

**Presenting
debate on
contemporary
and emerging
portfolio
construction
issues**



portfolio
construction

CONFERENCE

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What are the global mega trends? What do they mean for your equity portfolio?



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Agenda

- **A little history**
- **What is important in constructing portfolios?**
- **Mega trends and satellite investments - importance in constructing portfolios**
- **Portfolio construction – building efficient portfolios**
- **Conclusion**



A little history

- **The theory of portfolio construction was formalised in the 1950's by Harry Markowitz**
- **His work is one of the pillars of modern portfolio theory**
- **Markowitz focused on total risk and total return in his problems and examples**
- **As the investment industry has progressed and matured it has moved away from Markowitz's original ideas, for example:**
 - Focused on active portfolio management (tracking error, information ratios)
 - Focused on downside risk (Semi-variance, VaR)
- **How do we incorporate these ideas into our portfolio construction processes?**



What is important in constructing portfolios?

- Understanding the risk/return expectations of our clients
- What investment style do we need
- Risk identification and control in multi-manager portfolio problems
- What is the objective we are aiming for? For example, maximising total return, maximising active return, maximising the Sharpe Ratio, maximising the Information Ratio, minimising downside risk...
- How does the investment problem change as the objectives change?



Defining mega trends – Investment opportunities

- Soaring world population growth
- Increasing demand on food resources
- Climate change
- Emerging markets

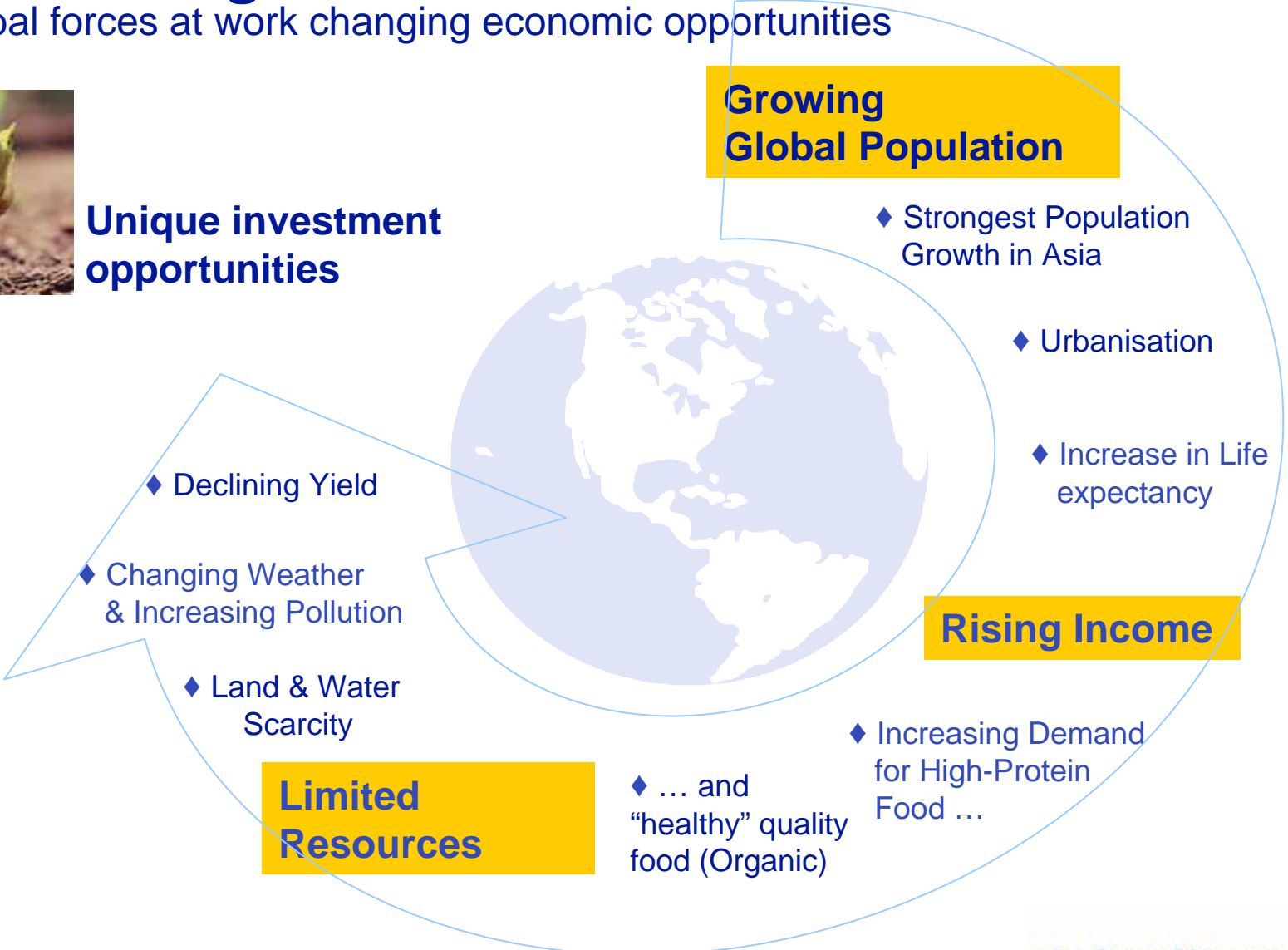


Global mega trends

Global forces at work changing economic opportunities



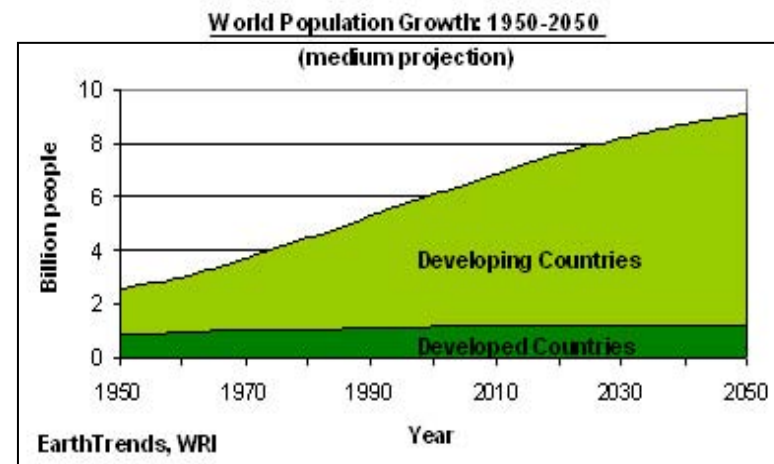
Unique investment opportunities



Soaring Population Growth

Particularly in Asia

- At the start of the 20th century, world population was less than **2 billion**
- The current world population stands at **6.5 billion**
- By 2050, the United Nations estimates that the global population would have expanded to more than **9 billion**

