Minister’s foreword

The Queensland Agricultural Land Audit identifies land that is important to current and future agricultural production throughout the state.

It is an initiative supporting the Newman government’s vision for agriculture in Queensland, and plans for a bigger, stronger and more productive agricultural sector as one of the four pillars of the Queensland economy.

This audit highlights the diversity and importance of Queensland’s agricultural land, which supports a wide range of industries across regional and rural areas, and contributes an estimated $14.7 billion to the Queensland economy each year.

It has been more than 30 years since an equivalent study of this nature has been undertaken and, during that time, significant changes have occurred:

- There has been increasing pressure on farmers to consolidate and innovate in the face of declining terms of trade and increasing mechanisation of farming systems.
- The population has more than doubled and become increasingly urbanised.
- Demand for non-agricultural land use such as housing, infrastructure, industry, mining, energy, recreational uses and conservation has grown and will continue to grow.

The challenge ahead is to balance the demands on agricultural land resulting from those changes, while adapting and planning for future needs.

The Queensland Government is focused on doubling the value of agricultural production by 2040. This audit will help guide investment in the agricultural sector and inform decision-making to ensure the best use of our agricultural land.

It will help coordinate program delivery across Queensland and assist land planners and decision-makers by identifying areas for prime agricultural development.

The release of this audit is part of this government’s commitment to planning for and working with agriculture, aquaculture and forestry industries and rural and regional communities to achieve growth.
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This audit could only be conducted with the collective input of many people knowledgeable in the development of agricultural industries. Thanks go the following groups—thanks also go to the many individuals who contributed to this audit, who are too numerous to acknowledge personally.

Overseeing committee

The Queensland Agricultural Land Audit Overseeing Committee was established to provide advice regarding the audit process, including methodology approach, information sources, reporting style, communication and draft reports. The committee was appointed by the Honourable Dr John McVeigh, Minister for Agriculture, Fisheries and Forestry:

- David Farley, Chief Executive Officer, Australian Agriculture Company
- Linton Brimblecombe, Lockyer Valley vegetable grower
- Steve Greenwood, Chief Executive Officer, Canegrowers
- Joanne Grainger, President, Queensland Farmers’ Federation
- Brent Finlay, AgForce representative.

Government agencies

The development and delivery of the audit was a collaborative process across several Queensland Government agencies. While the Department of Agriculture, Fisheries and Forestry led the audit, it would not have been completed without scientific and regional expert input from the following agencies:

- Department of Science, Information Technology, Innovation and the Arts
- Department of Natural Resources and Mines
- Department of State Development, Infrastructure and Planning
- Department of Transport and Main Roads.
1.1 Introduction

The Queensland Government committed to undertaking an audit of agricultural land in Queensland. The objective of the Queensland Agricultural Land Audit was to identify land important to current and future agricultural production across Queensland.

The audit considers all land across the state where natural resources are, or could be, used for agricultural activities. The audit analyses agricultural production activities up until the product leaves the farm gate, including:

- broadacre cropping
- sugarcane
- grazing
- intensive livestock
- horticulture
- forestry.

The audit provides information regarding socio-economic data, overlapping land uses, infrastructure and other opportunities and constraints to agricultural development, enabling Queensland to better identify and plan for future food production. Queensland’s 12 regional planning areas form the basis of each regional chapter, including analysis of issues at the state level (see Map 1.1 for the regional boundaries used in the audit).

The audit was prepared at a point in time and based on available information. Knowledge about agricultural industries and natural resources is always expanding and the audit will be revised to reflect significant new information.

Report structure

The statewide overview provides an analysis of production and issues at a state level. Each regional chapter includes the following sections:

- Regional agricultural profile
- Current and potential agricultural land use
- Data confidence
- Sources of information.

The maps for each region are placed at the end of the chapter—cross-references to the maps are provided throughout the report.
Map 1.1 Regions and local government areas

Queensland
Regions and local government areas (LGAs)

Legend
- Region boundaries
- LGAs

Datum: GDA 94  Projection: Geographic

Locality map
1.2 Growth of agriculture in Queensland

Agriculture has long been a significant feature of the Queensland economy—the industry has grown and evolved as markets, infrastructure and services have evolved. The Queensland agricultural industry will continue this tradition for some time yet.

Grazing has always been a dominant part of agriculture in Queensland. Between 1840 and 1860, there was significant settlement of pastoral land, primarily for grazing sheep for wool. Wool production was an important commodity—a valuable export product, non-perishable and in high demand. By 1860, there were 3.5 million sheep and 500,000 cattle, and pastoral concerns generated 70 per cent of Queensland's revenue and represented over 90 per cent of exports. Cropping was limited to the eastern Darling Downs, where large pastoral properties were subdivided into smaller properties in the 1870s.

