Soy Aquaculture Alliance

SOY IN AQUACULTURE FEED DEVELOPMENTS

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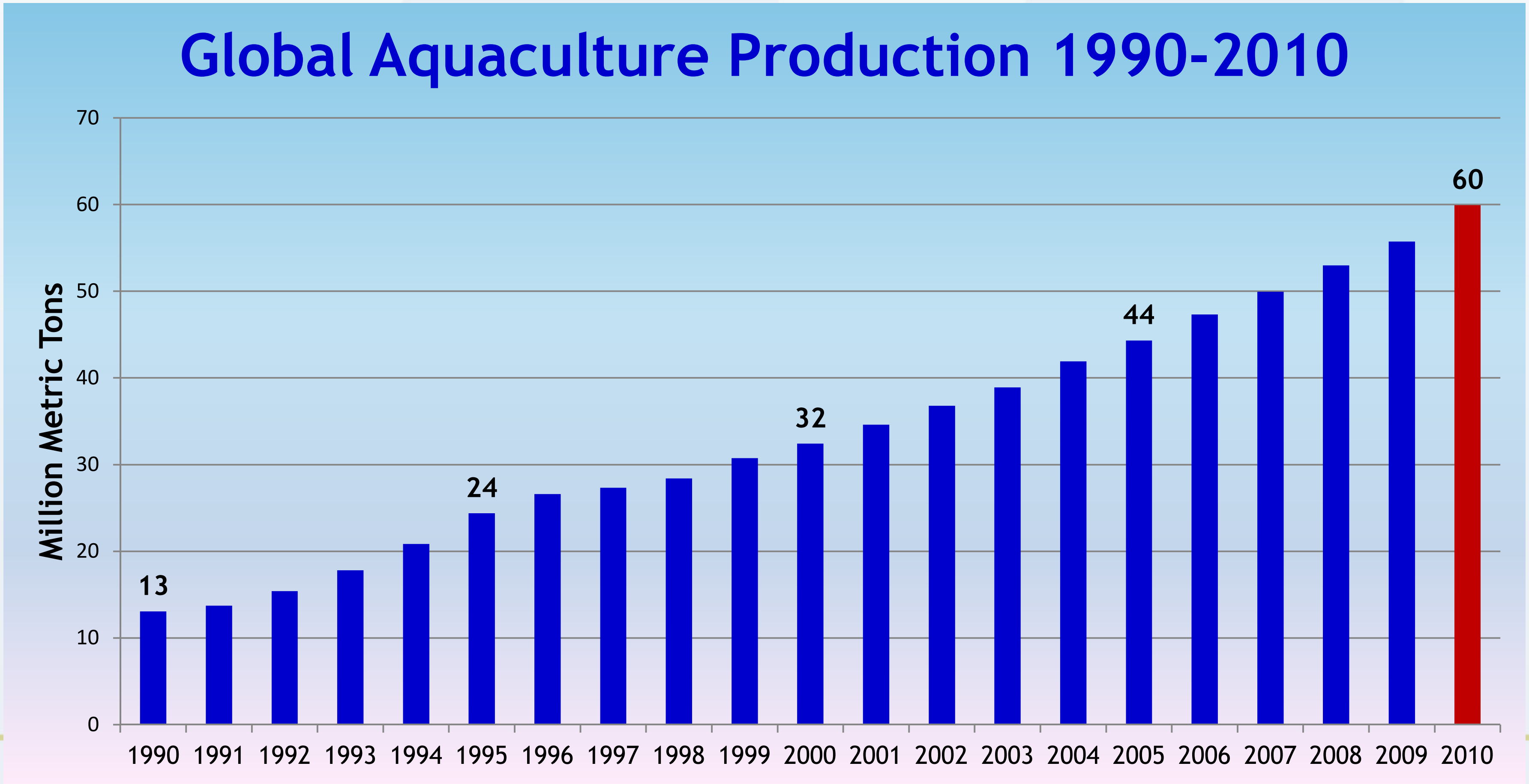
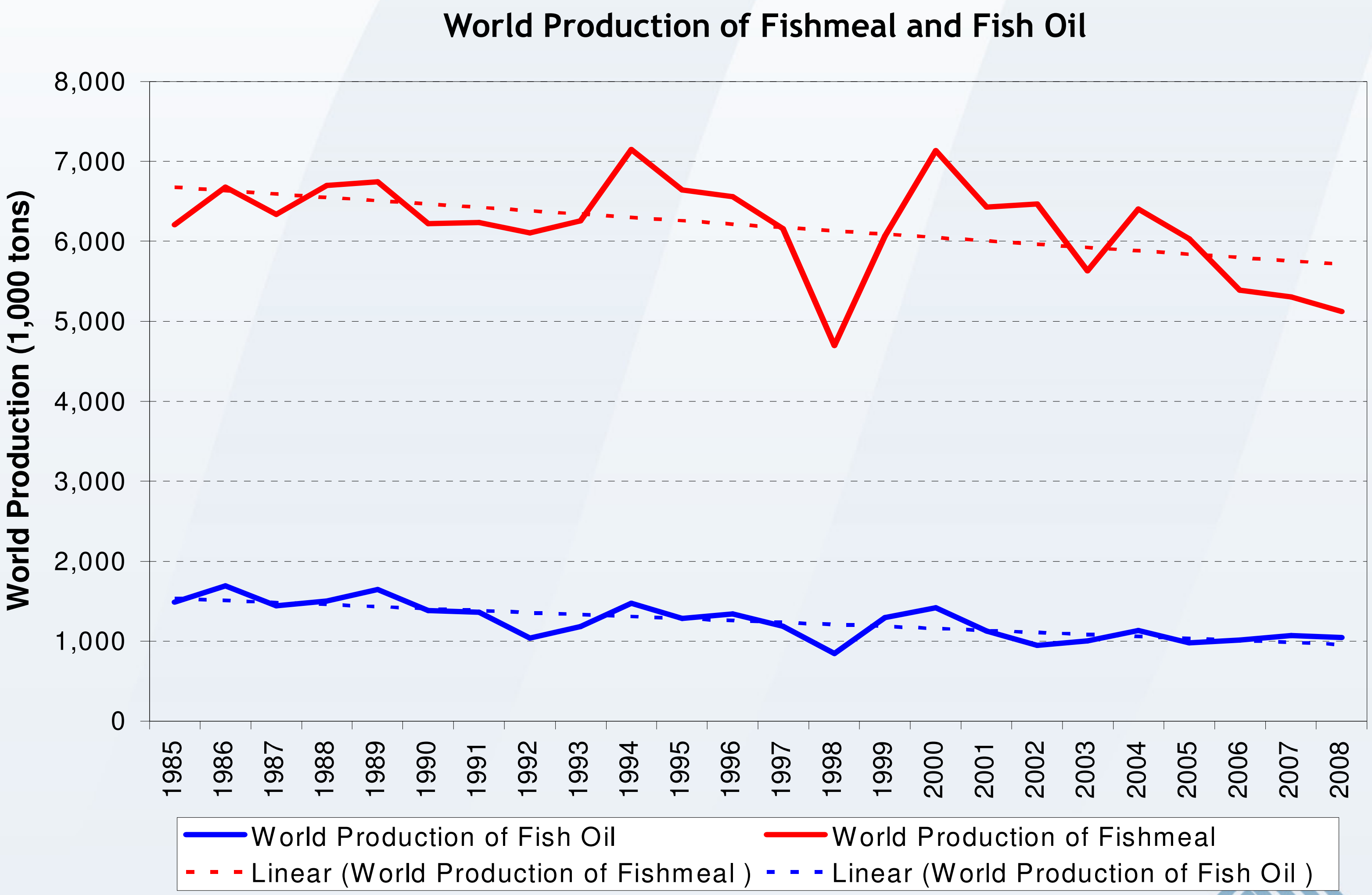
Soy Aquaculture Alliance

