ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

The Importance of Natural Products to the New Zealand Economy and the Role of Research

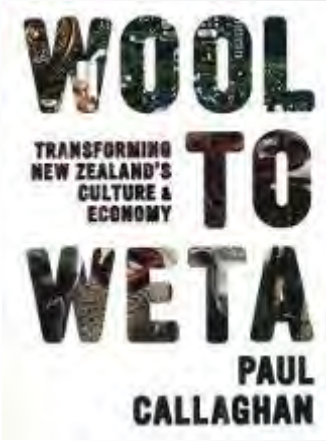
Dr Max Kennedy
National Manager - Biological Industries
Ministry of Science and Innovation
March 2012

MSI ref: 163596

What are we here for?

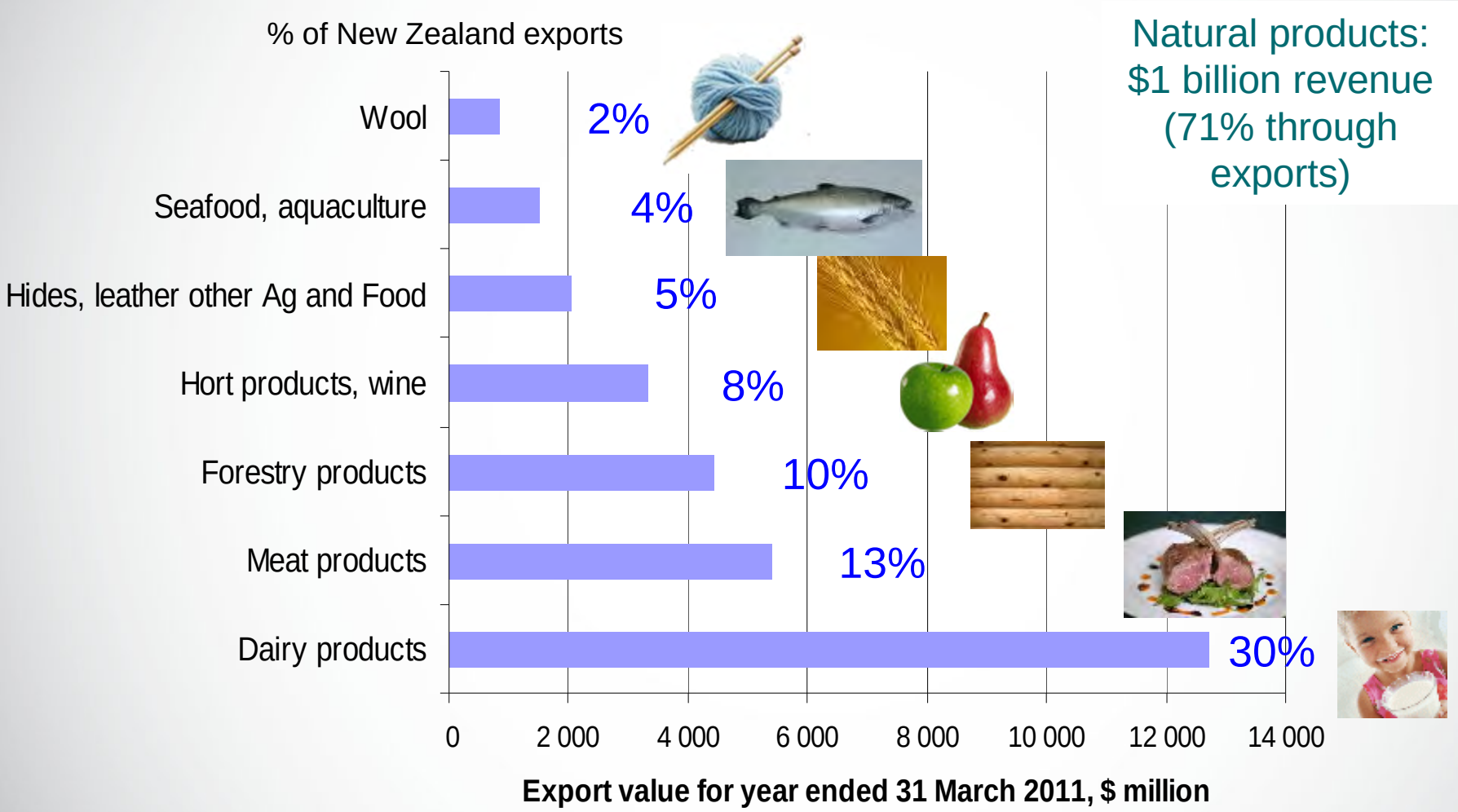
To increase prosperity, we need:

