



BUILDING A SUSTAINABLE AND COMPETITIVE BIOECONOMY IN NEW ZEALAND

THE KEY FOR FUTURE ECONOMIC PROSPERITY

Position Paper November 2008

CONTENTS

1 EXECUTIVE SUMMARY.....3

2 INTRODUCTION5

3 OVERVIEW OF THE NEW ZEALAND BIOSCIENCE SECTOR7

3.1 NZBIO, A National Industry Association: Creating a Sustainable Bioeconomy in NZ9

4 OPPORTUNITIES AND CHALLENGES12

4.1 Government Funding13

4.2 Improved Investment Environment/ Supply of Venture Capital13

4.3 Creation of Centres of Excellence14

4.4 Regulatory Systems.....15

4.5 Education System to Promote the Economic and Consumer Benefits of Biotechnology15

5 CONCLUSION & RECOMMENDATIONS16

1 EXECUTIVE SUMMARY

New Zealand's economy has been based on the primary sector for the last 150 years. In the past few years however, even with our global scientific and technical leadership of the sector, it has not been enough. New Zealand's GDP per capita and economic growth has been falling steadily in the OECD rankings. This is particularly clear when we look across the Tasman. If our economy is to grow it needs to diversify and diversification requires a committed strategic approach, which builds on New Zealand's areas of natural competitive advantage. For New Zealand this lies in two areas; our depth of knowledge in the primary sector and the excellence of our science. These come together in New Zealand's development of a sophisticated bioeconomy across agricultural, food, industrial and environmental biotechnology and human healthcare, incorporating human therapeutic development and medical technologies.

To enable New Zealand to significantly impact on our OECD rankings as desired, we need to actively support industries that offer the potential to substantially transform the New Zealand economy, attracting international investment and retaining Kiwi talent, expertise and capabilities in New Zealand.

The OECD's International Futures Programme, "The Bioeconomy to 2030: Designing a Policy Agenda" (OECD 2006 – Preliminary Documentation) states that *"Innovation in the biosciences requires active support from Government and industry. Those countries able to muster resources to invest in R&D and human capital formation – and equipped with policies to meet the challenges posed by new products and processes – will move ahead, creating wealth within their societies and becoming leaders in innovation globally. Those who fail to keep pace with these changes risk losing new global markets and compromising growth at the national level."*

This statement by the OECD supports evidence and experience both locally and overseas, which has reinforced the need for a vibrant research, science and technology sector as a driver and supporter of innovation and thereby economic growth and development. For this to continue in New Zealand we believe Government focus should be in five areas:

1. Improved process and quantities of public funding into Research, Science & Technology, with specific emphasis on funding mechanisms which support the development of a vibrant bioeconomy.
2. Creation of an improved environment for private sector investment, including support for the development of a local venture capital industry and improved access to and support for alternative sources of capital, local or international.
3. A long term focus and commitment to the creation of Centres of Excellence in the biosciences, recognising areas of international competitiveness and excellence and fostering their growth and expansion.
4. Streamlining regulatory systems and lessening the barriers to commercial development through regulatory harmonisation and a rational, scientific approach to regulation of novel technologies, including genetic technologies.
5. Promotion of understanding throughout the general public of New Zealand of the consumer and business benefits that will be derived from a stronger and more vibrant bio-based economy, within a context of a stronger New Zealand economic landscape and better quality of life for all New Zealanders.

New Zealand's bioscience sector is built on a century of world class biological research. We have a long tradition of applying cutting-edge research to pastoral and arable farming, horticulture, forestry and human healthcare. The New Zealand Bioscience industry is an emerging industry and although developments in the sector over the

past 12 months reflect an industry that is continuing to mature and establish itself in international markets, significant commitment and support from the public sector is required to enable the sector to truly mature and achieve significant economic gains for New Zealand.

New Zealand cannot afford to be complacent. A strong focus on investment into the country's research science and technology infrastructure and capabilities in the biosciences; strong support for private sector R&D and the integration of privately and publicly funded research; and the support of emerging companies in the sector are key to transforming the New Zealand economy to an innovation based, high growth, high skill, high value economy in the future. It is an area of natural competitiveness for New Zealand, where skills, talent and expertise in New Zealand can develop high value products for large global markets, allowing New Zealand to become a recognised leader internationally.

