



cutting through complexity

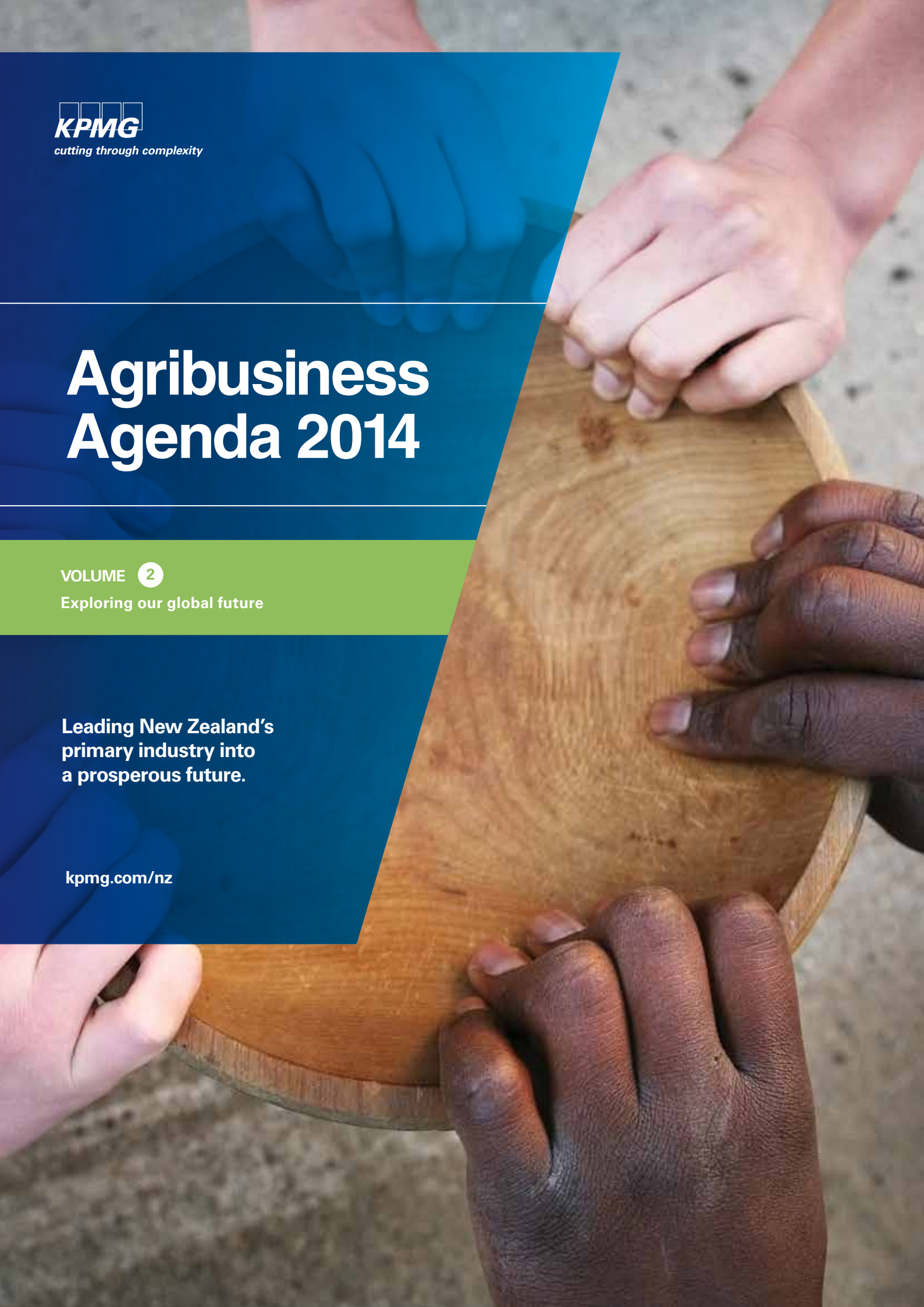
# Agribusiness Agenda 2014

VOLUME **2**

Exploring our global future

Leading New Zealand's  
primary industry into  
a prosperous future.

[kpmg.com/nz](http://kpmg.com/nz)



## The Zero Hunger Challenge

# Hunger can be eliminated in our lifetimes.

Michael Andrew, the former Global Chairman of KPMG International, along with the leaders of many other global agri-food companies, signed the World Food Programme's Zero Hunger Challenge at the World Economic Forum's Davos meeting in January this year. He signed the following commitment on behalf of KPMG...

I declare:

- 1) I am actively working to eradicate hunger;
- 2) I align myself with all elements of the Zero Hunger Challenge;
- 3) I encourage others to join in my activities and take the Challenge;
- 4) I advocate for actions and policies that achieve Zero Hunger; and
- 5) I will hold myself accountable to deliver on my promise.

### The challenge of Zero Hunger means:


- › zero stunted children less than 2 years old;
- › 100% access to adequate food all year round;
- › all food systems are sustainable;
- › 100% increase in smallholder productivity and income; and
- › zero loss or waste of food.

Eliminating hunger involves investments in agriculture, rural development, decent work, social protection and equality of opportunity. It will make a major contribution to peace and stability and to the reduction of poverty. It will contribute to better nutrition for all – especially women from the beginning of pregnancy and children under the age of two.

**KPMG New Zealand is committed to working with the wider KPMG International community and other organisations in New Zealand to utilise the skills and experience inherent within our organisations to make progress in delivering upon this significant challenge.**

**While the New Zealand primary industry does not have sufficient scale to feed the world; there is much we can do, as a leading producer and exporter of high-quality protein, to make a contribution to meeting this challenge.**





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# THRIVING IN OUR MULTIPOLAR WORLD /



At the start of the year, the plan for this volume of the KPMG *Agribusiness Agenda* looked fairly simple on paper. We would look at how the major trends shaping the world in next 20-30 years are likely to impact the agri-food sector globally and, consequently, New Zealand's economy. Having done this analysis, the plan was then to contemplate the types of questions New Zealand primary industry companies should be asking themselves about their current strategy and operations; in order to better position themselves to capitalise on the opportunities, and weather the challenges, that will present themselves over the next 20 to 30 years.

The reality of bringing together this volume of the *Agenda*, titled *Exploring our Global Future*, has been anything but simple. Today's world is not a simple place. Researching this document has starkly highlighted the fact that our global society is an extremely complex ecosystem. It is being driven by forces that operate at multiple levels in numerous directions.

Last year, I heard a senior executive of a major multinational describe the world as "increasingly bipolar". Having worked through the process of writing this volume of the *Agenda*, I have come up with an alternative description. The range of forces that impact (either directly or indirectly) on any significant decision being made by an individual, a business, a government agency, an iwi or community organisation are now so diverse and varied; that I believe the world is better described as 'multipolar'.

## Awareness in a multipolar world

In a multipolar world, the disruptive externality can come from anywhere at any time. When we first began our research for this *Agenda*, the Ebola scare in West Africa was not seen as anything different from the preceding outbreaks of the disease, drawing little international focus. Likewise, the Islamic State was seen as another radical group of jihadists creating localised friction in Northern Iraq and Syria, merely following in the tracks of the Taliban and Al Qaeda.

Within a few months, both of these issues have attracted global focus. They are impacting the daily lives of people across the world; requiring countries to change their security alert status, airport arrivals screening processes, and anti-terror laws. Despite occurring in countries that most nations have very little direct contact or trade with, both issues are impacting on the global assessment of risk, the willingness to invest and strategic plans of agribusinesses around the world.

Our multipolar world brings new challenges for any decision-maker. Traditional decision support tools used by businesses (for instance SWOT analysis and Porters Five Forces) provide a snapshot of an organisation's position and its competitive environment at a point in time. However, they struggle to capture the risk of an apparently unrelated external event which completely changes the fundamentals of a market within a very short timeframe.

Today's decision-makers are now required to judge the 'impact weighting' from the multiple influences that need to be balanced in reaching their decision. They also have to predict which forces will remain relevant or persuasive over the period of time that follows their decision. Nowhere is this more true than in the global agri-food sector given the breath of its physical footprint and its role in delivering a basic necessity of life.

Agri-food sector leaders must be effectively connected to information sources that are accurately tuned to detect the unusual event, or the emergence of an unsettling trend, *before* it becomes disruptive. More importantly, they need to be able to screen for these critical signals against the backdrop of our noisy, data-rich world. It is critical to understand what is happening globally under the radar of the media, politicians and investment community; and to analyse how these happenings may impact your organisation. This skill will, more than ever, become a core competency of an industry leader.

For me, this was summed up in just a few words by Professor Robert Burgelman during the New Zealand Bootcamp at Stanford University earlier this year. In his view, "only the paranoid survive". These are the leaders who are continuously looking for disruption. They question every presented truth, and leave no stone unturned. As the world continues to evolve around them, they are building a culture of complete strategic awareness, with an ability to continuously finetune their direction.

## Signposts for a multipolar decision-maker

This *Agenda* has more words than any of its predecessors, reflecting the number and diversity of trends that have emerged (or are expected to emerge over the next two decades). There are also strong recurring concepts that form the axis of the multipolar world:

### Using connectivity to enhance

**ACCESSIBILITY:** We are moving into an era where everything we use will be smart, connected and contributing to data warehouses. Organisations will seek to leverage this data to enable people to live more flexibly, and provide products and services that are easily accessible when the consumer needs them (but do not otherwise provide the constraints of ownership).

### Smart solutions that transcend

**BOUNDARIES:** While government institutions are struggling to respond to the pace of evolution, smart organisations of the future will not be limited by the traditional confines of sovereign borders. They will increasingly look at the world as their market place and expect their regulators to keep pace, responding to issues such as global trade and security in a collaborative fashion.

### Recognising the expectations of

**diverse COMMUNITIES:** As the world evolves into a single market place, the opportunities to target niche global communities grow exponentially. These communities may be defined by age, ethnicity, health, education, wealth, religion or gender. Organisations will increasingly focus on how their offering meets the expectations of the community they are targeting; whether it's an ultra-premium offering, or a low-cost/high-volume product.

### Susceptibility of business models to DISRUPTION:

Since time began, the new 'next best thing' has always come along. In the future, the time that elapses between each new arrival will shorten considerably. These inventions will be driven by flexible business models that do not require heavy investment in capital assets. An organisation that is not innovating will put their future survival at risk; as disruptive thinkers continuously seek new, lower cost, smarter and frictionless ways to do things.

### ENVIRONMENTAL awareness and sustainability at core:

Recognising the constraints on the capacity of our planet will be central to innovation in the future. There will be a strong focus on developing business models that produce more, while using less natural resources and generating less waste. This will create new opportunities and redefine many facets of our everyday experiences; be it the food we eat, the energy we use, or the way we travel.

Organisations can look to the five axes of the multipolar world to inform their decisions around future investments in products and services. It can help them assess the longevity of an existing profit stream, or the likelihood of a market existing for a new solution they are exploring.

They must, however, be able to draw their conclusions and react at speed. Today's assessment of an opportunity will look different tomorrow.

The organisations that will be successful are those that set their direction and purposefully shape their future market. They recognise that what created historical success will not deliver future success, requiring them to develop a flexible, innovative culture. Those that are too hesitant in their decision-making will become the Kodak or the Blockbuster of tomorrow. Organisations must be prepared to focus on the Big Ideas (the ideas that scare them); incremental innovation will be too conservative to ensure success.

We believe we have produced an *Agenda* that meets the ambition of our original simple plan; and that it will assist companies in the primary sector (and the wider economy) in shaping their future strategies. Insight and vision are critical to capturing new opportunities – we trust you'll find the following pages are rich with both. As always, our goal at KPMG is to work towards a more prosperous country for all New Zealanders, now and into the future.



#### Ian Proudfoot

Global Head of Agribusiness  
KPMG New Zealand  
Report Author

**Ian Proudfoot** is the Global Head of Agribusiness and an Audit Partner based in Auckland. He provides services to clients in a range of sectors including viticulture, horticulture, pastoral agriculture and agricultural support services. He has led KPMG New Zealand's strategic agribusiness initiative since it was launched in 2009, authoring each edition of the *KPMG Agribusiness Agenda* and editing the weekly *Field Notes* publication. In 2013, he was asked to establish and lead a global network of KPMG professionals working with clients in the agribusiness sector worldwide. Ian is a regular presenter and commentator on sector issues both in New Zealand and internationally.

# SNAPSHOT: PLACING NEW ZEALAND IN TODAY'S WORLD

The 2014 election campaign delivered scandal, conspiracy and plenty of controversy. Yet as we predicted in the first volume of this year's *Agenda*, it failed to deliver any real vision for the future of New Zealand. None of the parties clearly articulated a vision for New Zealand in 30 years time, with the steps that need to be taken today to deliver on that vision.

While environmental policies from all sides of the political spectrum gained some exposure, the discussion merely reinforced urban perceptions of the primary sector being a prime cause of environmental degradation. There was little substantive discussion on the contribution that the sector makes to New Zealand's prosperity, or what can be done to grow this contribution for the benefit of all New Zealanders.

The conspiracy sideshowes meant there was scant opportunity to reflect on New Zealand's place in the modern world during the election. However a stock-take of New Zealand's current comparative prosperity is critical, if we are to consider the opportunities and challenges that major global trends may present to the country over the next 30 years.

## **The traditional perspective on comparative prosperity**

New Zealand's performance is traditionally benchmarked against other small developed economies (e.g. Ireland, Denmark, Switzerland) as well as Australia. These countries are similar to New Zealand in many ways, with democratic governments and some reliance on the primary sector. However the European countries are closely located to their key export markets, and are geographically much smaller than New Zealand. We have also included Israel in this analysis, as it is often highlighted as a country that excels in leveraging innovation to deliver prosperity to its population.

We have used 12 measures to compare New Zealand's performance against this benchmark group. Broadly, these measures cover competitiveness, wealth, education, infrastructure, health, innovation, environment and economic freedom.

New Zealand performs strongly in many of the social development categories. We achieve top ratings in the delivery of primary healthcare and education, the high participation of females in the economy, and low perceptions of corruption. In addition we are a country with a relatively high level of economic freedom, above average life expectancy, and a moderate pace of urbanisation.

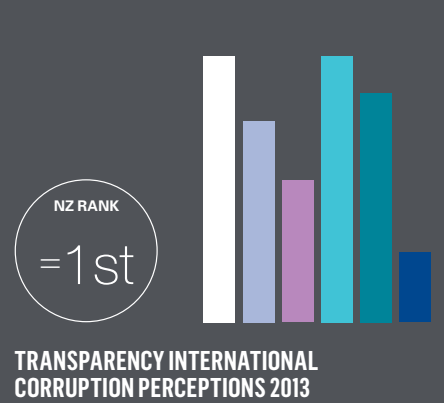
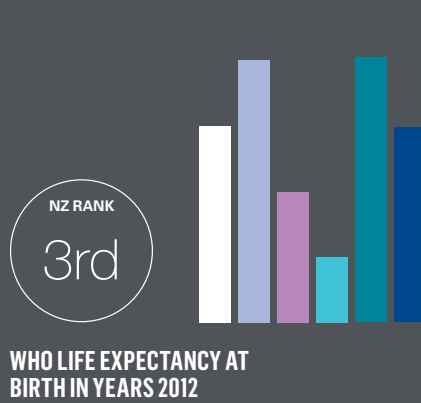
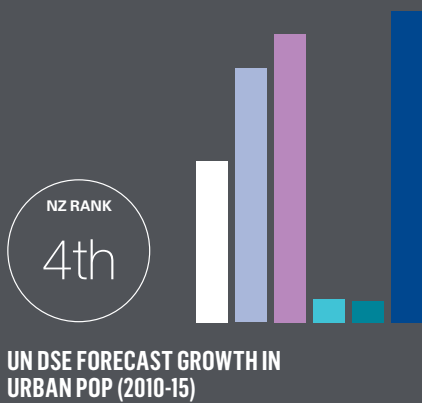
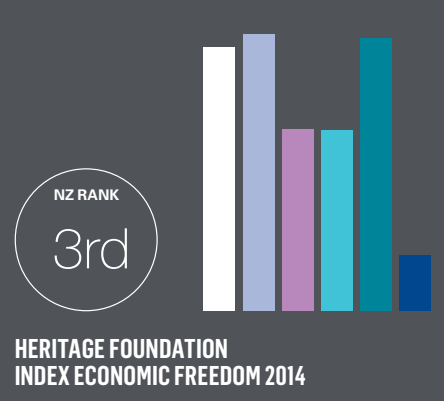
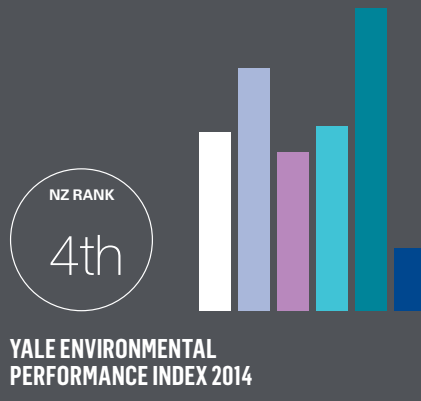
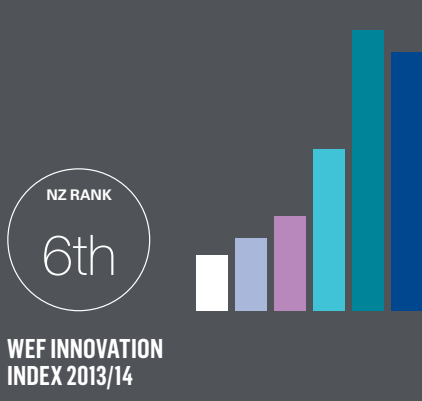
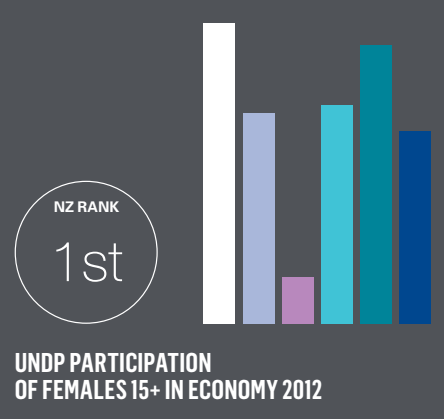
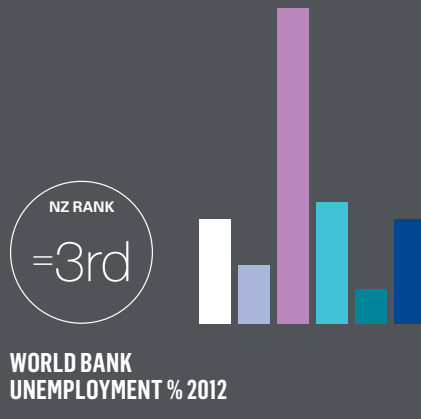
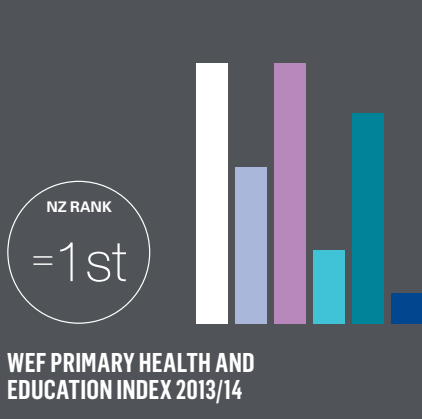
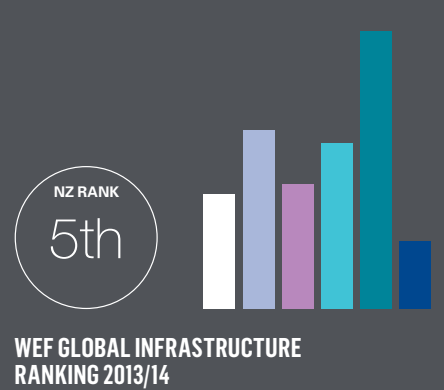
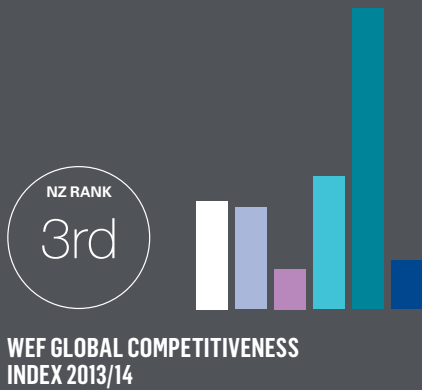
However, the analysis also suggests that in comparison to our traditional peers, New Zealand is a low-income economy with relatively high levels of unemployment, a major underinvestment in infrastructure, and a very weak innovation sector. Our environmental performance is below that of Switzerland, Australia and Denmark; reinforcing challenges to our claims of being '100% Pure'.

It appears New Zealanders have made a decision, consciously or not, to accept lower incomes in exchange for an easier, more comfortable pace of life in comparison to other small developed economies. The underinvestment in innovation and infrastructure has constrained the country's ability to enhance productivity, with a consequent impact on the ability to grow our national wealth. The population's fixation on property investment, rather than investing in productive assets such as equities, has regularly been identified as contributing to our under performance in growing income (with wealth being churned rather than created).

With a mix of strengths and opportunities, New Zealand achieves a mid-table performance when benchmarked against other small developed European economies. It can be argued, however, that a more future-focused comparator group for benchmarking would be the smaller, largely developed economies of Asia. We have run the same analysis again with an Asian comparator group.



New Zealand ranks strongly on social metrics but lags other small developed economies on key economic development measures.<sup>1</sup>



## The future-focused benchmark analysis

To be successful in the major markets of Asia, New Zealand companies will need to compete against Singaporean, Hong Kong, Taiwanese, Emirati and Malaysian companies – and win. These are countries with comparatively small domestic markets and that, like New Zealand, will need to look to secure opportunities to grow their income through exports.

The metrics that New Zealand performed strongly on when compared to the European economies also show up as clear strengths against the Asian comparator group (i.e. primary healthcare and education, participation of women in the economy and corruption perceptions). Unfortunately the weaknesses previously identified are also apparent against the Asian group; particularly high unemployment and poor comparative performance in respect of infrastructure and innovation.

Singapore stands out for its strong performance in this analysis; achieving the highest ranking in six categories, including per capita GDP and environmental performance, and second in a further five categories. The Singaporean Government has a future-focused vision for the country. With its reputation as a 'prototyping island', Singapore takes a lead in early adopting and incubating innovation; be that in healthcare, governance or infrastructure.

With an area of just over 700km<sup>2</sup> and a population of around 5.4 million, the Singapore government's share of the economy is lower as the demands of infrastructure investment is significantly more focused than in New Zealand. Singapore's success highlights the importance of collaboration and focus. To ensure New Zealand companies can compete with these rapidly growing Asian economies, we need to build innovation depth and focus on developing scale in key market niches.

If New Zealand fails to secure scale and, as a consequence, relevance, we run a real risk of being squeezed out of markets. In reality, we are only ever likely to have globally relevant scale in a relatively small number of markets. The key challenge for New Zealand companies, therefore, is developing strategies that enable them to maintain relevance to their customers in a world that is undergoing unprecedented change.

## The recipe for national relevance

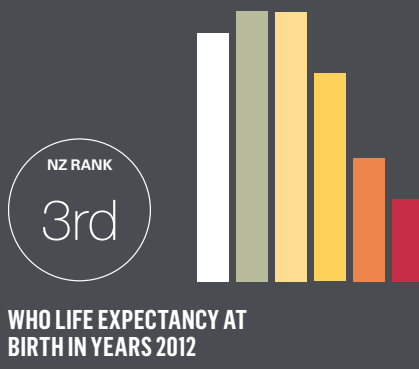
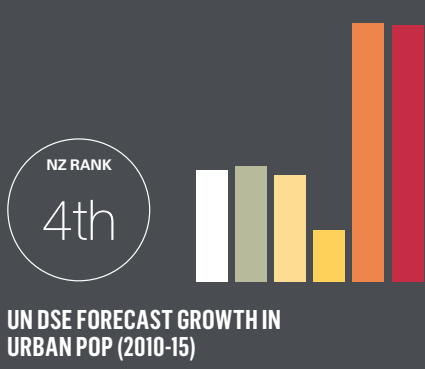
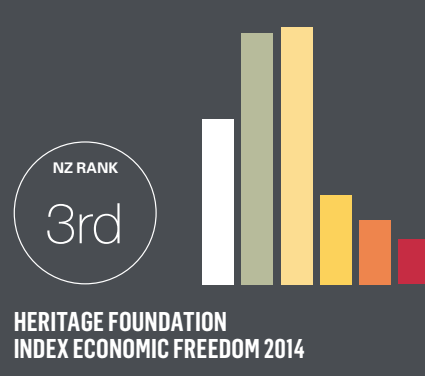
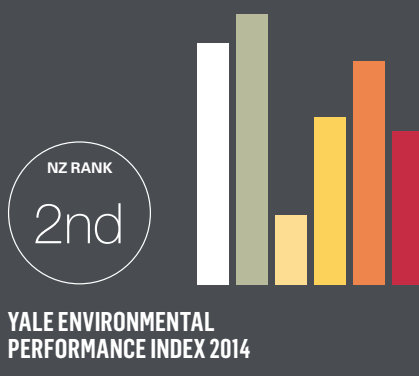
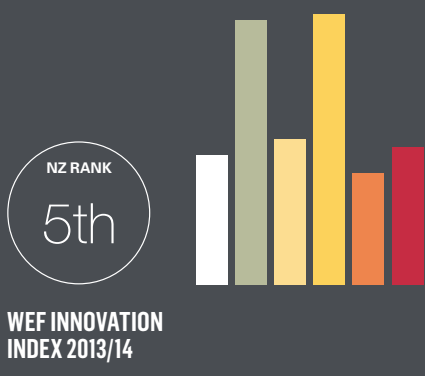
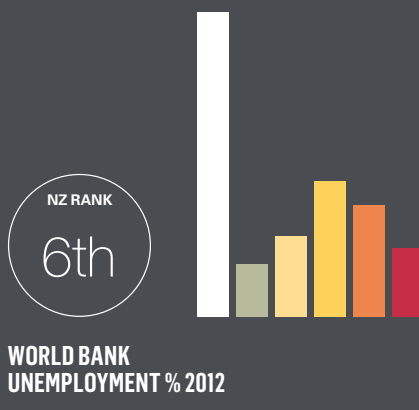
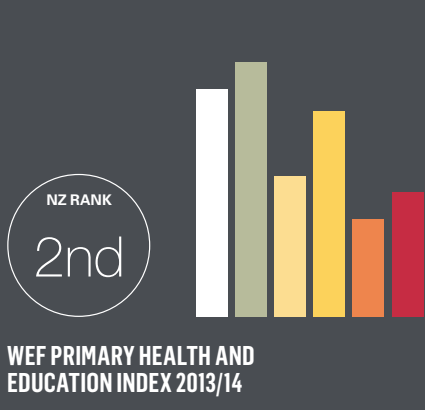
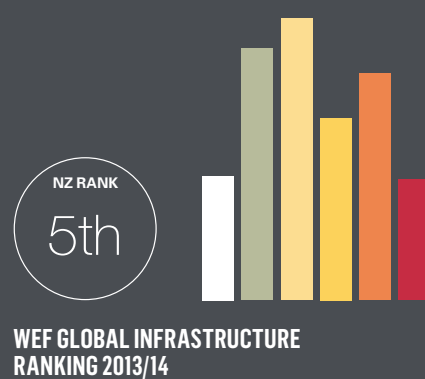
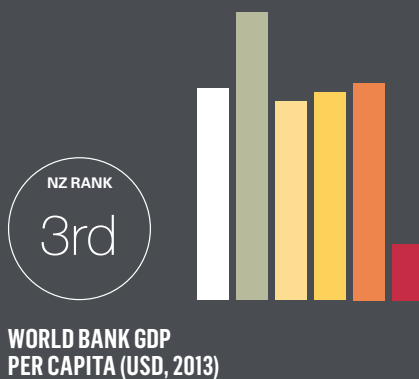
Looking across the small developed economies, and key competitor economies in Asia, the trends for growing wealth and success are apparent:

- › Investment in **world-class infrastructure** is critical.
- › Education must be focused on preparing **people for tomorrow's jobs and markets**.
- › **Continuous innovation** must be a part of the national DNA; with policy setting in a small economy designed to incentivise collaborative initiatives to increase scale and impact. All organisations must continuously think like startups.
- › Countries must utilise all their resources to **build sustainable wealth**; this includes appropriately using natural capital and engaging all groups within the community, so everyone benefits from increased prosperity.
- › Not constraining the real and perceived **economic freedom inherent in a country** is critical to enable companies to compete in a continuously changing world.
- › Focus extensively on **competitive advantages** to deliver unique solutions to identified niche customers. Doing the small things really well is critical when you lack the scale to change the mainstream market.

The story is similar when comparing to small developed Asia economies – rankings for key economic growth drivers remain low.<sup>2</sup>



- New Zealand
- Singapore
- Hong Kong
- Taiwan
- UAE
- Malaysia





# THE KEY TRENDS THAT ARE CHANGING THE WORLD

Take a few moments to think back to 1984.

The world was a very different place: none of us had email (in fact it was still four years before Sir Tim Berners-Lee invented the world wide web that we know today), very few of us had any form of mobile phone, airlines were all full service, and banking was almost exclusively done face-to-face at the branch counter.

The world was a slower place and established companies were comfortable with their role in the traditional world order. Their heavy investment on assets and infrastructure to meet customer needs made it all but impossible for emerging competitors to gain a toe hold in a market to try and disrupt the status quo. This is best illustrated by the tenure of listed companies in the S&P500 index; in 1958 a company remained in the index for an average of 61 years. This had decreased to 25 years by 1980, and 18 years by 2011<sup>3</sup>. *The Economist* has forecast that average tenure by 2025 could be as short as 5 years<sup>4</sup>.

Our ability to generate, collect and analyse data has increased at an exponential rate over the intervening 30 years; driven by unprecedented technological evolution. We can now access and share information 24/7. Algorithms, interfaces and social networks have replaced bricks and mortar as the drivers of business value; and intuition and technological nous are more relevant to the future survival prospects of a business than a venerable history and a current large market share. While it is a cliché, it has never been truer that change is the only constant in the world of 2014.

A review of recent literature on how our world is likely to evolve over the next 30 years suggests we will not see any let up in the pace of change. As technology continues to diffuse into our day-to-day environment, we will also have to grapple with the re-emergence of Asia as an economic powerhouse, expected changes to our climate, and approximately two billion additional mouths to feed.

For this volume of the KPMG *Agribusiness Agenda*, we have taken a different approach to previous editions, and have set out to explore the macro trends that are expected to shape the political, social, environmental and economic outcomes for the global community over the next 20 to 30 years. We have identified 14 key trends that are likely to have the greatest influence on our global future.

The *Agenda* considers the impact these trends may have on how the global agri-food system produces, distributes and ultimately consumes food, fibre and timber products. Based on our conversations with New Zealand primary sector industry leaders, we also assess the opportunities and challenges that these global trends create for the wider New Zealand economy, and primary sector companies in particular.

The world is not a simple place. The range of forces influencing global development are diverse and varied. We have grouped the key global trends into five over-riding themes that describe our multipolar world.

# 1

## CHALLENGING THE GLOBAL STATUS QUO

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Challenging the global status quo: explores the evolution of economic power and influence, and how this will impact the traditional institutions of government.



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# 2

## FUTURE WORLD CITIZENS

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Future world citizens: recognises the 21<sup>st</sup> century's unique demographic groups, particularly technologically-immersed young people, and the rapidly growing aged and urban populations.



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**INTEGRATED URBAN LIVING**  
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## EMPOWERING INFRASTRUCTURE

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Empowering infrastructure: analyses how the healthcare, energy and education needs of nine billion people are serviced as their demands on legacy infrastructure grow.



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### MEETING ENERGY NEEDS

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### TARGETED EDUCATION

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## A CONNECTED AND CONVERGING DIGITAL WORLD

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A connected and converging digital world: focuses on the disruption that technology may cause to traditional business models, as organisations become better at unlocking value from bulging data warehouses.



### DIFFUSED INNOVATION

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### REALISING VALUE IN DATA

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# 5

## ENABLING INDEFINITE SUSTAINABLE LIVING

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Enabling long-term sustainable living: addresses the environmental challenges technological evolution is creating, and what is required to ensure the whole population benefits from the progress mankind is making.



### CLIMATE CHANGING

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### FACING RESOURCE SCARCITY

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### EMERGING SOCIAL ENTERPRISE

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Photo: Larry Bruce / Shutterstock.com



## Wild cards will drive different outcomes!

The Global Trends we discuss in this volume of the *Agenda* and their potential implications are based on our research and discussions with industry leaders. However we live in a volatile world, and there is no doubt that wild cards will appear at irregular intervals and alter the course of world development, to a greater or lesser extent.

