James Anderson

World Bank –University of Rhode Island

United States

Dr. James Anderson leads the World Bank's Global Program on Fisheries and Aquaculture.

He previously chaired the Department of Environmental & Natural Resource Economics at the University of Rhode Island.

Dr. Anderson was also the editor of *Marine Resource Economics* from 1999 through 2011.

His recent work has focused on the role of seafood in food security, constraints to aquaculture development and seafood market analysis.

Global Outlook for Aquaculture Leadership
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FISH 2030 and Shrimp Production Review

James L. Anderson, The World Bank

Diego Valderrama, University of Florida

Mimako Kobayashi, The World Bank

Siwa Msangi, International Food Policy Research Institute

Overview

Fish 2030 – Supply and Demand

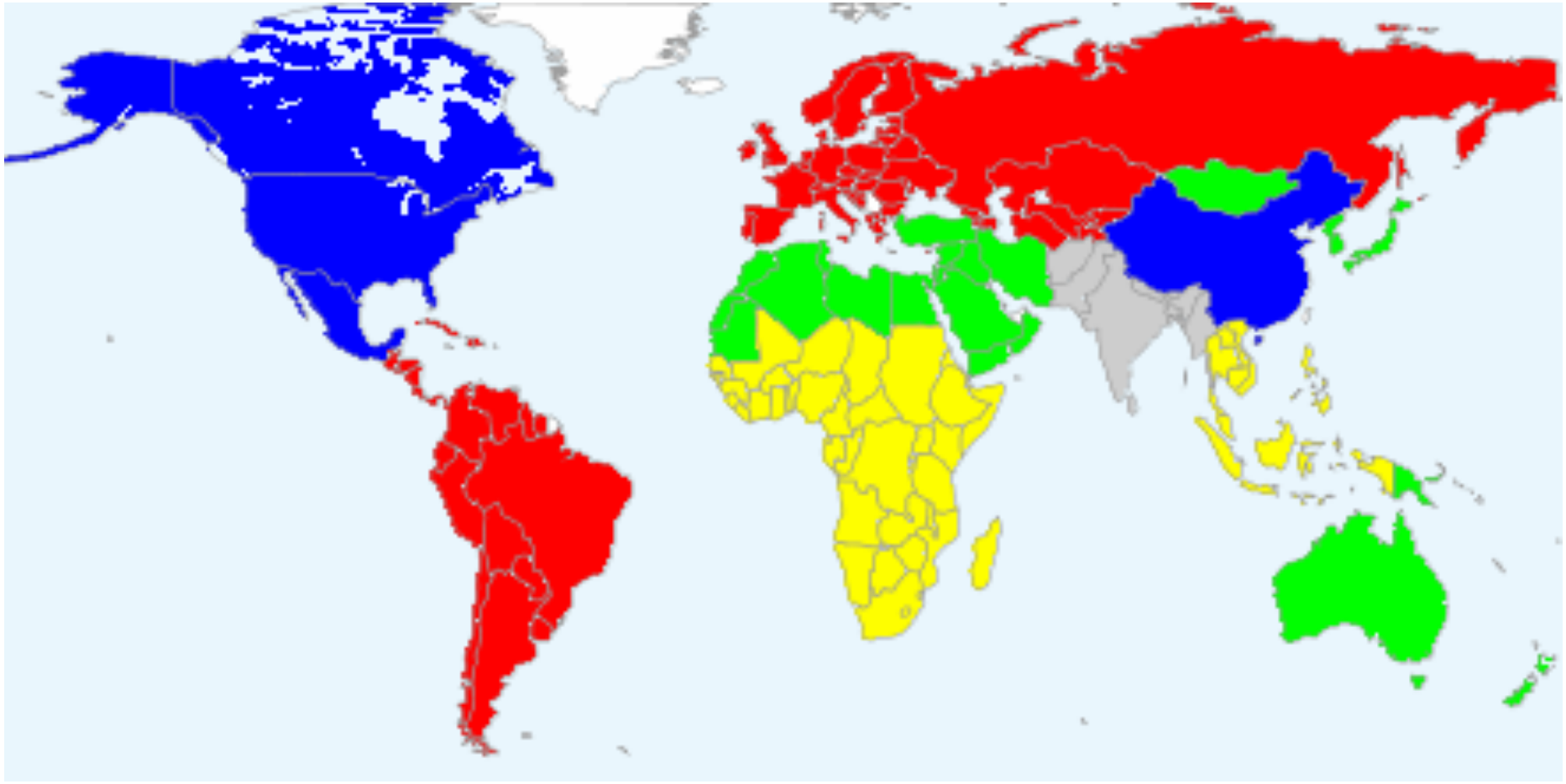
Shrimp Production

"Fish to 2030" Modeling Project

- Collaboration: The World Bank, International Food Policy Research Institute (IFPRI), University of Arkansas, and FAO
- Projection of global supply and demand for fish and fish meal & oil using IFPRI's IMPACT Model
- Capture and aquaculture supply modeled
- Model expanded since "Fish to 2020" Project
  - Country groups: 36 → 115
  - Seafood groups: 4 → 16

How the Model Works

- Calibrated using FAO data for 1984-2009
- Exogenous factors shift supply and demand curves
- In each country, Production + Imports = Consumption + Exports
- Equilibrium is reached when S = D globally

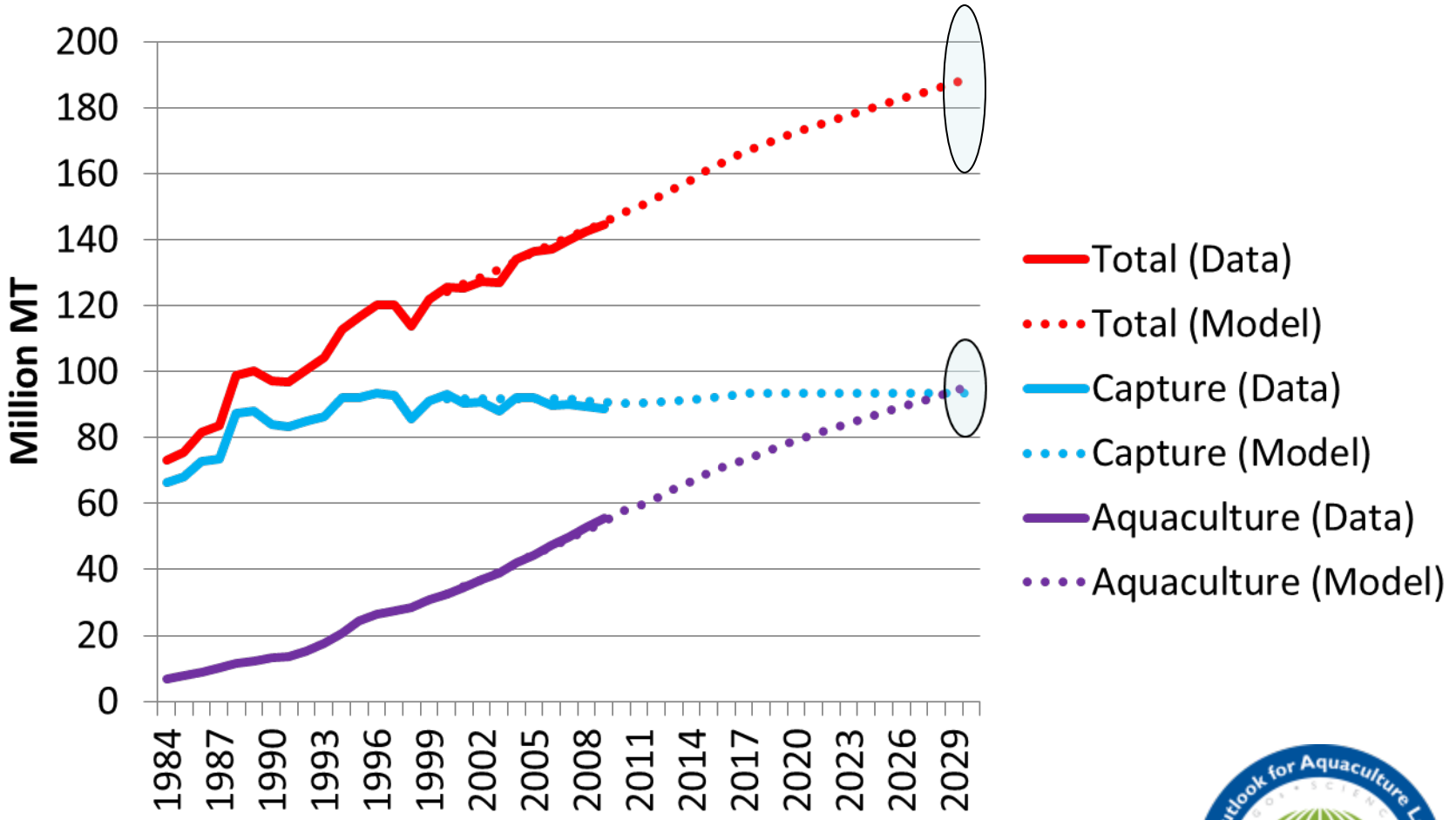


Definition of Regions

Commodity Groups

Consumption Aggregation	*Production Aggregation*
Shrimp and Prawns	Shrimp and Prawns
Other Crustaceans	Other Crustaceans
Mollusks and other Aquatic Invertebrates and Animals	Mollusks and other Aquatic Invertebrates and Animals
Salmon, Trout and other Salmonoids	Salmon, Trout and other Salmonoids
Tuna	Tuna
Freshwater and other Diadromous Fish	Tilapia and other Cichlids
	Pangasius and other Catfish
	Major Carp and Milkfish
	Eels and Sturgeon
	Silver, Bighead and Grass Carp
	Other Freshwater and Diadromous Fish
Demersal Fish	Demersal Fish
	Mullet
Other Marine Fish	Other Marine Fish
Other Pelagic Fish	Other Pelagic Fish
	Cobia and Swordfish

Total Fish Production: 1984-2030



Aquaculture Growth

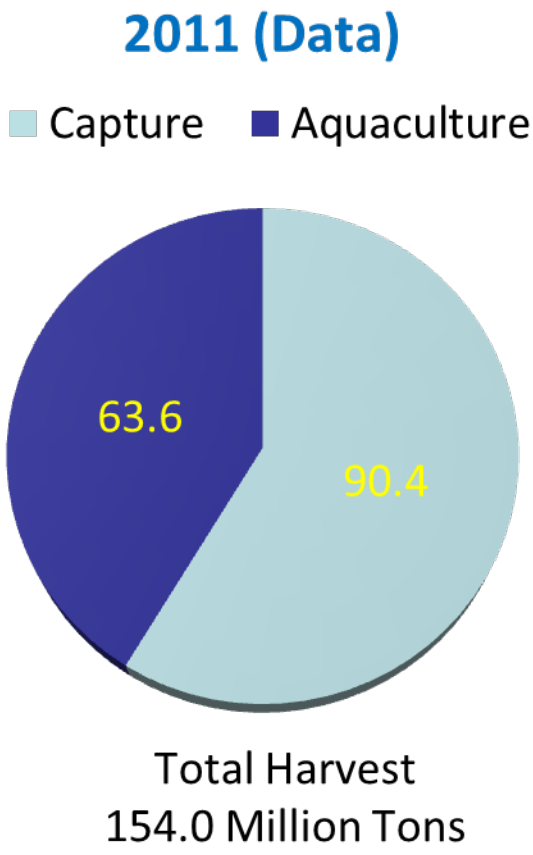
2010 (Data)

- Approx. **41%** of total harvest
- Approx. **49%** of fish for human consumption
- Aquaculture growth 2000-2010 – **79% in 10 yrs**
- Growth in total supply 2000-2010 – **17% in 10 yrs**

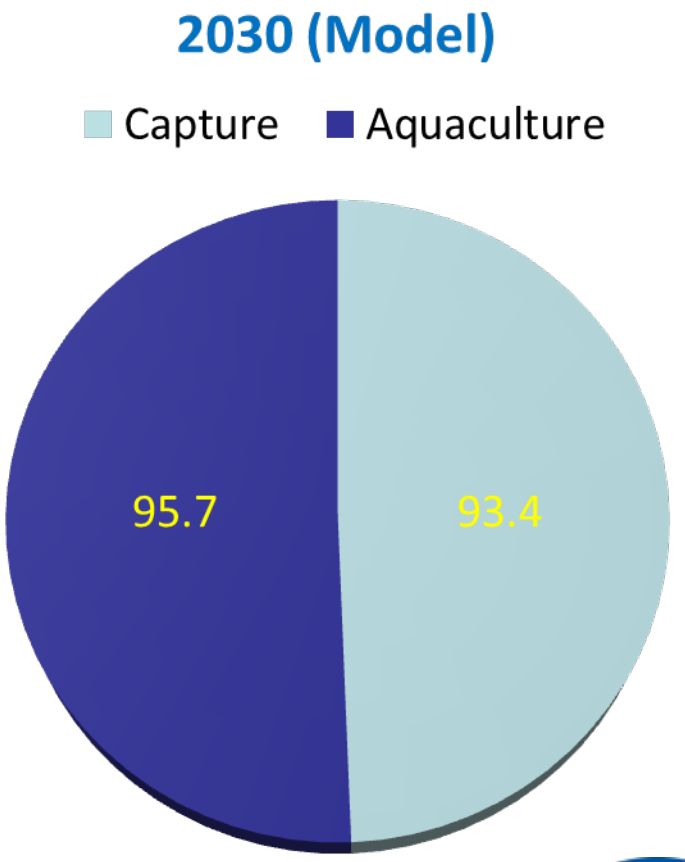
2030 (Model)

- Approx. **51%** of total harvest
- Approx. **64%** of fish for human consumption
- Aquaculture growth 2010-2030 – **66% in 20 yrs**
- Growth in total supply 2010-2030 – **28% in 20 yrs**