GLOBAL AQUACULTURE GROWTH

❖ Global aquaculture production has grown at an average annual growth rate of 6.6% over the last 10 years (1998-2007). Projections indicate it needs to grow by another 40-100 million MT by 2030.



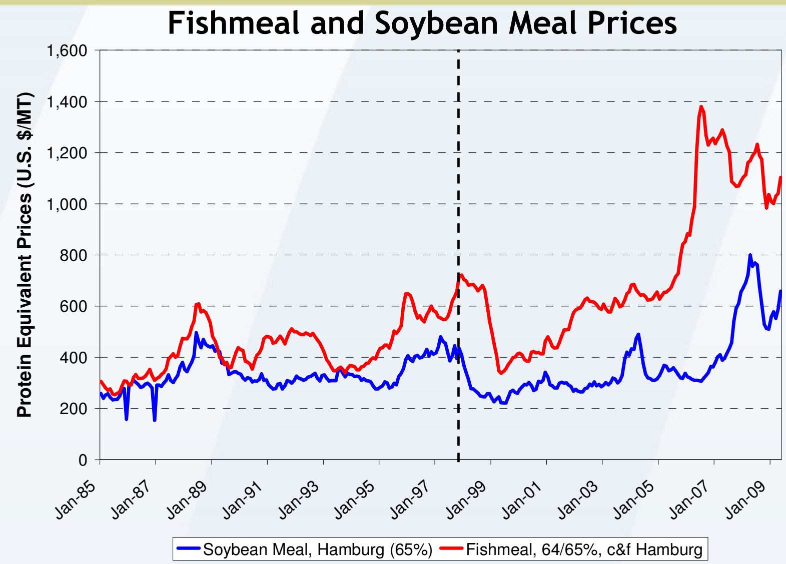
WHY DO SOYBEAN FARMERS CARE ABOUT AQUACULTURE?

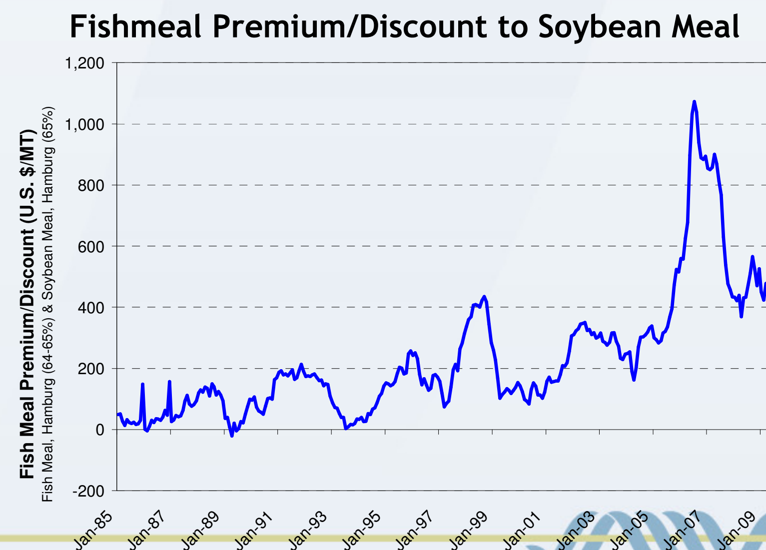


Source: Oil World

WHY DO SOYBEAN FARMERS CARE ABOUT AQUACULTURE?

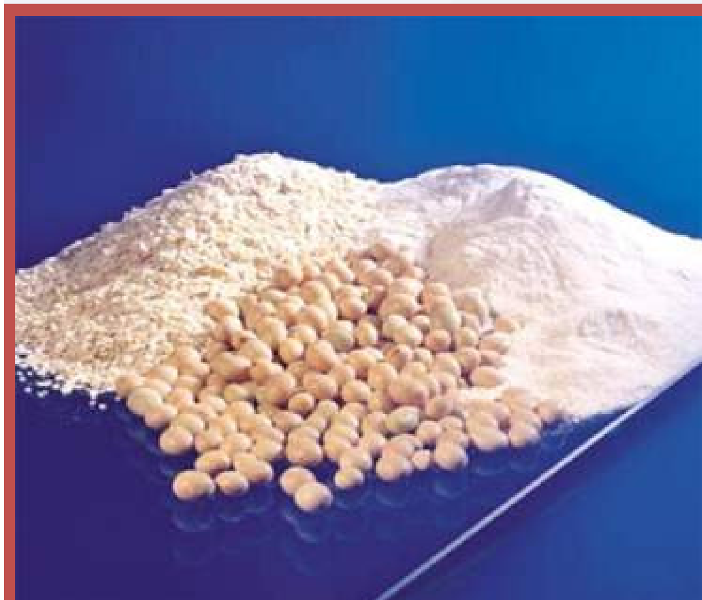
- The fishmeal premium: general upward trend since the early 2000s, peaked in 2006 and 2007
- Since then, the premium has declined to an average of $450/MT, still above the historical average of $200/MT
- Fishmeal prices have likely bottomed out, so fishmeal premiums are expected to increase as supplies continue to tighten and demand grows