- **an extra $30 billion of export earnings per annum**
- **about 4x Fonterra or 60x F&P Healthcare**



How can research contribute?

The biological industries are our powerhouse



Natural products: $1 billion revenue (71% through exports)

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

Sources: Statistics New Zealand, AgResearch, MAF
% are of total merchandise exports.

The biological industries are our powerhouse

- Approximately 70% of all merchandise exports
- Traditionally based on whole and processed foods (ingredients)
- Aiming for diversification into higher-value food and non-food products for future markets
- Looking for international research collaboration to provide necessary research skills and innovation



New Zealand is a major trader in some sectors

	2009 world production (million tonnes)	New Zealand % of world production	2008 world trade (million tonnes)	New Zealand % of world trade
Sheep meat	8.2	8.8%	1.03	38.4%
Kiwifruit			1.2	32.0%
Game meat	1.8	1.5%	0.06	25.5%
Butter			1.40	21.5%
Milk powder			3.91	19.7%
Wool	2.0	8.8%	0.56	6.7%
Cheese			4.44	4.8%
Beef	62.8	1.0%	1.54	1.8%
Whole milk	583.4	2.6%		

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

Source: FAOSTAT

New Zealand has many advantages

- Geographical factors: sun, water, grass
- Diversity of abundant natural resources: forestry, farming, fishing and more
- Island nation: protection against plant and animal pests
- Over 150 years of experience: skilled growers and farmers
- Small nation: easier to focus on priorities and national brand (clean, green image)
- Free trade agreements
- Out of season: able to supply Northern Hemisphere customers
- Some hidden clusters, eg timber kilns
- Respected brand and regulatory environment for food safety

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

New Zealand has many advantages

Specifically for natural products:

- Unique flora and fauna: huge range of unique native plants and wide range of sea organisms
- Waste streams from food and beverage manufacturing
- Ability to offer differentiated products, eg manuka honey, horopito, green-lipped mussel extract
- Trusted image and favourable opinion of New Zealand with secure food source
- Proximity to high-demand Asian market
- Māori economy and knowledge

Can we achieve more of this?

Photo: Accenture advertisement

Target export growth by 2025 (selected sectors)

Industry	Export starting point ($billion/yr)	Industry target by 2025 ($billion/yr)
Dairy	10.1	14.0-17.0
Meat and co-products	8.0	14.0
Forestry	4.0	6.0
Horticulture and wine	4.2	10.0
Aquaculture	0.4	1.0
Total	**26.7**	**45-48.0**
Natural products	0.7	

$18-21 billion

70-80% increase

Source: industry publications

Starting point years: 2009, 2011, 2010, 2010, 2011

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

What are our mechanisms to generate extra exports?

On-farm/orchard/forest

1. productivity improvements, eg genetics, farm management
2. better distribution of water – spatially and temporally
3. ecologically sustainable intensification
4. whole of ecosystem optimization

Off-farm/orchard/forest

1. more value from co-products
2. more value-added processing
3. new products with higher value

Of most relevance to the natural product sector

Market

1. value capture mechanisms, eg branding
2. value chain coordination and waste reduction
3. improved market access (food safety etc)