This century has already seen the 9/11 terrorist attacks on New York and Washington and the resulting war on terror; the failure of Lehman Brothers triggering the global financial crisis (GFC); and the meltdown of the Fukushima Daiichi nuclear reactors in Japan following a direct tsunami hit. All of these events have had global repercussions on wealth, security and the environment. They help define the future we discuss in this report, but it is worth briefly reflecting on what the next wild card could be. Any future strategy needs to recognise that the next card could be dealt at any time, and have sufficient flexibility to respond instantly to the revised world order that follows.

Some of the potential wild cards (with either positive or negative impacts) that are on the radar of futurists include:

### Potential positives:

- › Systems and robots developed with full artificial intelligence (AI) enabling risk to be eliminated in workplaces, productivity to be enhanced, and unlocking the potential for deep space exploration.
- › Hydrogen fusion achieved and scaled commercially to provide unlimited cheap, clean energy; eliminating the need for fossil fuels and changing the way we travel.
- › The medical discovery of genetic switches that eliminate cancers and other major health disorders, removing these illnesses and their social and economic consequences from daily life.

### Potential negatives:

- › A regional natural disaster (such as a super volcano eruption or a large meteor strike) in close proximity to large population centres, causing significant destruction.
- › The collapse of the Chinese Communist Party and subsequent breakdown of regulatory structures and civil society in China.
- › A significant bioterror attack leaving regions uninhabitable (either urban or agricultural), resulting in major displacement of resident communities.
- › A pandemic disease spreading globally, resulting in large human mortality and significant limits being placed on trade and travel for a sustained period of time.
- › Co-ordinated cyber-attacks disabling global satellite systems, deactivating GPS, communications and banking networks, and grounding air transport for a sustained period of time.

While these risks may not be on the risk map of most companies today, the GFC and the resultant liquidity constraints across the global banking system was not on the radar for many organisations in early 2008 (despite some early warning signs). The GFC saw many good companies stretched to their limits – and in some cases beyond into receivership and liquidation – because the directors and management failed to ensure that their businesses had the capacity to respond to a wild card event. The future will serve up more wild cards; the businesses that survive will have the capacity to get on their feet and effectively respond to the changed world order the next morning.

THEME

1

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# CHALLENGING THE GLOBAL STATUS QUO



## Geopolitical instabilities

### The Macro Themes

- › Growing wealth challenges governments
- › Religious-based division
- › Combating the remote criminal

### Impacts on the global agri-food system

- › Delivering food security
- › Religious food adherence
- › Delivering customers safe food



## Economic rebalancing

### The Macro Themes

- › The full emergence of new economies
- › Moving past the Global Financial Crisis
- › Increasing the participation of women

### Impacts on the global agri-food system

- › Middle classes adopting new diets
- › Globalised eating trends
- › New investors in agri-food



## Government 3.0

### The Macro Themes

- › Creating new world institutions
- › Issues beyond national borders
- › Delivering affordable government

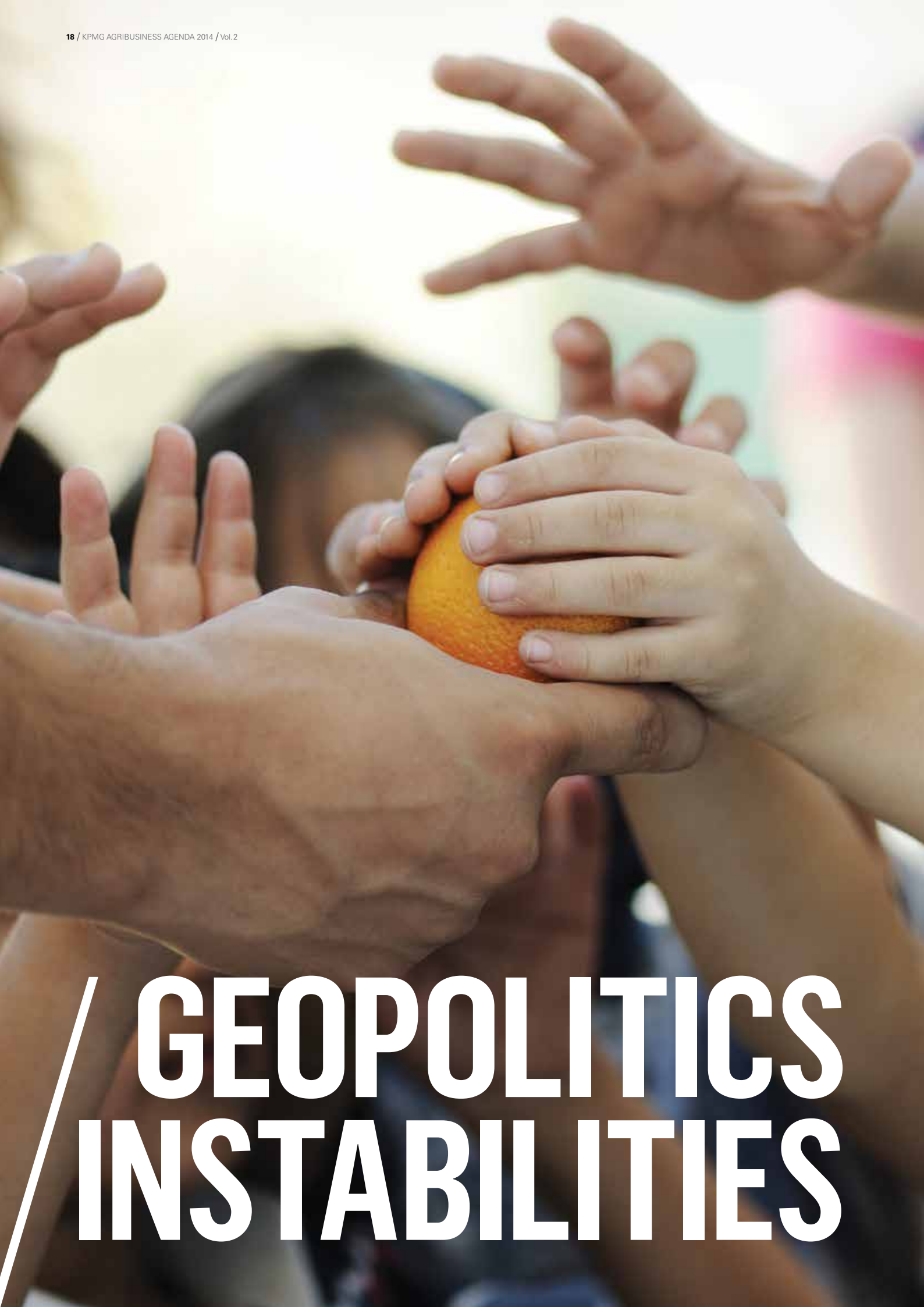
### Impacts on the global agri-food system

- › Relaxing the grip of government?
- › Co-ordinating cross border responses
- › Meeting the costs of affordable food

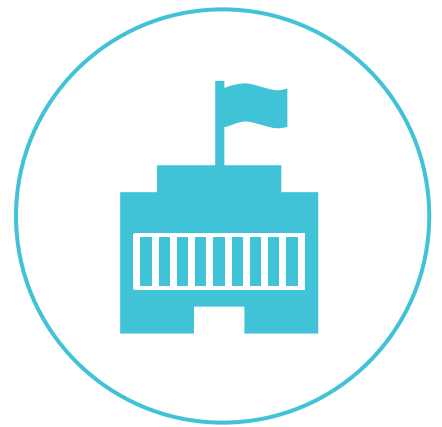
**We live in a world where hardly a day goes by without escalating tension in one region of the world or another; be it the Ukraine, Syria, Iraq, Nigeria or the Senkaku Islands (to the Japanese, or Diaoyu Islands to the Chinese).** At the same time, many emerging economies are achieving sustained and rapid growth at unprecedented rates; while developed Western economies still battle to get back on to a stable growth track after the GFC. Millions of newly-affluent consumers are demanding the goods and services to deliver on their lifestyle aspirations and, in some cases, are also seeking greater freedom and democracy.

The centre of economic influence appears to be returning east across Asia. With this shift, the effectiveness of global institutions that were created post-WW2 is being challenged, as their structures are no longer aligned with the geopolitical influence countries and regions can exert in 2014. Globalisation is raising issues that are no longer defined by geographical boundaries of countries, and consequently require new regional responses to regulation. This is a challenge that old world structures are struggling to meet.

The global status quo we have lived with for decades is coming under increasing pressure – due to the emergence of new developed economies, regional and religious tensions, and the long-term impacts of the GFC. The world needs to create new structures and institutions to equip it to handle its new world problems, and deliver greater security and certainty to communities across the globe.



# **GEOPOLITICS INSTABILITIES**



**For the majority of governments around the world, ensuring that sufficient food is available for the population at an affordable price is critical to retaining their power and influence.**

The way societies evolve – whether it’s an orderly response to increasing wealth and knowledge; or the result of war and unrest; or a reaction to poverty, inequality or extremism – has significant long-term impacts on the quality and nature of foods consumed around the world.

**MACRO THEME #1**

**The middle classes flex their muscles: driven by growing wealth and wider knowledge**

History has been shaped by the most repressed citizens within countries rising up and revolting against the ruling classes. However it will not be the poorest communities that stand up for change in the next 30 years; it will be the emerging middle classes (a middle-class consumer is considered to be somebody earning more than US\$10 a day, or US\$4,000 a year). Forecasts suggest that the number of middle-class consumers in the world will increase to around 4.9 billion by 2030. That is around three billion additional consumers that will have sufficient income to have some discretion in how they spend their money; consumers that are no longer buying food purely for subsistence purposes, but purchasing products and services because they add something to their lifestyle.

Newly-empowered consumers will have greater access to knowledge than any previous 'repressed' social group in history, enabling them to contrast their personal circumstances, and particularly their economic and democratic freedom, with others around the world.

Political leaders will be held to account in countries that are perceived to limit the freedoms of this population group. Unwillingness on the part of existing governments to evolve their policy settings will result in opposition movements gaining strength, and undoubtedly lead to regime change over time.

We expect that the civil uprisings that have been seen in Middle East in recent years (particularly those associated with the Arab Spring) will be replicated in many countries over the next 30 years; as people seek greater freedom to lead the lives they aspire to.

**MACRO THEME #2**

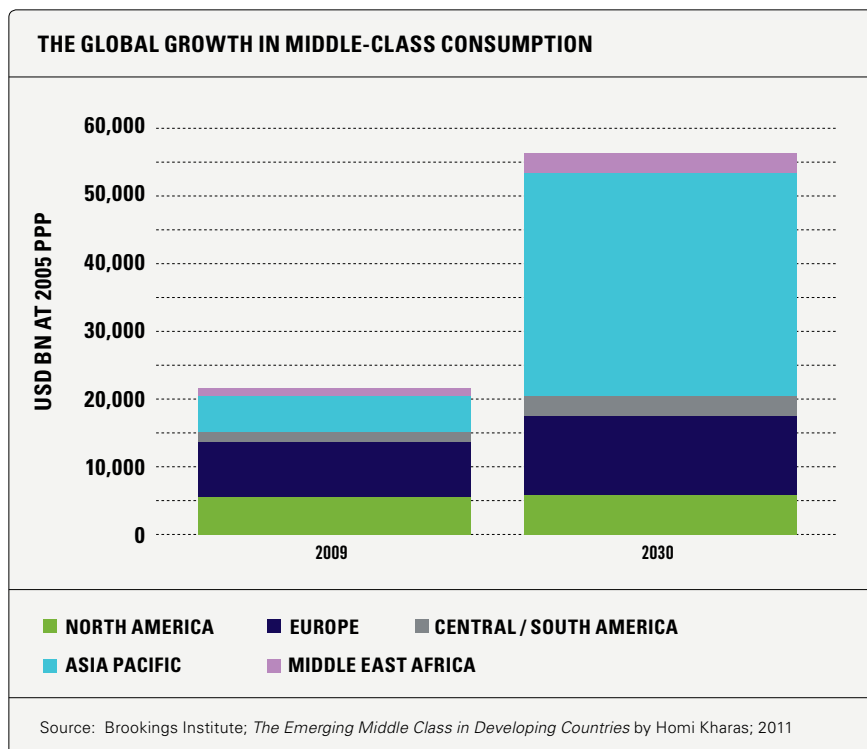
**Religion causing division and conflict between communities**

There is no evidence that the world is becoming a more secular place. In fact, the major global religions are expected to gain almost 2.9 billion additional adherents between 2000 and 2050. Yet the headline growth in the followers of the Islamic or Christian faiths hides the fact that not all the followers interpret the core teachings of the religion in the same way, or have consistent values.

It is the minority groups within these faiths – be it the Islamic State Group in Iraq, or the Westboro Baptist Church in Kansas – which are fuelling distrust and division between communities. While it is unlikely that the world will see a new round of crusades, if sects continue to radicalise young people and attempt to impose their views onto more moderate communities, there is an increased likelihood of major religious-based conflict in the next 30 years.

At the same time as major religions grow, in the Western World and China, there is a growing number of people that choose not to affiliate to any religion. Historically, broad religious alignment has delivered communities a default set of values. It is not yet apparent how secular communities will achieve consensus around the core values that shape their social and economic frameworks, given that many members of the community have differing goals and aspirations.

A regularly noted case study of secular challenge is the Chinese economic reforms started by China in the late 1970s. They, for many, have replaced traditional cultural values with individualism and the celebration of wealth as key priorities. This has raised questions among experts over the sustainability of the existing system without reprioritising deeper social values.





The FBI estimate global losses resulting from botnets is in the region of **US\$113 billion**

**Botnet:** malicious software that infects computers so they can be used to automatically perform tasks over the internet

Approximately **375 million computers** are infected each year or **12 victims a second**

Source: Federal Bureau of Investigation; Statement before the Senate Committee on Homeland Security and Governmental Affairs by Robert Anderson, Executive Assistant Director of Criminal, Cyber, Response and Service Branch; 10 September 2014

#### MACRO THEME #3

### Fear of remote criminals paralysing the global community

At the start of the 21<sup>st</sup> century, the world was faced with entirely new criminal and security threats that can be executed remotely through cyber networks. A more connected world makes it possible for fleet-footed criminals operating beyond the reach of enforcement agencies to commit large-scale fraud, and impede the freedoms of individuals to conduct their daily business; while being thousands of kilometres away from the scene of their crimes.

A recent report from KPMG in India found that 51% of businesses perceive themselves to be an easy target for cyber-attacks, with the financial services sector being identified as the most at risk<sup>5</sup>.

The reality is that no matter how effective the authorities are in responding to the threats, cyber criminals will always be one step ahead. The global community will be subject to continual attacks resulting in both financial losses and cost increases, as businesses and communities take steps to protect themselves.

It is expected these attacks will lead to increased regulation of the internet to enable better traceability of activities and maintain confidence in the cyber environment. If governments fail to preserve this confidence, it is likely commercial opportunities will be lost, our ability to move ourselves and goods across borders will be constrained and, perhaps most significantly, the transformational potential inherent in technology will not be fully realised.



The Indian Government passed a **'right-to-food' law in 2013** that doubled the portion of the country's population eligible to receive a 5kg per annum allocation of government subsidised grain to 70%.

**The government is now considering increasing the annual allocation to 7kg.**

Source: Financial Times; *India's tough trade talks stance wins few friends in poor nations* by Shawn Donnan and Amy Kazmin; 24 September 2014

#### IMPACT ON GLOBAL AGRIFOOD #1

### Security of the food supply is top priority for the majority of governments globally

The bottom line for the majority of the world's governments (democratically elected or otherwise) is a need to secure sufficient food to feed their population at an affordable price. Failure to deliver against this fundamental objective can lead to social instability and ultimately challenge the ability of any government to continue. As the growth in demand for food is widely expected to exceed growth in supply between now and 2050, we expect governments to become increasingly involved in influencing the availability and access to food in their domestic markets. In the developing world, this is likely to include policy responses to enhance the effectiveness of domestic production; in particular by providing new incentives for farmers to consolidate their holdings to build scale and productivity.

Historically governments have utilised a variety of tools to influence the security of their food supply; including producer subsidies, price regulation, and preferential trading relationships with countries that fill gaps in domestic production. The reality for many governments, particularly in the developed world, is that the subsidy cost has spiralled out of control while supporting inefficient production techniques (the European Union's Common Agricultural Policy (CAP) being the most obvious example of this). New solutions are needed to meet the goal of securing food supply.

In recent years, governments facing immediate food shortages have taken a more interventionist approach in the supply chain; using state-owned enterprises and sovereign wealth funds to invest directly in land and processing assets to gain direct access to the products they require. While this outbound investment will undoubtedly continue, we expect concerns in investee countries over the loss of control of land assets to constrain the extent of this activity moving forward.

As a consequence, new policy interventions to deliver security over food supply will be developed. We expect to see greater focus on investing in innovation throughout the supply chain; with initiatives to drive productivity and minimise wastage, as well as evolving the nature and composition of foods consumed (all themes that will be returned to later in this *Agenda*). Rather than subsidise inefficiency, it is likely that governments will invest alongside the producers and processors, providing the capital to develop the infrastructure to support more intensive and reliable production.





**There is no evidence of the world becoming more secular with significant growth in followers of major religions.**

**Estimated increase in adherents between 2000 and 2050:**

**ISLAM**

87.6%

**SIKHISM**

59.3%

**CHRISTIANITY**

52.6%

**Estimated adherent numbers by 2050:**

**ISLAM**

2.22 Billion

**SIKHISM**

37.0 Million

**CHRISTIANITY**

3.05 Billion

#### IMPACT ON GLOBAL AGRI-FOOD #2

### Religious preferences are fully integrated into food development and production

The dietary rules embedded in many of the world's major religions mean that billions of consumers globally have strong preferences to consume or avoid particular types of food. While the majority of groups within the Christian religion have no significant restrictions on food choices; it is expected that the Islamic, Hindu, Buddhist and Jewish faiths will collectively have around 3.8 billion adherents by 2050. All of these religions prescribe, to a greater or lesser extent, dietary exclusions and restrictions (be that restrictions on pork and shellfish for the Islamic and Jewish faiths, beef for the Hindu faith, and all meat products for strict Buddhists).

In addition to the restrictions on what can be eaten, some religions also have strict rules about how food must be handled and prepared. For instance, a Muslim can only consume meat if it has been prepared in a Halal manner; while Jewish people who follow strict Kosher principles require meat and dairy foods to be both prepared and consumed separately.

With over 40% of the world's population expected to be eating in accordance with religious practices, these requirements will permeate through the global food supply chain. An unwillingness to design processes to ensure that foods are sensitively handled or align a product offering to the dominant religion in a market could limit opportunities and damage a company's reputation globally. Some companies, however, are choosing to exclude themselves from supplying products to customers from a particular religion, as they consider complying with the specific requirements of that faith is impacting existing business relationships with consumer groups from other religions.

However, religious adherence also creates opportunities for businesses seeking to create innovative products that work within religious restrictions, and extend the options available to particular religious groups. For example, this could be new forms of animal-based protein or lab-developed synthetic proteins.

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IMPACT ON GLOBAL AGRI-FOOD #3

**Supply chain integrity evolves to deliver consistently safe experiences to customers**

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Consumers in many markets have little trust in the integrity of the product they are purchasing. They routinely question whether the product described on the package is the same as the contents of the package. This lack of trust is the result of too many producers, processors and retailers failing to meet their obligations to deliver safe food to their customers. A desire to maximise profits is behind many of the food scandals we have seen in recent years.

In recent years we have seen: milk powder being adulterated with melamine and other chemicals; animals being fed with chemicals such as clenbuterol to accelerate muscle growth; numerous cases of a meat supply being contaminated with alternative varieties of meat (including the European horse meat scandal last year); and most recently, revelations that expired meat and off-cuts were recovered from the floor and mixed into burger patties produced by OSI Group for quick service restaurants in China<sup>6</sup>.

Governments are now tightening food safety regulations to reassure consumers and rebuild confidence. However the changes appear to have limited impact on the rate of scandals, with the financial incentives outweighing the potential criminal penalties for many. Those companies that are prepared to invest in categorically assuring the integrity of their products will be able to secure premium prices on a sustainable basis.

The future will bring significant innovation in the area of food integrity. Emerging technologies that forensically footprint the chemical profile of a product will over time evolve to incorporate genetic technologies. Traceability systems currently being developed and rolled out by individual companies will consolidate into national or even international solutions to secure credibility across the supply chain. Potentially, we could see mobile applications developed to interact with these databases to provide point-of-sale assurance to a consumer when purchasing a product.



## IMPLICATIONS FOR NEW ZEALAND

As we have noted in many previous *Agendas*, New Zealand is in a sweet spot as the demand for food expands globally on the back of the growing wealth of consumers, particularly in Asia.

- › It is critical that, as a country, we grow a wider recognition of the strategic importance of our primary sector assets. We need to create a regulatory environment that maximises their contribution to the economy, while preserving the environment for the benefit of all New Zealanders. As we have previously argued, we believe it is important a pan industry vision and strategy is developed for New Zealand's Primary Industries.
- › Governments facing food security challenges will recognise the potential of the primary sector assets in New Zealand; and will be prepared to pay a premium to gain control of them. Clarifying our position in relation to international investment is important, and should have a strong focus on promoting co-investment that generates positive outcomes for both the parties to the investment and the wider New Zealand economy.
- › The potential opportunities available to the industry are vast. Given that we are, and will always be, a relatively small producer of primary products on a global scale, intense focus is necessary on carefully selected niche markets to maximise value. The best opportunities will be those that enable producers, processors and exporters to bring innovation to a market that consumers will pay a premium price for.
- › The increased number of adherents to religious dietary practices creates opportunities for New Zealand. We have already developed protocols for producing Halal-certified products, creating opportunities in rapidly growing Islamic markets in Indonesia, Malaysia and the Middle East. Given that Hindus are significant dairy consumers, gaining greater access to markets in the Indian sub-continent must be a high priority to secure a foothold in this region.
- › The Whey Protein Concentrate recall undertaken by Fonterra in August 2013 clearly signalled that a food safety failure could have a catastrophic impact on the New Zealand economy. It also highlighted that food safety is not just another cost to be managed; it is a strategically important component of our agri-food sector.
- › There are early-adopter advantages currently available for companies and countries that are innovative in delivering food integrity assurance to their customers. There are benefits to be derived from exploring a New Zealand Inc solution to this issue to enable greater investment to be made in introducing new technology solutions to deliver assurance at the point of sale.

## THE COMPANY AGENDA

- 1 Consider product innovation to take advantage of high-value niches in emerging markets. What production strategies, further processing, packaging and marketing innovation could differentiate your product in a crowded market?
- 2 Determine your strategy in relation to marketing in strongly religious markets. What are the opportunities to introduce new solutions and products to the market while retaining strong compliance with core religious practices?
- 3 Ensure you are delivering direct assurance to the ultimate consumer of your products as to its integrity. Are you making a sufficient investment in full supply chain traceability, and making this information available to the consumer?



# **ECONOMIC REBALANCING**



**For most of recorded time, the world's largest economies were Asian.** The shift of the balance of wealth to Europe, and ultimately North America, is a relatively recent phenomenon driven by the rapid industrialisation and urbanisation of these countries from the late 1700s. The initial industrial revolution bypassed the major Asian economies, and their wealth and influence declined as increasingly wealthy Western countries entered an expansionary phase to fuel national ambitions. The GFC, however, has confirmed the wealth pendulum is swinging back East; disrupting perceptions we have held of the global economy for the last 200 or so years.

### THE PERIOD TO 2050 SEES AN UNPRECEDENTED EMERGENCE OF NEW SUPER ECONOMIES

	GROSS DOMESTIC PRODUCT 2012	ESTIMATED GDP IN 2050
<b>US</b>	16.24	34.56
<b>BRAZIL</b>	2.25	9.71
<b>RUSSIA</b>	2.01	8.01
<b>INDIA</b>	1.84	24.98
<b>CHINA</b>	8.23	52.62
<b>MEXICO</b>	1.13	6.95
<b>INDONESIA</b>	0.83	6.04
<b>NIGERIA</b>	0.26	4.91
<b>TURKEY</b>	0.79	4.45

Source: World Bank, Goldman Sachs

#### MACRO THEME #1

### The emergence of a new generation of developed economies progresses rapidly

It is likely that the BRIC (Brazil, Russia, India and China) and MINT (Mexico, Indonesia, Nigeria and Turkey) economies will all sit within the 15 largest economies in the world by 2050. With a combined GDP of over US\$117 trillion, the emergence of these economies will change perceptions of a developed economy.

As these economies emerge, core infrastructure investment will grow, healthcare investment will increase life expectancy and greater access to education will enable more people to participate in the economy. Over time more people will be available for higher skilled jobs, and dependency levels in the countries will reduce (with fewer mouths to feed and more people prepared for their old age).

Concerns about climate change mean that the emerging economies will develop very differently to the Western economies. Unconstrained development with no regard to its impact on the

environment will not be sustainable for these countries, and their 'industrial revolution' will need to balance the demands of consumers with the global availability of resources. The MINT economies, that are currently earlier in their development phase, are better positioned to meet this expectation than the BRICs, who are already facing significant environmental challenges that will slow the relative speed of their future development.

These newly emerged economies will evolve from meeting the needs of export markets to be driven by vibrant domestic consumer markets. However, these will look and feel very different to our traditional understanding of a consumer market, as the per capita income levels will continue to be lower than those in Europe and North America. Businesses will develop different operating models focused on high-volume, low-cost products and services to meet the needs of these consumers. Rather than simply clone solutions targeted at higher value markets, they will create innovative products created to fit within their customer's lifestyle. Successful companies will not just copy others; they will cut new, dynamic paths for themselves.

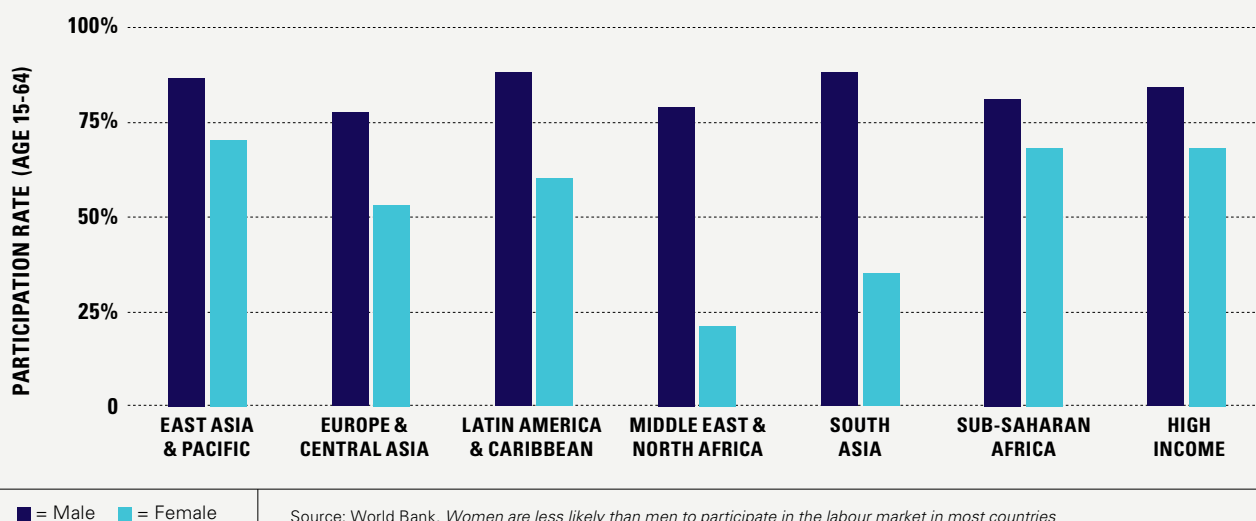
#### MACRO THEME #2

### Old world economies forge new paths following the Global Financial Crisis (GFC)

Six years after the GFC, its impacts continue to resonate throughout the world economy and will continue to do so for many years to come. While even the most severely impacted countries are starting to find ways to move on, the psychological damage the GFC has inflicted on governments, banks, companies and individuals will take longer to heal. The near-death experiences many organisations faced during the crisis have changed the way risk is perceived. This is impacting decisions being taken today and will shape how Western economies develop in the future.

Corporate profits have been restored after the GFC, and companies have actively reduced their gearing to de-risk their balance sheets. Recent research indicates that many market leading companies are over-allocating cash resources to maintain their share price; rather than applying surplus cash to higher risk investments with greater potential to fuel long-term economic prosperity for the company and the wider economy. A tendency to be conservative, which is intended to deliver consistency to stock markets that favour steady growth, has the potential over time to further destabilise Western economies; as it erodes opportunities to innovate and compete with leading companies in the emerging economy<sup>7</sup>.

## WOMEN ARE LESS LIKELY THAN MEN TO PARTICIPATE IN THE LABOUR MARKET IN MOST COUNTRIES



Western companies must recognise that underinvesting in innovation in favour of maintaining share prices in the short term is ultimately a flawed strategy. Companies must again be prepared to take on acceptable risks. In a rapidly evolving world, companies that focus on preserving current profits are at a higher risk of missing the opportunities for their business. They risk being overtaken by the companies that are driving the growth in emerging markets, that are better equipped to deliver new products and services to consumers.

The future of established Western companies is not yet apparent. Will they increasingly be focused on simply mimicking innovation in the emerging economies? Or will they again become more willing to take on greater risk, and invest in the future prosperity of their companies and the wider economy?

### MACROTHEME #3

#### Increased participation of women in the economy could unlock previously wasted potential

The desire of women to increase their participation in the economy represents a significant 'demographic dividend' available to increase global output and productivity. Too many countries, however, still choose to largely exclude the potential contribution of women. As a consequence, it is not certain that the benefits will be realised consistently across all economies.

Capturing the potential of women around the world will require countries to step up in three areas: changing economic policies, changing laws and institutions, and changing attitudes and culture. This could see governments adopting a spectrum of pro-female, pro-family initiatives<sup>9</sup>; such as easier access to early childhood education, legislating more flexible working practices, and giving women and men equal treatment under the law (for instance equal property rights).

Overcoming cultural limitations represents the biggest barrier to realising this demographic dividend. While governments can be encouraged to change their legislation through making these reforms a condition of aid packages, changing the cultural mindset is a much greater challenge. This is particularly so if historically girls have not been encouraged (or permitted) by their families to gain an education. Consequently, the initial focus must be closing the gender gap in education, both through access for females and enabling the wider population to challenge traditional stereotypes.

One analysis suggested that taking immediate action to address the gender gap in the Indian education system could result in a per capita income increase of 10 to 13 percent by 2030, when compared to a 'do nothing' baseline model<sup>9</sup>. There is no question about the contribution women can make to the economy if they are treated consistently with men. However therein lies the challenge, and it is unlikely this goal will be fully realised by 2030.



Between 2000 and 2030 each person in India is expected to increase consumption of...

DAIRY PRODUCTS BY

57%



PORK BY

86%



EGGS BY

173%



POULTRY BY

577%



2000-2030, the Indian population is expected to grow from 1 billion to 1.5 billion people.

IMPACT ON GLOBAL AGRI-FOOD #1

The growing middle classes demand more and different products in emerging markets

The lifestyle aspirations of the rapidly growing middle classes will drive increased demand for products and services that have historically been associated with affluence; such as clothing, food, motor vehicles and international travel. While the increased affluence does not seem significant by Western standards (a middle-class consumer is considered to be somebody earning more than US\$10 a day, or US\$4,000 a year), the spending capability provides these consumers with a new level of choice in their purchasing decisions. With regard to food, this means purchases that have historically been driven by a need for basic sustenance can evolve into purchases that are made to enhance the purchaser's lifestyle.

The impact of this discretion is apparent in the huge growth in demand for more complex animal-based proteins. Globally, the demand for poultry, pork, dairy and seafood products is growing faster than supply. This is increasing price volatility around a long-term price track which appears to be moving upwards. As discussed below, the demand-driven fundamentals of food are attracting new investors to the sector.

Shifting from a diet based predominately on grains, pulses, fruit and vegetables to one involving higher levels of animal-based proteins creates a myriad of issues for the industry. Capital is required to develop the property and equipment to house animals and process outputs. Temperature-controlled supply chains are required to move products to market, while ethically treating animals throughout their life is a friction point with the wider community. Most significantly, there is the challenge of sourcing sufficient feed for the animals in a food-constrained world.

Innovation will be required across the supply chain to meet the evolving dietary aspirations of the emerging middle class. This makes wide-scale adoption of genetic improvements in both feed crops and animals unavoidable (explored further in Trend 12).

