

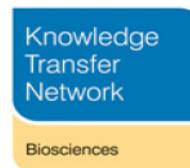


The expanding future for marine ingredients

Andrew Jackson

International Fishmeal & Fish Oil
Organisation

Workshop on Marine By-products
Grimsby 7 September 2011





IFFO

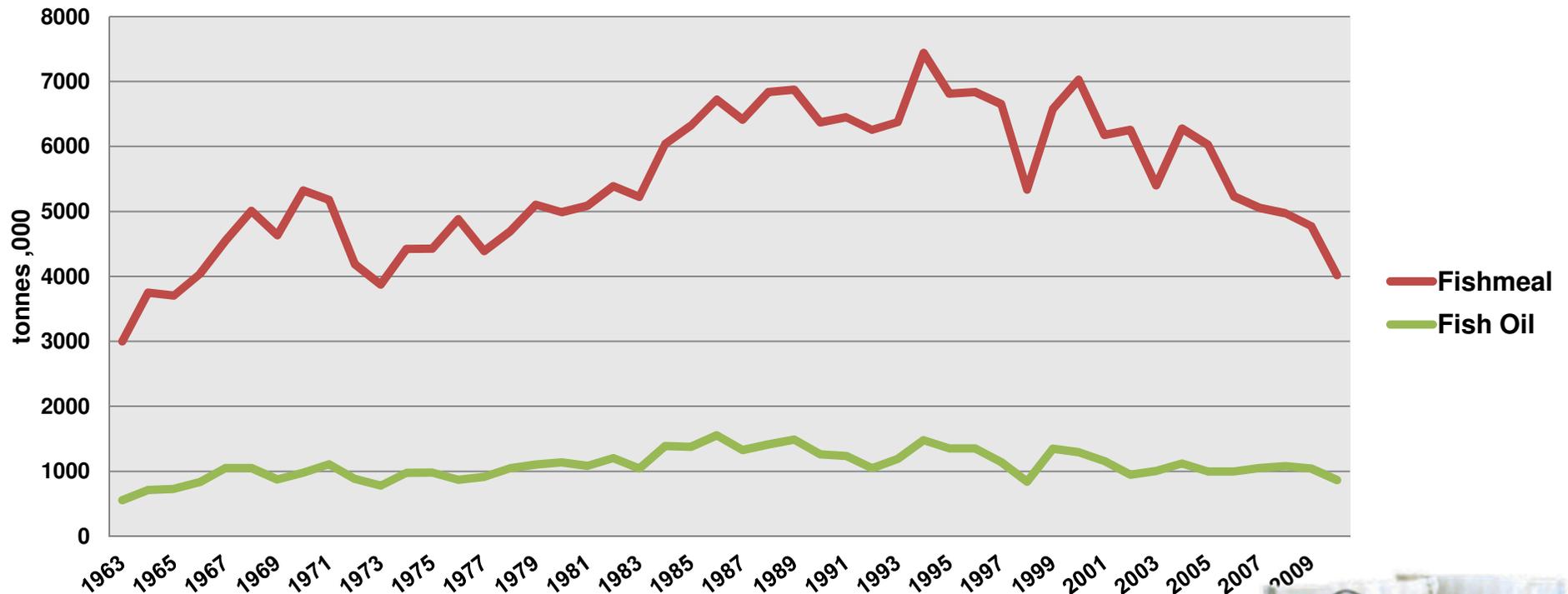
International Fishmeal and Fish Oil Organisation is the global trade association representing marine ingredient producers and related trades.

Represents two thirds of world production and 80% of trade in fishmeal and fish oil worldwide with producers in Europe, South America, Africa, USA, China and India.