Land regulations introduced in 1860 permitted one-year licences on properties or 'runs' of 100 square miles, and the grazing industry expanded rapidly. The industry was further strengthened by the tapping of artesian water from 1880, which provided a reliable water source for livestock. The extension of railways enabled efficient transport of wool for export and livestock to processing works on the coast, and the establishment of stock route networks enabled the movement of cattle to railways for loading. The development of refrigeration technology after 1883 meant that shipments of beef and mutton could be sent to overseas markets.

By 1892, sheep numbers peaked at 21 million and cattle at 7 million shortly afterwards, but drought, dust-storms, strike action, economic depression and tick fever led to a decline in stock numbers.

Farm selections on the Atherton Tableland began in 1882, mostly for dairy farms. A butter factory opened north of Atherton in 1909 and by 1917, 330 dairy farmers were supplying the factory. A railway opened between Cairns and Mareeba in 1893 and it was extended to Atherton by 1903. Atherton and Mareeba provided markets, transport and social infrastructure to support the growing agricultural industries. With the construction of the Tinaroo Dam for irrigation in post-war reconstruction, farming diversified into cereals, feed crops, pigs and beef cattle.

Across eastern Queensland, brigalow was cleared from the early 1900s to access the fertile clay soils underneath. There were problems with thick regrowth and prickly pear. The practice of feeding prickly pear to stock in the drought of 1901–02 spread the species—by 1926, prickly pear was so thick in places that settlers abandoned their properties. In the late 1920s, the cactus moth (Cactoblastis cactorum) was used to successfully control prickly pear and by 1934 it had ceased to be a problem.

In 1962, the Brigalow Development Scheme began and was the first 'closer settlement' policy that provided a combination of transport infrastructure, generous financial assistance in the form of interest-free loans and large, economically viable holdings. The majority of settlers were selected through a ballot process. Previous agricultural experience was required and the brigalow land had to be cleared and developed. Within 5 years, 30 per cent had been cleared in the areas around Taroom, Baughinia, Duaringa and parts of the northern brigalow belt. The intention of the government was to maintain a minimum of 10 per cent vegetation on each property in the form of shade lines. However, much of this vegetation was destroyed in the very hot fires that resulted from burning piles of 'pulled' brigalow, and clearing evolved into a practice that typically left little or no remnant vegetation.

The Nogoa–Mackenzie water supply scheme near Emerald and the Burdekin Falls Dam and associated water supply scheme south-west of Townsville were established in 1968 and 1987 respectively to meet agricultural, urban and industrial water requirements. The main crops irrigated near Emerald are cotton, citrus and grapes. The main crops irrigated from the Burdekin–Haughton water supply scheme include sugarcane and horticulture. These irrigation schemes have enabled production and incomes to stabilise, with flow-on benefits to the local and regional communities.

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1 Closer settlement schemes involved providing land, usually in smaller blocks than previously existed, to encourage settlement and agricultural development of sparsely settled areas. It was usually associated with soldier settlement and land was either owned by the crown or large properties were purchased.
From the 1930s to the 1980s, the Queensland Government established softwood plantations for sawlog production in coastal areas, primarily in the south of the state. Hardwood plantations in Queensland were established from the late 1990s by private investors and the Queensland Government. The plantation forestry estate on state-owned land was licensed, and on freehold land sold, to private interests in 2010 by the Queensland Government.

### 1.3 Best practice

Towards the end of the 20th century, there was a growing awareness of the need for land management practices to protect the soil and water resources that sustain agricultural production. In recent decades, there has been a significant investment in improving land management—in recognition of the role land condition plays in productivity, long-term viability of the industry and off-site impacts.

Improved soil conservation practices introduced in the 1980s and 1990s resulted in greatly reduced soil loss from cropping lands in the Darling Downs and Central Highlands. These practices included stubble retention, reduced tillage and contour construction, and also improved soil structure and fertility.

The introduction of green-cane harvesting in the last 20 years has led to an improvement in soil health and production, and reduced off-site impacts. Green-cane harvesting markedly reduces soil erosion, helps control weeds, improves soil structure, conserves soil moisture and reduces fertiliser requirements.

Breeding for climatic conditions and markets, and improving land condition and herd management have been the focus of best practice in the beef and sheep industry, and present the most significant opportunity for growth. Cattle are bred to comply with meat quality market specifications and cope with climatic conditions (such as regular, long periods of dry conditions) and external and internal parasites. In North Queensland, Brahman cattle (*Bos indicus*) were crossed with British beef herds in the early 1900s and, over time, the Droughtmaster breed was developed. During the 1980s and 1990s, there was a rapid improvement in the beef herd to meet both market standards and environmental conditions.

