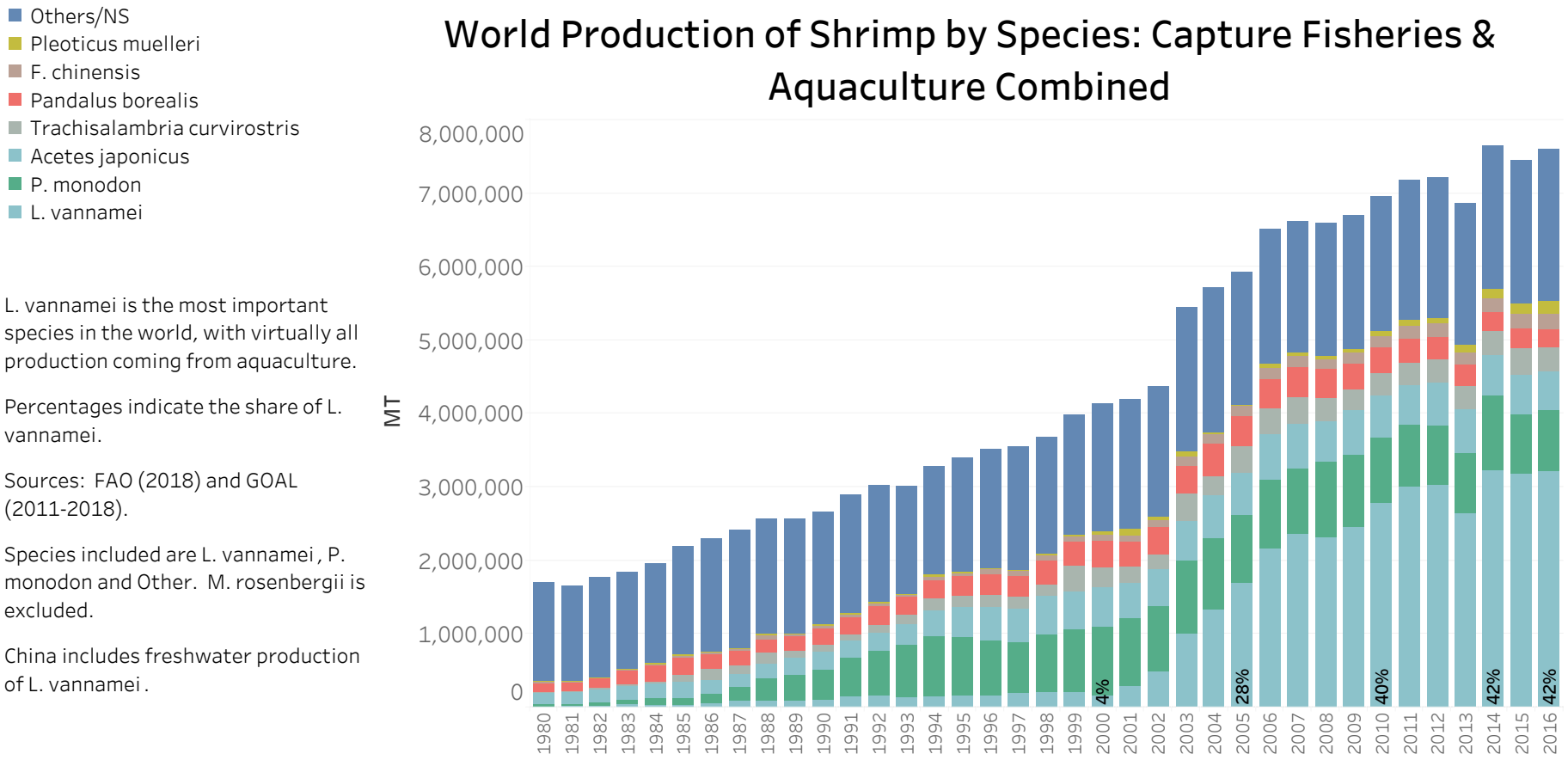
Aquaculture accounted for 54% of world shrimp supplies in 2016.

Sources: FAO (2018) and GOAL (2011-2018).

Species included are L. vannamei , P. monodon and Other. M. rosenbergii is excluded.

China includes freshwater production of L. vannamei .

World Production of Shrimp by Species: Capture Fisheries & Aquaculture Combined



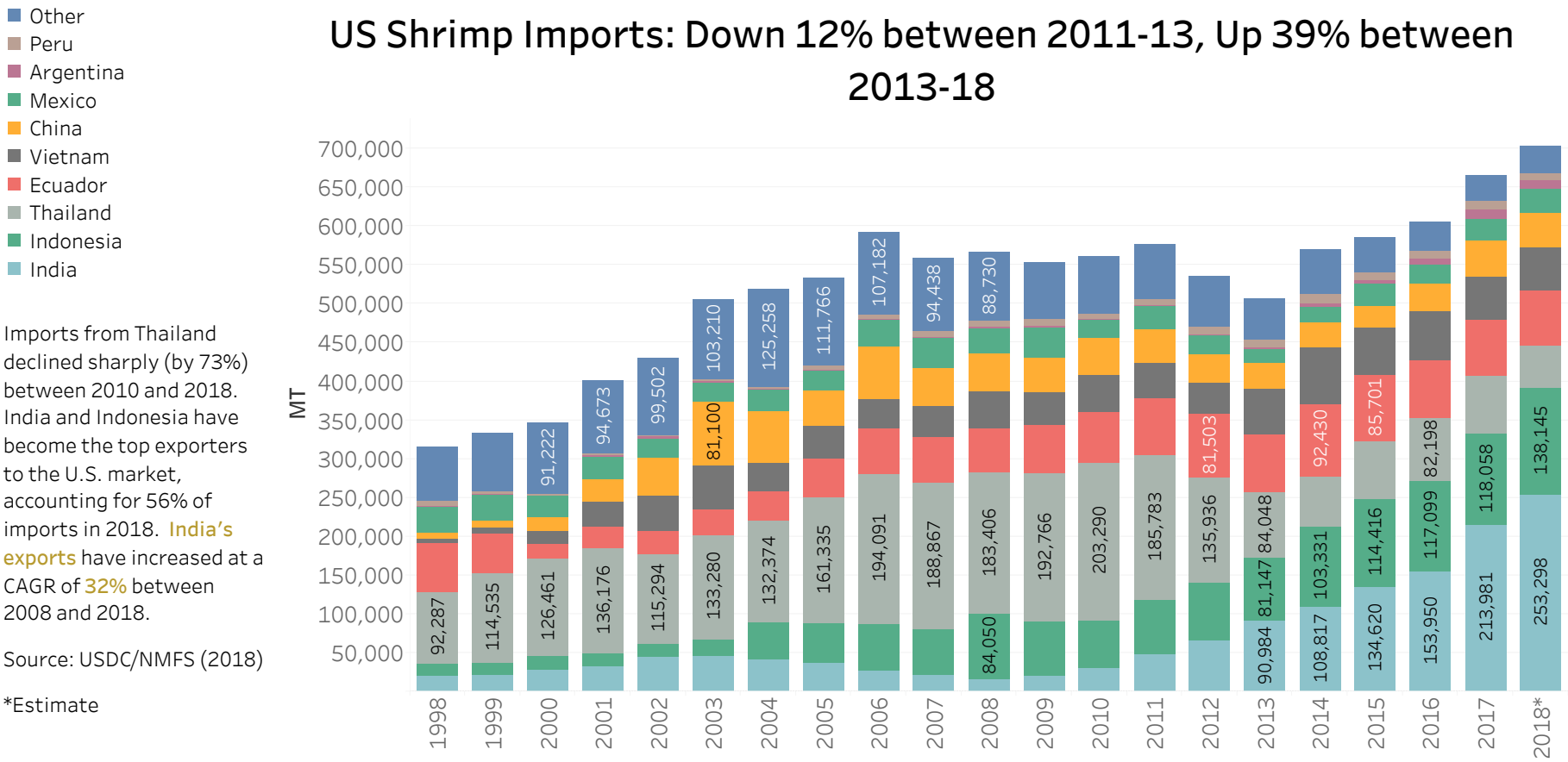
L. vannamei is the most important species in the world, with virtually all production coming from aquaculture.

Percentages indicate the share of L. vannamei.

Sources: FAO (2018) and GOAL (2011-2018).

Species included are L. vannamei , P. monodon and Other. M. rosenbergii is excluded.

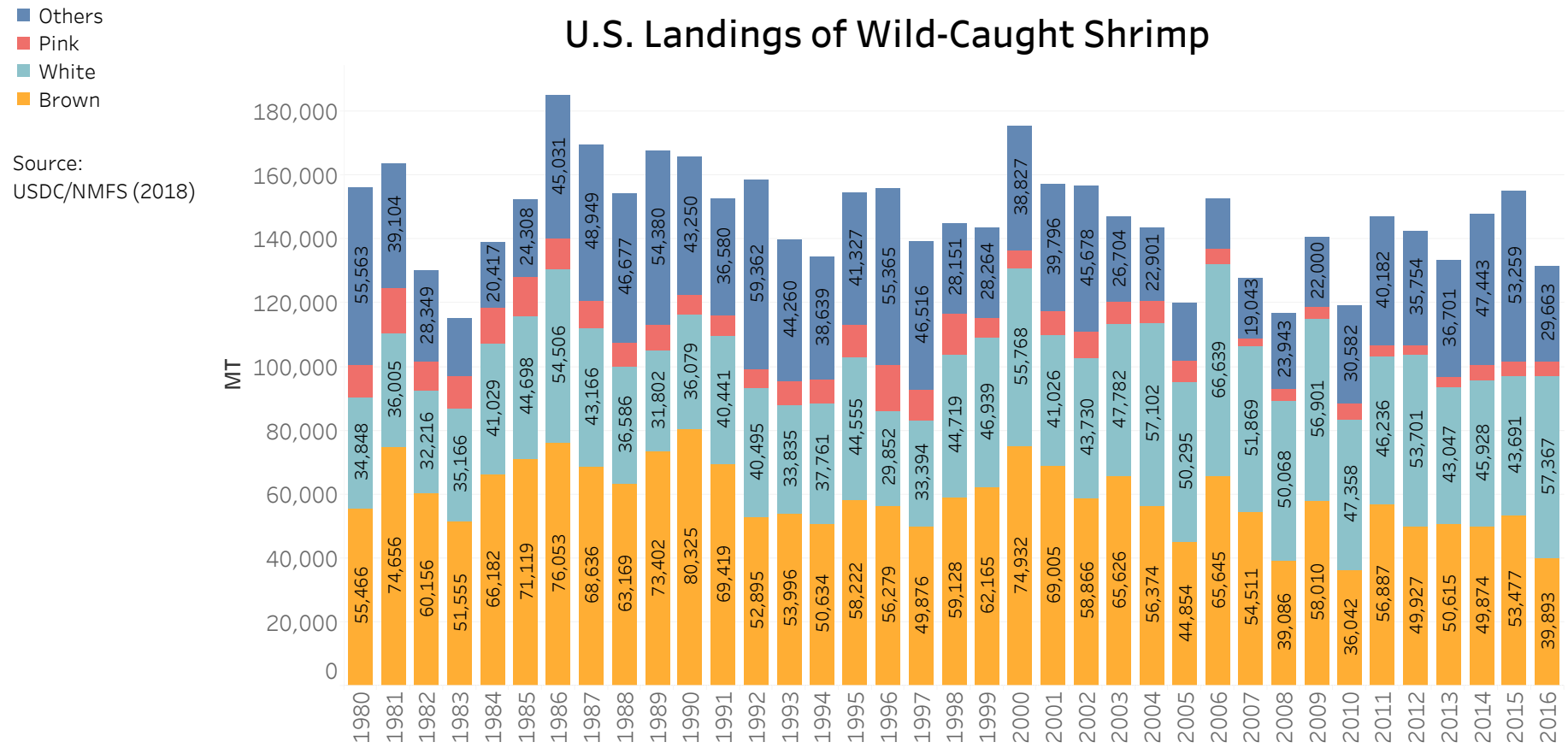
China includes freshwater production of L. vannamei .

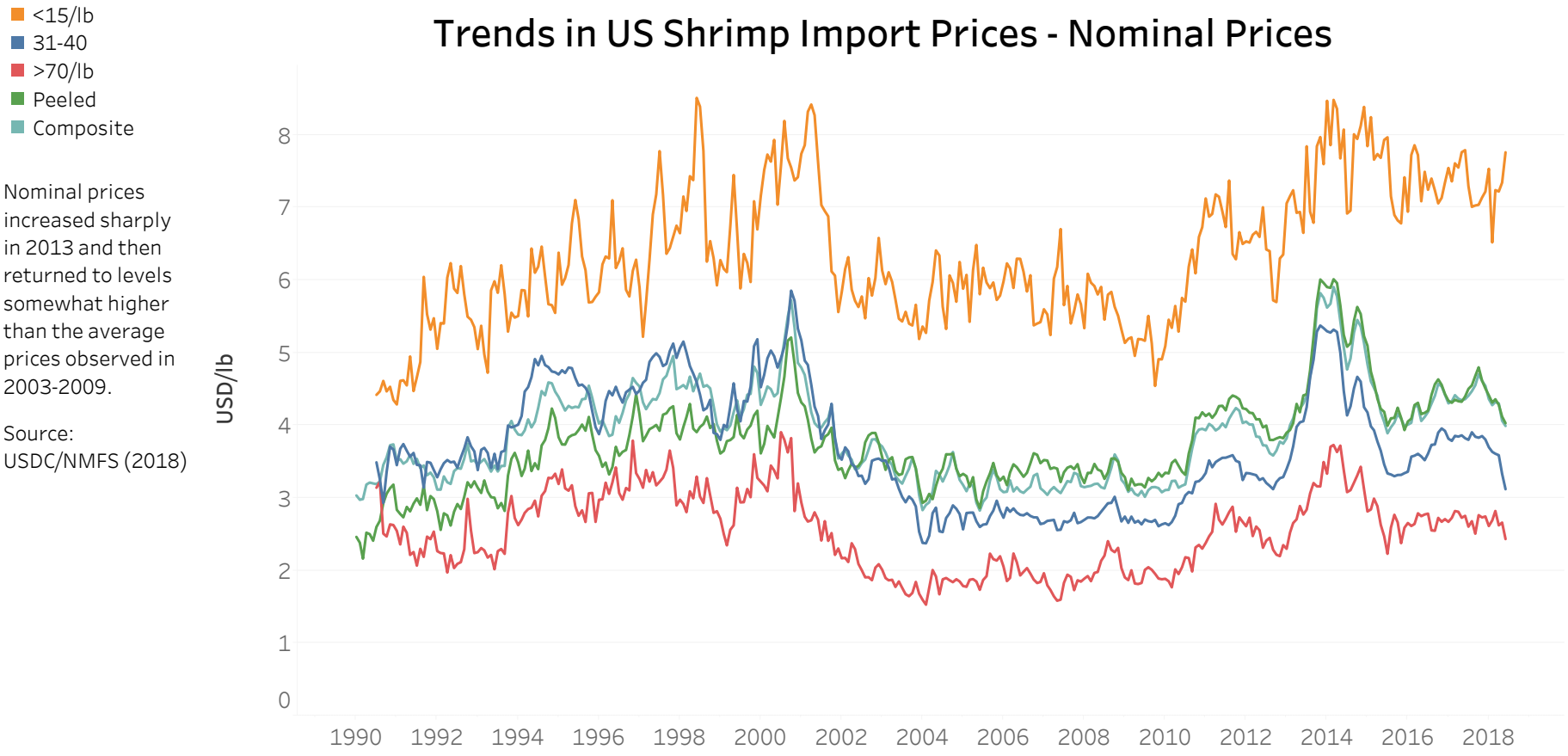


Imports from Thailand declined sharply (by 73%) between 2010 and 2018. India and Indonesia have become the top exporters to the U.S. market, accounting for 56% of imports in 2018. India's exports have increased at a CAGR of 32% between 2008 and 2018.