2 INTRODUCTION

For some time now the New Zealand Government has been determined to return New Zealand incomes to the top half of the OECD rankings. In 2007, New Zealand's GDP averaged \$26,000 per capita, ranking us 22 out of 30 OECD countries. However, in the past three years, our nation's growth performance has been lower than the rest of the OECD (1.5% against 3.0% per year), indicating that a further drop in OECD rankings is imminent. Statistics also show significant decreases in labour productivity and an inability to maintain equivalent GDP per capita with even the smallest of Australian States.

This document provides an outline of progress within New Zealand's biosciences sector over the past few years and how NZBIO, the National Industry Association, sees the sector as an agent for economic transformation and New Zealand's future economic prosperity.

Evidence and experience both here and overseas has reinforced the need for a vibrant science and technology sector as a driver and supporter of innovation and thereby economic growth and development. For this to continue in New Zealand we believe Government focus should be given to the five areas listed below:

- **Government funding**
 - Clear funding priorities and strategies, established to support New Zealand's natural competitiveness in the biosciences
 - Increased quantum of funding to ensure an appropriate pipeline of opportunities to allow success to flow through the product development lifecycle
 - Streamlined application process (reduced time of application, reduced bureaucracy)
 - Improved Funding Mechanisms, tailored to the specific needs of bioscience across different industry sectors (e.g. Agriculture, Health, Food, Energy etc)

- **Improved Investment Environment/ Supply of Venture Capital**
 - Proactive development of a local Venture Capital industry and capability
 - Venture, Private Equity and Alternative Capital sources (superannuation funds) need to be developed and international investment needs to be leveraged
 - Improved business environment (including taxation) to stimulate Private Sector Investment in Research, Science and Technology and to provide support for investors and emerging companies

- **Creation of Centres of Excellence**
 - Recognition that other global centres took many years to develop and that New Zealand is a relative newcomer to the international bioscience sector
 - Long term commitment to appropriate public sector funding and transformational strategies, recognising that the bioscience industry faces long product development lead times and rigorous regulatory requirements
 - Attraction & retention of local and international talent (salary levels, adequate infrastructure, incentives)
 - Integration with industry and support for industry engagement and uptake of novel research, science and technology as a key step in the commercialisation of leading edge discoveries

- **Regulatory Systems**
 - A rational, scientific approach to the regulation of new technologies, including genetic technologies, based on international best practice and harmonisation with primary trading partners
 - Re-instigate discussions under the Australia New Zealand Biotechnology Alliance and refocus on the establishment of Australia New Zealand Therapeutic Products Authority
 - Harmonisation of regulatory and monitoring systems with largest trading partners (e.g. Australia) especially in areas of the release of leading edge discoveries, including genetic technologies.

- **Education System to Promote the Consumer and Economic Benefits of Bio-based technologies**
 - Clear, rational and evidence-based communications regarding the economic and consumer benefits of a strong a bioeconomy in New Zealand
 - Promotion of the developments in the sector to school age and tertiary students to encourage increased enrolments in technical qualifications such as science, mathematics and engineering
 - Holistic communications regarding the industry to Policy makers, Government & the general public
 - Strong National Industry Association, promoting New Zealand’s competitive capabilities on the world stage and proactively working with Government, policy makers and stakeholders to facilitate the development of the sector

“Innovation in the biosciences requires active support from Government and industry. Those countries able to muster resources to invest in R&D and human capital formation – and equipped with policies to meet the challenges posed by new products and processes – will move ahead, creating wealth within their societies and becoming leaders in innovation globally. Those who fail to keep pace with these changes risk losing new global markets and compromising growth at the national level.”

OECD International Futures Programme “The Bioeconomy to 2030: Designing a Policy Agenda” OECD 2006

3 OVERVIEW OF THE NEW ZEALAND BIOSCIENCE SECTOR

New Zealand's bioscience sector is built on a century of world class biological research. We have a long tradition of applying research to pastoral and arable farming, horticulture, forestry and human healthcare.

Historically, many global industry reports have remained focused on the Human Health aspects of the sector. However, increasing pressure on fossil fuel and food prices, in a broader environmental context of climate change issues and the importance of sustainability, is driving strong growth in industrial and environmental bioscience, in addition to placing additional emphasis on the more mature agricultural sector. (Juma, C & Konde, V, *The New BioEconomy: Industrial & Environmental Biotechnology in Developing Countries*, United Nations Conference on Trade & Development 2001).