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

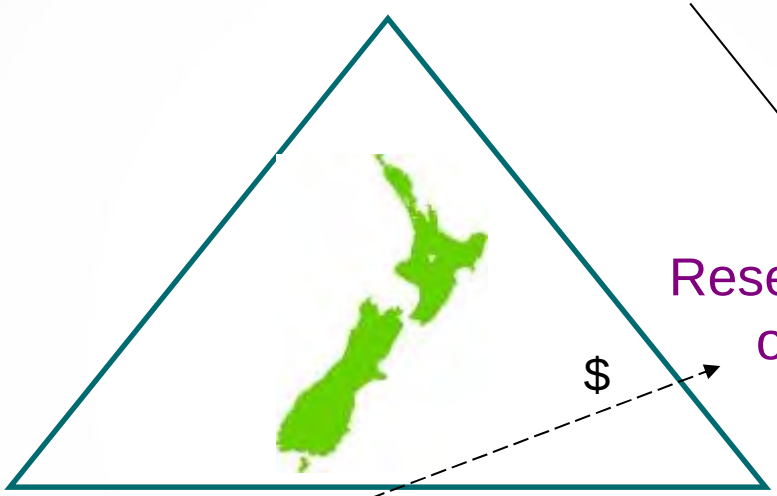
What are our mechanisms to generate extra exports?

- A strong advanced manufacturing industry that supports the pastoral sector
  - a double win: more manufacturing **and** increased on-farm productivity
- Beta testing in New Zealand
- Import more technology
  - <1% of world R&D is done in New Zealand
  - >98% of the innovation comes from overseas
- Foreign knowledge vital in a small, open economy – needs to be customised to New Zealand circumstances

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

Key players

1. Industry and resource owners
(including Māori)



Research partnerships and other collaborations

3. Government
(policy-makers, regulators, investors, facilitators)

2. Researchers (CRIs, TEIs, others)