Yet even with unprecedented levels of agricultural innovation, we cannot be certain that demand will be able to be met. Accordingly, increasing focus will be placed on the engineering and commercial-scale production of synthetic animal proteins. The technical feasibility of synthetic protein has been confirmed, but there is more work required before they are able to be scaled for everyday consumption. Every food company should have the potential for synthetic substitution of natural foods within the next two decades on their risk register, and be thinking today about what their commercial response might look like.





**Insects lead the way in efficiency of converting feed into protein...**

**CRICKETS**

**48%**



**SALMON**

**45%**



**CHICKEN**

**22%**



**PIG**

**11%**



**Percentage represents conversion rate of feed into edible body mass.**

#### IMPACT ON GLOBAL AGRI-FOOD #2

### Globalisation drives the mainstreaming of ethnic and non-traditional foods

Historically, diets have been highly regionalised; reflecting the food that could be hunted, collected or grown seasonally within a tight radius of a community. This often meant that within a country or a region, there was huge diversity in the food being eaten; although the dietary diversity of any single person would have been limited to where they lived and that locale's 'speciality'.

Increased globalisation of the food system, coupled with higher levels of international travel, mean that diverse regional diets have been supplemented by a standard selection of international cuisines across much of the world. These are predominately based on Western diets or Western interpretations of ethnic food.

However, the growing affluence of emerging economies – together with increases in economic migration into cities and across borders – provides an opportunity for traditional regional cuisines to be better understood and represented in the global food system. This is resulting in a richer diversity of food becoming more readily available in many markets around the world, creating export opportunities for niche food producers.

This mainstreaming of ethnic foods will continue to introduce new food categories to the market. One trend we expect to see is the increased consumption of alternative animal proteins, as traditional sources of these proteins continue to escalate in price. This is likely to include the incorporation of insect proteins into diets, as is common in many regional diets in Asia and South America. There are around 2,000 known species of edible insects, many of which have high nutritional and protein content (as the graphic illustrates) and can be produced with a low environmental impact. While the 'yuck factor' may see insects being processed into pastes and powders, it is unlikely to be too long before insect-based protein products are available in mainstream retail channels across the world.<sup>10</sup>

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**IMPACT ON GLOBAL AGRI-FOOD #3**
**New investors in industry  
introduce new business  
expectations**


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The global growth in demand for food and the challenges that suppliers have fulfilling this demand suggests only one long-term direction for agricultural prices: upwards. However, history suggests that this upward track will still be subject to price volatility – with weather (both good and bad), production issues, politics and economic fundamentals (such as exchange rates and employment) all being contributing factors.

As we have discussed in previous *Agendas*, the inherent volatility associated with agriculture has historically scared professional investors away from sector.

Agricultural assets do not deliver the consistent quarterly returns many fund managers seek, and most funds have consequently chosen to exclude agriculture from their portfolio allocation. Yet the compelling global food story is causing more high-net worth individuals, and private equity, pension, endowment and sovereign wealth funds to see through the volatility and invest in the agri-food sector in a substantive way.

This trend, which has become clearly apparent in the last two or three years, changes the game for the sector. It provides the finance to enable the capacity growth needed to meet the global demand for food; in particular facilitating the industry consolidations necessary to secure the benefits of scale (within a single country or on an international basis). The funding comes with obligations, however, including an expectation that operating profits will be generated together with the cash flow to support dividend payments. This changes the focus of many agricultural businesses that have relied on land appreciation rather than earnings for their return. Investors will also require more formal governance, rigorous compliance with policies and procedures, and comprehensive operational and financial reporting.

Professional investors are not looking for a single farm – they are looking to invest in companies that can bring an investment-ready business to the table (preferably one that is diversified across geographies and agricultural sectors, involved at various stages along the value chain, and has an established track record of production). In many countries there are only a limited number of agri-food companies that meet these criteria. Consequently we expect to see many smaller organisations and co-operatives exploring combinations over the next decade to secure scale and diversity, and position themselves to attract this wave of new money.



## IMPLICATIONS FOR NEW ZEALAND

The rapidly evolving global economy generates many opportunities for companies in New Zealand. Yet the changes create equally as many risks to our traditional business models.

- › New Zealand's main focus has been on the huge opportunities in China, as a result of the preferred market access provided by the FTA. Yet there are many economies developing as fast (or faster) than China, that have growing premium consumer segments creating opportunities for New Zealand companies. It is critical that our exporters monitor and target the opportunities available to them – in China, or elsewhere.
- › There are opportunities for companies to deliver innovative products to the emerging middle classes in rapidly growing Asian markets that meet their needs around cost and quality. This will require a different focus; to develop high-volume, quality products with a low retail price point but higher margins. New Zealand companies that expect to supply traditional products into emerging markets indefinitely will either fail, or risk being marginalised as competitors develop disruptive products.
- › New Zealand has a pioneering history in promoting gender equality. There are opportunities for companies to build on this tradition with their community engagement programmes in emerging markets. Supporting the potential of women, and the resulting benefit to their countries, is a productive way for companies to give back to the economies buying New Zealand products. Such mechanisms could include education scholarships and intern programmes.

- › The need for innovation across the agri-food sector reinforces the need for New Zealand to commit to a globally focused agri-tech strategy. The ultimate goal should be to create equivalent earnings from agri-food technology and IP exports as we do from selling food, fibre and timber. The challenge is to grow agri-tech companies with the global 'fit' and structure to achieve this potential.
- › New offshore investors into agriculture have the available capital to transform New Zealand's primary sector. As a nation, we must present a stable investment environment that welcomes investors looking for long-term and mutually beneficial opportunities.
- › Demand and supply challenges will alter the types of proteins eaten by the world population. While dairy currently leads exports, this is relatively recent; and there is every likelihood the primary export mix will be different again in 30 years. Companies need to open their minds to alternatives (be they sheep milking or grasshopper rearing) as demand patterns change, so we can secure early-mover advantage for the next big thing.

## THE COMPANY AGENDA

- 1 Review the portfolio of markets that your company trades into. Are you staying alert to the opportunities in fast-growing emerging markets beyond China? Is there an opportunity arising in an emerging market that, when carefully assessed, will deliver greater value than current deals?
- 2 Recognise the emerging market trend towards sales of high-volume, high quality, low unit cost products. Be ready to explore new revenue opportunities in these emerging, high margin markets.
- 3 Assess the intellectual property inherent within your company's operations. Do you have IP assets that could generate new export revenue streams or licensing income?



# GOVERNMENT / 3.0



**Technology is claimed to have shrunk the world.** While physical distances have not changed, technology has shortened or eliminated the time delays that were inherent in most cross-border transactions 20 years ago. Having made the world faster, technology is now highlighting the constraints of governments, international institutions and treaties that were constituted in very different times. There is a growing recognition that the global food system cannot continue to fail the tens of thousands of people that die of the direct effects of poverty every day. We require a new generation of government and institutions that bring collaborative perspectives to issues, and an ability to work more flexibly than ever before.

## MACRO THEME #1

## Growing recognition that old world institutions struggle to solve new world problems



### Foundation dates of current constitutional arrangements:

- 1776** USA
- 1901** Australia
- 1917** Mexico
- 1945** Indonesia
- 1949** India
- 1949** Germany
- 1958** France
- 1982** China
- 1982** Turkey
- 1988** Brazil
- 1993** Russia
- 1999** Nigeria

**Neither New Zealand or the UK have a codified constitution.**

The constitutional structures of many countries around the world, and consequently their primary institutions of government, were established in different times. Transformational developments have often occurred without reviews of the constitutional arrangements in many countries around the world – such as the creation of the World Wide Web, globalisation of the economy, mass access to international travel; even the discovery of penicillin and development of nuclear fusion.

The limitations of old world institutions are not restricted to national governments. Of the hundreds of international organisations which have been created over the last century, many are struggling to broker effective and sustainable solutions to the major social, environmental and economic challenges that are facing the world. Examples include the inability of the United Nations to secure stability in the Middle East, or the failure of the recent climate summits to deliver a consensus on the issues associated with global warming.

The countries and organisations that will be best equipped to thrive in the future are those that recognise their shortcomings and take practical steps to evolve. Institutions with mechanisms that allow flexible, tailored responses to issues as they arise – rather than continuing to apply outdated protocol and template responses – will better position themselves to resolve problems quickly and generate greater value for their stakeholders. Examples might include: preferential use of temporary agencies and targeted levies established for fixed periods to address specific challenges; greater engagement with constituencies (potentially seeking opinions on specific issues through online referendums); and greater use of public private partnership (PPP) structures to apply commercial solutions to political problems.

## MACRO THEME #2

## The boundary of an issue will determine legislative response, not a national border

One of the constraints besetting old world institutions is the lack of jurisdiction that they are able to exercise over the full extent of a particular issue. When a problem crosses national borders, the challenge of achieving a single, co-ordinated solution multiplies. A greater number of agencies need to be consulted, there is a proliferation of legislation to be navigated, and wider social and cultural considerations have to be acknowledged.

The challenge with many issues the world is currently facing, or will face in the future, is they are not confined within national borders. For solutions to be effective, they need to be aligned to the boundaries of the issue. This is easily said but difficult to achieve, as there are few examples of international regulation operating effectively and consistently across borders. For instance, reflect on the challenges faced by the International Atomic Energy Agency in regulating the proliferation of global nuclear technologies since it was established in 1957. Or those faced by the UN Framework Convention on Climate Change in ensuring that signatories to the Kyoto Protocol deliver against the commitments they signed up for.

Yet there are also examples of institutions that are more successful in regulating across boundaries. The European Union is creating legislation being adopted across 27 countries in Europe (although enforcement often remains the responsibility of national governments and can vary dramatically); while Antarctica has been jointly managed by a coalition of 29 countries under the Antarctic Treaty since 1959.

Cross-border management of issues will be critical to enabling the world to respond effectively to many challenges currently faced. This will require individual nation governments being prepared to cede some sovereignty (and the associated enforcement) to international organisations to enable co-ordinated responses to be initiated successfully. The response to climate change, seabed mining, sustainable fisheries, antibiotic resistance and poverty will all need cross-border solutions if the global community is ever to effectively respond to these issues.

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#### MACRO THEME #3

### Affordable government requires innovative approaches to investment

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#### Forecasts of Government spending in 2017 as a percentage of GDP compared to pre-GFC levels in 2008:

Increased by 2% or more  
in 11 countries

Increased by 0.5-2%  
in 4 countries

Decreased by 0.5-2%  
in 8 countries

Decreased by 2% or more  
in 5 countries

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Based on sample of 34 developed economies<sup>11</sup>

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In the aftermath of the GFC, many companies have focused on reducing costs and improving productivity to protect profitability and improve cash flow. The GFC also highlighted the public sector debt levels that many governments are carrying.

Not surprisingly, questions have followed about the steps being taken to reduce the costs of public services and improve their productivity. Governments around the world are being challenged to do more (particularly in relation to supporting ageing populations and delivering infrastructure), and do it better while holding their tax take or reducing it.

Failure to meet this challenge is likely to shorten the life expectancy of a government. However, for many administrations that have historically operated a tax-borrow-and-spend regime, there is a need for radically different thinking. Governments need to supplement their traditional skills with experienced commercial executives to drive productivity and reduce long-term costs. Spending decisions must be viewed as investments, with more consideration given to the return delivered from both a social and economic perspective.

Governments will rapidly need to establish how data analytics can support their decision-making processes. Integrating the extensive datasets that governments hold on a society across multiple platforms will enable them to unlock valuable insights; driving better decisions, reducing wasteful spending and enhancing productivity.

Using this analysis, we expect governments will be prepared to make significant investments to address the root cause of an issue, rather than continuing to write open cheques to respond to the implications of leaving an issue unresolved. Many initiatives make good political sense, although the payback may take years to be realised. For example, lifting families out of the poverty trap by enhancing access to education from early childhood level through to vocational training. Some of these initiatives will require political courage; for example, investing in reintegrating criminals into society to break the cycle of reoffending and drive long-term reductions in the societal costs of crime.

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**IMPACT ON GLOBAL AGRI-FOOD #1**
**Globalisation of the agri-food system will depend predominately on politics**


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As we noted in Theme 1, the top priority for many governments around the world is the security of their food supply. The importance of food to the effective functioning of society gives farmer and grower groups significant political influence in many countries. The threat of farmers protesting on the Champs Élysées has kept the French Government focused on protecting their interests in negotiating CAP reform, for instance, while the Japanese Government has been reticent in its approach to the Trans Pacific Partnership (TPP) negotiations given its desire to protect its domestic farming sector.

The reality is that some regions of the world hold significant competitive advantages over others in producing particular foods. The global agricultural system will maximise its output of food in the most cost-effective and environmentally sustainable manner when natural competitive advantages are maximised. However, maximising production of a particular product in one country has obvious consequences.

On the negative side, the country has an abundance of one food product and dearth of other foods needed for a balanced diet; and the resilience of the agricultural sector in a country reduces (as it becomes highly dependent on a limited range of products). On the positive side, the country may be able to exert influence over the market price of the product.

Any trend towards significant regional specialisation will depend on the establishment of free trade arrangements. The strength of the farm lobbies appears to be limiting the ambition of many governments in this area. In recent months, the Indian government has blocked a WTO measure intended to liberalise agricultural trade because of concerns over the impact it would have on their ability to support local producers. The Russian Government has banned food imports from specific countries in response to sanctions imposed over the situation in the Ukraine; while many governments continue to use phytosanitary and tariff barriers to restrict free agricultural markets.

While the global food system could undoubtedly be more efficient through geographical specialisation, we expect progress will remain slow – given the uncertain geopolitical environment, and the bottom-line focus most governments place on the security of their food supply. While we expect to see the creation of more multinational agricultural companies over the next 20 years, these companies will be constrained by political restrictions on the free movement of agricultural products. This will limit their ability to consolidate production into a single or small number of locations, in contrast to the approach taken for other types of modern consumer products.





## Number of multistate foodborne outbreaks in the US

1993-1997

28

1998-2002

45

2003-2007

71

2008-2012

103

### IMPACT ON GLOBAL AGRI-FOOD #2

#### Cross-border food integrity threats requires coordinated responses

While we may still be decades away from a globally integrated food system, analysis from the US Centre of Disease Control and Prevention clearly highlights an interesting trend. When a food integrity issues arises in one state in the US, it is significantly more likely to become a multistate issue today than it was in the past. It is reasonable to assume that the same is likely to be the case across national borders. This was best illustrated recently by the 'horsemeat for beef' scandal in Europe in early 2013. This ultimately impacted products in the supply chain across 16 countries, where horsemeat was sold to consumers as beef.

Food integrity issues can take many forms in the modern world. It may include: fraudulent product descriptions to pass a product off as something else, intentional contamination of the supply chain for political or financial reasons, food safety failures in manufacturing or distribution, or transmission of a pathogen across borders. These issues do not respect jurisdictions, and effective management requires cross-border co-ordination. Agencies must be prepared to share information, act in a collective manner to quarantine at-risk product and, in the worst cases, pursue criminal prosecutions together.

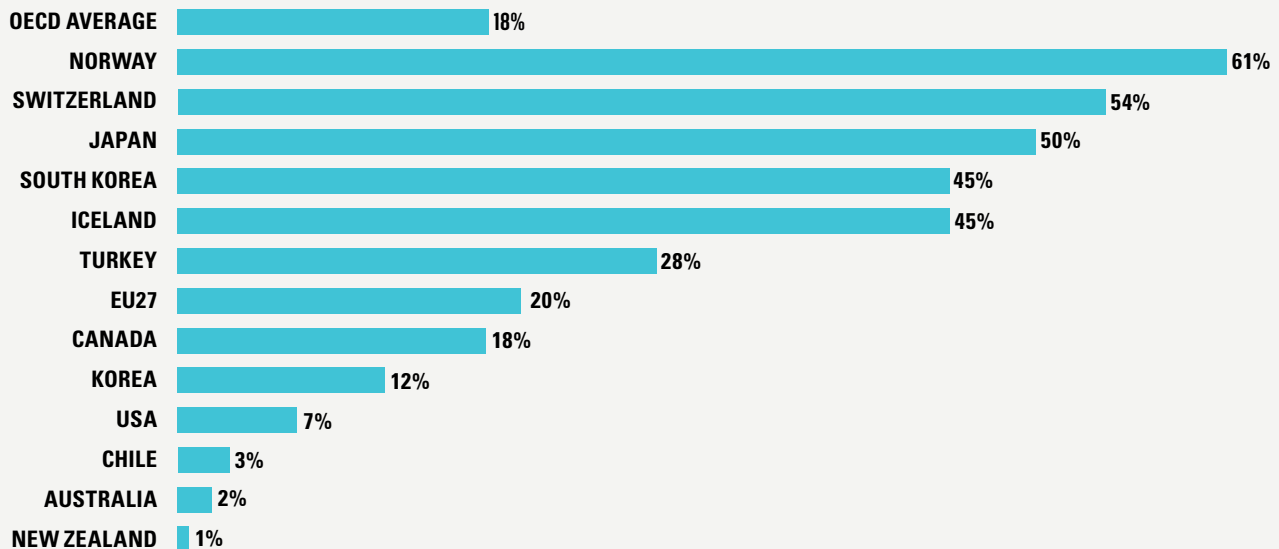
Emerging global food integrity issues are challenging the current institutions of government. Many countries do not have food integrity units within their policing structures, and the protocols for cross-border cooperation are driven more by trade considerations than a real desire to deliver food integrity and security to consumers. It is noticeable that the integrity of food and agricultural systems does not currently feature in the crime areas that Interpol facilitates co-ordination between global police forces.

We expect to see many countries placing greater focus on food integrity, either through establishing specialist units within their police force or creating new agencies. There is also a need for a new intergovernmental institution to address this emerging issue. We would expect to see a global food integrity body created that establishes protocols for cross-border responses and facilitates international criminal investigations. Furthermore, the inherent trust that has existed in the integrity of the food system in the developed world is not something that is taken for granted in emerging economies. With their growing influence on the global economy, an increasing priority will be placed on assuring food integrity.

Source: CDC National Outbreak Reporting System, 2008-2012

Image: ChameleonsEye / Shutterstock.com

### PRODUCERS SUPPORT PAYMENTS AS A % OF GROSS FARM RECEIPTS



Source: OECD iLibrary

#### IMPACT ON GLOBAL AGRI-FOOD #3

### Food subsidy mechanisms are reformed as costs become unmanageable

The cost burden associated with existing food subsidy mechanisms was highlighted in Theme 1 as a driver for governments seeking new approaches to guarantee the security of their food supply. Yet for many governments in the developed world, the strength of farming lobbies and the dependency farmers have on support mechanisms mean the complete removal of subsidies is not a politically viable option. That is why governments are seeking new ways to support agricultural producers, while mitigating the total cost of programmes and encouraging improvements in productivity and sustainability.

In recent years, the US Government and the European Union have taken steps to overhaul support of the agricultural sector. The EU is removing production quotas from April 2015 and increasingly linking producer support payments to

the implementation of more sustainable production practices. In the US, the renewal of the Farm Bill in 2013 was protracted, with significant pressure being exerted to cut the almost US\$1 trillion proposed to support the US food and agriculture system over the next 10 years. The actual cuts were less deep than many had argued for, and mostly targeted the nutritional support programme directed at lower socio-economic groups (also known as food stamps), and removing direct support payments to farmers that do not grow crops.

With support payments in some countries exceeding 50% of total farm receipts, the burden of these schemes makes them unsustainable in the long term. Our Roundtable conversations continually indicate that farmers are naturally innovative people. However, in many countries the lack of market connection has dulled the spirit of innovation and created high-cost, inefficient agricultural systems; and left many farmers with a strong sense of entitlement. Those countries that

have been prepared to stand up to the farming lobby and expose the industry to the market have seen more efficient, innovative operators emerge. They are focused on meeting the needs of their customers and contributing to the wealth of the country, rather than burdening the taxpayer.

Many more farmers globally will be exposed to the market in the coming years, as the cost of supporting the industry becomes unaffordable. This will drive innovation, lift the total global production of food, and drive greater regional specialisation. It will also change the relationship between the industry and the wider community, as it becomes recognised as a major contributor to economic prosperity rather than a burden on the public purse.



## IMPLICATIONS FOR NEW ZEALAND

As a small country, New Zealand relies on global institutions working effectively to protect our interests, particularly in relation to minimising the imbalances in global markets.

- › New Zealand has been vocal on the shortcomings of many global institutions, particularly the UN. Our recent election to the Security Council proves our willingness to contribute on the world stage. The Government needs to remain active in ensuring the organisations that preserve the economic, social and environmental security of the planet are reinventing themselves to remain relevant in the 21<sup>st</sup> century. Without the international frameworks these organisations maintain, the challenges for a small trading nation to maintain its living standards becomes increasingly difficult.
- › New Zealand must remain active in addressing cross-border issues that have a direct impact on our economic and environmental wellbeing (for instance, the protection of South Pacific fisheries). At the same time, our position on these issues must enhance our international reputation as a producer of premium food, fibre and timber products.
- › The level of New Zealand's public spending is significantly higher than that of many Asian countries we now compete against. Lower government spending results in lower tax expenses and provides companies from low tax countries with a cost advantage over our companies. It is critical that the New Zealand Government focuses on managing spending and investing in ways that will position the country to compete with Asia in the future.

- › As discussed in previous *Agendas*, our primary sector relies on market access arrangements to maximise the value of agricultural exports. We believe that 'more is better' when it comes to access, as it provides greater market options to our exporters, increasing their ability to grow value. Finalising a high-quality TPP and bilateral agreements with the EU, South Korea, India and other emerging economies is key to this.
- › The integrity of the global food system is critical to New Zealand. We must be prepared to take a position to protect our national interests, and contribute to international initiatives to deliver greater certainty to global consumers. We propose the establishment of a food integrity unit within the New Zealand police to protect our domestic consumers and our customers throughout the world.
- › With EU production quotas due to be lifted in April 2015, this is likely to materially increase competitor supply into many of the markets that New Zealand companies are targeting for growth. Reform of the Common Agricultural Policy is a disruptive event to premium agricultural markets, and one that we have been slow to understand. It is going to increase supply, particularly in dairy markets, and impact prices for a number of years.

## THE COMPANY AGENDA

- 1 Develop and regularly test your company's strategy for responding to and recovering from food integrity incidents. An effective response must be fast and informed, as the cost of any delay increases exponentially. Is your strategy embedded within risk management protocols in your organisation?
- 2 Analyse the impacts of regulatory change in key markets you supply, and the countries your global competitors source from. Doing this on a regular basis will help you identify the seeds of disruptive change at the earliest possible opportunity; and maximise the time available to implement responses.
- 3 Actively manage your trading relationships to take advantage of the opportunities inherent in market access agreements; and support collective efforts to further develop the network of agreements.

THEME

2

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**FUTURE  
WORLD  
CITIZENS**



## 21<sup>st</sup> century consumer

### The Macro Themes

- › Limited customer loyalty
- › Ownership vs access
- › Leveraging the power of the crowd

### Impacts on the global agri-food system

- › Meeting information needs of consumers
- › Making a global company local



## The ageing generation

### The Macro Themes

- › Health and welfare funding constraints
- › Ageing populations in emerging economies
- › Raising the ageing point

### Impacts on the global agri-food system

- › Lifestyle enhancing foods



## Integrated urban living

### The Macro Themes

- › Urbanisation dominates infrastructure spend
- › Developing smarter cities
- › Rapid urbanisation creates social issues

### Impacts on the global agri-food system

- › Initiating ruralisation
- › Creating new farming methods
- › Meeting needs of the urban consumer

## We are living at a time of significant demographic change.

There are models suggesting the global population will continue to grow through to 2050, when the world will have around 9 billion citizens (with the majority of the population growth occurring in Africa). At the same time, the global population is more affluent, more educated and more aspirational than it has ever been. People are also more willing to relocate to realise their potential. Urban regions around the world are growing at a rate of more than 1 million people every week, and this rate of growth is expected to continue for at least the next 30 years.

Birth rates are falling in many regions around the world, while life expectancy is increasing. Half of all the people that have ever reached the age of 65 are alive today; and it is forecast that by 2035 there will be more than 1.1 billion people exceeding the age of 65. The working-age population has already started to decline in Japan and some European countries (a trend expected to become much wider by 2030), leaving a shrinking labour force to support an increasingly large aged population.

The next 30 years will also see the first generation of citizens born in a technology-enabled world grow into adulthood, with different lifestyle and relationship expectations. Many emerging economies will continue to have a significant proportion of their population aged under 20, presenting significant challenges around how governments manage and meet the expectations of their young people.



# 21<sup>ST</sup> CENTURY CONSUMER



**No longer constrained by the confines of their physical location, the early adopters of online commerce view the world as an instantly accessible market place. The web offers 24/7 access to the ultimate global bazaar.**

The rapid adoption of new technology is creating new markets (for instance the App economy is expected to grow to over US\$150 billion by 2017<sup>12</sup>), while disrupting traditional ones. The 21<sup>st</sup> century consumer will continue to experiment with new products and services as they become available, as well as using different metrics to assess their wealth and happiness.




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**MACRO THEME #1**
**Full loyalty to a supplier  
(until something better  
becomes available anywhere)**

Early adopters enjoy the excitement of living on the disruptive edge of the economy, and the kudos associated with using something before it becomes mainstream. Once that happens, the early adopter will resume their global search for the next greatest innovation and the cycle starts again.

In the past, achieving a disruptive breakthrough in the mass market would almost guarantee a company a cash cow product for decades to come. This is no longer the case, and as we noted in the introduction to this report, is being reflected in the expected lifespan of companies (with the life of an S&P500 country expected to be as short as five years by 2025).

Many traditional businesses have argued that their brands, and the loyalty that consumers have to these brands, will retain their competitiveness in the 21<sup>st</sup> century market place. However recent research suggests that supremely well-informed consumers will look beyond logos and seek out the absolute value of a product before making a purchase decision. Social media is rapidly accelerating access to informal yet highly influential information on which product to select.<sup>13</sup>

Brand equity is becoming a more precarious asset. Companies that rely solely on brand, and fail to offer a product perceived as the most valuable to their consumers (and innovate continuously to retain this position), will see consumer loyalty and price premiums plummet. That said, a recognised brand that also delivers the product with the highest absolute value to a consumer will be in a sweet spot to receive a strong price premium (at least for today).





Disownership  
is the new normal

52%

of Americans have rented, leased or borrowed traditionally-owned items in the last two years.

24%

of Americans are more likely to engage in disownership now than they were five years ago.

53%

of people do this to save money.

#### MACRO THEME #2

### Ownership constrains flexibility; value resides in access

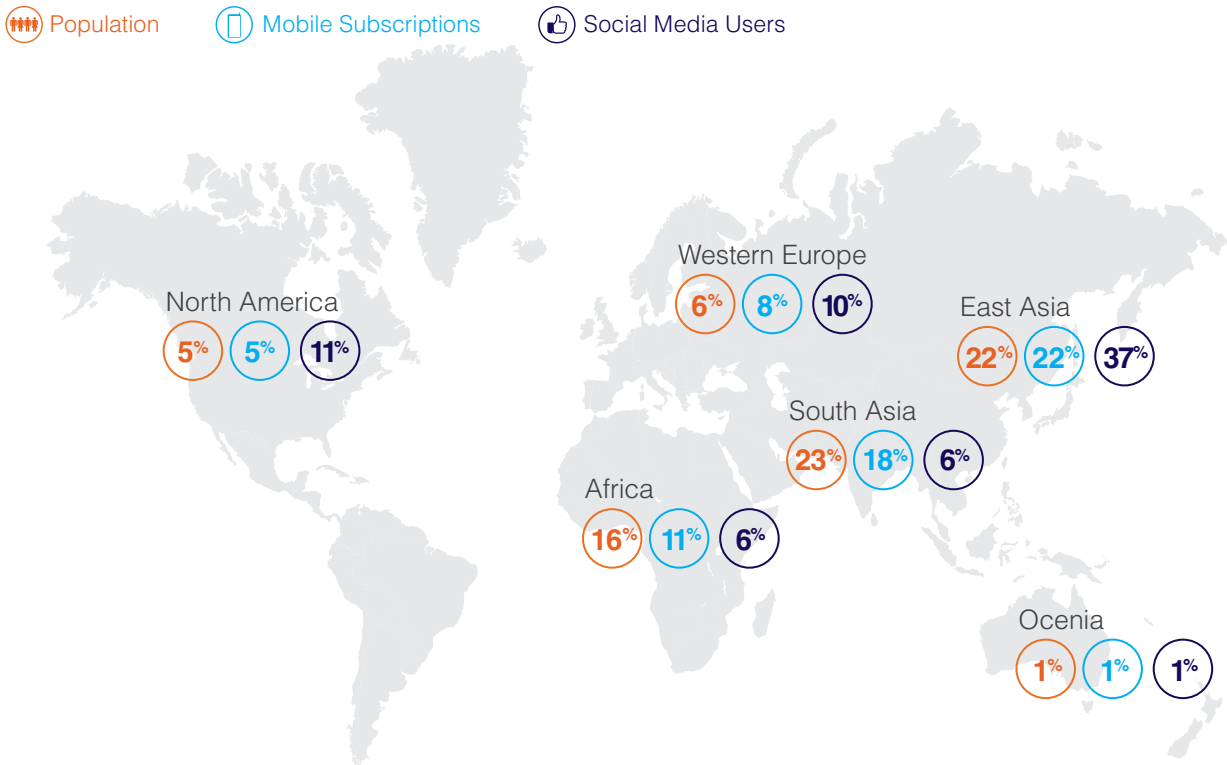
One of the huge paradigm shifts driven by the connected marketplace is a movement away from ownership in favour of accessing a product as required. From the perspective of many 21<sup>st</sup> century consumers, ownership places a constraint on flexibility and curtails the ability to take advantage of a passing opportunity. While past generations have attached security to the acquisition and ownership of property, this is being replaced by the satisfaction of having access to things and the associated social interactions in gaining that access.<sup>14</sup>

Access models can provide an individual with all the benefits of ownership, when designed properly, while saving them money (by reducing the upfront cost, eliminating maintenance and avoiding the long-term impacts of obsolescence). It also saves space and time, as well as enabling greater freedom. Technology has facilitated the expansion of sharing business models; it is increasingly commonplace to share music and other entertainment, clothing, durable goods, cars and a whole host of other products. The models are also viewed as producing more sustainable outcomes. Fewer products need to be manufactured upfront, those that are produced are more fully utilised, and waste is minimised as a result.

This shift is a significant challenge for bricks and mortar businesses designed to service traditional markets. Access models are about fee-for-service type arrangements, and thus require different infrastructure. The aim is to make the consumer experience frictionless – available when a subscriber needs it, with a fee structure that remains profitable (as consumers will generally be expecting savings). However, frequently used consumer goods are unlikely to lend themselves to sharing. Services that depend on trust will, on occasion, be compromised, impacting consumer confidence in the wider sharing economy.

It is not certain how far the disruption of the access economy will extend. It has already transformed the media sector. Could it also change the financial services (with the development of peer-to-peer lending systems, for example), healthcare, retail, agri-food, or education sectors of the economy?

**SHARE OF GLOBAL POPULATION, MOBILE SUBSCRIPTIONS AND SOCIAL MEDIA USERS.**



Sources: US Census Bureau, InternetWorldStats, CNNIC, IAMA, Tencent, Facebook, Vkontakte, ITU,CIA

**MACRO THEME #3**

**Harnessing the collaborative power of connected minds**

There has been much commentary on the impact social media is having on our lifestyles, and the economy, and how it will impact on the future. Facebook, LinkedIn and Twitter have been part of daily life for less than a decade, yet collectively have over 1.8 billion users around the world. Their equivalents in China, such as Sina Weibo and WeChat, have gained hundreds of millions of users in less than five years. Social media platforms are being used for both business and social purposes; the market values of the developers being driven by the vast access the platforms can provide companies to potential consumers.

Regardless of the platform being used, the uptake of social media demonstrates that people want to share their views on a wide spectrum of issues and contribute to wider conversations. Businesses that can effectively harness the connected minds of the 21<sup>st</sup> century consumer ('the crowd') will be better positioned to launch products and services that are tailored to solve the real problems people tackle every day.

Crowdsourcing is currently being used by companies to find solutions to a defined problem, by challenging the crowd to come up with potential answers. Crowdfunding platforms are also securing investment needed for a wide range of enterprises. It is conceivable that some entrepreneurs could use a series of crowds to: identify a problem, develop and refine the

solution, fund the business, facilitate the delivery of the product, and validate its outcomes. Connecting the points of engagement with the wider community will unlock highly disruptive businesses that are perfectly aligned with the specific needs of a group of consumers. They will consequently attract the loyalty of 21<sup>st</sup> century consumers and potentially command a premium in the market.

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**IMPACT ON GLOBAL AGRI-FOOD #1**
**Hyper-informed consumers expect to be able access and compare information about the food they eat**


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Many 21<sup>st</sup> century consumers are critically interested in the composition and quality of food that they eat; or more importantly, that they feed to their children. They expect to be able to find all the relevant information before making a purchasing decision; preferably in easy-to-use tools that enable cross-product comparisons, based on the specific criteria they apply to their daily purchases.