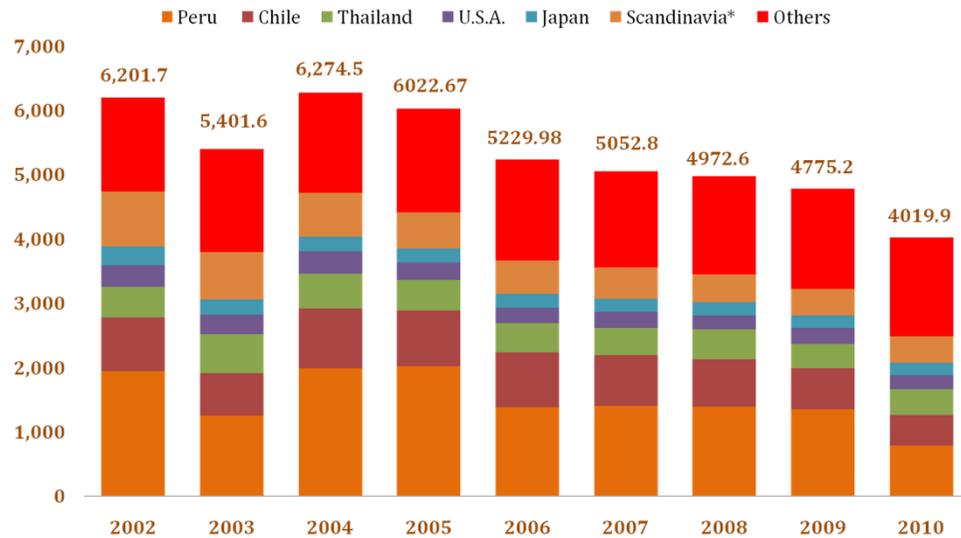


Global Fishmeal & Fish Oil Production 1963-2010 thousand tonnes

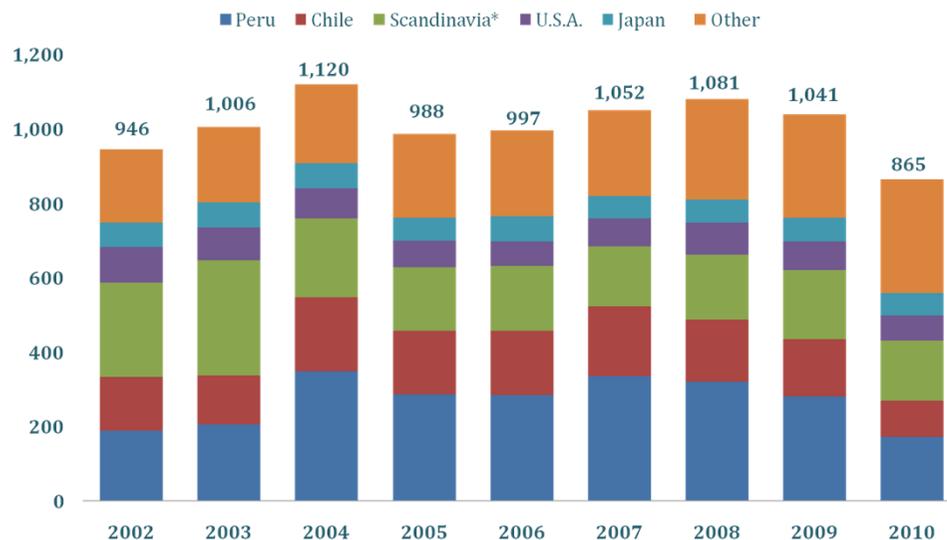




Fishmeal world production (000 mt)



Fish oil world production (000 mt)



Production of fishmeal and oil has remained relatively steady although the introduction of precautionary quotas & increased use for direct human consumption has resulted in reduced volumes of whole fish going for fishmeal & oil

Production of fishmeal & fish oil

Seasonal surpluses of less desirable fish and inedible by-products are collected.

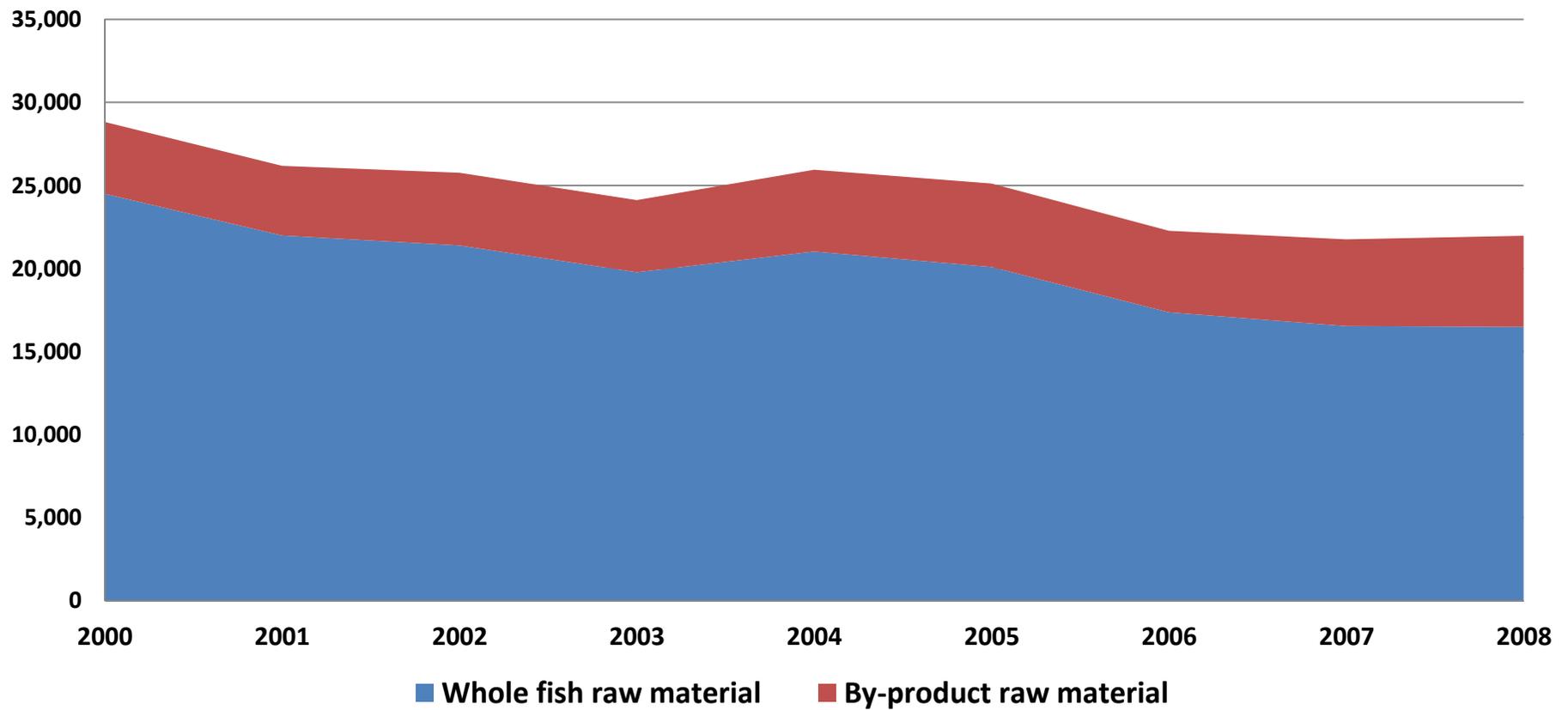
They are converted into concentrated stable products which can be economically shipped to where they are required



