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Information Paper

A Methodology for Estimating Regional Merchandise Exports

**Including Experimental Estimates
for Three Queensland Regions**

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Estimating Regional
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**Including Experimental
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Regions**

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AUSTRALIAN BUREAU OF STATISTICS

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PREFACE

In 1996–97, exports of goods earned \$81m for Australia. Over the period from 1994–95 to 1996–97, exports of goods grew by 20.6%. This growth has impacted on industry, in many ways, and has had significant effects on regional economies. Both State and local governments continue to seek information on origin of exports to enable them to measure the effect of export activity on defined regions. They also require a method of measuring the response to policies and initiatives that have been designed to stimulate growth.

The Australian Bureau of Statistics (ABS) is the source of Australia's international trade statistics. For merchandise exports, statistics are available classified by State of Origin (i.e. the State in which the final stage of manufacture or production occurs) and State of Loading and Port of Loading (i.e. the State and port in which the goods are loaded on to the ship or aircraft to be exported; this could be the same as, or different from, the State of Origin). Statistics are not available for exports classified by region of origin.

This information paper discusses a methodology that has been developed by the ABS and can be used for estimating merchandise exports for some regions of Australia. The methodology has been applied to three regions in Queensland and the resulting experimental estimates of merchandise exports are included in this paper. It is doubtful if estimates for capital city regions could be made because of their diverse industrial bases and the lack of information on a number of their industries.

For more details on issues covered in this information paper or to obtain a quote for producing estimates, contact Sally Barrett on telephone (07) 3222 6083, fax (07) 3222 6283, or email sally.barrett@abs.gov.au. Comments on this paper are also welcome.

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Regional Director, Queensland.

ABBREVIATIONS AND SYMBOLS

ABS	Australian Bureau of Statistics
AFMA	Australian Fisheries Management Authority
ANZSIC	Australian and New Zealand Standard Industrial Classification
AHECC	Australian Harmonised Export Commodity Classification
ASGC	Australian Standard Geographical Classification
AQIS	Australian Quarantine and Inspection Service
Customs	Australian Customs Service
DPI	Queensland Department of Primary Industries
DSD	Queensland Department of State Development
NTC	National Trade Consultations
QFMA	Queensland Fisheries Management Authority
QRail	Queensland Railways
SD	Statistical Division
n.a.	not available
nec	not elsewhere classified
n.p.	not available for publication
. .	not applicable
—	nil or rounded to zero

CHAPTER 1

INTRODUCTION

In late 1997, the ABS responded to the increasing demand for regional statistics by devoting resources to the development and provision of a range of new statistics for regional Australia.

Around the same time, the Queensland government was developing international trade action plans for regional Queensland. At the 1997 National Trade Consultations (NTC) Ministerial Meeting, the Queensland government raised the problem of the lack of export data at the regional level and identified it as an impediment to delivering well-targetted services to rural and regional exporters. NTC ministers agreed that officials should conduct research to determine whether mechanisms for obtaining regional exports data could be developed.

The Export Industry Consultative Group made inquiries of the ABS and the Australian Customs Service (Customs). It was discovered that a review of Custom's EXIT (export data) collection system was being undertaken. Modification of the EXIT system to allow the tracking of region of origin for exports would impose a prohibitive cost, both in terms of the modification itself and subsequent efficiency losses in completing the additional information.

An examination of the data items reported on export entries was subsequently undertaken by the ABS. In particular, attention was paid to name and address details. A feature article entitled 'Measuring Exports by Region of Origin' was included in the March Quarter 1999 issue of *International Merchandise Trade, Australia* (Cat no. 5422.0). The article reported on the examination of the data items collected by Customs to determine whether any of them would provide useful indicators in determining the region of origin of exported goods. The ABS concluded that the owner address and contact details were too often not reported or reported inaccurately for this information to be useful. A different approach or data source was needed to obtain the region of origin of merchandise exports.

The Queensland office of the ABS consulted with the Queensland Department of State Development (DSD) to discuss alternative methods to measuring exports.

PROJECT OBJECTIVE

The project objective was to develop a methodology to estimate international merchandise exports for Australian regions by utilising ABS and non-ABS data and information.

The first phase of the project included the development of the methodology and the production of experimental estimates for one Queensland region. The Mackay Region was chosen as it was one of the four pilot regions selected by DSD for its export promotion work. The estimation of data for the Mackay Region successfully demonstrated that the methodology produced meaningful information.

PROJECT OBJECTIVE

continued

The second phase of the project was to apply the methodology to other Australian regions and produce estimates to demonstrate its applicability across a variety of regions. After the presentation of the Mackay Region report to DSD, the ABS proceeded to test the methodology on two more Queensland regions. The regions selected were two of DSD's: Central Highlands and Bundaberg. These regions had different characteristics from the Mackay Region in terms of size, location and export commodities and industries and it was assumed that the diversity between the regions would test the methodology and highlight strengths and weaknesses.

CHAPTER 2

SUMMARY OF METHODOLOGY

A METHODOLOGY FOR REGIONAL EXPORTS

The methodology for the estimation of regional merchandise exports involved the definition of the geographic area of study and then the determination of the significant industries and commodities of production, for the region. Further research was then conducted to identify the distribution channels for these industries and commodities. This research revealed either defined pathways to various ports or seasonal and/or predictable patterns of availability in different regions. Information gathered during the research phase was used in conjunction with ABS economic statistics to produce estimates of exports for each of the defined geographic areas. A summary of the process applied is listed below.

- (i) Economic data for Queensland and the defined region were gathered and tabulated, including business counts, exports, agricultural and manufacturing industry data. The data were analysed to determine significant export commodities and industries for the defined region.
- (ii) Research was conducted into the possibility of obtaining information for the commodities and industries identified from government and industry organisations. The subject region's development board was consulted on the appropriateness of selected commodities and industries.
- (iii) Tables of export quantities and values for the defined region, for the years 1994–95, 1995–96 and 1996–97, were produced. The tables were then checked by DSD and the appropriate regional development board, to ensure that all estimates were reasonable. It should be noted that all regional merchandise exports data in this paper are experimental estimates.

The process is described in more detail below.

SELECTION OF SIGNIFICANT INDUSTRIES AND/OR COMMODITIES WITHIN A REGION

For this analysis, an industry's or a commodity's significance was interpreted as both significant in terms of contribution to the regional economy and significant in terms of contribution to State production.