Aquaculture's Share in Total Harvest

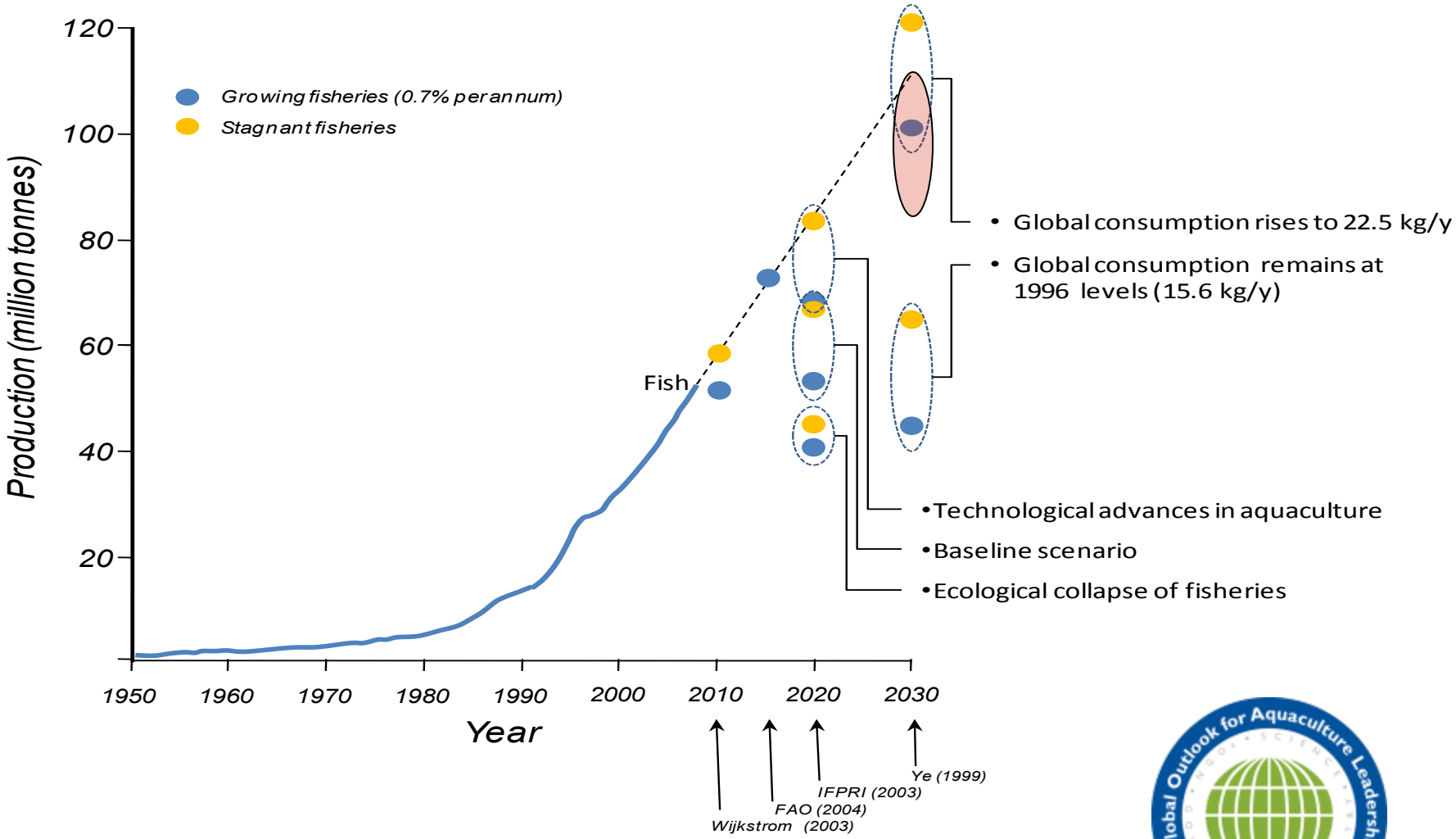


Total Harvest
154.0 Million Tons



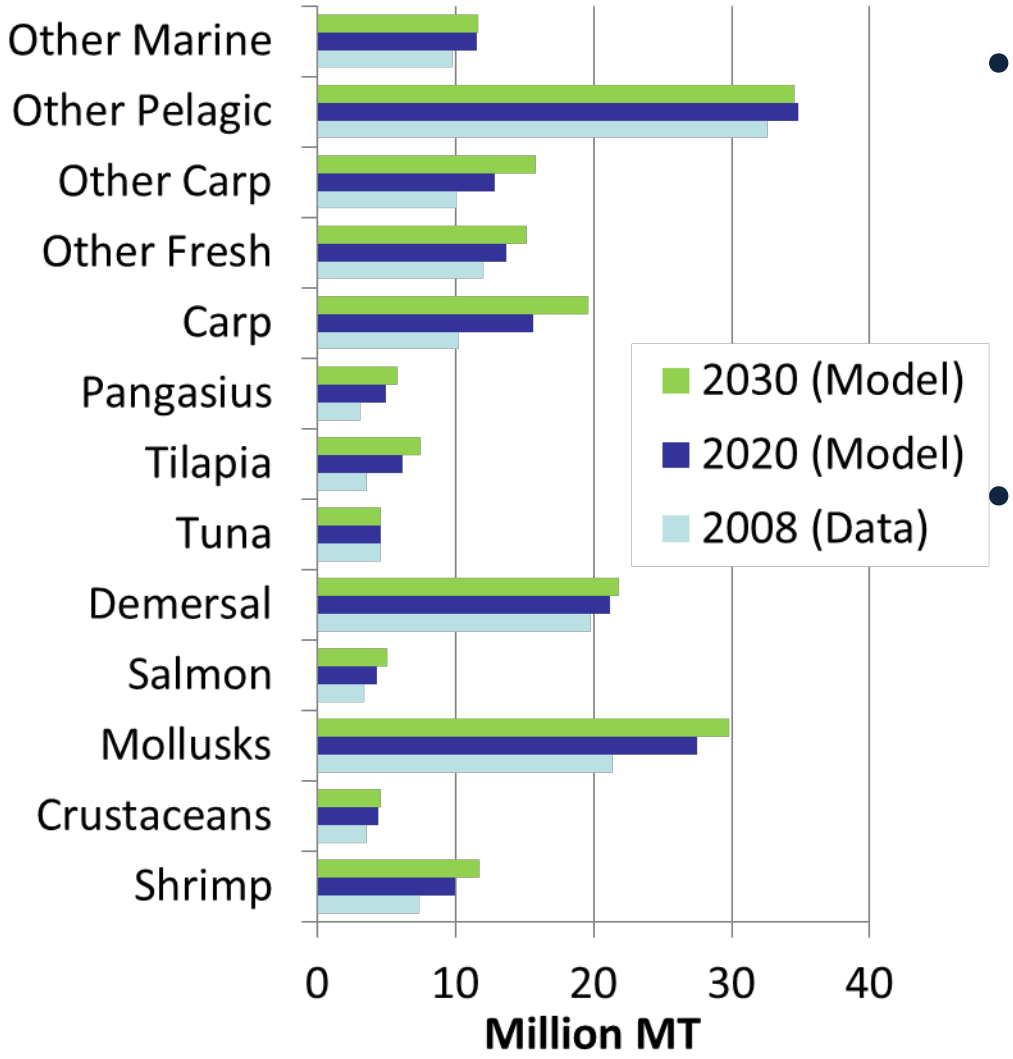
Total Harvest
189.1 Million Tons

Other Aquaculture Forecasts



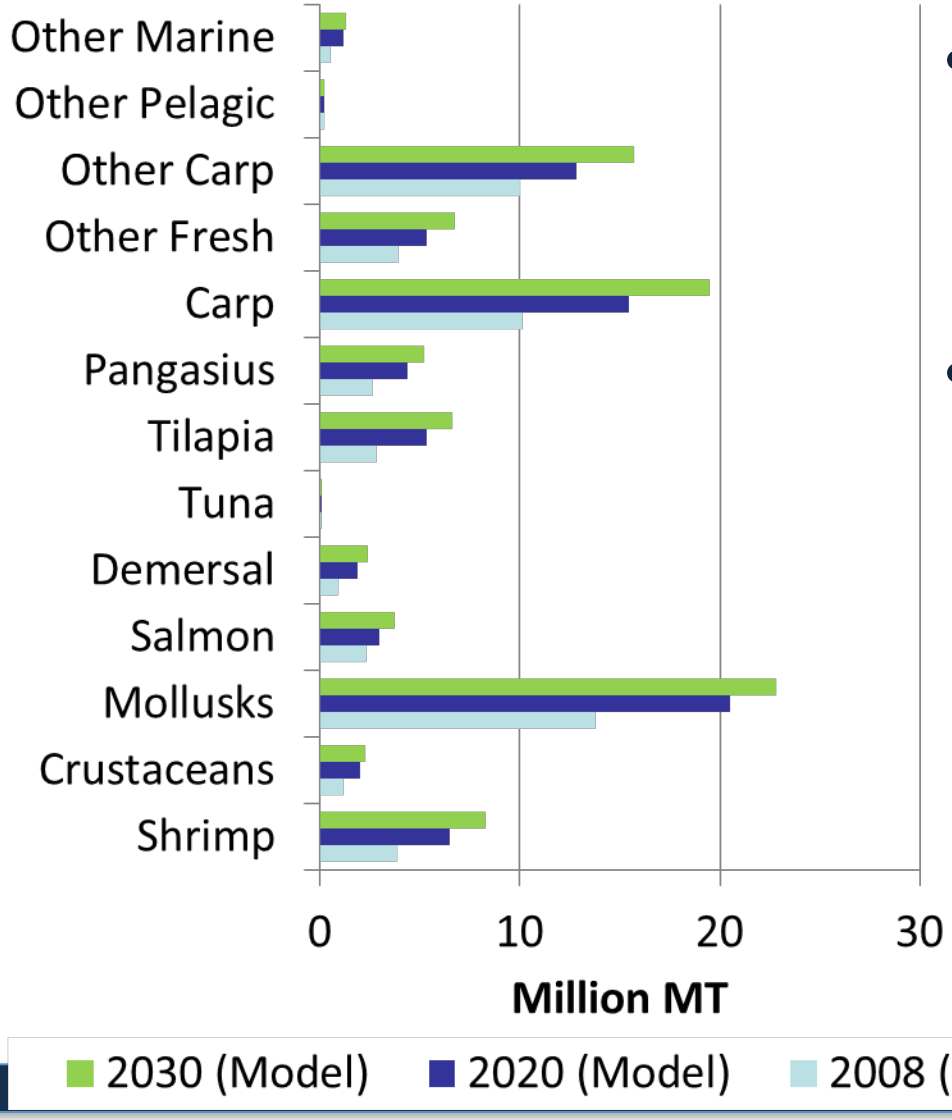
Source: Hall, S. Blue Frontiers (2011), WorldFish Centre

Supply Growth (Capture + Aquaculture)



- **More than 50% increase from 2008 to 2030**
  - Tilapia
  - Pangasius
  - Carp
  - Salmon
  - Shrimp
- **20-40% increase from 2010 to 2030**
  - Crustaceans
  - Molluscs
  - Other Fresh Fish
  - Other Marine Fish

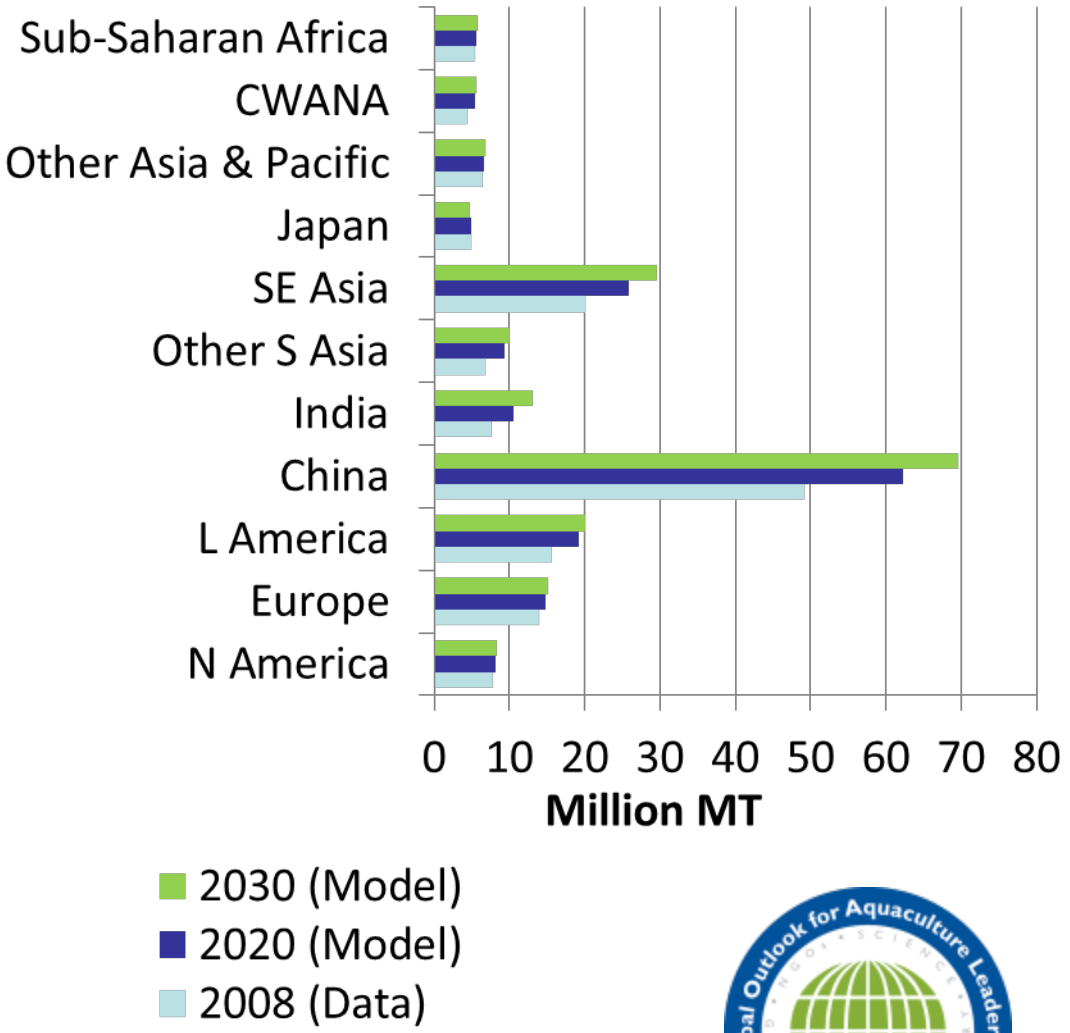
Sources of Aquaculture Supply Growth By Commodity



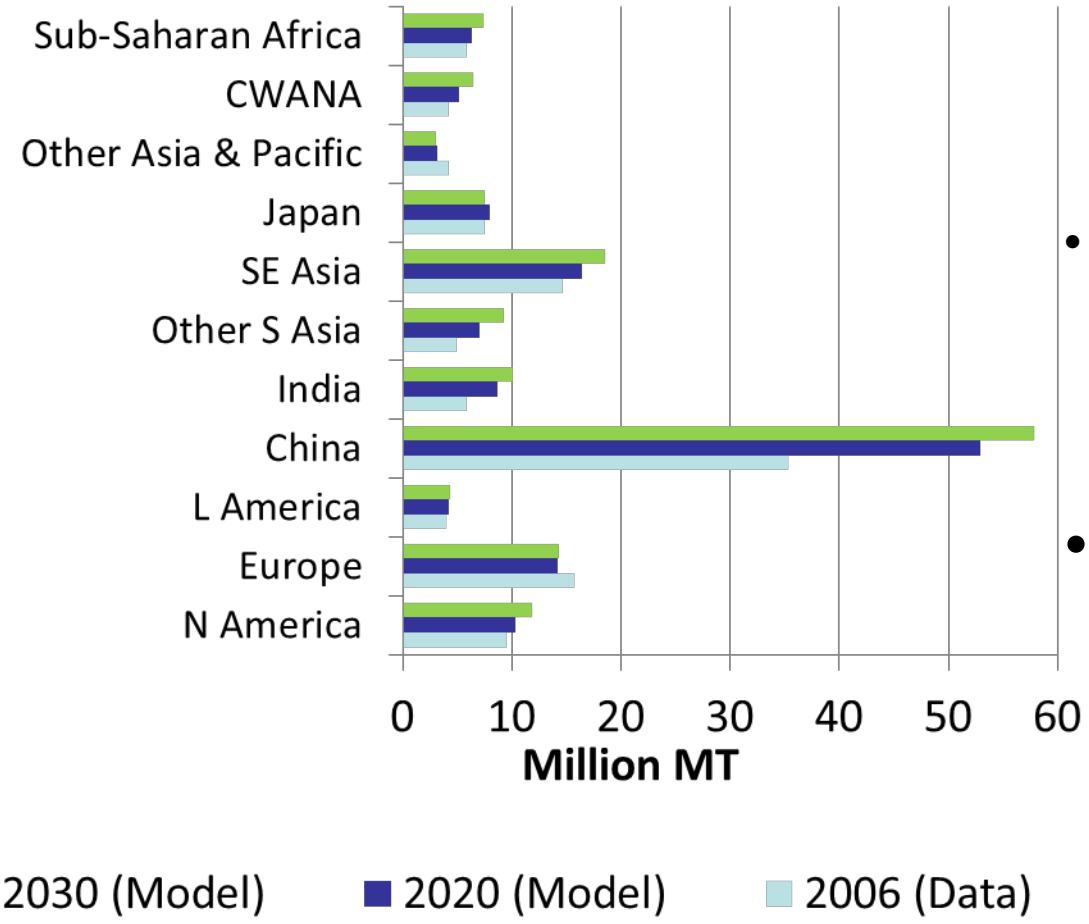
- **More than 100% increase 2008 to 2030**
  - Tilapia
  - Shrimp
  - Demersal
  - Other marine Fish
- **50-100% increase 2008 to 2030**
  - Pangasius
  - Carp
  - Crustaceans
  - Molluscs
  - Salmon
  - Tuna