Thousand tonnes



Raw Material for Marine Ingredient Production ,000 tonnes





Where are the raw materials of the future going to come from?

Fewer whole fish and more by-products

By 2020 50% of the fish raw material could be coming from by-products

The growth of aquaculture will mean more and more of the by-products will come from farmed species

New sources of raw material : krill & algae

Marine Ingredient raw material



- Anchovy
- Jack mackerel
- Mackerel
- Sardines
- Herring
- Tuna
- Cod
- Salmon
- Menhaden
- Trout
- Hoki
- Halibut
- Sandeel
- Angelfish



- Squid



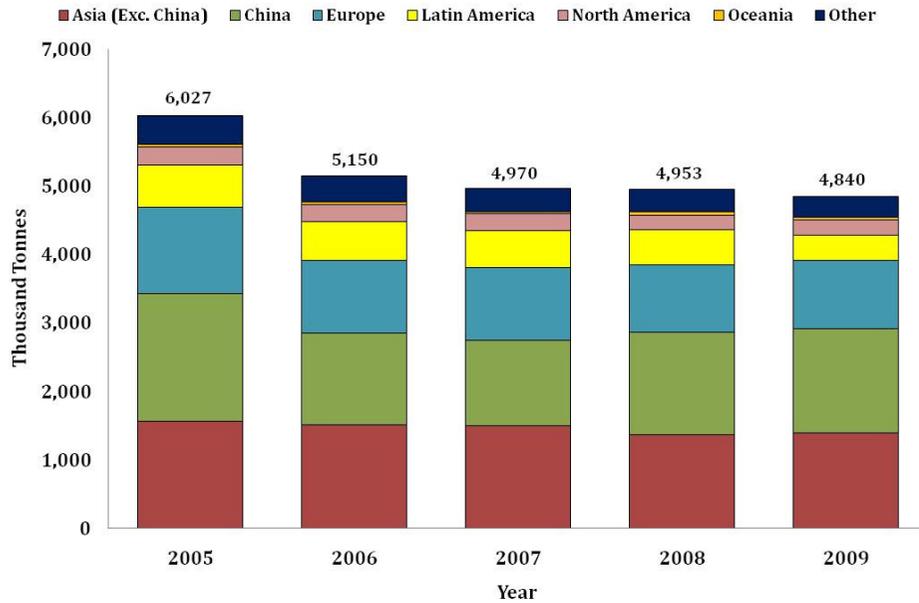
- Antarctic Krill
- Pacific Krill
- Northern Krill