The steps in the selection process employed were as follows:

- (i) Business counts for the defined region were obtained from the ABS Business Register and compared with Queensland exports data. Both were classified by the Australian and New Zealand Industrial Classification (ANZSIC) at the industry class level. This step identified industries in the defined region for which no exports were recorded at State level, and they were eliminated from the study. This step resulted in a list of industries for the region where some export activity was evident at the State level during the reference period. The list was used and refined in subsequent steps involved in the selection of significant industries.

SELECTION OF SIGNIFICANT INDUSTRIES AND/OR COMMODITIES WITHIN A REGION *continued*

- (ii) The turnover for the region's manufacturing industries, which had exports recorded at State level, was obtained from the Manufacturing Census by ANZSIC class level. The regional turnover data were compared to State turnover data and to Queensland exports by ANZSIC class level¹. Industries where the value of turnover was 20% or more of the value of State exports and/or State manufacturing turnover and/or total regional manufacturing turnover were considered significant. These industries were flagged for further scrutiny. Regional manufacturing industries which did not meet any of these criteria were eliminated from the study.
- (iii) The value of production for the region's agricultural commodities which had a production value of more than \$1m was obtained from the Agricultural Census and compared to Queensland exports, classified by Standard Industrial Trade Classification (SITC). Commodities which had a value of production that was 20% or more of the value of Queensland exports and/or Queensland value of production were flagged for further scrutiny. Commodities which were 15% or more of the total regional value of production for agriculture, were considered to be potentially significant and flagged for further investigation. Commodities which did not meet any of these criteria were eliminated from the study.
- (iv) For the mining, forestry and fishing ANZSIC classes identified in step (i) as having both regional production activity and State exports, employment size details were obtained from the ABS Business Register. Employment size was used as an indicator of the likelihood of the industry significantly contributing to State exports. Detailed data on the size or value of production, at a regional level, were not available from ABS economic statistics collections, so employment was the only available indicator of economic significance.
- (v) The industries and commodities selected during steps (i) through to (iv) were combined. These steps, produced for a region, a list of industries and commodities that were significant, both in terms of economic importance to the region, and in terms of potential significance to Queensland exports.

¹ The ANZSIC coding of export data is on an 'Industry of Origin' basis. These data are compiled, within the ABS, by classifying international merchandise trade data according to the industry most likely to have produced the traded items. This is undertaken by allocating Australian Harmonised Export Commodity Classification (AHECC) items to the ANZSIC industry which is considered likely to have ultimately produced the commodity. The allocation is sometimes necessarily arbitrary, for example, the export of live cattle, regardless of the breed, is allocated to the ANZSIC Class 0125 Beef Cattle Farming. In addition, any exported items that have confidentiality restrictions on the publication of value details are included in 'Other Industries'.

Industry of origin is quite a different concept from the standard industry basis on which most economic statistics are compiled and published. The standard method is to classify a business to an ANZSIC according to the predominant activities undertaken by the business. Hence, the comparison of exports data by industry with other ABS data by industry should not be considered to give accurate results. However, the comparison is used in the methodology (as detailed above) to identify possible export industries for further analysis.

SELECTION OF SIGNIFICANT
INDUSTRIES AND/OR
COMMODITIES WITHIN A
REGION *continued*

- (vi) External reports were obtained on the defined regions. The aim was to gauge what external agencies considered to be the main industries and commodities of the region, as well as obtaining any information in reference to exports from the region. The sources for external reports were universities, regional development boards, port authorities and local government. These reports were used to validate the selection of significant industries and commodities in step (v). If external reports featured other industries or commodities, then further analysis was done to verify or refute claims made in the external reports. If there was any doubt about including an industry or commodity, it was decided that it was preferable to include it.
- (vii) Once the list of commodities and industries had been compiled, it was examined to assess its reasonableness. If the selection process (detailed above) captured industries that were very small in value, the list was revised and some entries culled. The final list of industries and commodities was presented to the relevant regional development board for comment. After verification of the list from the regional development board the process of data estimation commenced.

GATHERING DATA FOR
SELECTED COMMODITIES
AND INDUSTRIES

After extensive research, it became evident that the estimation of exports by region of origin was not able to be done by the application of a single formula or process, for all commodities or industries. Each commodity and industry was unique and often had complex and unclear distribution channels. Qualitative and quantitative information about the various distribution channels from production to domestic sale or overseas export, was accumulated and analysed for patterns that would provide a basis on which to make estimates or track accurate data for exports, by region of origin.

Research was done by consulting numerous industry 'experts' including State and local government representatives, regional development boards and local field officers who had established relationships with the region's primary producers. This research revealed either defined pathways to various ports or seasonal or predictable patterns of product availability in different regions. Estimates for each commodity or industry utilised unique sets of facts. Accurate exports were available for some industries by region of origin, for example the mining industry, because they were highly regulated and export data had been recorded. In some cases, company annual reports were accessed to derive detail on sale activity. Domestic sales were often separated from transfers within the company and/or overseas exports.

Information gathered during the research phase was used in conjunction with ABS economic statistics to produce estimates of exports for each of the defined geographic areas. Chapters 4 to 6 provide details on how each of the industries or commodities for the Mackay, Bundaberg and Central Highlands Regions were estimated.

CHAPTER 3

UTILITY OF THE METHODOLOGY

UTILITY AND LIMITATIONS OF THE METHODOLOGY

The first stage of the methodology provided a consistent and comprehensive means of identifying significant industries and outputs in a region that potentially contributed to international exports. This stage was designed to narrow down the list of possible significant commodities/industries for which estimates of exports were made. While a commodity/industry may have been significant locally and/or within the State, in terms of proportion of turnover or production, it may not necessarily have been significant in terms of proportion of exports. Similarly, a commodity/industry may not have been as large as others in the region in general terms, but may have been exporting all of its product overseas. Therefore, the first stage of the methodology was both useful and important in terms of narrowing the scope of commodities/industries to those which were potentially significant exports. The combination of an objective approach to eliminating insignificant commodities and industries with local knowledge (via regional development boards) ensured that a representative list of commodities and industries was researched for each of the defined regions and estimates produced.

The usefulness of the estimates which were made for each of the commodities varied. Estimates for some commodity exports, e.g. sugar, and mineral exports were high quality. The production and sale of these commodities is highly regulated by either Commonwealth or State governments or cooperatives. The benefit of this regulation, in regard to the estimation of exports by region of origin, is that comprehensive data was available on the movement of the commodity from its source to the export point. The estimation of exports, for other commodities, relied on the combination of production data, local knowledge of the industry and its activities and export data for commodities originating from Queensland.