New Zealand is beginning to reap the benefits of our unique bioscience capabilities traditionally strongly focused on improvements in primary production, and from new high-value agriculturally-based products. We now have a growing number of companies whose core business is from the wider bioeconomy. These are high technology companies developing a range of novel products and services for global markets across a range of industry applications. Convergence between the different sectors using innovative bioscience (e.g. agriculture & food, food & health, agriculture & environment, medical devices, diagnostics & therapeutics etc) offers a significant opportunity for New Zealand to utilise its natural competitive advantage to become a global leader.

NZ SUCCESS STORY: CODA THERAPEUTICS

15 May 2008 (http://www.codanz.com/15_05_08.html)

CoDa Therapeutics has announced that it now has an open IND (Investigational New Drug application) after review by the US FDA (Food and Drug Administration).

The company had previously received approval by New Zealand's MedSafe and Multi-Regional Ethics committee and is now initiating clinical trials for its lead compound Nexagon™. CoDa's first trial is a Phase 1 clinical trial in patients following photorefractive keratectomy (PRK).

It is a randomized, prospective, double-masked, vehicle-controlled, dose-escalation study to evaluate the safety, tolerability and clinical effect of Nexagon™ in subjects following bilateral PRK for the correction of mild to moderate myopia.

The trial will be conducted at Auckland Eye, Remuera, Auckland, in 24 eligible subjects recruited in sequential cohorts of 6 subjects with follow-up continuing for 30 days after a single topical application of Nexagon™ or Nexagon™ vehicle. The primary objective will be assessed by safety evaluations in the 30 days post-application of investigational product.

The clinical trial will commence on May 19th 2008 and CoDa has recruited all 24 patients and successfully screened and booked the first cohort to undergo treatment on this day. A second Phase 1 trial to evaluate Nexagon™ in application to skin wounds is in process, and scheduled to begin in July.

CoDa Therapeutics is a biopharmaceutical company with a unique approach to wound healing, the company was founded on patented inventions and data generated in the laboratories of Professor Colin Green (University of Auckland) and Dr. David Becker (University College London) and is focused on the development and commercialization of therapeutics for wound care and tissue repair based on a new platform technology known as "Gap Junction Modulation." CoDa is building a portfolio of novel, proprietary compounds that, through control of gap junctions, can reduce cell to cell communication and improve wound healing and tissue repair post-injury. CoDa's lead compound is Nexagon™

**CoDa Therapeutics raised US\$23 million in Series A Financing in 2008*

New Zealand's bioscience industry is spread across the nation, with a growing number of firms also establishing offshore operations in order to be closer to their primary markets.

Regional Use of Biotechnology⁽¹⁾

Within previous two years

2007

Region ⁽²⁾	Biotechnology organisations			
	Core	Active	Research	Total
Number⁽²⁾				
Auckland and Northland	54	24	51	129
Waikato and Bay of Plenty	33	15	30	78
Gisborne, Hawke's Bay, Taranaki and Manawatu-Wanganui	39	12	27	81
Wellington and Wairarapa	24	9	33	69
Tasman, Nelson, Marlborough, Canterbury and West Coast	42	27	36	102
Otago and Southland	39	12	21	72
Overseas	39	6	27	72
Total	273	105	225	603

The sector's ability to transform the New Zealand economy can be seen in the growth in income, expenditure and exports generated by the sector and in the highly skilled workforce employed in the sector:

Income, Exports and Expenditure for Core Biotechnology Organisations

	Year		
	2004	2005	2007
	\$(million) ⁽¹⁾		
Income	158	181	276
Exports	53	56	104
Expenditure	153	169	250

Source: Statistics NZ 2007 BIOTECH SURVEY

Employment Figures for Core Biotechnology Organisations

By qualification

Qualification	Year		
	2004	2005	2007
PhD	99	99	177
Postgraduate and undergraduate	171	168	246
Technical and trade	27	39	72
Other ⁽¹⁾	114	45	120
Total employees	414	348	618

Source: Statistics NZ 2007 BIOTECH SURVEY

(1) Data is supplied by respondents who may have difficulty in assigning employees to categories.

The 'other' category may include some employees that may better fit into the other three categories.

Note: All counts are random rounded to base 3 to protect confidentiality, so actual figures may differ from those stated.