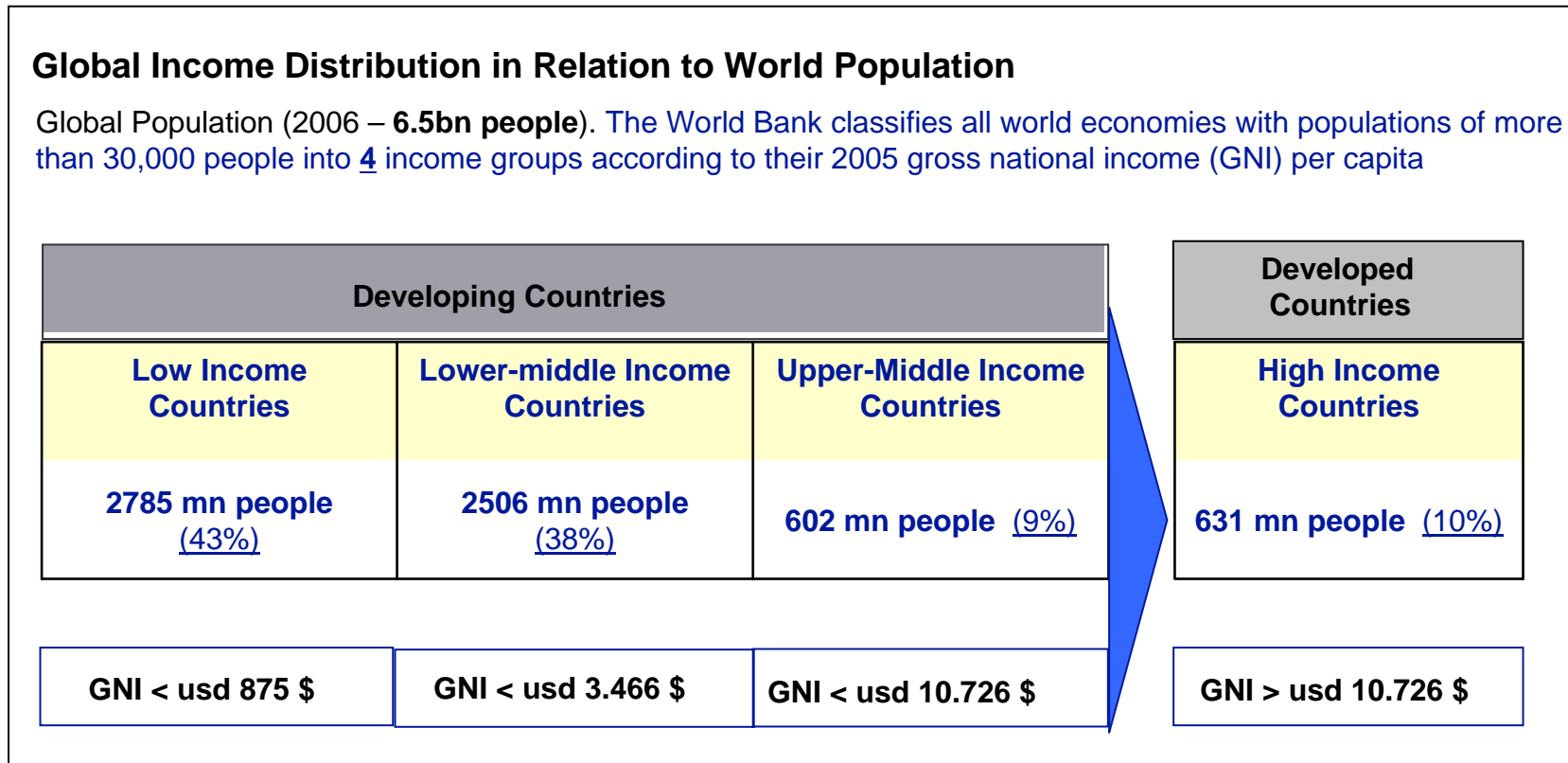


Source: UNO 2004



Rising income levels

Particularly in Asia



Source: UNO 2004

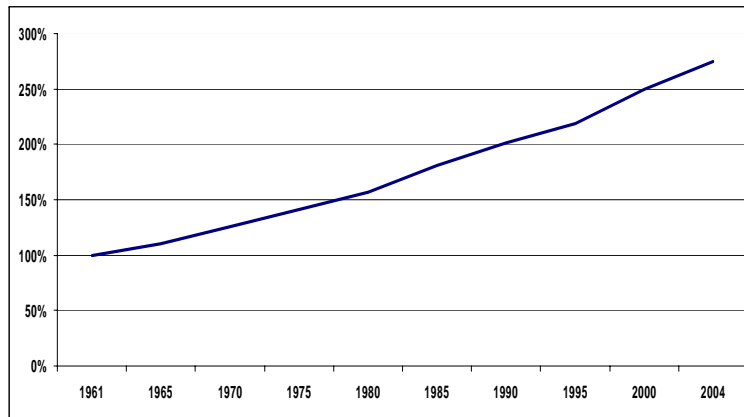
Agribusiness. A global Megatrend

Global demand increases continuously over the last four decades



Long term trend

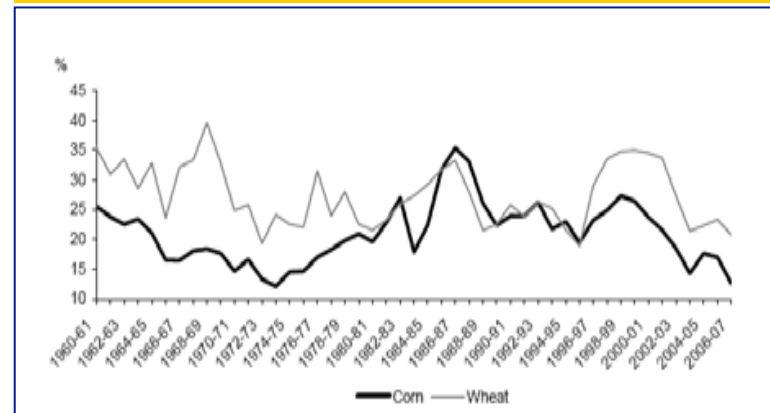
Global agriculture production has grown about 275% since 1961.