Source: USDC/NMFS (2018)

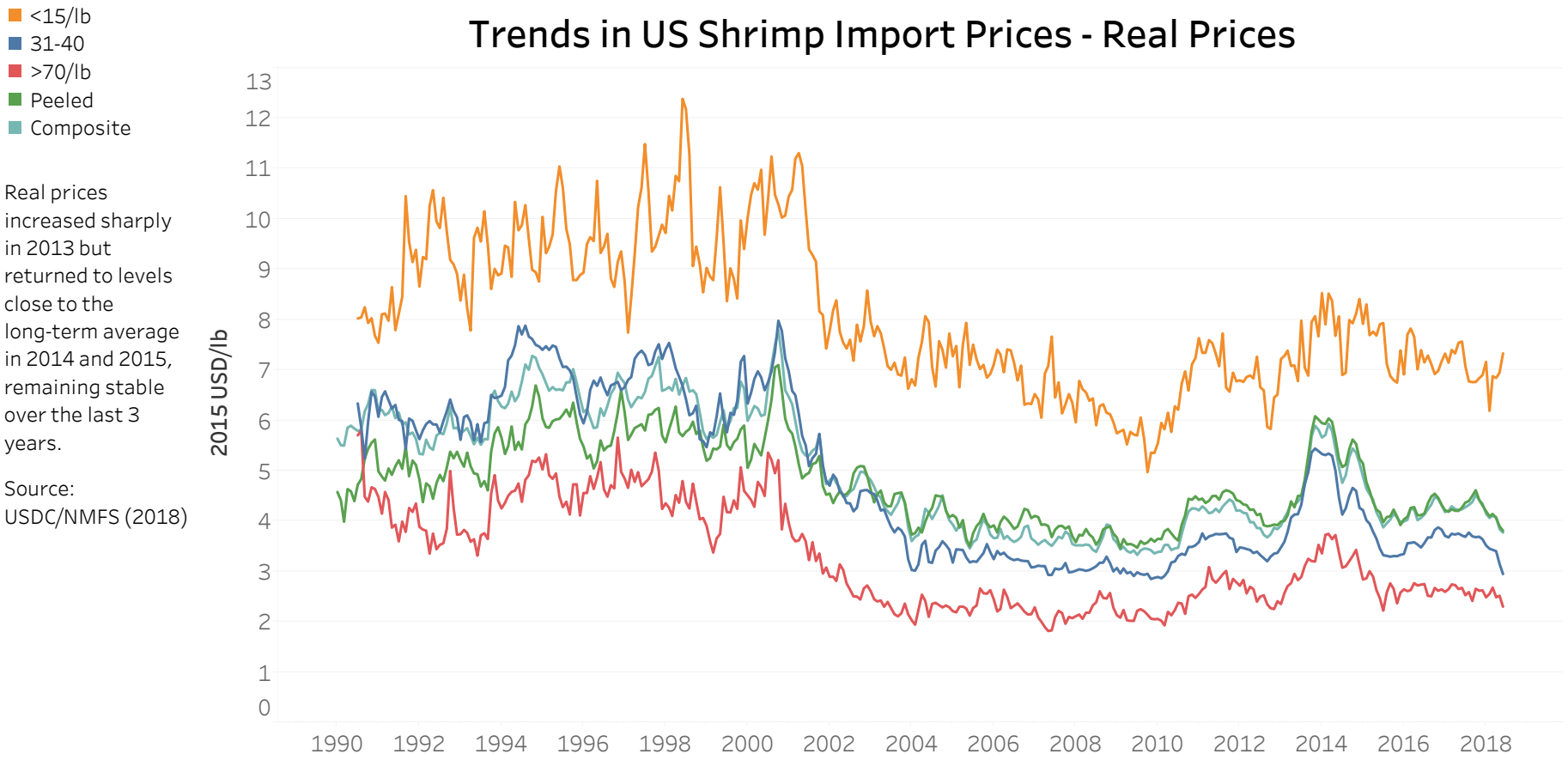
*Estimate


U.S. Landings of Wild-Caught Shrimp
Others
Pink
White
Brown
Source:
USDC/NMFS (2018)
MT
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
1980 55,466 34,848 55,563
1981 74,656 36,005 39,104
1982 60,156 32,216 28,349
1983 51,555 35,166
1984 66,182 41,029 20,417
1985 71,119 44,698 24,308
1986 76,053 54,506 45,031
1987 68,636 43,166 48,949
1988 63,169 36,586 46,677
1989 73,402 31,802 54,380
1990 80,325 36,079 43,250
1991 69,419 40,441 36,580
1992 52,895 40,495 59,362
1993 53,996 33,835 44,260
1994 50,634 37,761 38,639
1995 58,222 44,555 41,327
1996 56,279 29,852 55,365
1997 49,876 33,394 46,516
1998 59,128 44,719 28,151
1999 62,165 46,939 28,264
2000 74,932 55,768 38,827
2001 69,005 41,026 39,796
2002 58,866 43,730 45,678
2003 65,626 47,782 26,704
2004 56,374 57,102 22,901
2005 44,854 50,295
2006 65,645 66,639
2007 54,511 51,869 19,043
2008 39,086 50,068 23,943
2009 58,010 56,901 22,000
2010 36,042 47,358 30,582
2011 56,887 46,236 40,182
2012 49,927 53,701 35,754
2013 50,615 43,047 36,701
2014 49,874 45,928 47,443
2015 53,477 43,691 53,259
2016 39,893 57,367 29,663



Nominal prices increased sharply in 2013 and then returned to levels somewhat higher than the average prices observed in 2003-2009.

Source: USDC/NMFS (2018)



Real prices increased sharply in 2013 but returned to levels close to the long-term average in 2014 and 2015, remaining stable over the last 3 years.

Source: USDC/NMFS (2018)

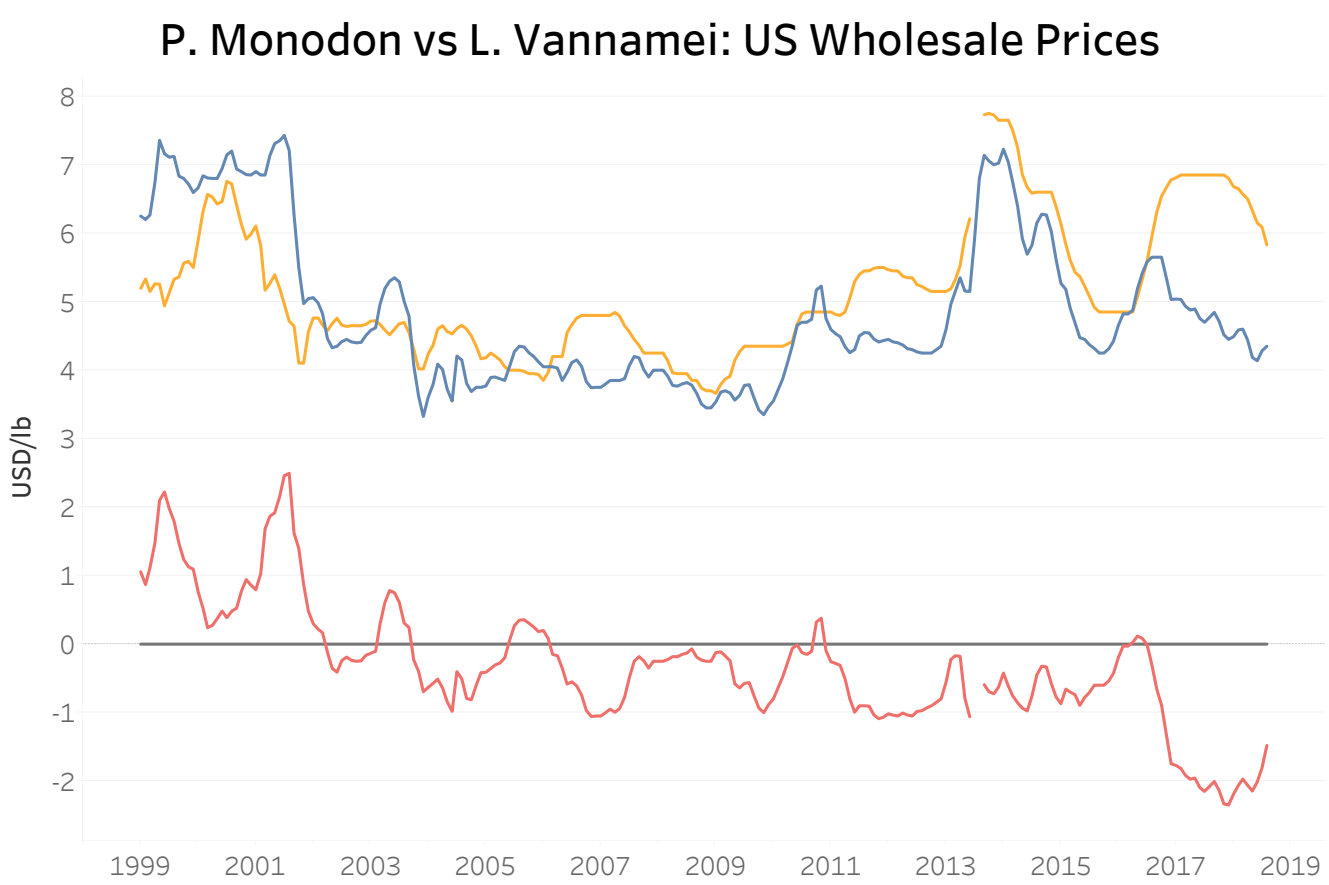
Farmed, C&SA White, 26-30
Farmed, Southeast Asian BT, 26-30
Premium, White - Tiger

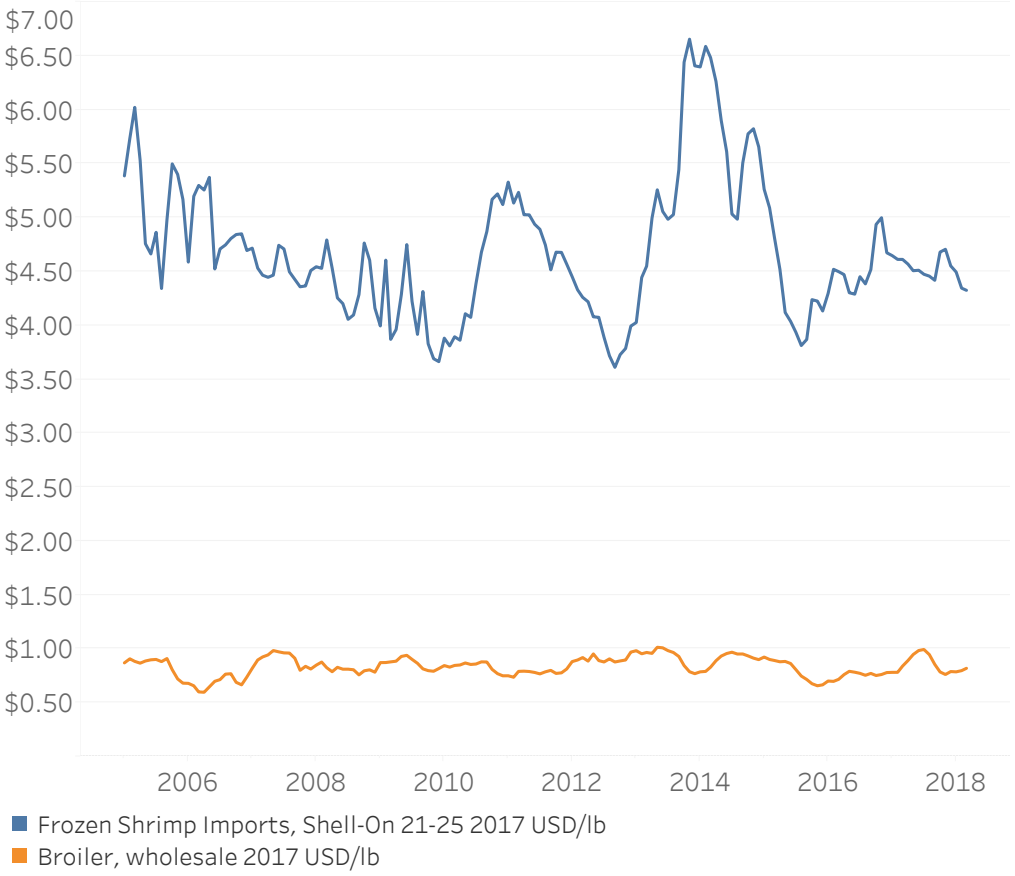
Coinciding with falling supplies from Thailand, wholesale shrimp prices began rising in 2010 with the sharpest increase taking place in 2013.