Photo: University of Auckland

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

What is industry doing? (selected sectors)

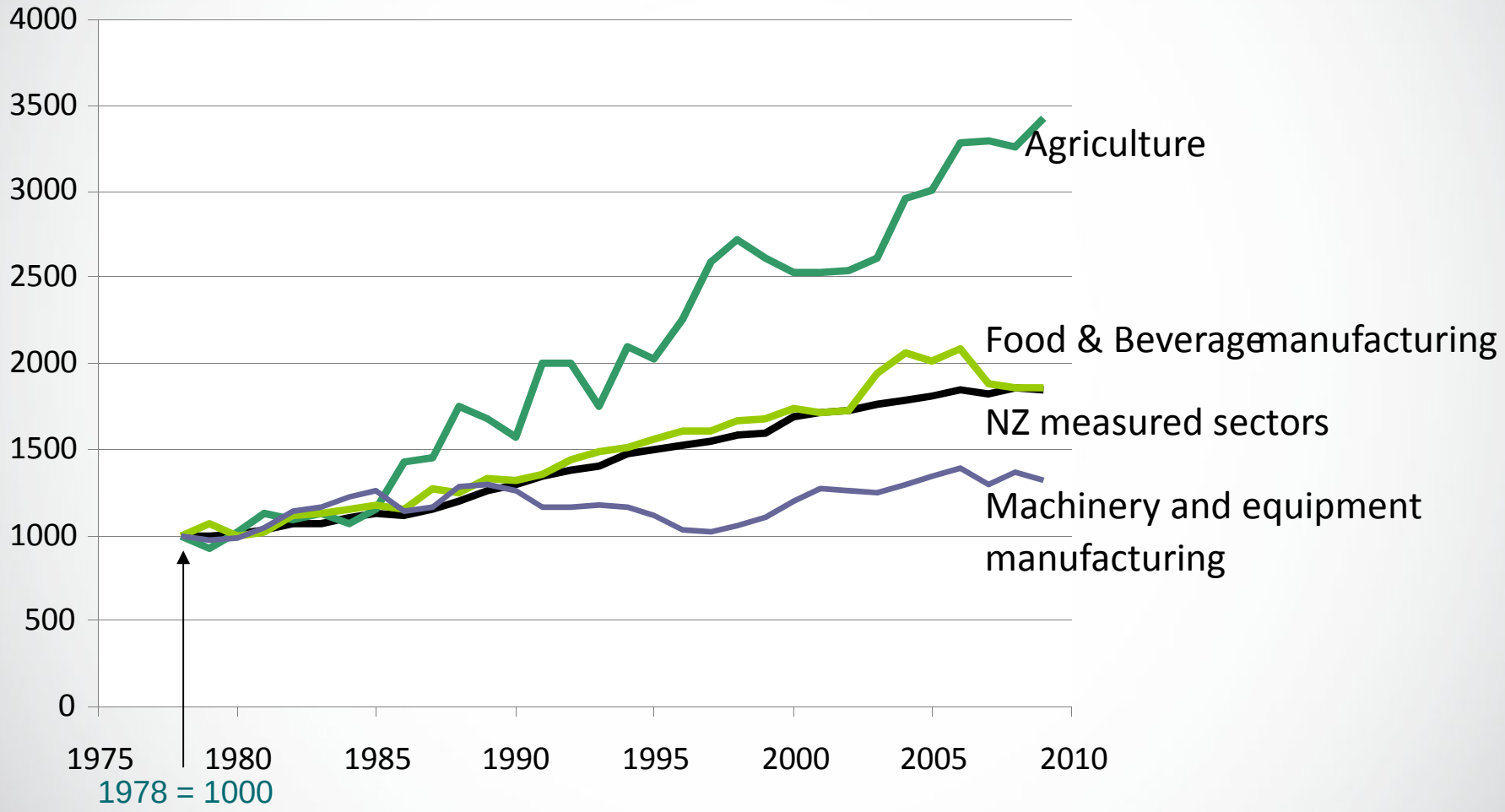
Sector	Main relevant focus areas
Meat	• Coordinated in-market behaviour (strong brand position, scale) • Efficient and aligned procurement • Sector best practice (improving productivity)
Horticulture, vegetable, arable	• Build competitiveness through control of plant variety rights • More focused approach to markets, integrated branding • Novelty value, functional health benefits • Set the standard for sustainably produced products
Aquaculture	• Improved harvesting, processing, handling, presentation • Novel product forms and culture techniques • Species diversification, selective breeding • High-value shellfish and other invertebrates