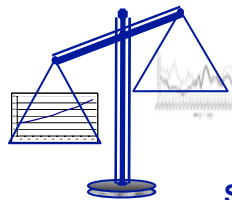
Source: FAO agricultural production index

New trend? Declining inventories

1960 – 2006. Global corn and wheat inventories .



Source: ABABE, USDA, 2006. Global Corn & Wheat inventories declining (stock/use ratios), 1960 – 2006.



Demand

Global Agricultural Production since 1961. Please refer to chart (left) above.

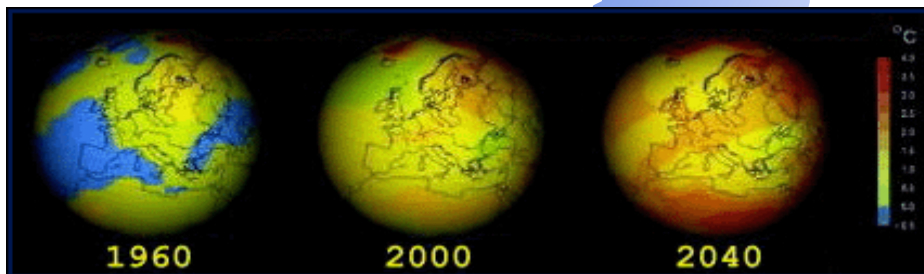
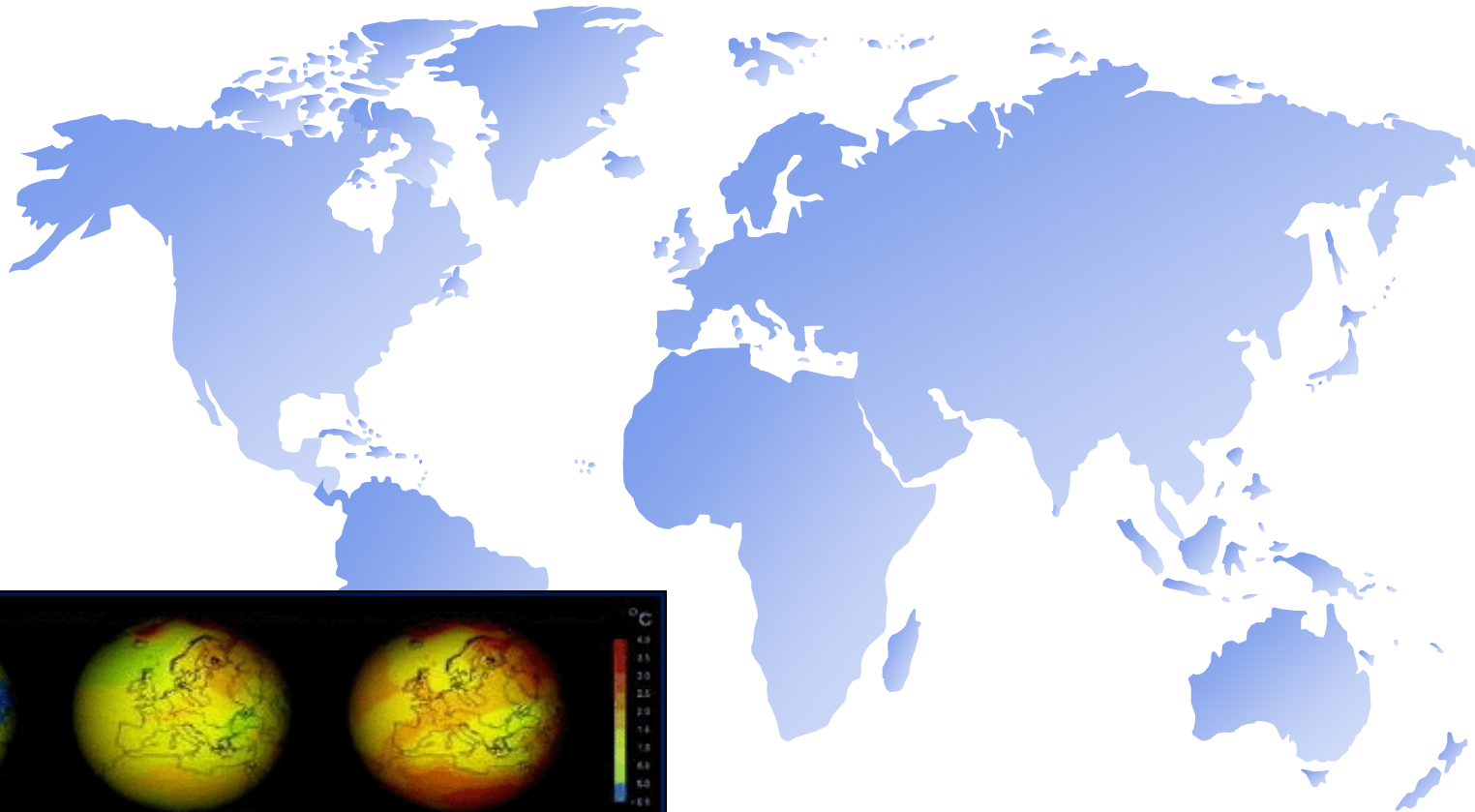
Supply

1960 – 2006 Global Corn & Wheat inventories declining (stock/use ratios). Please refer to chart (right) above.

New Trend. Global imbalances?