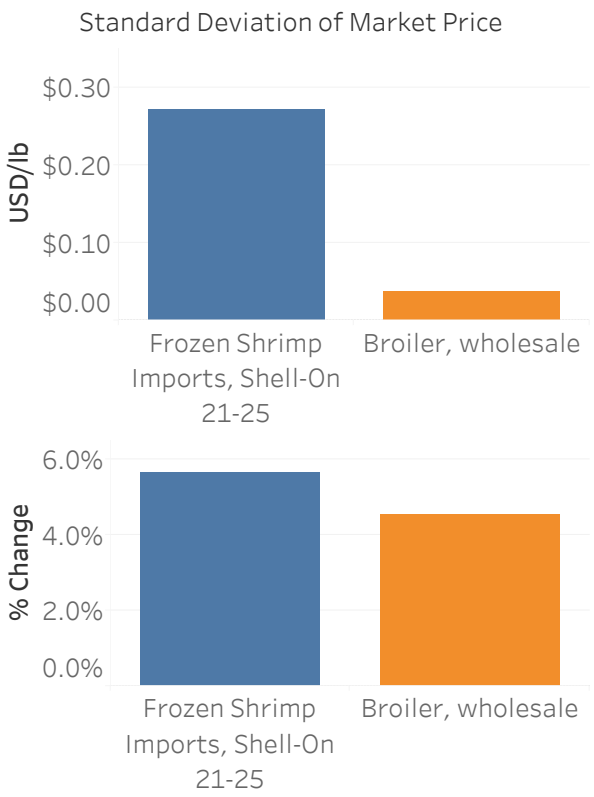
Prices have declined since 2014 as other countries (India, Indonesia, Ecuador, Vietnam) increased their exports to the U.S.

Nevertheless, prices of BT shrimp rose in 2016 and remained high in 2017, widening the premium over white shrimp.

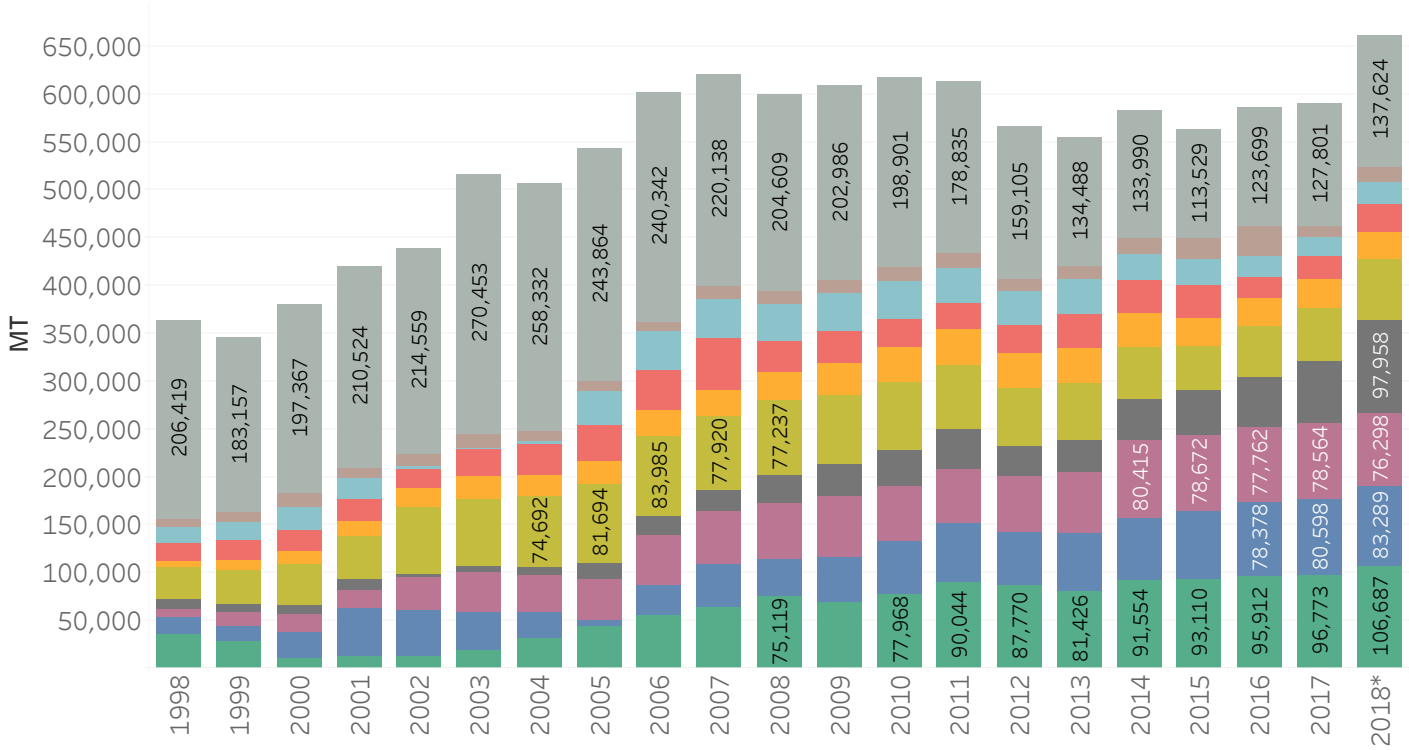
Source: Urner Barry (2018)




$7.00
$6.50
$6.00
$5.50
$5.00
$4.50
$4.00
$3.50
$3.00
$2.50
$2.00
$1.50
$1.00
$0.50
2006
2008
2010
2012
2014
2016
2018
Frozen Shrimp Imports, Shell-On 21-25 2017 USD/lb
Broiler, wholesale 2017 USD/lb


Standard Deviation of Market Price
USD/lb
$0.30
$0.20
$0.10
$0.00
Frozen Shrimp Imports, Shell-On 21-25
Broiler, wholesale
% Change
6.0%
4.0%
2.0%
0.0%
Frozen Shrimp Imports, Shell-On 21-25
Broiler, wholesale

European Shrimp Imports from Extra-EU Countries: Down 9% between 2010-15; Up 18% between 2015-18

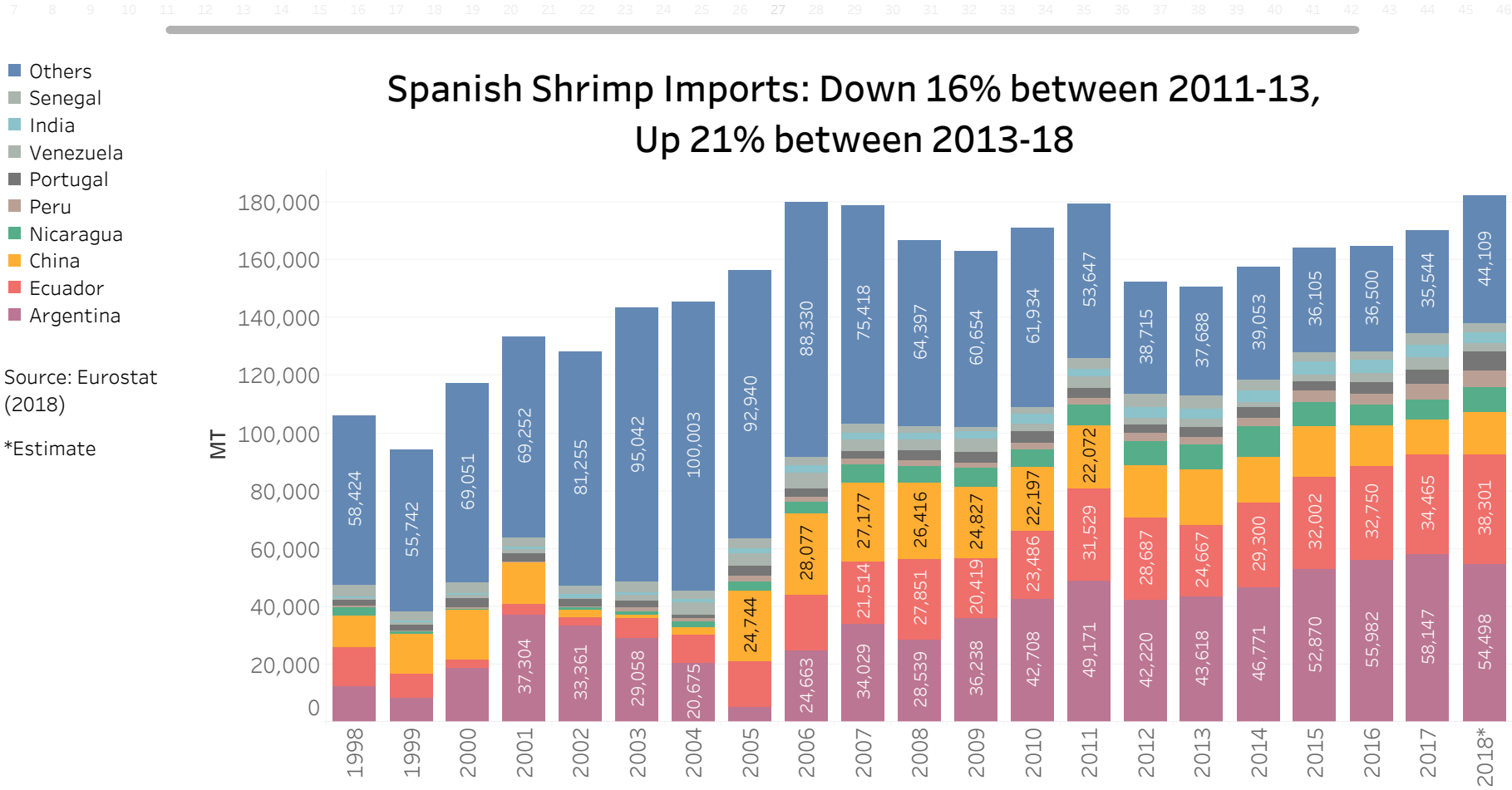


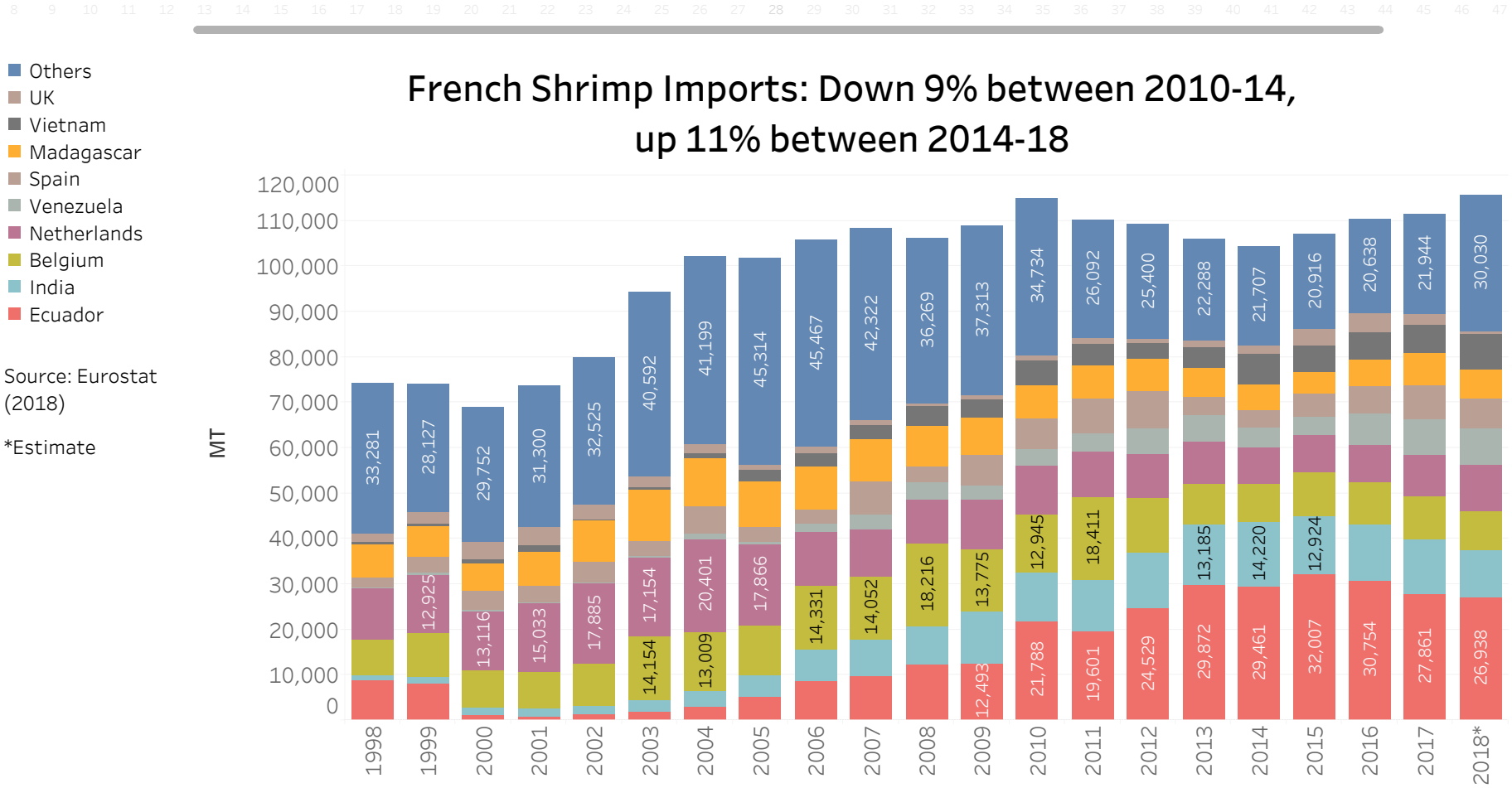
The European market contracted during 2010-2015 but it has recovered since then, driven by imports from Ecuador, Argentina, India and Vietnam.