To quote the Cutler Report “Venturous Australia” The Review of the National Innovation System (Cutler & Company 2008):

“This report stands for the proposition that we should arrest the slide in our performance and seize the opportunity ...to begin building a more innovative and productive world in which our children will live, to which they will contribute and which they will pass on in their turn.”

Research, science, technology, commercialisation and the growth of an indigenous, high value, high growth bioeconomy is essential to the long term prosperity of New Zealanders of this generation and future generations. Whilst significant capability has been built, long term, strategic and committed Government support is required to invest in this growing industry.

3.1 NZBIO, A National Industry Association: Creating a Sustainable Bioeconomy in NZ

NZBIO is New Zealand’s National Industry Association for the biosciences. Formed in 2003, it has been successful in bringing together what was a fragmented sector and has delivered significant value to its stakeholders and the sector as a whole. Currently NZBIO receives some supportive funding through the Ministry of Economic Development (administered by New Zealand Trade and Enterprise) to assist its development into a sustainable industry association. The current Government support will expire in 2013.

NZBIO’s three hundred members span individuals, micro-companies (bio-based companies and service providers with less than 10 staff), government agencies, large international companies and NZ based SME’s. Their interests span the entirety of the bioscience spectrum, from agricultural biotechnology, through to environmental and energy research, food and nutraceutical companies and human health focused organisations (including the development of human therapeutics, medical devices and diagnostics).

In addition, NZBIO has a significant number of service providers and other organisations in its membership. Some of these organizations have opted for increased participation with the organization through engaging with NZBIO as corporate partners and sponsors (Thompson & Clark, PWC, Simpson Grierson, and AJ Park).

NZBIO’s role is to create the right environment for individuals and organisations in the bioscience sector to be successful. The four strategic goals identified by NZBIO to have greatest significant impact on building a prosperous and sustainable bioeconomy are:

- ***Generating valuable intellectual property***
Industry development requires a strong pipeline of opportunities. It is important to have sufficient research scale to be successful, with high quality intellectual property and effective technology transfer.
- ***Creating a favourable operating environment for commercialisation***
The industry needs an environment that supports its development. It is imperative that Government policy and strategy, particularly in the areas of investment, taxation, regulation and technology transfer, are aligned with this goal.
- ***Developing business connections***
To take advantage of opportunities the industry needs to be well informed and networked. NZBIO’s role is to encourage the development of business connections between industry participants, and this is where the regional networks, special interest groups and our international connections play a valuable part.

- **Promoting industry development**

NZBIO's role is to increase the level of understanding of bioscience and its applications in the wider community, to build a constituency of advocates who support its development.

Key successes of NZBIO to date include:

- Over 300 Corporate, Individual and Student Members nationwide, spanning a number of key industries utilising bioscience to develop novel products and processes.
- An Annual National Conference attracting ~600 delegates every year and featuring prominent local and international speakers and a vibrant trade exhibition space, student poster competition and the annual NZBIO Industry Excellence awards.
- Strong advocacy and policy activities, providing insight on the views of NZBIO's members and the broader industry on key issues of relevance to New Zealand's competitiveness and capability in the biosciences.
- An internationally recognised brand as the National Industry Association for bioscience in New Zealand and reciprocal agreements with other national peak bodies including but not limited to AusBiotech, BioteCanada, BioSingapore, DuBiotech (UAE), Thailand, Korea, India, Malaysia, Thailand and Taiwan.
- Publication of a NZ BioScience Industry Journal twice yearly and offering a weekly News service and a regional and national events program.
- Creation of a number of active Special Interest Groups to identify and act upon issues in specific sub-sectors, e.g. Human Therapeutics, Stem Cell & Regenerative Technologies, Agbiotech etc.
- Successful lobbying for the inclusion of an R & D Tax Credit Scheme in New Zealand's Taxation system, a critical element in supporting increased Private sector R&D and support for emerging, high-technology companies.

NZ SUCCESS STORY: SYMANSIS

New Zealand biotech company, Symansis has bought Apollo Cytokine Research for an A\$500,000. The Australian business specialises in the development, manufacture and marketing of human cell expressed (hcx™) proteins for drug research and offers the world's largest range of these superior human proteins.