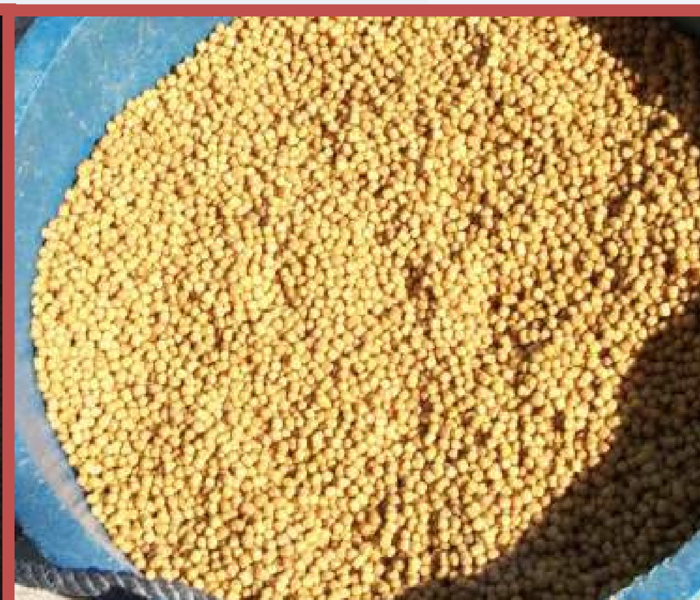




CURRENT SOYBEAN USAGE

- The nutritional qualities of soybean meal make it effective source of quality protein and amino acids for freshwater fish feeds, including feeds for all life stages. Current estimates show 10 mmt of soy are being used in aquafeeds today.





WHY IS THIS IMPORTANT DOMESTICALLY?

- The United States is the 2nd largest consumer of seafood in the world behind China

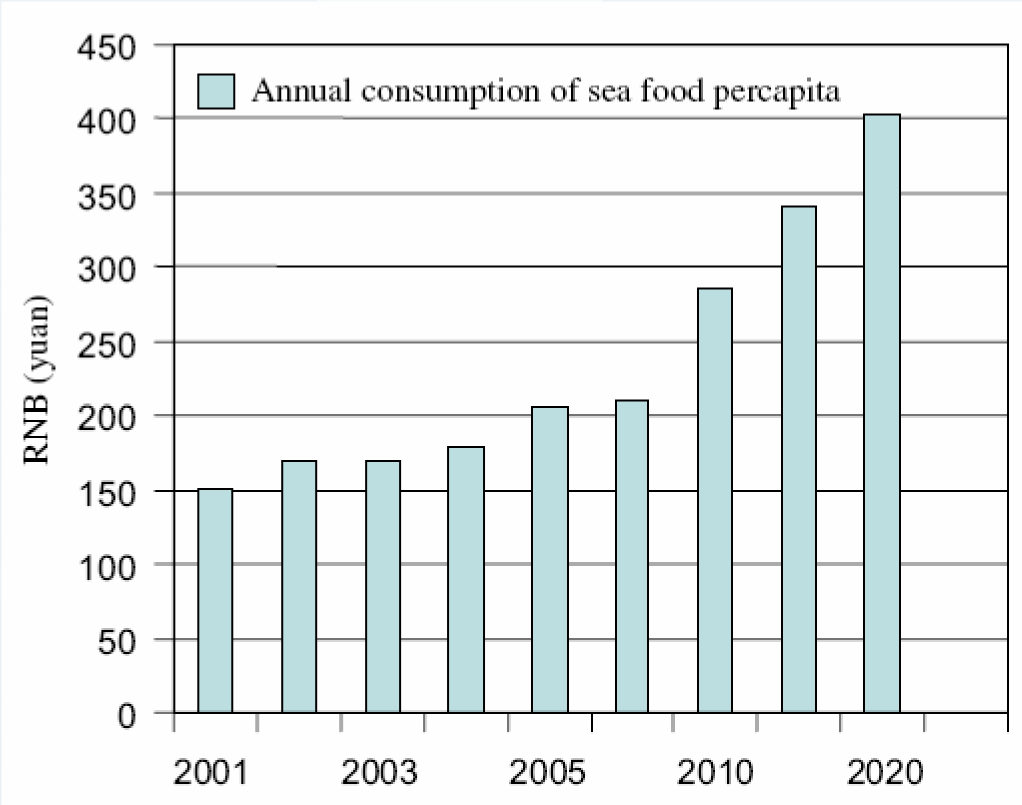
- Changes in the global economy have created major seafood supply issues
  - According to the Chinese government, China became a net importer of seafood in 2010 (a year ahead of projections)

WHY IS THIS IMPORTANT DOMESTICALLY?