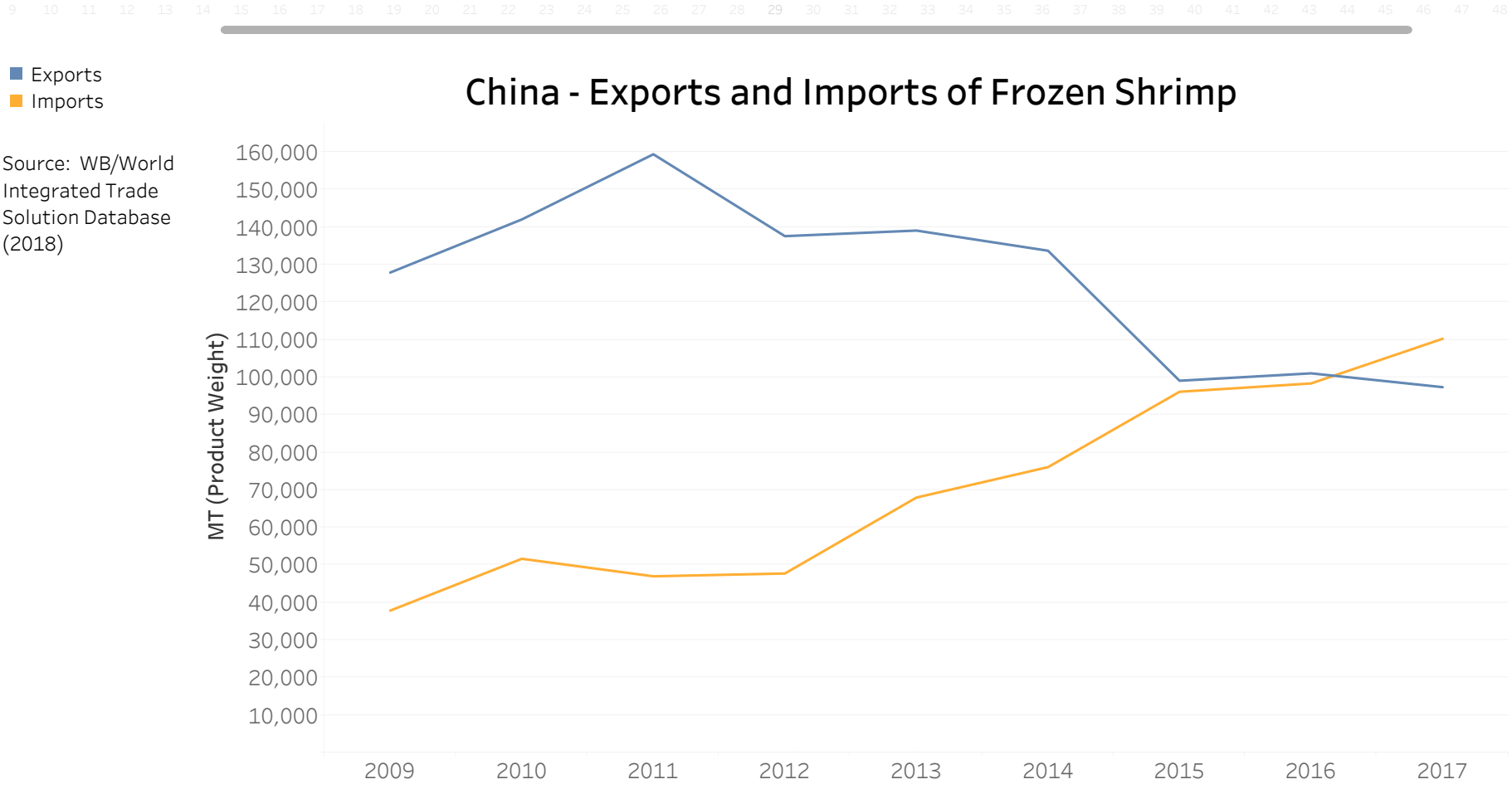
Imports from Vietnam increased by 50% in the first half of 2018 relative to 2017; as a result, the European market could exceed 660 thousand MT in 2018, a record amount.

Source: Eurostat (2018)

*Estimate

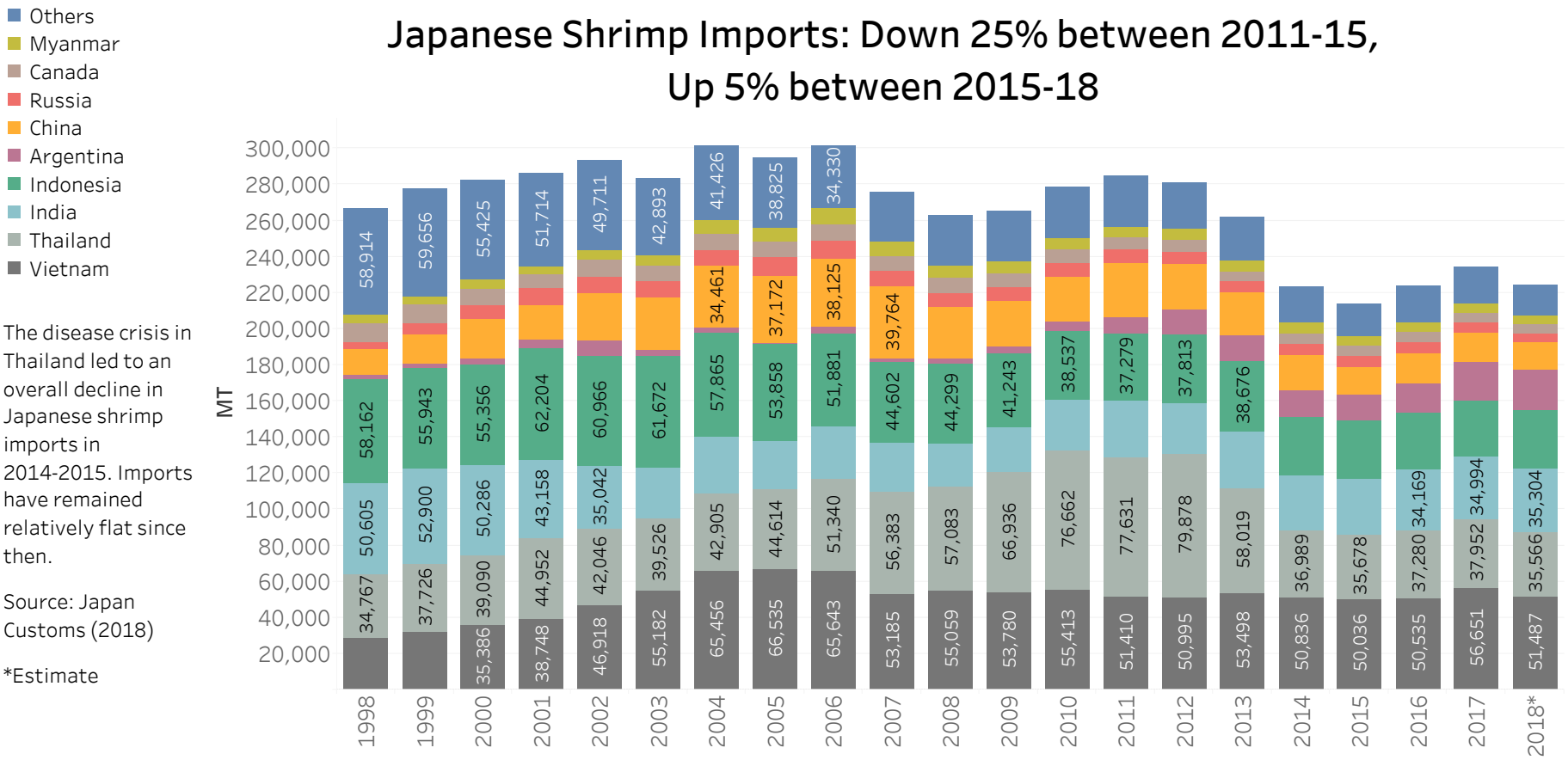

Spanish Shrimp Imports: Down 16% between 2011-13, Up 21% between 2013-18
Others
Senegal
India
Venezuela
Portugal
Peru
Nicaragua
China
Ecuador
Argentina
Source: Eurostat (2018)
*Estimate
MT
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018*
58,424 55,742 69,051 69,252 81,255 95,042 100,003 92,940 88,330 75,418 64,397 60,654 61,934 53,647 38,715 37,688 39,053 36,105 36,500 35,544 44,109
37,304 33,361 29,058 20,675 24,744 24,663 28,077 34,029 21,514 27,177 28,539 27,851 26,416 36,238 20,419 24,827 42,708 23,486 22,197 49,171 31,529 22,072 42,220 28,687 43,618 24,667 46,771 29,300 52,870 32,002 55,982 32,750 58,147 34,465 54,498 38,301


French Shrimp Imports: Down 9% between 2010-14, up 11% between 2014-18
Others
UK
Vietnam
Madagascar
Spain
Venezuela
Netherlands
Belgium
India
Ecuador
Source: Eurostat (2018)
*Estimate
MT
120,000
110,000
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018*
33,281 28,127 29,752 31,300 32,525 40,592 41,199 45,314 45,467 42,322 36,269 37,313 34,734 26,092 25,400 22,288 21,707 20,916 20,638 21,944 30,030
12,925 13,116 15,033 17,885 17,154 20,401 17,866 14,331 14,052 18,216 13,775 12,945 18,411 13,185 14,220 12,924
14,154 13,009 12,493 21,788 19,601 24,529 29,872 29,461 32,007 30,754 27,861 26,938



Source: WB/World Integrated Trade Solution Database (2018)

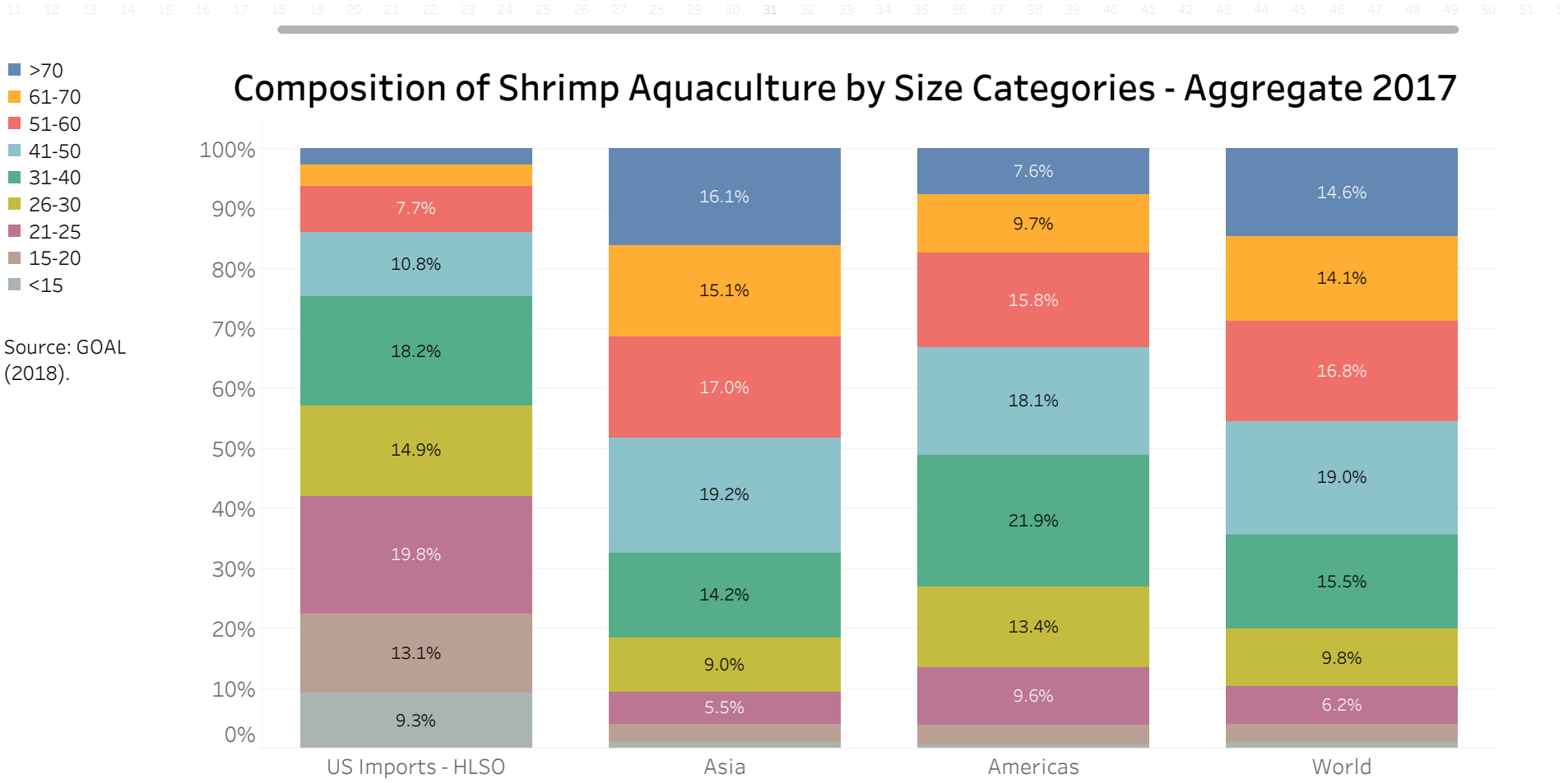
Japanese Shrimp Imports: Down 25% between 2011-15, Up 5% between 2015-18



The disease crisis in Thailand led to an overall decline in Japanese shrimp imports in 2014-2015. Imports have remained relatively flat since then.

Source: Japan Customs (2018)

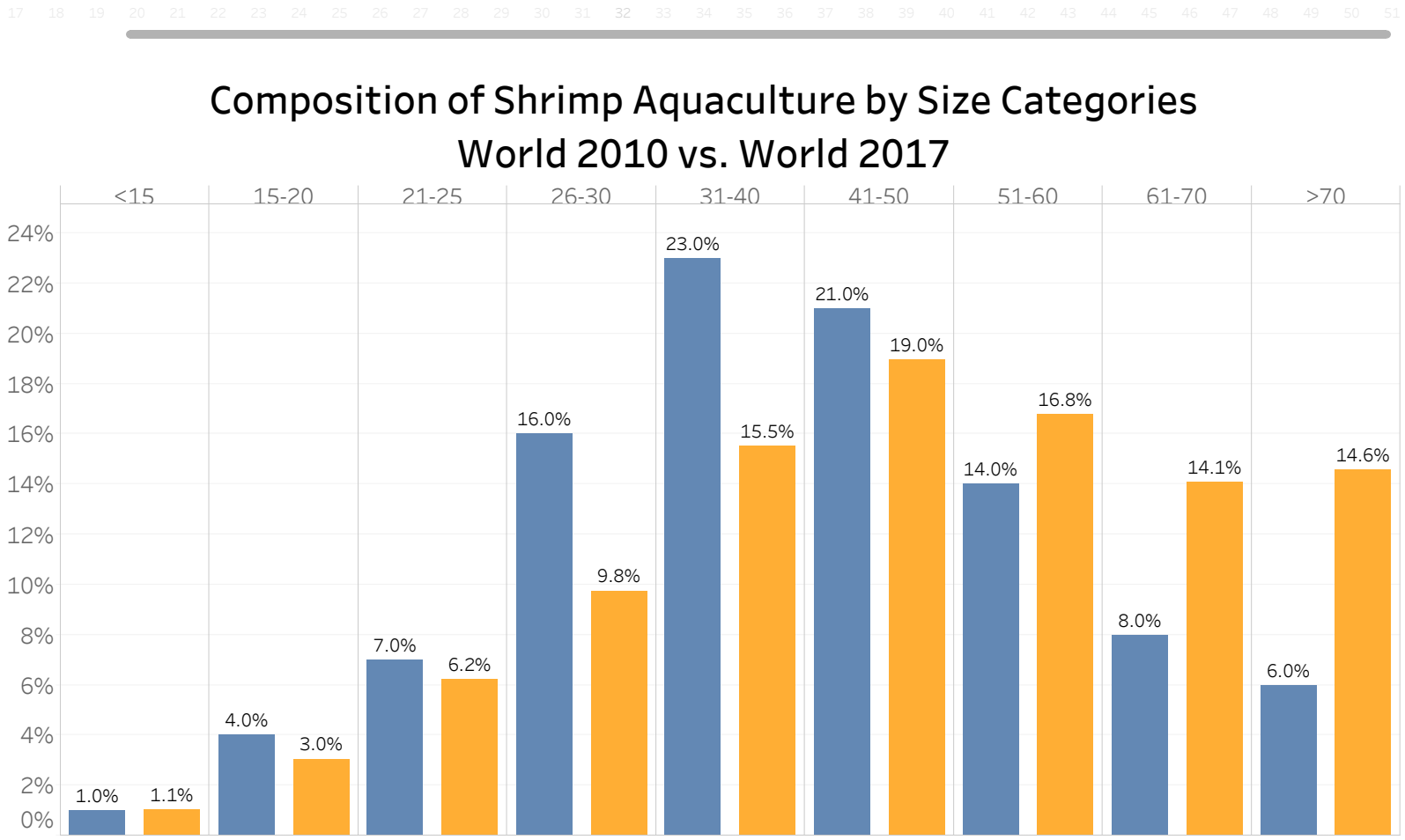
*Estimate



Source: GOAL (2018).

