

Foreword from the Premier of Queensland and the Minister for Tourism, Regional Development and Industry

Tropical Queensland is not just a beautiful place to live and visit. Behind the beauty is unparalleled biodiversity, unique tropical expertise and unsurpassed opportunities.

The huge economic growth forecast for India, China and South East Asia over the next 20 years will result in an unprecedented demand for more products, services and innovative research solutions suited to tropical conditions.

Queensland has a unique opportunity to capitalise on this demand and establish an international reputation for tropical economic, social and environmental expertise. A growing number of our businesses are already producing products and services tailored to tropical regions.

Our researchers are undertaking groundbreaking studies into cures and vaccines for tropical diseases like malaria, Dengue fever and African sleeping sickness. We're designing and building sustainable buildings for tropical living, implementing leading edge tropical agriculture solutions and leading tropical environmental management practice.

Q-Tropics is a strategy which aims to build on this tropical expertise, commercialise tropical research, and export tropical products and services to tropical communities throughout the world.

The strategy sits perfectly with three of our Government's *Toward Q2 Tomorrow's Queensland* ambitions; strong, smart and green – by building on our strengths and protecting our lifestyle and environment.

By strengthening our tropical expertise, we are contributing to the diverse economy of tomorrow's Queensland. Q-Tropics will also help create a healthy lifestyle for all Queenslanders well into the future.

Anna Bligh MP
Premier of Queensland

Desley Boyle MP
**Minister for Tourism, Regional
Development and Industry**

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“Tropical science is one of those fields where Queensland can truly make a difference. As one of the few first-world economies in the tropics, we are in a unique position to use our formidable tropical expertise, infrastructure and research capacity to build industries that will not only better the lives of Queenslanders, but also provide solutions to health and environmental problems facing the developing tropical world.”

Professor Peter Andrews
Queensland Chief Scientist

Queensland's vision for tropical growth

To remain competitive in a crowded global market, Queensland needs to grow its knowledge-based industries: those that are relatively high in their inputs of technology and human capital. Targeting those areas where we have comparative advantages will secure Queensland's future in international and domestic markets, and assist us in developing, attracting and retaining these knowledge-based industries and workers into the future.

International competitors like the United States, Singapore and various European countries are growing their knowledge-based industries, as are major emerging market economies. These emerging economies are placing increased emphasis on the creation and commercialisation of innovative products, processes and services over low value-added production.

Innovation will be the key to addressing some of the biggest challenges facing Queensland in the future, such as climate change, population growth, sustainable development, health and wellbeing. We are working to ensure that Queenslanders provide the solutions and that we all benefit from the opportunities they create.

In 2006, the Smart State Council, an advisory body to the Queensland Government, commissioned *Opportunities in tropical science, knowledge, research and innovation in Queensland*.¹ This report highlighted significant global market opportunities and found that Queensland has the opportunity to become a world leader in tropical expertise.

Queensland has a clear comparative advantage in tropical expertise across a range of our knowledge-based industries in particular in the Cairns and Townsville regions. This is because of the State's location as the only developed economy spanning a wide variety of tropical zones, its biodiversity, and its research and development (R&D) strengths.

Capitalising on Queensland's tropical expertise is a key component in growing local knowledge industries and innovative capacity.

Q-Tropics strategic vision

To establish Queensland as a world leader in tropical science, knowledge and innovation.

To achieve this vision, Queensland needs to capitalise on its existing research and business strengths and effectively convert them into marketable commodities.

The Q-Tropics Strategy will focus on the development of four key industry sectors - health, environmental management, primary industries, and tropical infrastructure and living. The Strategy will unite regional Queensland industry and researchers, particularly in the Cairns and Townsville regions, with the critical research mass in South East Queensland and beyond our borders.

Many of the key initiatives and programs of the Q-Tropics Strategy will be driven out of north Queensland and benefit the State as a whole.

¹ <http://www.smartstate.qld.gov.au/partnerships/SmartStateCouncilReportTropicalopportunities.pdf>

Outcomes for Queensland

The Q-Tropics Strategy will:

- establish Queensland as a global region for excellence in tropical science, knowledge, research and innovation
- build the tropical expertise capability of northern Queensland
- provide greater regional economic development through developing knowledge-based export industries focussed on commercial outcomes
- provide increased economic, environmental, and social capital for Queenslanders living in the tropics
- encourage international funding and investment
- encourage effective alliances with overseas entities

Growth in demand for tropical expertise

More than 3.3 billion people, almost half the world's population, live in the tropics, many in developing countries and regions. These developing countries are growing rapidly in both population and income, averaging annual growth in gross domestic product of six per cent.

This brings with it a high demand for products, services and research solutions suited to the tropics from governments, international development agencies (IDAs), philanthropic organisations and individuals.

Developing economies in tropical regions currently produce around US\$12 trillion, around one-fifth of the gross world product.²

Many of the developing economies in tropical regions of Asia, Africa and South America face significant health and sustainability issues, and these issues are the focus of most of the United Nations Millennium Goals for 2015. Less developed and poorer nations rely heavily on IDAs and philanthropic agencies for support and services. Although some countries are still relatively poor, the standard of living and wealth is growing in others, particularly in China and India.

This growth in wealth and population is increasing demand for community-based solutions that produce environmentally sustainable, aesthetically pleasing and healthy living conditions. This, in turn, is putting pressure on governments, industry and communities alike to address these challenges to assist all areas of their societies.

Tropical expertise:

- businesses developing new, or adapting existing, products and services to meet the unique conditions of tropical environments
- the development, commercialisation and diffusion of research, applied science and technology, processes and systems that could be applied to tropical regions.