This creates significant opportunities for the agri-food sector to deliver relevant point-of-purchase information about a product; how it was produced, what it contains, and how it can be used. This information might be delivered into a supermarket in San Francisco, a wet market in Chengdu, a fine dining restaurant in Paris, or fast food restaurant in Johannesburg through the single platform.

Many food producers and retailers are already developing tools that enable them to provide this kind of information to their consumers. The majority of these initiatives are marketing tools designed to sell more product, leaving questions about the independence and balance of the content being presented. Most of them fail to deliver a platform that allows frustration-free comparison of products, which is a key requirement for a hyper-informed consumer.

There is a clear rationale for developing a robust product comparison platform that enables consumers to understand their product choices, using independently assured data. The key issue is at what level such a platform will be developed. One option would be for it to be driven by global industry organisations (such as the International Dairy Federation), and include details on products produced in multiple countries. This would provide greater assurance to the consumer, but require them to use multiple tools to complete a weekly shop. An alternative would be a country-level platform driven by a government food agency, covering all products produced and sold in that market. While it would deliver an easy-to-use solution, the reliability of the platform may be challenged in those countries where there is a level of distrust around food integrity.

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## 2012 US local farming trends

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# 144,530

**farms that sold fresh edible agricultural products directly to consumers. The value of these sales was US\$1.3 billion.**

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# 4,432

**Californian farms that sold their products directly to restaurants, grocery stores, schools, hospitals, and other retail outlets.**

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# 94,799

**farms sold value-added products including beef jerky, fruit jams, jelly, floral arrangements, ciders and wine.**

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# \$704m

**value of agri-tourism and on-farm recreational services such as hunting, fishing, hay rides, and farm and winery tours.**

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### IMPACT ON GLOBAL AGRI-FOOD #2

#### **Technology offers potential to alleviate distance and become a local supplier, globally**

Local food movements are gaining traction across the world, particularly among premium consumer groups. The definition of 'local food' is relatively vague, but is generally taken to mean the food is produced within a short distance of where it is consumed (i.e. the supply chain is significantly more localised than is the case for mainstream agricultural systems).

Research conducted by the Food Marketing Institute in the US found the three key drivers for local purchasing were: freshness, support for the local economy, and knowledge of where the product came from.<sup>15</sup> We consider that, for premium consumers, the knowledge of where the food comes from and the relationship that the consumer is able to develop with the producer is a critical driver of the local purchasing decision. Building a relationship with a food producer enables trust to be developed, and the story behind the product to be understood. For many consumers, a local food product has greater integrity than a product purchased through mainstream channels.

Technology unlocks the ability for producers located anywhere in the world to build close relationships with potential customers. The web can enable a company to tell the story of its product in an interactive way, and far more comprehensively than could be done at a farmers market. Social media tools mean that the producer can maintain a comprehensive dialogue with its customers; telling them about operations, products and advice on how to use a product. They can also give consumers technical specifications and integrity information.

Clever use of technology, backed by an effective supply chain, can enable a producer to be 'local' to a consumer anywhere in the world. For all but the most dedicated of locavores, we suggest this opportunity is open to all growers and producers of differentiated, high-quality products which are proven to be ethical and sustainable. They will be able to build a loyal, engaged customer base around the world that considers them part of their local supplier group. Over time this may create opportunities for agri-tourism, enabling these consumers to visit the source of the product and build even closer connections with the producer.



## IMPLICATIONS FOR NEW ZEALAND

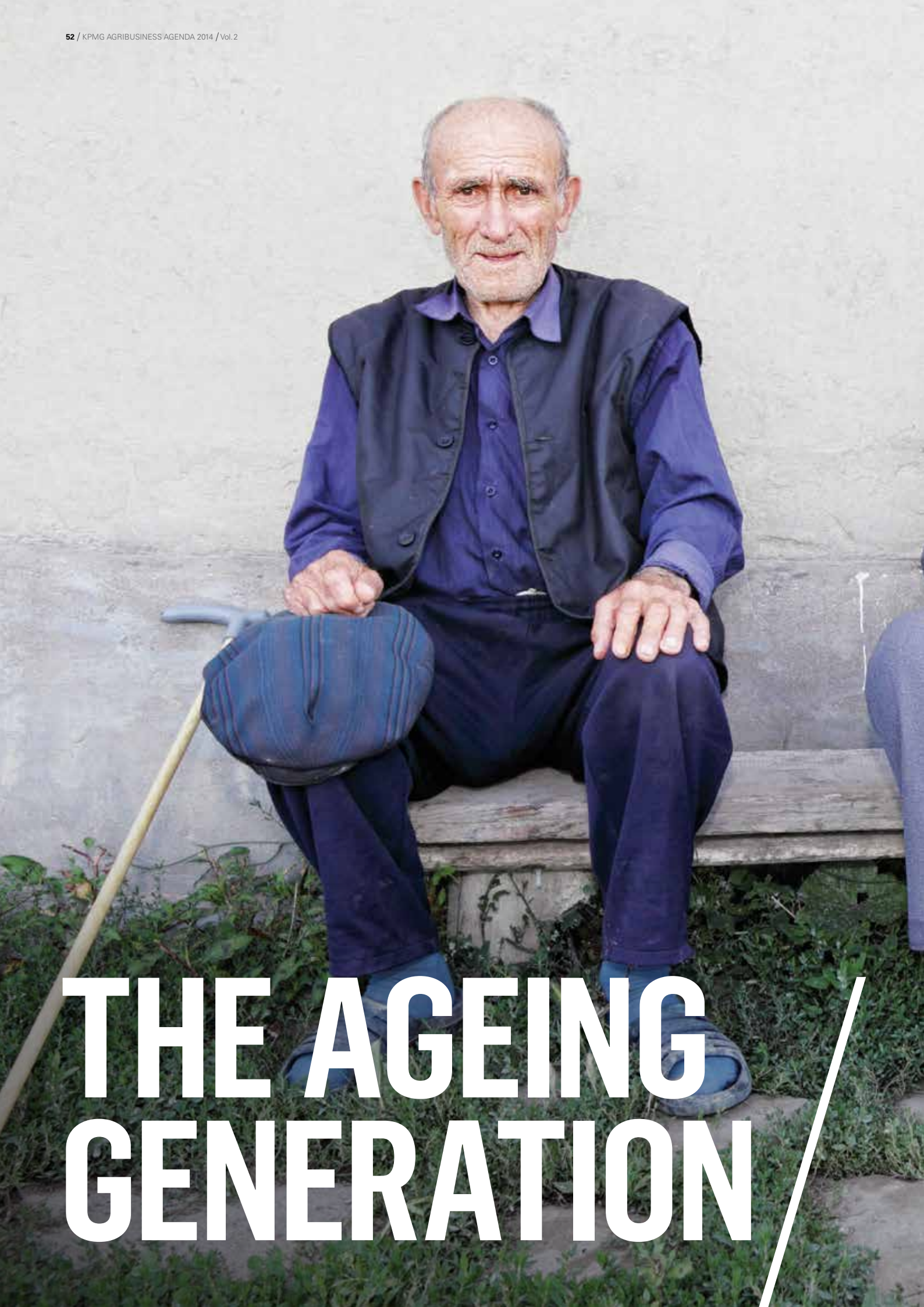
Technology is an antidote to the tyranny of distance. Consumers coming of age in the connected world are focused on solutions a company can present to them – no matter where they are – which places New Zealand companies on a more equal global footing than ever before.

- › Industry leaders have pointed out that the generic legacy of 'Brand New Zealand', and the attributes consumers have historically attached to it, often contribute more to success than their own official branding initiatives. Yet as consumers become better informed, it is more challenging to preserve the equity inherent in the New Zealand brand. Any issue that questions the integrity of how we do things (in relation to the environment, food safety, human rights or ethical business practices) impacts the value of 'Brand New Zealand'. In an increasingly connected world, customers have full access to our dirty laundry. We need to be aware they are always watching us, and ensure that we consistently live up to the values we have embedded into New Zealand's global reputation.
- › Given that food is a single-use product, the trend towards access and sharing models would appear unlikely to impact on the agri-food sector. The industry will be impacted by iterations of these models, however. For example, it will create opportunities for companies that deliver seasonal produce boxes, or the precise ingredients required for a meal direct to a customer. Innovators servicing the sharing economy will have different demand patterns to bricks and mortar retailers, requiring producers to evolve their business models.

- › The ability to leverage the crowd – both to generate ideas and to endorse products – has significant potential for New Zealand companies. Given the costs of maintaining in-market presence, using the crowd can provide a cost-effective connection to global markets. The crowd can also help companies understand the most significant problems their consumers are facing, as well as point to possible solutions.
- › Commercial necessity has driven numerous New Zealand companies to develop traceability systems, while others utilise statutory platforms (like NAIT) to some extent. The plethora of solutions has the potential to frustrate 21<sup>st</sup> century consumers, as they fail to facilitate easy comparison. There is a potential commercial benefit for New Zealand companies that partner to create a single, independent integrity portal to deliver assurance about our products and facilitate comparisons.
- › The most significant potential, however, is the ability to use technology to build direct, close relationships with connected consumers globally. The ability to tell stories directly to these people, answer their questions and enable them to order 'direct from the farm' can shrink the world to a local farmers market for our premium food, fibre and timber products.

## THE COMPANY AGENDA

- 1 Consider how your business model may be disrupted by the growth of the sharing and access economy. Can you create services that support a new generation of consumers that are less focused on ownership than the experience associated with accessing a product?
- 2 Explore ways to access unique insights and innovation from your customers and others through utilising crowd sourcing tools and social media. Do you have current capability in your organisation to benefit from these insights, or do you need to make an investment in this space?
- 3 Review your online presence. How effectively does it tell your story, enable you to interact and deliver integrity assurance to your customers, and supply them direct with products? What needs to be done to your presence to make your company a local producer to world?



# THE AGEING GENERATION /



**People aged over 65 represent the fastest growing segment of the global population; their numbers are expected to double to more than 1.1 billion people by 2035 (which will represent 13% of the global population)!<sup>6</sup>** The growth is being driven by increasing life expectancy and falling birth rates. It also means there will be a smaller proportion of the population who are productive and working to meet the associated welfare and healthcare costs of the ageing generation. The impact of increasing life expectancy will be more significant on emerging economies; which historically have had less than 10% of their population aged over 65 and are still experiencing growth in their youth populations.

## MACRO THEME #1

### Aged populations increase funding strain for welfare and healthcare systems

Research suggests that more than half of people aged 65 or over have one or more of the following chronic diseases: cardiovascular disease, cancer, respiratory disease, diabetes, arthritis and dementia. Analysis of chronic disease in Canada found that while aged people represent 13% of the general population, they account for 52% of hospital nights; with 90% of the over 65 population group taking prescription medicines.<sup>17</sup>

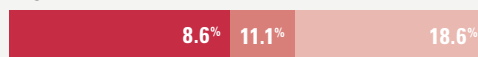
Clearly, providing this growing sector of the population with the health and welfare support they require is placing an increasing strain on the fiscal resources of many countries. This challenge is most pronounced in Japan, where more than 20% of the population is already aged over 65; it is expected that by 2035 there will be 69 retirees for every 100 people in the productive workforce. Many developed countries are on a similar population track; and will require immediate solutions to avoid stretching public healthcare resources to breaking point.

Governments need to develop policy settings now to ensure health and welfare systems are resourced to meet the expected demand in 20 or 30 years. This should include: reconsidering retirement ages and pension arrangements; investing in proactive initiatives that promote long-term health and wellness; and exploring reforms of health insurance arrangements to reflect longer life expectancies.

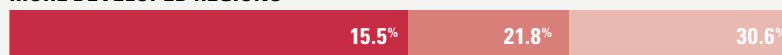
The effective functioning of society in the future requires that the full burden of funding these long-term liabilities is not deferred to the next generation of workers. Policy must ensure those currently in the working population are required to make a greater provision for their own care during their expected lifetime. The preferable role of the state is to provide a safety net, rather than being the primary funder of care for the increasingly aged population.

### THE AGEING POPULATION (% OF PEOPLE OVER 60 YEARS)

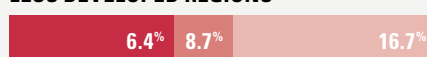
#### WORLD



#### MORE DEVELOPED REGIONS



#### LESS DEVELOPED REGIONS



0 10% 20% 30%

■ 1980 ■ 2010 ■ 2040

Source: United Nations Economic and Social Affairs; *World Population Ageing 2013*; 2013

## MACRO THEME #2

### Growth of aged populations in emerging economies risks creating a new poverty trap

The ageing population has been on the radar of governments in the most developed countries for some years; but it is creating a new set of issues for the leaders of emerging economies. The United Nations expects that by 2050, nearly 8 in 10 of the world's aged population will live in developing countries,<sup>18</sup> meaning many of these aged citizens are likely to be living in poverty without support from social security systems.

In many emerging countries, elderly relatives have traditionally lived with their children, often caring for grandchildren. However this is changing – and leaving elderly people in a precarious position – as families become increasingly nuclear with fewer children and less time to care for relatives.

Research by the International Labour Organisation shows that the breakdown of the family system is particularly significant in India, where some policymakers have suggested the government should enact laws that force working age people to take care of their elderly relatives. The problem is not specific to India; similar challenges are being faced by many emerging economies, severely stretching available

resources. One of the major challenges in emerging economies is that social security nets are generally not available to people that live and work outside of a country's formal economy. Yet this is where many of the poor, particularly the ageing poor, are expected to continue to live and work.<sup>19</sup>

In the developed world, social security provisions have cushioned the impact on communities during periods of economic downturn. It is argued that emerging countries have no option but to progressively widen access to social security if they are going to secure long-term economic growth. Analysts suggest the costs of such initiatives are reasonable when contrasted to the alternative: a vast ageing population living in poverty, acting as an anchor on the country's ability to grow its wealth.



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Young people between 15 and 24 account for 40% of the total global unemployed population.

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**Countries with the highest rates of youth unemployment:**

**BOSNIA & HERZEGOVINA**

57.5%

**GREECE**

54.8%

**SPAIN**

54.3%

**MACEDONIA**

53.8%

**SOUTH AFRICA**

52%

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**MACROTHEME #3**

**People remain active in the workforce for longer: disenfranchising youth populations**

How many times have you heard somebody suggest that “75 is the new 65” or “50 is the new 30”? They may be glib, unscientific assessments of the changes in global demographics – but they do reflect a reality. As life expectancy extends, health improves and wealth increases; older people are able to work productively for more years than they could two decades ago. They are willing and able to remain in the workforce for longer.

The collective opportunity to retain knowledge and experience in the productive economy is a positive, but it also creates challenges for governments. Many emerging countries are also handling a ‘youth explosion’ which has the potential to deliver a demographic dividend through a growth in the total workforce – although it requires young people to be productively engaged in the economy. The lasting impact of the GFC has disproportionately impacted young people; limiting their ability to develop skills and experience and affecting their long-term employability and earnings potential.<sup>20</sup>

The challenge of retaining experience in an economy while avoiding disenfranchising youth depends on an economy having sufficient jobs available for all those who wish to work. This is easier said than done when technology developments are enhancing efficiency and reducing the need for low skilled workers. Governments, companies and community organisations need to explore solutions to create employment opportunities and minimise the risk of social upheaval.

Investment is required in growth opportunities and training by companies and governments will need to design tax regimes to secure this investment. Innovative solutions could include: job sharing and mentoring schemes between experienced and youth workers; grants to support entrepreneurial enterprises; and collaboration with community groups to engage young people and deliver targeted development to those in need. Governments of countries with labour shortages could explore building deeper relationships with high unemployment nations to develop targeted global workforce solutions for the mutual benefit of both countries.

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## Estimated calorie needs per day by age and gender.

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### MALE

AGE 16-18

3200<sup>Cal.</sup>

AGE 19-35

3000<sup>Cal.</sup>

AGE 36-55

2800<sup>Cal.</sup>

AGE 56-75

2600<sup>Cal.</sup>

AGE 76+

2400<sup>Cal.</sup>

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### FEMALE

AGE 16-30

2400<sup>Cal.</sup>

AGE 31-60

2200<sup>Cal.</sup>

AGE 61+

2000<sup>Cal.</sup>

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## IMPACT ON GLOBAL AGRIFOOD #1

### Delivering food solutions that meet the needs of the ageing generation

The food we eat, and the experience it delivers, shapes our quality of life. As a person ages, research suggests that many of the sensory experiences gained from the food they eat will decline; the sense of smell becomes less acute, visual enjoyment can be impaired, loss of hearing can impact the perceptions of the crispness of a food product, and reduced saliva production can make it more difficult to swallow. (Research however is split on whether taste is impaired as a person ages, with some works finding that the elderly people were equal to the young in detecting changes in the tastes of foods.<sup>21</sup>)

This means the type of foods that older people seek to eat changes as they age. With the ageing generation expanding rapidly, food businesses need to recognise this and create products that meet these needs. That does not mean producing bland, simple foods. It means thinking about how elderly people experience food, from the point of purchase to the time of consumption; and developing solutions that are cognisant of these challenges while respecting the lifestyle aspirations that this generation now hold.

Products will need to be reformulated as the nutritional needs of older people differ, particularly as many are managing chronic illness as part of their daily lives. Elderly people need foods that deliver more nutrients per bite; lower activity levels often mean that appetites are smaller and they consequently have little need for meals packed with carbohydrates. The reduced sensual perceptions of the food also need to be taken into account. For instance, foods may need to have higher levels of moisture than traditional meals to take account of the chewing and swallowing challenges some elderly people face.

The solution however, needs to extend beyond the composition of food itself to how it is presented and distributed. Portion sizes will need to be smaller; a large portion can be intimidating to an older person (as eating is often a chore rather than a pleasure), perceived as poor value for money and/or wasteful. How the food is designed to be consumed is also important; as arthritis and similar complaints can constrain motor skills, ensuring food can be eaten with minimal cutting is critical. Any labelling must be easy-to-read, and the packaging easy to open (and reseal if not everything is used in a single sitting). Reduced mobility will require food distributors to think carefully about the channels they use to serve the needs of the elderly consumer.



## IMPLICATIONS FOR NEW ZEALAND

New Zealand will not be immune from an ageing population. By 2030, more than 20% of the country's population will be aged over 65, with population models suggesting that we may also have almost 150,000 people aged 85 or over at this point in time. With the government showing little desire to address the growing burden of New Zealand Superannuation, the future burden on the working population increases on a daily basis.

› We do not accept that no action is the best strategy in respect of ensuring appropriate provision for the health and welfare needs of New Zealand's rapidly ageing population. New Zealand Treasury forecasts that under current policy settings, NZ Super and healthcare expenses will increase from 11.1% of nominal GDP in 2010 to 14.1% in 2030 and 18.7% at the end of the forecast period in 2060, driving a huge increase in government debt levels and the associated interest costs.<sup>22</sup>

› The burden of these overhead costs on the productive sectors of the economy and constraints they will place on the government's ability to support business to innovate and compete in global markets mean a balanced and fair policy response is urgently required. The long-term prosperity of the country requires that we start to meet more of the cost of these future liabilities from our current incomes rather than expecting future generations to pick up the tab.

› Taking active steps to extend the contribution that aged members of society can make to the economy is critical. Particularly in the primary sector where many of our leading practitioners, in the areas of both science and business management, are rapidly nearing retirement age with, as we have noted in past *Agendas*, limited availability of skilled people to back fill their roles. There is a need for incentives to be introduced, potentially in the form of tax concessions, to keep the knowledge and skills these people hold engaged in the economy (possibly in part-time or mentoring roles) while the industry grows a deeper bench of new leaders.

› The ageing generation globally creates opportunities for New Zealand food producers to innovate with product solutions to help meet the specific nutritional needs of this group. Initiatives, such as the Food HQ at Massey University, are being established to increase the industry's ability to identify these trends and collaborate on integrated design-based solutions that go beyond the food product itself, and incorporate preparation and presentation. A collaborative, holistic approach will increase the likelihood of successfully delivering innovative products to this and other emerging niches.

## THE COMPANY AGENDA

- 1 Explore opportunities to develop products with appeal to the growing aged population. Can you innovate with nutritional content, flavour profiles, serving size and packaging solutions to create food solutions for this market?
- 2 Review how your company is integrating the benefits of age/experience and youth/innovation within your employment mix. Specifically, do you have strategies and plans in place to preserve and transfer institutional knowledge when experienced employees move on?

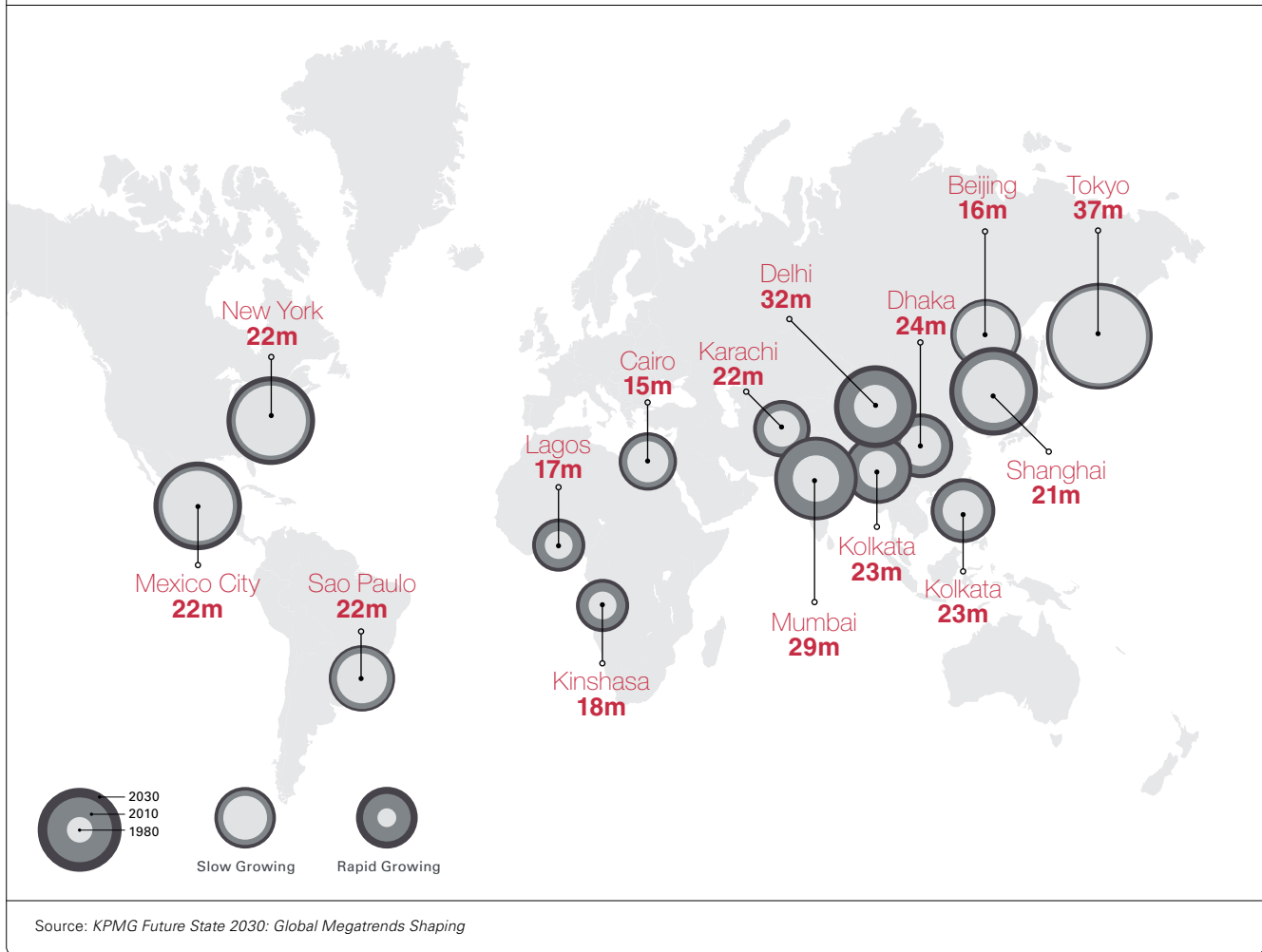


# INTEGRATED URBAN LIVING



**Globally more people are moving today for employment and economic empowerment than at any previous time in history.** Every week this year, it is estimated that the population of the cities and urban areas around the world expands by around 1.3 million people (or 68 million people a year).<sup>23</sup> As a consequence of this trend, which has become increasingly apparent in the last decade, more than half the world's population now live in urban areas; placing pressure on infrastructure, employment and the environment. People are evolving how they live, work and socialise as a response to the population intensity of cities; while those responsible for designing our urban areas are looking for smart solutions to make their city stand out from a rapidly growing crowd.

**THE 15 LARGEST CITIES IN 2030. URBANISATION FROM 1980 TO 2030 (POPULATION IN MILLIONS)**



**MACRO THEME #1**

**Speed of urbanisation continues unabated requiring massive infrastructure investment**

Most governments are being challenged by the speed of urbanisation – which is stretching governance structures, investment budgets and service quality. People are attracted to cities for many and varied reasons; however at the core of the shift throughout history has been a belief that the economic opportunities available in cities are greater in choice and potential than those in rural areas. As people start to move to cities, the existence of a pool of people attracts businesses that in turn require more people and more support service, thus increasing the speed of urbanisation in a region.<sup>24</sup>

With 67% of the global population expected to be urbanised by 2050, and around 80% of the urban growth expected to occur in emerging economies, the challenges facing the governance bodies of cities are significant. For many city leaders, their term of leadership is often short in comparison to the long-term perspective needed for the master planning of their city, its infrastructure and institutions. Their need to demonstrate immediate outcomes to secure re-appointment often necessitates short-term solutions that run contrary to the long-term needs of the city.

As the trend towards larger and more intensive urban areas appears to be unstoppable, more foresighted approaches are needed to planning.

Governments need to look beyond the political cycle and develop ultra-long term master plans for city development. These need to balance growth with effective service delivery and enhancement of living standards, to create a region that will be an attractive base for ambitious companies and people.

Funding challenges for infrastructure are significant, but not insurmountable. We expect to see innovation in the field of public private partnership (PPP) for example. This would unlock commercial funds to deliver the critical infrastructure required to enable 1.3 million people to make the move to cities every week for the foreseeable future.

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**MACRO THEME #2****Interface between built and natural environment drives Smart City developments**

The adhoc and unplanned way that many urban areas have grown over time has left many cities struggling to handle the growth they are now expected to absorb. It is simply accepted, for instance, that gridlocked traffic will mean it will take hours to get to the airport, and the economic and social costs of this seem to be accepted as a fait-accompli. The cost of transport delays to businesses in Central London was estimated at almost GBP1.2 billion a year in 2005.<sup>25</sup>

Financial impacts of this magnitude have caused people to ask questions about how cities can be more creatively organised to enable them to work better for all stakeholders; in particular deliver lower costs to businesses, enhanced quality of life for residents, and an improved environment for all city users. The concept of the Smart City has emerged from this thinking. This is where a vibrant environment is central to the essence of the city; achieved through employing a technology-enabled, integrated approach to energy, transport, infrastructure, public services (such as health and education) and development.

Recent research suggests that by 2025 there may be 26 global Smart Cities, with around half of these in Europe and North America. To date, Amsterdam has taken a lead in Smart City development, executing a range of smart and intelligent systems within energy, mobility and governance. The potential environmental and social benefits from widespread adoption of Smart City principles are huge. However, very few cities in the world have the finances to take on projects that involve re-engineering critical elements of a city's infrastructure.<sup>26</sup>

Amsterdam's progress towards Smart City status has been built on a clear vision for the city, and a willingness of city leaders to partner with commercial organisations in building this. Creating the cities of the future will rely on PPP structures, with particular focus likely to fall on open rather than prescriptive structures that give qualified companies the flexibility to develop innovative infrastructure or service solutions, within the regulatory confines of the Smart City master plan.

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**MACRO THEME #3****Living conditions and lifestyle pressures give rise to a range of social issues**

It would be nice to believe that it is only a matter of time before we are all able to live and work in Smart Cities. Yet the reality for most cities is that the speed with which people are arriving is putting huge pressure on housing stocks, water resources, sanitation systems and healthcare. The slum areas are the fastest growing areas of many cities, creating significant social issues for city and national governments to address. The scale of the issue is highlighted by UN Habitat, which suggests that there is a need for between 42 and 52 million homes in Latin America and the Caribbean alone; while the demand for residences in Asia grows at around 20,000 houses a day.

This is not a problem the world can afford to ignore – as it gives rise to significant health and social issues that constrain economic development. Informal communities suffer higher crime rates than other urban areas and are susceptible to infectious diseases. Yet simply displacing these communities is not the answer; there must be permanent alternative accommodation into which people can be relocated. The biggest constraint is who underwrites the cost of developing alternative housing.

It is likely that these informal communities will remain a part of cityscapes around the world, and

continue to grow for the foreseeable future. It is therefore critical that programmes are developed to create safe, secure living environments; so people have the ability to seek work and a future for their families.

In particular, policy needs to empower people to make improvements to their living conditions. For instance, could the design thinking principles of Smart Cities also be used to create sustainable, low-cost housing that will lift living standards in informal neighbourhoods?

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UN Habitat estimates that **860 million** people live in slum conditions in emerging economies around the world in 2013.

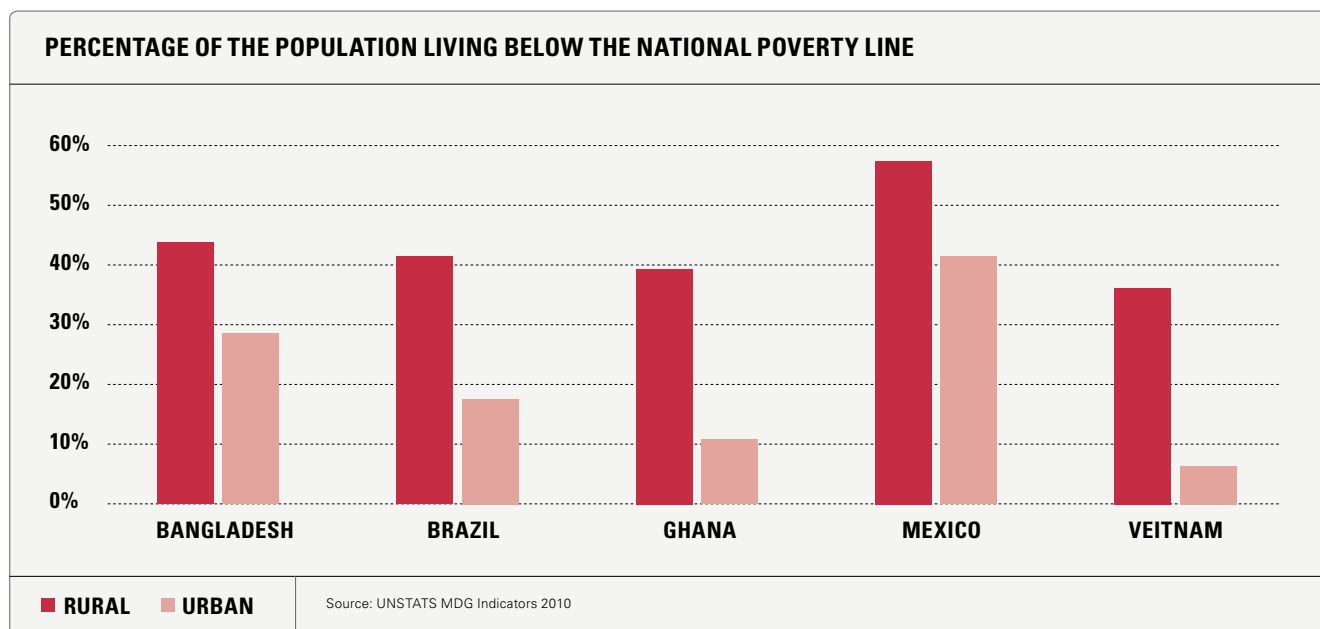
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This population has grown by **55 million** since 2000.

In some cities **up to 80%** of the population lives in slums.

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Source: UN Habitat; *Urban Themes: Housing and Slum Upgrading*; [www.unhabitat.org](http://www.unhabitat.org)



#### IMPACT ON GLOBAL AGRI-FOOD #1

### Maintaining attractive rural communities to initiate a ruralisation trend

The ability of the agri-food sector to meet the global demand for food depends on many factors. One of the most critical is having sufficient appropriately skilled people available in rural communities to lead successful food businesses. The practical requirements of agriculture mean that most practical activity takes place outside of urban areas; yet despite the importance of food, there is a consistent global theme of underinvestment in rural communities.