Taken from George Chamberlain's GAA presentation

- Domestic demand for seafood in China has increased from 7 kg consumption per person in 1985 to about 25kg in 2005

- The same source estimates that China will double its per capita spending on seafood products between 2008 and 2020 (in Yuan terms)



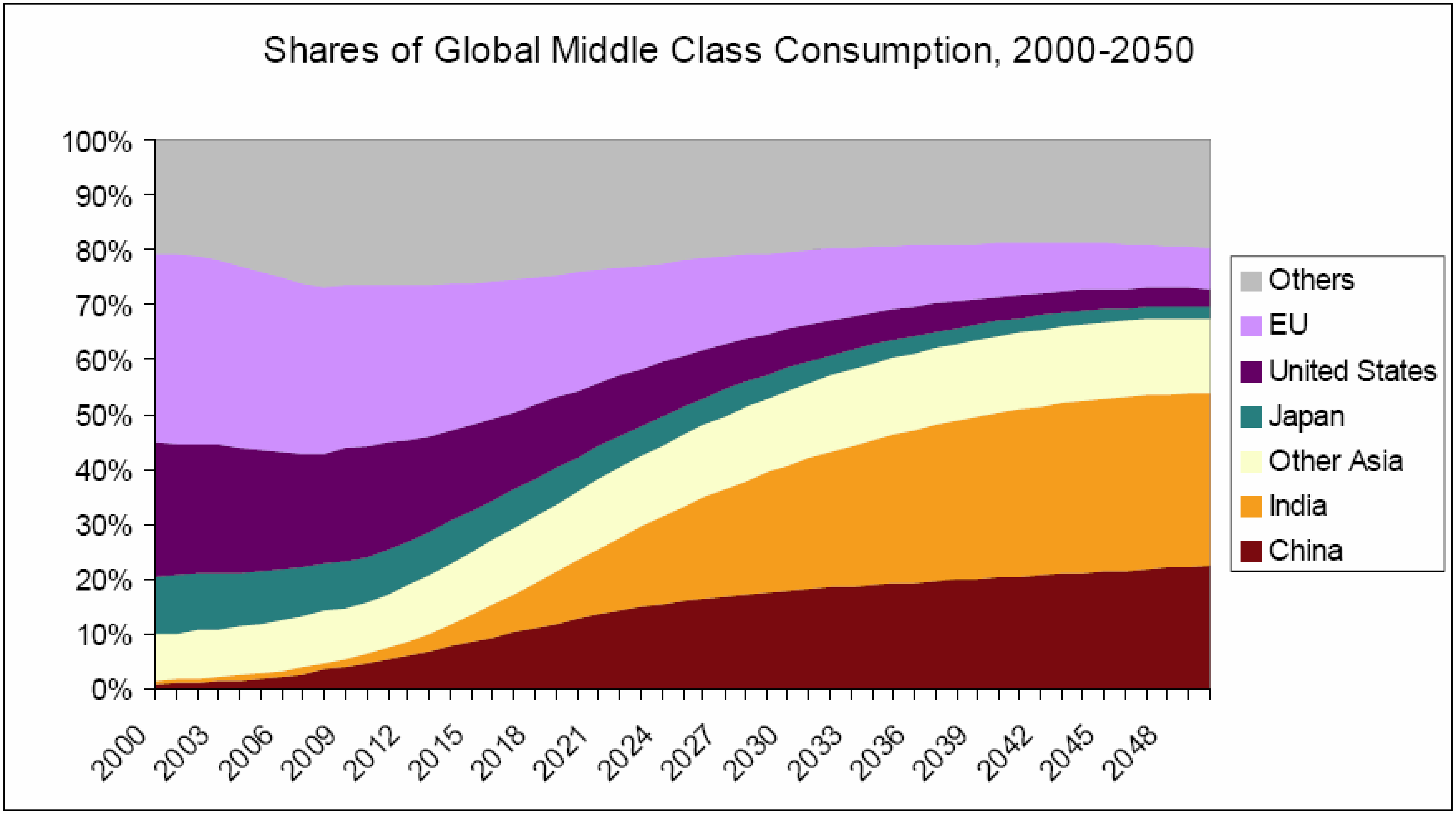
Source: K.B. Lindkvist et al. / Marine Policy 32 (2008)

WHY DOMESTIC AQUACULTURE?