LIMITATIONS OF THE METHODOLOGY

The estimates in this information paper are strictly for merchandise that is transported from the region where the final stage of production occurs, to an ultimate final overseas destination. The produce may travel via markets, at or near any Australian port, but the product must remain in the same form, from its departure from the region of origin to leaving an Australian port. During the research phase of the project and through consultations with clients, it became evident that the term 'exports' was used fairly loosely in some industries. Some industry representatives would refer to anything shipped out of the region as an 'export' regardless of the intended destination or purpose for the commodity. Some of these commodities were to be used as inputs to other manufactured goods, e.g. fresh fruit sold to be canned. While producers in a defined region may sell their product to a manufacturer who further processes the product to export, this export will only be reflected as an export of the processed commodity in the region in which the manufacturer operates.

Non-availability of data	The absence of statistics or information recording the flow of a commodity from producer to exporter presented a challenge and made estimates for these commodities difficult to produce. Estimates were derived, for a number of commodities, by using broad export percentages (usually sourced from within the specific industry) applied to regional production figures. It may not be correct to assume that a region exports the same percentage of its production as does the State as a whole.
Estimation of exports for horticultural commodities	Estimates for horticultural commodities were derived from the comparison of annual production data, harvesting times for the region and monthly exports of the commodity (where the State of origin was identified as Queensland). This comparison was very useful for commodities where the harvesting time in the region did not match or did not have a large overlap with harvesting times for the same commodity in other Queensland regions. It was assumed that perishable produce which was exported during the defined region's harvesting period must have originated from the defined region and/or other Queensland regions with harvesting periods that overlapped. Where there was an overlap of harvesting periods, production data for the relevant regions were compared and proportions were calculated and applied to the export data, for the relevant months. These assumptions, coupled with local knowledge which indicated that the produce was sent to market with the intention of being exported, made it reasonable to use this information to estimate exports for the defined region. In the case where there was produce on the market that could have originated from more than one region, it was not possible to account for the discrimination or preference the export agent displayed in the choice of produce to export. This is a further limitation on the quality of the final estimates and it is not known to what degree discrimination affects the estimates where there is produce from more than one region available for export at the same time.
Estimation of exports for manufactured commodities	Export data for most manufactured commodities were either confidential or it was not possible to produce estimates. It became apparent that the only way to get data on the exports of manufactured goods from a region was to approach the manufacturers directly and request the information. Organisations such as DSD are able to overcome such problems by conducting their own survey of known producers and/or marketers of commodities from the region under study. It needs to be remembered that, if such surveys are carried out, the organisation carrying out the survey will be faced with similar confidentiality issues as the ABS, but the information from the survey would be available for use within the organisation. Where the manufacturer is a public company, data can sometimes be obtained from the company's annual report.

Geographical classifications	Available data may not always match the defined region under study. In this paper, the regions defined by clients did not always match with areas as defined by the Australian Standard Geographical Classification. There were instances in this project where data were available for geographic areas whose boundaries were not consistent with those of the defined region. Further, there is potential for adjoining defined regions to actually overlap, which could cause problems for confidentiality. Data could be consequentially derived for the region contained in the overlap.
Capital cities	While the methodology was not tested on a capital city region, research, completed for the three regions presented in this paper, indicates that it may not be possible to produce a reasonable set of estimates for such regions. The successful production of estimates for the three non-metropolitan regions defined and presented in Chapters 4 to 6, was largely based on the fact that the regions' major industries were involved in primary production or were closely connected to primary production. The diversity of the industrial base of a capital city demands a different approach to estimating exports by region of origin. International trade data by capital city port could be useful if data were filtered by State of origin. For example, exports for the port of Brisbane where the commodities have Queensland recorded as their State of origin, may be used as a proxy for Brisbane's exports. The weakness in using port data is that commodities are not always exported from the port closest to the region of origin. Distribution channels vary from commodity to commodity. Commodities are often transported large distances by road or rail, often crossing State boundaries, before export. Horticultural products are quite often exported from a capital city port in a State different from the State of origin.
Confidentiality	Confidentiality was often an obstacle to releasing information on export activity to the public, as in some cases there were only one or two producers/exporters in a region.

SUMMARY

The methodology succeeded in providing export estimates for defined regions where no existing data or estimates were available. The experimental estimates were provided to the appropriate Regional Development Boards for comment. The quality of the estimates was variable, depending on the commodity. The estimates were not derived from a sample of statistical units with a known and quantified statistical population, therefore a statistical measure of accuracy could not be calculated. The estimates were derived from information extracted from numerous reports and industry sources. A consistent approach to the estimation of all commodities was not achievable because of the complex nature of the distribution channels of the various commodities. This complexity demanded various approaches be applied to produce final estimates, for the range of commodities researched for the three defined regions (presented in Chapters 4 to 6).

SUMMARY *continued*

The research and development of a methodology to estimate exports for a variety of commodities was very labour intensive. This will make the production of estimates in the future a costly exercise. Repeating the exercise for the same regions would still require research to verify that the assumptions made for the years 1994–95 to 1996–97 were still applicable.

The methodology should only be used in the absence of accurate exports data for region of origin. Estimates produced from the application of the methodology should be used with care and as indicators rather than as an accurate account of export activity. They would be best utilised in conjunction with ABS merchandise export statistics for State of origin and national estimates. When combined with knowledge of the local economy and knowledge of the industries within a region, the estimates would be useful for planning purposes and policy development.

CHAPTER 4

MACKAY REGION

The Mackay Region, as defined by the DSD, was the Mackay Statistical Division plus Bowen Shire. Applying the methodology, detailed in Chapter 1, the main exported commodities/industries identified were sugar and black coal, beef/meat processing, tomatoes, mangoes, rock melons, lifting and material handling equipment manufacturing, organic industrial chemical manufacturing and fishing.