What is industry doing? (selected sectors)

Sector	Main relevant focus areas
Deer (venison)	• Premium positioning through differentiation • Long-term product and market development • Increased farm profitability
Wine	• Disease management • Consistent grape supply • Efficient and sustainable production systems • Designer vines (high-quality, ultra-premium wines) • Fruit and wine qualities
Dairy	• Increased farm profitability • Internationally competitive milk supply – returns maximised
Natural products	• Increased New Zealand competitive advantage • Increased profile of New Zealand as a source of high-quality natural products

Selected industry strategies

Multi-factor productivity index by sector



ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

Source: Statistics New Zealand, AgResearch

What is the research community doing?

Examples:

- deer antler velvet
- nutraceuticals
- bioactive-based products
- functional foods and ingredients
- health supplements
- bioplastics
- food safety
- nutrition and human health
- food science
- biotechnology

ministry of
science + innovation
TE PŪNAHA HIRINGA WHAKAEA

What is government doing?

Government's Economic Growth Agenda

- Tax system geared for growth
- Better public services
- Better regulation
- Investment in infrastructure
- Improved education and skills
- Science, innovation and trade

Source: MED

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

Government science and innovation initiatives

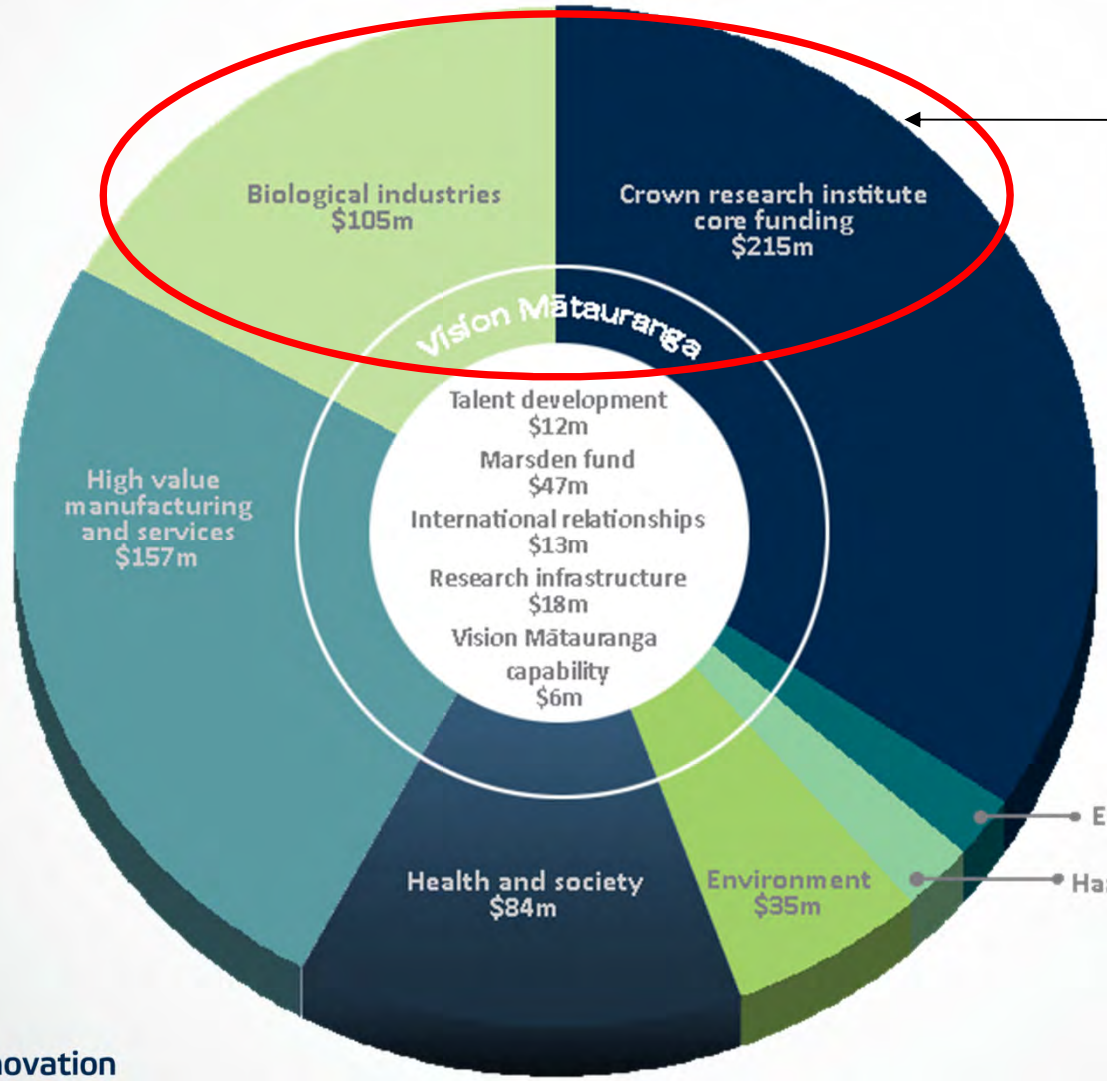
Science sector reforms

- Organisational changes
- Appointment of Science and Innovation Boards
- Appointment of Prime Minister's Chief Science Advisor
- Increase in business assistance initiatives, including partnerships
- Core funding for CRIs
- Vote restructure