Symansis chairman Andrew Turnbull says "We will be expanding our biotech base by bringing in these innovative products and the expertise that lies behind them. The manufacture will be transferred to our strategic manufacturing partners, South Pacific Sera, in Timaru, New Zealand, where we are co-locating our research laboratories. This will add to our core products that were developed in The University of Auckland. We are in the process of employing several researchers including commercially experienced scientists from overseas who will help build a highly skilled and competent New Zealand - based team."

Symansis was supported by New Zealand Trade and Enterprise in relocating the initial business from the UK and has received the benefit of funding from the Foundation for Research, Science and Technology for the early development of the antibodies through The University of Auckland. The University remains a key strategic partner and shareholder, and the Professor of Cell Signalling at the University, Dr Peter Shepherd, is a Founder of Symansis and the CSO.

Prof. Shepherd says he is extremely excited about this acquisition, which will add great value to the company.

"It is really exciting to see the business that I, along with several other scientists and supporters, founded and relocated from the UK some two and a half years ago moving ahead in such a positive way. I think it is important to recognise the support that we had from New Zealand grants and from the University in the early years. The business would definitely not be where it is now without their support and I think this is a great example of how properly channelled research funding can have a really positive effect for NZ."

Source: <http://www.symansis.com/aboutus/news>

NZ SUCCESS STORY: LANZATECH

\$12m grant for fuel project

Jul 15, 2008

An Auckland firm aiming to commercially make biofuel out of the flue gas from factories has been awarded \$12 million in Government funds.

LanzaTech - partly backed by The Warehouse founder Stephen Tindall - won the first major contract awarded under the Foundation for Research, Science and Technology's Low Carbon Energy Technologies fund.

"This is one of the most exciting projects of its kind we have invested in, with great potential to reduce our carbon emissions," said foundation chief executive Murray Bain.

LanzaTech founder Dr Sean Simpson said the three-year contract would allow further development in its biofuels research.

The company was pioneering a process to turn carbon monoxide into fuel that can power cars. Just as yeast turns sugar into alcohol, LanzaTech uses a bacterium to produce ethanol from carbon monoxide, a waste product of many industrial processes. A pilot plant design is being developed that will allow ethanol production to be demonstrated at scale over the next 12 months.

"We looked essentially for the lowest cost source of carbon that was out there," said Dr Simpson. "You quickly realise that waste resources are the lowest cost."

He conceded the idea might sound like science fiction but said it was hoped the fuel would go to market in the next five years. The funding allowed the research to be broadened to explore alternatives to get around drawbacks of ethanol.

Source:

http://www.nzherald.co.nz/science/news/article.cfm?c_id=82&objectid=10521588

Working Closely with Government & Regional Agencies

Key government agencies form the basis of NZBIO's access to opportunities around the project management of government projects. These agencies include:

- New Zealand Trade & Enterprise
- Ministry of Research, Science & Technology
- Foundation for Research, Science & Technology
- Ministry of Economic Development
- Ministry of Health
- Ministry of Education
- Tertiary Education Commission

Regional development agencies and local councils may also provide an increasing client base for NZBIO's project work. Agencies where NZBIO has existing relationships include:

- Canterbury Development Corporation
- Auckland City Council & Auckland Plus (also Manukau & North Shore City Councils)
- Katolyst (Waikato)
- Grow Wellington
- Dunedin City Council
- Manawatu

NZBIO also draws on a National Advisory Council, a key group of senior industry leaders, formed to act as a think tank for the NZBIO Board & Senior Management. Small groups of Industry Leaders participate in Special Interest Groups in key sectors of interest, acting as advisory resources for the NZBIO Board and Management and also for government agencies seeking industry input in the early stages of policy development.

4 OPPORTUNITIES AND CHALLENGES

In assessing the broader industry perspective on building a sustainable bioeconomy in New Zealand, it is useful to assess the key characteristics that globally differentiate the bioeconomy from other innovation based industries.

The following assessment is sourced from “OECD International Futures Programme, *The Bioeconomy to 2030: Designing a Policy Agenda, 2006*” & outlines key reasons why the bioeconomy differs to other innovation cycles:

Affordability – The cost of biotechnologies has decreased markedly in the past decade. For example, diagnostic and treatment devices, once only available to large corporations and well-financed R&D efforts, are now available on the general market for use by doctors and consumers.