Global issues and challenges

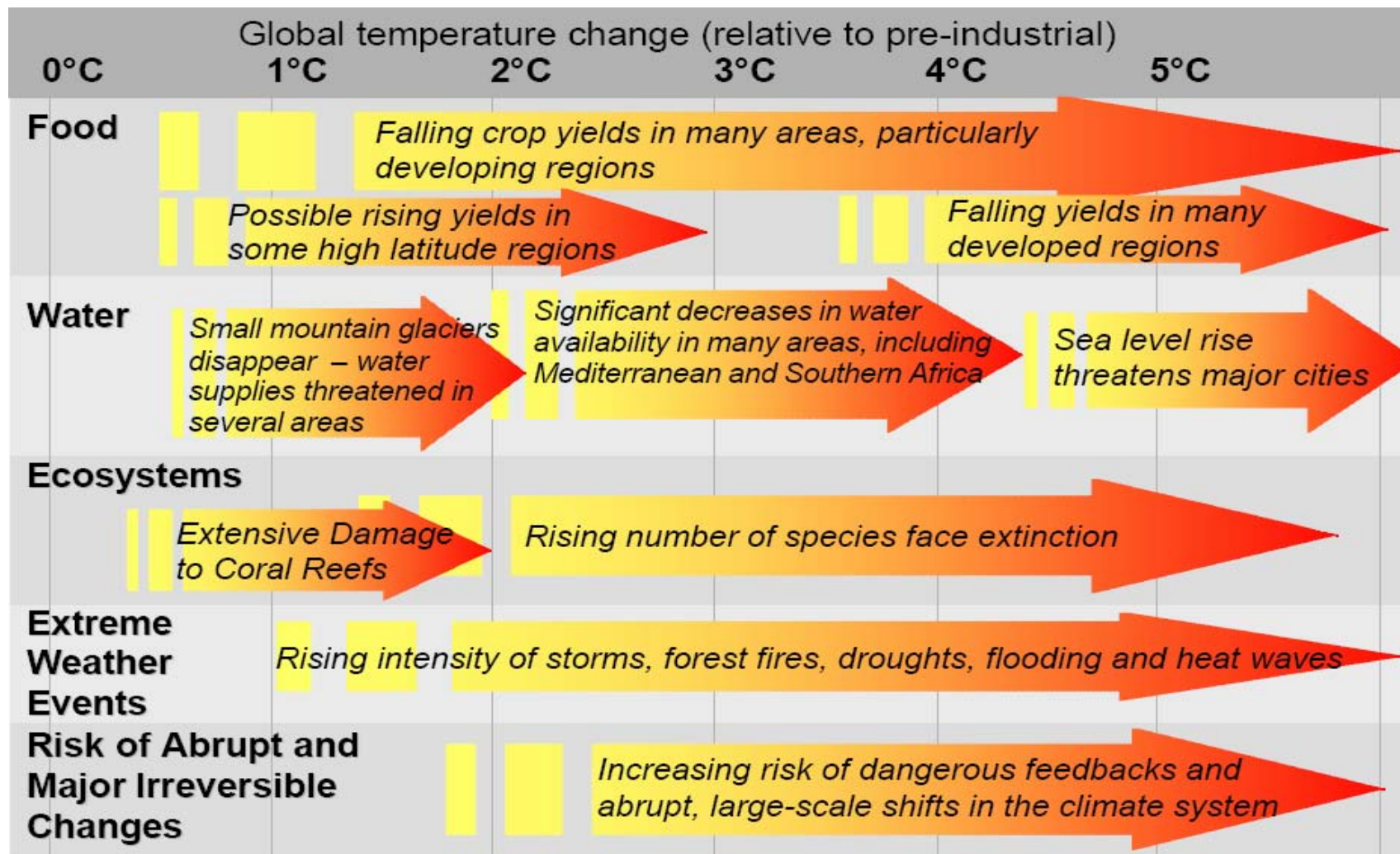


Climate change



The "costs" of climate change...

The potential impact of climate change is immense, and...



Source: Stern report October 2006

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...create significant investment opportunities

- Estimates in the Stern Report put the overall cost of climate change at up to 5 percent of global economic output* (approx. €2,000 billion)
- If nothing is done, the cost could rise to more than 20 percent of GDP (€7,400 billion)!
- The cost of avoiding the worst consequences is put at just 1 percent (€400 billion; over an investment period of 10-20 years)
- For comparison: US military expenditure in 2006 was about €450 billion
- The resultant capital investment will generate revenue of several hundred billion euros

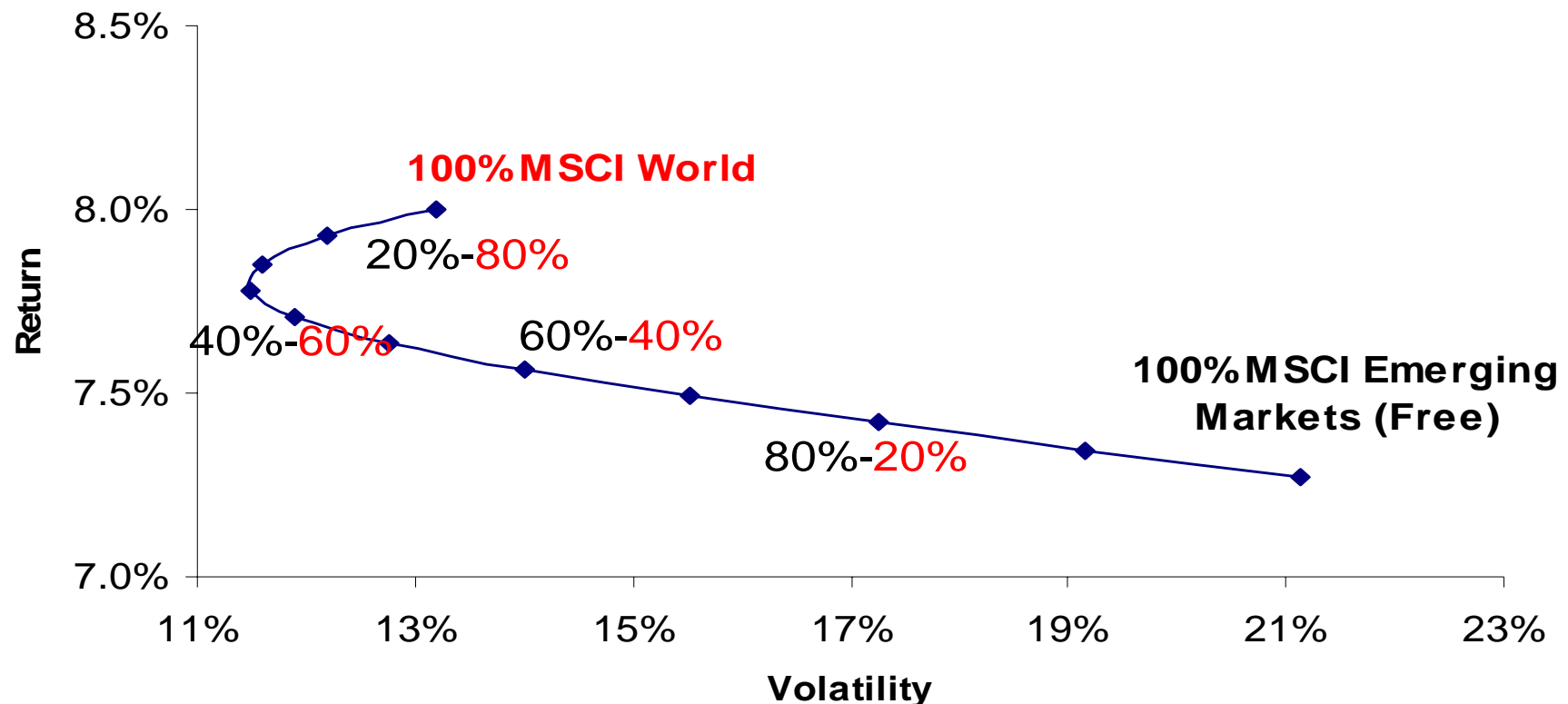
* World GDP was approx. €37 trillion in 2006
Source: World Economic Indicators (IMF)