- Schizochytrium
- Crypthecodinium
- Phaeodactylum
- Nitzschia alba
- Euglena

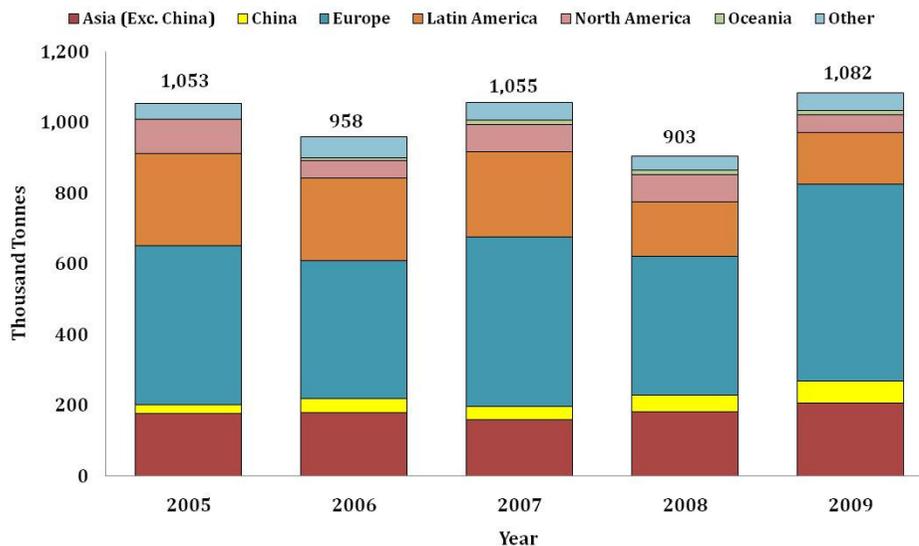


WORLD FISHMEAL APPARENT CONSUMPTION



Consumption of fishmeal is increasingly being concentrated in Asia with China continuing as by far the single largest market. In fish oil Europe continues to dominate the market.