- The world's economic centre of gravity, 1980–2007 (black) and extrapolated (in red), at 3--year intervals

Source: Danny Quah, "The global economy's shifting centre of gravity", LSE 2010

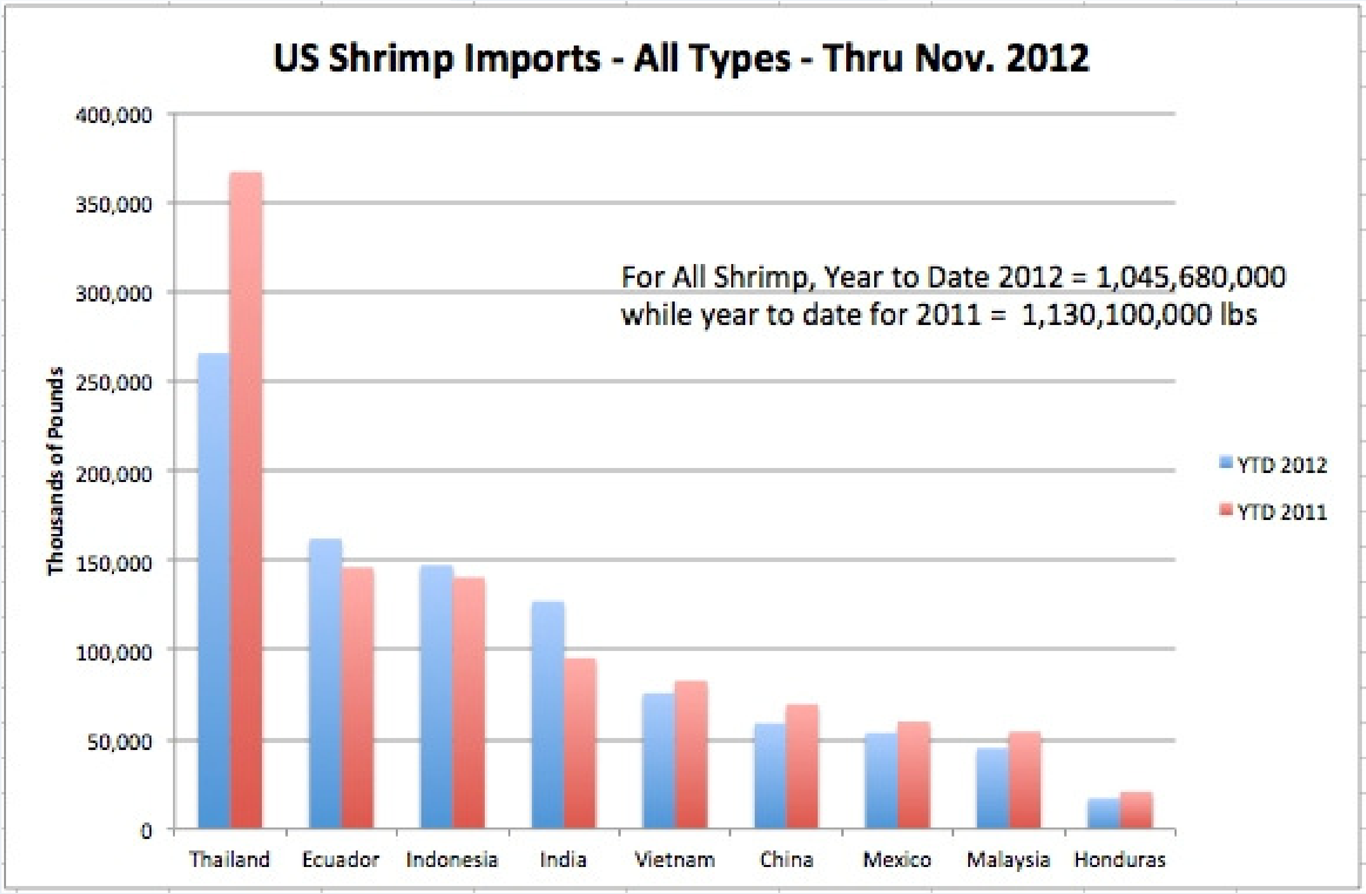
WHY DOMESTIC AQUACULTURE?