Tropical zone of the world

² Office of the Queensland Chief Scientist, 2008

Queensland strengths

A developed economy in the wet and dry tropics

Queensland is the world's most developed economy in the tropics, has a politically stable economy, and is close to the Asia–Pacific region.

The State possesses a mix of wet and dry tropical environments, including rainforests, savannas, rangelands, wetlands, coast and reefs.

Queensland businesses have developed and adapted products and services for tropical conditions over many generations, building a substantial depth of tropical expertise and capability.

Businesses with this tropical expertise are located principally in the Cairns and Townsville regions of Queensland, as well as in Central and South East Queensland.

Queensland has undertaken extensive tropical research and developed substantial business capability, particularly in the areas of health, environmental management, primary industries and tropical infrastructure and living.

This tropical expertise extends Statewide across Queensland and into the Northern Territory and Western Australia.

Tropical biodiversity

Queensland's unique tropical biodiversity provides us with significant opportunities for the discovery and development of novel natural products. The application of these natural products cuts across many sectors, for example, the development of pharmaceuticals and nutraceuticals for use in the human and animal health markets.

The Queensland Government is committed to growing Queensland's biodiscovery sector, and has taken a leading position in the conservation and sustainable use of its biodiversity. Queensland was the first jurisdiction in Australia to introduce world's best practice biodiscovery legislation to create legal certainty for those undertaking biodiscovery activities.

Queensland's unique biodiversity, world-class biotechnology capabilities and supportive legislative environment distinctly position the State at the forefront of global biodiscovery. The expertise of Queensland companies and researchers in the application of biodiscovery, sustainable use of resources and compliance with associated regulatory systems can be exported to developing economies.

Queensland's biodiversity

Queensland is Australia's most naturally diverse State. Many of Queensland's plants, animals and microbes are found nowhere else in the world. Queensland has 13 terrestrial and 14 marine bioregions, supporting more than 1000 ecosystem types, including rainforests, savannas, rangelands, the dry tropics, wetlands and the coast.

The state has 70 per cent of Australia's mammals, 80 per cent of its native birds, and more than 50 per cent of its native reptiles, frogs and plant species. Queensland is also home to five World Heritage-listed areas, including the Wet Tropics, the Great Barrier Reef and Fraser Island.

Queensland's commitment

The **Biodiscovery Act 2004** (Qld) provides streamlined, sustainable access to the state's native biological resources, while returning a fair and equitable benefit to the community.

The Queensland Government introduced the **Queensland Biotechnology Code of Ethics** to ensure activities in the biodiscovery sector occur within a transparent and ethical regulatory environment. Queensland was the first jurisdiction in the world to introduce a code of ethics for biotechnology.

Commercialising biodiscovery - UniQuest and Xenome Limited

Xenome Limited is using the toxins of cone shell snails from the Great Barrier Reef as a starting point to develop a pain management drug. Xenome Limited is a successful spin-off company, developing and commercialising intellectual property originally from UniQuest, the successful commercialisation arm of the University of Queensland (UQ).

A globally-recognised tropical research base

Queensland is home to world-class research institutions that specialise in R&D and commercialisation activities that can specifically address the needs of tropical regions. A selection of contributing universities and organisations are detailed in the tables below.

Tropical regional presence

Research institution	Expertise and capabilities
James Cook University (JCU)	JCU has more than 20 specialist centres and institutes focusing on tropical areas of health, marine science, forestry, biodiversity, sustainable management of ecosystems, architecture and design, disaster management and agriculture.
Australian Institute of Marine Science (AIMS)	AIMS is Australia's tropical marine research agency, with highly developed capabilities in marine biodiversity, impacts of and adaptation to climate change, water quality and ecosystem health. Its research in collaboration with Australian and international research institutions benefits industries such as fisheries, offshore oil and gas, mining, reef tourism and aquaculture.
Central Queensland University (CQU)	CQU contributes to the tropical space in marine, terrestrial and freshwater ecology, environmental resource economics, ecotoxicology, coastal hydrodynamics, plant production and conservation, and wastewater management.
CSIRO Tropical Landscapes Research Program and Tropical Forest Research Centre	CSIRO research programs and centres collaborate with Queensland's major research institutions and conduct specific tropical research on sustainable ecosystems, tropical agriculture, forestry and landscape management.
Great Barrier Reef Marine Park Authority (GBRMPA)	GBRMPA's main goal is to provide for the long-term protection, ecologically sustainable use, understanding and enjoyment of the Great Barrier Reef through the care and development of the Great Barrier Reef Marine Park. GBRMPA works cooperatively with other primary tropical research institutions such as AIMS, JCU and the CSIRO.
Wet Tropics Management Authority	The authority is responsible for overall planning, management and protection of the Wet Tropics World Heritage Area, including activities such as research and monitoring, vegetation mapping, educational activities, involvement of Indigenous communities and threat abatement.
Marine and Tropical Sciences Research Facility/Reef & Rainforest Research Centre	These facilities are dedicated to North Queensland's public environmental assets, including the Great Barrier Reef, tropical rainforests and the Torres Strait, seeking to maintain and build the health of these assets through the generation, transfer and sharing of world-class research and knowledge.
Tropical Population Health Unit – Queensland Health	The unit provides population health services with expertise in health surveillance, coordination of disease control initiatives, environmental health surveillance, and specialised health advice.
BSES Limited	BSES is a Queensland-based principal provider of research, development and extension to the Australian sugar industry. BSES has a long history of applying science to problems facing sugarcane production and developing effective solutions that benefit the whole industry.