Convergence and linkages – The bioeconomy is possible because of our rapidly expanding knowledge of how living organisms develop, react, and interact at fundamental levels that range from nano molecular structure to genes. This discovery process in turn drives innovation in a wide range of economic domains. This convergence cycle is blurring the traditional boundaries that separate chemistry, biology, mathematics, etc. The development of certain biotechnologies will indeed depend on advances in other technologies such as nanotechnology and informatics.

Impact – Technology applications flowing from developments in the life sciences will have far-reaching impacts on other economic sectors. For example, the agriculture and chemical sectors were once linked through the use of pesticides in crop production, but emerging technologies will create biobased chemicals with decreased toxicity and increased effectiveness. Nano bio tools will be used for a large variety of applications, from medicine to security and environmental monitoring.

Rapid, discontinuous change – The biological sciences are among the most dynamic sectors of modern science. Discoveries in genetics, metabolics, systems biology and proteomics are leading to novel and ecoefficient products at ever faster rates. Meanwhile, the pace of discovery is accelerated by the growing – and global – human capital and financial investment in bioscience. What had been an expensive, frontier scientific effort in 1990 is often now a routine, increasingly automated procedure. “Knowledge Churn” has become the motor for advances in the biosciences.

The human factor – Unlike many other technologies, most biotechnologies involve a human element in development, production, and consumption. Products have to be developed in secure laboratories, tested with animal and human subjects, and in many cases consumed directly by humans. Individual and societal values will play an important role in decisions as to which technologies are explored and exploited. Public opinion will be a key determinant in this innovation wave (security, safety, privacy, ethics).

Safety – Biotechnology can affect human health dramatically. The same technologies that improve human welfare can be used for harm. It is imperative that safety issues be addressed in order to fully realise the potential of the bioeconomy.

Increased knowledge intensity - A good example of this interplay is the linkage between innovations in the life sciences and informatics. Data can now be collected, stored, retrieved and analysed more and more quickly. This rapid increase in knowledge will lead to greatly shortened discovery paths.

Information – Information in the biological sciences is more readily available today than ever before, but the complexity of that information and the problem of its reliability pose challenges for researchers and industrialists.

High opportunity costs – Innovation in the biosciences requires active support from government and industry. Those countries able to muster resources to invest in R&D and human capital formation – and equipped with policies to meet the challenges posed by new products and processes – will move ahead, creating wealth within their societies and becoming leaders in innovation globally. Those who fail to keep pace with these changes risk losing new global markets and compromising growth at the national level.

All of the above - The biosciences offer a combination of factors that make this innovation wave different from past ones (i.e. the IT revolution). Governments need to map these possible future directions, match them to social and economic needs, and adjust policy agendas to reap the benefits of the bioeconomy.

There are a lot of opportunities and challenges ahead for the bioscience sector, both in New Zealand and offshore. For us to continue to drive a prosperous bioeconomy in New Zealand we believe Government should focus on the following five areas:

4.1 Government Funding

(Source: New Zealand Biotechnology Industry Growth Report, LEK Consulting 2006)

Key advances include:

- Total funding of R&D and commercialisation activities through these funds totalled approximately \$195m in 2005.
- Creation of biotechnology and emerging technology teams in key government agencies (NZTE, FRST, MoRST) and support of international trade promotion opportunities.
- Publication of the Biotechnology Research Roadmap in 2007.
- Formation and funding of NZBIO as a central unified industry association, representing the industry's perspective in public policy environments.

The New Zealand Government has provided past support for the development of a bioscience sector in New Zealand. However, significant advances in policy development and implementation need to be made in order to truly capture the value of the natural capabilities and the opportunity created by this emerging industry in New Zealand. NZBIO sees biotechnology policy as **not** the domain of just a single area (RS&T) but extending across major policy areas of education, economic development and treasury. This was discussed in some detail by the Work Foundation (UK) 2003 who compared the UK and Germany for government investment in biotechnology.

NZBIO believes there is a strong need for a coordinated effort within Government Agencies to provide clear long-term funding priorities and strategies, as well as a continued increase by Government in the quantum of funding. Further improvements in the funding mechanisms with streamlined application processes will reduce the time of application and bureaucracy associated with R&D in New Zealand. A unified policy supporting the development of an innovation-based economy is recommended, encompassing both public and private sector incentives to progress compelling technologies and create leading NZ firms with novel products, exporting into large global markets.

NZBIO recommends reconvening a key group of industry leaders to assess the progress made to date and reframe the long term vision for the future of this critical sector in New Zealand's economic development.