Source: The Emerging Middle Class in Developing Countries, OECD 2010

WHY IS THIS IMPORTANT DOMESTICALLY?

- Shrimp imports to the US have declined four months in a row



Source: Urner Barry

THE SOY AQUACULTURE ALLIANCE

- Sourcing seafood in the U.S.
  1. If we don’t grow it, we might not get to eat it
  2. Look at export opportunities

- Why USB and QSSBs are involved:
  1. **Funding many projects, but not coordinating**
  2. Potential domestic market for U.S. soybeans
  3. Potential to supply seedstock to a global industry

RESEARCH IS A MAJOR DRIVER

- Peer review process
  - Science & Technology Advisory Panel (STAP)
    - Works with stakeholders to develop research priorities
    - Ranks reviews once they have been submitted
    - Makes suggestions to board of directors

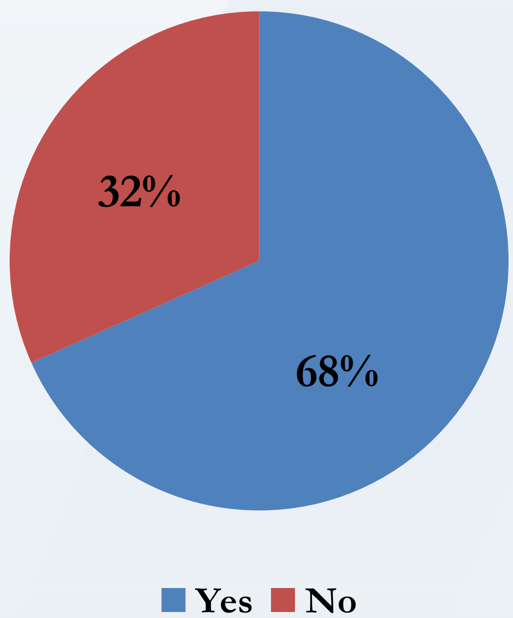
RESEARCH IS A MAJOR DRIVER

- Key research gaps identified for year 1
  1. Taurine requirements of fish
  2. Impacts of soy-based feeds on waste output
  3. Genetic selection to develop domesticated broodstocks
     - Select for growth, disease resistance, ingredient tolerance, nutritional characteristics, etc…