The data that were estimated for the Mackay Region are as follows:

4.1

MACKAY REGION EXPORTS BY SELECTED COMMODITIES — EXPERIMENTAL ESTIMATES

Commodity	Units	1994-95		1995-96		1996-97	
		no.	\$m	no.	\$m	no.	\$m
Coal	'000 tonnes	44 022.1	2 308.6	43 248.1	2 508.9	46 595.2	2 673.1
Raw sugar	'000 tonnes	1 317.0	526.5	910.5	342.3	924.9	341.6
Refined sugar	'000 tonnes	109.5	49.2	109.5	56.5	136.0	63.8
Molasses	'000 tonnes	50.5	3.2	11.0	0.9	122.2	7.6
Ethanol	m litres alcohol	26.4	12.0	19.0	10.1	28.0	14.1
Tomatoes	tonnes	3 233.7	5.0	2 854.3	5.1	3 082.9	5.4
Capsicums	tonnes	43.8	0.1	322.1	1.0	349.4	1.0
Melons other than water melons	tonnes	350.5	0.5	485.5	0.7	189.2	0.3
Mangoes	tonnes	129.9	0.4	n.p.	n.p.	160.8	0.4
Live fish — trout	'000	35.4	1.8	72.6	3.9	n.a.	n.a.
Live fish — trout	'000 kgs	n.a.	n.a.	n.a.	n.a.	151.8	5.2
Tallow	'000 tonnes	10.6	6.6	11.9	7.4	8.6	4.8
Frozen beef	'000 tonnes	0.6	1.4	1.4	2.6	—	—

The process for estimating each commodity for the Mackay Region is detailed below. It was not possible to estimate exports for the Lifting and material handling equipment manufacturing industry as no relevant data sources were found. Similarly, only a small range of fish commodities could be estimated as relevant information covering the whole Mackay fishing industry could not be obtained.

COAL

The coal data were obtained from the Queensland Department of Mines and Energy. The mining and exporting of coal is highly regulated, as is mining in general. For this reason, export data on most mined commodities are available at a regional level, providing they are not confidential. As mining companies pay a different royalty for commodities mined for domestic consumption compared to that mined for export, there is an incentive for the State government to ensure data are accurate.

SUGAR INDUSTRY PRODUCTS

ABS export data for the Port of Mackay¹ were used to produce the raw sugar, refined sugar and molasses export figures. Molasses was included because it is a by-product of raw sugar processing. The selection of the manufacturing industry ANZSIC 2534 — Organic Industrial Chemical Manufacturing lead to the identification of the commodity ethanol. Ethanol was produced in the region and is closely associated with the sugar industry. The ethanol export estimates were derived from the Queensland State of Origin figures from the ABS export data.

The confidence in the regional estimates for sugar and related by-products is based on the regulation of the industry. The bulk sugar terminals have been strategically located on the coast near where the production actually occurs and there is considerable capital investment in them and the ports that service them. For this reason, the relationships that exist from producers through to the point of final transport are not likely to change. Port data will continue to be a good measure of regional exports.

FRUIT AND VEGETABLES

The Queensland Department of Primary Industries (DPI) was the main source of information on fruit and vegetables. The Extension Officer at the DPI Bowen Research Centre provided information regarding the level of contribution to State exports for each of the selected horticultural commodities. As a result, capsicums were added to the study, as he believed they were a developing industry, especially in regard to exports.

Estimates for these commodities have been compiled from ABS State of Origin exports (these included Queensland exports from all Australian ports). The data were disaggregated to regions by using a combination of annual production for each of the growing regions obtained from the agricultural census, and the estimated proportion of production occurring during different times of the year, supplied by DPI.

Production/export periods for Mackay Region produce were advised by DPI extension officers. Melons from the Mackay Region are exported during the months of April to October. Using annual production data from the Agricultural Census and the harvesting periods as advised by DPI, the estimated production for the period April to October for each of the growing regions was calculated, and Mackay Region proportions calculated. These proportions were applied to the Queensland State of Origin ABS export data for April to October to estimate Mackay Region exports for melons.

¹ There has been some miscoding of exports to the coal ports of Hay Point and Abbot Point. For this information paper, it has been assumed that exports of sugar industry products, tallow and frozen beef, recorded as being from Hay Point and Abbot Point, were actually from the ports of Mackay/Bowen.

FRUIT AND VEGETABLES
continued

The tomato and capsicum growing seasons are the same. Tomatoes and capsicums are in the same family, have the same pests and need the same climatic conditions. Produce from the Mackay Region is sent to market and exported during the months of June to October. A similar method to that used for melons was used to estimate exports of tomatoes and capsicums from the Mackay Region.

The harvest period for mangoes, in this region, is November to December. Most of the mangoes produced in northern Queensland are from north of the Mackay Region. The mango exports that originated from Bowen, Thuringowa and Mareeba and the rest of the Atherton Tablelands were difficult to identify separately because the growing seasons almost completely overlap. It was assumed that all regions of Queensland exported the same proportion of their crop. Queensland State of Origin ABS export data for mangoes were prorated among regions based on production data from the agricultural census.

The strength of the estimates for the horticultural commodities lies in the comprehensive production data available from the Agricultural Census. Annual production data enabled the accurate assessment of where certain commodities were produced and in what proportions in relation to each other. This, coupled with information obtained from DPI, enabled estimates of exports to be made. The quality of these estimates is largely dependent on the accuracy of the information and advice provided by DPI.

MEAT AND TALLOW

The Australian Quarantine Inspection Service (AQIS) is responsible for issuing export licences to abattoirs. The abattoirs report details of their exporting activities because meat is a 'prescribed good'. The origin of these meat products is able to be traced in the event that the meat does not pass AQIS's strict quarantine procedures. AQIS's systems would allow for extraction of data for small regional areas but the data are confidential.

Queensland DPI was the source of information about the beef/meat industry in the Mackay Region. Data in table 4.1 for Frozen beef and tallow are the ABS exports from the Port of Mackay¹. To verify information received from DPI, these data were compared with ABS export data for all meat products by port of exit. The location of the abattoirs was verified by extracting business location data by local government area from the ABS Business Register. There was a strong association between the location of the abattoirs and the ports of exit for meat products. Chilled and fresh produce is exported by air, while frozen meat generally leaves from the sea ports closest to the abattoirs. ABS export data indicated that only frozen carcasses had been exported from the Mackay port, and meat exports from the port had declined. In 1996–97, there were no meat exports. The abattoir in Mackay closed down late in 1997.

MEAT AND TALLOW
continued

The abattoir in Bowen also closed during 1997. It is likely that produce from the Bowen abattoir was exported from the Townsville port. It was not possible to determine how much of the meat exported through Townsville should be attributed to the Bowen abattoir, in the Mackay Region. Meat exports going through Townsville included meat products produced by the abattoirs in the Townsville Region. The estimates made for meat products produced in the Mackay Region are likely to have been under-estimated, as it was not possible to quantify exports from the Bowen abattoir.

Meat was a significant industry, for the Mackay Region, in past years. Recent closure of the abattoirs has made it unimportant, in the context of this analysis. Although beef cattle are still farmed in the area, they are moved to another region to enter various channels to final distribution. Some go to feedlots for 'fattening' before being moved again and some are taken for slaughtering. Now that there is no abattoir in the Mackay Region, there will no longer be processed meat exports that can be attributed to this region.