World 2010
World 2017

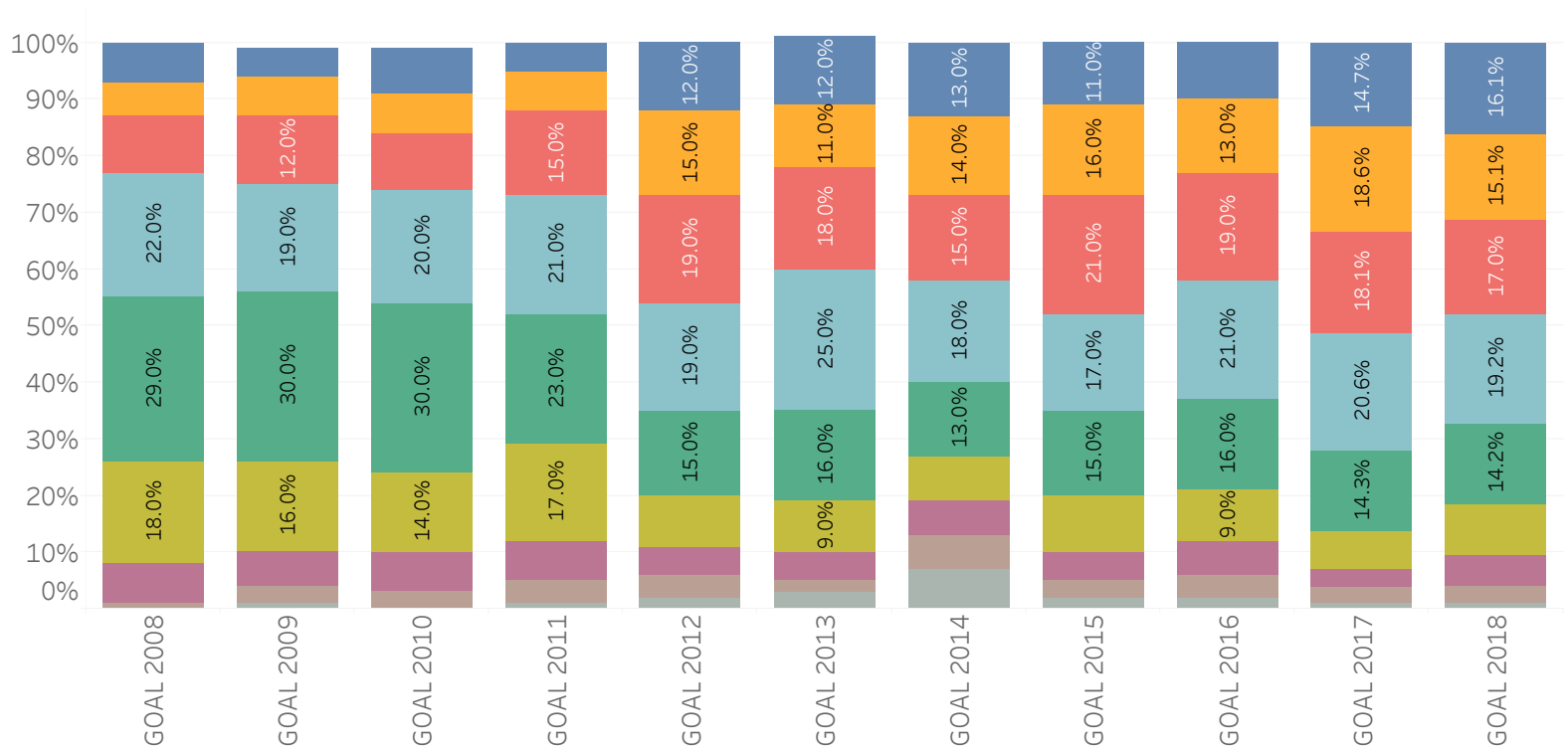
Sources: GOAL (2011, 2018).



13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53

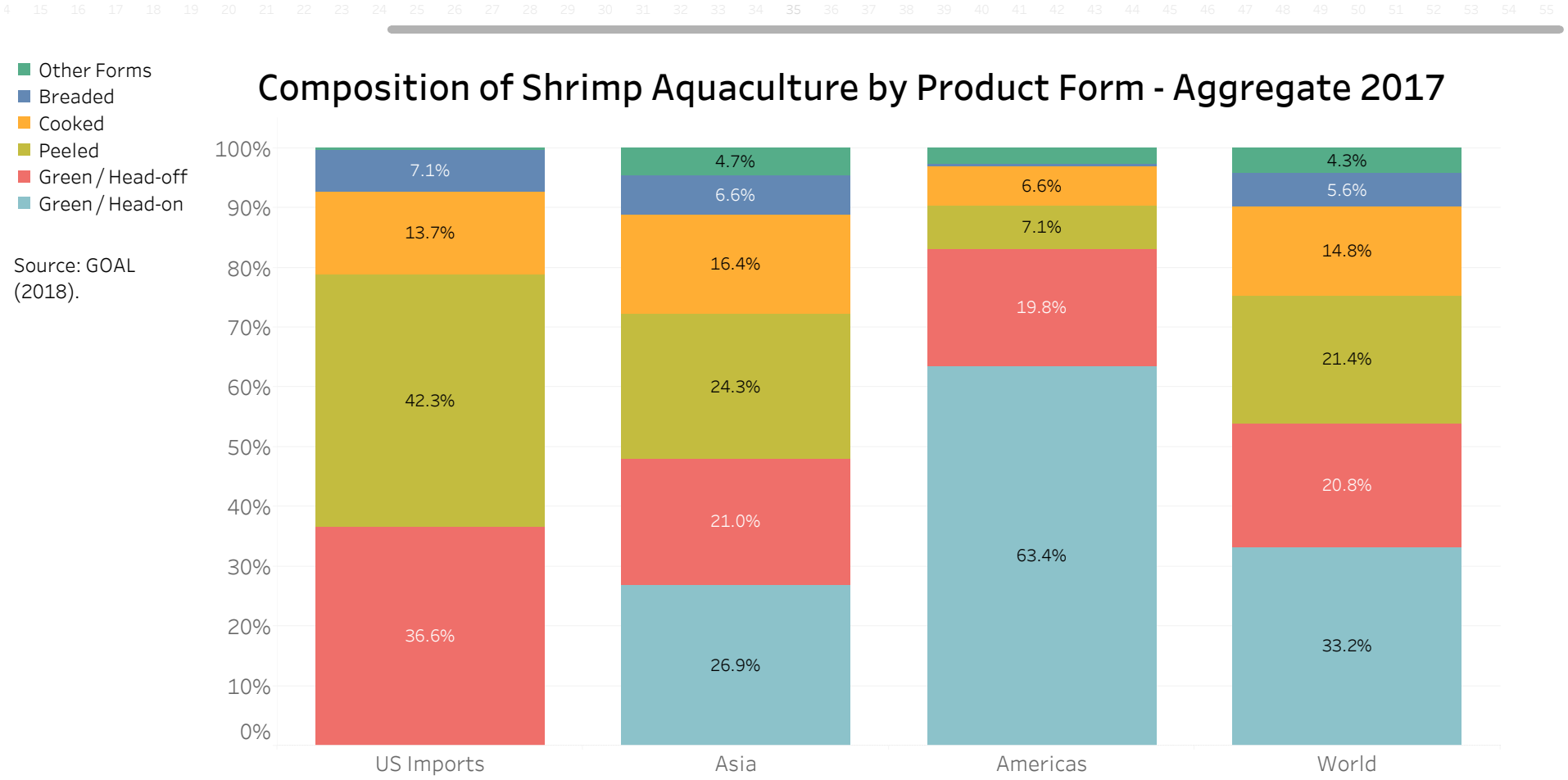
- >70
- 61-70
- 51-60
- 41-50
- 31-40
- 26-30
- 21-25
- 15-20
- <15

Disease problems in Asia led to the harvesting of smaller sizes since 2011.



Expected Trends in Shrimp Aquaculture: Size Categories - GOAL Survey 2018

Size Category	Asia	Americas	World
<15	Stable / Decrease	Increase	Stable / Decrease
15-20	Stable / Decrease	Increase	Stable
21-25	Decrease	Stable / Increase	Stable / Decrease
26-30	Stable	Decrease	Stable
31-40	Stable / Increase	Stable / Increase	Stable / Increase
41-50	Stable / Increase	Stable	Stable / Increase
51-60	Stable / Increase	Stable	Stable / Increase
61-70	Increase	Increase	Increase
>70	Increase	Decrease	Increase



Source: GOAL (2018).

4 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55

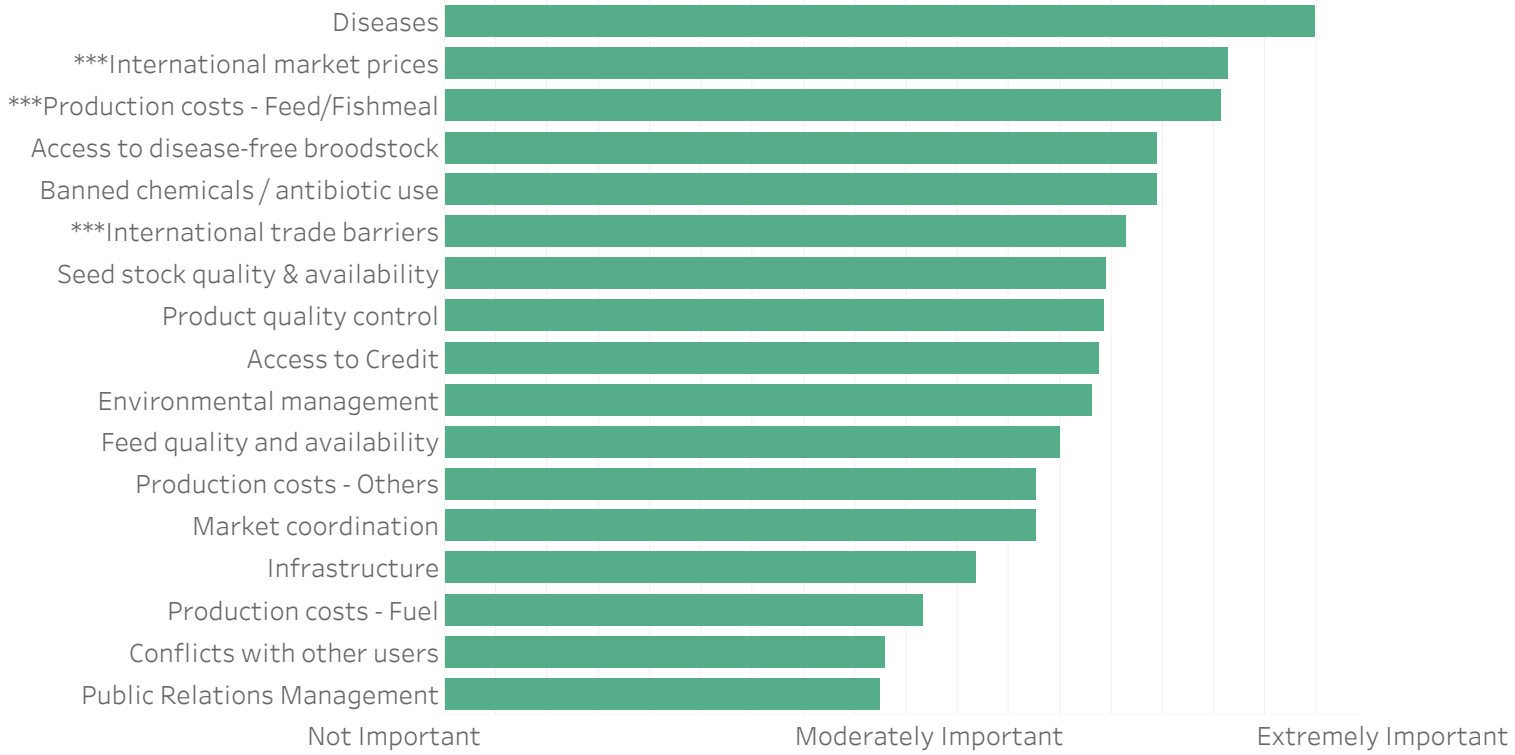
Expected Trends in Shrimp Aquaculture: Product Forms - GOAL Survey 2018

For a number of years, production of green / head-on shrimp for the European and Asian markets has been trending upwards in Ecuador.