4.2 Improved Investment Environment/ Supply of Venture Capital

(Source: New Zealand Biotechnology Industry Growth Report, LEK Consulting 2006)

Key advances include:

- Expansion of the New Zealand Venture Investment Fund (VIF) through the introduction of the Seed Co-investment Fund (SCIF) and the increased investment in the Venture Capital Programme.
- Creation of the Australia New Zealand Biotechnology Partnership Fund (ANZBPF) designed to facilitate and accelerate trans-Tasman collaboration.
- Tax legislation has generally become more favourable to biotechnology companies and investors in biotechnology companies, largely due to changes in allowances for R&D Tax Credits, the ability to carry forward losses and proposed changes for taxation of foreign based investment; however further work to advocate for more positive changes is required.

CCMAU commentary on 06/07 VIF performance (<http://ccmau.govt.nz/vig.html>)

“During 2006/07 there was a significant slowdown in the rate of investment into new companies with only two new initial investments made. While the number of new companies receiving investment is low, it was not unexpected due to challenges facing new venture capital fund managers. 2006/07 did see, however, an additional \$15.7 million of capital drawn down by venture capital funds and invested into mainly follow-on investment into existing portfolio companies.

Since its commencement in July 2005, the SCIF programme has seen \$1.8 million capital drawn down by 30 June 2007. During 2006/07 NZVIF reached agreement with four co-investment partners and made four investments. While this was a good result, it was lower than the targeted seven co-investment partners and eight to ten investments. This reflects the challenges facing potential angel networks finding and training active and passive investors.”

NZBIO believes that additional work needs to be undertaken to support the emergence of a local Venture Capital capability, both in funds available and expertise. It is essential that New Zealand does not become uncompetitive by reducing tax incentives for private sector R&D, whilst its neighbours and trading partners actively increase incentives. Such a decision would result in the transference of New Zealand owned and operated high technology firms to offshore very early in the development cycle, limiting New Zealand’s ability to capture the economic benefit of its international class research, science and technology.

To ensure we can capture the value we generate through our R&D, a strong supporting and informed investment environment is required. Positive steps have been made to grow and encourage domestic and international angel and venture capital investment. Further commitment to encouraging investment with additional funds targeted at start-ups and an improved taxation environment will support the development of a prosperous bioeconomy.

4.3 Creation of Centres of Excellence

New Zealand biotechnology competes globally. Our comparative advantages are aligned with our historical biological research base. We are very strong in large animal, fruit, forage, and forestry biotechnology, as well as niche areas of human healthcare. A long-term commitment by Government to funding and support provides the capacity for New Zealand to develop and grow global R&D Centres of Excellence.

We need to be able to attract and retain local and international R&D and biobusiness talent at globally competitive salary levels, incentives and with adequate infrastructure and resources to build a vibrant bioeconomy and to ensure continued economic prosperity in the future. A visionary policy is required, with a true

NZ SUCCESS STORY: BIOMATTERS

Biomatters was founded on the principle of creating software that can be used by all researchers in their daily work. Our technology converts raw data into meaningful, visual information, simplifying research and ultimately improving efficiency.

Biomatters’ flagship software packages are:

- Geneious: a platform that dramatically speeds up research times and improves collaboration with tools to quickly filter, store, process and analyze gene and protein data. Providing industry standard bioinformatics tools at the fingertips of all researchers in biology, therapeutics and genetics.
- Cheesecake: a software system that streamlines and simplifies experimental protocols, ethics reporting and data management for laboratories doing in vivo research.
-

Biomatters CEO, Candace Toner, was a finalist in the 2008 Bayer Innovation Awards, Top Innovator in Science for New Zealand. Last year they were United Nations World Summit Awards winner in the e-Science category, and Computerworld Excellence Awards winner for Most Innovative Use of ICT for New Zealand.

Source: <http://www.biomatters.com/default,15,biomatters.sm>

understanding of the level of investment and long term commitment required to truly transform the basis of New Zealand's future economic growth.

4.4 Regulatory Systems

Significant developments have also been made in New Zealand's regulatory environment. In general, the regulatory environment in New Zealand has had to address a broad set of issues, ranging from genetically modified organisms to xenotransplantation.