Centre of Excellence in Tropical Design (CETD)	CETD is a virtual centre that aims to position North Queensland at the forefront of tropical construction and design. The CETD involves collaborative development and sharing of information and expertise between government, industry and universities to achieve sustainable design and living in the tropics.
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Other regions

Research institution	Expertise and capabilities
Queensland Institute of Medical Research (QIMR)	QIMR is one of the largest medical research institutes in the southern hemisphere, with research divisions and programs concentrating on clinical tropical medicine and health areas, including the collaborative Australian Centre for International and Tropical Health.
The University of Queensland (UQ), UniQuest and IMBcom	UQ is a commercialisation powerhouse with tropical expertise in marine science, biotechnology, mining, tourism, collaborative health programs with overseas partners, weed science, forest management, animal health and agriculture.
Griffith University (GU) and Griffith Enterprise	GU is active across tropical research areas such as forestry and horticulture, biodiscovery, biosecurity, health and diseases.
Queensland University of Technology (QUT) and bluebox	QUT has a strong focus on tropical crops and biocommodities, as well as concentrating on tropical and subtropical architecture and design.
Australian Army Malaria Institute (AMI)	The Institute is primarily focused on malaria research, and has broadened its interests to include the arboviruses, particularly dengue and Japanese encephalitis.
Queensland Department of Primary Industries and Fisheries (DPI&F)	DPI&F is Queensland's largest provider of R&D services to the primary industries (food and fibre) sector, encompassing tropical and subtropical animal and plant production, fisheries and aquaculture, forestry and horticulture. It provides leading edge solutions which underpin increases in productivity, expanded market access and sustainable resource use for the sector.
Queensland Department of Natural Resources and Water (NRW)	NRW undertakes and brokers tropical landscape research across Queensland in nutrient and sediment management, soil and landscape health, remote sensing of natural resources, and water management and modelling, in collaboration with universities, government and private organisations, with an overall aim to protect and enhance our natural resources for today and tomorrow.
Environmental Protection Agency (EPA)	The Queensland EPA is State government's lead agency for ecologically sustainable development, including protected area management, biodiversity conservation, wildlife management, climate change and air sciences. The EPA provides tropical knowledge, information and research about the environment, its conservation and management. It also coordinates a program of energy efficiency, renewable energy and water efficiency through the Sustainable Energy Innovation Fund.

Queensland businesses, across a broad range of industry sectors, also have the capacity to research, commercialise and produce products and services for tropical regions.

James Cook University – Queensland’s Tropical University

Located in northern Queensland, James Cook University is one of Australia’s leading tropical research universities, with main teaching campuses located at the Douglas Campus in Townsville and the Smithfield Campus in Cairns.

The University has a strong focus on molecular sciences, tropical veterinary sciences, and tropical health and medicine, including communicable disease control, skin cancer, clinical medicine, indigenous health and occupational health in mining. Expansion in tropical medical and health science is highlighted by recent research developments, increasing research infrastructure, and significant co-locations involving tropical science on both the Smithfield and Douglas campuses.

The co-location of research groups into the Douglas Campus has resulted in strategic and collaborative linkages between public health, tropical medicine and veterinary science, and includes:

- Co-location of the Townsville Hospital and the Health and Medical precinct of James Cook University with a major expansion of health professional education and clinical science
- Development of the Australian Tropical Science and Innovation Precinct in collaboration with CSIRO and the Queensland Government, including marine microbiology and medicinal chemistry
- A Memorandum of Understanding with the Department of Primary Industries and Fisheries relating to Australian Institute of Agricultural Sciences that will have a strong focus on biosecurity issues and animal production
- A \$40 million expansion of medicine and pharmacy facilities at the campus.

In Cairns, James Cook University is focused on field orientated public health in dentistry, indigenous health, and mosquito-borne disease. Key initiatives in which the university is involved, either at the Smithfield campus or in Cairns, include:

- development of the new Dental Surgery program
- The Australian Tropical Forest Institute in collaboration CSIRO and supported by the Smart State program
- Collaboration with Queensland Health’s Tropical Public Health Network
- Development of the Tropical Medical Mosquito Research Facility, jointly funded by the university and the Bill and Melinda Gates Foundation
- Re-development of the Cairns Hospital where the university has a substantial medical school presence and at which the final three years of medicine will be taught from 2010.

QUT Banana Biofortification for East Africa

Professor James Dale of the Queensland University of Technology (QUT) Centre for Tropical Crops and Biocommodities has been focusing on increasing the nutritional yields of Ugandan bananas to alleviate nutritional deficiencies in the Ugandan population. The project is funded by the Bill and Melinda Gates Foundation, and will potentially benefit other tropical African nations.

Queensland’s tropical health research heritage

The Queensland Institute for Medical Research, founded in 1945 to research and develop solutions to tropical diseases, has broadened their scope to include immunological, biological and molecular basis of a wide range of infectious diseases, cancers and other disorders. QIMR has an active program for patenting and commercialisation of technologies developed within the Institute.

The Queensland Government – supporting tropical expertise

The Queensland Government is increasing the levels of creativity and innovation by investing in people, ideas and partnerships. The Q-Tropics Strategy is an initiative under the *Smart State Strategy: Queensland's Smart Future 2008–2012*.