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

MSI funding

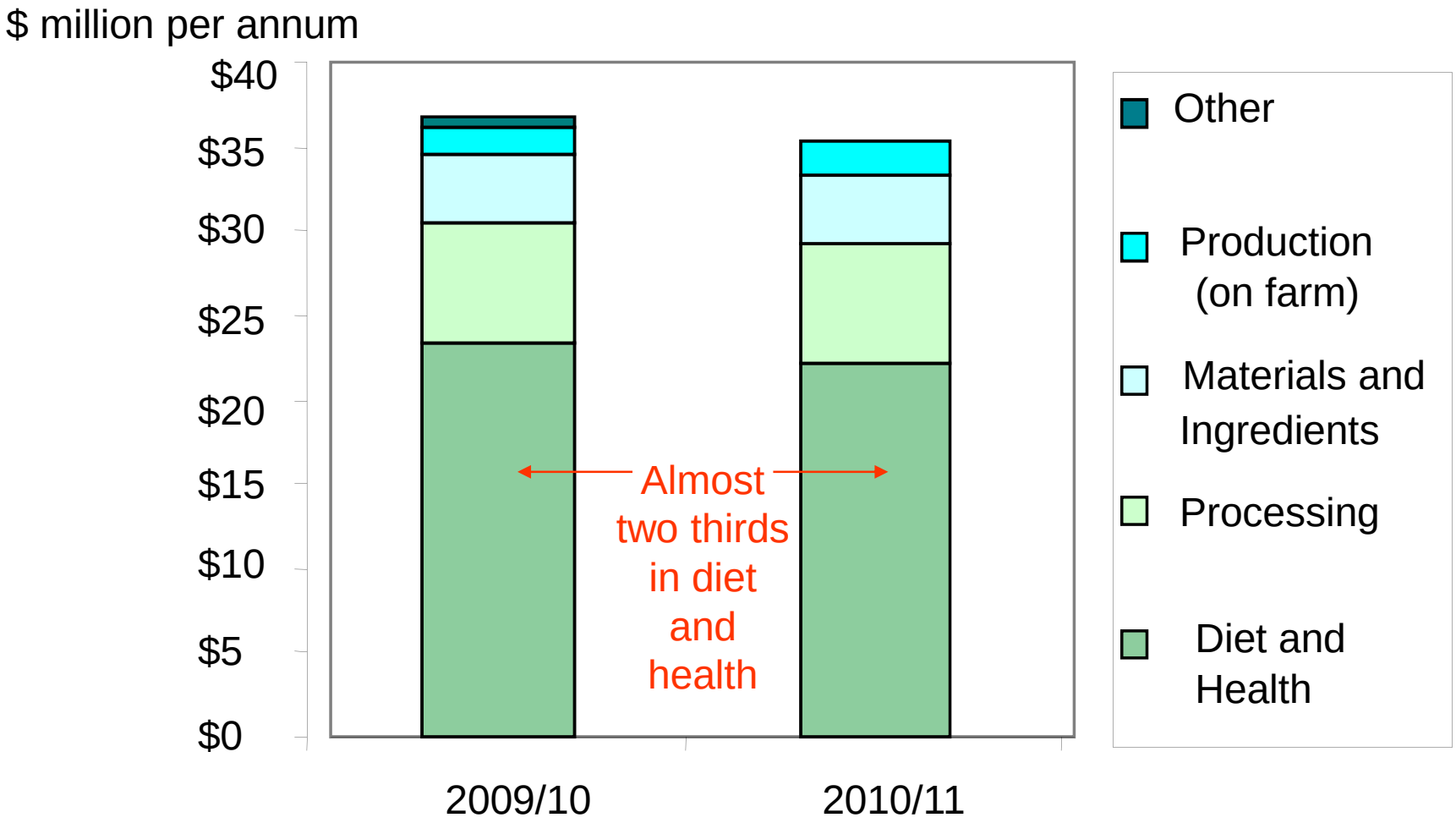
Restructure of Vote Science and Innovation: 2011/12 allocation