Emerging markets - a changing paradigm?

MSCI Emerging Markets (Free) vs MSCI World Index

Annualised portfolio outcomes – 10 Year risk and return



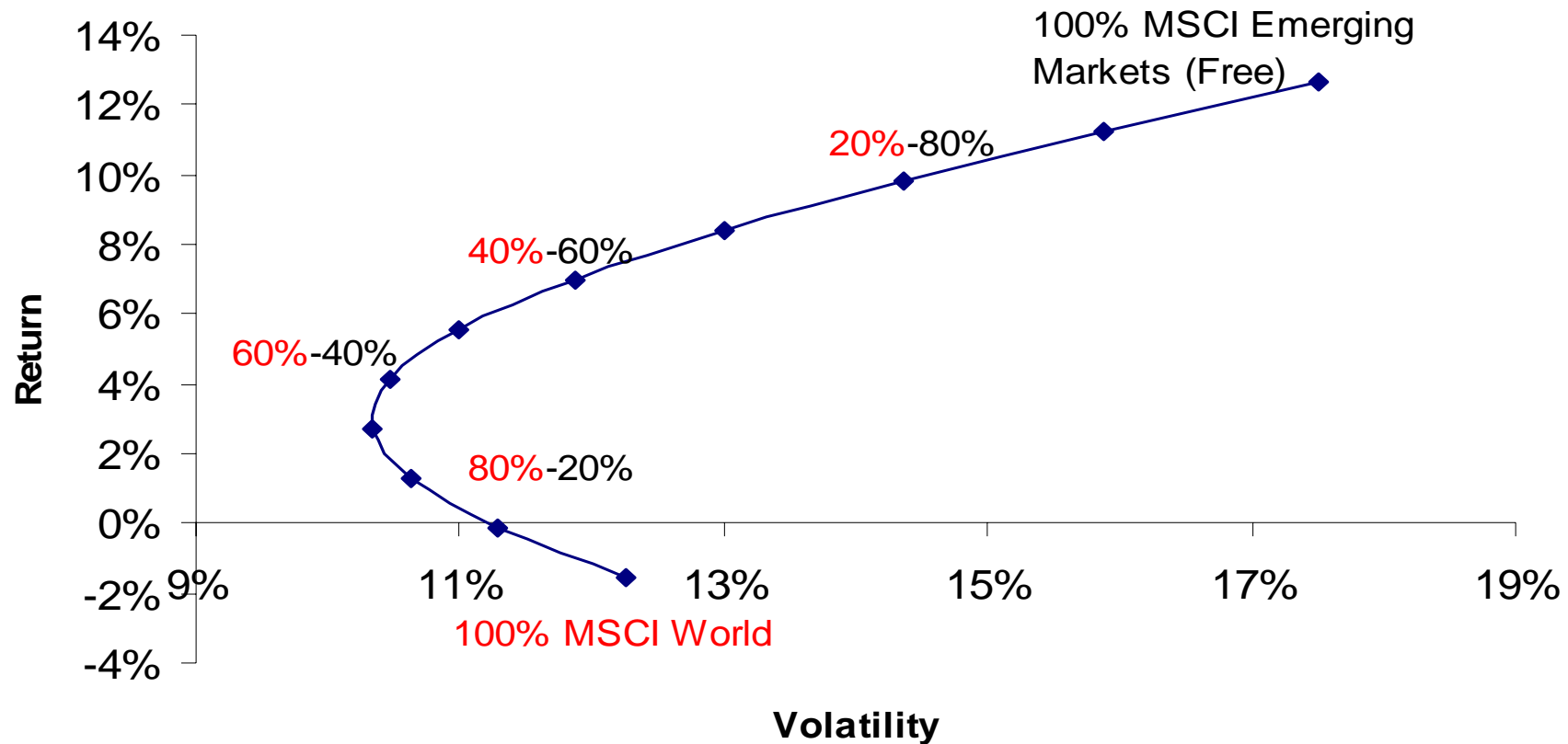
Source : MSCI World Accumulation and MSCI Emerging Market (Free) Accumulation indices as at 30 June 2006 in Australian Dollars. Volatility is annualised standard deviation. All returns are annualised.



Emerging markets - a changing paradigm?

MSCI Emerging Markets (Free) vs MSCI World Index

Annualised portfolio outcomes – 5 Year risk and return



Source : MSCI World Accumulation and MSCI Emerging Market (Free) Accumulation indices as at 30 June 2006 in Australian Dollars. Volatility is annualised standard deviation. All returns are annualised.