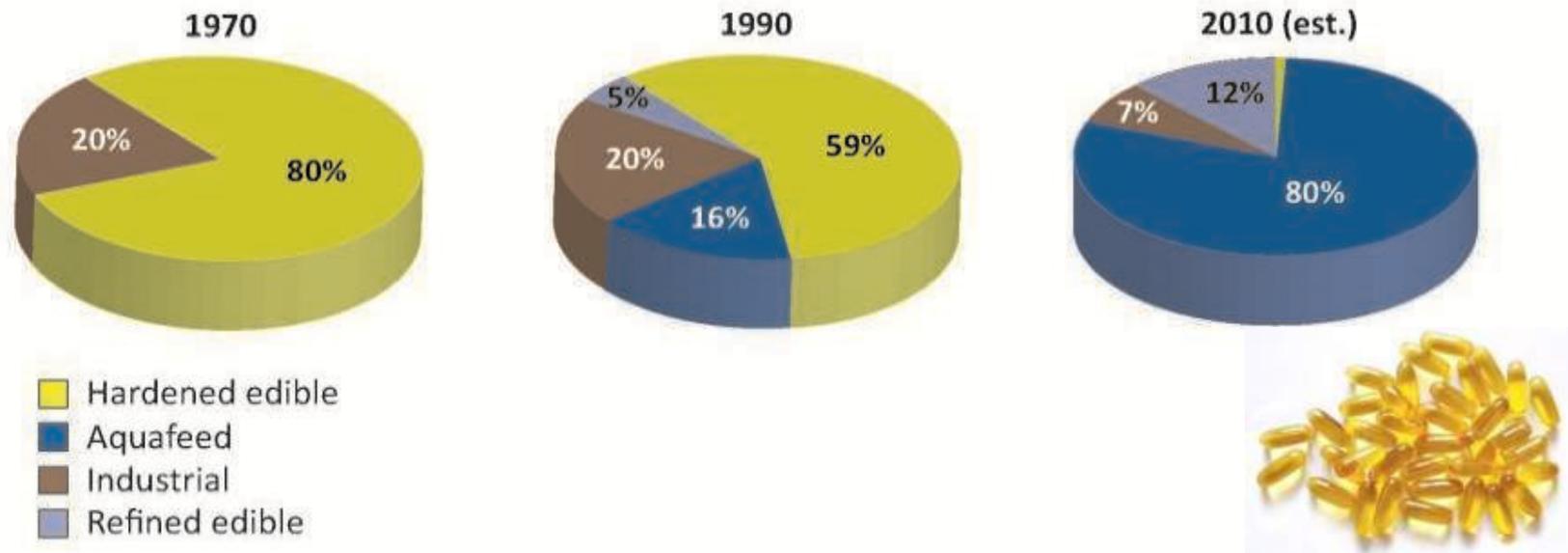
WORLD FISH OIL APPARENT CONSUMPTION



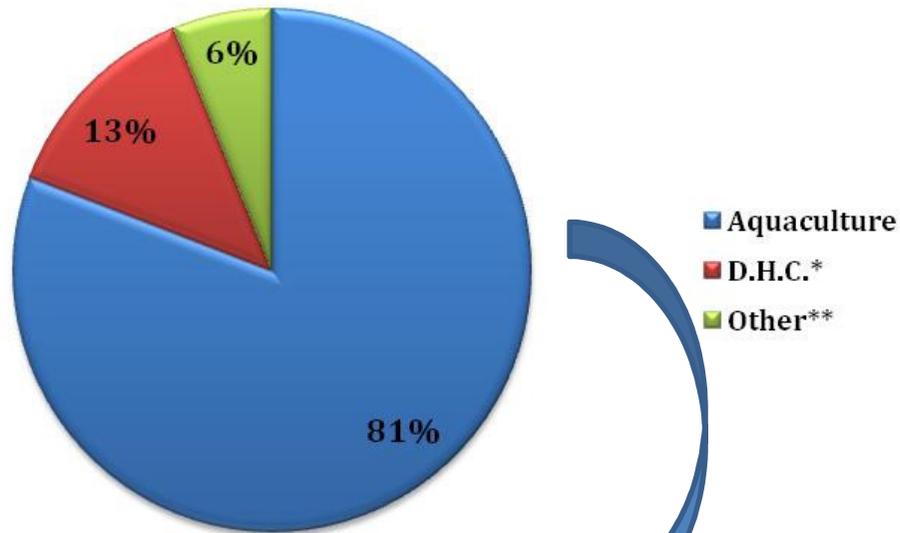
Fish oil usage moves from hydrogenated fat to aquaculture & capsules

A growing recognition of the importance of EPA & DHA

Changing uses of fish oil

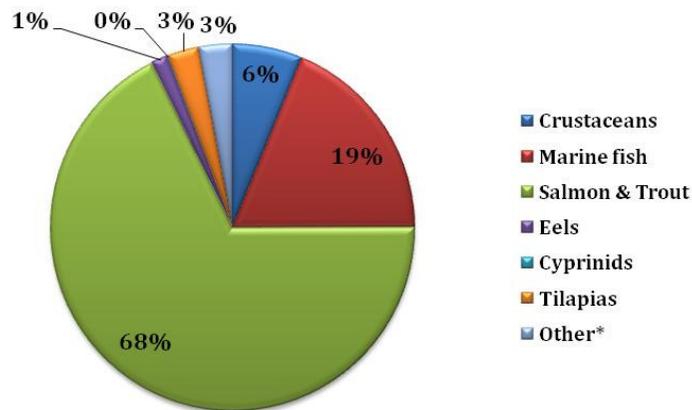


PERCENTAGE OF FISH OIL USAGE PER MARKET 2009



We estimate that in 2009 81% of global fish oil production went to aquaculture and that 68% of that went to salmonids.