In the first volume of the 2014 *Agenda*, we discussed the challenge faced to maintain vibrant rural communities; the need to manage healthcare, education, connectivity, aged care, labour practices and other core infrastructure in a way that enhances the lifestyle benefits of living in rural areas. We also recognise that most governments do not have unconstrained resources, and are forced to allocate spending to maximise the impact it can generate for the widest proportion of society. With populations being predominately urban, it follows that the largest impact is generated there.

While there are major social issues in urban areas, the proportion of people living in poverty in rural areas is often significantly higher. The belief that a better life exists away from the farm is still widely held around the world. However with the growing demand for food, the need for people in rural areas is increasing. This raises the question of what needs to be done by governments and the industry to make rural life more aspirational; to make existing residents less likely to leave, and to encourage others to consider a rural lifestyle.

If no such proactive measures are taken, the continual migration into urban areas is predicted to continue for the foreseeable future. Over the next decade, the industry globally needs to ensure that there is a steady flow of people prepared to move away from the city. This will require agri-food companies to become involved in developing rural infrastructure to a standard that will attract sufficient numbers to live and work in rural-based businesses.





It is suggested that by putting rooftop farms on supermarkets across the US, food transport costs could be reduced by up to **40%**.

#### OTHER ROOFTOP BENEFITS:

- › significant water savings would be generated through the use of rainwater
- › land could be freed up
- › energy saved through rooftop insulation
- › the marketability of local products improved.

#### IMPACT ON GLOBAL AGRI-FOOD #2

### Smart cities present opportunities to create urban community linkages to food sources

Urban agriculture is not new. Millions of people around the world have maintained allotments and communal gardens to grow vegetables, while city farms have been run to raise livestock and provide an environment for children to engage and learn about where food comes from. Historically, urban agriculture has been more in the nature of these hobby activities; rather than a truly commercial activity which can contribute significantly to feeding the community, while also reducing supply chain costs and improving the city environment.

However Smart Cities create opportunities for commercial-scale agricultural production to be integrated into the design of cities. This could take the form of rooftop farms, but could also include co-operatives which operate numerous city-wide farming gardens and control their distribution channels (which could include shops, farmers markets and restaurants). These emerging urban farming businesses are often run with a wider goal of providing sustainably-produced food to at-risk members of the community by supporting food assistance programmes.

Over the next decade there will be further advances in the complexity and professionalism of urban farming operations. As well as vacant land being used for urban farming, vacant office space can be converted into farms (as has been done in Japan), which enables growers to utilise hydroponic techniques to produce at scale all year round. Other rooftop farming operations involve building glasshouses on buildings to enable production even during harsh winters, while the emerging trend of aquaponics enables urban farming operations to produce both vegetables and fish in an integrated system.<sup>27</sup>

A further trend we expect to see is the development of farming businesses that exclusively focus on urban activities, operating in a truly commercial manner across multiple cities to enable them to develop wider supply arrangements with national retailers. Urban farming businesses will by their nature have a higher cost base than many rural farming businesses, so their commercial success will depend on securing a premium price for locally grown, sustainable produce.

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**IMPACT ON GLOBAL AGRI-FOOD #3**
**Urban lifestyles drive innovation  
in buying and consuming food**


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As urban areas expand, the way that people live in cities is changing. As the cost of space increases, the average size of apartments will continue to get smaller. With less space, decisions have to be made about the critical facilities which are incorporated into a home. With a fully equipped kitchen often being space intensive, more urban homes are being developed with little more than a basic kitchenette. In addition to the space constraint, many urban dwellers are increasingly time poor; as they split their time between commuting, working and socialising with family and friends. This brings significant implications for the way people will buy and consume food in cities in the future; and will result in innovations across the food supply chain.

Less ability to prepare and cook food will mean more people buying processed and prepared food products to heat at home, as well as eating out more often. At the same time, consumers will be demanding more fresh produce in their diet, a greater variety of choices (reflecting the wide mix of ethnicities in a city's population), and food solutions that deliver some level of health benefit.

This is likely to see a number of trends emerge in urban food markets. A key one will be an increased demand for products that can be consumed on the go, placing a strong focus on innovative fruit and vegetables that are easy to consume and can deliver proven health benefits, but also healthy snack foods and drinks. The increase in demand for processed and ready-to-eat products in emerging markets will result in a shift towards formal retail channels and away from wet markets, as consumers place greater emphasis on food safety.

Packaging will no longer simply transport food. There will be significant innovation in packaging technologies; utilising solutions that lend themselves more effectively to heating the product, and enhancing the consumer's overall experience. Other considerations need to be incorporated into product design – such as the space the customer has to store the product, how often they shop, and how the product aligns with their wider religious and social values.



## IMPLICATIONS FOR NEW ZEALAND

New Zealand lacks a world-class, international city; a city that is an important node in the global economic system, attracting major companies, fostering creative and innovation ecosystems, backed by world-class education. World-class cities attract people, create wealth and ultimately become internationally relevant.

- › The Christchurch reconstruction presented an opportunity to build the world's smartest, most sustainable city. Although there was not a clean sheet of paper there was the potential to create a city with a set of attributes that would attract global companies looking for an energised environment, designed to enable the company and its people to realise their potential in a rapidly evolving world. The opportunity to do something unique may have been lost in the rush to do something and a one-off opportunity to create an iconic city has been missed. We also feel the opportunity to showcase how New Zealand's premium primary products can augment a smart city has been missed.
- › We expect the population migration to continue from the provinces to Auckland, making it increasingly difficult to maintain vibrant rural communities across the country. With the scale of agri-food opportunities, there is an urgent need to ensure sufficient investment is made in rural schools and healthcare, to attract people to ruralise their lifestyles in New Zealand.
- › Past *Agendas* have raised the lack of urban/rural understanding and the risks this creates to the future economic viability of the primary sector and consequently the country. The risks are not being reduced, if anything the recent election widen the gap, with major parties proposing policies to 'protect the environment from farmers'. It is critical that all industry participants seek to directly engage with urban communities to understand their expectations of how the industry should work with the environment and explain the industry's contribution to the economy.
- › The evolution of eating patterns in urban areas creates opportunities for our companies. As people dine out more, the potential to innovate with foodservice solutions increases. As people seek greater convenience there is the opportunity to create ready to eat products and meal components packaged sustainably and designed to be used in small kitchens. To justify the investment, these products should be developed for export markets making it critical to understand the needs and expectations of customers clearly before investing in commercialising any product.
- › We also consider that there is an opportunity to expand urban farming activities in New Zealand. While there is undoubted pressure on space, particularly in Auckland, the industry should consider supporting community farming initiatives to increase people's understanding of where food comes from and enabling social enterprise and schools to make a tangible difference to the most disadvantaged communities in urban areas.

## THE COMPANY AGENDA

- 1 Review the initiatives in place in your organisation to engage with urban communities; are they helping the wider community to understand the contribution the primary sector makes to the economy? Is there the opportunity for the support of an urban farming initiative within your programme?
- 2 Incorporate consideration of the opportunities in meal ready solutions and food service products into innovation strategy conversations. What collaborations and partnerships can you develop to create products tailored to the needs of urban customers in key growth markets?
- 3 Recruitment strategies need to reflect the challenges of recruiting people into rural areas. Consider whether there are opportunities to partner with other primary sector companies to enhance rural infrastructure and create environments that high-performing people would be comfortable relocating to?

THEME

3

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# EMPOWERING INFRASTRUCTURE



## New wellness models

### The Macro Themes

- › A shift to prevention rather than cure
- › Responding to antimicrobial resistance
- › Living with the risk of pandemic

### Impacts on the global agri-food system

- › Healthcare rationing driven by regulation
- › Synthetic food solutions come to market
- › Markets for functional wellness food



## Meeting energy needs

### The Macro Themes

- › Fossil fuels dominate energy mix
- › Renewable fuel becomes economically viable
- › Regional energy imbalances constrain growth

### Impacts on the global agri-food system

- › Agri-food/ energy land competition



## Targeted education

### The Macro Themes

- › Education delivers social and wealth dividends
- › People move for tailored education
- › New methods of learning delivery develop

### Impacts on the global agri-food system

- › Attracting talented people to Agri-food

### **Infrastructure is defined as the basic physical and organisational structures and facilities that are needed for the operation of a society or an enterprise.**

While utilities, roads, railways and airports are important community assets, they are not the only infrastructure that will determine the future success of an economy. It is increasingly apparent that social infrastructure, particularly healthcare and education systems, have a very material impact on the ability of a country to deliver on the aspirations of their community.

Newer, bigger and better is generally preferable when it comes to infrastructure. Modern equipment delivers improved reliability, enhances efficiency and cuts operating costs, creating a strong platform for economic growth. Yet the reality is that governments around the world need to make choices on infrastructure investment, as part of a strategy to maximise the opportunities for an economy to prosper.

Our analysis indicates that there are four key components of infrastructure that make significant contributions to a country's future. A clear energy strategy that delivers secure supply is a fundamental building block of any economy. We also consider that making long-term investments in improving healthcare outcomes, and fully investing in education, have huge potential to empower a community, to lift it sustainably out of poverty and set it on a clear course to prosperity. The other key infrastructure investment that should be on every government's agenda relates to enhancing connectivity, and enabling an economy to participate directly in a technology-enabled world. The role of technology is considered to be so significant that we have addressed it as a separate theme in section 4.

GLUTEN FREE

**NEW  
WELLNESS  
MODELS**



**The healthcare sector is one of the most innovative globally. There will be no let-up in the pace of innovation – with the population ageing, new illnesses continuing to evolve, and globalisation making a future pandemic more likely.** Constant advances are being made in medical practice, with the developments being quickly adopted at the point of care. There is an extensive pipeline of pharmaceutical innovation; however little progress is being made in addressing antibiotic resistance. Healthcare innovation is expensive and the cost of treatment will continue to increase, placing greater focus on developing new models for the delivery of care, particularly in emerging economies.

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US spends  
**2.5 times** the  
OECD average  
on healthcare

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**UNITED STATES**

\$8,233

**DENMARK**

\$4,464

**AUSTRALIA**

\$3,760

**OECD AVERAGE**

\$3,268

**NEW ZEALAND**

\$3,022

**KOREA**

\$3,035

**CHILE**

\$1,202

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**\$=USD total health  
expenditure per capita,  
public and private 2010**

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**MACRO THEME #1**

**Cost of treatment drives  
healthcare models towards  
prevention rather than cure**

Globally, the cost of healthcare is increasingly driven by treatment innovation, longer life expectancy and earlier detection of illness. This is increasing the focus on healthcare models that are targeted at proactive illness prevention, rather than treating symptoms.

Research indicates that lifestyle choices are a significant contributor to premature mortality. In the US, it is estimated that around 900,000 deaths a year can be attributed to smoking, inactive lifestyle, poor diet and misuse of alcohol (around 40% of total annual mortality); yet developed countries only spend around 3% of their healthcare budgets on disease prevention compared to 57% on curative care.<sup>28</sup> Evidence suggests that influencing people's lifestyle choices can positively impact mortality. Although it is unlikely to drive cost savings in the short term, it will generate better outcomes from healthcare budgets.

Analysis by the KPMG Healthcare and Life Sciences Institute has identified that a shift away from the traditional health practitioner mind-set is required to effectively adopt prevention-based care models. Like any business, the key to success lies in having a comprehensive understanding of the motivations of your consumers (for instance, their likely compliance with prescribed regimes, medical history, living environment, lifestyle choices), and a range of tailored solutions. It is unlikely a single strategy will work for all segments of the population.

Increasing the funding allocation to prevention presents a range of challenges to funders (both governments and private healthcare providers). Funders are highly invested in assets intended to cure illness and the professionals that operate those assets, and shifting funding to prevention can create perception issues. For instance, replacing doctors and nurses with community workers gives the impression that frontline services are being cut, rather than being seen as a proactive investment in long-term wellness. We expect to see prevention strategies being more readily adopted in emerging economies; where there is less legacy infrastructure to be considered, and funding is not available to build Western-style healthcare systems.





**Over the last 30 years no major new types of antibiotics have been developed.**

Antimicrobial Resistance is rapidly increasing globally: for instance extensively drug-resistant tuberculosis has been identified in **92 countries.**

Source: World Health Organisation; *Antimicrobial resistance*: Fact sheet 194; April 2014  
<http://www.who.int/mediacentre/factsheets/fs194/en/>

#### MACRO THEME #2

### **Living in a world becoming resistant to antibiotics**

There is no doubt that the effectiveness of antibiotics used for treating both human and animal illness is declining rapidly. It is reasonable to expect that the world will move into a post-antibiotic era within the next 20 years. The World Health Organisation describe the growing level of antimicrobial resistance ('AMR') as presenting "a serious threat to global public health" that requires co-ordinated action by government and wider society. Countries around the world are experiencing declines in the effectiveness of antibiotics to treat a wide range of relatively common diseases; including malaria, pneumonia, bloodstream infections, gonorrhoea and tuberculosis.

The rise of AMR will have serious consequences on healthcare costs: common diseases that are currently able to be easily and fully treated at a relatively low cost will again become potentially fatal (increasing both the cost of care and the associated social costs if a patient dies or is disabled). The lack of antibiotic protection will also impact on success rates of all surgical procedures, with infection becoming significantly more difficult to treat. In addition to the increased risk of fatality, AMR makes it more difficult to control outbreaks of infectious diseases (requiring more extensive and expensive containment measures to be taken). It threatens free movement of people and goods (particularly agricultural products) across borders; and ultimately, it threatens to unwind the healthcare gains society has made in the last century.

In the short-term, we need strategies to slow the development of AMR and extend the use of existing antibiotics. At the core of this is more specific guidance to health practitioners on when it is appropriate to prescribe antibiotics for both humans and animals.

However, an international collation is required to identify new diagnostic tools and vaccines that will secure public health into the future. There are alternatives – including a molecular solution using lab-synthesised forms of DNA that are targeted at disrupting a bacteria's genes, and a virus (or bacteriophage) solution that attaches to the strain of bacteria and destroys it. However they are not progressing as quickly as AMR, making an antibiotic resistant world more than a remote possibility in the next two decades. The implications of this on healthcare, agriculture and the economy are huge.

## MACRO THEME #3

## Responding to the threat of global pandemics



The Ebola outbreak in Africa has highlighted the susceptibility of our highly-connected population to a global pandemic. It only takes one infected person to get on a long-haul flight, and a contained disease outbreak can become a global emergency. Concerns about Ebola becoming a pandemic follow other recent scare events; SARS in 2002, avian flu in 2007 and swine flu (H1N1) in 2009.

The recent transmission of Ebola from remote regions of Western Africa highlights the key challenges of containing a virulent disease outbreak. These include an inability to restrict the movement of people away from the location of 'patient zero'; the elapsed time between the first infection and global mobilisation; and the challenge of getting effective vaccines available to medical teams.

If a region has a well-organised and accessible healthcare system, it is unlikely that a novel illness will morph into a pandemic. Consequently few pandemics originate in the developed world. In the developing world, it is more difficult to identify novel illness where people live in close proximity with each other, and lack sanitation and access to basic healthcare.

The World Health Organisation estimates a global pandemic is likely to occur every 10 to 50 years. There were three pandemics in the 20<sup>th</sup> century in 1918, 1957 and 1968; which killed approximately 40 million, two million and one million people respectively<sup>29</sup> (SARS by comparison resulted in 774 deaths<sup>30</sup>). An event on the scale of the 1918 Spanish flu could see fatalities exceeding 200 million people, should it occur today.

Improvements in healthcare systems over the last 50 years may reduce the incidence of pandemics, however the speed of spread should an event take hold would be greater than ever before. Based on the WHO predictions, companies should be prepared to respond to a pandemic potentially within the next decade. It is critical they make contingency plans to maintain business continuity and withstand the subsequent economic fallout.

## IMPACT ON GLOBAL AGRIFOOD #1

## Healthcare rationing: increased regulation on consumption to protect health and wellbeing

The World Health Organisation estimates that at least **2.8 million** people die as a result of being overweight or obese annually.

**The prevalence of obesity has doubled between 1980 and 2008, with more than 500 million adults being assessed as obese.**

Source: World Health Organisation; *Global Health Observatory: Obesity – Situations and trends*; 2014

There are many groups around the world that actively campaign to limit consumer access to a range of food, drink and tobacco products. The concern is focused on how the products are being processed, the quantities consumed, and the resulting health issues. There are campaigns aimed at many food products produced by the agri-food sector; including sugar, cocoa, corn, meat, dairy, hops, palm oil and tobacco.

Many lobby groups are calling for governments to implement regulations and legislation to restrict the access consumers have to these products. Arguments are made for imposing limits on the amount of a product a consumer can purchase at any one time, introducing taxes and levies on the products (as has been done with tobacco and alcohol products in many countries), restricting the products to purchasers older than a specified age, restricting advertising and sponsorships associated with the products and, at the most extreme end of the scale, a complete prohibition on the sale of a product.

Historically, many governments have preferred to leave consumers to make their own decisions on their use of products with potential adverse health outcomes, rather than adopt 'nanny state' policies that mandate how people should live their lives. However, there have been circumstances, particularly in relation to tobacco and alcohol products, where the evidence of health-related impacts is sufficiently compelling to lead to regulation of consumption ages and sales licensing. As the scientific evidence becomes more compelling around dietary factors contributing to major health issues, governments will implement further rationing policies as part of their strategy to focus on wellness and lower cost healthcare.

This will present challenges to many companies in the sector – as regulation restricts the size of their market or closes it completely. This will encourage major innovation into new food solutions that still enable people to consume products they enjoy but in more healthy formats (be that new products using more natural ingredients, smaller portion sizes or completely new product categories). We also expect to see food companies taking a more active role in promoting healthy, balanced lifestyles and educating people, particularly children, about the importance of good nutrition.

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#### IMPACT ON GLOBAL AGRI-FOOD #2

### **Emergence of synthetic food solutions with specific health benefits engineered into them emerge**

The growth in demand for food, particularly animal proteins, places a challenge on the global food system to produce sufficient food using traditional agricultural techniques. It is not surprising that research teams are beginning to explore opportunities to synthetically engineer products that have equivalent properties to natural animal proteins. A research team at Maastricht University unveiled and cooked the first synthetic 'beef' burger (biologically identical to beef but grown in cultures in a laboratory) in 2013.<sup>31</sup> Another US start-up, Muufri, has recently announced that it is working with University College Cork to produce cow-free milk and could have a product ready for the market in three years.<sup>32</sup>

While these technologies remain sometime away from being commercially scalable and, more importantly, having a sufficiently sized market to be sold into; there will be more developments of this nature in the coming years. If consumers are able to look beyond the artificial manufacturing processes, there are potential health benefits that can arise from synthetically-produced proteins. In particular, products can be developed with specific nutritional benefits engineered into them (e.g. low in fat, high in protein or other nutrients). The product can also be produced with greater consistency than the natural product (e.g. while each cow produces milk with a different protein and fat profile, this variability can be engineered out in the lab). Furthermore, the risk of food scares can be minimised by completing production in a controlled

world-class manufacturing environment.

It is also likely that there will be greater innovation in how food is prepared and cooked to create new taste experiences and deliver more healthy food.

Molecular gastronomy is the study of the chemical processes of cooking and integrating technical innovations and science into food preparation. This is currently a niche within the food sector, but we expect some of the molecular techniques that create unique, healthy food products to be developed and scaled into the mainstream.

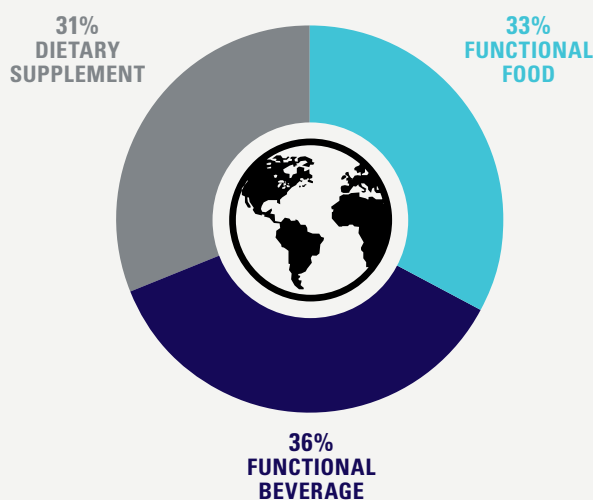
## IMPACT ON GLOBAL AGRI-FOOD #3

**Meeting the demand for innovative nutraceutical foods**

Previous *Agendas* have highlighted that the demand for functional foods with proven health benefits will grow significantly in coming years. This is driven by two key trends: the growing population of older consumers that are focused on their health; and the growing wealth of Asian consumers, where eating food for health benefits has been an integral part of the culture for thousands of years. A third factor is the increased use of diet-based prescriptions as a key part of preventative treatment programmes.

Recent industry analysis highlights that the nutraceutical and functional food segments are growing at a significant pace (the compound average growth rate of the industry during the first decade of the 21<sup>st</sup> century is estimated to be around 14.7% per annum<sup>33</sup>), and industry is innovating rapidly in response to the growth.

A key trend is a shift away from consumers relying on nutritional supplements to support their health in favour of eating a diet that encompasses more nutraceutical and functional foods. For example, more people are consuming foods with probiotic properties to maintain healthy digestive and immune systems. Many consumers, particularly millennials, are looking for natural food and are using these products in place of medicines to address a wide range of lifestyle ailments, including fatigue, stress and eye health. One of the most significant functional food categories is the protein segment, with a wide range of consumers incorporating high protein foods and supplements into their diet to retain energy, maintain healthy bones and joints and, again, support immune systems.<sup>34</sup>

**NUTRACEUTICAL MARKET:  
SPLIT BY PRODUCT TYPE, (WORLD), 2010. MARKET SIZE: US\$140.1 BILLION**


Source: Frost and Sullivan; *Global Nutraceutical Industry: Investing in Healthy Living*; 2011

In addition, parents are increasingly likely to incorporate supplements and functional foods into the diets of their children, while the aged population are looking for products to incorporate into their diets that reduce the impacts of heart disease, osteoporosis, diabetes and Alzheimer's disease.

People are willing to explore dietary solutions for a growing number of ailments, creating opportunities for the sector to increase both the volume and value of products sold through this channel over the next decade. However significant investment will be required to clinically verify the health benefits that are associated with any product.



## IMPLICATIONS FOR NEW ZEALAND

As a small developed country, the expectations we place on our healthcare system are often significantly greater than the funding available. This makes it critical that we develop smart, prevention-focused wellness models to enable the country to live within its means.

- › The government has actively managed the pharmaceutical bill through the use of the consolidated procurement agency, Pharmac. While this has been effective in managing down the per capita cost of drugs, it has left some global pharmaceutical companies choosing not to offer innovative therapeutic treatments in New Zealand for fear of damaging their global price point. The government needs to ensure that the wider treatment regime is not compromised by Pharmac's strong focus on cost. Furthermore, upfront investment in innovative wellness drug-based therapies could deliver significant long-term savings in curative care.
- › The AMR issue will impact the New Zealand economy. We face similar challenges to others in maintaining an effective human health system without the assistance of antibiotics. Yet with an economy dependant on animal protein, the reduced availability of animal health antibiotics requires major advancement in animal management practices, to maintain production levels and meet export standards. A bright light for New Zealand is that research into next generation treatments indicate dairy products could be a significant part of the solution, providing both active compounds and delivery mechanisms.

› Antibiotic replacement is just one of numerous nutraceutical opportunities for New Zealand food producers to grow the export value of their products. However the costs of developing products and clinically proving their health benefits can be a significant burden on small companies. Utilising components of food in smart ways to meet global health challenges must be a central focus of government innovation assistance, building on the High Value Nutrition National Science Challenge and a key investment strategy for agri-food companies.

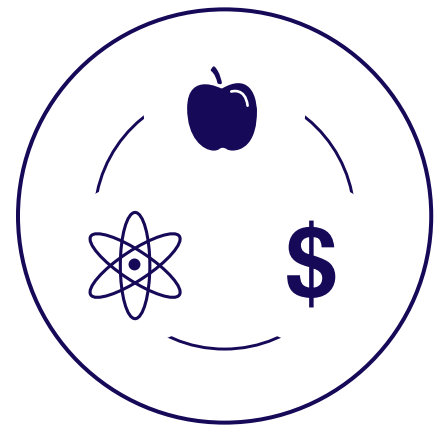
- › Like many developed countries, we face a raft of challenges from lifestyle health issues, some of which are associated with food products produced here. We must be proactive in responding to these. Our government must look beyond simplistic regulatory rationing responses, and recognise we can create export opportunities by developing education programmes and solutions that promote the healthy consumption of products (specifically those that can have health and social consequences if used excessively). The Lifestyle Wines PGP programme is an example of the type of research the industry should be committing to.
- › New Zealand has built a developed economy on the back of producing high quality, natural primary products. So it is perhaps easy to put our head in the sand when it comes to the role of synthetic food in future global diets. The wool industry did this when synthetic carpets were developed; mistakenly believing nobody would buy polyester carpet. We can't afford to take the same approach to synthetic food. We must embrace the technology, position ourselves as innovation leaders in the sector, and establish how it can complement the value we create from our continued natural food production.

## THE COMPANY AGENDA

- 1 Monitor developments in therapeutic care that are relevant to your business. Can you identify any existing and pipeline products that have nutraceutical potential? Have you evaluated the business case for clinically proving the health benefits of a particular product? Are you ensuring that a wellness lens is being cast across the full supply chain, to ensure opportunities are captured?
- 2 Consider whether your organisation has a wider corporate responsibility in relation to the healthy consumption of food. Would it be appropriate for you to engage with food promotion networks, community groups or schools?
- 3 Does your innovation programme incorporate the development of healthy lifestyle alternatives to the mainstream products in development?
- 4 Recognise that synthetic alternatives to agricultural products will move into the mainstream over the next 20 to 30 years. How are you incorporating these developments into your investment strategy? Specifically, how could these products complement or help grow your share of premium natural food markets?



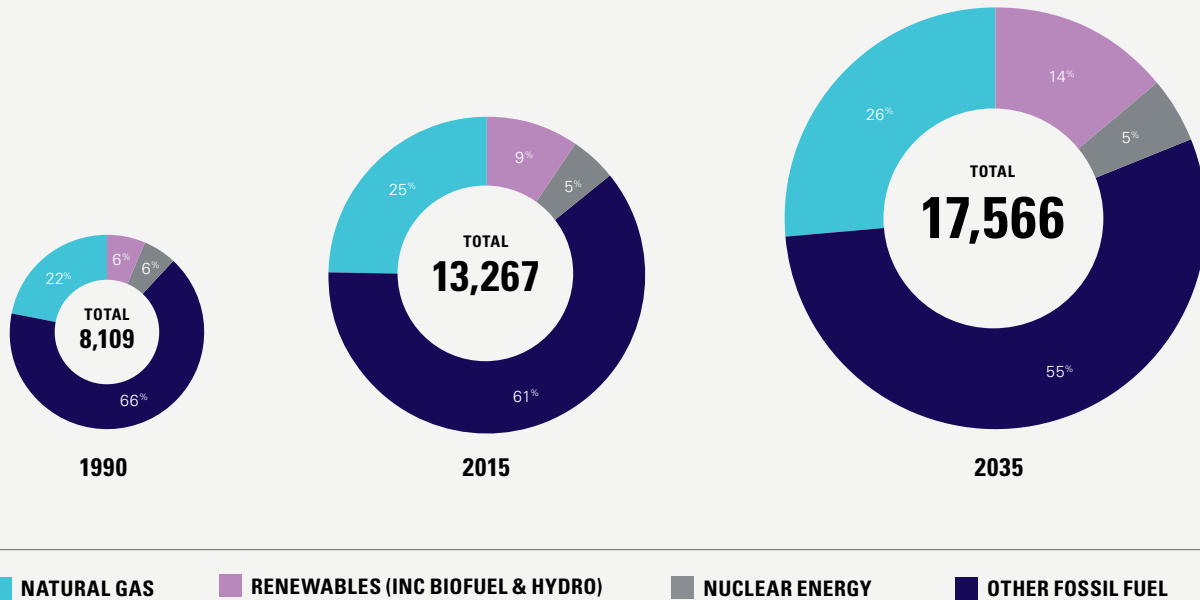
# MEETING ENERGY NEEDS



**There are three basic requirements for economic activity; food, energy and currency. For much of the last century, there have been loud claims that the world's finite energy resources are close to exhaustion, and this has driven significant investment in renewable fuel solutions.** In recent years, however, the assertions of 'peak oil' proponents have noticeably quietened; as innovation has unlocked a greater ability to economically recover previously uneconomic oil and gas reserves, and made mining of deep sea reserves more accessible. Access to natural energy varies dramatically between countries, and with concerns about climate change continuing to grow, it is realistic to expect further innovation in global fuel supply away from fossil fuels. This will make a sustainable energy strategy critical for every country – and every company.

## INCREASE OF GLOBAL ENERGY USE

### PERCENTAGE OF GLOBAL ENERGY MIX (TOTALS MILLIONS OF TONNES OIL EQUIVALENT)



Source: BP Energy Outlook 2035: January 2014

#### MACRO THEME #1

### Fossil fuels continue to dominate the energy mix driven by shale gas

While demand for energy is expected to increase for the foreseeable future, forecasts suggest the rate of growth will progressively slow over the next 20 years (from a current annual rate of around 2.2% to nearer 1.1% after 2030); and will be significantly lower than the rate of global economic growth. Given the investment in infrastructure associated with energy assets, it is not surprising that the forecast indicates the relative contributions of each energy source to fulfilling global demand will change only slowly between now and 2035. There is a clear move towards natural gas (which increases from 23.9% to 26.4% of the energy mix between 2012 and 2035), and renewables (up from 9% to 14.1%<sup>35</sup>).

The North American mix shows an even more significant shift towards gas (increasing its contribution from 25% to 35% between 2005 and 2035). Energy production in the US has been revolutionised in the last 10 years with the rapid adoption of 'alternative' extraction techniques. In particular, hydraulic fracturing of gas and oil from shale deposits (fracking) has enabled the US to unlock previously uneconomic or inaccessible reserves of oil and gas.

America's concerns about its historic reliance on unstable regions of the world for oil, particularly the Middle East, have influenced US foreign policy for decades. Fracking has enabled the US to become self-sufficient in oil and gas; and in early 2014, it became the world's largest oil producer (pumping 11 million barrels a day, compared to 600,000 in 2008). Forecasts suggest rates of production will continue to increase

through to 2020, before stabilising.<sup>36</sup> Energy self-sufficiency is contributing to the US economy's post-GFC recovery; the industry will continue to create jobs (potentially up to three million), it is contributing significantly to US government revenues, and is providing energy certainty encouraging many US companies to bring production back onshore.

While environmental concerns have been raised about fracking, analysis has concluded that its impacts can be effectively managed with appropriate regulation.<sup>37</sup> The new extraction methods ensure there will be plentiful supplies of economically viable fossil fuels for the foreseeable future; which has raised concerns about the incentive of energy companies to progress in addressing the global community's environmental challenges.



## MACROTHEME #2

### Cost of renewable energy falling increases adoption without need for direct subsidy



Installed solar energy capacity **increased 26%** globally in 2013 to 39 Gigawatts despite a **23% decrease** in investment in solar installations to US\$104 billion, reflecting the falling cost of solarvoltaic systems.

**Renewable energy sources (excluding large hydro) accounted for 44% of all new generation capacity installed in 2013.**

Source: Frankfurt School – UNEP Collaborating Centre for Climate and Sustainable Energy Finance; Press Release: *Renewable Energy Market Share climbs despite dip in investments*; 7 April 2014

Despite the rapid development of shale gas resources, the renewables segment of the global energy supply picture has been the fastest growing in both developed and emerging economies. Renewable energy from a wide range of sources (including hydro, bio-matter, geothermal, solar and wind) is being used to generate electricity and power vehicles. Much of the growth is being driven by government policies promoting the use of renewable power alternatives and providing financial incentives to support their adoption. By the end of 2013, 144 countries had policy targets for renewable energy, and many regions and cities have adopted local frameworks with more ambitious targets than the national legislation.

Policymakers are using renewable energy to achieve a number of goals; the most obvious being to move a country towards energy self-sufficiency and reduce its reliance on volatile and politically sensitive global energy markets. Beyond this focus, renewable energy is also considered to contribute to the delivery of other social and environmental objectives. These include reducing the health and environmental impacts of fuel usage, greenhouse gas reduction, support of rural development initiatives, and creation of employment opportunities.<sup>38</sup>

Use of renewables technology has accelerated rapidly in the last 10 years and is now widespread globally. However much of the uptake has relied on the financial incentives from governments to make it economic compared to more traditional fossil fuel sources.