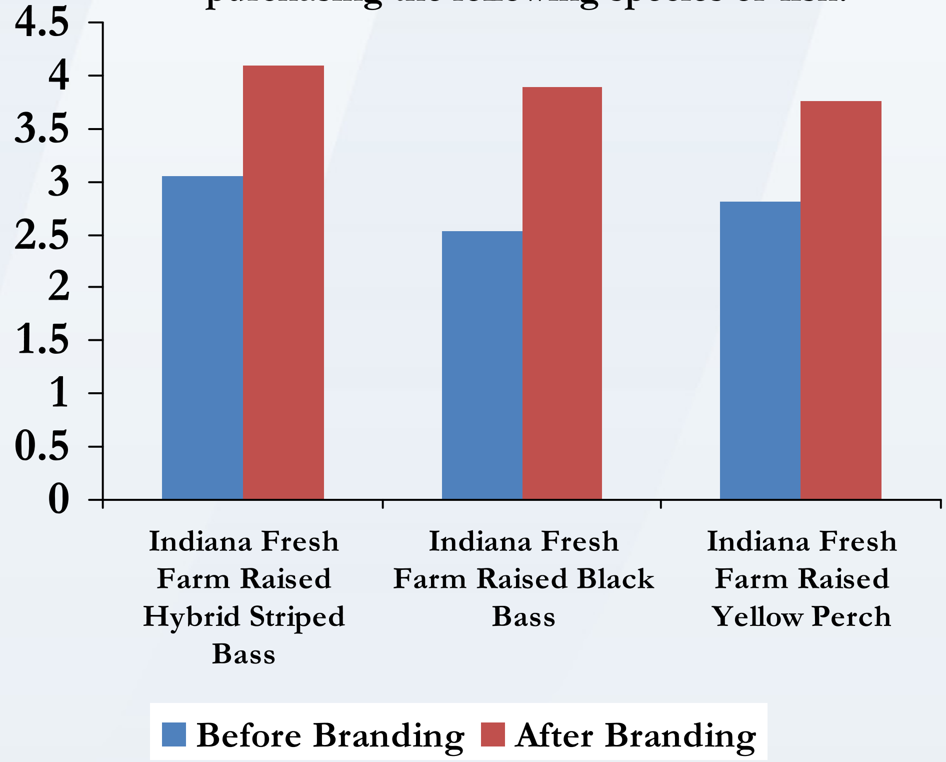
CASE STUDY – YELLOW PERCH

BRANDING YELLOW PERCH - RESTAURANTS

If an "Indiana Fresh Farmed Brand" was developed for these species of fish based on important freshness criteria, do you think your customers' interest would increase?



On a scale of 1 to 5 where 1 being not interested and 5 being very interested, how interested would your customers be in purchasing the following species of fish?



CURRENT YELLOW PERCH WORK

- Commercial yellow perch diets are not available, so working with Purdue University and Bell Aquaculture to develop a yellow perch feed

YELLOW PERCH RESEARCH

- Previous research indicated that hybrid striped bass EAA requirements could be predicted by whole body analysis + 20% EAA, but the addition of trp, thr and ile produced even better growth

- Used what is known from other studies to develop an EAA profile for practical yellow perch diets based on whole body amino acid concentrations

YELLOW PERCH RESEARCH

- Used the results from this study to form recommendations for EAA concentrations in a commercial formula
- Until Bell Aquaculture, not enough demand from yellow perch producers for a mill to justify producing a feed
- Worked with a commercial feed mill to produce a test diet

SAMPLE YELLOW PERCH DIET

Ingredient	%
Fish meal 64/67	5.00
Corn protein concentrate 75%	7.50
Poultry byproduct meal 60%	15.00
Soybean meal 46%	25.00
Whole wheat	25.00
Millrun	10.60
Vitamin premix	1.00
Choline chloride	0.15
Fish oil	2.80
Calcium propionate	0.05
Trace mineral premix	0.30
Stable C	0.10
Poultry fat	2.75
L-lysine HCl	1.00
Feather meal	3.75

YELLOW PERCH RESEARCH

- This diet worked, but wasn't ideal
- New soy products and processing techniques will allow us to advance this industry even further
- Conducted a trial with a specialty variety of soybeans

NEW PRODUCTS PROVIDE FLEXIBILITY

Composition of the experimental diets (g/100 g).

Ingredient	20 FM	15 FM	10 FM	5 FM	0 FM
Fish meal	20	15	10	5	0
SG 3010	36.8	42.3	48.3	53.9	59.4
Corn protein concentrate	5	5	5	5	5
Wheat flour	23	21.5	18.8	17	15.6
Fish oil	6.8	7.2	7.6	8.1	8.5
Lysine HCL	1.1	1.1	1	1	1
Methionine	0.5	0.55	0.58	0.62	0.65
Threonine	0.25	0.24	0.22	0.2	0.18
Taurine	1.5	1.5	1.5	1.5	1.5
Vitamin premix	2.3	2.3	2.3	2.3	2.3
CaHPO4	1.8	2.35	2.86	3.42	3.92
Magnesium oxide	0	0	0.05	0.05	0.05
Potassium oxide	0	0	0.56	0.56	0.56
Sodium chloride	0	0	0.28	0.28	0.28
Mineral premix	0.1	0.1	0.1	0.1	0.1
Choline Cl	0.6	0.6	0.6	0.6	0.6
Ascorbic acid	0.3	0.3	0.3	0.3	0.3
Protein	42	42	42	42	42
Fat	9	9	9	9	9

NEW PRODUCTS PROVIDE FLEXIBILITY

Weight gain, feed conversion ratio and specific growth rates (SGR; (ln final wt. – ln initial wt.)/112 days*100) for juvenile yellow perch fed the experimental diets.

Diet	Weight Gain (%)	FCR	SGR
20 FM	702	0.81c	1.91
15 FM	745	0.87abc	1.87
10 FM	735	0.89ab	1.86
5 FM	732	0.91ab	1.89
0 FM	694	0.93a	1.85
Commercial	602	0.85bc	1.72
Pooled SE	68.1	0.013	0.087
P > F	0.8061	0.0015	0.798

QUESTIONS