Supply Growth (Capture + Aquaculture) By Region

- **More than 20% increase 2008 to 2030**
  - China
  - Southeast Asia
  - India
  - Other South Asia
  - Latin America
  - Cent./West Asia & North Africa
- **Less than 10% increase 2008 to 2030**
  - Europe
  - North America
  - Sub-Saharan Africa
  - Other Asia & Pacific (Korea, etc.)
  - Japan



Consumption Growth



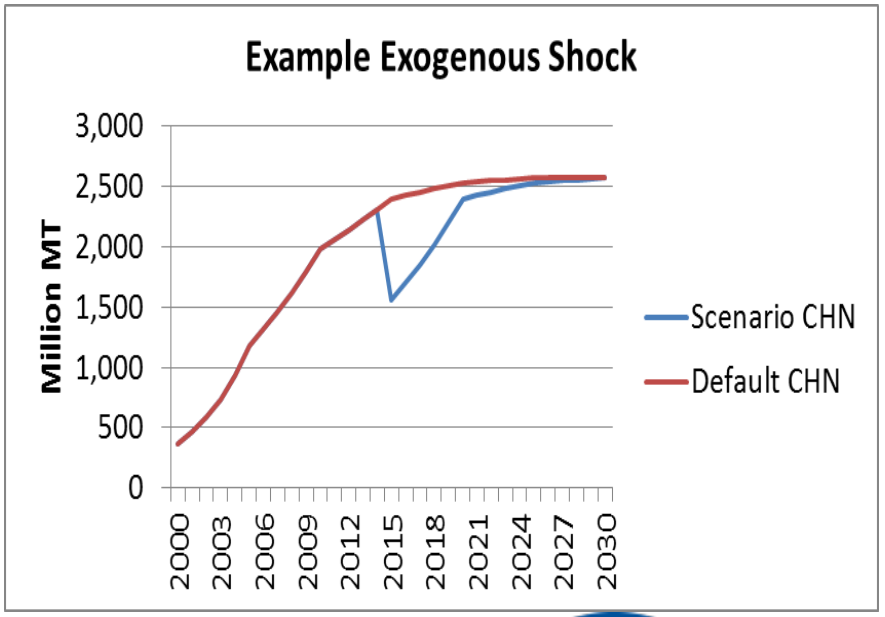
- **More than 50% increase 2006 to 2030**
  - China
  - India
  - Other South Asia
  - Cent./West Asia & N. Africa
- **Less than 20% increase 2006 to 2030**
  - Southeast Asia
  - Sub-Saharan Africa
  - North America
  - Latin America
- **Regions with little growth or decline**
  - Other Asia & Pacific
  - Europe
  - Japan

Impact of Hypothetical Disease Outbreak

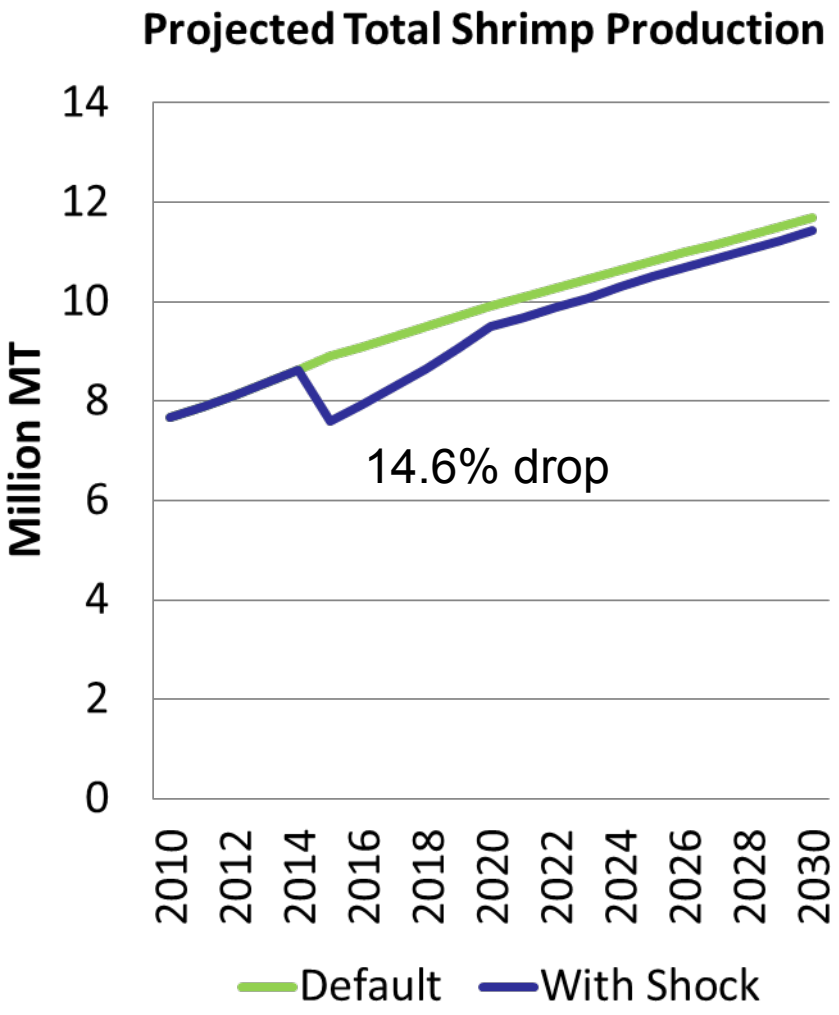
Scenario: Disease outbreak in Asia shrimp aquaculture in 2015

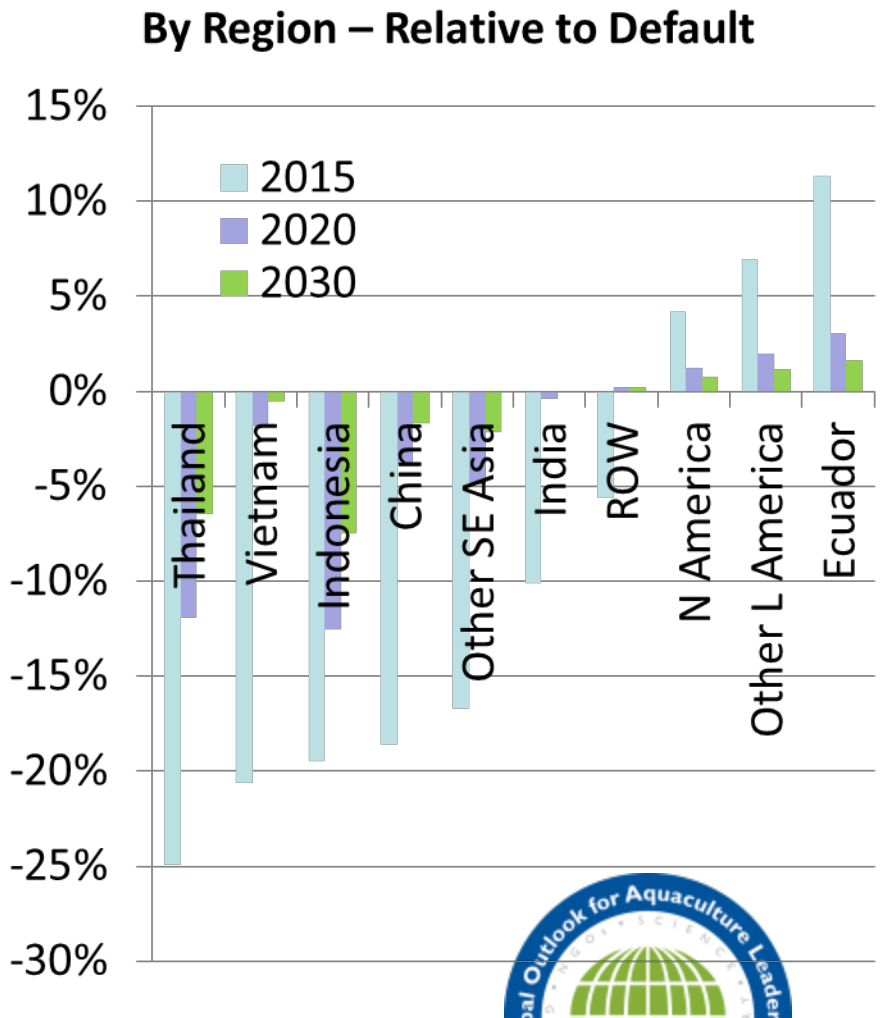
Assumptions:

- production declines by 35% in 2015 relative to the default projection for 2015
- Recovery to the default projection for 2015 takes 5 years
- Subsequently resume the original growth path



Scenario Results: Impacts on Shrimp Production





Long vs. Near Term Forecast

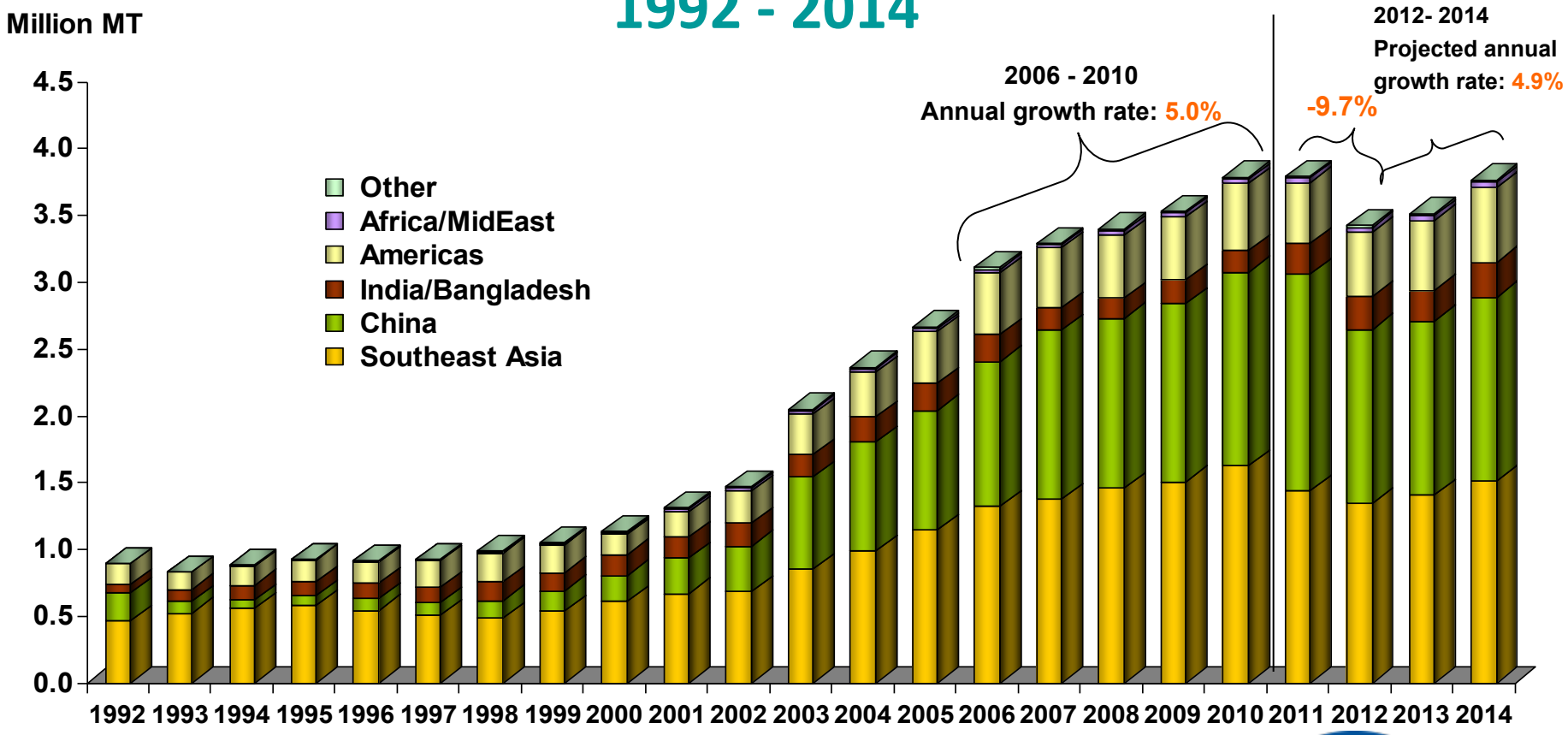
- Projections with IMPACT Model are based on aggregate and historical data
  - Useful for deriving global-level forecast
  - Useful for deriving long-term forecast
  - But limited foresight into country and species specific details
- Next: Complementary information from survey of industry and country experts

GOAL 2012

Shrimp Production Survey

Issues & Challenges

GOAL 2012 Survey
Shrimp Aquaculture Production by World Region:
1992 - 2014



Sources: FAO (2012) for 1992-2010; GOAL (2012) for 2011-2014.

Note: *M. rosenbergii* is not included.