Legislation and regulations in regards to these types of issues can have a significant impact on participants in the New Zealand biotechnology sector and, in general, the regulatory environment appears to support the expansion of R&D horizons. However, regulatory hurdles that remain provide a significant disincentive to New Zealand companies to keep their primary operations in New Zealand. The local environment should be as positive as possible if the ownership and profits of these emerging companies are to stay in New Zealand.

Feedback from industry also indicates there is a desire to see a review of the emissions trading scheme, to ensure this does not negatively impact on core parts of the New Zealand bioeconomy.

Increasing harmonisation with Australia (and global) regulations will also enhance the increasingly fluid exchange of funds, resources and innovation between the countries. A reduction in bureaucracy and compliance costs will also assist. These issues are essential to ensure that New Zealand companies can remain in New Zealand without compromising their commercial goals due to undue regulatory hurdles, out of step with international thinking. If the environment becomes a barrier to the commercial success of these companies, they will be forced to move offshore.

4.5 Education System to Promote the Economic and Consumer Benefits of Biotechnology

Education and communication are key components to ensure that the utilisation of the biosciences for the benefit of consumers and businesses and the sector's contribution to New Zealand as a whole is truly understood and supported.

Many of the technologies utilised by the sector are poorly understood by the general public, and as such generate a negative reaction based on non evidence based mass media campaigns. In order to succeed, this sector and the bioscientists and business people within it, require a skilled workforce operating to generate wealth within a supportive society. Therefore, clear consistent messages and direct communication of the benefits of these technologies to policy makers, Government, and the general public are important.

As a strong National Industry Association, NZBIO aims to promote both the economic and consumer benefits of these leading technologies, however further support at all levels of Government will assist in overcoming the misinformation that is currently in the public domain.

5 CONCLUSION & RECOMMENDATIONS

NZBIO strongly believes that New Zealand should be focusing on investment into the country's vibrant and growing bioeconomy as an agent for economic transformation and to ensure continued economic prosperity in the future.

To enable New Zealand to significantly impact on our OECD rankings as desired, we need to actively support industries that offer the potential to substantially transform the New Zealand economy, attracting international investment and retaining Kiwi talent, expertise and capabilities in New Zealand.

Research, science, technology, commercialisation and the growth of an indigenous, high value, high growth bioeconomy is essential to the long term prosperity of New Zealanders of this generation and future generations. Whilst significant capability has been built, long term, strategic and committed Government support is required to invest in this growing industry.

There are a lot of opportunities and challenges ahead for the bioscience sector, both in New Zealand and offshore. For us to continue to drive a prosperous bioeconomy in New Zealand we believe Government should focus on the following five areas: Funding, Improved investment environment, Creation of centres of excellence, Regulatory and Education systems.

New Zealand Government has provided past support for the development of a bioscience sector in New Zealand. However, significant advances in policy development and implementation need to be made in order to truly capture the value of the natural capabilities and the opportunity created by this emerging industry in New Zealand.

RECOMMENDATIONS

NZBIO believes there is a strong need for a coordinated effort within Government Agencies to provide clear long-term funding priorities and strategies, as well as a continued increase by Government in the quantum of funding.

It is essential that New Zealand does not become uncompetitive by reducing tax incentives for private sector R&D, whilst its neighbours and trading partners actively increase incentives. Such a decision would result in the transference of New Zealand owned and operated high technology firms to offshore very early in the development cycle, limiting New Zealand's ability to capture the economic benefit of its international class research, science and technology.

NZBIO recommends reconvening a key group of industry leaders in order to assess the progress made to date and reframe the vision for the future of this critical sector in New Zealand's long term economic development.

We believe Government focus should be given to the following five areas:

1. Improved process and quantities of public funding into Research, Science & Technology, with specific emphasis on funding mechanisms which support the development of a vibrant bioeconomy.
2. Creation of an improved environment for Private Sector Investment, including support for the development of a local venture capital industry and improved access to and support for alternative sources of capital, local or international.

3. A long term focus and commitment to the creation of Centres of Excellence in the biosciences, recognising areas of international competitiveness and excellence and fostering their growth and expansion.
4. Streamlining regulatory systems and lessening the barriers to commercial development through regulatory harmonisation and a rational, scientific approach to regulation of novel technologies, including genetic technologies.
5. Promotion of understanding throughout the general public of New Zealand of the consumer and business benefits that will be derived from a stronger and more vibrant bio-based economy, within a context of a stronger New Zealand economic landscape and better quality of life for all New Zealanders.