The Queensland Government is already actively supporting industry and researchers to expand the state's tropical expertise sector:

- Investing in infrastructure, skills and research: over \$60M in the past 10 years has been invested by the Queensland Government in key tropical expertise infrastructure, skills and research initiatives.
- Centres of Enterprise initiative: a Queensland Government election commitment, Centres of Enterprise for Townsville and North West Queensland and Cairns and Far North Queensland provide action plans to maximise commercial outcomes and increase tropical science and expertise, industry critical mass and research capability.
- Government commissioned R&D: across government, tropical research is being undertaken or supported to address tropical challenges and opportunities. The Queensland Department of Primary Industries and Fisheries (DPI&F), the Queensland Department of Natural Resources and Water (NRW), Queensland Health and the Queensland Environmental Protection Agency (EPA) are world-class R&D and service organisations. They focus research and other services such as biosecurity, health surveillance and resource protection to support tropical primary industries, preserve biodiversity, ensure population health and assist land, water and vegetation management.
- The Cooperative Framework on Tropical Science, Knowledge and Innovation: in 2004, Queensland, the Northern Territory and Western Australia entered into a 10-year agreement to work together to realise the potential of tropical science knowledge and innovation. Queensland is committed to this framework and the pursuit of collaborative opportunities that generate tropical knowledge creation across northern Australia.

The Queensland Government supporting tropical research

The Queensland Government has funded a range of infrastructure and research into tropical issues, including terrestrial and marine ecosystems, coral diseases, and the effects of climate change. Tropical projects that have been funded include:

- \$14M for the Australian Tropical Science and Innovation Precinct (ATSIP) at James Cook University Townsville Campus. ATSIP will provide capacity to commercialise tropical R&D for use within Australia and export markets.
- \$7.8M for the Australian Tropical Forest Institute (ATFI) at James Cook University, Cairns Campus. This is a centre of excellence resulting in better tropical forest conservation and sustainable use, including business and research opportunities. ATFI also houses the Australian Tropical Herbarium, a comprehensive tropical botanical collection and research centre for biodiversity and ecology.
- \$5M for the Tropical Marine Science Centre of Excellence to manage the State's marine resources. This includes \$3.5M for the Queensland Centre for Climate Change and Coastal Ecosystems (partners UQ [Heron Island and Gehrmann Labs] and JCU [Orpheus Island]) and the \$1.5M Centre for Marine Microbiology and Genetics Research (AIMS - Townsville).
- \$3.1M for the Mackay Renewable Biocommodities Pilot Plant assisting the Queensland University of Technology and Sugar Research Limited to commercialise sugar product and process innovations such as biofuels and biocommodity replacements for petrochemicals.
- \$1.25M for the University of Queensland's Professor Ove Hoegh-Guldberg at the Centre for Marine Studies to further study into the effects of climate change on the Great Barrier Reef and improve reef management strategies.
- \$300K for James Cook University's Dr Stephen Williams for research examining the impacts of global climate change on Queensland's tropical rainforests.
- \$150K for the Australian Institute of Marine Science's Dr Bryan Wilson for development of diagnostic tools for early detection of coral disease. The research will have implications for monitoring and conservation of the reef systems worldwide.

Tropical economy challenges and opportunities

The challenges faced by economies in tropical regions require innovative and practical solutions. If the following challenges are not addressed, they will impact on the long-term sustainability of these countries.

There are substantial opportunities for Queensland in the application of research, knowledge, products and services to address the challenges.

Health

Tropical nations have some of the poorest levels of health worldwide. Tropical diseases account for 10 per cent of the global disease burden, with at least one million deaths a year from malaria. Viral encephalitis kills 15,000 people in South East Asia annually. Developing countries in the tropics are now also experiencing lifestyle-related chronic diseases such as diabetes, heart and kidney disease. Queensland faces the possible expansion of mosquito-borne diseases such as dengue fever and malaria due to climate change effects.

Traditionally, large pharmaceutical companies have not focused on disease control and medical research related to developing economies in tropical regions, as it was not profitable. However, this role is starting to be filled by smaller companies and research organisations, especially as they partner with philanthropic and aid organisations, and governments. The World Health Organization, the Bill and Melinda Gates Foundation and international development agencies commit billions of dollars to health programs every year. In 2006–07, the World Health Organization’s budget was US\$3.3B, with other sources contributing well over US\$2B billion every year.³

The development and spread of emerging human and animal infectious diseases represents unprecedented risk for tropical regions. Australia is at particular risk from emerging infectious diseases such as SARS and avian influenza.

Queensland opportunities

Queensland has significant tropical health research and industry expertise that can assist not only Australians living in the north, but also Queensland’s tropical neighbours.

Queensland tropical health strengths and opportunities	
<ul style="list-style-type: none">• tropical disease treatment, management and research• health diagnostic products and monitoring systems• health education, management and training• remote health service delivery	<ul style="list-style-type: none">• health systems and governance• low-tech allied health equipment and delivery mechanisms• relief and health management planning pre- and post-disasters• zoonoses and pandemic surveillance and control• biotechnology and associated technology transfer

³ World Health Organization, 2006–07 Budget, Geneva, February 2006.

The Smart State Council report identified major opportunities for Queensland in the tropical health sector. In order for Queensland to advance its health and biosecurity expertise, strong partnerships and improved coordination is required by tropical health researchers, professionals, public agencies and their international counterparts.

Stronger relationships are also required between researchers and organisations that deliver health and medical products and services to tropical zones.

This increased coordination when combined with Queensland's internationally recognised expertise in tropical health will provide the critical mass and capacity required to better address tropical disease and biosecurity issues.

Queensland and tropical health

Panbio manufactures and exports diagnostic tests to detect mosquito and animal-borne viral tropical diseases, including dengue fever and Ross River fever.

JTA International is a Brisbane-based firm specialising in the provision and implementation of health services in remote and challenging environments throughout Australia, South East Asia, Papua New Guinea and the Pacific.