PERCENTAGE OF FISH OIL USAGE IN AQUACULTURE 2009

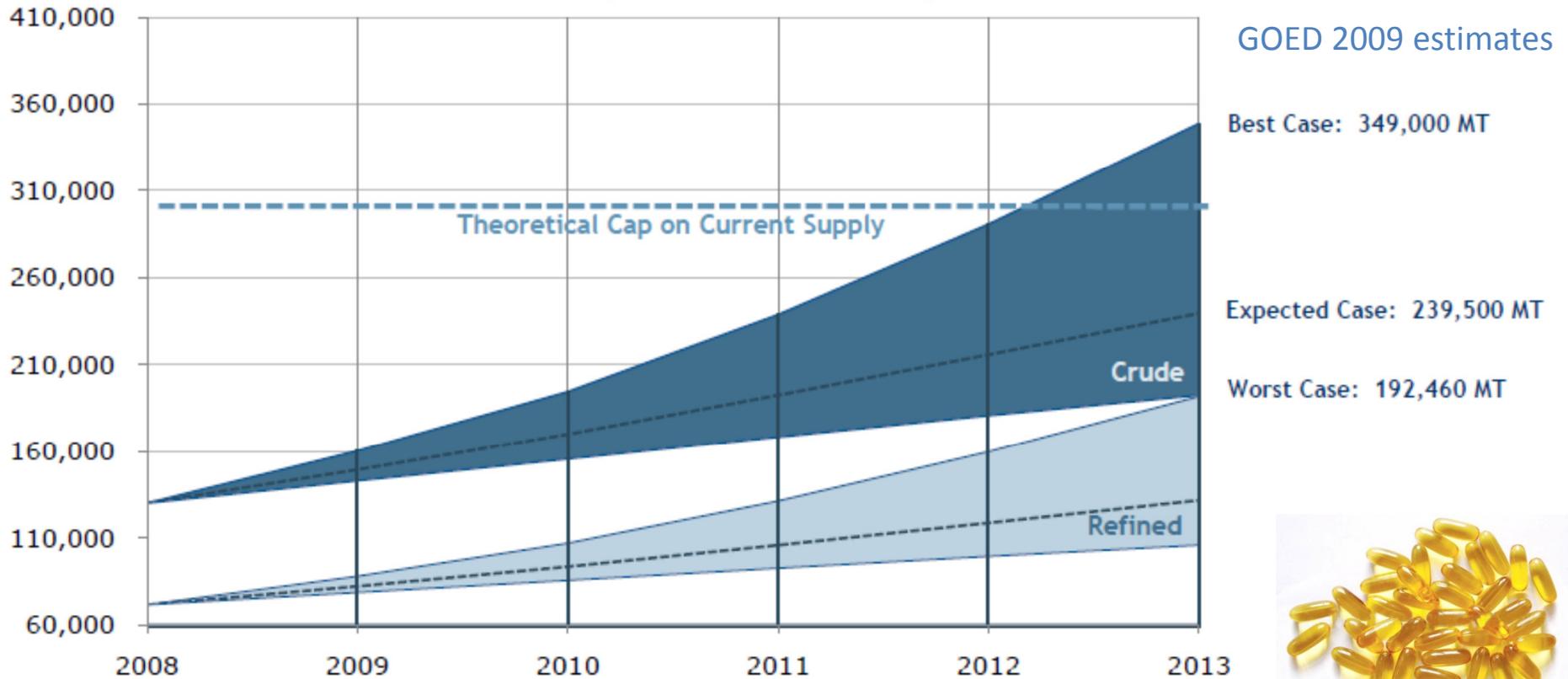


•Direct Human Consumption,
 •** Other usage including fat hydrogenation & industrial use
 Source IFFO



The growth of fish oil for direct human consumption is opening up a significant market with a price premium

Projected Global Marine Omega-3 Market Volume (Metric Tons of Oils)





Dietary supplements are currently the largest consumer of refined oils

End Use Applications of EPA and DHA Oils
2009 Estimate by Sector (in Metric Tons)

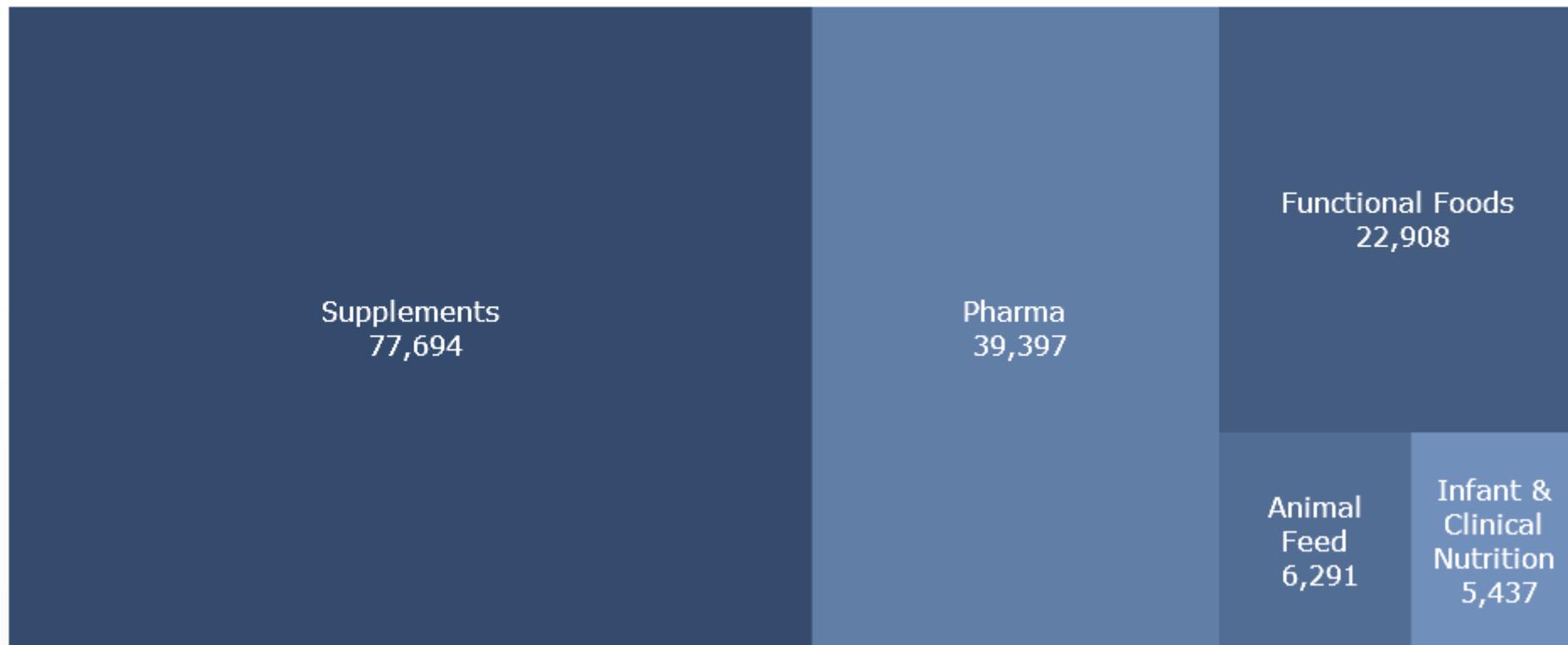


Source: Frost & Sullivan, GOED Estimates



However, pharmaceuticals are an increasingly important outlet for this industry

Crude Fish Oil Requirements of EPA/DHA Applications
2009 Estimate by Sector (in Metric Tons)