Portfolio Construction – building efficient portfolios



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Fund of funds management – input parameters

Consider the following manager-of-manager problem

Benchmark	Total Return (%pa)	Total Risk (%pa)
MSCI World ex Australia	10%	15%

Core Portfolios	Total Return (%pa)	Total Risk (%pa)	Active Return (%pa)	Tracking Error (%pa)
Core 1	13%	15%	3%	3%
Core 2	9%	10%	-1%	4%
Core 3	14%	20%	4%	4%
Core 4	11%	12%	1%	2%

Satellite Portfolio	Total Return (%pa)	Total Risk (%pa)	Active Return (%pa)	Tracking Error (%pa)
Satellite 1	18%	15%	8%	5%

Source: Deutsche Asset Management

Fund of funds management – input parameters

	Core 1	Core 2	Core 3	Core 4	Sat 1	Bench
Core 1	1.00	0.80	0.98	0.99	0.40	0.99
Core 2	0.80	1.00	0.50	0.50	0.00	0.80
Core 3	0.98	0.50	1.00	0.98	0.70	0.95
Core 4	0.99	0.50	0.98	1.00	0.50	0.90
Sat 1	0.40	0.00	0.70	0.50	1.00	0.40
Bench	0.99	0.80	0.95	0.90	0.40	1.00

Source: Deutsche Asset Management

Fund of funds management – input parameters

For active returns:

	Core 1	Core 2	Core 3	Core 4	Sat 1
Core 1	1.0	0.1	0.0	0.5	-0.1
Core 2	0.1	1.0	0.0	0.2	-0.2
Core 3	0.0	0.0	1.0	0.0	0.0
Core 4	0.5	0.2	0.0	1.0	0.1
Sat 1	-0.1	-0.2	0.0	0.1	1.0

For implied betas:

Core 1	Core 2	Core 3	Core 4	Sat 1
1.0	0.5	1.3	0.7	0.4

Source: Deutsche Asset Management



Fund of funds management – problems to solve

- We will solve the following investment problems and investigate the difference in the resulting portfolio structures:
 1. Maximise the Sharpe Ratio
 2. Maximise the Sharpe Ratio whilst constraining tracking error
 3. Maximise the Information Ratio
 4. Maximise the Information Ratio whilst constraining total risk
- The idea of the constraints in the above problems is based on work by Jorion (2003) and Muralidhar (2000)



Fund of funds management - results

Strategy 1: Maximise Sharpe Ratio

Manager Allocation	Exposures	Min	Max	E(totalReturn)	E(activeReturn)	E(totalVolatility)	E(activeVolatility)
Core 1	0.0%	0.0%	50.0%	13.0%	3.0%	15.0%	3.0%
Core 2	0.0%	0.0%	50.0%	9.0%	-1.0%	17.0%	4.0%
Core 3	0.0%	0.0%	50.0%	14.0%	4.0%	20.0%	4.0%
Core 4	50.0%	0.0%	50.0%	11.0%	1.0%	12.0%	2.0%
Satellite 1	50.0%	0.0%	50.0%	18.0%	8.0%	15.0%	5.0%
Total Exposure	100.0%	100%	100%				
Portfolio Return				14.5%	4.5%		
Portfolio Risk				11.7%	2.8%		
Portfolio Return/Vol Ratio				1.2	1.6		
Benchmark Return				10.0%	0.0%		
Benchmark Volatility				15.0%	0.0%		

Assumptions: maxSR

Source: Deutsche Asset Management

Fund of funds management - results

Strategy 2: Maximise Sharpe Ratio and Target 3%pa Tracking Error

Manager Allocation	Exposures	Min	Max	E(totalReturn)	E(activeReturn)	E(totalVolatility)	E(activeVolatility)
Core 1	0.0%	0.0%	50.0%	13.0%	3.0%	15.0%	3.0%
Core 2	0.0%	0.0%	50.0%	9.0%	-1.0%	17.0%	4.0%
Core 3	40.5%	0.0%	50.0%	14.0%	4.0%	20.0%	4.0%
Core 4	9.5%	0.0%	50.0%	11.0%	1.0%	12.0%	2.0%
Satellite 1	50.0%	0.0%	50.0%	18.0%	8.0%	15.0%	5.0%
Total Exposure	100.0%	100%	100%				
Portfolio Return				15.7%	5.7%		
Portfolio Risk				15.3%	3.0%		
Portfolio Return/Vol Ratio				1.0	1.9		
Benchmark Return				10.0%	0.0%		
Benchmark Volatility				15.0%	0.0%		

Assumptions: maxSR. Active Vol = 3.0%

Source: Deutsche Asset Management

Fund of funds management - results

Strategy 3: Maximise Information Ratio

Manager Allocation	Exposures	Min	Max	E(totalReturn)	E(activeReturn)	E(totalVolatility)	E(activeVolatility)
Core 1	39.7%	0.0%	50.0%	13.0%	3.0%	15.0%	3.0%
Core 2	0.0%	0.0%	50.0%	9.0%	-1.0%	17.0%	4.0%
Core 3	25.4%	0.0%	50.0%	14.0%	4.0%	20.0%	4.0%
Core 4	0.0%	0.0%	50.0%	11.0%	1.0%	12.0%	2.0%
Satellite 1	34.9%	0.0%	50.0%	18.0%	8.0%	15.0%	5.0%
Total Exposure	100.0%	100%	100%				
Portfolio Return				15.0%	5.0%		
Portfolio Risk				14.5%	2.3%		
Portfolio Return/Vol Ratio				1.0	2.2		
Benchmark Return				10.0%	0.0%		
Benchmark Volatility				15.0%	0.0%		

Assumptions: maxIR

Source: Deutsche Asset Management

Fund of funds management - results

Strategy 4: Maximise Information Ratio and Target Risk = Benchmark Risk

Manager Allocation	Exposures	Min	Max	E(totalReturn)	E(activeReturn)	E(totalVolatility)	E(activeVolatility)
Core 1	35.6%	0.0%	50.0%	13.0%	3.0%	15.0%	3.0%
Core 2	0.0%	0.0%	50.0%	9.0%	-1.0%	17.0%	4.0%
Core 3	32.4%	0.0%	50.0%	14.0%	4.0%	20.0%	4.0%
Core 4	0.0%	0.0%	50.0%	11.0%	1.0%	12.0%	2.0%
Satellite 1	32.0%	0.0%	50.0%	18.0%	8.0%	15.0%	5.0%
Total Exposure	100.0%	100%	100%				
Portfolio Return				14.9%	4.9%		
Portfolio Risk				15.0%	2.2%		
Portfolio Return/Vol Ratio				1.0	2.2		
Benchmark Return				10.0%	0.0%		
Benchmark Volatility				15.0%	0.0%		