Ecobiotics Ltd is a north Queensland-based company specialising in discovery and early development of pharmaceuticals derived from Queensland's tropical rainforest materials. The company has an agreement with a European biotechnology company for pre-clinical stage anti-cancer compounds.

Queensland Health's Tropical Population Health Network, in partnership with James Cook University, has developed a world-first tool for combating deadly dengue fever. Early large-scale trials are showing promising results, with dengue mosquito populations on Thursday Island reduced by 92 percent following island-wide deployment of the Lethal Ovitrap, 'lure and kill' mosquito traps.

Environmental management

Forecasts indicate that some of the poorest nations in the tropical world are particularly vulnerable to the impacts of climate change. These include rising sea levels, variability in land and water surface temperatures, more intense cyclones and significant changes in rainfall distribution.

Tropical countries also face environmental challenges such as urban air and water pollution, land degradation, deforestation and biodiversity loss. These challenges are exacerbated by the international pressure on businesses to improve their environmental standards.

Queensland's Great Barrier Reef and tropical rainforests are highly vulnerable to the effects of climate change and impacts from human activities, threatening ecosystems, industry and communities alike.

Queensland opportunities

Queensland has the opportunity to export its considerable tropical expertise in environmental products, services and research solutions to these regions, a market in the Asia region that the EnviroAsia 2007 conference predicted will triple over the next decade to US\$100B per annum.⁴

Queensland tropical environmental management strengths and opportunities	
<ul style="list-style-type: none">• climate change adaptation and research• urban air quality monitoring and improvement• waste management• water management — coastal, marine and freshwater• reef and coastal protection	<ul style="list-style-type: none">• environmental governance, maintenance and compliance systems• disaster mitigation and planning• tropical mine site rehabilitation• tropical landscape management• environmental impact assessments

The Smart State Council report recommended that in order to address the challenges and capitalise on the opportunities within the environmental science and management space, Queensland needs to strategically align its significant R&D capacity in tropical environmental management.

⁴ EnviroAsia 2007, (www.enviroasia.com.sg/ea07/home.html), accessed July 2007.

Queensland and tropical environmental management

The International Water Centre in Brisbane promotes its expertise in the sustainable management of catchments and other resources in South East Asia, Latin America, Africa, China and India through education, training, provision of software and high-tech products, and skills transfer.

Tropical Energy Solutions in Townsville provides clean, reliable and sustainable energy solutions designed for the tropical environments of Australia and the Pacific.

Envirotec Group on the Atherton Tablelands has commercialised and is exporting energy efficient refrigeration, dehydration and air conditioning systems designed for tropical conditions.

Tropical primary industries

Food, fibre and biomaterials production in the future will be characterised by a more intensive, varied and sustainable agri-systems approach. This approach will seek to balance the output of enterprises with more efficient production systems and improved risk management practices for climate and market variability.

A primary concern of aid agencies around the world is the 862 million undernourished people living in the world today.⁵

Biosecurity is another key issue for tropical economies, with the introduction and establishment of exotic pests and diseases (plant, animal and human) an ever present threat to tropical agriculture, environments and communities.

Queensland can use its tropical expertise in primary industries to address the impacts of these significant issues.

Queensland opportunities

Significant opportunities exist to assist tropical regions in developing food and fibre systems to meet and alleviate these food supply and related challenges, and to mitigate and manage biosecurity threats.

Queensland's agricultural and processing technologies are among the most efficient in the world. The State is a leader in livestock production (for example, husbandry, genetics and nutrition), cropping (for example, sugar, maize, sorghum and cotton) and the production of horticultural crops in the tropics and subtropics.

Biosecurity Queensland, established by the State Government in 2007 represents an Australian first in providing coverage across the spectrum of biosecurity capabilities.

Queensland tropical primary industry strengths and opportunities	
<ul style="list-style-type: none">• beef and crop production systems• sustainable agricultural production• horticulture• aquaculture and sustainable fisheries	<ul style="list-style-type: none">• forestry and plantation management• agroforestry• biosecurity• bioproducts and technology• agricultural biotechnology• molecular farming

Queensland possesses the capacity and capability to address the requirements of tropical primary industries through its array of research facilities and networks of expertise. The Smart State Council report recommends that the primary industries sector needs stronger links with these facilities and programs in Queensland, as it is acknowledged as a major centre for tropical agricultural biotechnology in the Asia-Pacific region.

⁵ Food and Agriculture Organization of the United Nations, *High-level Conference on World Food Security: the Challenges of Climate Change and Bioenergy*, 3–5 June 2008.

Stronger links are also required with primary producers and related supply chain businesses to ensure that tropical expertise is being translated into commercially viable returns for industry.

Queensland and tropical primary industries

MBD Biodiesel, in collaboration with James Cook University, is developing tropical algae strains for the production of biodiesel in a pilot farm in Townsville.

The Sugar Research Institute at QUT has a long history of exporting its expertise in post-harvest R&D into sugar milling, power generation, sugar refinery and sugar chemistry to India, South Africa and South America.

Yuruga Nursery, Australia's largest producer of tropical rainforest plants, is now leading R&D into native plant cloning.

Tropical infrastructure and living

Tropical cities are among the fastest growing urban environments in the world. An increased standard of living in tropical nations and greater focus on environmental issues, climate change adaptation and sustainable development have combined with this urban growth to produce an increased demand for better tropical living environments. Environments that work for people and the economy.

The rise of the middle class in developing economies in tropical regions is putting pressure on governments and industry to provide a better quality of life for communities. Accordingly, demand is increasing for products, services and research in areas such as architecture, infrastructure and urban design, clothing and education. The trends in Asia of massive urbanisation within areas with similar climactic conditions to Queensland also present significant opportunities.