FISHING

Exports of Queensland seafood in 1996–97 were significant. The following table illustrates the significance of various categories of seafood exports.

4.2 QUEENSLAND SEAFOOD EXPORTS — 1996–97

	\$m
Live fish	17.8
Fresh or chilled fish, excl. fillets & other fresh meat	9.5
Frozen fish, excl. fillets & other fresh meat	19.3
Fish fillets & other fish meat, fresh, chilled or frozen	5.0
Other fish	5.5
Crustaceans	146.4
Molluscs	21.6
Total	225.0

Source: *International Trade, ABS.*

Information available on the commodity flows, for fish, were complex and incomplete. As a result of this, only estimates on live trout were able to be made. Information on the fishing industry and fish processing are detailed below. The estimation of seafood exports was done on the basis of the last stage of processing.

Fishing Industry	<p>The Queensland Fisheries Management Authority (QFMA) was consulted and provided production data for regions. The production data were derived by obtaining catch data from QFMA, categorised to statistical division. This was done by using longitude and latitude coordinates corresponding to the waters bordering the coastal statistical divisions in Queensland. The Mackay Region accounted for 43.8% of coral trout caught in Queensland waters, 46.1% of red throat emperor, 15.5% of total finfish, 28.9% of bugs, 27.7% of banana prawns, 20.9% of mud crabs, 4.8% of scallops and 10.6% of prawns in total. It must be noted that the Australian Fish Management Authority (AFMA) monitors prawn catches in Torres Strait and in the Gulf of Carpentaria so that data for prawns obtained from QFMA are only a component of what might be considered Queensland production.</p> <p>While fishing was a significant industry in the waters off the Mackay Region, the proportion of fish brought in to be traded in the local economy is not known. Fisherman sometimes travel a long way from their base to do their fishing. Also, there is not a direct relationship between what is caught in a State's or Territory's waters and what is considered to be exports, sourced from the State or Territory, e.g. gulf prawns caught in Northern Territory waters by Karumba based boats would be Queensland exports. This makes it difficult to quantify production of exports from a particular State or Territory.</p>
Processed seafood	<p>The Manufacturing Census indicated the Queensland turnover for seafood processing in 1993–94 was \$47m, in 1994–95 it was \$60.4m and in 1995–96, \$70.8m. Examination of the International Trade data indicated that in 1996–97, 68.4% of processed fish (ANZSIC 2173) left the Port of Brisbane, 17.6% from the Brisbane airport and 7.5% from Cairns airport. Exports from these three exit points accounted for 93.6% of Queensland processed seafood exports. The location of seafood processing factories (ANZSIC 2173) was obtained from the ABS Business Register. Most of the factories were found to be in Brisbane, Cairns and Gladstone.</p> <p>While Queensland seafood turnover from the manufacturing industry could be quantified, the location of the factories identified and the exports from port of exit quantified, there was no method available to quantify processed seafood exports, from the Mackay Region.</p>
Live fish	<p>Live fish exports leave from international airports, mostly from Cairns and these fish are caught in local waters, with the exception of some fish caught off Bowen which are transferred to Cairns by road.</p> <p>The following table illustrates the significance of various categories of live fish exports from the Cairns airport compared to total Queensland live fish exports for the financial year 1996–97.</p>

4.3

CAIRNS AND QUEENSLAND LIVE FISH EXPORTS — 1996–97

	Cairns	Qld
	\$m	\$m
Live ornamental fish	3.6	5.0
Live trout	10.1	10.3
Live eels	0.7	2.0
Live fish excl. trout and eels	0.1	0.3
Total	14.5	17.5

Source: *International Trade, ABS.*

Live fish *continued*

Of Queensland trout exports, 98.3% were exported from Cairns airport. Examination of QFMA catch data indicates that in Queensland, 14.5% of trout were caught in water south of the Mackay Region. The Mackay Region accounted for 51.2% of trout caught in waters north of, and including, Mackay. Therefore, the best estimate that could be achieved for exports of live coral trout was 51.2% of trout exports from the Cairns airport.

The strength of the estimates of exports of live trout is the distribution of the catch along the coast, Mackay's proximity to the Cairns airport and the fact that separate data for trout exports can be obtained from the international trade data. It must be noted that the estimate is an upper limit of exports, the true figure could be lower.

Estimates for total live fish exports cannot be derived with any degree of confidence. This is mainly because the Australian Harmonised Export Commodity Classification (AHECC) is not sufficiently detailed to allow matching of catch data obtained from QFMA. Trout is a separate commodity in both AHECC and in the QFMA data and thus estimates could be made. The estimates of live trout exports are heavily reliant on production data and there are no market data to support them.

ABS PORTS EXPORT DATA
FOR COMPARISON

Readers may wish to compare values in table 4.1 with port data. Table 4.4 shows total exports values, for all commodities, for the ports in the Mackay Region. The ports are Abbot Point, Bowen, Mackay and Hay Point. Figures for sugar industry products, tallow and frozen beef are the same in both tables as the best estimate of Mackay Region exports for those commodities were exports from the region's ports.

4.4 EXPORTS FROM PORTS IN THE MACKAY REGION

<i>Commodity</i>	1995–96	1996–97	1997–97
	\$m	\$m	\$m
Coal	2 733.4	2 960.2	3 029.7
Raw cane sugar, in bulk	526.5	342.3	341.6
Cane molasses	3.2	1.1	7.6
Refined cane sugar	49.2	56.5	63.8
Ethanol	12.0	10.1	14.1
Tallow	6.6	7.4	4.8
Frozen beef	1.4	2.6	—
Other commodities	8.4	32.5	29.8

Source: ABS Trade data.

ABS PORTS EXPORT DATA Of other commodities, grain sorghum accounts for \$4.5m for 1994–95,
FOR COMPARISON *continued* \$20.7m for 1995–96 and \$14.7m for 1996–97.

CHAPTER 5

CENTRAL HIGHLANDS REGION

The Central Highlands Region consists of the shires of Emerald, Peak Downs, Duaringa, Bauhinia, Jericho and Belyando. Applying the methodology detailed in Chapter 1, the main commodities/industries identified were black coal, sorghum, cotton, sunflower, cattle and explosives manufacturing. While these commodities were identified as significant in terms of production in this region and potential for contributing to exports from this region, investigations determined that only some of these commodities reached export. Details of the investigations are recorded after the table of experimental estimates below.