In addition to the cost of installing the technology, its environmental impacts (e.g. the flooded valley floor for hydro or the noise of wind farms), and the high weather-dependence of many of the technologies; there are technological barriers limiting wider adoption. Examples include the lack of a viable renewable equivalent to jet fuel, or the inability of electric cars to replicate the range and performance of traditionally-fuelled vehicles.

Breakthroughs on these constraints, together with the cost reduction which comes with product maturity, will shift renewable technologies into the mainstream and result in uptake that is increasingly uncoupled from government incentives. Forecasts from BP suggest that by 2035, 25% of energy used in the OECD will come from renewable sources and 16% used in other markets; as the renewable option becomes cost competitive on any measure of comparison, particularly for power generation.<sup>39</sup>

## MACROTHEME #3

### Regional energy imbalances have potential to constrain growth in some emerging economies

Since the shift from using wood as the primary source of energy to coal (and then oil and gas), there have been imbalances between countries in relation to the fuel reserves that they have within their borders and the needs of their domestic economies. Given the huge reliance of a modern economy on energy, this has provided some countries with surplus fuel resources, the ability to generate significant wealth and secure political influence.

For countries without deep domestic fuel reserves, the issue of energy security is usually high on the government agenda. They are tasked with ensuring there is sufficient energy available to meet the basic needs of the population, and provide a reliable supply to support economic development at an affordable price. Import dependency in many emerging economies can be significant. Thailand, for instance, has to import around 40% of energy needs while India and South Africa have to import around 20% of their needs.<sup>40</sup> These and other countries have a structural vulnerability in their economy to energy price fluctuations which has the potential to constrain economic growth and drive adverse social outcomes.

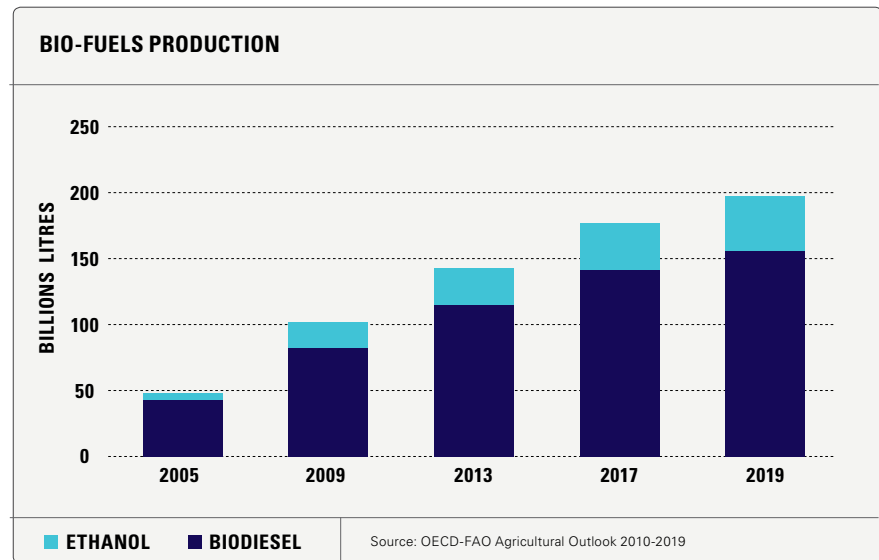
With both China and India being net importers of energy, many forecasts of global economic growth rely on these countries and other energy-constrained growth economies being able to source sufficient energy to support their long-term growth aspirations. Adopting renewable technologies is likely to be a significant contributor to energy security for these nations; but of potentially greater importance is structurally changing how the world uses energy. For instance, an EU report suggests a 2% improvement in Chinese vehicle efficiency may have a bigger impact on energy markets than the development of a major new oilfield.<sup>41</sup>

Fundamentally, the solution to energy security relies more in how energy is used rather than the creation of more energy. The primary goal of future research investment will be to create technologies which use less energy to do more; particularly in energy intensive areas such as transport, heavy industrial manufacturing and agriculture.

#### IMPACT ON GLOBAL AGRI-FOOD #1

### Pressure from energy producers to access and utilise agricultural land

There are currently three significant points where the agri-food and energy sectors directly interact; often creating significant competition for land, and major cultural change issues for traditional rural agricultural communities. The most obvious interaction arises from the use of land and agricultural by-products for the production of biofuel. The production of biofuels has grown significantly in recent years, with much of the growth being the direct result of government incentive programmes intended to encourage the adoption of renewable energy.



The largest growth has occurred in the US and Brazil, and has been fuelled by government incentives being paid to farmers to convert their land from growing food to producing a feedstock for biofuel production. However with the US becoming energy self-sufficient as a result of the shale gas revolution, the incentive programmes are likely to evolve to reflect changed energy priorities. There is also significant innovation in the biofuel sector around utilising more waste products (both solid and gas), rather than specifically grown feedstocks. This has the benefit of enabling agricultural land to continue to be used for food production, while providing potentially profitable uses for the by-products of agri-food processing activities.

A second point of interaction between the sectors lies in competition for land in areas where commercial coal seam gas and shale gas reserves exist. The values that gas producers are willing to place on land have resulted in some farmers accepting offers to sell their land. Concerns around the impact of gas extraction on the environment, water sources and rural communities have been very divisive in rural areas (particularly in Australia). There is also

concern over the long-term sustainability of farming in areas where large-scale gas extraction occurs.

A further interaction between energy and the agri-food system arises in ocean ecosystems where deep sea oil and gas exploration and drilling programmes often have a strained relationship with commercial fishing operators. Aside from the obvious environmental impacts that arise when an incident occurs on an offshore rig, and the long-term damage this can do to fish stocks, it is claimed that drilling activities can make large sections of ocean unavailable to fishing operators. It can also interfere to a greater or lesser extent with the migratory routes of fish and their spawning and feeding areas. Given the number of ocean areas that are being investigated for exploration, we expect that the two industries will develop stronger protocols to enable them to effectively co-exist; with some of the license revenue from oil and gas activities being invested in improving the regional infrastructure for commercial fishers.



## IMPLICATIONS FOR NEW ZEALAND

New Zealand has many natural advantages when it comes to energy, and has been able to reduce reliance on fossil fuels in favour of a wide variety of renewable energy sources. However the debate around mining of the oil and gas resources within the country's exclusive economic area remains political and highly emotive.

- › The use of alternative extraction techniques for oil and gas, in particular fracking, provokes strong emotions among both proponents and detractors of the technology. While debate rages around the world on the impact these techniques can have on groundwater resources and the wider food chain, reaction has been more muted in New Zealand thus far. As the utilisation of these technologies increases, the discussion on their impact on food safety will become louder. It will be critical for our government to: clearly define their operating parameters from the outset; require robust base case data to be established before operations start; and impose a monitoring regime to provide assurance to consumers that the food supply is not impacted.
- › As part of our *Agenda* surveys over the last four years, we have asked industry leaders about the role of biofuels in the New Zealand primary sector. The issue has consistently received a low priority rating. While we don't foresee a scenario with large-scale land conversion to grow feed stocks for biofuel production, we do believe it is prudent to actively look at opportunities to commercially generate biofuel from the by-products of agricultural production. This could include extracting energy from waste biomass produced by the forestry, horticulture and arable sectors; or looking at ways to capture and utilise biogas from animal effluent.

These have the potential to reduce costs, create revenue streams, improve environmental performance and expand the opportunities for export of agricultural technology.

- › Globally, the primary sector is an intensive user of energy, making it a major cost line for producers in many countries. While energy costs tend to be a less significant consideration compared with other industry sectors in New Zealand, we expect this to change as farming systems become more intensive, driven by both production needs and environmental requirements. Energy efficiency is likely to be a key driver in the design of these intensive systems, creating further opportunities to develop agri-tech export markets.
- › The inherent tensions between the energy and fishing sectors have started to become apparent in New Zealand in recent years; particularly in the Taranaki region where most offshore oil and gas production is centred. The challenges of balancing the operating needs of these industries while ensuring the environment is adequately protected (including the endangered Maui dolphin and other sea life) means that all parties need to make compromises. We need to focus on frameworks that balance the needs of each operator; and any solution that leaves the fishing fleet in port cannot be considered in the best interests of the wider community or the economy.

## THE COMPANY AGENDA

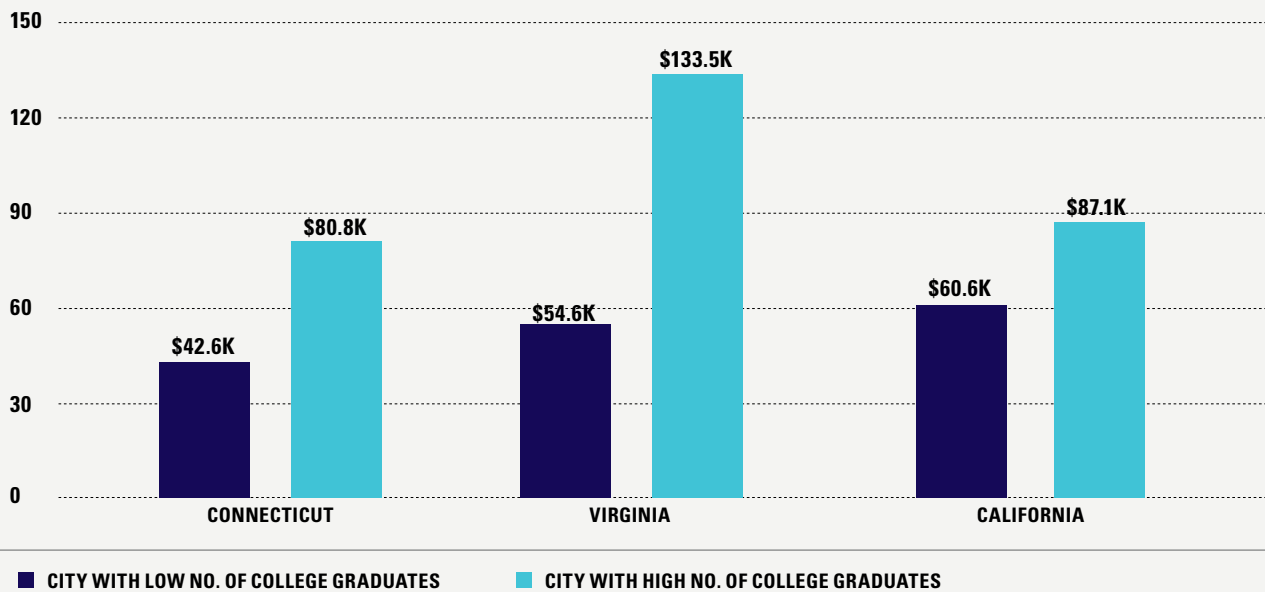
- 1 Analyse energy use levels in your organisation, and benchmark these to energy levels being used in similar agricultural businesses around the world. Are there any 'quick-win' opportunities to improve the efficiency of energy use in your business? Have you explored renewable energy solutions for longer-term sustainability?
- 2 Consider how increased energy self-sufficiency in the US and other countries may impact your business. Does low-cost energy create a risk of your exports being substituted or create an opportunity to relocate production to take advantage of the lower cost base?



# TARGETED EDUCATION



**When discussing infrastructure, the focus is often on energy and transport. Yet a high performing education system is critical for any country that has aspirations for growth and development.** Unlike energy or transport, where a system can be engineered to deliver consistent results, the outputs of an education system currently rely heavily on the quality of teachers engaged in the system. As the world evolves, it will be critical that education systems utilise available technology to equip people with the skills they need to respond to constant change. Others will use technology to access the education they need to achieve their goals, regardless of where it is offered in the world.

**AVERAGE SALARY OF COLLEGE GRADUATES. COMPARING 6 METROPOLITAN CITIES IN 3 AMERICAN STATES**


Source: Forbes; *The New Geography of Jobs: Where you live matters more than ever* by Troy Onink writing about *The New Geography of Jobs* by Enrico Moretti; 22 May 2012

**MACRO THEME #1**
**Economies invest heavily in education to gain social and wealth dividends**

Education has always been recognised as an important key to unlocking the potential of an individual. Much work has been done historically into the systematic causes of poverty and exploring how wealth can be better redistributed. Yet there is a growing belief that a high-quality education system will have the greatest impact on eliminating the inequality of wealth between regions. The chart highlights that cities in relatively close proximity of each other can have dramatically different income levels, depending on the overall levels of educational attainment in the region.

Put another way, increasing the educational attainment in a city drives wealth in a community as higher paid,

innovation-based jobs are created. Other qualified people are attracted to the region (including teachers and engaged parents) and the overall quality of the educational system increases, creating a cycle of improvement. It is argued that education has a social return to a community that is significantly greater than the return derived by the individual; consequently lifting educational standards is one of the most effective tools to closing income differentials.

As discussed earlier, governments will increasingly look at social spending through an investment lens (assessing spending on a programme against the future savings it will generate). It is therefore likely that a high performing education system that equips people to contribute productively to society will be a high priority for investment. There will consequently be a focus on ensuring the systems are consistently high performing; with greater emphasis being placed on standardising the curriculum,

integrating innovative technology into the classroom, and ensuring that teachers meet consistent quality standards.

In a profession that has historically shied away from differentiating and rewarding individual performance, the need to unlock the available social dividend will force significant changes in how the teaching profession functions, assesses its outputs, and is rewarded. New techniques will be required to assess teacher performance, incorporating more than short-term results with a need to take account of the achievements of their students a number of years down the track. Recognising that education is important to unlocking the economic potential of a community will fundamentally change how the sector operates in the future.



# 500,000

Chinese students study overseas.

**27%** named the US as their preferred destination for study.

**64%** specified education quality as a main factor in choosing a destination.

**31%** specified weather as a main factor.

**28%** believed an overseas degree will help their career.

## MACRO THEME #2

### More people access the global education solution tailored to their needs

Emerging economies will invest heavily in tertiary education in the coming decades, to develop sufficient graduates with the skills and capabilities required to support the growth of their economies. New institutions will be created that will come to rank alongside the best universities in the world. The impact of this investment is that top academic talent will be in significant demand, and well-financed institutions in emerging markets will pay a premium to build teams with world-class expertise to place them on the map of noteworthy institutions. There will be more joint ventures between existing tertiary institutions and newer organisations, to share knowledge and deliver internationally-recognised qualifications.

Students will also be more geographically mobile than ever before. Young people will be willing to look internationally to find the institution and qualification that will best deliver on their career aspirations. Whereas the shift of students from emerging economies has historically created strong fee revenues for universities in the developed world, it is likely that these patterns will change over the next decade. Students will be prepared to move to wherever the best course is offered – and in the future, will have a choice of more countries – resulting in much more varied, diverse patterns of student mobility.

Increasingly, however, students will not need to travel. Many students will access courses of study through online portals that link video content with networking and crowd sourcing tools. These open access courses (often referred to as Massive Open Online Courses or MOOCs) may make components of course material available

for free, significantly reducing the cost of obtaining a world-class education. These platforms, which are being created by universities as well as not-for-profit and commercial organisations, have the potential to completely revolutionise access to education and the future role of universities. These technologies and the associated business models are at an early stage of development; but a future of increasingly short, tailored and flexible education programmes are likely to be an integral part of the tertiary system of the 21<sup>st</sup> century.

## MACRO THEME #3

### Learning delivery changes in response to technology

The uptake of MOOCs and virtual learning platforms will change the tertiary education experience for many people. Early childhood, primary and secondary education systems will also have to evolve in response to technology. While it is likely we will continue to see children congregate in school each day to receive their educational experience, the experience they receive will be increasingly tailored to their specific needs to enable them to learn in the manner and at the speed that best suits them.

Research by the OECD has suggested that the education industry is at or below average in terms of adopting innovation, when compared with other sectors of the economy. While the pace of technology adoption has been in line with the wider economy, the sector has been slow to innovate with its products and service delivery. The report highlights that change has been constrained by the costs associated with innovation, along with an unwillingness of schools and teachers to shift away from traditional models of delivery to align more closely with the needs of the students and their parents.<sup>42</sup>

Increased access to technology is a given across most school systems; but the challenge is how this technology is effectively integrated into the learning experience to enhance educational outcomes. Currently many schools are utilising technology as a teacher aide within a traditional classroom environment. Few have explored how it could be used creatively to disrupt the learning environment to ultimately deliver better outcomes and capture the wider social dividend from education.

Schools that lead the way in innovating will follow the path of all innovative organisations. They will work closely with their stakeholders to understand what excellent looks like for them, and focus on recruitment (contracting the best and brightest young educators who may or may not be physically located at the school or in the country). They will offer incentives to teachers that meet key priorities, which will include providing them with the time and funding to experiment with new approaches (and accept when these on occasion fail). The innovative school will have more in common with Google than the schools we know today.

#### IMPACT ON GLOBAL AGRI-FOOD #1

### Challenge attracting talented people with relevant educational backgrounds to agri-food

We have discussed in previous *Agendas* the importance of getting sufficient numbers of appropriately-educated people into the primary sector in New Zealand; to enable the sector to capitalise on the available opportunities. The global agri-food sector faces similar talent issues; it is not seen as an aspirational sector with the attributes to attract and retain educated young people. The sector

PERCENTAGE OF STUDENTS' BELIEFS ABOUT AGRICULTURE BY SCHOOL TYPE			
	Urban Schools With No Ag Programme	Rural Schools With No Ag Programme	Rural Schools With Ag Programme
Involves professionals	63.0%	60.7%	58.9%
Requires no education	57.9%	66.3%	62.4%
Is for anyone	71.1%	69.5%	65.6%
Is only farming	30.1%	34.6%	24.1%

Source: Cornell University; High School Students' Perceptions of Agriculture and Agricultural Careers as Delineated by Presence of an Agriculture Program and Rural/Urban Categorization by Erin Smith; 2010

faces numerous perception challenges. These include perceived utilisation of child labour, high levels of gender inequality, weak health and safety systems, and low incomes in return for long hours of hard, physical work.

Addressing this issue is urgent, as the average age of farmers and agricultural professionals around the world continues to increase. (For instance in sub-Saharan Africa, the average age of a farmer is around 60 years, compared to an average life expectancy of 55 years), while young people continue to migrate to urban areas at increasing rates. The number of unemployed young adults is increasing around the world (the International Labour Organisation estimate that there are 73 million youth worldwide looking for work<sup>43</sup>), meaning there is no shortage of potential labour. The challenge is making the industry cool so young people are prepared to explore the diverse opportunities available.

The contribution that agriculture can make to developing a more sustainable society appeals to many millennials (who, as a demographic, seek to make a real difference). There are other factors that are likely to attract educated young people – including the global nature

of the industry, the ability to develop transferable skills (particularly as the industry gains scale and consolidates across borders), and the potential to explore social enterprise models.

There are many organisations with missions focused on attracting young people into agriculture; at local, regional, national and international levels. These groups educate people about the opportunities available, provide networking and social forums for people in the industry; and cover all aspects of the sector including farming, research, support sectors and academia. Given the critical importance of addressing the people challenge facing the global industry, it needs a more co-ordinated and better-resourced response than is currently in place. It is necessary for farmers and corporate organisations to align with non-governmental organisations and other groups seeking to create opportunities for young people, to tell the industry's stories in a more compelling manner.





## IMPLICATIONS FOR NEW ZEALAND

The OECD survey on educational innovation, noted earlier, ranked New Zealand's educational innovation among the lowest in the OECD. (Our innovation rating was 17 points, compared to the average of 22, and Denmark's highest rating at 37 points).

- › Countries with higher levels of educational innovation achieve higher attainment levels, more equitable learning outcomes and greater teacher satisfaction. It is incredible to think that we need to be equipping today's new school entrants for a working life that could extend into the 2070s. This kind of education relies on teachers that can inspire kids to see a world unconstrained by borders and boundaries. Overhauling the rewards mechanism for teachers should be a key priority for the Government.
- › The financial requirements of eight national universities present challenges to the New Zealand economy. Each establishment has some faculty that deliver world-class teaching and research, however only one institution is ranked in the Top 200 universities (Auckland at 175).<sup>44</sup> This implies the overall quality may be lower than the country needs to underpin an innovation transformation – and fulfil the industry's goal to be the most innovative primary producer in the world. Given students will increasingly choose to access programmes from the world's great universities online, the time is approaching to reassess the structure of the university sector in New Zealand. We need to right-size its capabilities, focus on quality, align investment with our economic future, and manage costs into the future.

- › The biggest constraint on attracting talent into the sector is the low awareness of the available opportunities. Much of the blame rests with the industry's failure to promote its career options; however the school system has done little to incorporate agri-food into the curriculum. It is critical for the sector to: increase engagement with schools and tertiary institutions, support the delivery of primary sector focused curriculum, create opportunities for experiences and internships, work with groups such as Young Farmers to inform young people, and educate career advisors on the range of careers available.
- › The industry has an opportunity to take a leadership position in providing job opportunities for societal groups that have historically been underrepresented in the employed population – including women, and Māori and Pacific Island communities. There are many opportunities for these segments of the community to develop varied careers in the industry, through the implementation of tailored recruitment and development programmes.

## THE COMPANY AGENDA

- 1 Reassess the programmes that your organisation runs, or participates in, to reach out to schools; consider the impact they are having (particularly in urban areas). Explore opportunities to collaborate with other organisations in developing a more impactful curriculum to attract young people to agribusiness.
- 2 Ensure your recruitment programmes are extending the net as wide as possible. Are you looking beyond the traditional sources of employees for the primary sector? Do you have recruitment strategies in place to attract strong candidates from a diverse range of backgrounds?

THEME

4

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**A CONNECTED  
& CONVERGING  
DIGITAL  
WORLD**



## Diffused innovation

### The Macro Themes

- › Mobile devices defining the new everyday
- › Technology becomes a component
- › A business world of constant reinvention

### Impacts on the global agri-food system

- › Maximising technology benefits
- › Connectivity enables thriving industry



## Realising value in data

### The Macro Themes

- › Unlocking and monetising the value of data
- › Managing the ethics of artificial intelligence
- › Protecting the integrity of data

### Impacts on the global agri-food system

- › Data management integral to agri-food

**In a world where we are rarely without a digitally connected device, it is increasingly difficult to recall a time (less than 40 years ago) when computers with a fraction of the power of what we have in our pocket today took up whole offices.** Over this period, we have seen technology move from mainframes, through PCs, to a virtual world of mobile connectivity and commerce.

Many experts suggest that we are still only in the formative stages of the digital revolution, and we can expect a similar pace of development for at least the next 40 years. Developments are expected to follow the same trends over this period; equipment will get continuously smaller, the resulting data generated will grow endlessly, and technology will increasingly reshape the way companies work and people live their lives.

The boundaries between the physical world and the digital world will become increasingly blurred; the relevance of jurisdictional borders will be further challenged, and ethical issues will arise as the capabilities of master systems with high-level artificial intelligence increase. Markets will synchronise, segment and transform continuously. The biggest constraint on the speed of technological uptake is likely to be how people understand and react to the developments. For example, it will take time for people to become comfortable being a passenger rather than a driver in a self-driving car.



# DIFFUSED INNOVATION



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**Consistent progress has been made in recent decades in reducing the size of technological equipment.** The next step will be for processing chips to diffuse into the environment. New generation technology will become an inherent component of everyday products, rather than a feature of specific technology products. The ability to shrink processors further, enabling them to operate using very low power charges and be fully connected to the internet, will permanently change how technology is utilised. Literally any everyday object will have the ability to become a smart object. This will create new business opportunities but, as was noted when discussing 21<sup>st</sup> century consumers, the lifespan of a technology step forward will be short. It will only be a matter of time before the new 'next best thing' becomes available.



By January 2014 there were 264 4G LTE networks launched globally with 400 million connections.

**By 2020 there is expected to be 2.5 billion 4G connections accounting for around 28% of all mobile connections.**

**64% of the world's population will have access to 4G networks by 2020.**

Source: GSMA Intelligence; *Global 4G-LTE Connections forecast: 2010 to 2020*; March 2014

Photo: Nickolay Vinokurov / Shutterstock.com

#### MACRO THEME #1

### **Mobile devices mean everybody is always connected, defining new everyday experiences**

The spread of connectivity into the daily lives of around 5 billion people by 2020 will result in a significant convergence of working lives, home lives and the environment. It is suggested that connected living will utilise digital assistants that guide daily life by interacting with the technology embedded in everyday objects. This will introduce individuals to highly tailored experiences that alleviate many of their daily frustrations and create new business opportunities.

Experts predict that connected living will extend to all aspects of everyday life. House automation will link smart heating, lighting and security systems with other everyday appliances to maximise lifestyle while minimising cost. Within a decade, it is likely that housing systems will be able to accurately track a person's health and wellbeing and provide guidance, and potentially prescriptions, to significantly reduce the amount of time lost through ill health.<sup>45</sup>

Connected work environments will facilitate more effective mobile working and networking, and challenge the need for the expensive office space that many companies currently provide employees. It is expected that many companies will also adopt bring-your-own device policies to enable employees to work with the technology that integrates best with their wider lifestyle, delivering significant cost savings to businesses while improving the outcomes for individuals. Beyond the work environment, people will increasingly connect with government through a consolidated eGovernment portal that will enable them to interact directly with the services provided by both national and local government; including education, citizenship services, taxation, social welfare and, most likely, voting.

An ecosystem will develop to support the connected lifestyles of billions of consumers, presenting huge business opportunities. Over time, systems will become more proactive in selecting what opportunities are presented to the connected user, increasingly steering the life experiences they have.



Today, your smart phone has more computing power than the whole of NASA back in 1969 when it sent two astronauts to the moon.

The Sony Playstation today has the power of a military supercomputer circa 1997.

#### MACRO THEME #2

### 'Internet of Things' created as the size of meaningful computing approaches zero

Innovators in the field of IT have consistently challenged themselves to take today's products and make them smaller, cheaper and more powerful than anything on the market. This has seen the desktop PC become a laptop, then a tablet and today, the smart phone. The reality of today's technology is that the size of device required for meaningful, powerful computing is rapidly approaching zero, the opportunity exists to turn almost anything into a computer.

The next section highlights that as lives become more connected, our devices will increasingly interact with each other to create friction-free living environments. This will extend significantly beyond the confines of the devices we recognise today as connected (phones, computers, entertainment systems, some appliances, security systems and the like) to become a true network of things. The 'Internet of Things' will extend to the clothes we wear, the toys our children play with, the beds we sleep in, the contact lenses we use, and even the packaging that food is sold in.

In June this year, Intel highlighted its thinking around the potential of the next generation of processors. The company forecasts that 500 million pieces of technology-enabled clothing will be sold annually by 2020, each piece creating data that will be valuable to fashion retailers, medical providers, fabric manufacturers and market researchers.<sup>46</sup>

The potential of embedding technology in everything we use is likely to become a reality in the next seven years. It is limited only by our ability to think of uses and applications for the data. For many this creates practical concerns, meaning uptake is considerably slower than the speed at which technology develops. Most notable are concerns around the security of information, with a network of billions of devices (e.g. 'will I be exposed if somebody hacks my toaster?'). There are also concerns around how all the created data is stored (a subject we will return to in the next section), what it is used for, and how this could impact on an individual's privacy.<sup>47</sup> Yet companies that fail to recognise and respond to this revolution will likely miss the wave that will define how the century evolves over its remaining 85 years.

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**KPMG's third Global Innovation Survey asked 768 technology industry leaders which technology will enable the next indispensable consumer technology.**

**CLOUD PLATFORMS**

14%

**MOBILE APPS**

14%

**3D PRINTING**

8%

**BIOTECH & DIGITAL HEALTH**

7%

**INTERNET OF THINGS**

7%

**ARTIFICIAL INTELLIGENCE**

6%

**DIGITAL CURRENCY**

5%

**WEARABLES**

5%

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**MACRO THEME #3**

**If you are not reinventing your business model – a competitor will**

In the introduction to this *Agenda*, we noted the shortened tenure that a company can expect to have on the S&P500 index by 2025. Unfortunately, the coming years will see many companies join globally recognised names such as Kodak, Blockbuster and Nokia in failing to reinvent themselves in the face of significant competitor innovation.

Any market segment that is delivering strong profitability will inevitably be a target for a disruptive innovator. Any company enjoying strong profits in a market segment will only survive if they are focused on reinventing their business model before they are subject to disruption. Mature companies are susceptible to focusing on their high profit markets; very often the premium segments where consumers are prepared to pay for additional functionality. Research investment tends to focus on meeting the needs of these customers, with considerably less attention paid to presenting innovative new products at the lower price points in the market.<sup>48</sup>

Disruptive innovation often comes from a product offering geared to the mass market that is less complex, much cheaper and initially unattractive to the premium end of the market. (One example was early digital cameras, which were adopted by amateurs long before professionals gave up using film-based cameras). A successful disruptive product that secures a sizeable share of the mass market can then fund development of more advanced models. As was the case with cameras, where the film segment of the photographic market quickly became an immaterial niche, the high profit operator is left with limited business and no financial capacity to catch up.

Successful companies in the coming decades will be among the most paranoid. They will not sit back and wait for disruption – they will understand their core competencies, be prepared to experiment with business models, and seek opportunities for diversification. They will be the companies that regularly introduce products to the market and, more importantly, are willing to acknowledge a failure and withdraw a product quickly; as they experiment to find solutions that resonate with different groups of consumers.<sup>49</sup> Their strategy will be flexible however their reason for existing will not be: a core belief they are helping to make their customers lives better.





Customised drones could be used for farm inspections, targeted spraying, mustering and other activities that take significant time and incur large costs due to the distances involved.

#### IMPACT ON GLOBAL AGRI-FOOD #1

### Technology becomes embedded in agri-food production

Having been faced with numerous potential food crises over the last century, the global agri-food sector has been effective in delivering productivity improvements and continuously increasing the supply of food. Yet compared to many sectors of the global economy, agriculture has been a slow adopter of information technology. There have been a number of reasons for this – including infrastructure challenges in rural environments, few technology-based solutions being developed, and the older demographic of farmers.

However this is changing. Professional investors coming into the sector are demanding more information and placing greater focus on maximising the profitability of their farming businesses. As noted in the first volume of the 2014 *Agenda*, the ability to collect data from farming systems is increasing rapidly. As new applications become available utilising diffused sensors embedded across a farming system, this makes the use of sophisticated decision support systems increasingly common.

New technology solutions are also becoming available to integrate components of the supply chain; from the producer/grower through to the ultimate consumer of the product, to deliver greater product traceability and shorten the supply chain. To date, however, the majority of technology applications in agriculture have been supporting and facilitating existing supply chain models. The potential of technology to transform agriculture by reducing costs, enhancing productivity and creating new market opportunities is still to fully emerge.

Agriculture has the potential to be one of most significant markets for emerging drone technologies outside of military applications. Customised drones could be used for farm inspections, targeted spraying, mustering and other activities that take significant time and incur large costs due to the distances involved.

The potential of 'precision agriculture' to enhance productivity while significantly improving the environmental performance of a farming system is also becoming apparent. For instance, GPS-based systems are delivering benefits in a wide range of farm systems, particularly for the controlled use of water and nutrients. The potential and complexity of precision systems will increase significantly in coming years.

With the food and agriculture sector starting to come onto the radar of the IT innovation and venture capital communities – and as the scale of the opportunities in the sector become better understood by these groups – the number of disruptive technology start-ups will grow; integrating IT seamlessly into the day-to-day lives of producers across the world.

## IMPACT ON GLOBAL AGRI-FOOD #2

## Connectivity is critical in rural areas to support a thriving agri-food sector



As discussed above, inadequate communications infrastructure in rural areas has been a significant constraint on the uptake of IT- based innovation in the agriculture sector. It is not possible to establish an Internet of Things, for example, if the things have to connect via a series of dial-up modems. When it comes to the high-speed communications technology needed to support complex global businesses, the tyranny of distance has meant service levels offered in rural regions tend to lag behind urban areas, by several generations and often carry a higher cost to the users.

The key role that connectivity plays in rural areas cannot be ignored. As highlighted in previous *Agendas*, it is not only the business benefits that improved connectivity delivers that are critical to the future of the industry; but also the contribution it makes to the wider community. Delivering access to the internet to rural communities – and all the social networking, education and e-commerce opportunities that this presents – is critical to encouraging talented and skilled people to contemplate building a career outside of the urban areas.

Globally, governments are grappling with the challenges of delivering adequate connectivity to rural areas. Many governments have to allocate their limited budgets to infrastructure programmes that deliver the most impact for the investment dollars available, which naturally focuses investment into urban areas. However they also recognise the contribution that technology can make to enhancing the security of the food supply, and better utilising the available resources in an economy, and are exploring solutions to meet this need.

A number of countries have developed programmes that deliver incentives to communication network operators to build out network solutions into rural areas. Without these incentives, it is unlikely that the economics would work for building out rural networks using the technology currently available, as the prices required to deliver a commercial return on investment would prohibit uptake from the majority of businesses.