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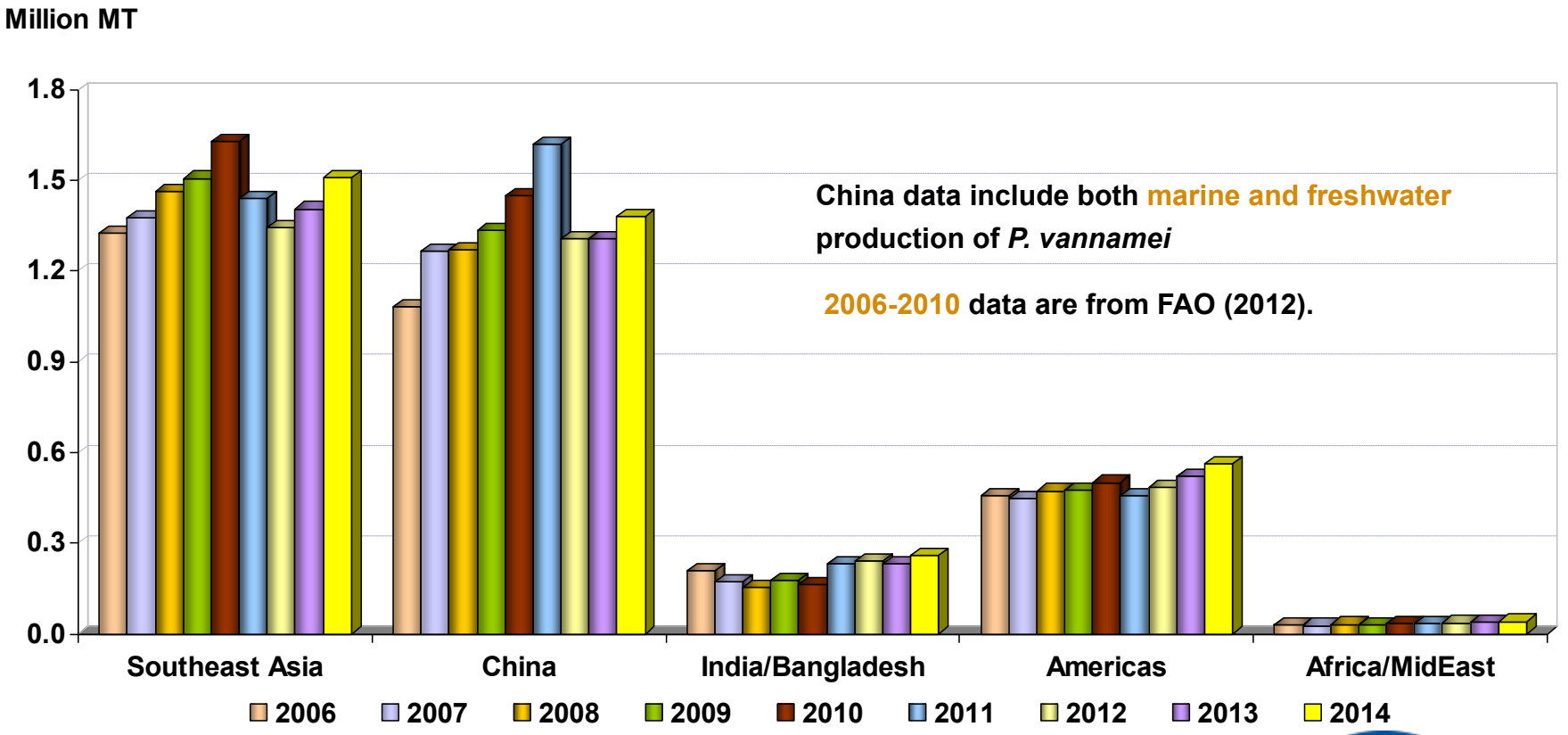
Shrimp Aquaculture by Major Producing Regions: 2006 – 2014



Sources: FAO (2012) & GOAL (2012).

Note: *M. rosenbergii* is not included.

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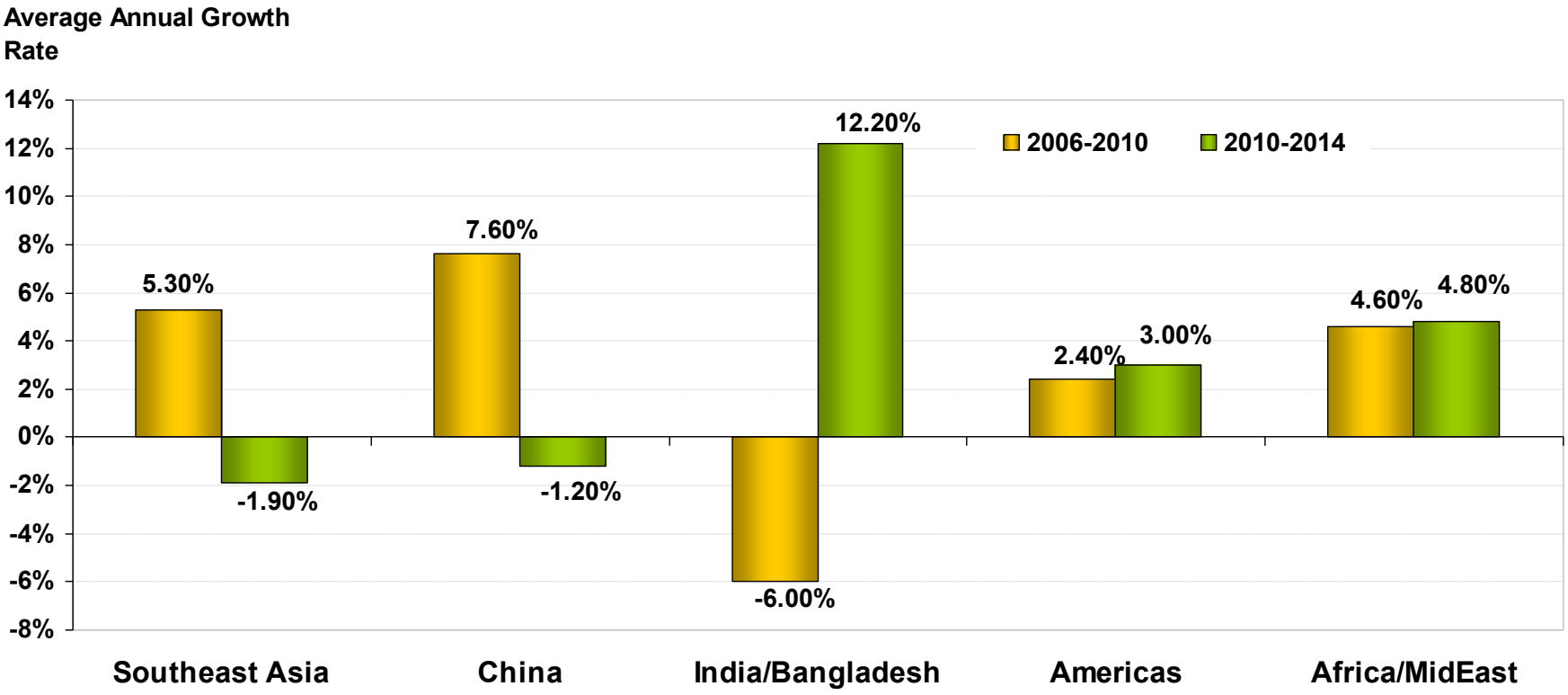
Shrimp Aquaculture by Major Producing Regions:

2006-2010 vs. 2010-2014



Sources: FAO (2012) & GOAL (2012).

Note: *M. rosenbergii* is not considered.

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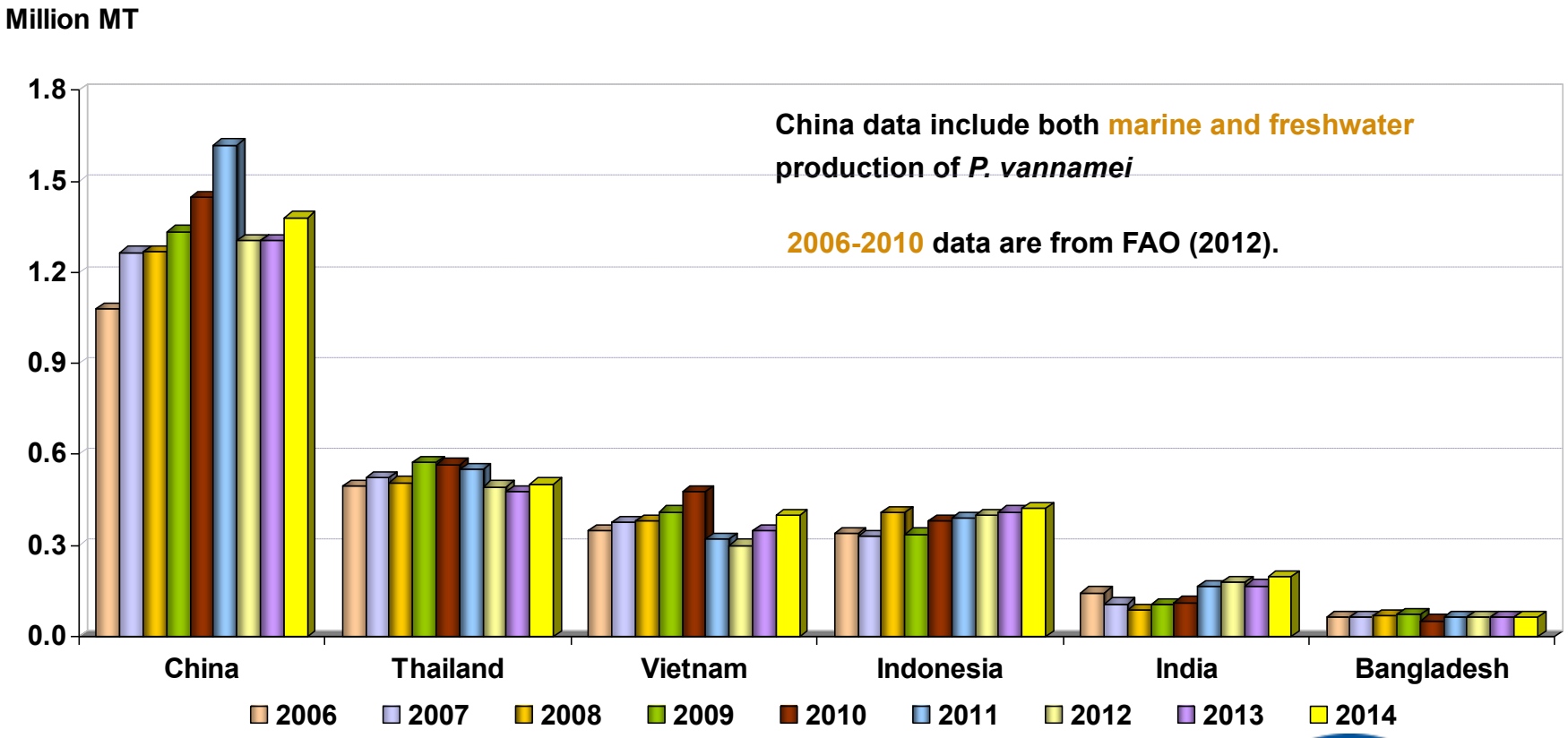
Shrimp Aquaculture in Asia: 2006 – 2014

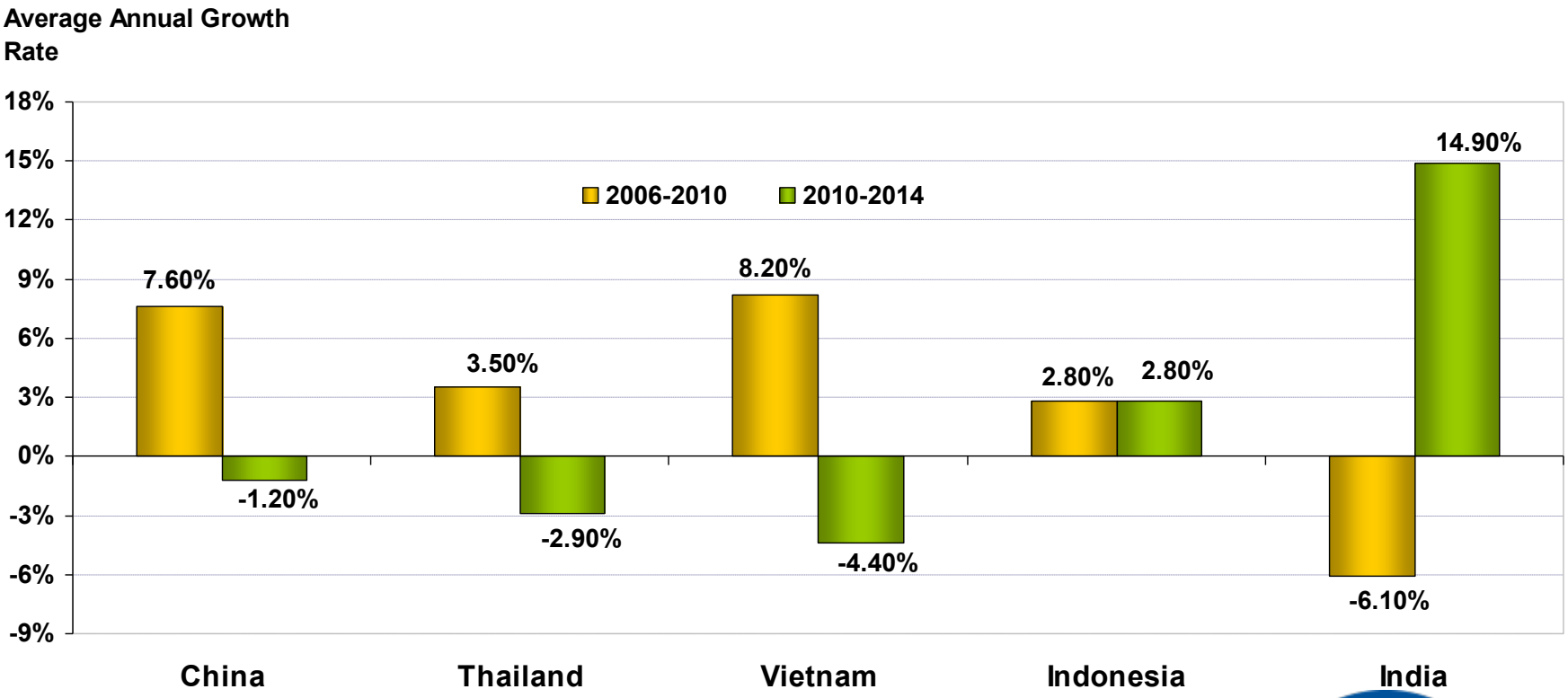


Sources: FAO (2012) & GOAL (2012).

Note: *M. rosenbergii* is not included.

Shrimp Aquaculture in Asia:

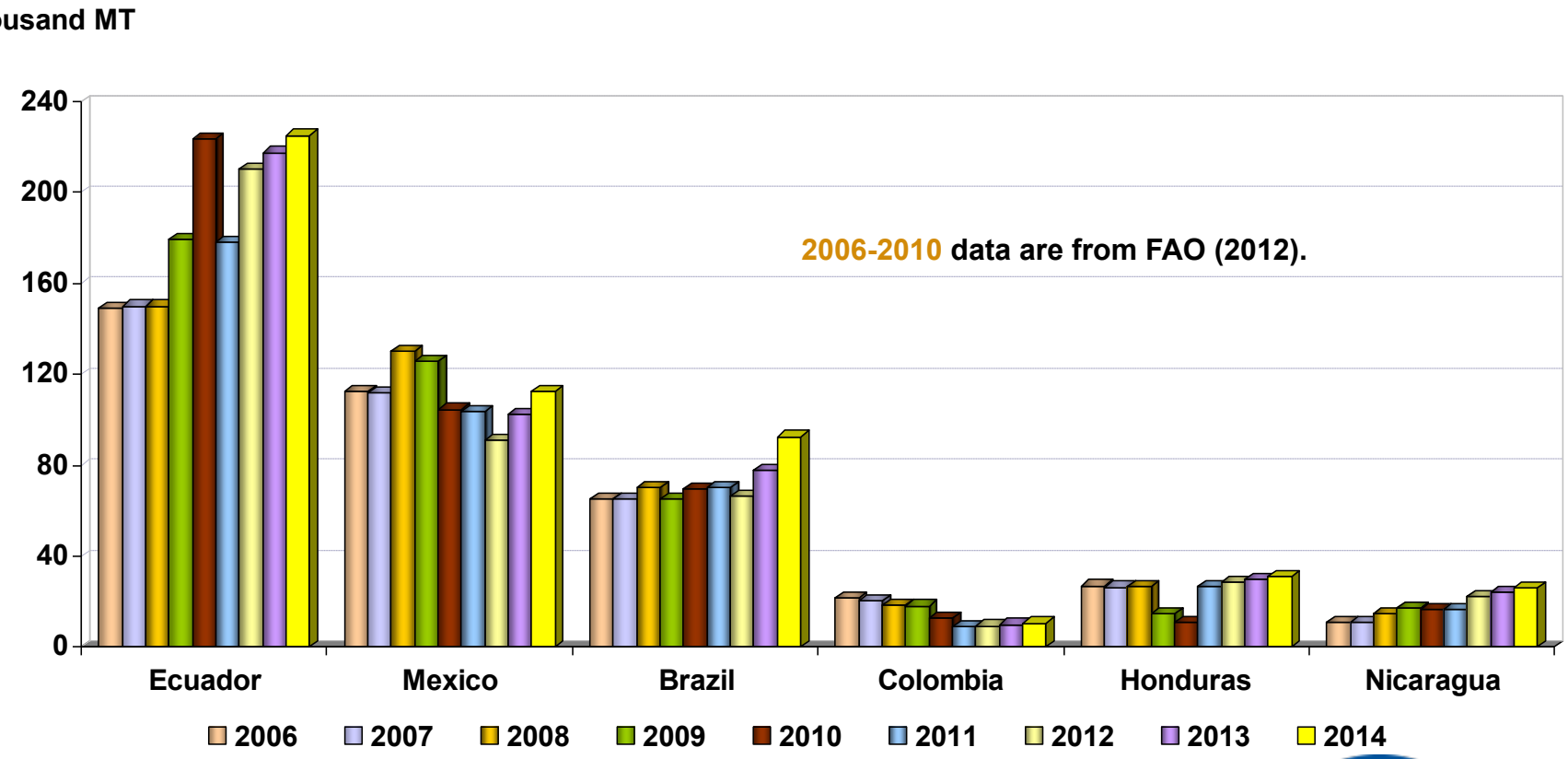
2006-2010 vs. 2010-2014



Sources: FAO (2012) & GOAL (2012).