5.1

CENTRAL HIGHLANDS REGION EXPORTS BY SELECTED COMMODITIES — EXPERIMENTAL ESTIMATES

Commodity	Units	1994–95		1995–96		1996–97	
		no.	\$m	no.	\$m	no.	\$m
Coal	'000 tonnes	55 147.6	2 971.8	53 455.4	3 161.0	56 495.1	3 333.6
Sorghum	'000 tonnes	75.1	12.8	143.8	34.0	104.7	24.7
Cotton	'000 tonnes	70.0	53.3	56.6	43.2	63.5	41.8

COAL

The Central Highlands is a very rich coal producing region. Once mined, the coal is transported by rail to port. Both Gladstone and Mackay ports receive coal from the Central Highlands. Data on coal exports were obtained from the Queensland Department of Mines and Energy. The accuracy of these data is discussed in Chapter 4, Mackay Region.

SORGHUM

Consultations with the Queensland Graingrowers Association and Grainco indicated that the majority of the sorghum produced in this region is destined for export. Approximately 98% of the grain grown in this region, for export, is transported by rail to a port. Data kept by QRail were both a useful and reliable source from which estimates of exports could be derived. Consultations indicated there was a tendency to stockpile grain if the market was depressed, sometimes for periods of up to 6 months. However, grain would not be held over from season to season. Sorghum from the Central Highlands is predominantly exported through Gladstone, with a small amount leaving from Mackay.

Export quantity estimates for the Central Highlands Region were obtained by multiplying the QRail figures by a factor of 1.02. To obtain a value of the estimated exports, an average price per tonne was derived based on the total value and quantity of Queensland sorghum exports, and then applied to the quantity estimated for export.

COTTON

Deregulation of the cotton industry has made it difficult to obtain definitive export figures for the Central Highlands Region. Examination of international trade data indicated that Queensland cotton was exported through the port of Brisbane with few exceptions. Consultations with the Raw Cotton Marketing Advisory Committee revealed that no information regarding the region of origin of the cotton is recorded. Discussions with industry suggested 92 to 95% of the cotton produced in Australia is exported. Investigation of ABS Agriculture and International Merchandise Trade publications confirm the high export to production ratio of cotton.

Estimates for cotton exports have been derived by multiplying the Agricultural Census cotton production data for the Central Highlands Region by a factor of 0.92.

SUNFLOWER

The majority of sunflower is transported to port via rail. Sunflower from the Central Highlands Region leaves through either Gladstone or Mackay port. The State's other major growing area, the Darling Downs, exports its grain through the Brisbane port. Drought has had an effect on sunflower exports, with very little being exported over the three years 1994–95 to 1996–97. Examination of ABS international trade data from Gladstone and Mackay, and QRail freight data confirms the absence of sunflower exports over this period.

CATTLE

Whilst the Central Highlands is a major beef cattle producer, the absence of an abattoir of sizeable proportion meant that there were no direct international exports of beef from the region. There are several major abattoirs in the Rockhampton area that process beef from the Central Highlands. Any meat that is exported from Central Highland's cattle slaughtered in Rockhampton, would be attributable to the Rockhampton area.

Although beef cattle was a major industry in the Central Highlands Region during the three years 1994–95 to 1996–97, the region is not the location of the last processing point for the commodity. Estimates of exports were not produced for the Central Highlands Region.

EXPLOSIVES MANUFACTURING

Analysis of the Manufacturing Census data indicated that explosives manufacturing was a significant industry for the region. However, investigations revealed that all of the commodity was consumed domestically. Explosives manufacturing is closely linked with the region's mining industry, with the majority of locations attached to mine sites. None of the explosives manufactured in the Central Highlands Region were exported.

CHAPTER 6

BUNDABERG REGION

The Bundaberg Region consists of Bundaberg City and the shires of Burnett, Miriam Vale, Kolan, Perry, Monto, Eidsvold, Mundubbera, Gayndah, Biggenden and Isis. Applying the methodology, detailed in Chapter 2, the main commodities/industries identified were sugar, asparagus, tomatoes, capsicum, cucumber, rockmelons, oranges, mandarins, lemons and limes, macadamia nuts, grapes, mangoes, lychees, avocados, logging, marine fishing, spirit manufacturing, agricultural machinery, food processing machinery and aircraft manufacturing.

The data that was estimated for the Bundaberg Region are as follows:

6.1

BUNDABERG REGION EXPORTS BY SELECTED COMMODITIES — EXPERIMENTAL ESTIMATES

Commodity	Units	1994–95		1995–96		1996–97	
		no.	\$m	no.	\$m	no.	\$m
Raw sugar	'000 tonnes	311.1	118.7	280.1	117.8	507.1	175.9
Molasses	'000 tonnes	—	—	—	—	12.2	0.9
Asparagus	tonnes	124.0	0.8	220.0	1.4	181.0	1.1
Tomatoes	tonnes	3 262.0	3.3	2 762.0	3.3	2 178.0	2.4
Capsicum	tonnes	392.0	0.5	450.0	0.6	488.0	0.6
Rock melons	tonnes	1 784.0	1.3	1 759.0	1.2	1 581.0	1.1
Oranges	tonnes	1 479.0	0.8	1 247.0	0.9	1 266.0	0.9
Mandarins	tonnes	3 821.0	5.1	4 075.0	4.8	4 116.0	5.2
Lemons & limes	tonnes	276.0	0.2	228.0	0.2	282.0	0.3
Grapes	tonnes	26.0	—	19.0	—	21.0	—
Mangoes	tonnes	125.0	0.3	175.0	0.4	134.0	0.3
Lychees	tonnes	n.a.	n.a.	n.a.	n.a.	13.0	—
Avocados	tonnes	12.0	—	14.0	—	16.0	—
Wood products(a)	—	(b)	15.0	(b)	25.1	(b)	25.7
Scallops(a)	'000 kgs	376.6	10.0	443.8	11.4	198.8	5.7
Spanner crabs(a)	'000 kgs	1 407.0	10.7	1 702.8	14.5	1 329.7	11.1
Agricultural machinery	—	..	31.7	..	n.a.	..	n.a.

(a) Figures relate to the whole Wide Bay–Burnett Statistical Division.

(b) Wood Products commodity is an aggregation of SITC codes 246, 247 and 248 containing “Wood in chips or particles and wood waste”; “Wood in the rough or roughly squared”; and “Wood, simply worked, and railway sleepers of wood”. These different SITC codes use conflicting measures of quantity, namely tonnes and cubic metres. Because of this, the quantity of Wood Products cannot be aggregated to a single publishable quantity.