We expect to see significant innovation in how connectivity is delivered to remote areas in the coming decades. One proposal currently in the pilot phase is Project Loon. Supported by Google, it proposes to create a network of balloons travelling on the edge of space, designed to connect people in rural and remote areas by filling coverage gaps.<sup>50</sup>



## IMPLICATIONS FOR NEW ZEALAND

With their investment in the Ultra-Fast (UFB) and the Rural Broadband initiatives (RBI), the Government has started to prepare New Zealand for a highly connected future. The question is whether the rural population will be ready to exploit the opportunities this brings.

- › The UFB initiative is providing the majority of urban homes and businesses with the ability to access high-speed fibre broadband, while the RBI provides rural areas significantly lower connection speeds through a mix of fibre and wireless technology. The RBI will complete in 2015 and, as we noted in the previous *Agenda*, it is critical that continued impetus is given to the 2025 broadband strategy for rural areas. Connectivity will have a huge impact on improving business performance, delivering critical education and healthcare services, and attracting people to live in rural areas.
- › Using mobile technologies to create tailored solutions for consumers could provide a significant boost to our reputation as a provider of premium food, fibre and timber products. This technology could be used to deliver assurance to consumers, build relationships, or in more radical ways. For instance, a virtual delicatessen selling New Zealand products using scan solutions in public places; or apps that enable consumers to enter a recipe and receive all the necessary ingredients (from New Zealand where possible) delivered to their door (or even a chef-created version of the meal).
- › Technological innovation across the farming system will enable producers to increase output while enhancing the sustainability of their operation. There is no question that many elements within a farming system that have historically been unconnected will become technology-enabled and join the Internet of Things. However realising the benefits this can provide will depend on the speed of uptake. Given that our economic future relies on farmers quickly adopting innovation, one option is to offer accelerated tax deductions for transformational innovative technologies that are adopted within a certain timeframe.
- › Numerous New Zealand companies have built solid agri-tech innovation businesses. However the majority of the solutions sold by these businesses have been developed to solve problems within our domestic farming systems. Exports have often been a by-product of commercialisation rather than integral to the plan from day one. As the technology component of innovations increase, development costs will also rise; meaning innovators need to aim at a wider market to justify the cost of innovation. New Zealand's innovative agri-tech sector will need to be increasingly export-led; and look to solve issues that not only impact producers in this country but in other markets around the world.

## THE COMPANY AGENDA

- 1 Think about mobile applications that could create new channels to market for your products. How can you make it easier for current and potential customers to use your products on a daily basis? Are there are opportunities to join wider collaborations to further raise consumer awareness for your product?
- 2 Explore opportunities to embed technology into your product packaging. How could this enhance the consumer experience and provide information on product performance? Could it also remove friction from the customer's experience (for instance providing food safety alerts, calculating true best before dates, suggesting relevant serving suggestions, or even reordering when product is used)?
- 3 Assess how your organisation filters development opportunities and prioritises investment. Is sufficient weight given to export market potential when considering these investment decisions?



# REALISING VALUE IN DATA



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**As we move into a world with billions of connected devices, there is little doubt among experts that the current swell of data we are seeing will become a wave and ultimately a tsunami of information. Cisco forecast that global data centre IP traffic will have a compound growth rate of over 25%, to nearly triple over the period from 2012 to 2017 to an annualised level of 7.7 zettabytes.<sup>51</sup>**

The challenge for businesses will be extracting valuable insights from this wall of information, and using them to inform their strategy and generate a financial return. The insights that will be available about the habits and behaviours of any specific connected consumer will be immense, but how this information is secured and used will determine the confidence people have to connect with the technology revolution.

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**MACRO THEME #1****Selectively converting data into knowledge can enhance the decision-making processes**

Companies that are able to mine their data effectively to identify insights and trends in the performance of their businesses, and the behaviours of their customers, are able to inform their decision-making process in a far more granular manner than has ever been possible in the past.

Having reviewed some of the recent literature on big data (much of which comes from companies with products to sell in this sector), many analysts appear to be linking analytics directly with enhanced returns. However our belief is that the application of sound business intuition to the analysis produced remains critical in making a decision that will create value for a business. The deepest insights to support transformative change will come from being highly selective about what is analysed.

We expect two significant trends will emerge in data analytics. Firstly, companies will undertake acquisitions primarily to gain access to the data of a competitor. We could see companies seeking to buy only the data of a failed business from its liquidator, or a company selling the trading arm of an acquisition to comply with anti-trust rules providing it is able to retain the data warehouse. Integrating the data of a competitor, particularly one that has failed, will create opportunities for even more granular analysis of a market and increased understanding of the key dynamics.

The second emerging trend is around integrating proprietary data with available open data sources, in particular government data, to further segment the market and provide insight into business opportunities. McKinsey has estimated that utilising open data in seven sectors of the economy has the potential to create between US\$3 trillion and US\$5 trillion in economic value annually.<sup>52</sup> By filling the gaps in a company's own information, open data enables a better understanding of prospective customers and assists in designing products and services that would appeal to these potential customers.

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**MACRO THEME #2****Ethics embedded into systems pose moral dilemmas to developers and consumers**

For decades science fiction writers have been envisaging the impact computer systems with full artificial intelligence (AI) may have on our society. Putting aside literary license, some of the ethical issues they have addressed are becoming practical issues that we will need to address globally in the next decade or so.

While we may be still some way off a system with full artificial intelligence, we are very close to developing systems that will have many of the hallmarks of AI, including the need to make potentially life-altering decisions.

An example is the self-driving vehicle. The car will be programmed to navigate a route, but like any vehicle, things can go wrong (e.g. a tyre could blow out at speed). This leaves the computer to make an instantaneous judgement on its reaction, as a driver would have to do. The ethics embedded into the decision algorithm that the computer uses could be life or death for the passengers in the vehicle (or other road users), presenting some deep moral issues for the system developers.

A key question facing society is how these moral issues are addressed and who is responsible for determining the responses built into the algorithm that is making a decision.

Many of the concerns currently revolve around how private information and data collected on an individual consumer is exploited by commercial organisations for their own benefit. For instance, a medical insurer could require consumers to give them access to their personal cloud of lifestyle data, and use this for analysis before recommending an approach to treatment (which could result in a claim being denied or treatment withheld if the data did not fall within a set of parameters the company had defined). Without confidence that these ethical issues are being addressed fairly, the potential for the enhancement of society inherent in emerging technologies may never be realised.

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IBM report  
that there was  
**1.5 million  
monitored  
cyber-attacks**  
in the US in 2013.

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These breaches  
have wide financial  
consequences on:

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› **Reputation and brand**

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› **Productivity**

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› **Revenue forensic costs**

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› **Technical support**

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› **Regulatory compliance**

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Source: IBM United States; *Data breach statistics: An information resource for data breach prevention and response*; 2014



#### MACRO THEME #3

**The value of a business will increasingly reside in its data, making it strategic to secure**

The global challenges posed by cyber-crime were explored earlier in this *Agenda*, where we noted that there is unlikely to be any slowing in the pace of attacks intended to defraud or disrupt the daily functioning of our communities. With an increasingly connected community, a growing proportion of an organisation's value will reside in its data warehouse and the insights that data is able to generate.

The financial consequences on a business of having its data compromised can cause serious, and potentially irreparable, damage to a company's reputation and brand. It can impact productivity, lose future revenue opportunities, and result in the company being subject to tighter regulatory oversight (with a resultant lift in compliance costs).

In reality, it is almost impossible to have completely impenetrable security around a network; and numerous analysts describe computer security as an unsolvable problem that is inherent in doing business online. More companies are treating network and data security as a risk management issue that lies squarely with an organisation's board, rather than it being fully delegated to management to address.

The key objectives for many senior managers – increased productivity and improved profitability – are often better served by a flexible, open network and security environment. Should the board require management to pursue a zero threat environment, this could constrain the functioning of the organisation (or to put it another way, the greatest risks may come from the pursuit of zero risks).<sup>53</sup> Determination of the optimal risk management strategy for data will increasingly require a wider perspective of the core drivers of value growth in an organisation. This will direct effort to counter and neutralise the current and emerging threats that could do the most harm to the long-term growth in organisational value.

**IMPACT ON GLOBAL AGRI-FOOD #1****Data collection, analysis and interpretation becomes integral to agri-food systems**

In many of our Roundtable discussions for *Agenda 2014*, a theme emerged around the benefits that could be gained from collecting, analysing and interpreting data in primary sector businesses. While agri-food may be joining the Big Data movement later than many sectors of the economy, there is no question that businesses across the global industry are recognising the economic benefits inherent in collecting the right data and analysing it correctly.

Apart from the practical challenges of collecting the data, which we explored in the previous theme, a significant challenge to successfully performing data analytics in the primary sector is that a wide spectrum of factors impact the outcome of a decision (e.g. climate, genetics, soil type, water, fertilisers, labour units, animal health treatments, feed inputs and many others). The variables that drive production are not all controllable, meaning it is not easy to collect sufficiently granular data to utilise in an analytical process. A lack of adequate data on the climate variables across a large farming station, for instance, could present a major challenge to effective analysis; and assumptions will have to be made in reaching conclusions. The enterprise systems that larger farming businesses are looking to adopt have yet to build modules designed to incorporate and report effectively on the physical production variables needed to fully analyse performance.

Another challenge in many countries is that data relevant to an agricultural business comes from many sources and there are few solutions that are able to integrate all the information feeds to deliver a single useful set of conclusions. In other sectors of the economy, platforms have developed that consolidate multiple data sources and deliver an integrated picture for decision-makers at both organisation and policy level. We expect to see similar solutions develop across the global primary sector, particularly as businesses consolidate and new investors come into the industry, looking for greater visibility and enhanced profit returns.

Sharing data between companies – and across borders – has been identified by governments as a tool that can be used to support agricultural development in emerging economies. For instance, the GODAN initiative (Global Open Data for Agricultural and Nutrition) was launched in 2013 and is supporting efforts to increase the open access to information globally. It has supporters from a wide variety of public and private entities, including government organisations, NGOs and companies.<sup>54</sup>







## IMPLICATIONS FOR NEW ZEALAND

Protecting the privacy of personal information has an unusually high profile in New Zealand. Much of the discussion during the 2014 general election related to the rights of government agencies to access and monitor an individual's personal information.

› There are significant practical issues facing the New Zealand governments into the future. They will need to balance legitimate concerns about the privacy of information, while enabling organisations to utilise data to unlock transformational change for the wider benefit of society and the economy. The Government received a report in July 2014 from The New Zealand Data Future Forum, established by Statistics New Zealand, which considered the data-use ecosystem required to become a world leader in the trusted use of shared data to deliver a prosperous, inclusive society.<sup>55</sup> The report recognises the strategic role of data, and calls on New Zealand organisations to use information to tackle the real and thorny issues facing the country. The development of such a data ecosystem relies inherently on trust; and building this requires robust controls, particularly related to consents for the release of data and mechanisms to enable data errors to be corrected. It is critical that the ability to access and utilise data for the benefit of all New Zealanders is not overly constrained by bureaucracy; and that the opportunity to innovate and lead in the global market is not lost.

› In the first volume of the 2014 *Agenda*, we highlighted the role of data in the primary sector was a major discussion point during the Roundtables for the first time ever. The ability to collect data within a production system is growing rapidly, as are the number of alternative sources that data feeds are available from. There are numerous organisations looking to create a platform that could consolidate a range of data feeds, and thus present richer data to users to support them in their decision-making. Given the small size of the New Zealand market, we would be concerned if too many integration platforms were being developed. This would imply investment dollars were being spread too thinly, with no single platform resourced to consolidate all the necessary information. We need to ensure efforts are co-ordinated to develop the best possible solution for the long-term future of both producers, and those providing data feeds to a collaborative platform.

## THE COMPANY AGENDA

- 1 Evaluate how effectively your organisation is leveraging its data. Are you optimising the way your data is being produced, collected and utilised? Are there opportunities to drive productivity improvement by embedding more technology into your business?
- 2 Review existing data privacy protocols within your organisation. Do these deliver sufficient protection to the individuals or organisations the data relates to?
- 3 Recognise the critical role of data security in preserving the intellectual property and reputation of your organisation. Who is responsible for IT security in your organisation? How informed is your board on IT security, and have they confirmed the delegation of responsibility?

THEME

5

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**ENABLING  
INDEFINITE  
SUSTAINABLE  
LIVING**



## Climate changing

### The Macro Themes

- › Regulatory environment remains unstable
- › Responding to volatility makes business sense
- › Business models need incremental resilience

### Impacts on the global agri-food system

- › Production systems evolve
- › Accepting GMO's in the global food system
- › Producers take steps to enhance biodiversity



## Facing resource scarcity

### The Macro Themes

- › Commodity cycles sharper and shorter
- › Renewable resources get greater focus
- › Governments develops sustainable solutions

### Impacts on the global agri-food system

- › Natural capital charging changes behaviours
- › Water scarcity changes how, what and where
- › Minimising wastage becomes key focus



## Emerging social enterprise

### The Macro Themes

- › Social entrepreneurs have alternative goals
- › Vehicles to drive disruption

### Impacts on the global agri-food system

- › Broad coalitions change poverty paradigm
- › Fair trade systems scale global best practice
- › Evolution of natural product categories

**The impact of more people, new technologies, greater energy and food demands, increasingly intensive living practices and growing incomes is generally recognised as placing a strain on the natural resources of the planet.**

However, a growing section of society argues that our rate of development is putting the sustainability of the environment, and consequently, the global economy, at an increased risk of failure. There are some that would argue the economy is already failing and too many people have been marginalised from society. These claims are particularly focused at the agri-food sector, given estimates that around 40,000 people die each day from poverty.

In this section, we explore some of the core themes being raised in relation to the long-term sustainability of the global environment, our communities, and our economies. The existence of human-created climate change is still disputed by many. For the agri-food sector, however, this is an issue that cannot be left on the back burner; given the apparent increase in weather-related volatility globally and the need for science-driven responses that will take time to be research and develop. Much of the science underway is focused on reducing the intensity of resource consumption (with a key focus on how water is utilised); and how the resulting food, fibre and timber is used and subsequently treated given current levels of wastage, particularly in the developed world.

Effective responses to these significant issues will require major change to some of the fundamental pillars of the global economy. It is likely many existing organisations will be unwilling or unable to do everything required, given their existing investments and interests. Instead change will be driven by disruptive business organisations – potentially social enterprises – where the impact they have on the environment and the community is of equal or more importance to their stakeholders than the economic outcomes delivered.



# CLIMATE CHANGING



**Although the risks associated with human-created climate change have been recognised for more than two decades, a collective response has been slow to mobilise.** Key messages from the recent fifth assessment of the Intergovernmental Panel on Climate Change ('IPCC') state that: the human influence on the climate system is clear and growing; now is the time for quick and decisive action to enable the global community to avoid increasingly destructive outcomes; and that we have the means to limit the impact of a changing climate. Over the next two decades, the long-term impacts of climate change will be determined by the actions – or inactions – of the global community.

## MACRO THEME #1

**Lack of consensus means regulatory environment remains unstable, individual actions lead response**

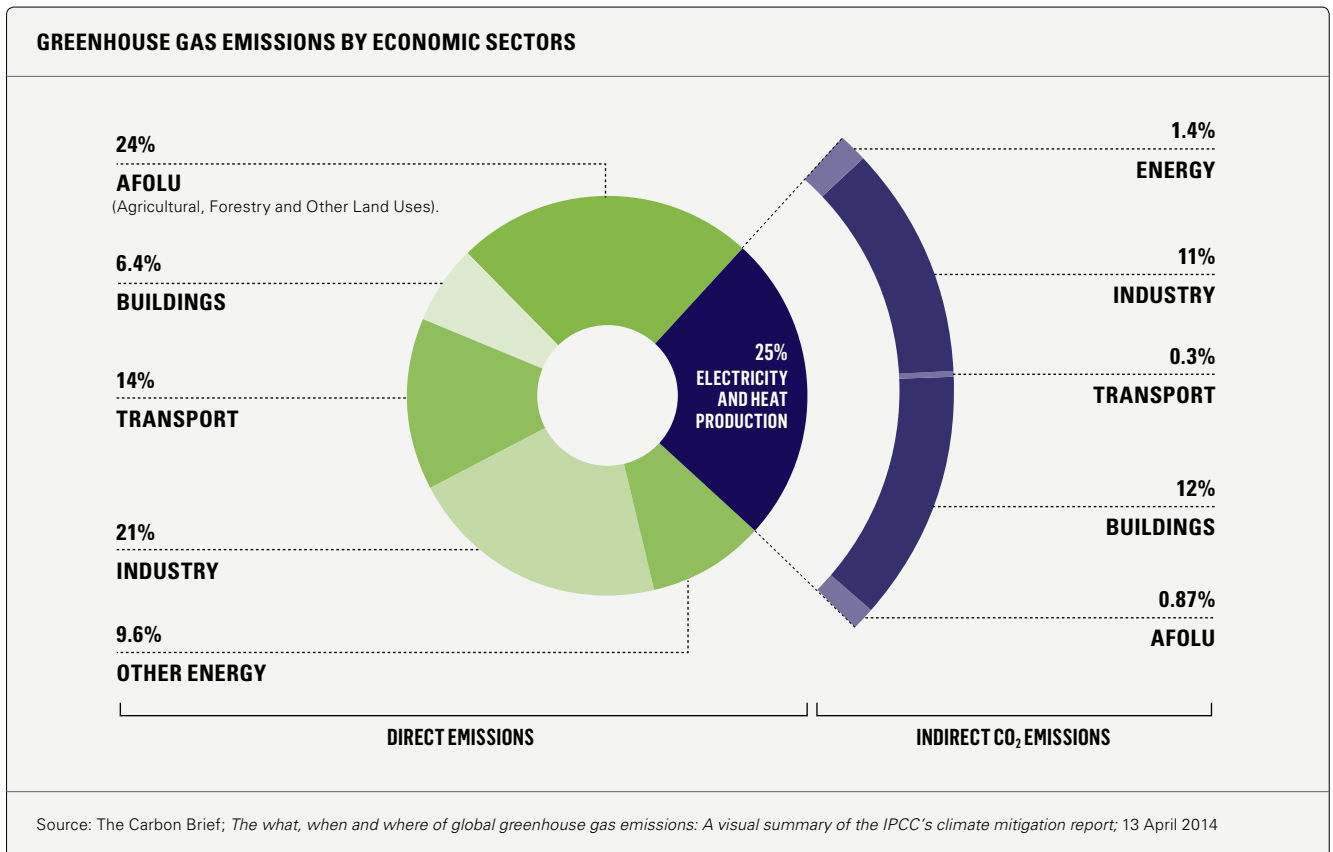


Analysing the arguments on either side of the climate change debate indicates that most sceptics and proponents are not necessarily very far apart. Proponents argue that the climate has warmed in comparison to historic levels and that human activity is a significant contributing factor to this change. They further argue current warming will accelerate the level of warming in the future (the climate feedback theory), causing catastrophic impacts on the environment and the lifestyles of the global community. The majority of sceptics do not deny the greenhouse gas theory; that the world has warmed in recent history, with humans responsible for a component of this. When it comes to the differences, they challenge the extent that climate feedback will accelerate future warming, and how much of the warming is man-made versus being natural and cyclic.<sup>5</sup>

So while there are often more commonalities than differences between parties on either side, the debate continues to rage within governments around the world. The inability to focus on the common ground – such as the broad acceptance that greenhouse gases and other man-made pursuits are having an impact on the climate – has meant there has been less progress made on climate policy than the world desperately requires. Policy in this area is prone to vary, with a change in leadership reflecting the ‘personal’ perspectives that a new regime brings to the table. At a global level, an inability to progress a replacement for the 1997 Kyoto Protocol after more than five years of negotiations spotlights the lack of collective progress on this issue.

Substantive headway will depend on the actions of individuals and organisations that are prepared to back their beliefs with practical changes in how they do things – even if these actions increase their costs or reduce their productivity. More organisations will enshrine sustainability principles into their DNA, following the example of leaders in this field like Unilever and Vodafone. They will recognise that corporates can no longer close their eyes to global challenges, and make a conscious decision to become part of the solution.

Change will also depend on the actions taken by individuals. While one person cannot change what happens to the climate, tens of millions of people choosing to make a difference will move the world beyond the current policy deadlock over the next decade.



## MACROTHEME #2

### The need to respond to recognised climate warming makes environmental and commercial sense

While not everybody agrees with all the conclusions of the IPCC, few people disagree that it is common sense to use the planet's finite resources in a more sustainable manner. The challenge is persuading them that using resources sustainably not only makes good environmental sense; it also makes commercial sense.

The analysis of the major sources of greenhouse gases indicates the areas where the biggest gains could be made quickly. The way we travel, how we use electricity, consume food and build offices and houses shapes the carbon

footprints of our lives. Changes can be made to these drivers at many levels and, collectively, can materially reduce our environmental impact.

The opportunities to secure meaningful reductions in greenhouse gases are apparent, and it is accepted that more sustainable living is desirable. Yet the problem is that the majority of organisations have done the easy things, but have been unwilling to invest in the more fundamental changes that will deliver noticeable reductions to their carbon footprint. Doing the right thing comes with a cost, and if your neighbour or competitor is not prepared to also make changes, the reality is they can neutralise the benefits of your efforts while being financially better off. This is well illustrated by a report in the Washington Post which stated that US carbon emissions dropped by

1.7% in 2011, this was more than offset by a 9.3% increase in carbon dioxide emissions in China in the same year.<sup>57</sup>

For companies that have to deliver on the growth expectations of their investors, large commitments to sustainability projects are a hard sell if the competitor is not following the same track and is returning higher profits. This is partly being addressed by sustainable investment funds that take a more holistic view of a business, and we expect funds of this nature to grow significantly in the coming years. Yet the big gains will only be delivered when government policy frameworks appropriately line up so that the competitor, wherever they are in the world, is not able to get a free ride without an appropriate cost to their business for their use of the planet's natural resources.

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**MACRO THEME #3****Business models develop capacity to handle climate volatility**

Whether it is specifically related to a warming climate, or purely a series of statistical anomalies, news reports that regions of the world have been subjected to unprecedented weather extremes seem to be increasingly common. California is now into its fourth year of severe drought, with many irrigation systems having no water to supply to farmers. Japan has experienced an intense typhoon season this year, and parts of Europe experienced their wettest winter in 250 recorded years. While parts of North America were again locked down by the 'polar vortex', Muscovites enjoyed their warmest winter weather for many years.

These unusual events are not incorporated into the budgeting or business planning of most organisations. They can create significant unexpected social and economic burdens when they do eventuate, particularly if the event itself (or its impacts) persist for months or years, as has been the case with the droughts in California. The timing, nature and extent of these events are not predictable. Traditionally they have been incorporated into the risk analysis framework of an organisation as a low probability event, with low to moderate impact.

With the potential of these events becoming more frequent and more intense, organisations need to reassess how they have categorised this risk, and build the capacity they have to handle such an event. What steps does a business need to take if an event like Hurricane Sandy (the storm in 2012 that killed at least 286 people in 7 countries and caused an estimated US\$68 billion of damage) impact all or part of their operations on an annual

or biannual basis. We expect to see more organisations including weather volatility into business continuity planning. In some cases, this will result in business decisions to relocate all or part of their operations to regions that are less prone to volatile weather. For instance, a technology company that is providing data centres will need to incorporate weather volatility as a factor in asset planning decisions in the future, to assure customers that their capacity will be available to continue operations.

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**IMPACT ON GLOBAL AGRI-FOOD #1****Food production evolves in response to climate risks**

To cope with climatic changes, we may need to consider innovation in how we eat and farm...

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**› Completely different diets**

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**› Shifting production areas for familiar crops, livestock and fisheries**

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**› New approaches to managing waste, water and energy in food supply chains**

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**› Restoring degraded farmlands, wetlands and forests**

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Source: Fast Company; Co.Exist: The UN's latest dire climate warnings, visualised; 31 March 2014

The importance of favourable climatic conditions to a productive and secure agricultural supply is often overlooked by the wider population (who are more focused on the weather for the weekend rather than the impact it has on producing their daily food requirements). Weather is critical to almost every agricultural system. Should global climate change become as volatile as the IPCC and many other organisations are forecasting, this will require many agri-food producers to materially change the products they produce and the systems they use.

The impact of climate change will be regionalised, however. Warmer temperatures and increased levels of carbon dioxide will result in productivity improvements in some areas; while the same levels of change in other geographical regions has the potential to completely devastate production. Without significant investment in infrastructure and wholesale changes in the farming systems utilised, it will potentially leave land unproductive. The current cause of climate evolution suggests it is likely there will be an increase in the frequency and intensity of droughts and floods, thus raising the focus on water management strategies (a theme we return to in the next section). It will also disrupt natural ecosystems, fundamentally making it more difficult to grow plants, raise animals and catch fish.

The consequences are significant, particularly in regions that are modelled to be the most severely impacted. This includes much of Africa, the southern USA, Central America, the Middle East, the Indian subcontinent, South East Asia, and Northern and Western parts of Australia. Many of these regions already face challenges producing sufficient food to meet the demands of their populations and some have governments that lack the resources to invest in rural infrastructure.



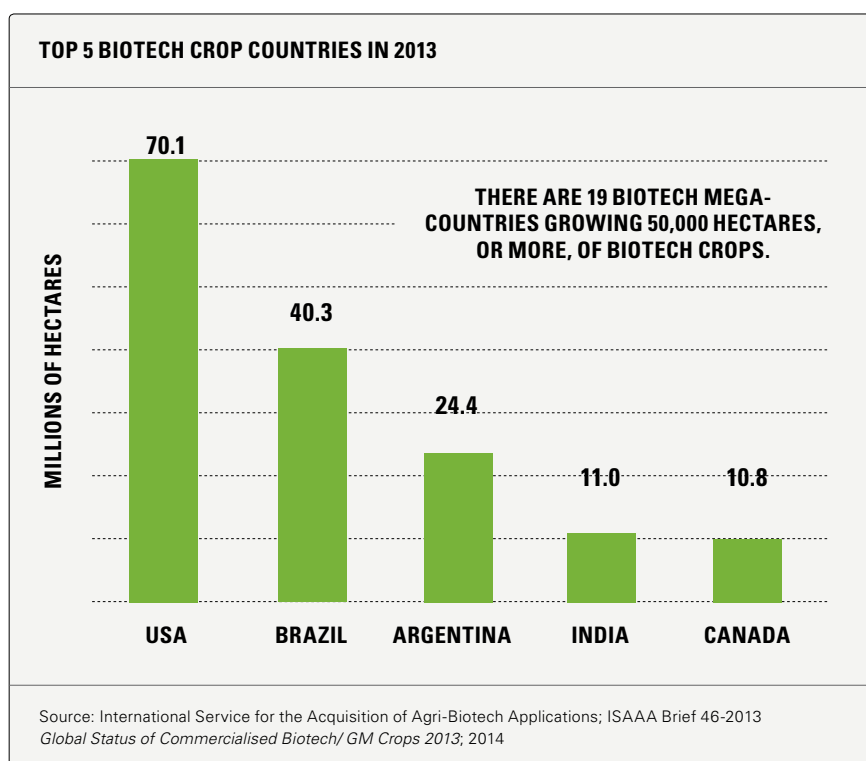
Climate change is not a Y2K-type event that will strike on a single day; its impacts will build over time. The agri-food sector cannot afford to sit back on this issue, on the basis that the catastrophic impacts of climate change may still be 50 years or more away. The industry must actively adopt proactive science and innovation strategies within the next decade; to both enhance the resilience of production systems, and provide practical technologies to mitigate carbon emissions from agricultural production systems.

#### IMPACT ON GLOBAL AGRI-FOOD #2

### The role of GMO solutions in systems grows as a response to climate challenges

The global perspective on the use of genetically modified organisms (GMOs) is evolving rapidly. Many countries and organisations that have historically been opposed (or highly sceptical) of the technology are now coming out in favour of their use; given the positive impacts they can have on yield, crop security and the environment. This is highlighted in the speed of adoption of the technologies around the world; the planted areas have increased from around 40 million hectares in 2000 to more than 175 million hectares today. The speed is likely to accelerate as more countries reform their regulatory system to enable adoption. The most significant step in this direction is the recent announcement that the European Union is proposing to decentralise much of the regulation of GM products to individual governments, enabling those countries that wish to pursue adoption to do so without being constrained by countries that still hold concerns about the technologies.

The global debate surrounding the uptake of GMOs is an ethical debate, as much as it is a scientific discussion.



Today it revolves around whether it is morally acceptable not to use a technology we know can make a significant contribution in alleviating the hunger and poverty the world is facing; given the scientific evidence to date indicates the risks to health and the environment are remote, but not completely eliminated. Like climate change, there is much discussion on the validity of the scientific claims made by both the organisations that develop the technologies and those that challenge their use. The American Medical Association, the World Health Organisation, the European Commission and the UK Royal Society have concluded there is no evidence that the technologies present any additional human health or environmental risks over other food products.

It is interesting to note that major philanthropic foundations are providing large-scale funding for research programmes focused on developing food solutions for use in emerging economies that incorporate

biotechnologies. A major example is the investment by the Bill and Melinda Gates Foundation in Golden Rice. This programme is developing a rice varietal that is high in Vitamin A, a deficiency of which can impact sight in children. The programme aims to provide a nutritional solution to this major public health issue; as well as enhancing the yield, quality, disease resistance and climate tolerance of the crop.

One of the primary concerns expressed about GMOs is that, to date, they have largely benefited the companies that have developed the technology rather than farmers, particularly in the developing world. Philanthropic investment in creating these developing technologies on a more open-access basis would address this concern; as the driver for the investment is to make a contribution to addressing poverty and improving environmental outcomes in some of the world's poorest regions.

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**IMPACT ON GLOBAL AGRI-FOOD #3**
**Expectation grows on producers to take steps to preserve and restore biodiversity**


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Previous *Agendas* have discussed the expectations global customers are placing on their suppliers to produce to globally consistent sustainability standards. We have discussed how these standards are often based more on the marketing messages that a company uses, and customer perceptions of sustainability; rather than a scientific analysis of what constitutes the most sustainable farming system for the environment where the products are produced. The focus on global consistency means that the outcomes may not be sustainable for a specific producer and can increase costs. It is accepted that meeting these standards provides nothing more than a ticket to supply a customer; often there is no premium offered to compensate for the costs of meeting these standards.

As the wider population becomes more concerned about the impacts of climate change, the standards imposed by global customers will become tougher in the years ahead. We also expect the way standards are developed to evolve, as the focus among consumers shifts from sustaining the environment towards restoring and regenerating it. Some global companies are already looking to partner with producers focused on preserving the biodiversity of their land. However, few are currently looking beyond this, to the initiatives the producer is taking to address the historical impacts agriculture has had on the land they farm.

While regenerative agriculture is on the agenda of the organic farming sector, it is not a high priority across the mainstream industry, which is more focused on supplying sufficient food to feed the rapidly growing population. Initiatives to raise the focus placed on preserving and strengthening the biodiversity of a farming system – and requiring producers to take practical steps to achieve this – is a first step on the road to developing restorative farming systems.

There can be no standard rules for biodiversity intervention, as each farming system is unique to its environment and ecosystem. It may require: changes in patterns of land utilisation; the introduction of bio-control agents rather than chemicals; reintroducing traditional crop varieties and animal genetics; re-establishing hedgerows, copses and riparian strips as reserves; reforestation; or providing native flora to support sustainable bee colonies. While these steps may have no immediate financial benefits to the producer, they will over time create a stronger environment better able to withstand the impacts of future climate volatility.



## IMPLICATIONS FOR NEW ZEALAND

Having been an enthusiastic leader in the field of climate change policy during the first decade of this century, the current Government has been more cautious in imposing direct carbon charges on New Zealand businesses. This is partly driven by the fact other governments are not willing to levy similar charges on their domestic industries.

- › Our Roundtable conversations have thrown up a wide range of views on climate change among primary sector leaders, just as there is throughout the wider population. While many remain unconvinced that the impact will match that forecast by the IPCC, most accept it is an issue of concern for the wider population. As the largest contributor to New Zealand's greenhouse gas footprint, the industry has a resulting obligation to take their concerns seriously. Addressing the challenges of agricultural greenhouse gases requires effective global coalitions. It is critical the wider industry, not just the government, is supportive of these initiatives. The industry is expected to become more sustainable, and future policy settings will reflect this expectation.
- › Producers must continuously review the systems they use, and the products they grow, to ensure they represent the optimal mix for the environmental conditions at any point in time. If the climate evolves (becoming hotter, drier, windier or wetter), it is critical the industry also evolves to match the climate and optimise returns. Furthermore, the knowledge gained via this process should be retained, as it could be valuable to producers elsewhere who may experience similar conditions. The industry should remain alert to opportunities to monetise its experience.
- › As discussed in previous *Agendas*, New Zealand needs to hold a mature conversation around the use of GMOs in our agricultural systems. Each year, the country invests large amounts in research – yet the technologies being developed are not permitted to be used within our production systems. We fail to realise any benefit from our investment in innovation, or from having a 'GE Free' production system. The rest of the world is moving forward using GMO technologies, and we urgently need clarity around our strategy for these technologies.
- › Global customers require producers to meet environmental standards that are increasingly comprehensive and prescriptive. This makes it difficult for a small country to stand out from the crowd. Given that we can't feed the world (and in many cases we can't supply all year round), simply meeting the standards does not make us critical to a customer supply chain. Our producers need to set standards above and beyond those required to remain relevant; we must differentiate to stand out in a world of standardised supply requirements.