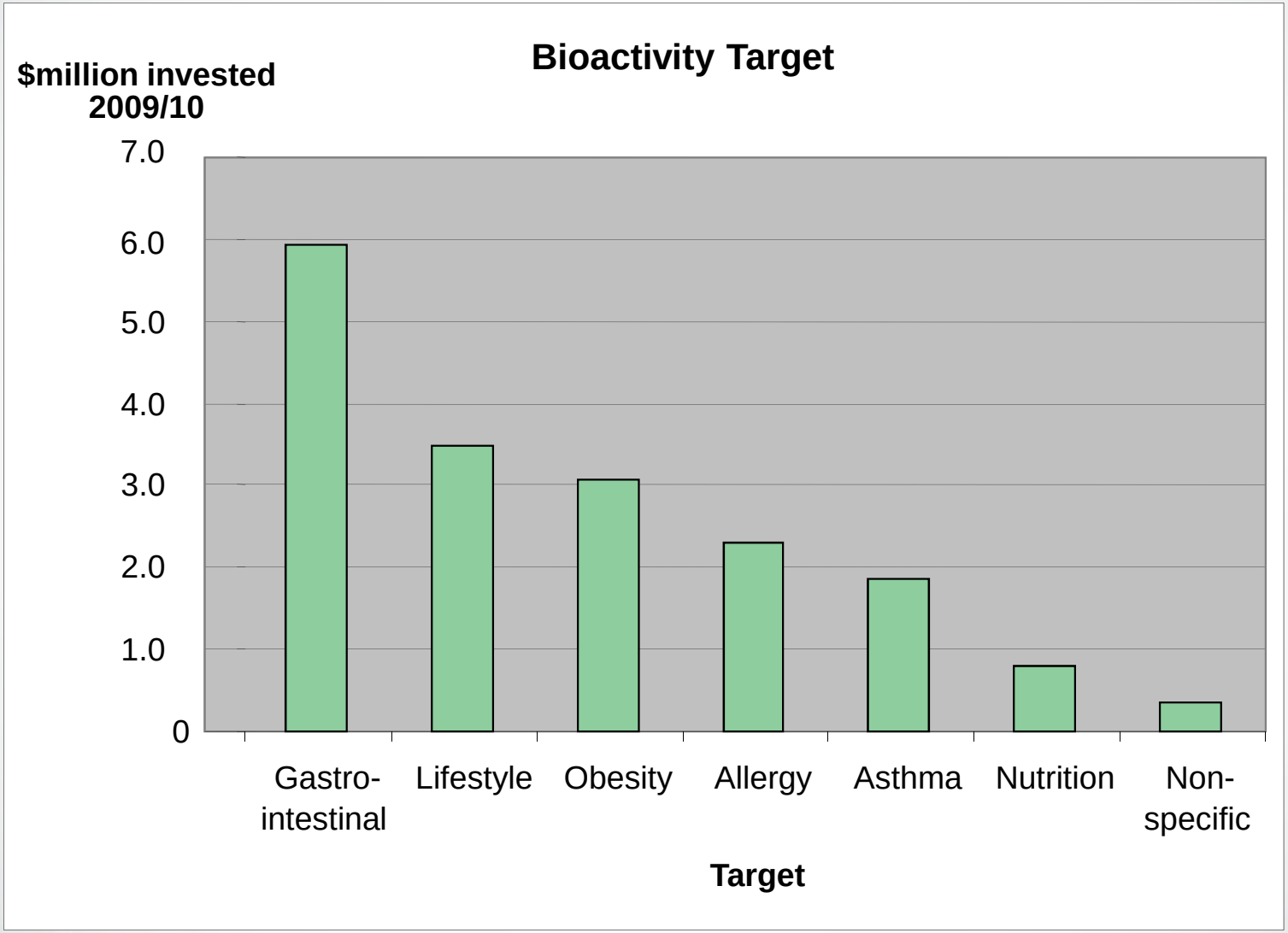
Biological Industries-Related Funding

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

MSI funding: food investments



MSI funding: biological targets



ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

MSI funding for natural product-related research

- Biological Industries Research Fund = $105 million per annum
- $27 million per annum is invested in natural product-related research, of which:
  - $20.3 million in dietary and health
  - $2.0 million in processing (extracts)
  - $4.4 million in bioproducts
- Plus business support assistance

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

MSI funding for natural product-related research

Nutrigenomics New Zealand

- Research collaboration between AgResearch, Plant & Food Research, University of Auckland since 2004
- Genetically distinct groups of individuals differ in their response to foods, food components, and dietary patterns
- Personalised nutrition (addressed to groups of individuals) helps maintain good health and protects against disease
- Nutrigenomics New Zealand undertakes multi-disciplinary collaborative research to develop gene-specific foods targeted at diseases
- Initial target is the Inflammatory Bowel Disease, Crohn's disease
- The expertise, information, tools and technologies developed are available to the food industry

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

MSI funding for natural product-related research

High-value lipid products

- new niche high-value lipids for export markets and new supercritical extraction industry in New Zealand

New Zealand flavours

- using traditional Māori knowledge to develop unique flavours from New Zealand flora for new export products