Assumptions: maxIR. Port Vol = Bench Vol

Source: Deutsche Asset Management

Portfolio Implementation – accessing Megatrends

Global Equity Thematic philosophy



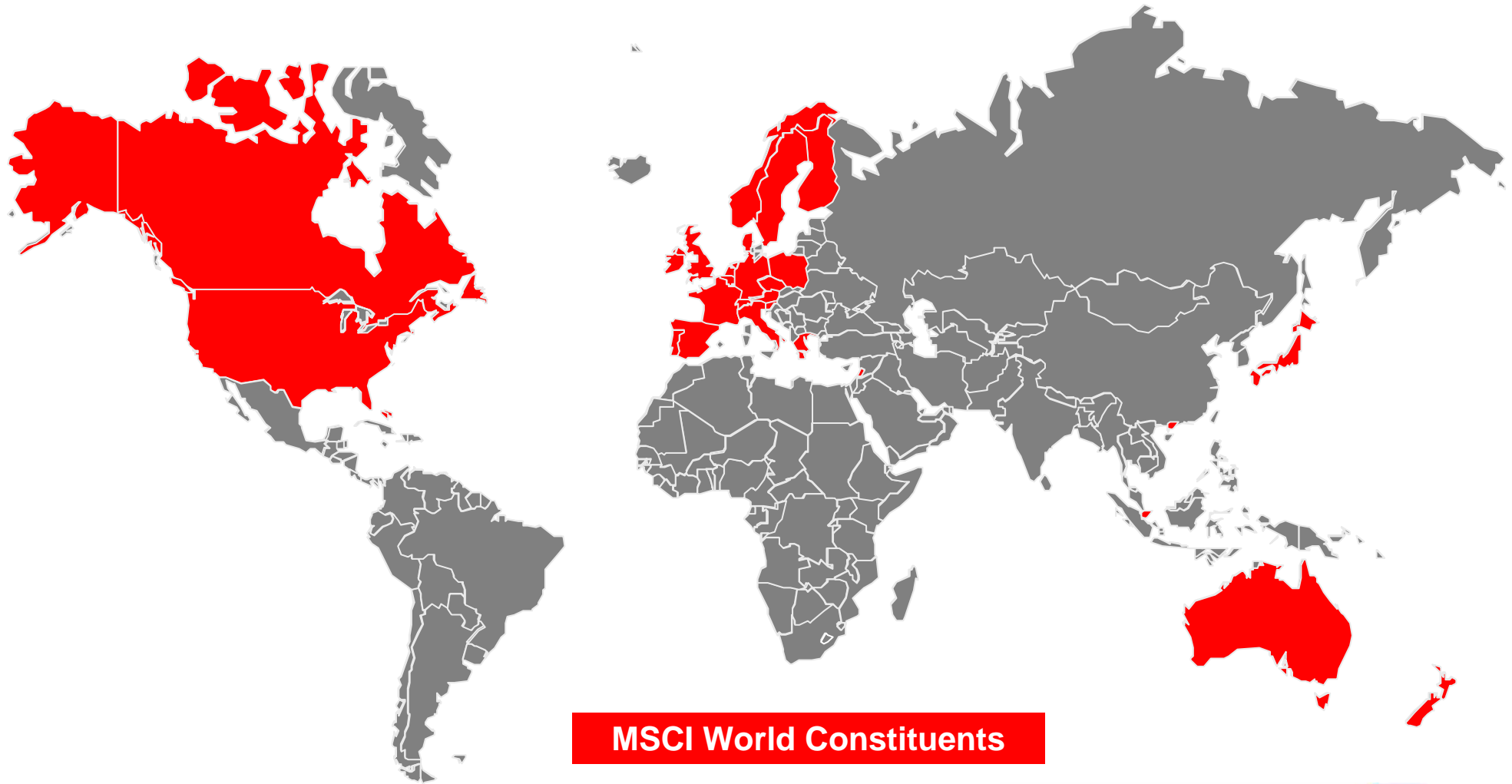
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MSCI World Index - A world of opportunities?



Source: MSCI



Our philosophy



“One increasingly integrated global market”

**Our core investment premise:
Not *if*,..... but *when*?**



Geographical attack of industrial advantage

Emerging markets

Cement
Chemicals
Generic pharmaceuticals
DRAM/Microchips
IT Services
Metals and mining
Oil and gas
Steel
Personal computers