SUGAR INDUSTRY PRODUCTS

The sugar industry is the major industry in the Bundaberg Region, accounting for approximately 50% of the region’s manufacturing turnover. The bulk raw sugar terminal at Bundaberg receives sugar from the mills in the region. All bulk sugar exports leave from the port located closest to the bulk sugar terminal. ABS export data for the Port of Bundaberg were used to produce the raw sugar and molasses exports figures.

The absence of exports of molasses, for the years 1994–95 and 1995–96, was investigated. During the drought period, the government had encouraged manufacturers to supply primary producers with molasses rather than to export it.

SPIRIT MANUFACTURING

Spirit manufacturing was included as a significant industry for the Bundaberg Region because of the volume of production. Investigations revealed that there was only one producer in the region. Confidentiality restrictions prohibit the publication of the estimates.

FRUIT AND VEGETABLES

Production quantities and values for the Bundaberg Region were available from the Agricultural Census. DPI Crop Profiles provided estimates of the percentages of Queensland production that is exported for each crop. For this study, the Queensland percentage was applied to the Agricultural Census production data, for the Bundaberg Region. It was assumed that the same proportion of each region's crop was exported. Note that, prior to 1996–97, separate data on lychees was not available from the Agricultural Census.

Due to the absence of information kept by the DPI and horticultural industry groups on cucumbers and macadamia nuts, no estimates on exports from the Bundaberg Region were able to be produced for these commodities.

LOGGING

Queensland DPI was the main source of information for timber exports. Logging is a regulated industry, the issuing of a licence commits a logger to report information, via the Forestry data collection, on logging activity. DPI compiles this data to produce tables by geographic region. The Australian Standard Geographic Classification is used and data are compiled at the statistical division level.

Data from DPI indicating the number of cubic metres of processed timber produced by each of Queensland's statistical divisions, was used with international trade data on timber exports, where the State of origin was Queensland. Wide Bay-Burnett's proportion of processed timber was calculated, as a percentage of the total timber processed in Queensland, for each of the years 1994–95 to 1996–97. This proportion was applied to the total Queensland timber exports for each of the financial years, to derive an estimate of exports for timber.

The geographic area that this estimate represents is larger than the defined Bundaberg Region. The absence of production data on a smaller geographic level made estimating for regions smaller than statistical division impossible. The Bundaberg Region is approximately half the size of the Wide Bay-Burnett Statistical Division.

FISHING

Research previously conducted on the Mackay Region revealed that information available on the Queensland commodity flows for fish were complex and incomplete. The only estimates that were able to be made for the Bundaberg Region were for scallops and spanner crabs.

QFMA production data for the Wide Bay-Burnett Region were analysed and incorporated into the calculations to produce export estimates. As for the logging industry, the export estimates for fish represent a larger area than the defined region of Bundaberg. In this instance, the production or catch data available were for the waters bordering the Wide Bay-Burnett Statistical Division. The method of compiling data to a geographic level is discussed in the Fishing section of the chapter on the Mackay Region.

Examination of the QFMA data revealed that spanner crabs caught in the Wide Bay-Burnett waters, accounted for 55.2%, 65.4% and 59.9% of spanner crabs caught in total Queensland waters, in the years 1994–95 to 1996–97, respectively. Scallops caught in the Wide Bay-Burnett waters accounted for 31.2%, 39.5% and 32.1% caught in Queensland waters in the years 1994–95 to 1996–97 respectively.

Estimates of scallops exported from the Wide Bay-Burnett Region were derived by applying the region's proportion of the total Queensland catch to the total Queensland scallops export data, extracted from the international trade collection. Spanner crab exports were more difficult to quantify. It was not possible to obtain data on the export of spanner crabs from the international trade collection. Crabs, regardless of species, are aggregated into one category.

To estimate what proportion of the total crab exports could be attributable to spanner crabs, catch data from QFMA was compiled on crab species. See table below:

6.2 CRAB SPECIES' PROPORTION OF PRODUCTION — QUEENSLAND

	1994–95	1995–96	1996–97
	%	%	%
Mud crabs	10.3	12.2	12.8
Blue swimmer crabs	3.2	3.9	4.1
Spanner crabs	80.3	77.9	78.0
Other	6.1	6.0	5.0
Total	100.0	100.0	100.0

Source: QFMA.

FISHING *continued*

The estimates of exports of spanner crabs from the Wide Bay-Burnett Statistical Division were calculated in two steps. First, an estimate of spanner crab exports for Queensland was calculated using the proportions for spanner crabs in the table above and applying them to State of Origin data for total crab exports from the international trade collection, for each financial year. This calculation was done for both quantity and value of export data items. Then, to derive how much of the estimated Queensland spanner crab exports should be attributed to the Wide Bay-Burnett Statistical Division, the proportions of spanner crabs caught in the waters off the Wide Bay-Burnett Region (discussed above), for each of the financial years, was applied to the data estimated for spanner crab exports for Queensland.

The estimation process used for the scallops and spanner crabs assumes that exports were proportional to production for regions in Queensland. It also assumes that values per kilogram of scallops are much the same among regions. A similar assumption applies for spanner crabs.

AGRICULTURAL MACHINERY
MANUFACTURING

There were 15 locations in the Bundaberg Region engaged in the manufacture of agricultural machinery. From publicly available sources, it was possible to identify two that were involved in exporting their products. One of these companies published export data in its 1994–95 annual report. Data for the following years were not available due to the sale of the company which resulted in it no longer being publicly listed. No data were available for the other agricultural machinery manufacturers in the region.

OTHER MANUFACTURING

Food Processing Machinery, Aircraft and Clay Brick manufacturing were all selected as industries that potentially may be contributing to exports from the Bundaberg Region. Investigations did not reveal any source of data that could be published. Confidentiality and/or lack of information, resulted in no estimates being made for the region.

ABS PORT EXPORTS DATA
FOR COMPARISON

The Bundaberg Region has only one port. Exports data for all commodities were extracted from the ABS International Trade collection for the Bundaberg port.

6.3 EXPORTS FROM THE PORT OF BUNDABERG

	1994–95	1995–96	1996–97
<i>Commodity</i>	<i>\$m</i>	<i>\$m</i>	<i>\$m</i>
Raw cane sugar, in bulk	118.7	117.8	175.9
Cane molasses	n.a.	n.a.	0.9
Harvesting machinery nes	n.a.	3.0	n.a.
Timber	n.a.	1.4	1.5
Other commodities	0.8	2.3	0.2

Source: *International Trade, ABS.*

ABS PORT EXPORTS DATA
FOR COMPARISON *continued*

Readers may wish to compare values in table 6.3 with Bundaberg port data. Data for sugar and molasses are the same in both tables, as exports from the Bundaberg port was the best estimate for these commodities, for the Bundaberg Region.