### 1.4 Recent developments

Agriculture has become more diverse and increasingly export-oriented since the 1980s, and now includes some non-traditional commodities and processed products. There are several niche processing facilities for products such as gourmet dairy products, sauces, dried fruit and vegetables, and frozen vegetables.

There are growing market-specific opportunities—for example, grass-fed ‘branded’ beef and sheep. There are also opportunities for organic produce. In the western regions, organic beef is cost-effective and reliable because drier conditions reduce the risk of pests and diseases.

Terms of trade have been declining for farmers in recent decades. Productivity growth has been the primary method to manage this decline. For example, over the past 33 years, Australian broadacre farmers have reduced their inputs by 0.8 per cent per year and increased their outputs by 0.5 per cent per year.²

There is a high level of debt in the beef industry.³ In some regions, the price of land does not reflect the returns from grazing. This is making investment in the cattle industry difficult, particularly when combined with the currently high Australian dollar.

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1.5 Future development

The Queensland Government's vision for agriculture, fisheries and forestry is for an efficient, innovative, resilient and profitable sector. In support of this vision, the Queensland Government has set a clear, ambitious target of doubling agriculture, fisheries and forestry production by 2040.

To achieve this target, the Queensland Government has developed Queensland’s agriculture strategy. The strategy provides the context and framework for the Queensland Government to work with industry, researchers and stakeholders to focus efforts and resources on addressing the four key pathways to grow—securing and increasing resources availability, driving productivity growth across the supply chain, securing and increasing market access, and minimising the costs of production.

The first pathway is resource availability, enabling agricultural growth through optimal use of critical resources including land, water, labour, capital, fisheries and forests. The natural resource base is under increasing pressure from a number of factors, including an expanding resources sector, growing population, inefficient or degrading practices and increasing climate variability. In addition, there is a skills shortage, an aging population and declining profitability. The strategy outlines a number of commitments to address these issues, including improving access to water while meeting long-term environmental requirements, managing conflicting land use, improving land management and investing in capital such as infrastructure, transport and technology.

The second pathway is increasing productivity through innovation across the supply chain and investment in biosecurity. Global productivity growth in agriculture has slowed in recent decades, but continued growth is needed to increase food production in order to feed the global population in the future. Supply-chain impediments and opportunities will continue to be investigated and addressed to improve production. Productivity growth requires the development and adoption of innovation across the supply chain. Continued investment in research, development and extension will lead to the development of better genetics, production systems and business decision-making tools, ensuring Queensland producers can adapt to environmental changes and market conditions. This will enhance business resilience and enable better risk management, including climate and biosecurity risks. The strategy includes a range of innovation investments and partnerships to increase productivity growth.

The third pathway is markets. Market access and demand are a key determinant of agricultural growth, and securing current markets and accessing new export markets will be vital to the sector’s ongoing success. Market access and demand can be achieved through consumer-targeted research and development across the entire supply chain. Identifying and unlocking supply-chain impediments and opportunities will be important to improving market access for Queensland produce. Queensland's favourable agricultural disease status and strong environmental management enables active marketing of high-quality, safe products and provides market branding opportunities.

The fourth pathway is reducing production costs. The rising costs of inputs, regulatory compliance and the logistics of supplying markets affects the profitability and viability of Queensland's producers. The challenge for the sector is to minimise the cost of production while continuing to ensure reliable access to inputs. The Queensland Government will explore a range of supply-chains issues that impact production costs. Across the supply chain, water and electricity are critical inputs—access to cost-effective energy and water is vital to minimise production costs. Regulatory compliance reduces flexibility, which can constrain growth. Improving infrastructure such as transport, storage and processing improves efficiencies along the supply chain and provides new investment opportunities.

These pathways will be underpinned by a commitment form the Minister for Agriculture, Fisheries and Forestry to be the point of leadership—working across government and with industry to drive initiatives and help the sector grow.
Chapter 2

Queensland Agricultural Land Audit

Methodology
2.1 Methodology

A fit-for-purpose framework has been developed to underpin the audit (the full framework is explained in a separate technical report). The information below provides an overview of the audit methodology. *The Queensland Agricultural Land Audit method: technical report* fully explains the methodology used.

Agriculture is defined as activities associated with the production of food or fibre, up until the product leaves the farm gate. This definition includes a very diverse range of activities involved in the production of a wide range of commodities, each with potentially unique land requirements and other inputs.

The broad groupings of agricultural land-use categories used in the audit are:

- broadacre cropping (rain-fed and irrigated)
- sugarcane
- annual horticulture (mainly vegetables) and perennial horticulture (mainly fruit and vine crops)
- grazing (sown and native pastures)
- forestry (plantation and native)
- intensive livestock (beef, pigs, poultry and aquaculture).

For efficient validation and delivery of outputs, each region was analysed using the following steps:

- establish regional context
- map current agricultural land use
- map agricultural land-use potential
- identify areas important to agriculture
- validate maps and information
- synthesise, interpret and report.