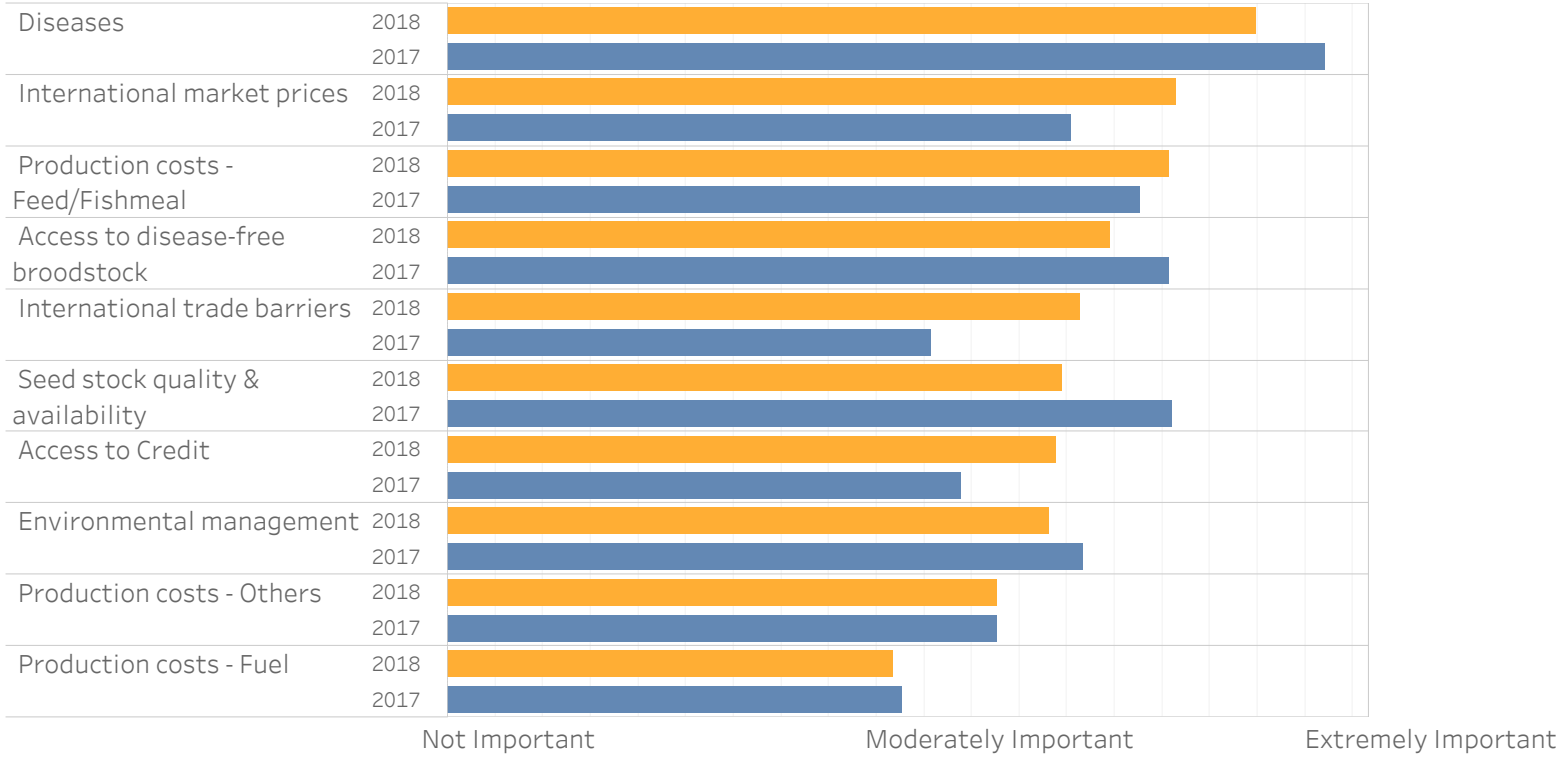
Product Form	Asia	Americas	World
Green / Head-on	Increase	Increase	Increase
Green / Head-off	Stable / Decrease	Stable / Decrease	Decrease
Peeled	Stable	Stable / Increase	Stable
Cooked	Stable	Stable / Increase	Stable
Breaded	Stable / Increase	Decrease	Stable / Increase
Other Forms	Increase	Increase	Increase

GOAL 2018 Survey: Issues & Challenges in Shrimp Aquaculture - All Countries

Asterisks indicate a Top 3 issue in GOAL 2007 Survey.

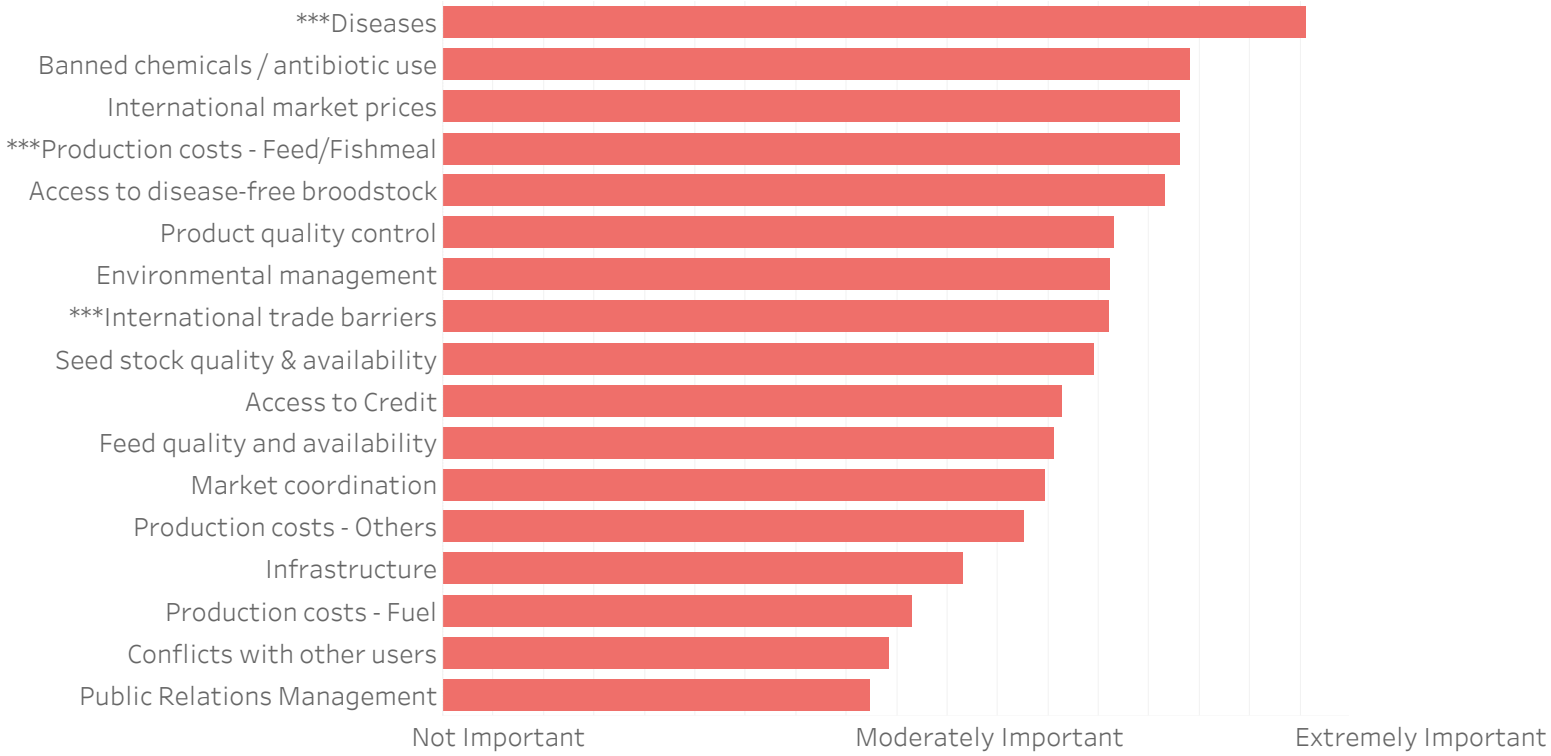


Worldwide Top Issues & Challenges in Shrimp Aquaculture: 2018 Survey vs 2017 Survey



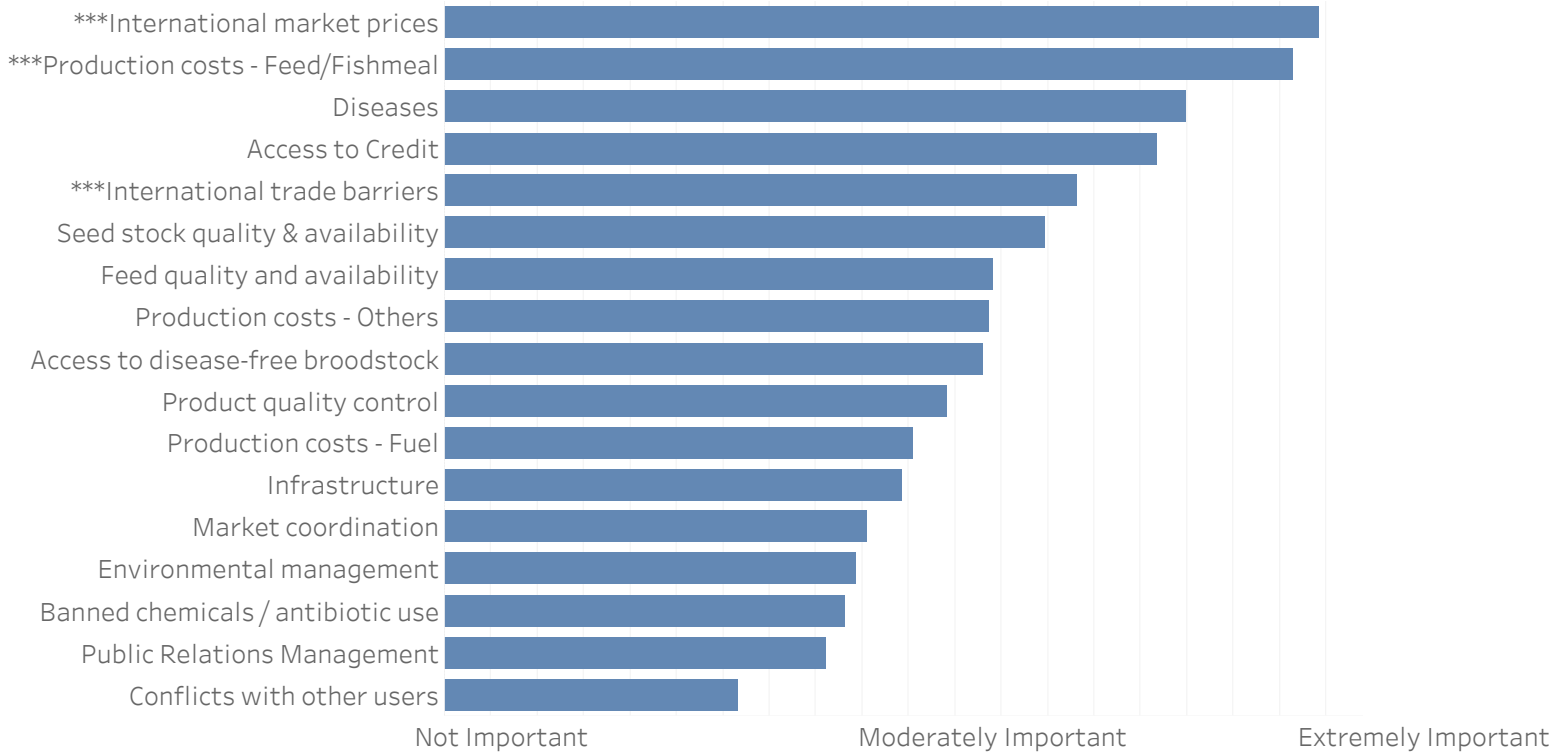
GOAL 2018 Survey: Issues & Challenges in Shrimp Aquaculture - Asia

Asterisks indicate a Top 3 issue in GOAL 2007 Survey.

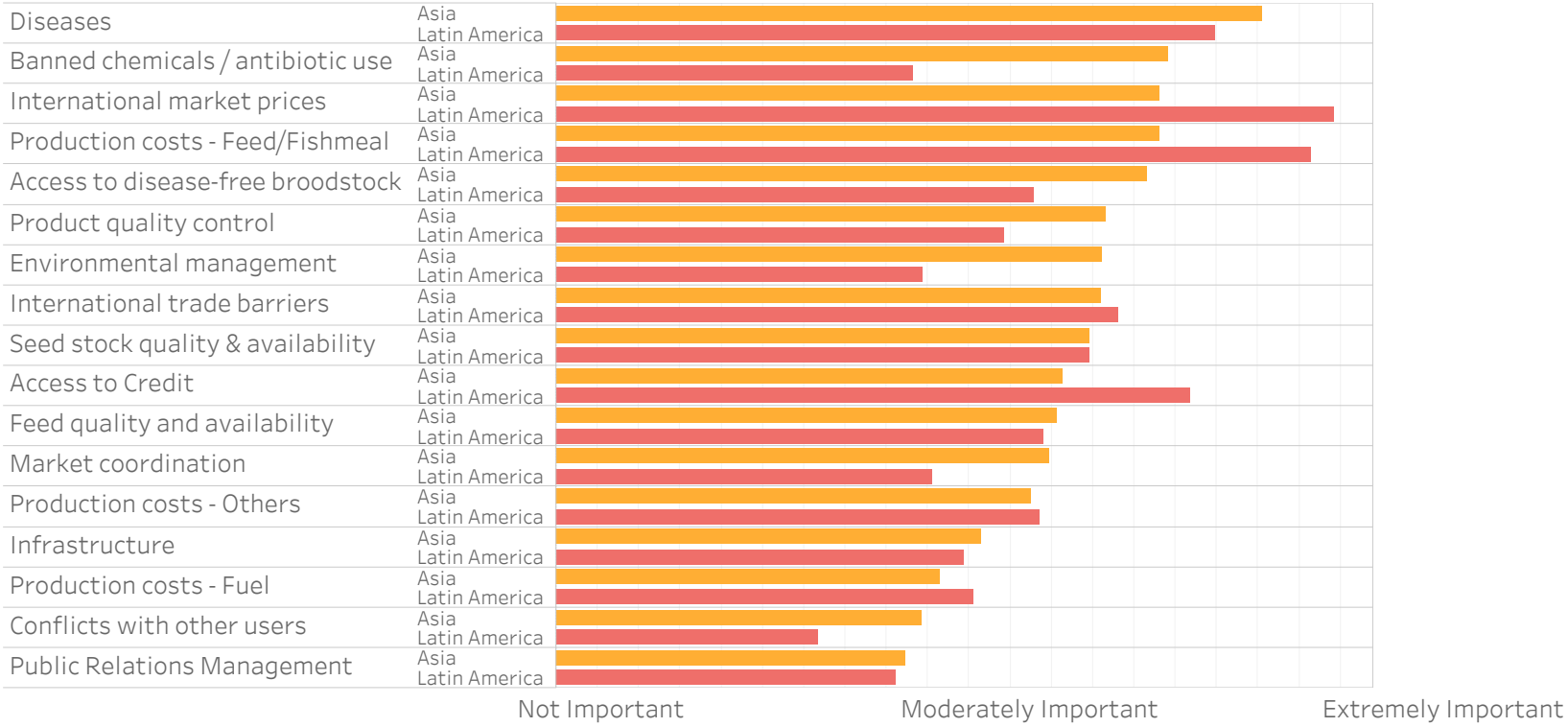


GOAL 2018 Survey: Issues & Challenges in Shrimp Aquaculture - Latin America

Asterisks indicate a Top 3 issue in GOAL 2007 Survey.