Beneficial marine lipids as ingredients for functional foods

- development of complex lipid functional food ingredients from marine resources
- lipids extracted and fractionated using supercritical extraction and related green processing technologies

Natural product leads based on traditional Chinese medicine

- drug discovery platform using Chinese medicines as natural product leads
- Combined with synthetic chemistry to refine privileged molecular scaffolds produced by nature into drug candidates
- specific target = neurogenerative disease

Photo: University of Auckland

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

MSI funding for natural product-related research

Future foods

- engage government, science, business, and community stakeholders in sustainable decisions on future food technologies
- anticipate the types of future food technologies that can support economic transformation and innovation
- identify the underlying drivers of societal and market responses to a range of future food technologies and link that understanding into government, science, and industry policy and investment decisions
- build ‘future watch’ and technology assessment capacity

Photo: NIWA

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

What is government doing? (MAF)

- **Primary Growth Partnership (PGP)**
  - a new initiative to invest in significant programmes of research and innovation to boost the economic growth and sustainability of New Zealand's primary, forestry, and food sectors
  - $226.7 million of government investment to date

- **New Zealand Fund for Global Partnerships in Livestock Emissions Research**
  - a contestable international fund to support the Global Research Alliance on Agricultural Greenhouse Gases
  - led by MAF, with MSI involvement

- **Sustainable Farming Fund**
- **Biosecurity New Zealand** etc

Source: MAF

What is government doing? (MED)

- Food information project, aquaculture reform, wine industry strategy
- Food Innovation Network of New Zealand
  - a network of open-access food development facilities
  - four hubs across New Zealand

FoodBowl at Manukau

Source: MED

Common strategies/goals across government and industry

- **Add value**/increase profit margins: more high-margin, ‘premium’, processed goods (in addition to unprocessed commodities)
- **Raise productivity**: adopt new technologies and farming practices, disseminate knowledge
- **Reduce risk**: pest and disease prevention, residue-free production, traceability, animal welfare, biosecurity, environmental integrity, food safety
- Emphasise country **branding/attributes**: respond to demands for higher integrity, highlight New Zealand’s competitive advantages and attributes such as safe food, ‘fresh to market’, ‘clean green’, quality, and sustainability
- **Expand exports**: diversify, maintain biosecurity and biodiversity, widen the product range, and introduce novel products and extracts
- **Connect firms** internationally, work collectively, speak with a single voice, develop a common story and position New Zealand as a global leader
- Boost the value of the **Māori economy**

Opportunities: how can we do things differently?

- Increase cross-sectoral knowledge transfer
- Achieve consistent raw materials
- Make productivity and processing improvements
- Provide access to pilot-scale facilities
- Maintain pest- and disease-free state
- Connect with international research
- Provide tools for systems thinking
- Import more technology
- Link Māori with the research community
- Develop a strong advanced manufacturing sector
- Improve linkages between research and commercialisation

MSI Biological Industries Fund

Research priorities for the 2012 funding round

Genetic quality and diversity of New Zealand's economic species
Added-value processing
Productivity of biological resources
Tools for added value
Protect and enhance New Zealand’s productive base and market access
Functional foods
Whole-of-system management
Technology and knowledge uptake

MSI Biological Industries Fund

Key dates

Proposals due	Thursday, 5 April 2012 – 12pm (noon)
Independent experts review proposals	April - May 2012
Assessment panels assess proposals	May - July 2012
Science Board meets	August 2012
Investment decisions announced	August 2012
Contracting discussions	September 2012
Contracts start	1 October 2012

Up to $59.5 million per annum available - $15.5 million in the Biological Industries Fund

… plus business support funding

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

Key points

- Government sees a key role for New Zealand's biological industries
- Natural products represent an emerging, value-adding sector
- The biological industries (selected sectors) target 70-80% export growth by 2025
- Research and innovation are key elements to achieve this growth
- New Zealand has many natural advantages and there is no lack of opportunities
- We assist by linking industry, researchers, and government

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA

Thank you

Any questions?

ministry of science + innovation
TE PŪNAHA HIRINGA WHAKAEA