Note: *M. rosenbergii* is not considered.

Shrimp Aquaculture in Latin America: 2006 – 2014



Sources: FAO (2012) & GOAL (2012).

Note: *M. rosenbergii* is not included.

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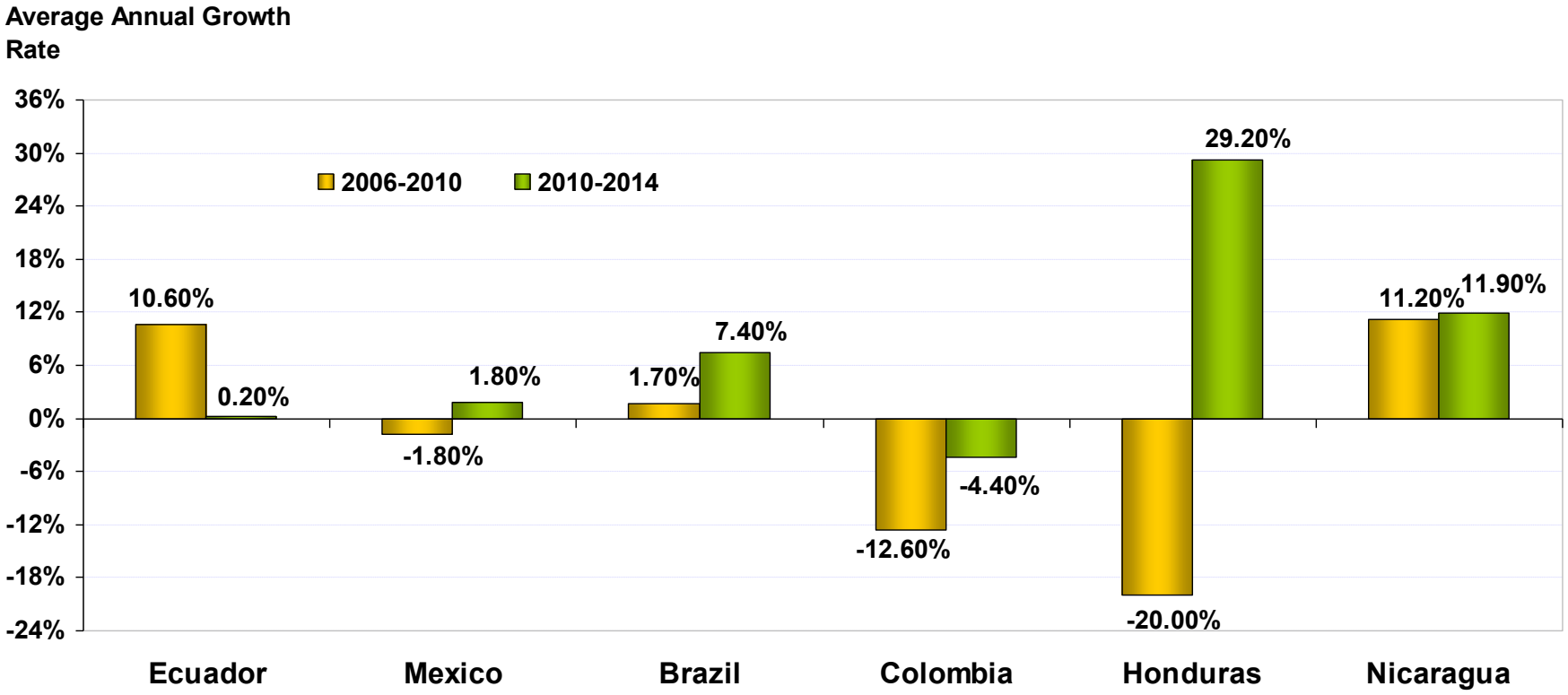
Shrimp Aquaculture in Latin America:

2006-2010 vs. 2010-2014

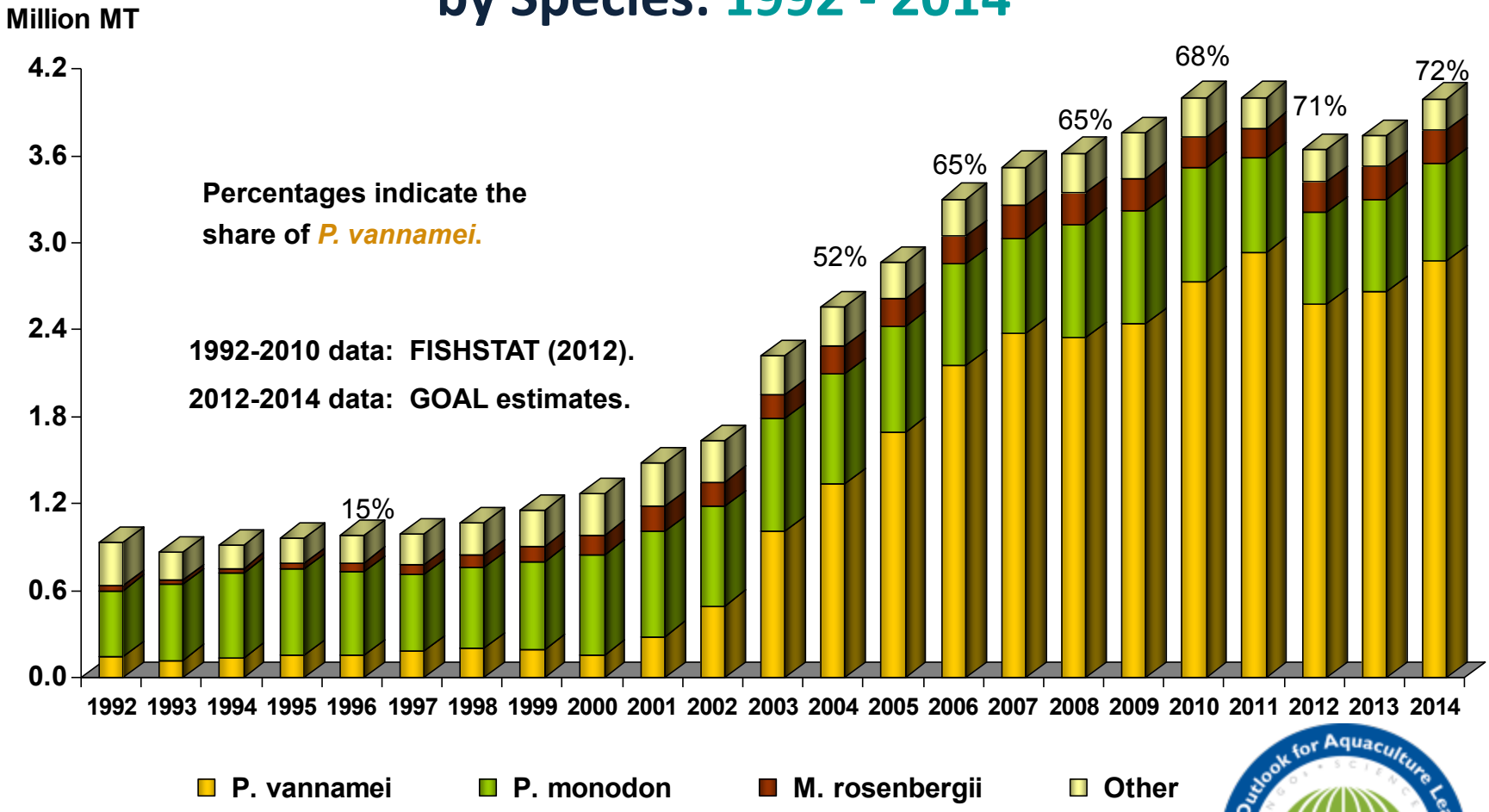


Sources: FAO (2012) & GOAL (2012).

Note: *M. rosenbergii* is not considered.

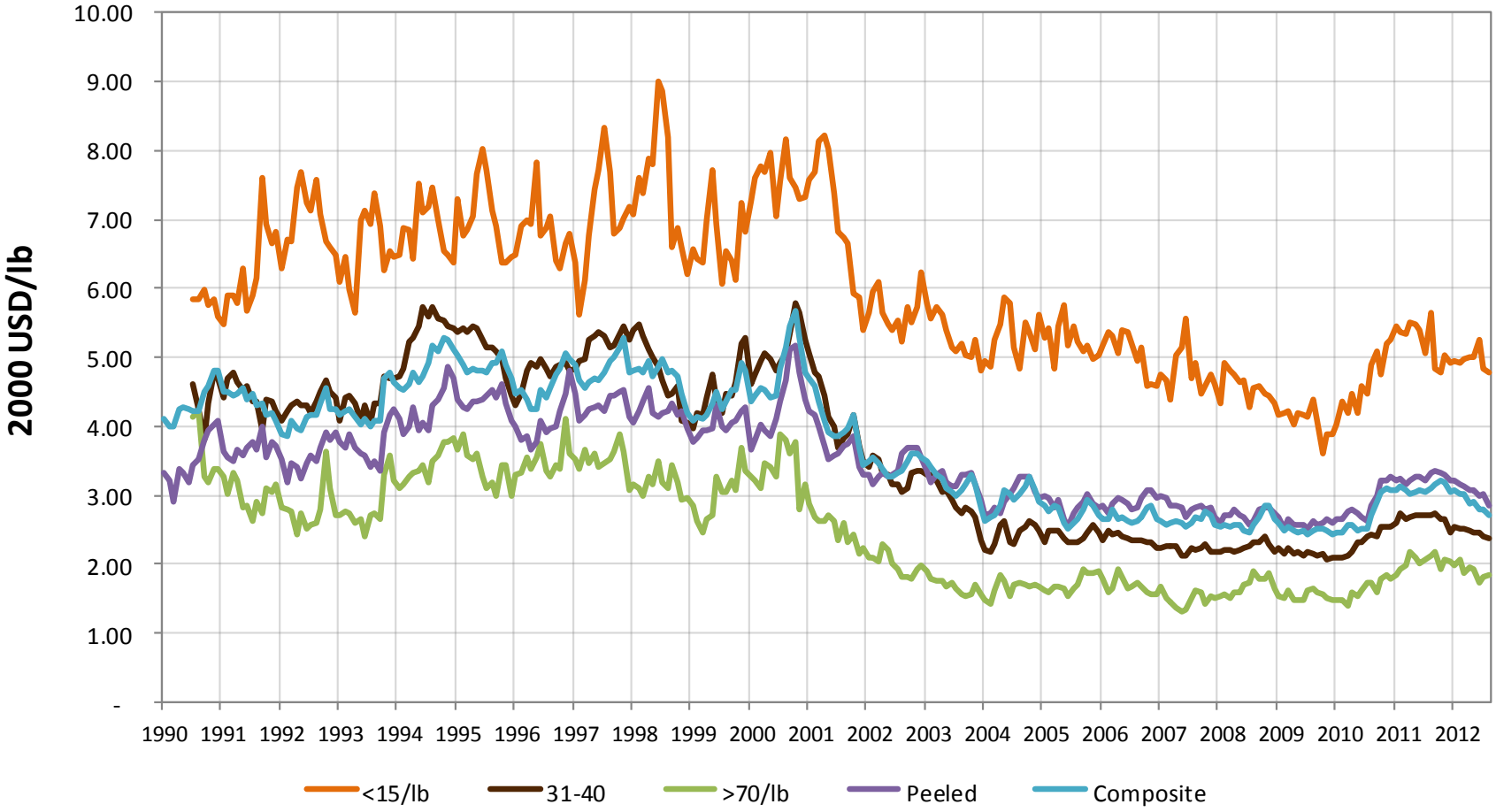
Global Outlook for Aquaculture Leadership BANGKOK 2012 ™

GOAL 2012 Survey
World Shrimp Aquaculture (including *M. rosenbergii*) by Species: 1992 - 2014



Sources: FAO (2012) & GOAL (2012).