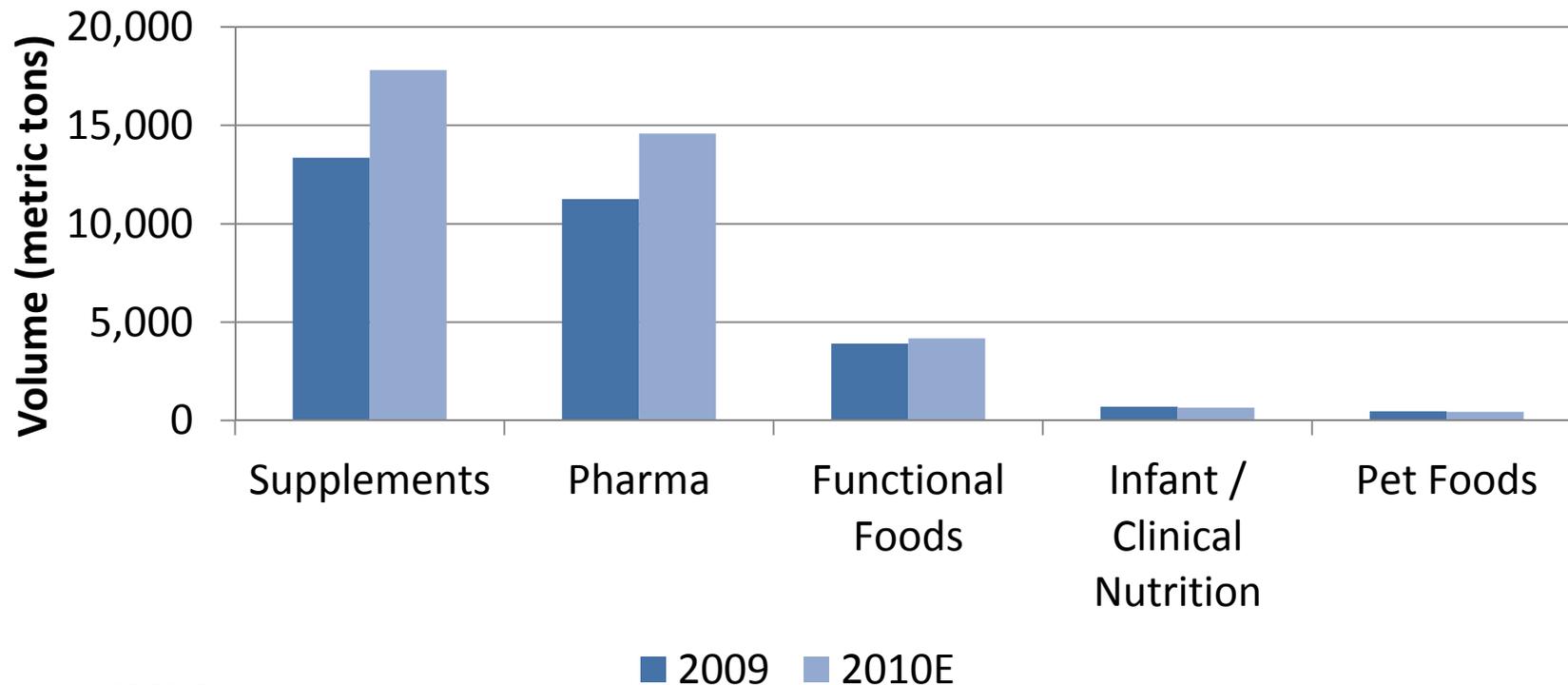


Source: GOED Estimates



Supplement requirements for crude fish oils grew fastest, but pharma is closing in

New Crude Oil Requirements by Omega-3 Sector



Source: GOED Estimates



Trends in the oil market

Very rapid change from hydrogenated fats to omega 3 feed oil

Equally rapid change now from omega 3 rich animal feed to omega 3 supplements & pharma