Queensland opportunities

Queensland demonstrates a unique commitment to providing innovative, holistic tropical living solutions and is well placed to further develop and export its expertise.

Queensland has significant expertise in developing sustainable tropical built environments that are safe, durable and responsive to the tropical lifestyles of the people who live and work in them. Queensland's tropical architecture is based on strong science and sustainability principles ensuring that design responses are developed taking into consideration the realities of climate change and to account for the materials and resources used in the construction and lifecycle of what they build.

In particular, northern Queensland researchers demonstrate world-class expertise in the development of materials that will deliver energy efficiencies and withstand the force of extreme weather events. The State's planning, architecture and engineering enterprises in Asia are highly regarded as being more attuned to appropriate environmental design than their counterparts from other countries.

Queensland's tourism industry is skilled at attracting tourists to the State's unique destinations and managing World Heritage sites with their extremely fragile and unique ecosystems. This expertise extends to sustainable tourism development, tourism futures and technology and Indigenous and cultural tourism that support tropical Queensland's tourism industry.

Queensland tropical infrastructure living strengths and opportunities	
<ul style="list-style-type: none">• infrastructure design and construction• tourism – ecotourism planning and construction• Indigenous economic, and social solutions and traditional knowledge transfer• urban living and architecture services: planning, design and construction	<ul style="list-style-type: none">• sustainable housing and construction• civil and structural engineering• emergency and disaster management, recovery and renewal• sustainable and renewable energy technology use• education and training

Queensland's tropical living expertise brings together a wide range of fields from architecture and infrastructure, environmental science, health, planning and urban design. Better coordination of this capacity will enable Queensland to develop a significant export industry based on urban design of mega cities in the developing tropical world, as identified by the Smart State Council report.

Queensland and tropical infrastructure and living

The Queensland Wet Tropics Management Authority, in an AusAID-funded project, strengthened the capacity of local government, communities and managers to operate Indonesia's Natural World Heritage Property of Lorentz National Park in Papua by providing technical and planning advice.

Cox Rayner Architects are experts in tropical and sub-tropical architecture, planning and urban design, with award winning projects in several countries in tropical regions. Their design for the Thuringowa Riverway complex in Townsville develops the city's relationship with its tropical environment and climate.

Arup is a multinational structural, civil engineering and consulting firm, with over a decade of experience in developing sustainable solutions for Australia's tropical environments. Arup's successes in tropical projects include the five-star Green Star rated William McCormick Place in Cairns, the Mamu Canopy Walkway Innisfail for rainforest ecotourism, Cairns Convention Centre and work with the Asian Development Bank assisting the Solomon Islands Government.

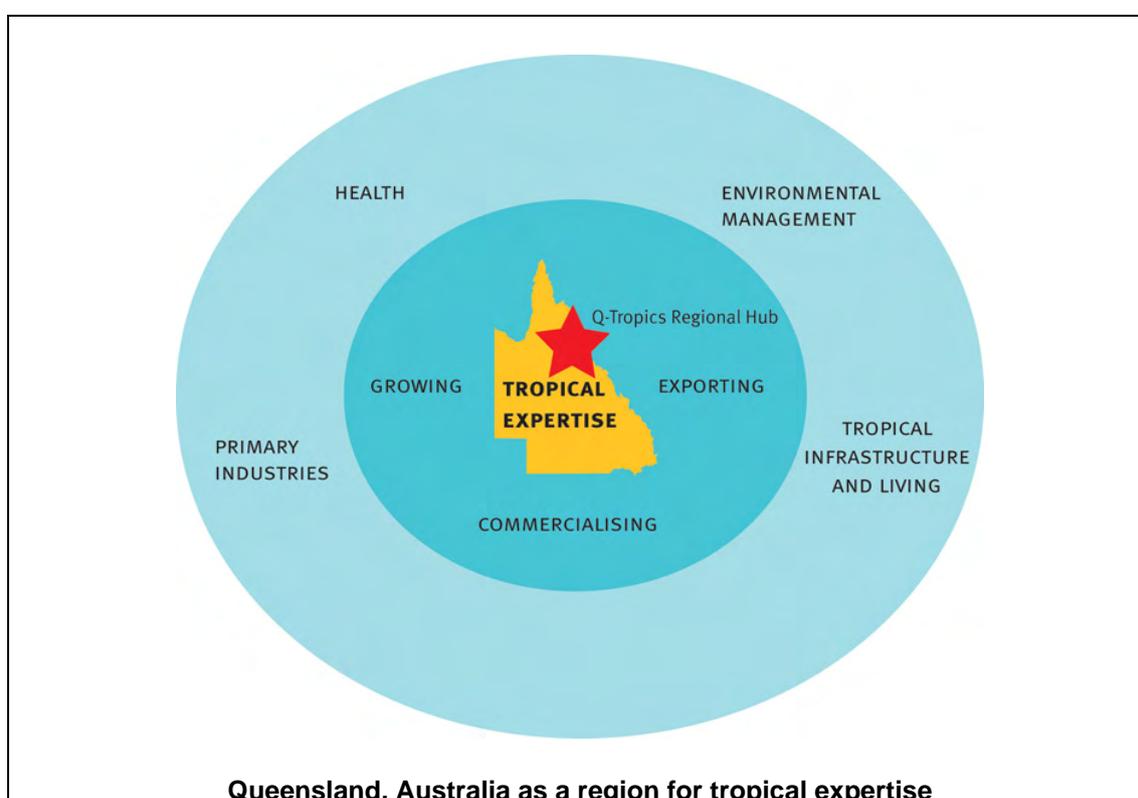
The Q-Tropics Actions

The actions proposed in this Strategy will be achieved through partnership between Government, industry, researchers and the communities across Queensland and northern Australia. The Q-Tropics Strategy launches over \$20 million in new initiatives as well as drawing upon a range of supporting funding initiatives.