Trends in U.S. Shrimp Import Prices



Source: USDC/NMFS (2012)

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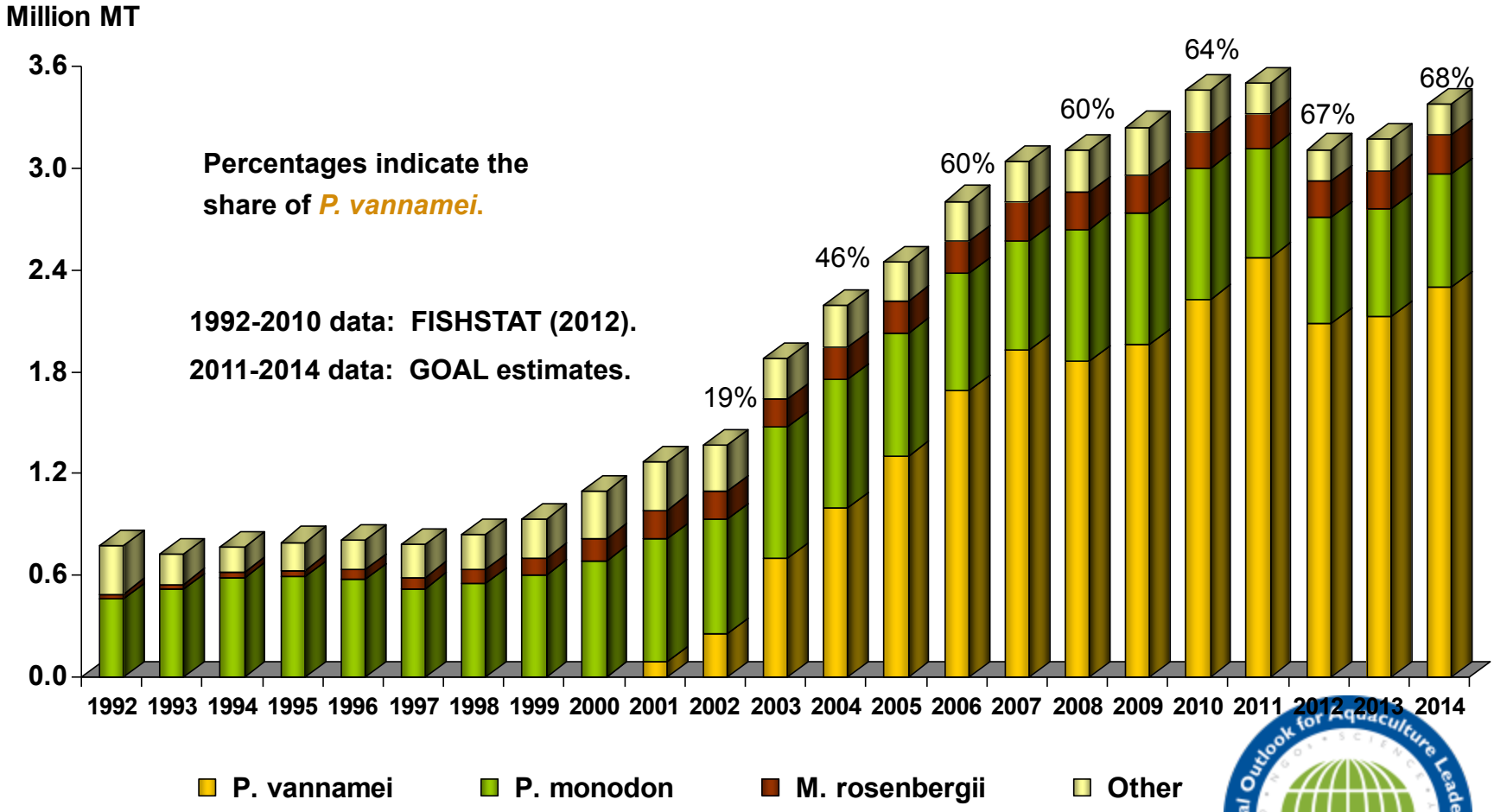
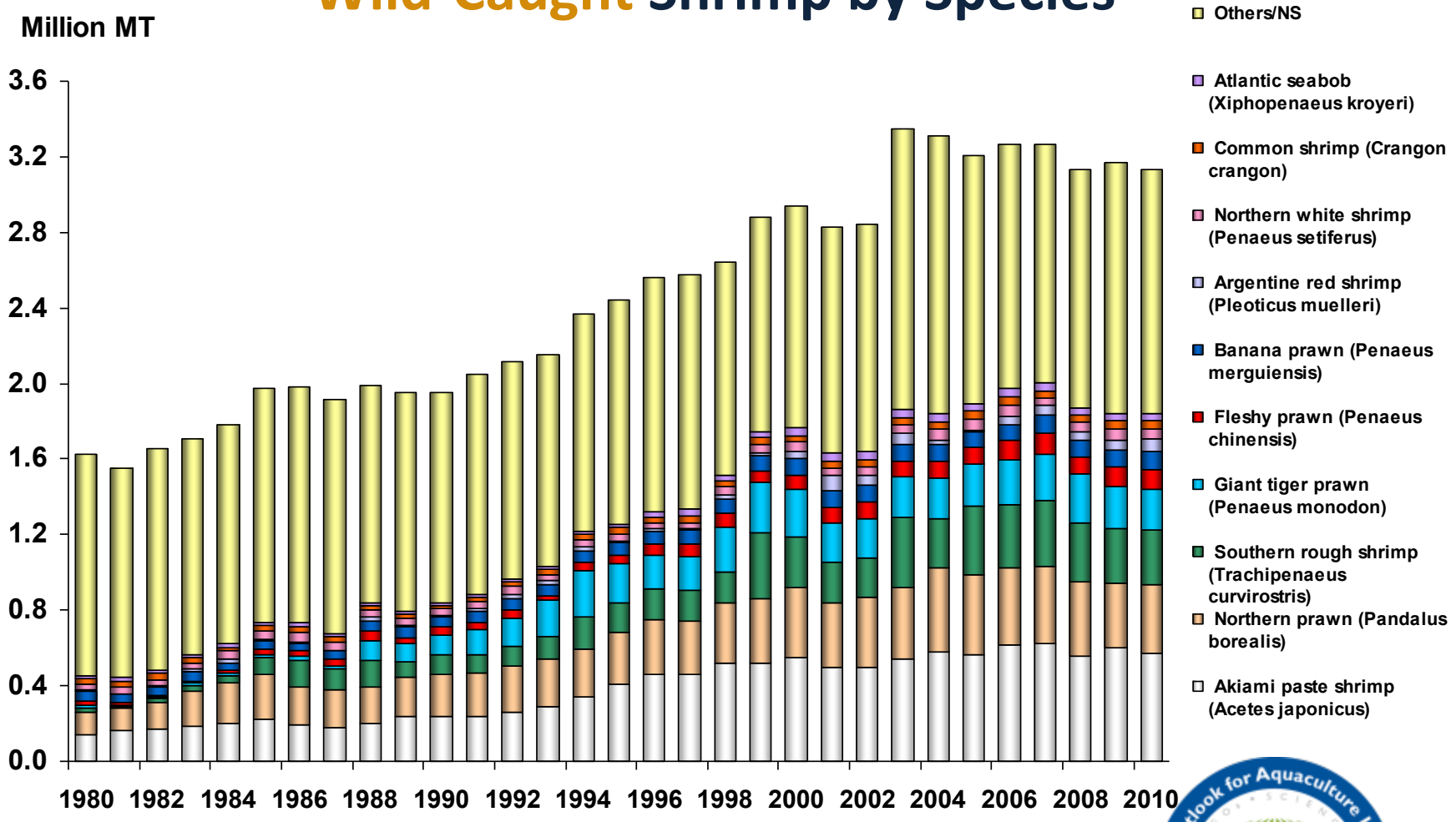
GOAL 2012 Survey
Shrimp Aquaculture (including *M. rosenbergii*) in Asia by Species: 1992 - 2014



Sources: FAO (2012) & GOAL (2012).

World Landings of Wild-Caught Shrimp by Species



Source: FAO (2012).

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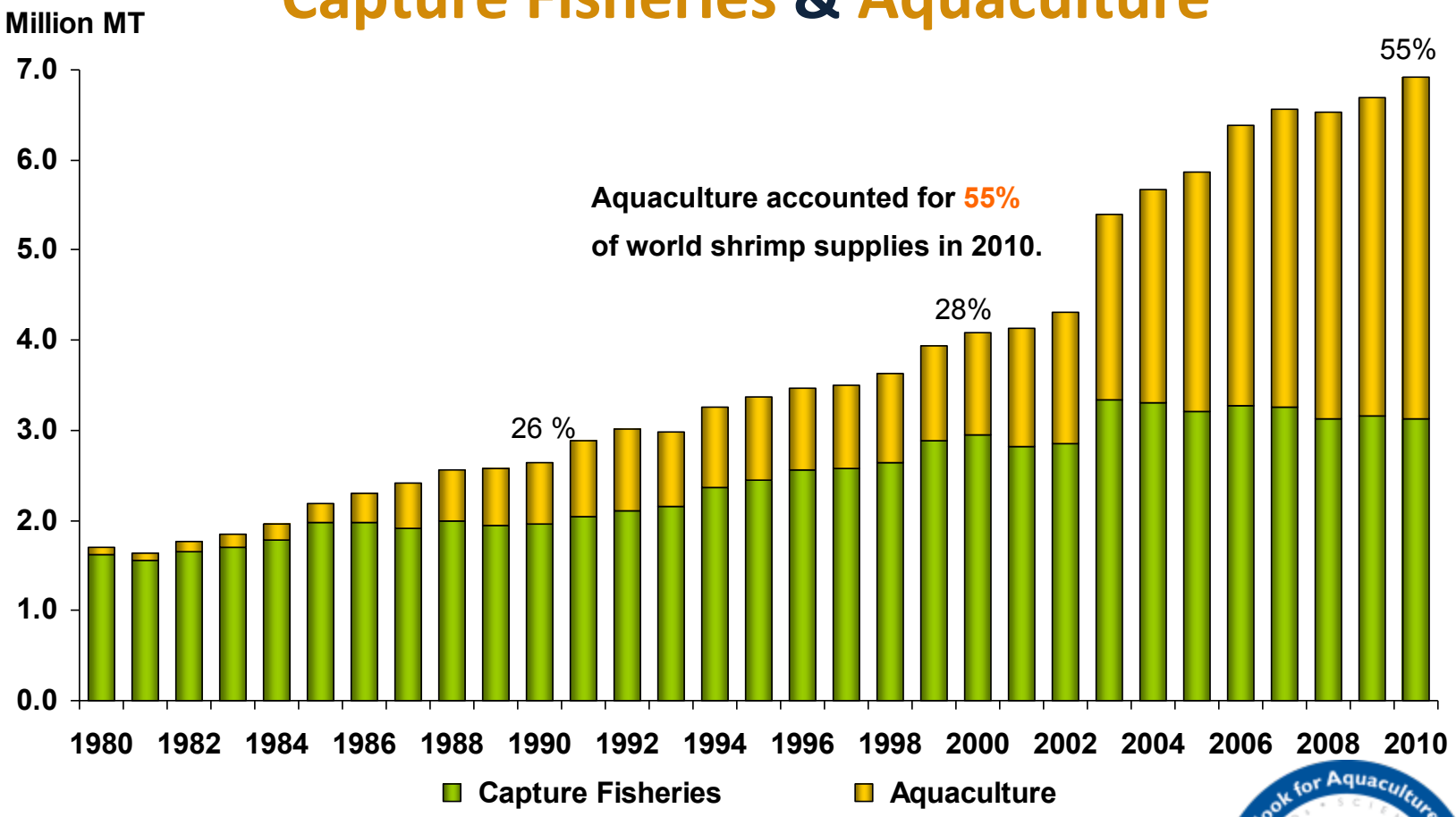
World Production of Shrimp

Capture Fisheries & Aquaculture



Source: FAO (2012).

Notes: *M. rosenbergii* is not included.

China includes freshwater production of *P. vannamei*.

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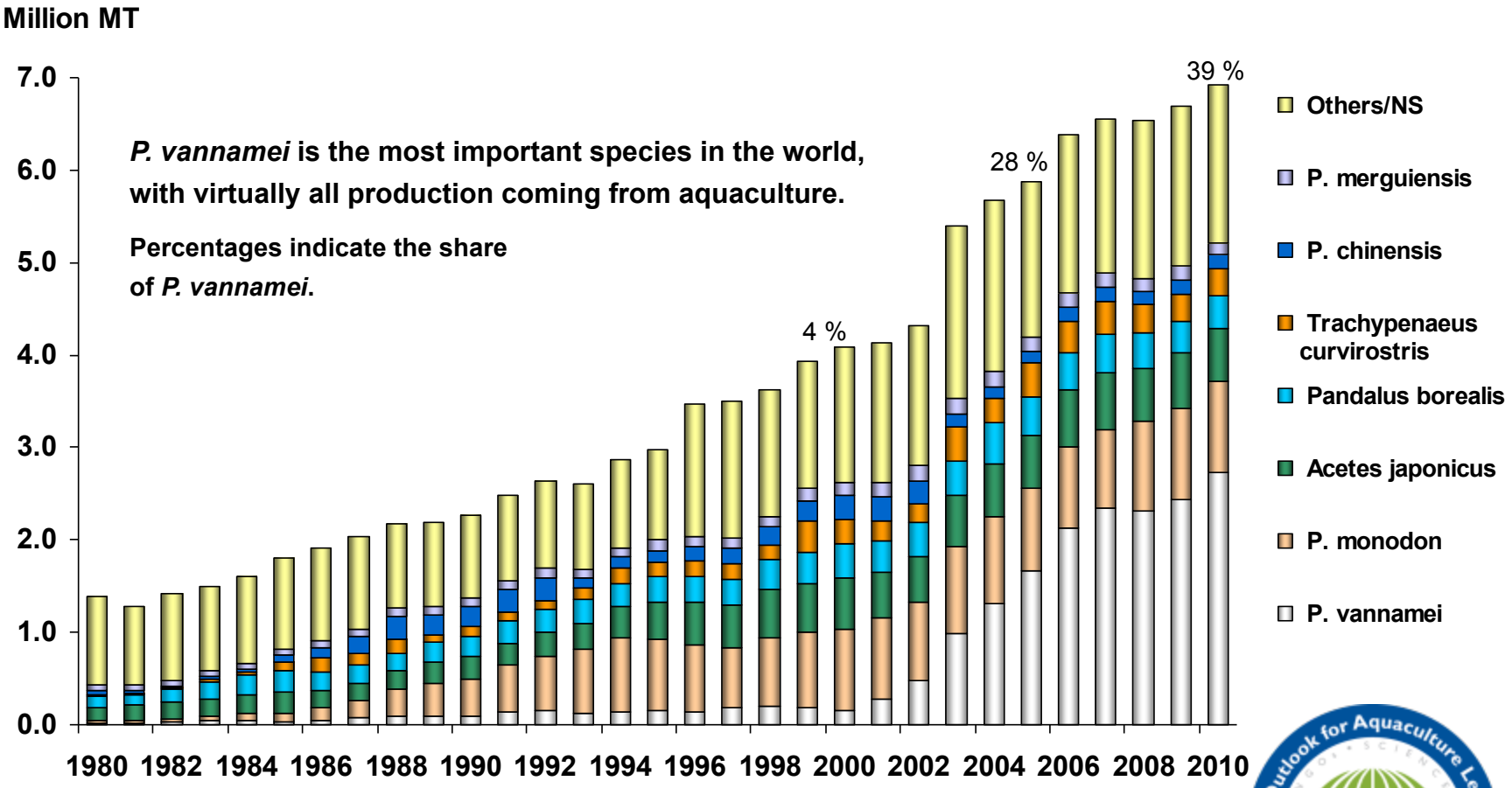
World Production of Shrimp by Species
Capture Fisheries & Aquaculture Combined



Source: FAO (2012).