2.2 Data sources

A profile of the key economic, social and natural resource conditions that are important to agriculture are documented for each region. This is based on a range of statistical data and information sources.

A map of the current land use for each region is provided. Most of the current land-use information used in the audit has been obtained through the Queensland Land Use Mapping Program (QLUMP).

Within the industry analysis for each region, current locations of intensive livestock and forestry industries are based on additional data.

The current locations of intensive livestock production facilities are derived from data from the Intensive Livestock Environmental Regulation Unit, within the Department of Agriculture, Fisheries and Forestry (Queensland). The area for intensive land use and location of current aquaculture were based on QLUMP data. The location of egg producers was based on Safe Food Production Queensland Egg Register as at October 2012.

Current plantation forestry locations were developed from data from the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), HQPlantations Pty Ltd and Forest Enterprises Australia Holdings (FEA Holdings).

For each agricultural land-use category, the potential area for expansion was overlaid on current land use.
For cropping industries, a multi-layer approach was used to identify the potential area, combining soil types—using the agricultural land class system developed across the state—with other biophysical features and business requirements for each of the agricultural land-use categories. Biophysical features can include slope, rainfall and groundwater where relevant to a specific region and/or agricultural production system. Business requirements that reflect access to infrastructure or inputs (such as distance to processing) are displayed where relevant for information.

For native forestry, the potential area was based on regional native vegetation community mapping that contains known commercial species of a potential height, which indicates if it is of adequate quality to produce commercial quantities of timber. These are rated as high, medium or low potential.

For grazing, annual biomass production was modelled and refined based on tree cover and land condition to show the difference in pasture production for grazing across a region. This is rated as high, medium or low pasture production. The suitability of an area to be sown to pastures was based on land types and tree cover.

Descriptive information that interprets the findings on maps and/or explains the agricultural potential and constraints of agricultural development in the region was based on expert opinion from the Department of Agriculture, Fisheries and Forestry (Queensland) and other Queensland Government departments.

Important agricultural areas are defined as land that has all of the requirements for agriculture to be successful and sustainable, is part of a critical mass of land with similar characteristics and is strategically significant to the region or the state.

The significance of a critical mass of current and potential agricultural land was based on consideration of a range of criteria that reflect the current (or potential) contribution that the land can make to the region and the state economically and socially. These criteria include:

- current or potential contribution of agricultural development of the area to economic activity and employment (and other social factors) in the locality, region or state
- strategic importance of the area for continuity and consistency of supply of particular products or markets locally, nationally or internationally
- extent of investment required to develop the land for agriculture (e.g. through construction of irrigation schemes, grain storage facilities or saleyards).

A process of expert validation was used to ensure the regional audits are as practical and accurate as possible to inform regional-scale decisions. Experts were consulted during the course of the audit for advice on developing the methods and selecting datasets and information sources. Draft reports were also reviewed by Queensland Government experts in agricultural science, land resources and regional services. This includes staff from various Queensland Government departments with expertise in and knowledge of the different land-use categories and each region.

### 2.3 Data confidence

Only existing datasets that cover the whole state and are suitable for strategic or regional-scale analysis were used. The audit indicates areas where more detailed investigation of the opportunities or constraints of agricultural development is warranted. However, the outputs are not suitable for direct application at a scale finer than the whole region, such as local government or property scale.

The outputs include varying degrees of confidence depending upon the scale of existing data used for inputs. A description of this level of confidence is included for each region.
Mapping of agricultural land class was based on a range of land resource datasets, many of which are at different scales or level of detail. The data confidence is related to the scale at which the mapping was conducted and the level of information that was assigned to each map unit by the mapping team. In some locations, no suitable data was available and this is shown as a grey area on the map. A data confidence map is also provided for each region.

QLUMP data is point in time, ranging from 1999 to 2009. Therefore, it is possible that land use in some locations will be different to the mapping. Apart from forestry and intensive livestock (where more up-to-date and specific datasets were available), QLUMP data represents the best available dataset for the other land uses and was used to identify current areas of agricultural production.

There were also more accurate and up-to-date plantation forestry datasets available from ABARES and FEA Holdings. As there are differences between the current Intensive Livestock Environmental Regulation Unit data, forestry information and the QLUMP dataset, the current land-use information based on QLUMP data does not represent exact and current figures for land area, but relative areas between the different land-use types. Intensive livestock operations represent relatively small areas of land. Therefore, differences in datasets for intensive livestock are not likely to significantly impact on the relative proportions of other land uses.

When determining the potential for each of the different land uses, a number of assumptions had to be made (as a result of issues such as uncertainties in the mapping). The net result of these assumptions is that the area figures contained in this report overestimate the true potential area for each agricultural land-use category.