Queensland has an impressive foundation in tropical knowledge and research that requires greater coordination and integration to ensure the formation of critical mass. The key to consolidating Queensland's position as a global region of tropical expertise is the strategic alignment, coordination and consolidation of this tropical ability with a focus on strengthening northern Queensland's capacity and capabilities.

The key themes for the actions are:

- **Growing** tropical expertise — establishing Queensland and Australia as a global region for tropical expertise and forging collaborative links among researcher groups, industry, private investors, corporate and philanthropic funding sources, and international institutions.
- **Commercialising** tropical expertise — translating tropical research and knowledge into commercial outcomes
- **Exporting** tropical expertise — increasing market awareness of Queensland's tropical expertise by marketing and branding this expertise and strengthening the capacity of businesses to win contracts at home and abroad.



Growing — a world-class centre for tropical expertise

Queensland has a strong tropical research capability. Through the Q-Tropics Strategy, the Queensland Government will strengthen collaboration and improve communication and coordination between researchers, industry, investors and philanthropic organisations, positioning Queensland as a world-class centre for tropical expertise. The specific actions detailed below:

- **Q-Tropics Alliance**

An independent Q-Tropics Alliance will be established comprising key industry and research leaders. The Q-Tropics Alliance will advise Government and provide strategic oversight of the Q-Tropics Regional Hub.

- **Q-Tropics Regional Hub**

The Q-Tropics Regional Hub will be situated at James Cook University Townsville Campus, and network commercialisation managers and researchers across the State with other jurisdictions. The Regional Hub will lead the commercialisation of the State's tropical expertise and broker tropical expertise contracts nationally and internationally.

A key role of the Regional Hub would be the establishment of spin-off companies and the development of licensing agreements based on the research and development produced.

A brokerage facility function within the Regional Hub will also work with industry and business to utilise and partner in the knowledge being developed in Queensland. The Regional Hub will also work to attract the interest of philanthropic bodies, multinational companies and venture capital companies.

Up to \$150,000 will be available to deliver annually agreed activities of the Q-Tropics Regional Hub in forging collaborative relationships among commercialisation and research arms of Queensland institutions.

Additional funding from the Centres of Enterprise initiative will be accessed and individually approved by the Queensland Government, Department of Tourism Regional Development and Industry for tropical science and expertise activities.

- **Business Development Manager**

Up to \$450,000 will be designated to engage an independent Business Development Manager based at James Cook University over three years to establish, drive and support the functions of the Q-Tropics Regional Hub.

The Queensland Government will fund 100 percent of the role in the first year, 50 percent in the second and 25 percent in the third year with funding contributions expected from other sources such as Queensland's research institutions.

Supporting actions

The Queensland Government is also supporting tropical expertise through a range of funding commitments. Tropical expertise is to be established as a priority area under the Queensland Government's \$80M Smart Futures Fund.

- \$19.45M through the Queensland Government's Innovation Building Fund to James Cook University (JCU) to lead a Queensland Tropical Health Alliance. JCU will partner with Queensland University of Technology, the Queensland Institute of Medical Research, Griffith University and potentially other partners. The alliance will undertake tropical health and medical R&D in the areas of disease surveillance and control, new product development and drug and vaccine trials.
- \$1.86M to the University of the Sunshine Coast through the Innovation Projects Fund to establish the Smart Forests Alliance Queensland. The project's collaborative partners include the Northern Territory Department of Primary Industry and Fisheries and Mines, Ensis, DPI&F, Integrated Tree Cropping Ltd and Forest Enterprises Australia Ltd. The alliance will use world-leading biotechnology to speed up production of fast growing trees for tropical and subtropical forest plantations.
- \$1.41M to the University of Queensland for the Korea–Australia Bio-product Alliance through the Innovation Projects Fund. The alliance will deliver platform technologies necessary to convert sugar into fuels and higher value products. Project partners include the Korea Advanced Institute of Science and Technology and the CRC for Sugar Industry Innovation through Biotechnology.
- \$1.15M to UQ for the Smart Environmental Monitoring and Analysis Technologies Initiative through the Innovation Projects Fund. It will investigate new architectures for building marine sensor networks and the associated collection, communication and presentation of data. Partners include the Queensland Cyber Infrastructure Foundation, JCU, Politecnico di Milano, Torino Foundation and the Danish Hydraulics Group

Other initiatives

- a formal collaborative science alliance between the DPI&F and JCU will be established to strengthen the research and development underpinning the tropical agri-food, fibre, biosecurity and fisheries industries.
- develop a tropical arm at Townsville for the Australian Biosecurity Intelligence Network (ABIN) in conjunction with the National Collaborative Research Infrastructure Strategy (NCRIS). ABIN will provide a national biosecurity collaborative platform that enhances biosecurity research, surveillance and response capability.
- Support the establishment a tropical node of the Terrestrial Ecosystems Research Network (TERN), linking South East Queensland with Cairns, Townsville, and Darwin. The node would support tropical ecosystem research and associated governance and data management systems.

Commercialising — translating tropical research into commercial outcomes

Queensland has a clear comparative advantage in tropical expertise research and products. Queensland's competitors are building their own tropical expertise knowledge-based industries rapidly and this advantage will not last.

Accelerating Queensland's commercialisation efforts to stay ahead of our competitors will require strong links between industry and researchers. This will ensure that tropical expertise is being translated into commercially viable and beneficial returns for research institutions, industry and the wider community.