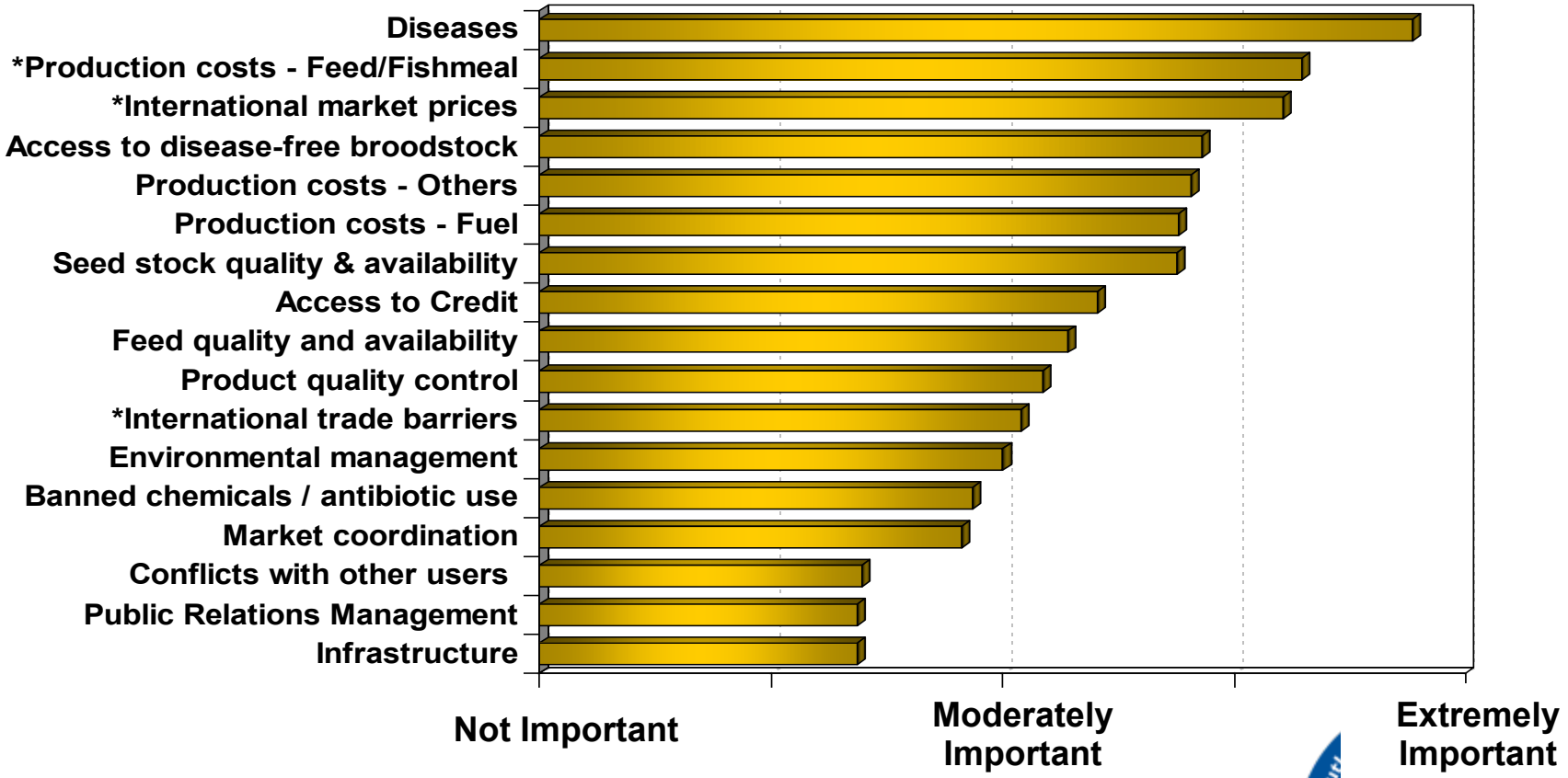
Notes: *M. rosenbergii* is not included.

Freshwater production of *P. vannamei* in China is included.

GOAL 2012 Survey

Issues & Challenges in Shrimp Aquaculture

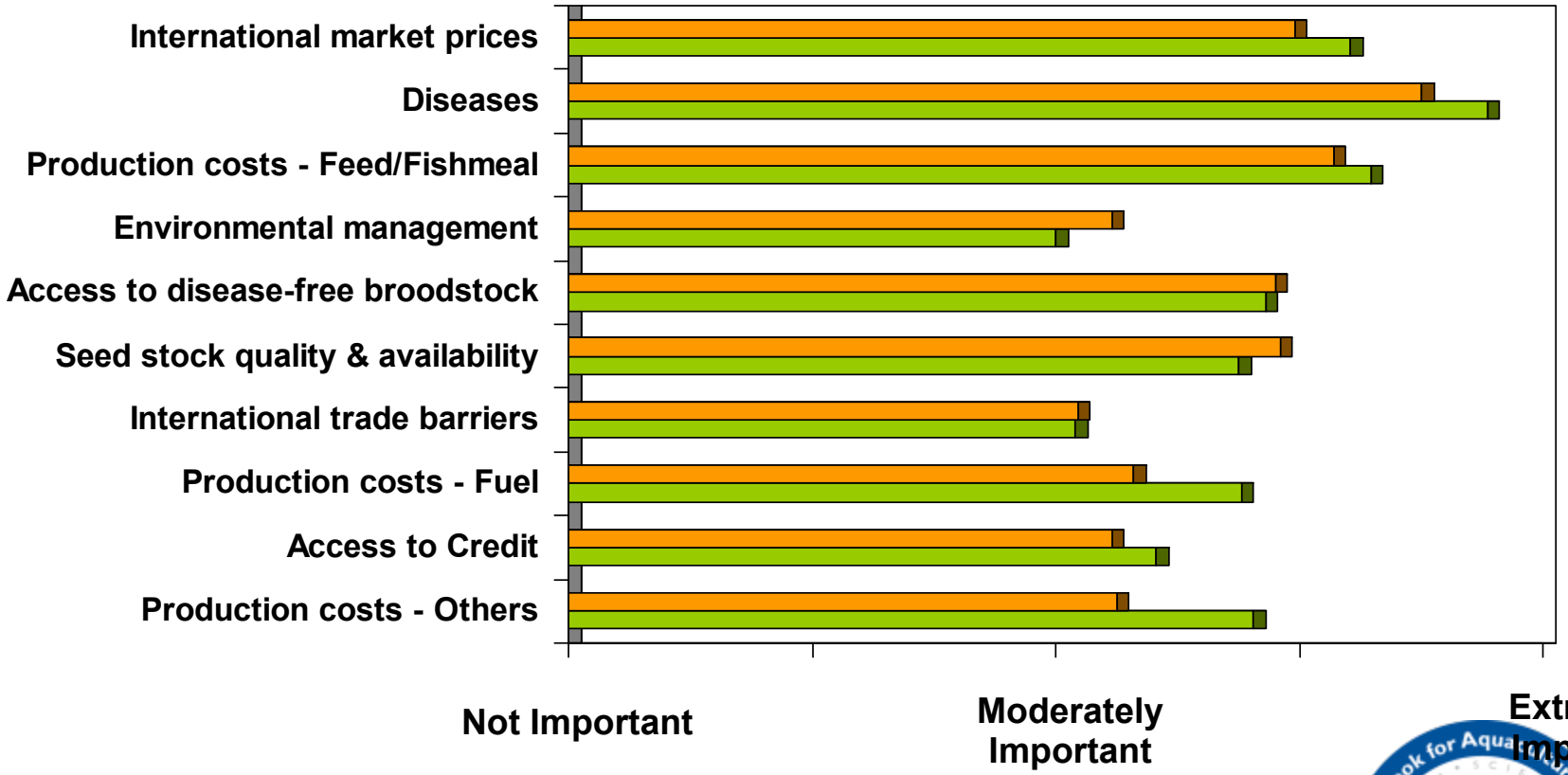
All Countries



Source: GOAL (2012).

Asterisk indicates Top 3 issue in GOAL 2007 Survey

Worldwide Top Issues & Challenges in Shrimp Aquaculture 2012 Survey vs. 2011 Survey



Source: GOAL (2012).

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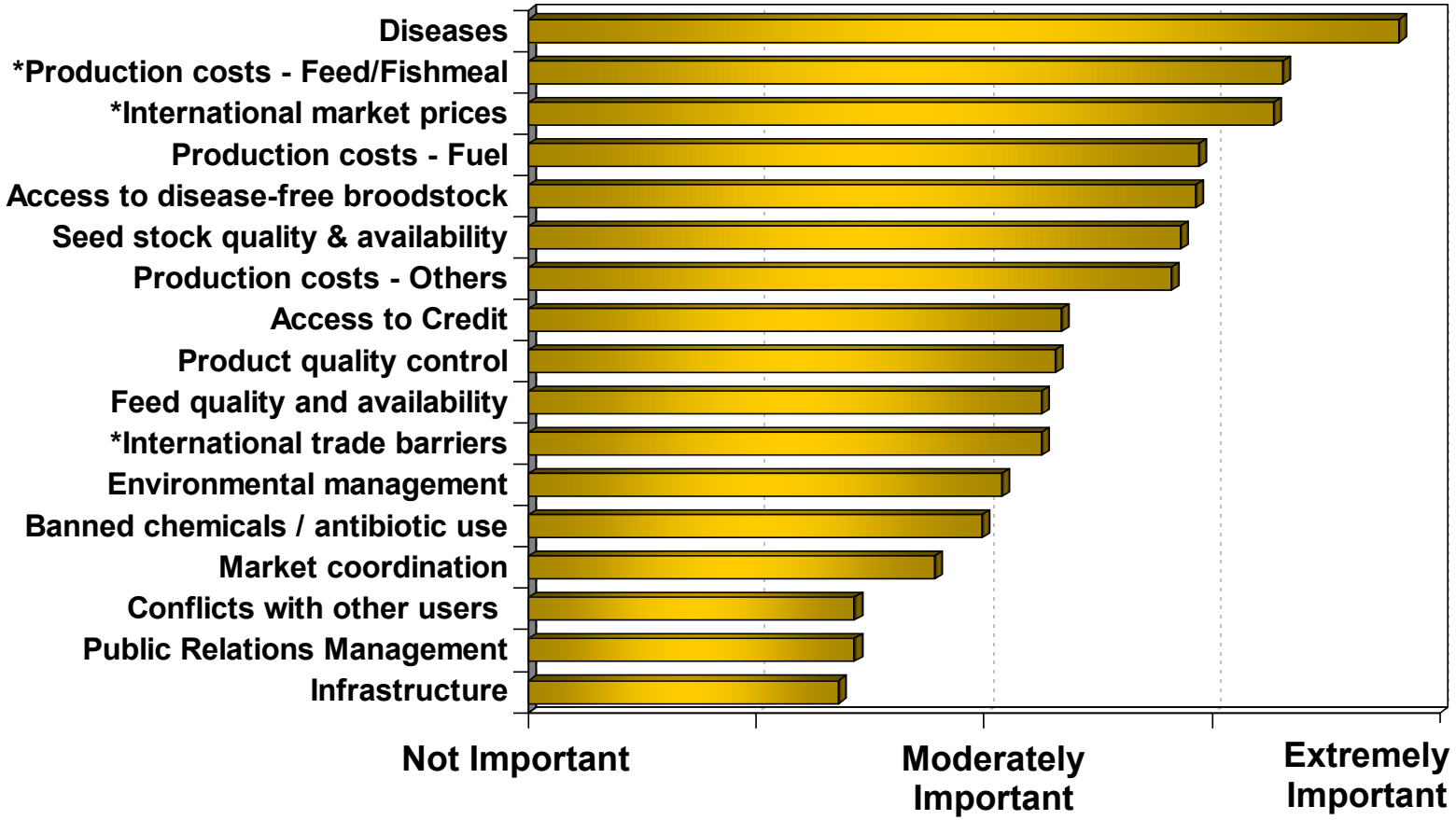
GOAL 2012 Survey

Issues & Challenges in Shrimp Aquaculture - Asia



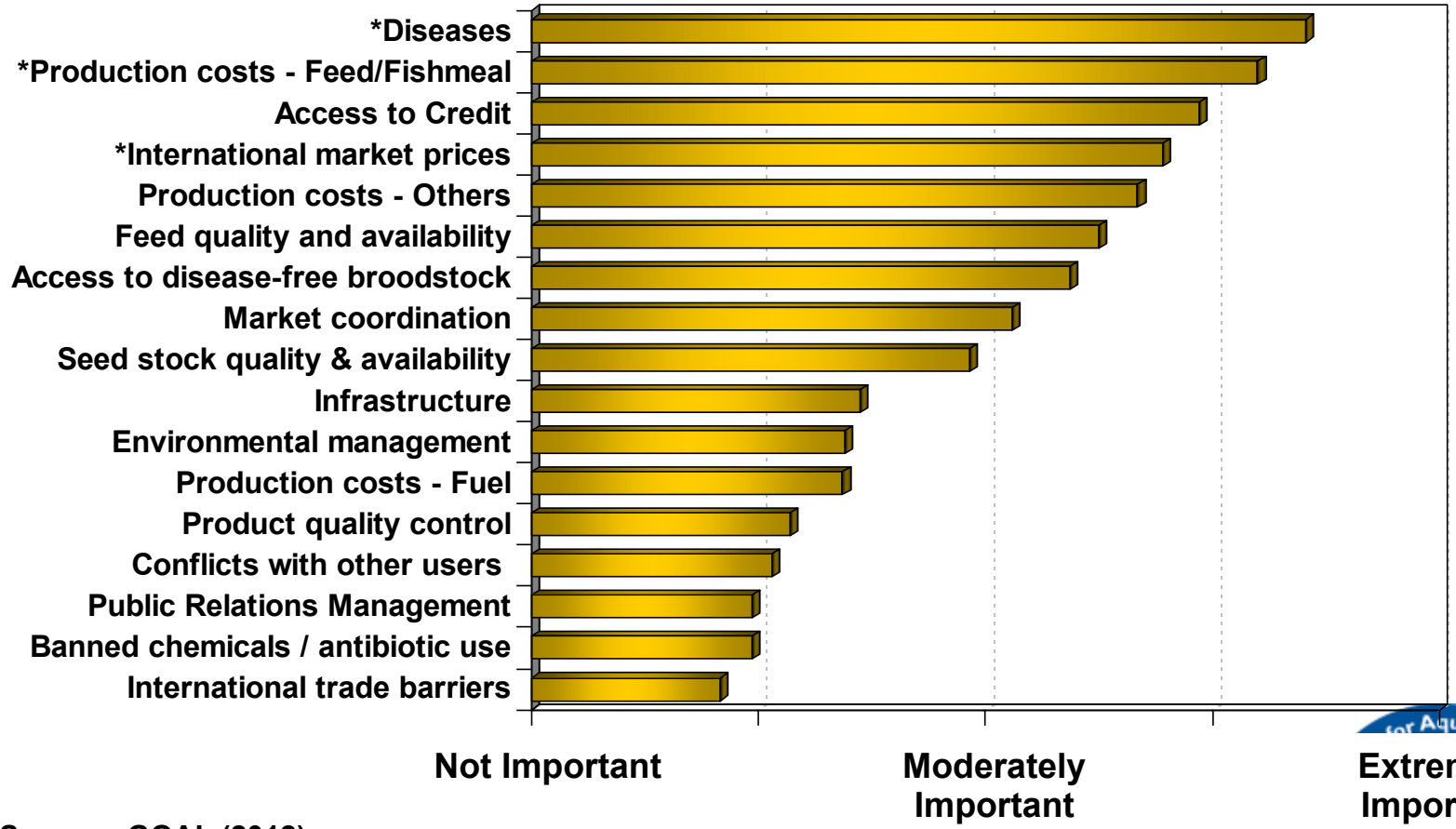
Source: GOAL (2012).