Contested industries

Automobiles
Consumer electronics
Financials
Leisure
Software
Telecommunications

Developed markets

Capital goods
Luxury brands
Biotechnology
Retail



Portfolio Implementation – accessing Megatrends

The investment opportunity: Agribusiness. A Global Megatrend



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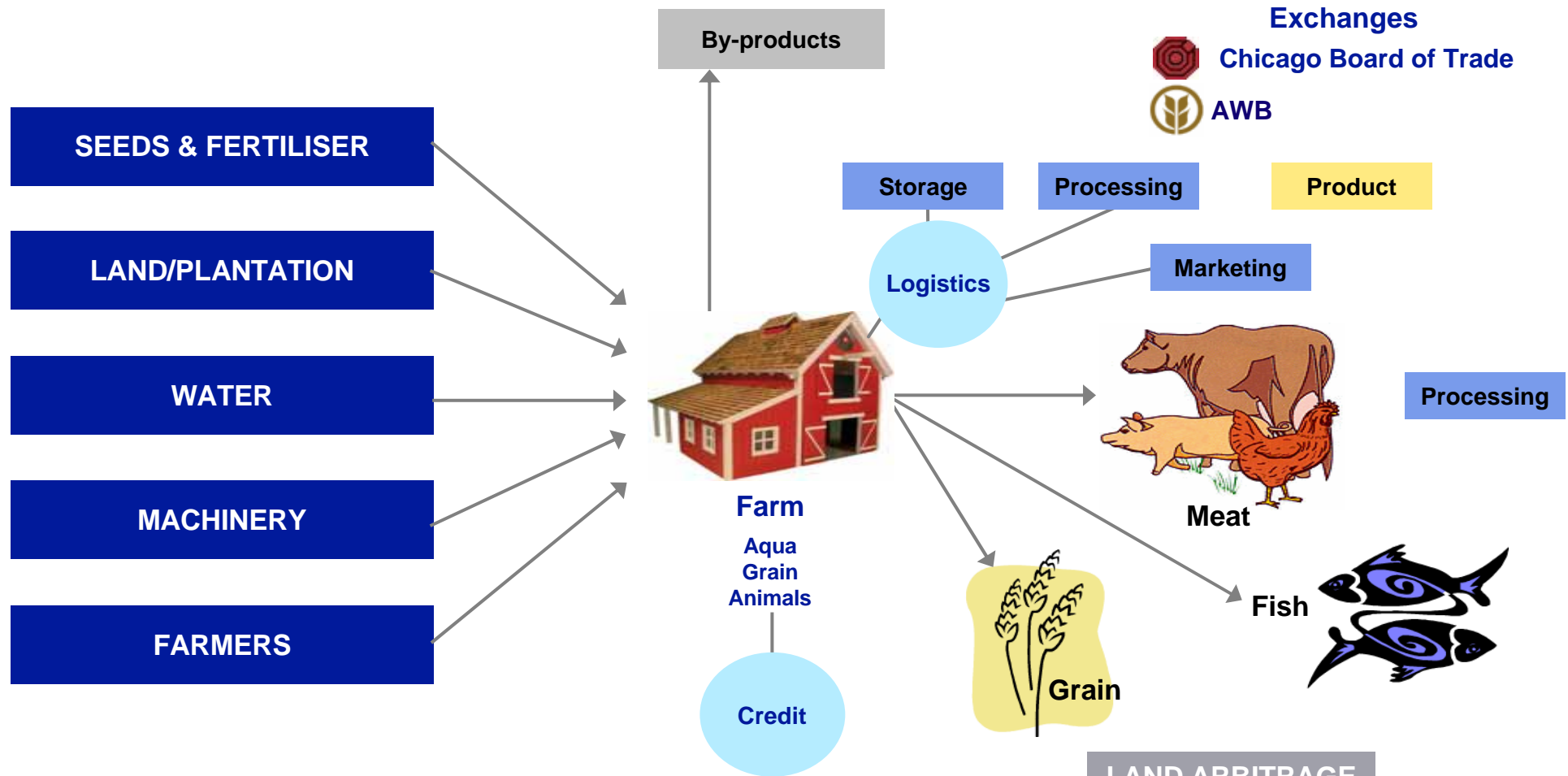
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What is Global Agribusiness?

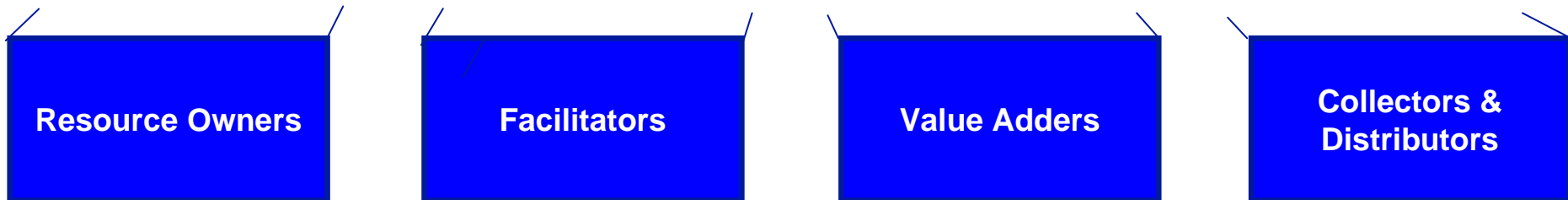
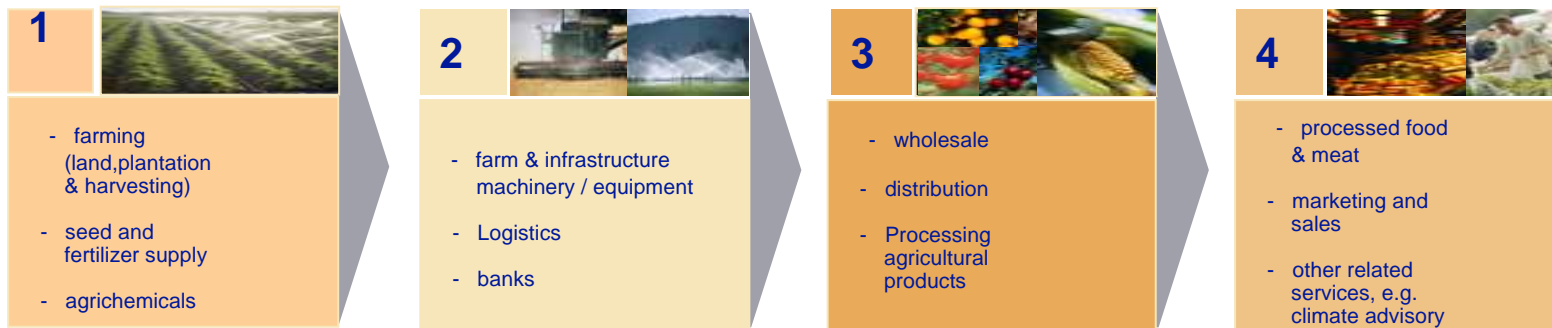
“Everything from agricultural commodities to consumer products”



Global Agribusiness

Essential for life. The investment opportunities.

From fields to market. Agribusiness is a generic term that refers to the various businesses involved in food production such as:



Conclusions

- Specialist investment strategies or “megatrends” provide investors with access to major global forces that are shifting the economic and investment landscape.
- Traditional portfolio construction that treats such investments as “satellite” may not in fact be providing investors the most optimal solution.
- Low correlation, high return potential, with well defined volatility and investment process should be rewarded in a fund of funds portfolio
- Maximising the information ratio whilst constraining total risk provides an efficient solution whilst ensuring the client is rewarded for active and market risk