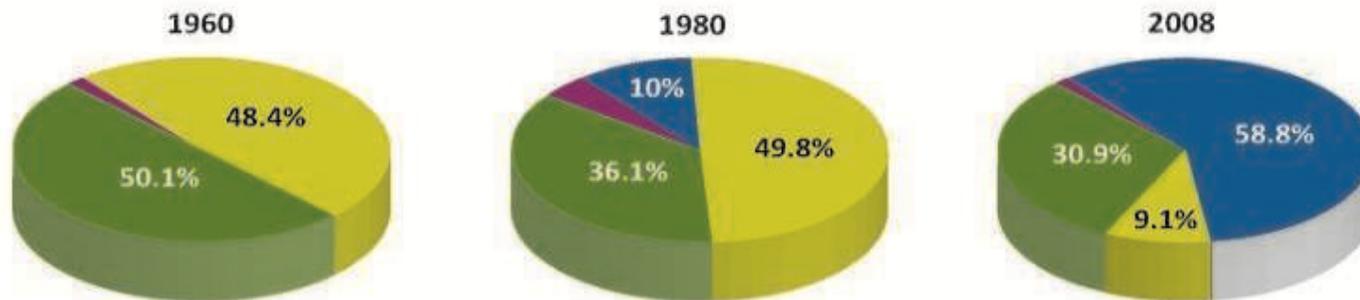
Further opportunities to add value

New sources of raw material : krill & algae

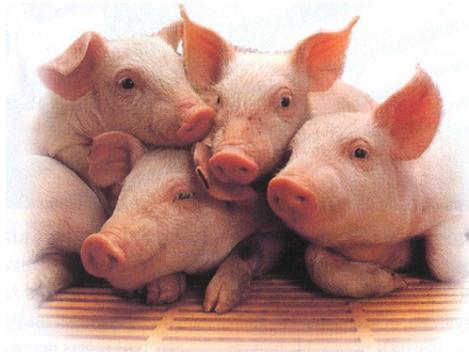
Aquaculture will make use of GM plant EPA & DHA as they become available

Fishmeal usage moves from 'Agri' to 'Aqua' sector

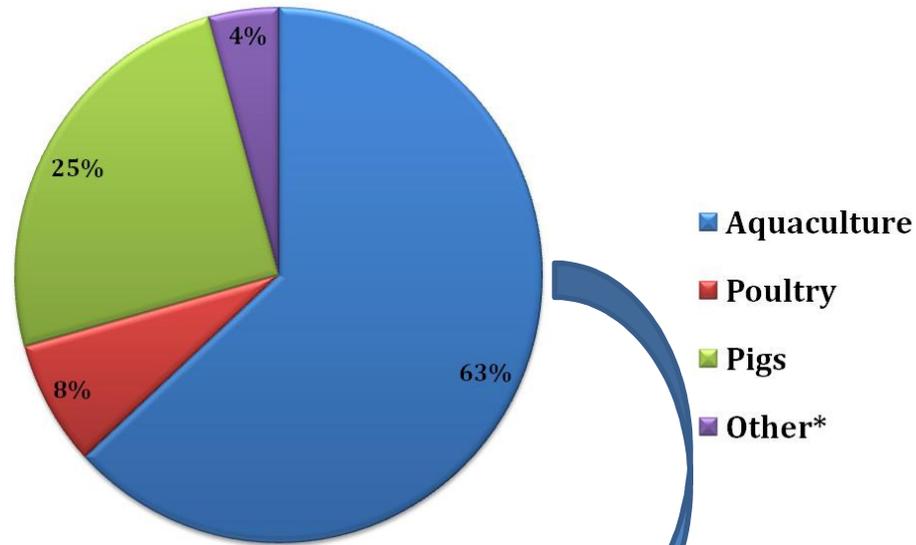
Changing uses of fishmeal



- Aquaculture
- Chicken
- Pig
- Other

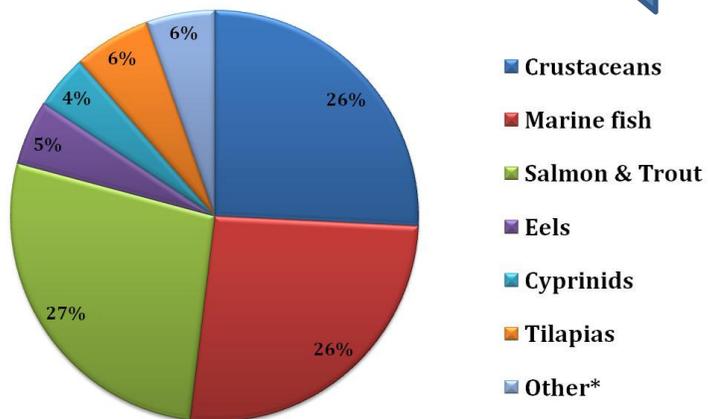


PERCENTAGE OF FISHMEAL USAGE PER MARKET 2009



IFFO data

PERCENTAGE OF FISHMEAL USAGE IN AQUACULTURE 2009



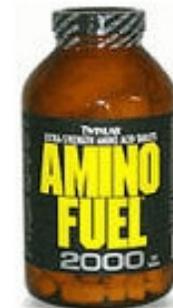
We estimate that in 2009 63% of global fishmeal production went to aquaculture and that was split almost equally between salmonids, marine fish, crustacean and others.



Unlocking the value



LOVAZA[®]
omega-3-acid ethyl esters



Minced fish feed

Formulated aquaculture diets

Pharmaceutical & nutritional products



Marine Ingredients – the next ten years

Reducing volumes of raw material from whole fish

Increasing volumes of raw material from aquaculture

By 2020 50% of the fish raw material could be coming from by-products

New sources from krill and algae

Move from animal nutrition to human health

The exciting future for both marine oil and protein is more refining, lower inclusion and higher value