The Trop-Comm Initiative

The Trop-Comm Initiative includes a suite of support services to commercialisation of Queensland's tropical expertise under the Q-Tropics Regional Hub, including:

- **R&D Forums and Technology Clinics**

R&D Forums and Technology Clinics will be undertaken to prioritise tropical industry and research needs and identify and address specific opportunities. The forums and clinics will facilitate better collaborative research programs and relationships, research and development proposals, as well as the identification of intellectual property issues. As a result, industry and research will be well positioned to leverage funding from other sources.

- **UniQuest Commercialisation Manager**

A one-off grant of \$375,000 will engage a UniQuest Commercialisation Manager at James Cook University to drive the commercialisation of tropical expertise research across the university's Cairns and Townsville campuses.

Supporting actions

Through the *Smart State Strategy 2008–2012* and other initiatives, the Queensland Government will launch a suite of innovation initiatives that will support the commercialisation of Queensland's expertise, including tropical:

- engagement of an Innovation Coach for North and Far North Queensland, and the launch of a suite of business commercialisation services through the Queensland Wide Innovation Network (Q-WIN) Program and the Smart Industry Toolbox Program, with a significant emphasis on tropical expertise. The Innovation Coach will build capability in tropical expertise firms, and provide specialist support in terms of commercialisation, access to capital, links to R&D and technology solutions and guided access to targeted innovation programs.
- formation of Investor Networks to connect business and researchers with strategic and financial partners. These Networks will assist tropical Queensland businesses and researchers maximise the potential to find the allies they need in order to commercialise and grow.
- a new \$4M Proof-of-Concept Fund to help to address the funding gaps in research commercialisation.
- a \$4M Commercialisation Fellowships and Entrepreneurs-in-Residence Program to allow the exchange of leading minds in industry and research to commercialise research discoveries.

Exporting — to increase market awareness of Queensland’s tropical expertise and strengthen the capacity of Queensland businesses

It is important to ensure that Queensland firms and researchers with tropical expertise have the capacity, capability and opportunity to link into supply chains, win tropical expertise contracts and promote their expertise internationally.

The Trop-Ex Initiative

The Trop-Ex Initiative will provide a suite of support services for the Q-Tropics Regional Hub to progress the export of Queensland’s tropical expertise, including funding of the following activities:

- \$190,000 to support a Q-Tropics brokerage based in Cairns that will bring together consortia of firms and researchers to collaboratively bid for major projects.
- \$150,000 to support trade missions, a targeted marketing campaign, and awareness raising to enhance the Q-Tropics profile for business opportunities in developing tropical economies and with multinational companies.
- \$150,000 for an international symposium and conference on tropical expertise and to support a series of “leading expert events and seminars”.
- \$100,000 to support the development of an industry identifier/brand that could be used by industry and researchers to market their tropical expertise and bundled contract offerings.
- the development of a tropical expertise industry and research capability profile to complement the marketing effort.

Centres of Enterprise initiatives

Through the Queensland Government’s Centres of Enterprise initiative, regional firms in Cairns and Townsville will initiate a targeted business capability and marketing campaign for businesses who supply tropical related products and services nationally and to developing countries. This will include:

- a campaign to link regional tropical expertise businesses with South East Queensland firms
- roll out of business capability, skills and capacity initiatives
- establishment of a business capability database and communication network
- domestic and international trade missions.

Supporting actions

Trade Queensland will assist in ensuring more exports for Queensland’s tropical expertise through the following actions:

- Trade Queensland will continue to identify export opportunities in tropical developing economies and pursue them through their relationships with international development agencies.

Other initiatives

Other supporting initiatives from the Queensland Government are as follows:

- Launch a tropical design and architecture initiative to position Queensland firms to capitalise on the opportunities presented by the urbanisation of developing tropical economies. This will include:
 - building on the Queensland Government's HEAT initiative to promote and sell Queensland architectural and design services with a particular focus on environmental and tropical expertise. The Queensland Government will host and participate in international events, lectures and seminars to increase market awareness of Queensland's tropical architecture and design expertise.
 - incorporating tropical design principles in new public infrastructure and affordable housing projects to showcase Queensland's environmental and tropical expertise
 - establishing tropical expertise design consortiums to broker and win national and international infrastructure, environmental, architectural, engineering, science and design contracts.
- through the *Smart State Strategy 2008–2012*, undertake a community engagement program to promote and build community pride in Queensland's tropical expertise. Activities will include:
 - a public awareness campaign bringing internationally renowned researchers to Queensland regions to showcase the valuable contribution this research makes to the tropical world economy
 - public participation opportunities enabling regional Queenslanders, including Indigenous communities, to be involved in open dialogue with research leaders about the future of their tropics
 - a promotional strategy to highlight the outcomes of Smart State funding into tropical science, technology and innovation.
- ensure that sectoral action plans from the Department of Tourism, Regional Development and Industry include targeted tropical expertise industry development actions for environmental management, food processing and tropical living (creative industries and tourism).
- ensure continuing and expanded access to markets for tropical primary industry products through ongoing development of sanitary and phytosanitary protocols by the DPI&F.

“As the only subtropical/tropical developed region in the Asia–Pacific region, Queensland is in a unique position to assist developing regions confronted by increasing environmental challenges. By combining teams of urban designers and architects with our marine and environmental scientists, engineers, sociologists, health planners and economists, Queensland can offer holistic strategies in ways no other region can. These strategies will epitomise the collaborative ethos of the Smart State, while generating solutions for long-term sustainability throughout the Asia–Pacific region.”

Michael Rayner
Cox Rayner Architects