## THE COMPANY AGENDA

- 1 Analyse the environmental standards your organisation is required to meet. Is there capacity to push your standards to exceed those imposed by customers? Have you set goals for reducing your carbon footprint in the future? Has your industry sector set goals?
- 2 Analyse the investment your company is making to minimise your industry's carbon footprint. Are you taking an active part in industry coalitions? Have you modelled the impact of potential climate changes on your business and industry, or started to think about your Plan B?
- 3 Engage in fact-based conversations on the role of GMOs in your industry sector. How can you contribute to a mature national conversation on this critical issue?



# FACING RESOURCE SCARCITY



Photo: Wessel du Plooy / Shutterstock.com



**The increasing population, and the growing wealth of many, is fuelling a huge growth in demand for a wide range of consumer products.** All of these goods utilise natural resources to some extent in their production. This wave of demand is increasing the stress on already-limited resource reserves, and is consequently driving up long-term prices. The increasing cost of key inputs is placing greater focus on how resources are consumed in a production process, as well as highlighting the high levels of wastage inherent in developed economies. Sustainable resource management will become an increasing focus of government policy, as they seek to influence how the market allocates resources in order to preserve access for the wider population.



**Sustained periods of price decline for agricultural commodities have been identified during the 20<sup>th</sup> century.**

#### **NON-TROPICAL AGRICULTURE:**

The downward super-cycle was estimated to have run from 1932 to 1994 and saw a cumulative reduction in prices of 46.9%

#### **TROPICAL AGRICULTURE:**

The downward super-cycle lasted from 1888 to 2002, with a cumulative reduction in prices of 67.2%

**In both cases a 1% reduction per annum.**

Source: International Monetary Fund; *Super-cycles of commodity prices since the mid-Nineteenth Century* by Jose Antonio Ocampo of Columbia University; Presented on 20 March 2013.

#### **MACRO THEME #1**

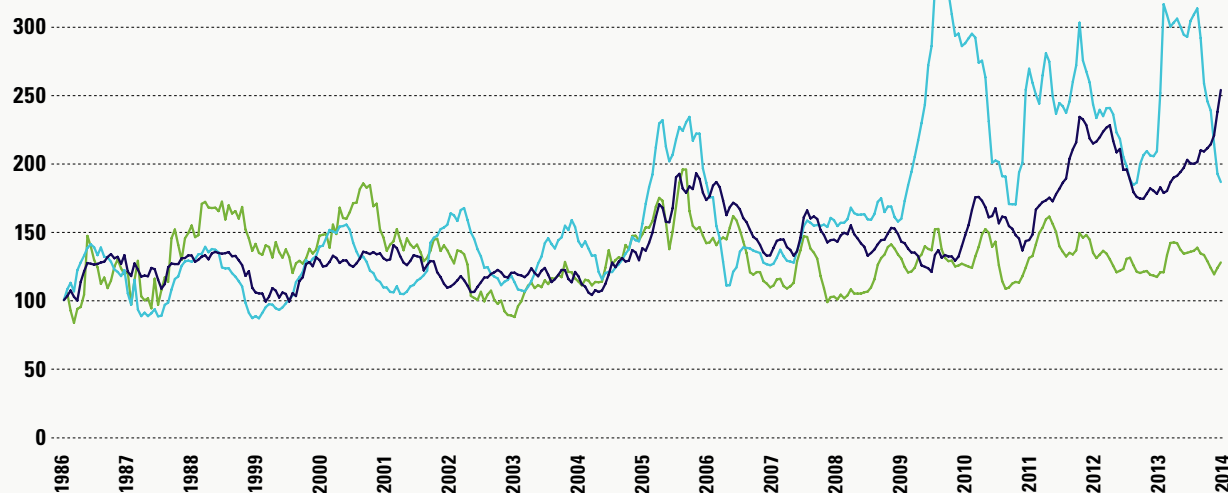
**Commodity price cycles are shorter and sharper, focusing attention on resource use**

Research has been conducted over the years in an attempt to interpret the movements and trends in commodity price cycles. A key conclusion from much of this work is that short-term fluctuations in commodity prices tend to fluctuate around longer term super-cycles which can last at least 30 to 40 years; with the short-term fluctuations varying from the trend by between 20 and 40% depending on the nature of the commodity. While there have been short-term supply/demand mismatches that have caused spikes, the overall story for food commodity prices over the last century has been downwards. This has been driven predominately by significant productivity gains in agricultural systems that have enabled supply growth to exceed demand growth.<sup>58</sup>

The analysis indicates that economic growth is the key predictor of future commodity prices. It suggests that all the current super-cycles analysed (tropical and non-tropical agriculture, crude oil and metals) are currently in an upward trend, reflecting the impact that demand from the emerging economies for resources has had on global commodity markets. With population growth forecast to at least 2050, and the wealth and purchasing power of many consumers expected to increase significantly, it is reasonable to conclude we are currently in a long-term cycle where demand growth is likely to exceed supply capabilities; maintaining the current upward trend in the super-cycle for the foreseeable future. Resource depletion will potentially become an increasing factor on long-term commodity trends, further sustaining long-term upward price paths.

That said, the fluctuation in price between the top of a peak and the bottom of trough could be as high as 80% of the peak price, depending on the commodity product. We also expect to see greater volatility in price movements as instant availability of information makes markets more reactive to positive and negative news. The challenge for resource-dependant economies is to develop resilience during the peaks and to manage the challenges during periods of contraction. For resource users, the long-term upward trend and the volatility of short-term fluctuations will increasingly focus attention on how resources are managed and utilised in their products. They will need to address the material risks to long-term profitability that high dependency on resources presents to any business.

## ANZ HISTORICAL COMMODITY PRICES INDICES



 DAIRY
  MEAT, SKINS & WOOL
  FORESTRY PRODUCTS

Source: ANZ Commodity Price Index and Component Indices [www.anz.co.nz](http://www.anz.co.nz) (Note in NZ Dollar terms)

### MACROTHEME #2

#### Renewable resources (such as water and food) become as important as hard commodities

Historically, the focus on commodities has centred on hard commodities: crude oil and petrochemical products, precious metals and inputs to these products. These were the products that market makers could buy derivative contracts for to facilitate trading, and they were bell weather indicators of the economic conditions of the developed Western economies.

Trading of selected agricultural commodities was possible via public markets; however this tended to be done on specialist markets such as the corn market on the Chicago Board of Trade. For many agricultural products, there is still no publicly traded market.

This means prices are set by sales between buyers and sellers, and there is little visibility of the prices at which trades take place. However, the growing interest in agri-food as an asset investment class is increasing the focus on the demand and supply positions for food products, and how these trends are impacting market prices.

In addition to the focus on food, the constrained water position in many economies is highlighting water as a key resource required to support the long-term development of an economy. We suggest it is only a matter of time before water trading moves beyond exports of premium bottled mineral waters and becomes a significant globally traded product.

The challenge with water trading is resistance from many sections of the population who consider water to be a free resource. Yet the amount of

fresh water that is actually available to drink is very small (only 2.5% of the total water on the planet is fresh water, with almost 70% of this resource being locked up in glaciers and permafrost<sup>59</sup>). To date, water trading has been localised (often limited to trading of water access rights); but with extreme water stress being experienced in many countries, we can envisage large-scale international trading and delivery of water (via pipe or tanker) becoming a reality with the next two decades. This would have all the associated financial market infrastructure of a critical global commodity.

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**MACRO THEME #3****Governments focused on solutions to manage the use of resources**

As already noted, meeting the needs of a growing and more affluent population will place significant stress on the supply of a wide variety of resources. This not only impacts commercial organisations meeting this consumer demand, but has a material impact on the ability of governments to deliver on core policies. If a government fails in meeting core policy obligations, such as managing the accessibility and cost of food, these can create situations of social unrest and have potentially significant consequences for the government and the wider community.

As a consequence, we expect to see governments adopting strategies that are designed to provide them with greater insights into both the demand and supply positions of critical resource categories (including food, water and energy); so that they can develop policy platforms to both promote and encourage supply-side security and manage growth in demand. On the supply side, this may include governments looking at constraints on extraction, production and distribution within its own national boundaries. It could also entail working with international partners to establish protocols for the sharing of resources in times of resource stress, well in advance of events occurring.

However, if a country does not naturally have the resources it requires (or it is unable to extract these economically) the policy responses are more likely to be focused on demand side issues. Here, governments have a number of policy options open to them in attempting to reduce demand and alleviate inefficiencies in the current consumption of resources. We expect to see government investment to support

R&D efforts that address the key resource constraints a country is facing. If science can be used to reduce energy consumption, develop alternatives to petrochemical-based plastics, or innovate building technologies that use less steel and concrete; then the government is taking practical steps to reduce its own resource use and support others in the economy to do the same (as well as creating potential export opportunities). We also expect to see governments developing major initiatives around waste minimisation to ensure the resources that are available are used effectively, with food products and packaging being a key focus of these initiatives.

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**IMPACT ON GLOBAL AGRI-FOOD #1****Natural capital charges change resource use patterns and production techniques**

The increasing concern over the long-term availability of key natural resources is increasing the focus for many governments on policy tools to ration their use. A possible policy response is to impose a charge on resource use – or a natural capital charge – in the form of a license fee or levy. This would to serve to ration the use the resource, and support innovation into alternative solutions with the goal of preserving the resource for future generations.

The impact of these policy decisions would be highly material to the agri-food sector. Research by KPMG International shows that if the food and drink sector had to pay the full direct and indirect costs of the natural capital it consumes, the annual reported profit of the sector (US\$89 billion in 2010) would be wiped out; with a charge equivalent to 224% of the industry's profit (or US\$199 billion).<sup>60</sup>

It is unrealistic to conclude that the production of food would be taxed to such an extent that the industry ceases

to function. However, it is not unrealistic to expect more charges being imposed. The global industry uses more land and fresh water than any other sector of the economy; and therefore needs to take practical steps to mitigate its resource use to remain profitable and attract investment funds.

We can expect to see farming systems evolve to reduce their environmental footprint in multiple ways; such as lowering of carbon emissions, less water used, reduced consumption of finite resources (such as inorganic fertilisers), and less energy used in production. The global trend towards more intensive agriculture where animals are housed indoors to reduce environmental impacts and improve productivity will accelerate. We also expect to see more cropping broad acre utilising precision agricultural systems, to minimise the extensive footprint of this broad acre agriculture.

Increasing regulation and charges could also accelerate the focus on synthetic food innovation. For many investors considering the emerging synthetic food sector, the ability to eliminate the consumption of resources and environmental impacts of farm-based production through laboratory-grown food will be factored into their thinking.



New Zealand enjoys an annual renewable water supply of 75.6 million litres per capita.



#### IMPACT ON GLOBAL AGRI-FOOD #2

##### Water scarcity changes production methods and the products taken to market

With less than 2% of the global water resource being available for human consumption, and a rapidly growing population, many regions of the world are increasingly water stressed. The current annual renewable water supply varies dramatically by region, with many emerging regions facing significant water constraints. It is sobering to consider that around 15,400 litres of water is required to produce a kilogram of beef, 6,000 for a kilogram of pork and almost 10,000 litres for a kilogram of cotton.<sup>61</sup> We are consuming vast amounts of the available fresh water in producing food, even before we use any water directly for the basic fundamentals of life.

Water scarcity presents a significant risk to the economic growth and development of many countries. Whether it is an inability to access sufficient freshwater, reduced water quality, or charges imposed to ration water use – these all present challenges to the agri-food sector when guaranteeing the safety, quality and security of the food produced. Some forecasters suggest that water scarcity increases the potential for social unrest and conflict, given the importance of water to human life. There is no doubt that the increasing scarcity of water will materially change how the industry operates and the products that are brought to market.

We expect to see significant innovation in improving the efficiency of water use. The ultimate goal is to completely eliminate water wastage through closed-loop processes that utilise recycling and make full use of the resulting 'grey water'. The focus for efficient use of water will not only fall on regions with significant supply constraints. We expect global buyers will focus on water use as an important criteria for supplier selection, and failure to maintain a world-class footprint will make it challenging to retain supply arrangements.

Water scarcity will change the products that are sold around the world. Historically, the valuable components of liquid products, such as milk, have been the nutrients within the raw product. However in a water-constrained world, people may not have access to fresh water to reconstitute a dried product. We expect to see a greater focus on developing both fresh and shelf-stable products that retain their liquid, while remaining easy to transport globally.

**At least one-third of food produced for human consumption is lost or wasted globally, which amounts to about 1.3 billion tonnes per year.**

**25%**

of food losses happen during the pre-harvest phase in developing countries.

**10%**

of the total US energy budget is spent getting food from farm to fork.

**10%**

of all grain products, 5% of all fish products and 4% of all meat products are lost at the processing and packaging stage.

**40%**

of food losses in developing countries are a result of inadequate storage.

**40%**

of wastage in industrialised countries occur at the retail and consumer level.

### IMPACT ON GLOBAL AGRI-FOOD #3

**Focus on pre and post-consumer wastage increases in response to resource scarcity**

Nobody really knows precisely how much food is wasted throughout the supply chain, particularly in the developed world. Estimates suggest that of the 195 billion kilograms of human-grade food available in the United States in 2010, around 61 billion kilograms or 31% was never consumed by a human being. Looking through another lens; the average family buys, but then does not eat, enough to feed at least one extra mouth. From yet another angle; 3.5 billion acres of land is used globally to produce food that nobody will eat.<sup>62</sup>

Addressing the issue of loss and waste provides an immediate and environmentally beneficial solution to feeding the world. It must be a central focus of all organisations operating in the agri-food industry. Food is lost or wasted at every point along the supply chain; from the farm management and harvesting practices adopted, through post-harvest handling and processing, the logistics and distribution supply chain, retail displays, domestic preparation and ultimate consumption. While zero loss will never be a realistic target, there are significant opportunities for step changes to be made throughout the chain from pasture to plate.

We expect this will become a priority for governments around the world, particularly those facing significant issues with the security of their food supply. In developing countries, it will require major infrastructure investment; such as major upgrades to the logistics and cool supply chain to reduce losses through mould, infestation, transport damage and souring. There are also far more micro solutions; such as providing better handling and storage equipment for individual farmers, or embedding processing facilities into regional areas.

In the developed world, the issues generally arise between the retailer and the consumer. There is huge wastage caused by oversized servings in restaurants, unnecessarily short use-by dates, and products being grown that do not meet the aesthetic expectations of customers. These are all solvable issues, but they require both retailers and consumers to commit to making a cultural change in how society values food. We believe if the wider community understood more fully the impact of wastage on our food system, it would not be too difficult for most people to commit to changing how they use and waste food.




## IMPLICATIONS FOR NEW ZEALAND

New Zealand has a world-class portfolio of natural resources that support a globally competitive agricultural sector. As discussed in previous *Agendas*, the country's agricultural assets are strategically important to its economic future; and utilising them in a sustainable manner is the responsibility of every operator in the primary sector.

- › The rapid fall in the dairy price over the last six months has starkly highlighted the inherent volatility that remains in today's agricultural commodity markets. As always, businesses must ensure they have capacity within their operating models to cope with rapid and unexpected declines in revenue. This must include the ability to quickly reduce discretionary expenditure, and adapt daily practices to fit within new financial realities.
- › It is only a matter of time before charging regimes are enforced on the natural capital our primary sector consumes to compensate the community for use of natural resources. While it is not clear what these regimes may look like, the industry should be taking preventative steps now to reduce its impact on the natural environment. Other industry organisations are setting themselves a goal of having zero impact on their environment and communities. This could be a valid long-term aspiration for New Zealand's primary sector: to become the world's first zero impact agricultural nation.
- › We have previously discussed the need to ensure that our world-class water resource is utilised as an economic resource, particularly given the increased incidence of drought recently. New Zealand has one of the largest fresh water resources in the world, while water is a scarce resource in many countries. To leverage this competitive advantage, we should take a lead in adopting technologies that enable highly efficient water use within our production systems.
- › The lack of water available in many countries should encourage New Zealand companies to review the products they supply consumer markets in the long-term. The demand for dried products, particularly milk powders, depends on the consumer's access to water to rehydrate the product. As fresh water resources decline, we should be exploring innovative product solutions that enable companies to export liquids in a cost effective manner. This will minimise the risk of our dried product consumer markets being disrupted in the future and create new revenue opportunities.
- › New Zealand has similar food waste issues to many countries in the developed world. It is only fitting for the industry to take a lead in promoting initiatives throughout the supply chain, to achieve a meaningful reduction in pre and post-consumer waste. This may include educational initiatives on shopping for a healthy diet, or encouraging restaurants to right-size the meals they serve.

## THE COMPANY AGENDA

- 1 Ensure that your business has built adequate capacity into its operating model to cope with rapid declines in commodity prices. Do you have the financial capacity and flexibility to adjust operating costs? Is your management and Board equipped to manage a material reduction in company revenue?
- 2 Consider how your product portfolio is aligned to the future availability of water. How would water scarcity affect the current and future markets for your products? Are there other resource constraints that should be built into your product innovation plans?
- 3 Quantify the current waste footprint of your business. What is your strategy to reduce waste within your business? Are there opportunities to partner with customers and consumers to reduce their food waste footprints?



FAIR

# EMERGING SOCIAL ENTERPRISE



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**Social entrepreneurs are people with a desire to make a positive difference to society using their commercial acumen and a profit motive to drive this change, rather than relying on government regulations and welfare.**

Social enterprises can take many forms – from well-known programmes like Fairtrade, through social housing schemes, commercial operations of charities, sustainable investment funds, and the provision of micro finance to support development of owner-operated businesses in emerging markets. The DNA common to these organisations is a desire to change a social failing that the majority continue to overlook. Many of these businesses are small and flexible, recognising that a solution to a deep-seated problem will often require disruption of well-established market practices. They are prepared to do things differently to get a different result.

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**Social entrepreneurs play the role of change agents by:**

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Adopting a mission to create and sustain **social value** (not just private value).

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Recognizing and relentlessly pursuing **new opportunities** to serve that mission.

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Engaging in a process of **continuous innovation**, adaptation, and learning.

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**Acting boldly** without being limited by resources currently on hand.

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Exhibiting a heightened **sense of accountability** to the constituencies served and for the outcomes created.

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**MACRO THEME #1**

**Social entrepreneurs create smart businesses focused on delivering social value**

While creating a social enterprise is very much the same as creating a traditional business enterprise, the core motivation for the business comes from a different place – a passion to solve a social problem rather than to make a profit. The focus is not just on financial sustainability but also the positive impacts that the business creates for the environment or the community. The use of a business structure is purely a mechanism to solve the focal issue, and as a result the businesses may function differently, particularly in the way that success is measured.

The diverse objectives of social enterprises mean the operating models adopted can differ significantly. It could be business operated to generate commercial profits which then subsidise the product for an underserved community. It might be a 'workshop-style business' that provides transferable skills training and a living wage to those participating by selling the output produced from the workshop. Or it may be a co-operative which operates a business that benefits the members by providing products or services at preferential rates. Social entrepreneurs will approach social issues using innovative business models, often by necessity, as they are often under-resourced and lack the capital to develop the physical infrastructure that other start-ups can access through external investors and banks.<sup>63</sup>

Social enterprises are often disruptive, smart businesses. A good example is social crowdfunding operators that have created platforms to link social entrepreneurs with funders who are prepared to accept a promise of a future return. Other examples of transformational social enterprises being developed around the world include: creating micro power solutions for use in the developing world; selling beauty products to support social missions; educational travel companies that provide intercultural learning experiences in return for a contribution to a community project; or producing socially conscious consumer electronics that are built from conflict-free materials by workers earning a living wage.

We also expect more social enterprises to be created as 'zero impact' businesses; organisations that are not only focused on achieving a social outcome, but doing so with zero impact on the environment and the wider society.

## Social investment budgets by sector.

Average percentage of pre-tax profit spent on social programmes:

### PHARMACEUTICALS

11.87%



### UTILITIES

4.6%



### TRANSPORT

1.89%



### FINANCE & INSURANCE

1.03%



### FOOD & BEVERAGE

1.02%



Base: 65 companies that report value of social investment and pre-tax profit, income or earnings

## MACRO THEME #2

### Vehicles developed to disrupt markets were profitability, risk and contribution unaligned

Social enterprises are likely to focus their efforts towards industry sectors that currently have the ability to generate sizeable profits; as it is in these sectors that comfortable margins are maintained, through entry barriers and market structures that reduce the incentive for competition or major innovation. Companies that are not perceived as not making a sufficient contribution to the communities that they operate in, or doing enough to respect the environment, will also be focus for social enterprise disruption.

KPMG International has done a review of the social contributions disclosed by 65 global companies from a range of sectors. It was noted that the pharmaceuticals sector made the largest contribution of pre-tax profits, reflecting the medicine donations that they made in developing countries. However many sectors were investing less than 1% of pre-tax profits back into their communities (including the chemicals, telecommunications, technology, automotive and oil and gas sectors). It is these profitable businesses that are at most risk for disruption from social enterprise, particularly those where the barriers to entry can be lowered through the use of outsourcing and co-operative business models.

As we have noted earlier, more businesses are embedding sustainable business practices into their organisational DNA. A key focus for many of these organisations is increasing the impact of their social engagement programmes. As we discussed in the 2013 *Agenda on Sustainability*, a Corporate Social Responsibility (CSR) programme that sponsors sports teams and community events that have direct business benefit to the organisation is no longer viewed as having sufficient societal engagement. It is self-interested marketing rather than a substantive commitment. Companies that want to minimise their risk of disruption need to define how they can make a transformational contribution to the daily lives of the communities that they work within. This will increasingly involve partnering with social entrepreneurs.



Of the hungry people living in the developing world, around 75% live in rural villages and around half of those people are smallholder farmers.

Photo: Adam Herlihy Photography

#### IMPACT ON GLOBAL AGRI-FOOD #1

### Broad coalitions develop to address 'market-failures' inherent in global food system

It is the innovative, disruptive business thinkers of this world who will bring solutions to the table to address the failures of the global food sector. They will no longer be prepared to accept that 805 million people in the world have insufficient food to lead a healthy, active life; and that nearly 9,000 children continue to die every day as a result of malnutrition.<sup>64</sup> Of the hungry people living in the developing world, around 75% live in rural villages and around half of those people are smallholder farmers.








From our Roundtable discussions with leaders across the New Zealand industry, the fact that the food system fails around one in nine people globally has never sat comfortably. Many believe that every company in the sector has to make a practical contribution to address the issue. For many organisations, this is not a matter of producing more food and supplying it to developing markets, but joining coalitions that have a cohesive plan to make a transformative difference to the world's food deficit.

There are numerous reasons for the failure of the global food system. There is a lack of investment capital to develop agricultural capabilities. Well-meaning aid programmes often provide hand-outs rather than long-term solutions. The cycle of poverty remains unbroken when malnutrition or lack of education defeats a person's productivity.

To help communities develop themselves out of hunger, we need innovators who are prepared to look at the problem through a different lens, and bring together coalitions of organisations who would never have contemplated working together in the past.

We expect to see social enterprise models being applied to transfer technology, develop scaled financing platforms, increase access to relevant education, and support the growth and development of markets. To stem the continuing death rate, social enterprises approach aid differently. In particular, they may work with existing food businesses to address waste and use some or all of the savings to transfer excess food (in a practical or notional manner) to the communities in most need.



FAIRTRADE SALES VOLUME REPORTED BY PRODUCT (VOLUMES IN METRIC TONNES)			
	2009-10	2010-11	2011-12
 Banana	347,000	321,300	342,300
 Cane Sugar	111,600	138,300	170,000
 Coffee	103,200	123,200	134,100
 Cocoa	37,400	40,000	68,300
 Flowers & Plants	384	400	554
 Seed Cotton	38,400	20,800	6,400
 Tea	10,900	12,700	13,800

Source: Fairtrade International; *Monitoring and evaluation report 2013*; 18 June

## IMPACT ON GLOBAL AGRI-FOOD #2

### Fairtrade systems scale global best practice to empower communities

The Fairtrade movement is a powerful example of how a socially-focused enterprise can deliver direct assistance to farmers and communities, and enable them to take practical steps to develop themselves out of poverty. Fairtrade International has successfully built partnerships between producers, traders, processing businesses and consumers. The global movement works across 25 countries to ensure that a fair share of the revenue generated from the sale of a final consumer product is passed back through the supply chain to

the communities that produce the base commodity products. This is used to provide a living wage, improved working standards, and a premium to invest in their communities and businesses.<sup>65</sup>

One of the strengths of the Fairtrade scheme and other similar programmes is the use of a certification mark on the packaging and in the marketing collateral of consumer products. This has captured the imagination of premium consumers in many developed countries. By buying and using the product, it tells a story about their world view and commitment to the wider community.

The analysis above indicates that the fairtrade sector has been successful in scaling operations to support developing communities. Fairtrade systems have become part of the mainstream

consumer economy, with major food producers and retailers increasingly linking key brands to the values inherent within the schemes. On the flip side, this places huge demands on schemes to meet the supply needs of these major global corporations. It also makes it critical to ensure individual projects deliver their expected transformational benefits to their host community. The failure of even a small number of programmes could seriously damage the credibility of the Fairtrade mark, and its attraction to premium consumers.

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**IMPACT ON GLOBAL AGRI-FOOD #3**
**Organic and natural foods segments develop in response to community demand**


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There are many producer co-operatives and not-for-profit organisations that focus on producing sustainable, often organic food, which is sold through community channels. Many of these businesses and organisations have been developed on social enterprise principles, with a particular focus on providing better quality, natural food to communities that often rely on cheap, high-calorie/low-nutrition food solutions.

The challenges of supporting these communities to improve their nutrition are significant, particularly given the changes that are occurring in food intervention programmes across the developed world (as discussed earlier in this *Agenda*). By way of example, 17.6 million households in the US do not have adequate resources to meet their basic nutritional requirements, and 48 million Americans rely on a nutritional assistance programme that provides them with an average benefit of US\$1.50 a meal.<sup>66</sup> Many people who are struggling to feed their families are turning to community organisations for food parcels or utilising soup kitchens to secure a square meal.

More affluent consumers will continue to buy natural and organic products to give them greater certainty about the integrity of the products they are feeding their families (although it is likely these products will remain part of discretionary spending, and will be dropped if and when economic conditions tighten). Yet we believe that the more stable growth in demand for these products will be created from programmes focused on providing food support to the growing hungry underclass in the developed world.

Many of the urban farming programmes that we discussed previously are adopting social enterprise models to address the need for real food in deprived communities. For many of these businesses, the products being sold through commercial supply chains at full commercial value will continue to be used to subsidise activities that supply community food programmes, or provide nutritional education. The aim is to help people understand how they can eat a more healthy diet without incurring significant additional expense.



## IMPLICATIONS FOR NEW ZEALAND

New Zealand's primary sector has a strong history of utilising co-operative business structures. The farming co-operative is one of the original social enterprises, created for the mutual benefit for all participants.

› While the co-operative ethos remains strong across the primary sector in New Zealand, the increasing demand for growth capital is raising questions about the future role of co-operatives in the industry. We have already seen a number of co-operatives adopt hybrid models to bring in investment capital unconnected to supply; albeit these models have an inherent tension. There are also questions about how far a co-operative business should diversify from its original purpose. There is debate over whether the value proposition for a new business area will provide a better return to shareholders than investing the funds through traditional investment structures, particularly if there is no direct business value to the shareholders. There are undoubtedly significant benefits to the co-operative model; the most important being the direct connection of the business and shareholders to a common set of goals and objectives. However it is hard to tell what the ultimate model will look like for a 21<sup>st</sup> century co-operative in New Zealand's primary sector.

› Despite New Zealand's relatively tiny contribution to feeding the world, our primary sector companies still have a role to play in addressing global issues of malnutrition. Initiatives such as the Zero Hunger Challenge (which is profiled inside the front cover of this *Agenda*) creates opportunities for them to join coalitions that are taking practical steps to address world hunger. The expertise and skills of primary sector professionals would be welcomed by many non-governmental organisations and social enterprises, as they strive to implement transformational programmes for communities throughout the emerging world.

## THE COMPANY AGENDA

- 1 Review your Corporate and Social Responsibility (CSR) strategies through the lens of world poverty and hunger. What initiatives could you put in place, particularly in communities you currently supply product to?
- 2 Offer expertise from within your organisation. Are there people within your organisation who would be willing to take part in secondments and internships with NGOs and other organisations working in this field?

**AGRIBUSINESS  
ACCOUNTS FOR  
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FOCUSED ON ADDING  
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TRUE POTENTIAL  
OF WHAT IS NEW  
ZEALAND'S MOST  
IMPORTANT  
STRATEGIC ASSET.**

**Ian Proudfoot**

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# HELPING THE SECTOR PROSPER

**New Zealand can and should be achieving more with the talent, knowledge, natural resources and market reputation the generations before us have built.**

We love agribusiness, and take great pride in how our roles as independent advisors, thought leaders, strategists and, in some cases, farm owners helps fuel prosperity for our great country.



## FUELLING PROSPERITY

Fostering pathways to prosperity for our clients, communities and the country is something KPMG is deeply committed to. Our team of specialist agribusiness advisors are passionate about the sector. The contribution we make with the professional advice we give and the success we create for our wide range of agribusiness clients is what drives us to do what we do.

We would like to thank our many clients for the opportunities they give us to help them overcome their challenges and contribute to their successes at home and around the world. Being proudly New Zealand owned, the investment KPMG makes in producing thought leadership for the industry, and our sponsorship initiatives across the agribusiness and food sectors, is our way of saying thank you to our clients for their business. We really appreciate it.

KPMG's agribusiness team can help you improve the efficiency and profitability of your business through our wide range of advisory services. Our national and international, cross functional agribusiness professionals focus solely on understanding the issues faced by agribusiness companies and developing tailored solutions to meet these challenges.

### KPMG Farm Enterprise

We continue to grow our capability in assisting New Zealand's most productive sector to grow its prosperity. Roger Wilson has recently joined the Hamilton team as a Partner focusing in agribusiness and brings a wealth of experience. Brent Love and Julia Jones, our Farm Enterprise Specialists, are passionate about

working with ambitious businesses to enable them to prosper. They do this by bringing the full extent of KPMG's resources, together with their own extensive experience, inside the farm gate.

Ian Proudfoot is an active speaker on agribusiness concerns across the country and internationally and is involved in various initiatives which support the growth in the prosperity of the primary sector.

KPMG is proud to partner with the New Zealand Primary Sector Bootcamp and support the Stanford University programme that this year provided over 40 industry leaders with the opportunity to explore how New Zealand companies can create value in our fast changing world and make New Zealand a great country for generations to come.

KPMG is actively involved in the agri sector; hosting regular Agribusiness Leaders breakfasts at both the Canterbury A&P Show and the National Fielddays at Mystery Creek, proudly sponsoring the New Zealand Food Awards and supporting organisations including the Agri Women's Development Trust and Young Farmers Clubs to meet and build industry leaders of the future. In addition our KPMG Agribusiness Agenda and Field Notes publications provide open access to insight and knowledge to all those working in the industry.

KPMG brings together over 800 staff across six offices to serve clients throughout New Zealand. So whether we are talking to you about farm ownership, your future business goals, or the tax valuation of your herd, we know the right questions to ask. It also means we are smarter about finding the best solutions for you.

### KPMG can help you with:

- » Availability and structure of equity and debt
- » Acquisition and transaction support to encourage growth in local and overseas markets
- » Mentoring and support for growing your business
- » Negotiating financing arrangements
- » Volatility in earnings due to exchange rates and commodity prices
- » Addressing customs and quota issues and maximising the benefit of FTAs
- » Issues arising from environmental regulations, carbon trading and food miles
- » Obtaining R&D funding to support innovation in genetics, seed technology and nutrition
- » Enhancing business performance by doing more for less
- » Financial reporting to support farming for profit
- » Valuation of brands on a local and international basis
- » Advice on control and governance structures for all sizes of business
- » Succession planning and future proofing your business strategy
- » Assisting businesses to successfully navigate China
- » Collecting, analysing and interpreting data

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