GOAL 2018 Survey: Top Issues & Challenges in Shrimp Aquaculture - Asia vs Latin America



GOAL 2018 Survey: Global economic conditions will be better in 2019 compared to 2018

Same perspective as last year

Outlook	Asia	Americas	Others
Strongly Agree			
Agree	Bangladesh, Philippines	Brazil, Ecuador, Honduras, Mexico, Venezuela	Egypt
Neutral / No Opinion	China, India, Indonesia, Malaysia, South Korea, Taiwan, Vietnam	Costa Rica, Nicaragua, Peru	Madagascar, New Caledonia, Saudi Arabia
Disagree	Thailand		Australia
Strongly Disagree			

GOAL 2018 Survey: The global shrimp market will strengthen in 2019 compared to 2018

Asia: Same perspective as last year.

Americas: Slightly more negative than last year.

Outlook	Asia	Americas	Others
Strongly Agree	Taiwan		
Agree	Bangladesh, Indonesia, Philippines, South Korea, Thailand, Vietnam	Venezuela	Egypt, New Caledonia, Saudi Arabia
Neutral / No Opinion	China, India, Malaysia	Brazil, Costa Rica, Ecuador, Honduras, Nicaragua, Peru	
Disagree		Mexico	Australia, Madagascar
Strongly Disagree			

Conclusions

Top 3 Constraints to Growth (Global):

#1 **Disease**
#2 **International Price** (last year - Seed Stock Quality)
#3 **Costs-Feed/Fishmeal** (last year - Disease-free Broodstock)

Top 3 Constraints to Growth (Asia):

#1 **Disease**
#2 **Antibiotic Use** (last year - Seed Stock Quality)
#3 **International Prices & Costs Feed/Fishmeal** (last year Disease-free Broodstock)

Top 3 Constraints to Growth (Latin America):

#1 **International Prices** (last year Production Cost feed/fishmeal)
#2 **Production Cost feed/fishmeal** (last year Disease)
#3 **Disease** (last year Market Prices)

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Conclusions

Expectations for 2019

Stronger shrimp markets
(Less positive than last year- Neutral - China, India, Ecuador)

Better global economic conditions
(Tend to agree but less positive - Neutral - China, India)

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Conclusions

Global Shrimp Production Expectations

2017-18: **+5.5%**

2017- 2020: **+5.7% per year**

2020 expected to be +18% over 2017

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Thank You!

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APPENDIX

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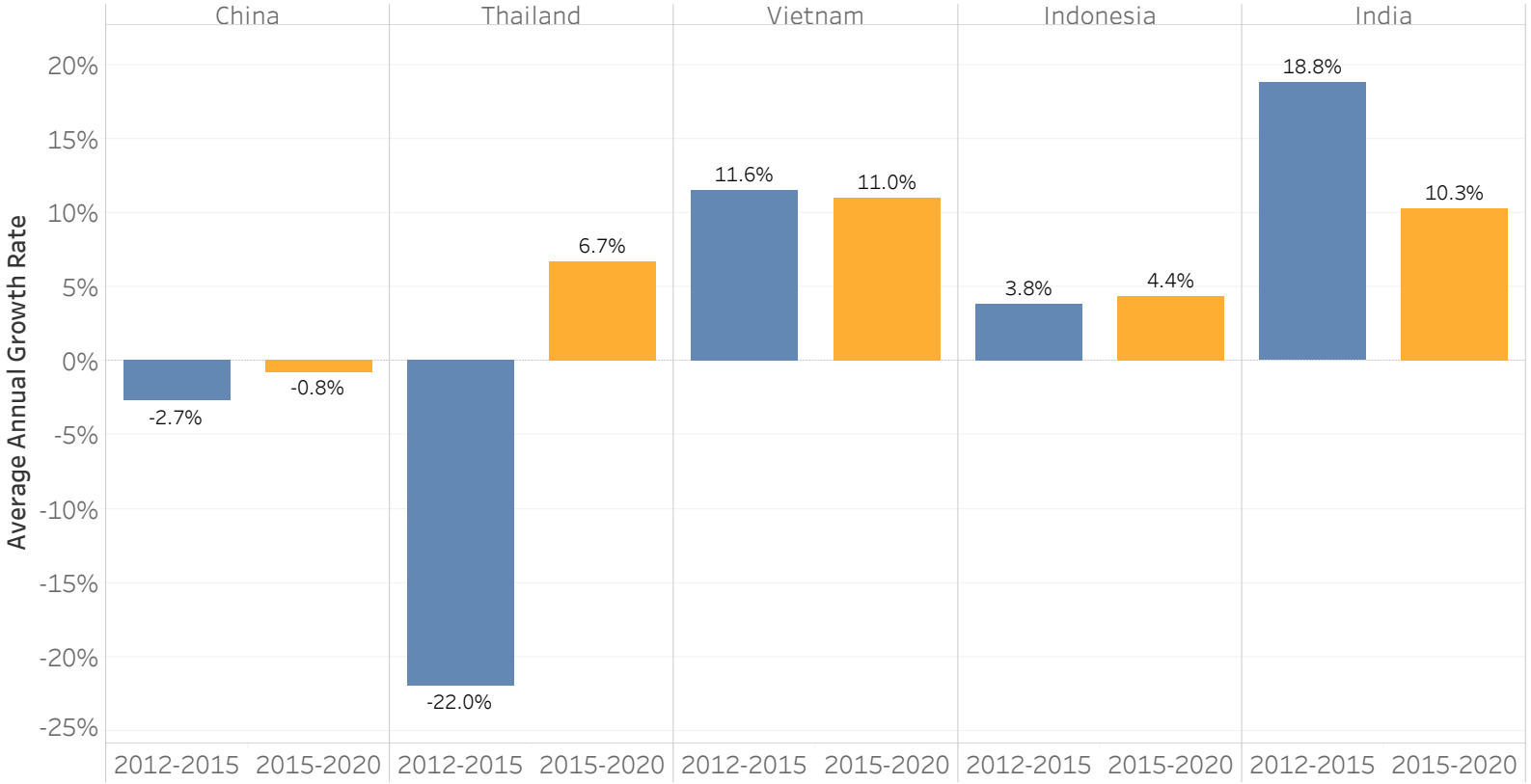
Shrimp Aquaculture in Asia: 2012-2015 vs 2015-2020

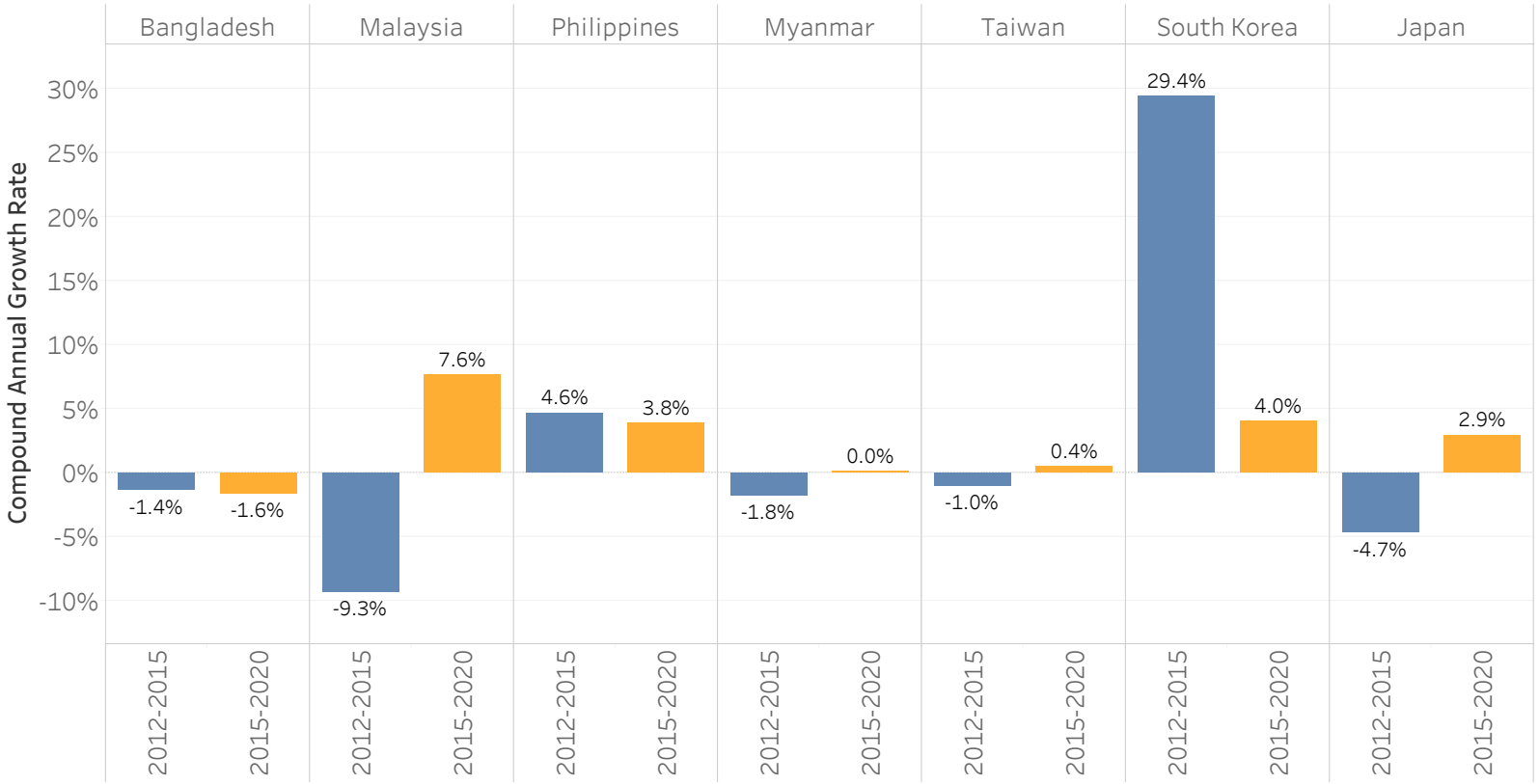


Sources: GOAL (2013-2017) for 2012-2016; GOAL (2018) for 2017-2020.

Southeast Asia includes Thailand, Vietnam, Indonesia, Bangladesh, Malaysia, Philippines, Myanmar and Taiwan.

M. rosenbergii is not included.

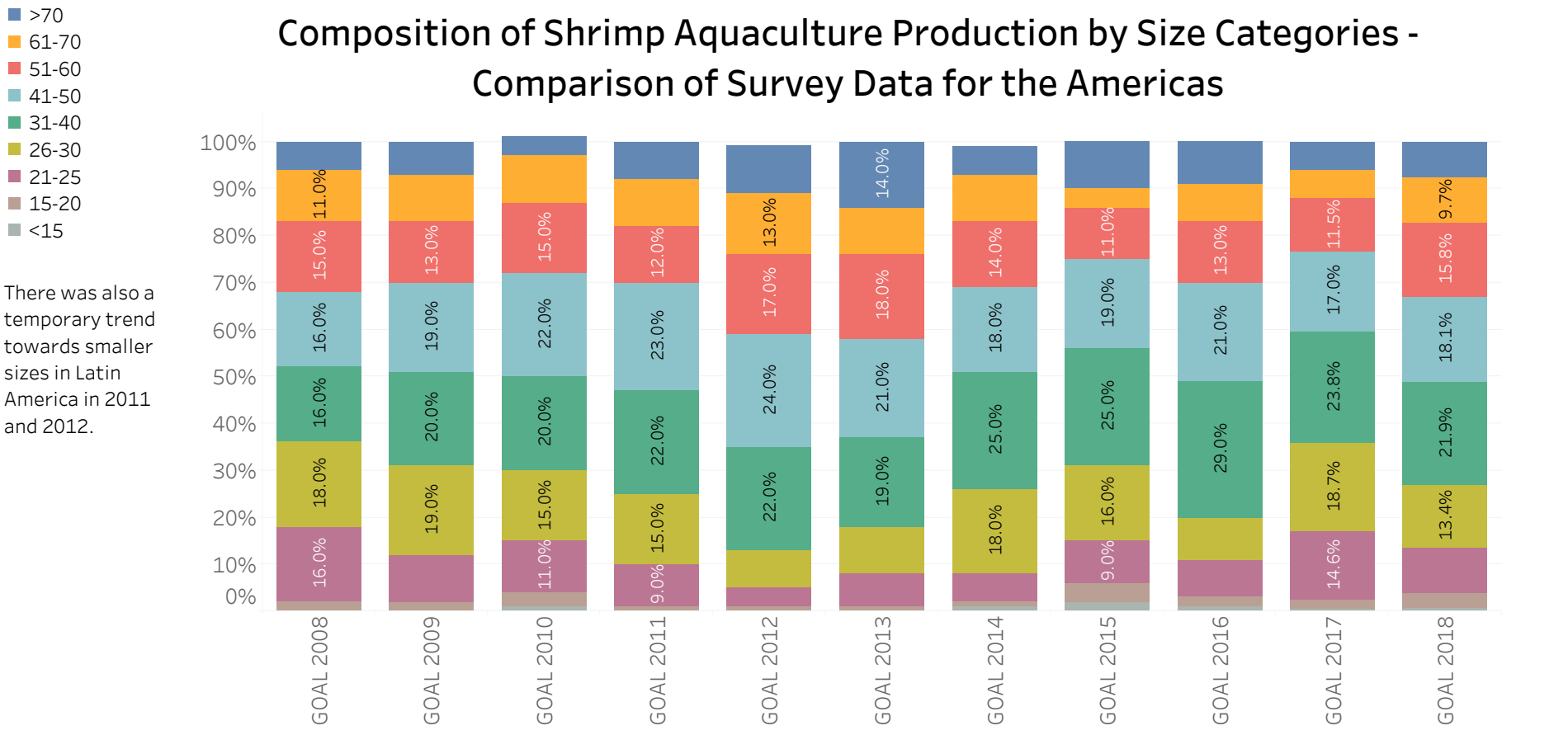
Shrimp Aquaculture in Asia: 2012-2015 vs 2015-2020