CHAPTER 7

CONCLUSION

In response to user demand, the ABS has explored options for quantifying exports data by region of origin. It is understood that region of origin exports data would enable governments, at all levels, to better target their policies that are designed to stimulate export activity. Reliable data would also enable monitoring export activity over time and comparisons between regions could be made.

Investigations into Customs administrative data did not reveal any additional information that would assist in providing a method to estimate region of origin for international exports. Imposing an administrative system, which would result in complete and accurate tracking of commodities from region of origin to a point of export, would be too great a burden on business and would be costly to implement.

Different approaches to estimating exports data by region of origin have been investigated. Some industries were found to be regulated. In such industries, for example, coal mining, this regulation resulted in statistical data being compiled and accurate export data, by region of origin, could be obtained. Other industries were very competitive and the distribution channels varied considerably. The complexity of the distribution channels demanded different methods be developed to estimate exports. Assumptions that were made affected the reliability of these estimates, which varies from commodity to commodity.

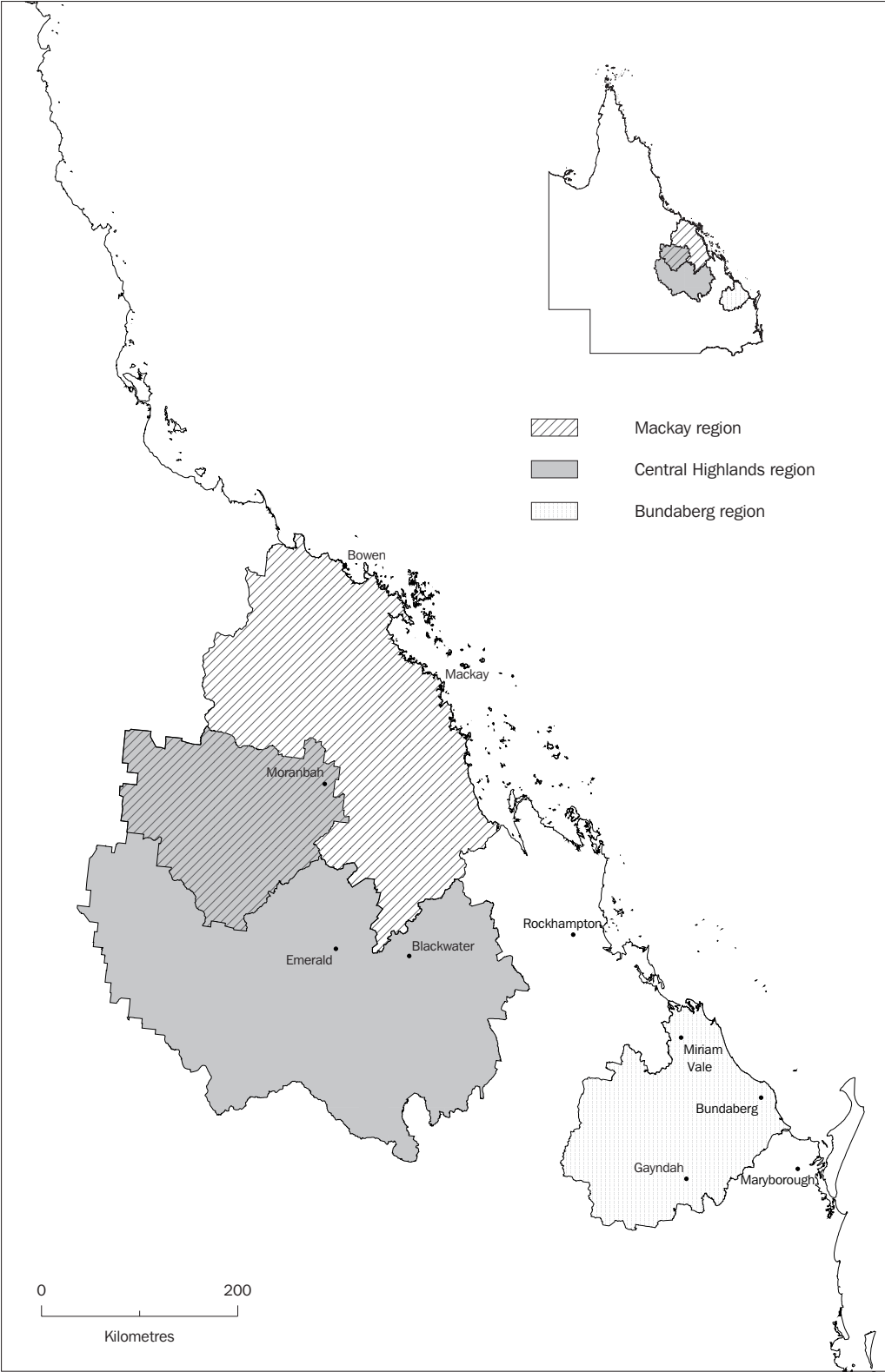
The methodology has been tested on three Queensland regions. These regions were chosen to ensure variability in the characteristics of the regional economies so that any deficiencies in the methodology could be revealed. The main weakness found was a simple lack of reliable information or data on the movement of a product from the point of origin to final consumption. Comparisons of the estimates produced by employing this methodology with international trade data by port, revealed that port data can, in a few cases, be used as an indicator. However, for many commodities produce does not always leave the country from the port closest to the region of production. Port data can represent exports from a number of regions, not just the region within close proximity to the port.

Without utilising the methodology as described in this paper, data for exports by region of origin are not available. Therefore, the methodology serves a useful purpose and fills an identified gap in the currently available range of economic statistics. Estimates produced from the application of the methodology should only be used in the absence of accurate exports data for region of origin. Responsible use of the estimates would result in data being used as indicators rather than as an accurate account of export activity.

Estimates of regional merchandise exports, for client defined regions in Australia, could be produced, on a user pays basis, as part of the ABS's consultancy service using this methodology with the limitations noted. It is doubtful if estimates could be produced for capital city regions because of their diverse industrial bases and the lack of information on a number of their industries.

APPENDIX 1

MACKAY, CENTRAL HIGHLANDS AND BUNDABERG REGIONS



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