Asterisk indicates Top 3 issue in GOAL 2007 Survey

GOAL 2012 Survey

Issues & Challenges in Shrimp Aquaculture

Americas



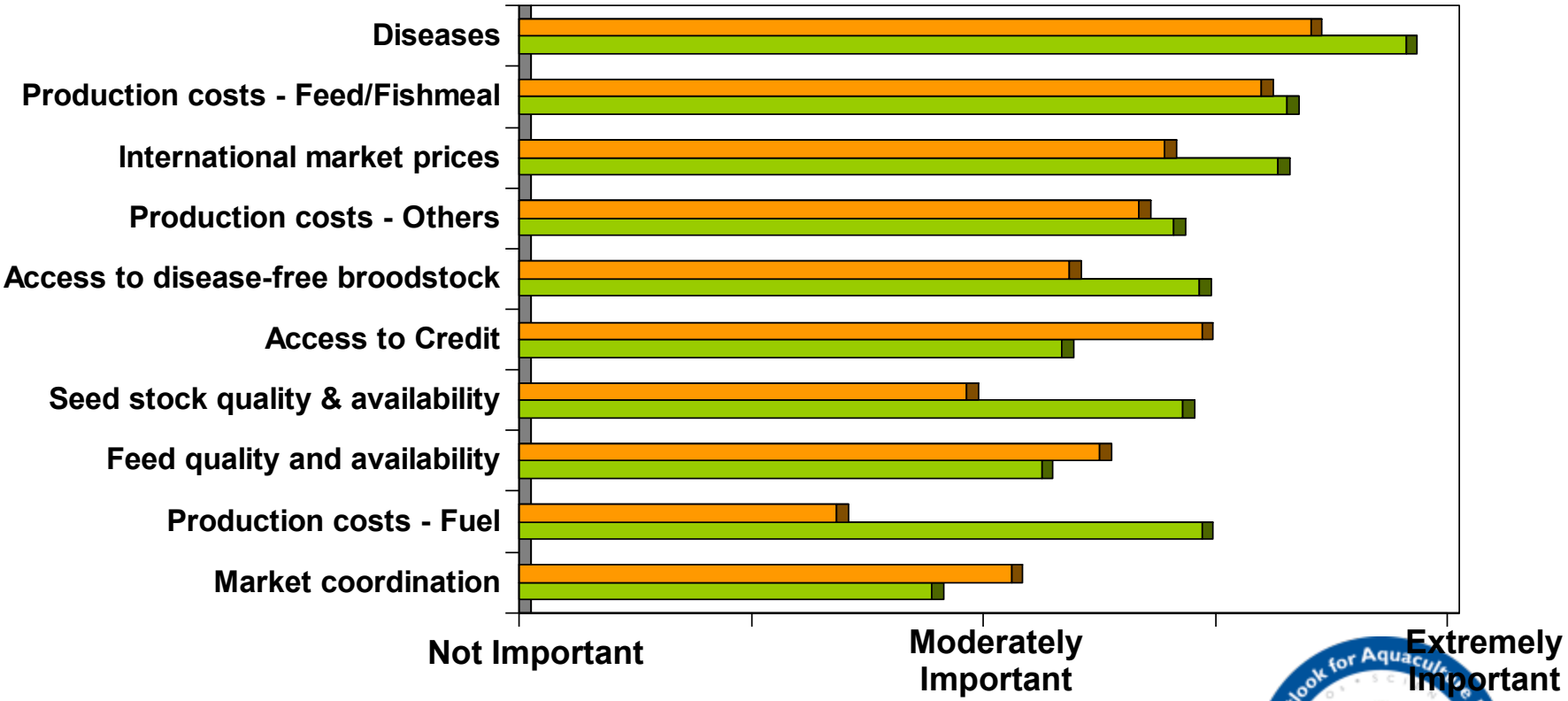
Source: GOAL (2012).

Asterisk indicates Top 3 issue in GOAL 2007 Survey

GOAL 2012 Survey

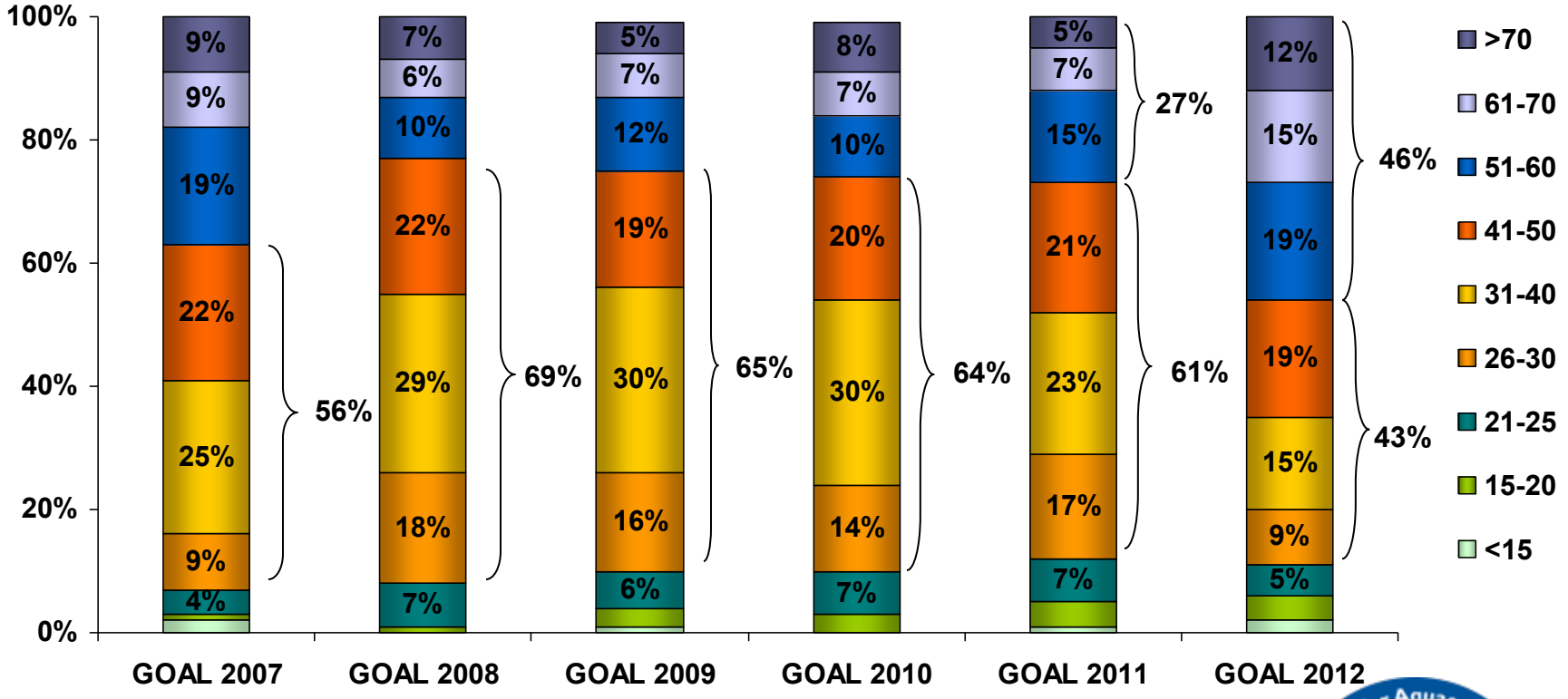
Top Issues & Challenges in Shrimp Aquaculture

Asia vs. Latin America



Source: GOAL (2012).

Composition of Shrimp Aquaculture Production by Size Categories – Comparison of Survey Data for Asia



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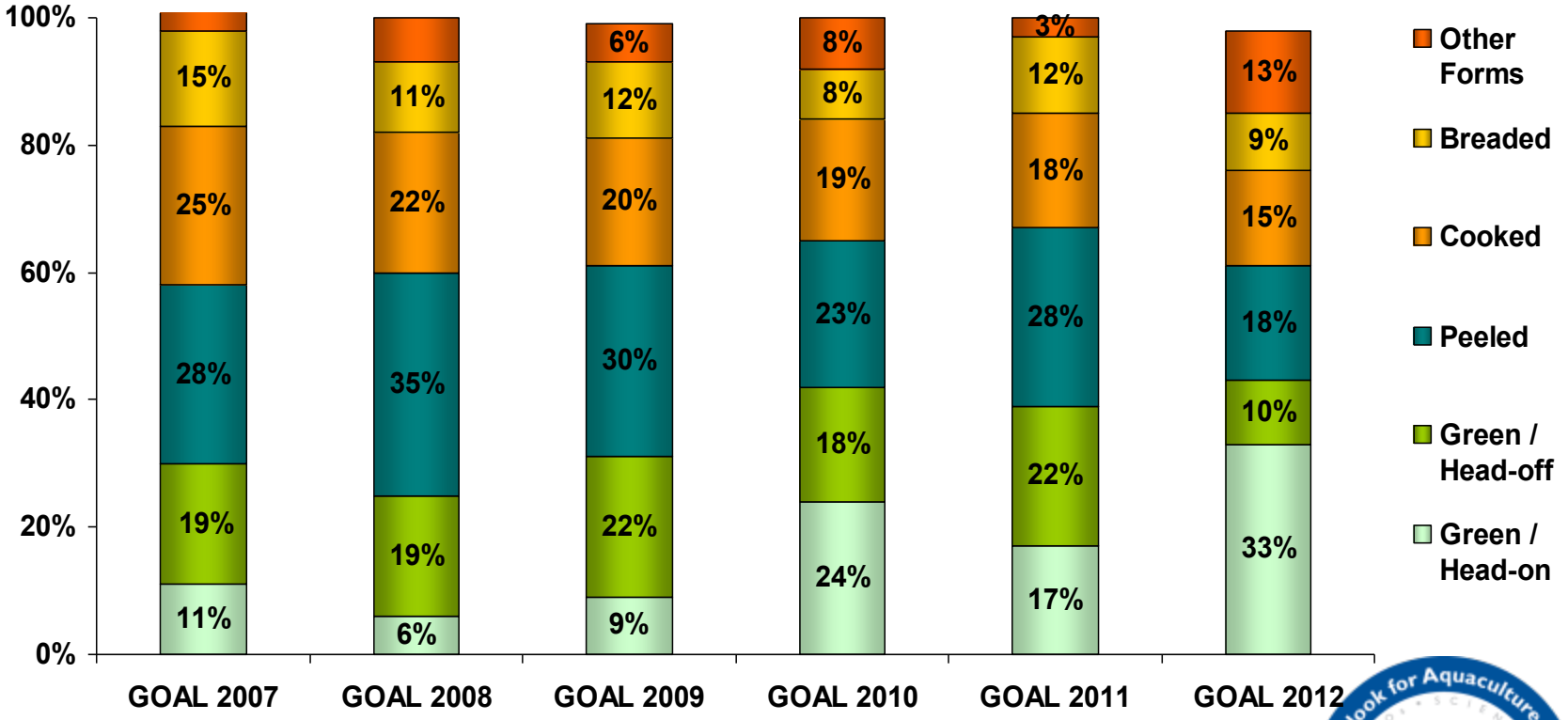
Expected Trends in Shrimp Aquaculture
Size Categories - GOAL Survey 2012

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

Composition of Shrimp Aquaculture Production by Product Form – Comparison of Survey Data for Asia



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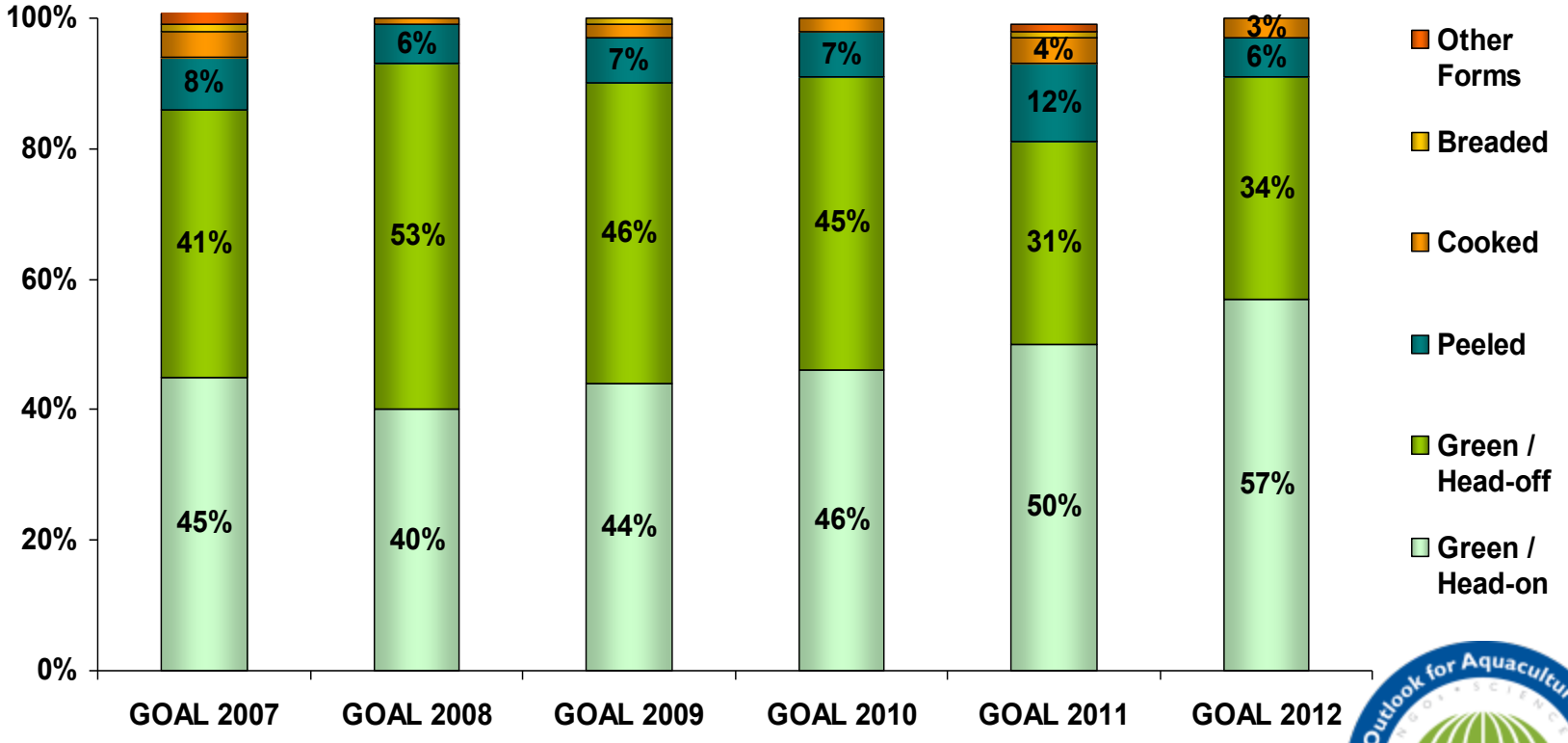
Composition of Shrimp Aquaculture Production by Product Form – Comparison of Survey Data for the Americas



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Expected Trends in Shrimp Aquaculture

Product Form - GOAL Survey 2012

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

GOAL 2012 Survey

Global economic conditions will be better in 2013 compared to 2012

Outlook	Asia	Americas	Others
Strongly Agree		Ecuador	
Agree	Malaysia, Taiwan, Thailand	Brazil, Mexico	
Neutral/No Opinion	China, Philippines, South Korea	Colombia, Nicaragua, Peru	
Disagree	India, Indonesia, Vietnam	Honduras, Panama	Madagascar, New Caledonia
Strongly Disagree			

GOAL 2012 Survey

Feed prices will be lower in 2013 compared to 2012

Outlook	Asia	Americas	Others
Strongly Agree			
Agree		Colombia	
Neutral/No Opinion			
Disagree	China, Indonesia, Malaysia, Philippines, South Korea, Taiwan	Brazil, Ecuador, Honduras, Mexico, Nicaragua, Panama	Madagascar
Strongly Disagree	India, Thailand, Vietnam	Peru	New Caledonia

GOAL 2012 Survey

The global shrimp market will strengthen in 2013 compared to 2012

Outlook	Asia	Americas	Others
Strongly Agree	Taiwan	Ecuador	
Agree	China, Malaysia, Philippines, Vietnam	Colombia, Mexico, Panama, Peru	New Caledonia
Neutral/No Opinion	India, Indonesia, South Korea, Thailand	Honduras	Madagascar
Disagree		Brazil, Nicaragua	
Strongly Disagree			

GLOBAL PARTNERSHIP FOR OCEANS

www.globalpartnershipforoceans

What is the Global Partnership for Oceans and why and how should the seafood sector be engaged?

If you are interested, please come talk to me during the conference.

Thank You!