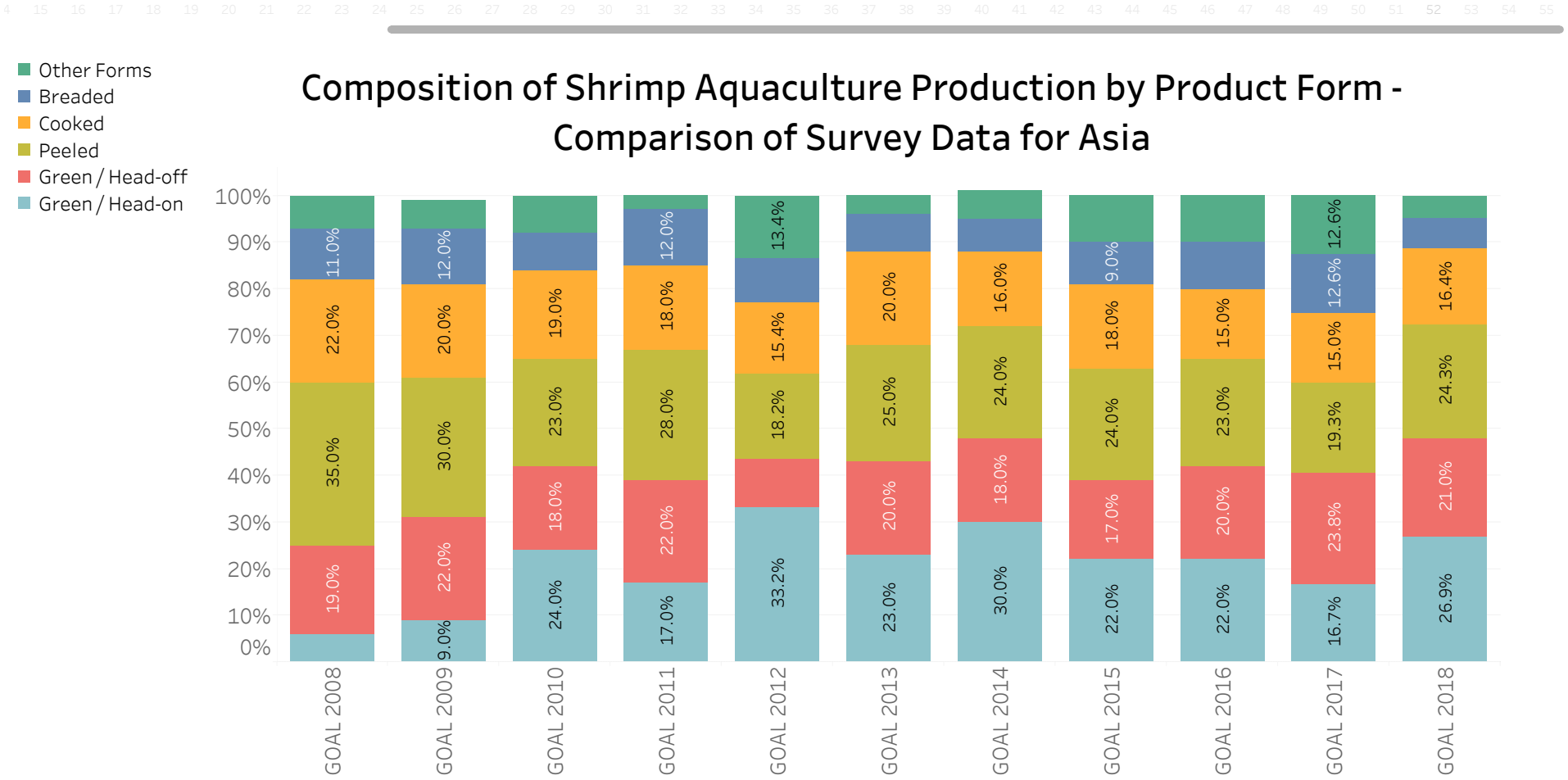
Sources: GOAL (2013-2017) for 2012-2016; GOAL (2018) for 2017-2020.

Southeast Asia includes Thailand, Vietnam, Indonesia, Bangladesh, Malaysia, Philippines, Myanmar and Taiwan.

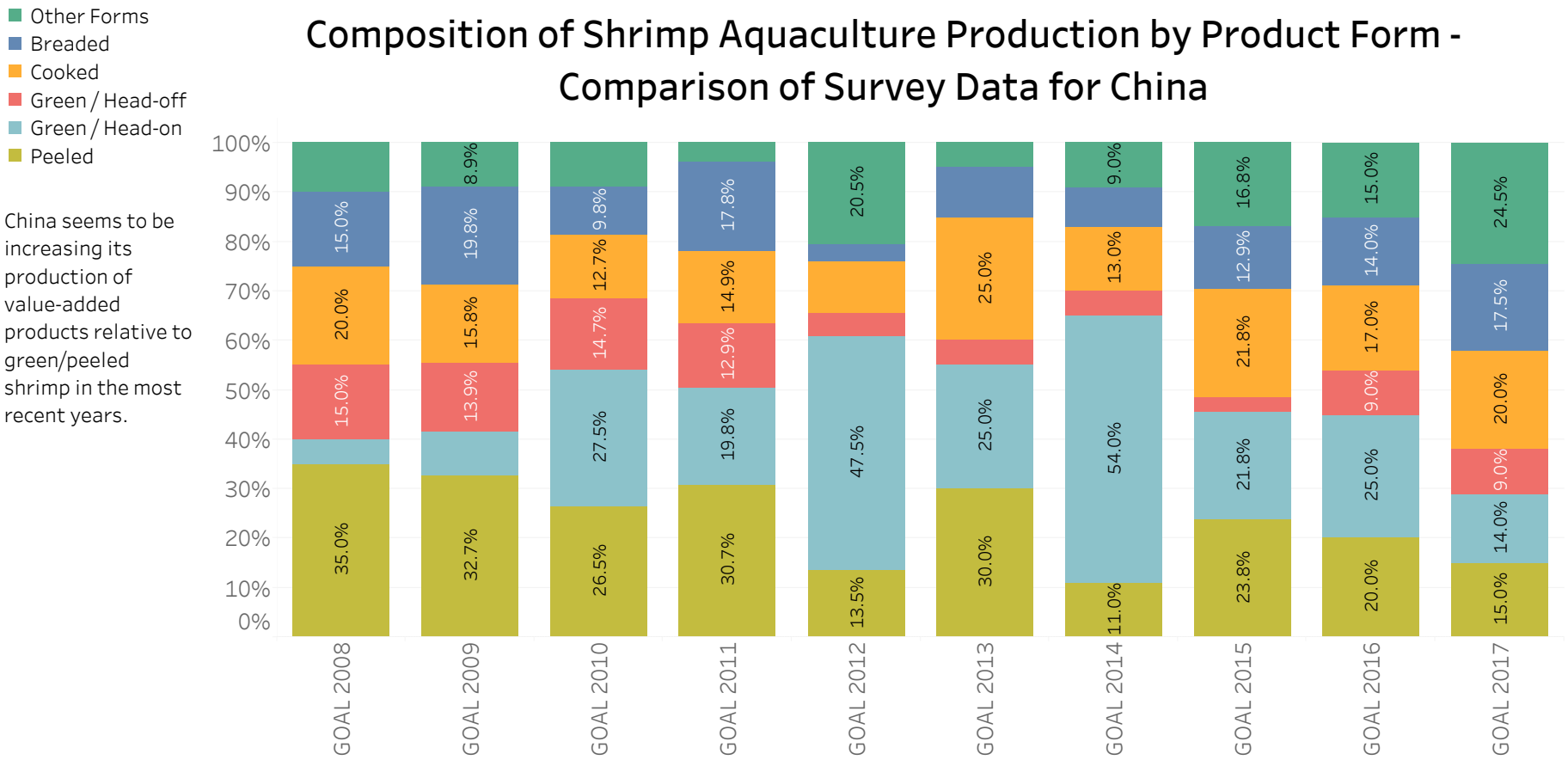
M. rosenbergii is not included.



There was also a temporary trend towards smaller sizes in Latin America in 2011 and 2012.


Other Forms
Breaded
Cooked
Peeled
Green / Head-off
Green / Head-on
Composition of Shrimp Aquaculture Production by Product Form - Comparison of Survey Data for Asia
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
GOAL 2008
11.0%
22.0%
35.0%
19.0%
GOAL 2009
12.0%
20.0%
30.0%
22.0%
9.0%
GOAL 2010
19.0%
23.0%
18.0%
24.0%
GOAL 2011
12.0%
18.0%
28.0%
22.0%
17.0%
GOAL 2012
13.4%
15.4%
18.2%
33.2%
GOAL 2013
20.0%
25.0%
20.0%
23.0%
GOAL 2014
16.0%
24.0%
18.0%
30.0%
GOAL 2015
9.0%
18.0%
24.0%
17.0%
22.0%
GOAL 2016
15.0%
23.0%
20.0%
22.0%
GOAL 2017
12.6%
12.6%
15.0%
19.3%
23.8%
16.7%
GOAL 2018
16.4%
24.3%
21.0%
26.9%

Composition of Shrimp Aquaculture Production by Product Form - Comparison of Survey Data for China

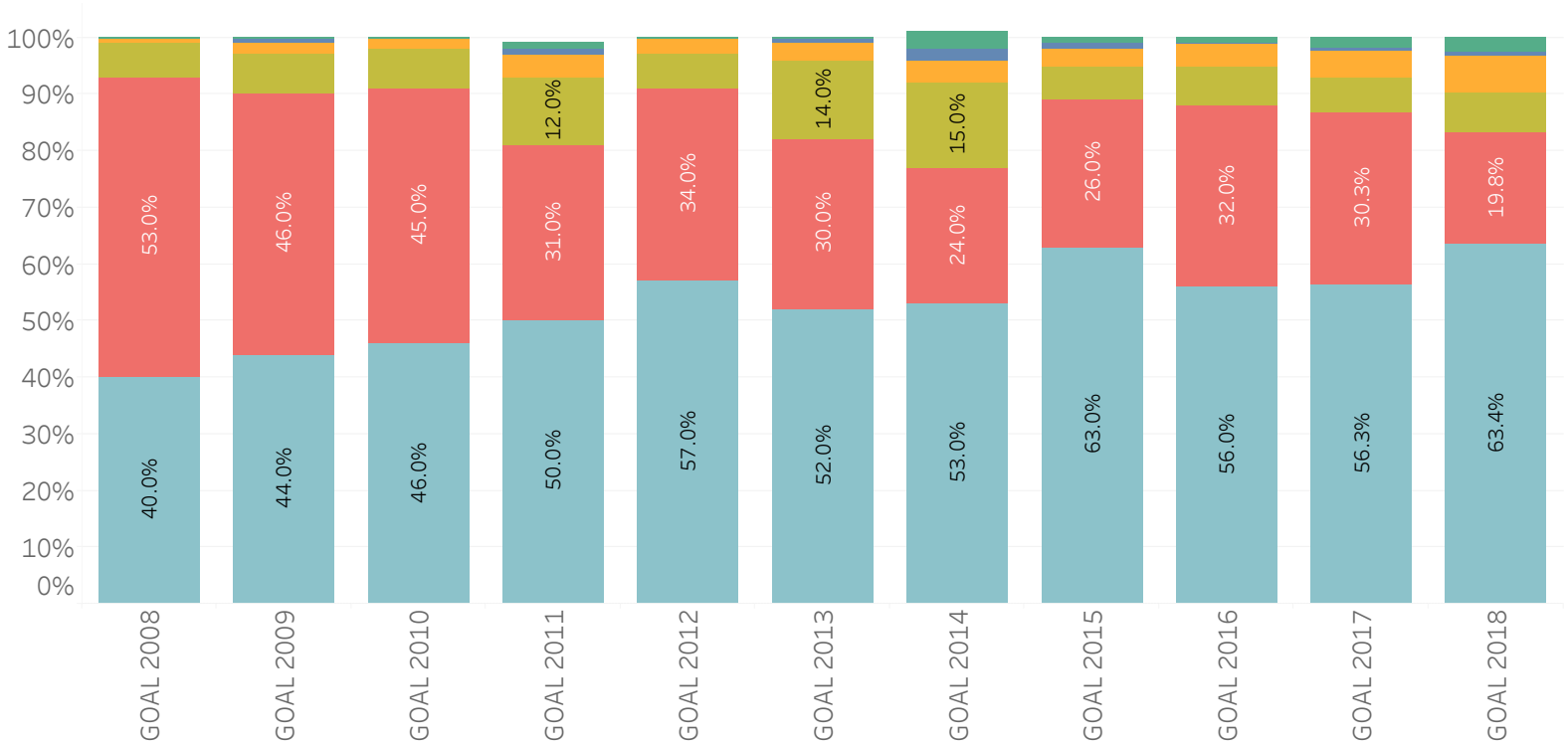


China seems to be increasing its production of value-added products relative to green/peeled shrimp in the most recent years.

- Other Forms
- Breaded
- Cooked
- Peeled
- Green / Head-off
- Green / Head-on

The growing share of the green head-on form reflects an increased presence of Ecuadorian shrimp in European and Asian markets.

Composition of Shrimp Aquaculture Production by Product Form - Comparison of Survey Data for Latin America



4 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55

GOAL 2018 Survey: Feed prices will be lower in 2019 compared to 2018

Asia: About same perspective as last year.

Americas: More negative than last year.

Outlook	Asia	Americas	Others
Strongly Agree			
Agree		Mexico	
Neutral / No Opinion	China, Philippines	Venezuela	
Disagree	Bangladesh, India, Indonesia, Malaysia, Taiwan, Thailand, Vietnam	Brazil, Costa Rica, Ecuador, Honduras, Nicaragua, Peru	Australia, Egypt, Madagascar, New Caledonia, Saudi Arabia
Strongly Disagree	South Korea		